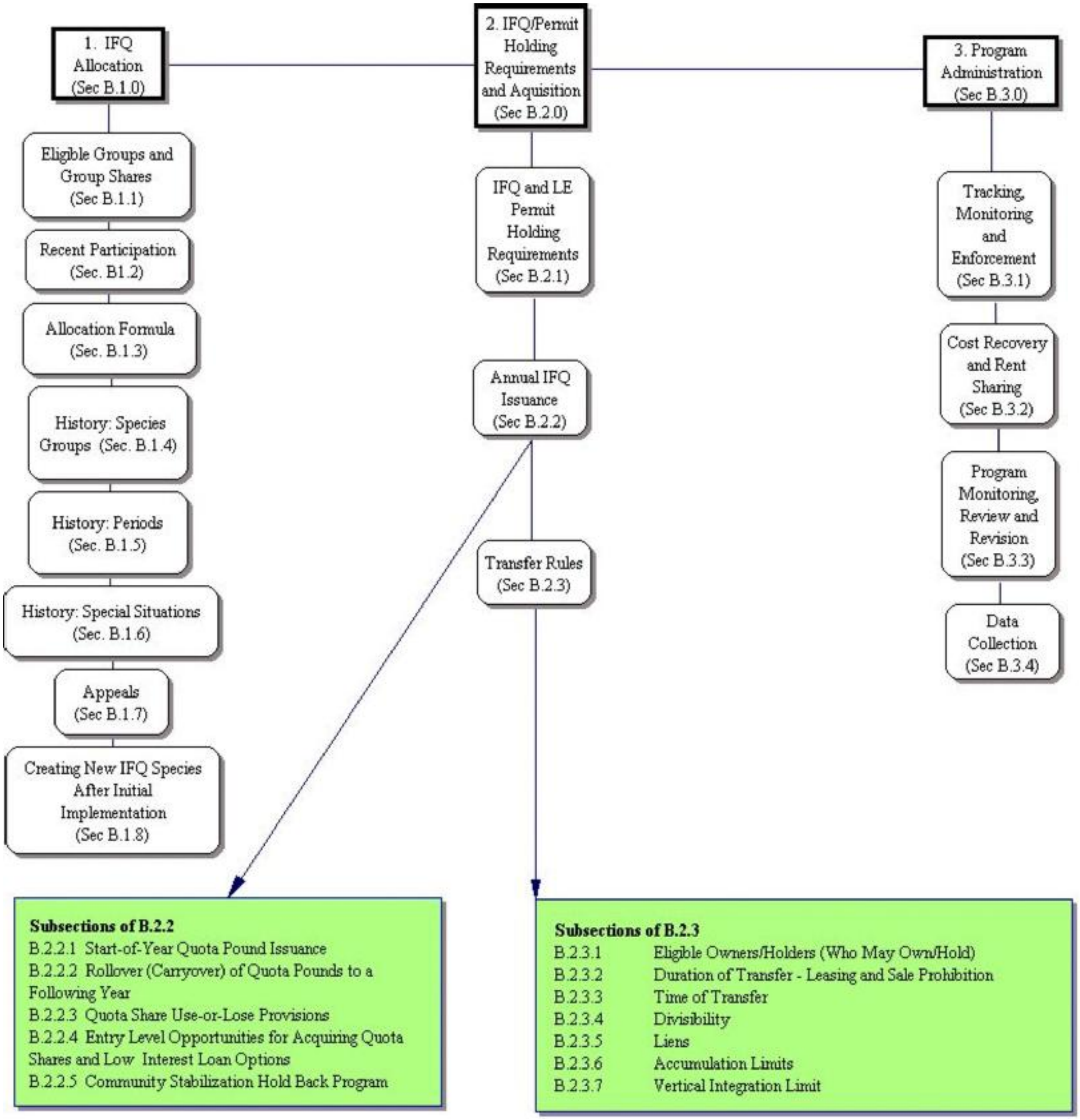
IFQ Program Primer

The design options covered in Appendix B of the scoping document are represented in the following diagram. Three pages of text follow providing a narrative description of the draft IFQ program and design options **(choice points are indicated in bold)**. This narrative is provided as an orientation on how the design options fit together to create an IFQ program.



IFQ Program Design Elements (from Appendix B)
General Description of the IFQ Program

Appendix B, Section B.1.0, IFQ Allocation

Section B.1.1, Eligible Groups and Group Shares

IFQ would be allocated to the following groups in the following proportions: . . . **[e.g., groundfish trawl permit holders (xx%), groundfish trawl vessel owners (xx%), processors (xx%)**]. Processors would be defined as . . . [FMP definition/alternative definition].

Section B.1.2, Recent Participation

In order to qualify for an initial allocation the applicant would . . . **[have to/not have to] . . .** demonstrate recent participation. If recent participation is required, the recent participation requirement for each group would be as follows: make/receive at least . . . **[X deliveries – number of deliveries to be determined]** . . . of trawl caught groundfish from . . . **[1998-2003 or 2000-2003]**.

Section B.1.3, Allocation Formula

Those eligible for an initial allocation will be allocated quota shares based on the following formula:
[0-100%] of the quota share issued for the group would be issued based on history of catch/landings/processing;
[0-100%] of the quota share issued for the group would be issued based on equal sharing;
[0-100%] of the quota share issued for the group would be allocated through an auction.
(Formula's may vary among groups.)

Section B.1.4 and Section B.1.5, History: Species Groups and Periods

For IFQ allocated based on delivery history, the applicant's . . . **[total groundfish; total for each IFQ species or species group; or total for each species, species group, or proxy species]** . . . **[caught; landed; or processed]** (Section B.1.4) . . . will be calculated for . . **[1994-2003, 1994-1999, 2000-2003, 1998-2003, or 1999-2004]** . . . , less . . . **[0, 1, 2, or 3]** . . . of the applicant's worst years. The calculation will be based on the applicant's . . . **[pounds, percent of total]** . . . for the relevant species/species group in each year. (Section B.1.5)

Section B.1.6, History: Special Situations

Permit history for combined permits would include the history . . . **[for all the permits that have been combined; for the permit originally associated with the permit number of the combined permit]**. Illegal deliveries would not count toward history. Catch in excess of trip limits, as authorized under an EFP and compensation fish . . . **[would/would not]** . . . count toward history.

Section B.1.7, Appeals

There would be no appeals process on the initial issuance of IFQ, other than that provided under the Administrative Procedures Act. Any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions.

Section B.1.8, Creating New IFQ Species after Initial Implementation

When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided. If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.

Appendix B, Section B.2.0, IFQ/Permit Holding Requirements and Acquisition

Section B.2.1, IFQ and LE Permit Holding Requirements

In order to be used, IFQ representing quota pounds would need to be registered for use with a particular vessel (deposited to the vessel's quota pound account). Only LE trawl vessels would be allowed to participate in the IFQ fishery. A vessel would need to acquire quota pounds to cover a particular landing. . . **[by the time of the landing, no more than 24 hours after the landing, no more than 30 days after the landing].** A vessel . . . **[would not need to hold quota pounds; would need to hold at least xxx quota pounds]** . . . before leaving port on a fishing trip. An LE permit may not be transferred from any vessel for which there is deficit in the vessel's quota pound account for any species or species group (i.e., if the vessel has caught IFQ species not covered by quota pounds).

Subsection B.2.2.1, Start-of-Year Quota Pound Issuance and Subsection B.2.2.2, Rollover (Carryover) of Quota Pounds to a Following Year

Each year quota pounds would be issued to quota share holders based on the amounts of quota shares they hold (Subsection B.2.2.1). For species that are not overfished, a vessel . . . **[would/would not]**. . . be able to roll-over . . . **[up to . . . 5%, 10%, 20%, 30% . . . of its]** . . . unused quota pounds or cover an overage . . . **[of . . . 5%, 10%, 20%, 30%]** . . . with quota pounds from the following year. For overfished species, . . . **[a full; a partial; no]** . . . rollover allowance would be provided (Subsection B.2.2.2).

Subsection B.2.2.3, Quota Share Use-or-Lose Provisions

Quota share use would be monitored as part of the TIQ program review process. **[Quota shares not used in at least one of three years would be revoked . . . OR . . . During program review processes, if it is determined that significant portions of the available quotas shares are not being used (catch is not being recorded against quota pounds issued for those shares), use-or-lose or other provisions will be considered to encourage more complete utilization]**.

Subsection B.2.2.4, Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options

There are many program features that would facilitate new entry and participation by small fishing operations (e.g., highly divisible access privileges as compared to limited entry licenses). Additional provisions for such purposes could include . . . **[none; a low interest loan program; provisions for new entrants to qualify for revoked shares being reissued (the latter two options are not mutually exclusive)]**.

Subsection B.2.2.5, Community Stabilization Quota

A percentage of the quota pounds each year . . . **[would/would not]** . . . be held back from that allocated to quota share holders **. . . [0-25%, based on analysis] . . .** would be awarded to proposals from fishermen and processors working together to benefit the local community.

Section B.2.3, Transfer Rules

[Anyone eligible to own a U.S. documented fishing vessel; Anyone eligible to own or operate a U.S. documented fishing vessel; Stakeholders] . . . would be eligible to own or otherwise control IFQ (quota shares or quota pounds) (Subsection B.2.3.1). Leasing . . . **[would/would not]** . . . be allowed (Subsection B.2.3.2). Quota pounds could be transferred any time during the year. Quota shares would be transferable . . . **[any time during the year/only at the end of the year]** (Subsection B.2.3.3). There would be no limit on the divisibility of quota shares for purpose of transfer. Quota pounds could be transferred in as little as single pound units (Subsection B.2.3.4). Liens on IFQ are a matter of private contract and would not be specifically limited by this program. A central registry might be created as part of the program administration (Subsection B.2.3.5). There . . . **[would/would not]** . . . be accumulation limits on the amounts of quota shares or pounds used on a vessel, owned, or controlled. The definition of control may extend beyond ownership and leasing. The range of limits being considered **varies from 1% to 50% to no cap.** The limits may **vary by species, segment of the fleet, or type of entity (e.g., vessel owner, permit owner, processor).** Accumulation limits for groundfish in aggregate may also be different than limits for individual species (Subsection B.2.3.6). There would be no direct limits on vertical integration (Subsection B.2.3.7).

Appendix B, Section B.3.0, Program Administration

Enforcement for the IFQ program may include one or more of the following elements:

- onboard compliance monitors;
- dockside compliance monitors (20%-100%);
- hailing requirements, small vessel exemptions for onboard compliance monitors;
- video monitoring systems;
- full retention requirements;
- a vessel-specific bycatch reporting system;
- electronic landings tracking system;
- limited delivery ports;
- limited delivery sites;
- electronic IFQ tracking systems; and
- VMS.

Section B.3.1, Tracking, Monitoring, and Enforcement

These measures have been arrayed into the enforcement and monitoring programs provided in Table B.3-1. While some likely specifics are identified to facilitate program design and impact analysis, the FMP amendment language on this issue may be general, specifying the Secretary will promulgate regulations to establish an adequate monitoring and enforcement regime. Strong sanctions may be recommended along with provisions specifying illegal overages be forfeited and debited against the vessel’s account. Fishing by the vessel would be suspended until the overage is covered. (Section B.3.1). As part of the program administration, a centralized publicly accessible registry for liens against quota shares would be requested with . . . **[all related ownership information/essential ownership information].** (Also see Section B.3.4, Data Collection.)

Section B.3.2, Cost Recovery and Rent Sharing

Landings fees would be charged to cover program costs and, over time, some elements of the program may be privatized, as appropriate.

Section B.3.3, Program Monitoring, Review, and Revision

The IFQ program would not have a built-in sunset provision nor would quota shares be issued for fixed terms (i.e., IFQs would not expire after a certain number of years). The program would be revised as necessary through standard FMP and regulatory amendment processes. Information on certain aspects of program performance would be compiled annually, and a program review would be conducted every four years.

Section B.3.4, Data Collection

The data collection program . . . **[would/would not]** . . . be augmented to include the . . . **[expanded and mandatory; expanded voluntary]** . . . provision of economic data from the harvesting and processing industry. All data collected would be maintained in a confidential manner. Aspects of these provisions would require modification of the MSA. A central registry of IFQ shareholders and transactions would be maintained and include market value information. Government costs would also be tracked.

Preparatory Briefing on Trawl Individual Quota Program Development (Agenda Item C.1, June 2005)

Major Decisions for Agenda Item C.5

- Alternatives for Analysis in the **Draft** EIS
- Impacts to be Covered In TIQ Analysis
- Timing for Intersector Allocation EIS

Council Action:
1. **Specify alternatives for analysis in an EIS and identify any impacts that should be addressed not already covered in Section 2.2 of Attachment *3*.**
2. **Decide on timing for the initiation of public scoping for an EIS on intersector allocations.**

Trawl IFQ and Intersector Allocation Processes

(Agenda Item C.5.a, Attachment 1, Last Page)

- Two Subprojects
  - Trawl Individual Quotas
    - Completed scoping and ready to initiate draft EIS with adoption of alternatives for analysis.
  - Intersector Allocation
    - Preliminary scoping process has been underway, decision needed on when to formally announce public scoping for an EIS in the *Federal Register*

Presentation Outline

- Overview of Decision Tables
- **Management Regime Alternatives**
  - **Decision Table A (Focus of Primer)**
- BREAK
- Catch Control Tool Design Alternatives (Decision Table C)
- **IFQ Program Design Alternatives**
  - **Option Table C-1 (Focus of Primer)**
- Cumulative Catch Limit Design Alternatives (Option Table C-2)
- Permit Stacking Design Alternatives (Option Table C-3)
- Create Main Analytical Alternatives for EIS (Decision Table D)
- Allocation Among Trawl Sectors (Decision Table E)

Overview of Decision Tables

(Agenda Item C.5.a, Attachment 1, Bottom of Page 1)

Decision Table A – Management Regime Alternatives

Decision Table B – Process for Addressing Management Areas

A now or later process question.

Decision Table C – Catch Control Tool Design Alternatives

- Status Quo – No Decisions
- IFQ Program Design Alternatives – Option Table C-1
- Cumulative Catch Limit Design Alternatives – Option Table C-2
- Permit Stacking Design Alternatives – Option Table C-3

Decision Table D – Create Main Analytical Alternatives for EIS

"Marry" Management Regime Alternatives from Decision Table A with
Catch Control Tool Designs from Decision Table C

Decision Table E – Allocation Among Trawl Sectors

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Decision Table A –
Management Regime Alternatives
(Agenda Item C.5.a, Attachment 1, Page 4)

- Alt 1 – Status Quo

- Alt 2 – IFQs for Trawl Target Groundfish
- Alt 3 – IFQs for All Groundfish Except “Other Fish”
- Alt 4 – IFQs for All Groundfish

- Alt 5 – Cumulative Catch Limits
- Alt 6 – Cumulative Catch Limits with Permit Stacking
- Alt 7 – Cumulative Catch Limits with Permit Stacking and Extended Periods

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1).				
Species Groups and Management Tools				
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except “Other Fish”	Alt 4 - IFQs for All Groundfish
PAGE 1	Non-Whiting Fishery Management Tools and Species			
PAGE 2	Whiting Fishery Management Tools and Species			
PAGE 3	Trawl Sectors and Intersector Transfers			
PAGE 4	Groundfish Catch of Limited Entry Trawl Vessels Using Gears Other Than Groundfish Trawl			
Alt 5 -- Cumulative Catch Limits Alt 6 -- Permit Stacking with Cumulative Catch Limits Alt 7 -- Permit Stacking with Cumulative Catch Limits and Extended Periods				

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Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 1 of 4)				
Species Groups and Management Tools				
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl . . .	Alt 3 - IFQs for All . . . Except. . .	Alt 4 - IFQs for All . . .
PAGE 1	Non-Whiting Fishery Management Tools and Species			
Primary Management Tools	Cumulative landing limits Monitoring			
Adjustments for Low Harvest Levels	Suspension of intersector allocations if overfished			
Prohibited Species	Monitoring			

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 1 of 4)				
Species Groups and Management Tools				
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl . . .	Alt 3 - IFQs for All . . . Except. . .	Alt 4 - IFQs for All . . .
PAGE 2	Whiting Fishery Management Tools and Species			
Primary Management Tools	Catch limited by season closure			
Prohibited Species	Monitoring			

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 3 of 4)

Species Groups and Management Tools	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl . . .	Alt 3 - IFQs for All . . . Except. . .	Alt 4 - IFQs for All . . .
PAGE 3	Trawl Sectors and Intersector Transfers			
Sectors	The traditional three			
Intersector Transfer/ Trading	Procedure for midseason rollover of whiting			

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 4 of 4)

Species Groups and Management Tools	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl . . .	Alt 3 - IFQs for All . . . Except. . .	Alt 4 - IFQs for All . . .
PAGE 4	Groundfish Catch of Limited Entry Trawl Vessels Using Gears Other Than Groundfish Trawl			
Trawl Vessel Exempted Gear Quota Accounting & Catch Control	**Exempted gea**r catch by LE trawl vessels counts against LE allocation but is subject to open access trip limits.			
Trawl Vessel Longline and Fish Pot Without LE Endorsement Quota Accounting & Catch Control	**Longline and fishpot** catch by LE trawl vessels counts against LE allocation but is subject to open access trip limits.			

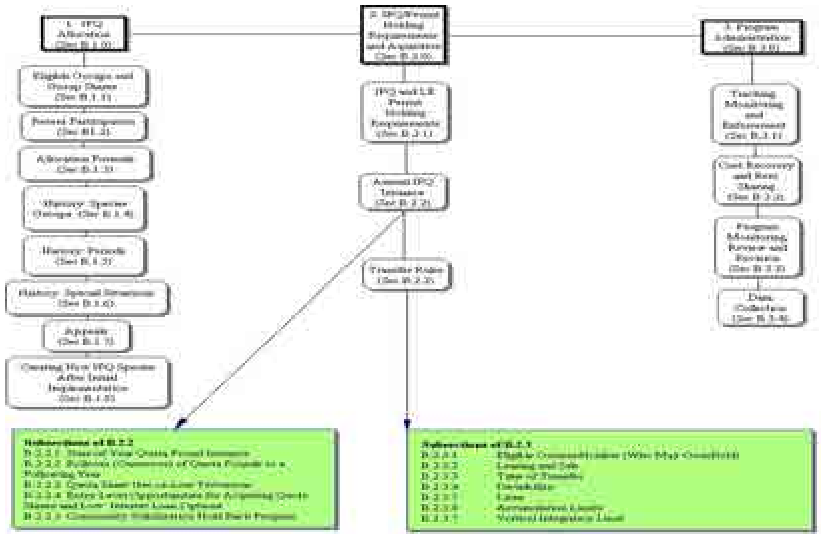
Decision Table C
Catch Control Tool Design
(Agenda Item C.5.a, Attachment 1, Page 10)

- IFQ Program Design Alternatives
  – Option Table C-1
- Cumulative Catch Limit Design Alternatives
  – Option Table C-2
- Permit Stacking and Extended Periods Design Alternatives
  – Option Table C-3

IFQ Program Primer and Related Documents

- The IFQ Program Primer – provides an overview of the IFQ design elements
- C.5.a, Attachment 2 – provides all options, public comments, and TIQC recommendations
  – Diagram showing program sections (page 1)
  – 3 pages of text (pages 2-4)
  – A listing of options, comments, and recommendations (pages 5-20)
- C.5.a, Attachment 3, Appendix B – provides everything in Attachment 2 plus some discussion and preliminary analysis

IFQ Program Primer
(Agenda Item C.1.a, Attachment 1,Page 1)



Option Table C-1
IFQ Program Design Alternatives
(Agenda Item C.5.a, Attachment 1, Page 11)

- IFQ Programs across top
- Program design elements down left
- Complete list of options in Appendix B
- All options in Attachment 2 (also found in Attachment 3, Appendix B) will be discussed in the analysis, but not all are included as part of one of the IFQ programs

Option Table C-2
Cumulative Catch Limits Design Alternatives
(Agenda Item C.5.a, Attachment 1, Page 16)

- CC Alternative 1 -- Nontransferable Cumulative Catch Limits
- CC Alternative 2 -- Transferable Cumulative Catch Limits
- CC Alternative 3 -- Transferable and Divisible Cumulative Catch Limits

Option Table C-3
Permit Stacking Design Alternatives
(Agenda Item C.5.a, Attachment 1, Page 16)

- PS Alternative 1 -- Stacking With Whole Cumulative Catch Limits for Additional Permits and Status Quo Period Lengths
- PS Alternative 2 -- Stacking With Fractional Cumulative Catch Limits for Additional Permits and Extended Period Lengths

Decision Table D
Main Analytical Alternatives for EIS
(Agenda Item C.5.a, Attachment 1, Page 17)

This Slide Based on Decision Table D from the TIQC report.

TIQC Decision Table D - Main analytical alternatives for the EIS.

Catch Control Tool Alternatives	**Alt 1** Status Quo	**Alt 2** IFQ for TargetSpp	**Alt 3**: IFQ for Groundfish Except "Other Fish" **Alt 3**-A	**Alt 3**-B	**Alt 3**-C	**Alt 4** IFQ for roundfish Except "Other Fish" and IBQ for Halibut	**Alt 5** Stacking, Cum Catch Limits, & Extend Periods
Cumulative Landing Limits	X	-	-	-	-	-	-
Season Closures	X	*	*	*	*	*	X
IFQ Programs	-	Program C	Program A	Program B	Program C	Program C	-
Cumulative Catch Limits	-	X	(Low OYs)	(Low OY)	(Low OY)	-	X
Permit Stacking and Extended Cumulative Limit Periods (PS - Alt 2)	-	-	-	-	-	-	X

Decision Table E
Allocation Among Trawl Sectors

(Agenda Item C.5.a, Attachment 1, Page 18)

- Formula for Allocating Among Trawl Sectors
  - Traditional Three (deliveries: shoreside, to mothership, to catcher processors)
  - Adding a Fourth (spliting shoreside into whiting and nonwhiting)
- Criteria for distinguishing between shoreside whiting and nonwhiting landings

PREPARATORY INFORMATIONAL BRIEFING ON TRAWL INDIVIDUAL QUOTA (TIQ) PROGRAM DEVELOPMENT

Council members will be provided an orientation briefing on the trawl IFQ agenda item and a preliminary review of the Trawl Individual Quota Committee report. The main focus of this briefing will be Attachments 1 and 2 of Agenda Item C.5. Ample time will be provided for Council member questions focused on understanding the content, organization, and tasks for the Thursday afternoon decision session on this issue (Agenda Item C.5).

As a point of emphasis, public testimony on the Council action is scheduled for Thursday afternoon, June 16. This agenda item is informational only in scope and strictly preparatory in nature to the primary agenda item, C.5. Those interested in providing comments intended to influence Council action should do so under agenda item C.5, not under this agenda item. Public comment under this agenda item will be limited to comment relative to matters such as accuracy and completeness of the information presented. Individuals or groups presenting comments on matters such as the policy decisions to be made under agenda item C.5 will be ruled out of order and asked to present their comments under agenda item C.5.

Council Task: None.

Reference Materials:

See Agenda Item C.5

Agenda Order:

a. Agenda Item Overview and Informational Briefing — Jim Seger
b. Questions of Clarification from Council Members
c. Public Comment
d. Council Discussion

PFMC
05/24/05

the Under Secretary for Oceans and Atmosphere has delegated authority to sign material for publication in the **Federal Register** to the AA.

Classification

This interim final rule is published under the authority of the ATCA, 16 U.S.C. 971 *et seq.* The AA has determined that these regulations are necessary to implement the recommendations of ICCAT and are necessary for management of the Atlantic tuna fisheries.

Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act (PRA) unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number.

This rule involves a collection of information requirement subject to the PRA and approved by OMB under Control Number 0648–0327.

This interim final rule has been determined to be not significant for purposes of E.O. 12866.

NMFS has determined that, under 5 U.S.C. 553(b)(B), there is good cause to waive the requirement for prior notice and an opportunity for public comment on this rule as such procedures would be contrary to the public interest. NMFS has underway rulemakings on this, and other, tuna fishery management issues. Specifically, NMFS published a proposed rule on March 4, 1997 seeking public comment on a variety of tuna issues. Additionally, NMFS published proposed quota specifications on April 21, 1997 seeking public comment on fishing category allocations. However, while the process for these actions remains ongoing, NMFS has received comment that a postponement for 1997 in the deadline to choose a permit category is necessary to allow the public an opportunity to assess the impacts of the pending final rules. As such, given the public interest in affording vessel owners to make a reasoned decision as to fishing category and the fact that NMFS has already received public comment on the subject matter of this rule, further delay in the implementation of this action to provide an opportunity for additional comment is contrary to the public interest.

Further, under 5 U.S.C. 553(d)(1), because this rule relieves a restriction, it is not subject to a 30-day delay in effective date. NMFS has the ability to rapidly communicate the extension of the deadline to fishery participants through its FAX network and HMS Information Line.

List of Subjects in 50 CFR Part 285

Fisheries, Fishing, Penalties, Reporting and recordkeeping requirements, Treaties.

Dated: May 14, 1997.

Nancy Foster,

Deputy Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR part 285, is amended as follows:

PART 285—ATLANTIC TUNA FISHERIES

1. The authority citation for part 285 continues to read as follows:

Authority: 16 U.S.C. 971 *et seq.*

2. In § 285.21, paragraph (b)(7) is added to read as follows:

§ 285.21 Vessel permits.

* * * * *

(b) * * *

(7) Except for purse seine vessels for which a permit has been issued under this section, an owner may change the category of the vessel's Atlantic tunas permit to another category a maximum of once per calendar year by application on the appropriate form to NMFS before the specified deadline. After the deadline, the vessel's permit category may not be changed to another category for the remainder of the calendar year, regardless of any change in the vessel's ownership. In years after 1997, the deadline for category changes is May 15.

* * * * *

[FR Doc. 97–13139 Filed 5–15–97; 9:41 am]

BILLING CODE 3510–22–F

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 660

[Docket No. 970403076–7114–02; I.D. 030397B]

RIN 0648–AI80

Fisheries off West Coast States and in the Western Pacific; Pacific Coast Groundfish Fishery; Whiting Allocation Among Nontribal Sectors

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: This rule implements: Allocation of the commercial harvest guideline of Pacific whiting (whiting) among nontribal sectors of the Pacific groundfish fishery; a framework procedure for annually choosing the starting dates of the primary whiting seasons for the nontribal sectors; and allowing the processing of fish waste at sea when at-sea processing of whiting is otherwise prohibited. This rule also implements starting dates for the 1997 primary seasons under the framework. These actions are intended to provide equitable allocation of the whiting resource and to provide flexibility in harvesting and processing opportunities.

DATES: Effective May 14, 1997.

ADDRESSES: Comments on the information collection requirements imposed by this rule should be sent to William Stelle, Jr., Administrator, Northwest Region, NMFS, 7600 Sand Point Way NE., Seattle, WA 98115, and to the Office of Information and Regulatory Affairs of the Office of Management and Budget, Washington DC, 20503.

FOR FURTHER INFORMATION CONTACT: William L. Robinson at 206–526–6140.

SUPPLEMENTARY INFORMATION: NMFS is issuing this rule to allocate whiting, establish a framework for setting season dates, and to provide for at-sea processing of whiting waste under the authority of the Pacific Coast Groundfish Fishery Management Plan (PCGFMP) and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). These actions were recommended by the Pacific Fishery Management Council (Council) at its October 1996 meeting in San Francisco, CA and at meetings of its ad hoc whiting allocation subcommittee that were held in 1996. At the same time, NMFS is announcing the starting dates for the primary whiting seasons in 1997 and addressing several housekeeping measures. These actions were proposed in the **Federal Register** at 62 FR 18572, April 16, 1996. No comments were received during the 20-day public comment period which ended April 30, 1997. This final rule is substantively the same as proposed; the minor changes are explained in this preamble.

The background for these actions appears in the proposed rule and in the environmental assessment/regulatory impact review prepared by the Council for this action. The actions taken are summarized below.

Background

Whiting allocation

The most recent allocation of whiting among nontribal sectors in the whiting fishery was in effect from 1994–96. Its expiration left no allocation in place for 1997 and beyond. The 1994–96 allocation was based on an industry agreement to provide 40 percent of the whiting harvest guideline to catcher vessels delivering to shore-based processors, plus any additional whiting taken while all sectors competed for the first 60 percent.

The allocations for 1997 and beyond also were derived by industry agreement in a series of public meetings sponsored by the Council. The allocations, which are within a few percent of the proportions actually harvested in 1994–96, are: 42 percent for the shoreside sector (catcher vessels delivering to shoreside processors), 24 percent for the mothership sector (motherships and catcher vessels delivering to motherships), and 34 percent for the catcher/processor sector (catcher/processor vessels). When applied to the 1997 commercial harvest guideline of 207,000 metric tons (mt), these percentages result in whiting allocations of 86,900 mt for the shoreside sector, 49,700 mt for the mothership sector, and 70,400 mt for the catcher/processor sector. Surplus whiting from one sector may be reallocated (via notice in the **Federal Register**) to the other sectors, in proportion to their initial allocations, near September 15. As in 1994–96, only the framework process for calculating the allocations is codified. The allocations will be calculated and announced annually, generally with the annual cycle for announcing specifications and management measures for the groundfish fishery in January each year. Because the shoreside fishery in California (which is south of 42° N. lat.) may start earlier than in Washington and Oregon, a 5–percent cap (4,345 mt in 1997) is placed on the amount of the shoreside allocation that may be taken south of 42° N. lat. before the start of the shoreside primary season north of 42° N. lat. This cap will discourage effort shifts into California early in the year and is not expected or intended to constrain traditional operations. If the 5–percent cap is reached, the routine trip limit under § 660.323(b) is resumed until the northern season begins, at which time the southern primary season also would resume.

Additional constraints were agreed to by the industry to assure that each sector has the opportunity to take its allocation and is not preempted by the high-capacity catcher/processors participating in more than one sector in a given year.

1. Within the same calendar year, a catcher/processor may not also act as a catcher vessel that delivers shoreside or to another at-sea processor.

2. A catcher/processor may operate solely as a mothership for that calendar year, but only if this has been requested and so designated on renewal of its limited entry permit for the Pacific coast groundfish fishery (Office of Management and Budget (OMB) #0648–0203). NMFS has made a slight change to the final rule at § 660.323 regarding recision of a declaration to act as a mothership for the entire calendar year. The modification clarifies that any recision of that declaration can only be made before the vessel has harvested or received any unprocessed whiting during that calendar year.

3. A catcher/processor (that has not declared itself as a mothership for the year) may receive codends over-the-side from a catcher vessel, but any such catch would be counted toward the catcher/processor allocation and would end when the catcher/processor allocation is taken. Catcher vessels that do not process may deliver to any or all of the processing sectors as long as the season for that sector is open.

The Council intends this allocation to remain in effect for at least 5 years, at which time it will be reevaluated.

Seasons

A framework is established for annually setting separate starting dates for each sector's primary season, and the starting dates for 1997 also are announced. The primary seasons for the whiting fishery are: For the shore-based sector, the period(s) when the large-scale target fishery is conducted (when trip limits under § 660.323(b) are not in effect); for catcher/processors, the period(s) when at-sea processing is allowed and the fishery is open for the catcher/processor sector; and for vessels delivering to motherships, the period(s) when at-sea processing is allowed and the fishery is open for the mothership sector. The framework provides for setting separate starting dates for each sector to accommodate operational needs. However, other factors also must be considered during the Council's two-meeting process, which generally would coincide with the setting of the annual management measures in the fall.

These factors are: The size of the harvest guidelines for whiting and bycatch species; status of whiting and bycatch stocks; age/size structure of the whiting population; expected harvest of bycatch and prohibited species; availability and stock status of prohibited species; expected participation by catchers and processors; environmental conditions; timing of alternate or competing fisheries; industry agreement; fishing or processing rates; and other relevant information.

The starting dates also are constrained by the incidental take statement dated May 14, 1996, issued pursuant to section 7 (b)(4) of the Endangered Species Act (ESA) to protect threatened or endangered species of salmon. The incidental take statement requires that the fishery north of 42° N. lat. not begin before May 15. This constraint remains in effect unless changed in a subsequent incidental take statement.

In 1997, the starting dates are May 15 for the catcher/processor and mothership sectors and June 15 for the shore-based sector north of 42° N. lat. The shore-based fleet operating in California between 42° and 40° 30' N. lat. began fishing in April 1997, but will be able to use the framework to set the starting date for 1998. The season south of 40° 30' N. lat. remains unchanged at April 15 as stated at § 660.323(a)(3)(i), and is not subject to the framework provisions for changing the starting date primarily due to concerns over potential salmon bycatch and harvest of juvenile whiting. However, the whiting fishery in California is subject to the 5–percent cap in 1997, as discussed above.

A slight change was made to § 660.323(a)(3)(i) to clarify that the routine trip limit before and after the primary season potentially could apply to all sectors, as currently is the case, not just the shore-based sector as stated in the proposed rule. The trip limits before and after the primary season currently are designated routine to accommodate small bait and fresh fish markets and bycatch in non-whiting fisheries.

NMFS Action—Starting Dates for the 1997 Primary Whiting Seasons: The primary season for each sector begins at 0001 hours (local time) on the following dates: (1) Catcher/processor sector—May 15, 1997; (2) mothership sector—May 15, 1997; (3) shore-based sector north of 42° N. lat.—June 15, 1997.

Processing Waste Products At Sea

This rule also allows processing fish waste at sea by a ''waste processing vessel,'' even at times when at-sea processing of whiting by catcher/processors or motherships is prohibited. To be considered a ''waste-processing vessel,'' the vessel must make only meal, oil, or minced product and cannot make or have on board surimi, fillet, or headed and gutted fish. The following restrictions assure that no fishing or receipt of whole fish is occurring while at-sea processing of whiting is prohibited:

(1) The vessel must be incapable of fishing for whiting; i.e., trawl nets and doors must be stowed and made inoperable; (2) receipt of codends containing any species of fish would be prohibited; (3) the amount of whole whiting on board must be less than any trip limit for whiting authorized under 50 CFR 660.323(b); and (4) the vessel could not operate as a waste-processing vessel within 48 hours immediately before and after any primary season in which it operates as a catcher/processor or mothership.

Housekeeping

A current prohibition is revised to enable a mothership to carry trawl gear while operating in the whiting fishery as long as trawl gear, clarified to mean trawl nets and doors in this final rule, is stowed and rendered inoperable. Similarly, the requirement for a waste-processing vessel to stow trawl gear also is clarified to indicate that trawl gear means trawl nets and doors.

A regulation issued on June 6, 1996, (61 FR 28786, authorized under old § 663.24) provided for whiting not needed in the tribal fishery to be made available to other users. This provision was inadvertently deleted when the regulations governing the Pacific Coast groundfish fisheries were consolidated at 61 FR 34570, July 2, 1996, with all other regulations governing the fisheries off the west coast states and in the Western Pacific, and therefore is included in this rule. Also in the consolidation, an error was made in paragraph (b) of § 660.306 regarding the citation for the definition of prohibited species and a typo exists in paragraph (r) of § 660.306. The corrections are included in this rule.

As part of the 1996 reorganization of NMFS, Regional Directors were retitled as Regional Administrators; however, the term Regional Director is still used in codified text until a universal change is made to 50 CFR 660.

Paragraphs (s) and (t) in § 660.306 are ''reserved'' for implementation of Amendment 9 to the PCGFMP which was approved by NMFS on May 8, 1997. Proposed regulations to implement Amendment 9 were published on March 21, 1997 (62 FR 13583).

Classification

The Assistant Administrator for Fisheries, NOAA (AA), has determined that this rule is necessary for management of the Pacific Coast groundfish fishery and that it is consistent with the Magnuson-Stevens Act and other applicable law.

Without the final rule being in place by May 15, the season north of 42° N. lat. will open on May 15 (50 CFR 660.323(a)(3)) without any allocation between competing sectors. A derby fishery would ensue and a substantial portion of the harvest guideline could be taken before the final rule was made effective, thereby disrupting 1997 allocations that would be implemented by the final rule. For these reasons, good cause is found under 5 U.S.C. 553(d)(3) for making the rule effective without a 30-day delay.

This final rule has been determined to be not significant for purposes of E.O. 12866.

The Assistant General Counsel for Legislation and Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration, when this rule was proposed, that it would not have a significant economic impact on a substantial number of small entities. As a result, a regulatory flexibility analysis was not prepared. No comments were received regarding this certification.

Notwithstanding any other provision of law, no person is required to respond to, nor shall a person be subject to, a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid control number.

This rule contains a collection-of-information requirement subject to the Paperwork Reduction Act. The collection of this information has been approved by the OMB, OMB Control Number 0648–0203. Public reporting burden is estimated to be negligible due to this action, as it involves, concurrent with renewal of a limited entry permit, checking a box to indicate if a catcher/processor will operate entirely as a mothership in the whiting fishery during the year covered by the permit. Fewer than 15 catcher/processors operate in this fishery, and even fewer are expected to exercise this option. Send comments regarding burden estimates, or any other aspect of this data collection, including suggestions for reducing the burden, to NMFS and OMB (see **ADDRESSES**).

A formal section 7 consultation under the ESA was concluded for the PCGFMP. In a biological opinion dated August 28, 1993, and subsequent reinitiations of consultation dated September 27, 1993, and May 15, 1996, the Assistant Administrator determined that fishing activities conducted under the PCGFMP and its implementing regulations are not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of critical habitat. This rule is within the scope of those consultations. In addition, coho salmon south of Cape Blanco, Oregon, recently have been listed as threatened (Northern California/Southern Oregon) and endangered (Central California) under the ESA. This action will not affect coho salmon.

List of Subjects in 50 CFR Part 660

Administrative practice and procedure, Fisheries, Fishing, Reporting and recordkeeping requirements.

Dated: May 14, 1997.

Nancy Foster,

Deputy Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR part 660 is amended as follows:

PART 660—FISHERIES OFF WEST COAST STATES AND IN THE WESTERN PACIFIC

1. The authority citation for part 660 continues to read as follows:

Authority: 16 U.S.C. 1801 *et seq.*

2. In § 660.306, in paragraph (b), the reference to ''§ 660.302'' is changed to ''§ 660.323(c)'', paragraphs (j), (k), (m), (q), and (r) are revised, paragraphs (s) and (t) are reserved, and paragraphs (u), (v), and (w) are added, to read as follows:

§ 660.306 Prohibitions.

* * * * *

(j) Process whiting in the fishery management area during times or in areas where at-sea processing is prohibited for the sector in which the vessel participates, unless:

(1) The fish are received from a member of a Pacific Coast treaty Indian tribe fishing under § 660.324;

(2) The fish are processed by a waste-processing vessel according to § 660.323(a)(4)(vii); or

(3) The vessel is completing processing of whiting taken on board during that vessel's primary season.

(k) Take and retain or receive, except as cargo or fish waste, whiting on a vessel in the fishery management area that already possesses processed whiting on board, during times or in areas where at-sea processing is prohibited for the sector in which the vessel participates, unless the fish are received from a member of a Pacific Coast treaty Indian tribe fishing under § 660.324.

* * * * *

(m) Fish with groundfish trawl gear, or carry groundfish trawl gear on board a vessel that also has groundfish on board, without having a limited entry permit valid for that vessel affixed with a gear endorsement for trawl gear, with the following exception. A vessel with groundfish on board may carry groundfish trawl gear if:

(1) The vessel is in continuous transit from outside the fishery management area to a port in Washington, Oregon, or California; or

(2) The vessel is a mothership, in which case trawl nets and doors must be stowed in a secured and covered manner, and detached from all towing lines, so as to be rendered unusable for fishing.

* * * * *

(q) Carry on board a vessel, or deploy, limited entry gear when the limited entry fishery for that gear is closed, except a vessel may carry on board limited entry gear as provided in paragraph (m) of this section.

(r) Refuse to submit fishing gear or fish subject to such person's control to inspection by an authorized officer, or to interfere with or prevent, by any means, such an inspection.

(s) [Reserved.]

(t) [Reserved.]

(u) Participate in the mothership or shoreside sector as a catcher vessel that does not process fish, if that vessel operates in the same calendar year as a catcher/processor in the whiting fishery, according to § 660.323(a)(4)(ii)(B).

(v) Operate as a waste-processing vessel within 48 hours of a primary season for whiting in which that vessel operates as a catcher/processor or mothership, according to § 660.323(a)(4)(vii).

(w) Fail to keep the trawl doors on board the vessel and attached to the trawls on a vessel used to fish for whiting, when taking and retention is prohibited under § 660.323(a)(3)(v).

3. In § 660.323, paragraphs (a)(3)(i), (a)(3)(iv), and (a)(4) are revised to read as follows:

§ 660.323 Catch restrictions.

* * * * *

(a) * * *

(3) *Pacific whiting (whiting)*—(i) *Seasons*. The primary seasons for the whiting fishery are: For the shore-based sector, the period(s) when the large-scale target fishery is conducted (when trip limits under paragraph (b) of this section are not in effect); for catcher/processors, the period(s) when at-sea processing is allowed and the fishery is open for the catcher/processor sector; and for vessels delivering to motherships, the period(s) when at-sea processing is allowed and the fishery is open for the mothership sector. Before and after the primary seasons, trip landing or frequency limits may be imposed under paragraph (b) of this section. The sectors are defined at paragraph (a)(4) of this section.

(A) *North of 40*°30' N. lat. Different starting dates may be established for the catcher/processor sector, the mothership sector, catcher vessels delivering to shoreside processors north of 42° N. lat., and catcher vessels delivering to shoreside processors between 42°–40°30' N. lat.

(*1*) *Procedures*. The primary seasons for the whiting fishery north of 40°30' N. lat. generally will be established according to the procedures in the PCGFMP for developing and implementing annual specifications and apportionments. The season opening dates remain in effect unless changed, but will be announced annually, generally with the annual specifications and management measures.

(*2*) *Criteria*. The start of a primary season may be changed based on a recommendation from the Council and consideration of the following factors, if applicable: Size of the harvest guidelines for whiting and bycatch species; age/size structure of the whiting population; expected harvest of bycatch and prohibited species; availability and stock status of prohibited species; expected participation by catchers and processors; environmental conditions; timing of alternate or competing fisheries; industry agreement; fishing or processing rates; and other relevant information.

(B) *South of 40*°30' N. lat. The primary season starts on April 15 south of 40°30' N. lat.

* * * * *

(iv) *At-sea processing*. Whiting may not be processed at sea south of 42°00' N. lat. (Oregon-California border), unless by a waste-processing vessel as authorized under paragraph (a)(4)(vii) of this section.

* * * * *

(4) *Whiting—allocation*—(i) *Sectors and allocations*. The commercial harvest guideline for whiting is allocated among three sectors, as follows.

(A) *Sectors*. The catcher/processor sector is composed of catcher/processors, which are vessels that harvest and process whiting during a calendar year. The mothership sector is composed of motherships and catcher vessels that harvest whiting for delivery to motherships. Motherships are vessels that process, but do not harvest, whiting during a calendar year. The shoreside sector is composed of vessels that harvest whiting for delivery to shore-based processors.

(B) *Allocations*. The allocations are: 34 percent for the catcher/processor sector; 24 percent for the mothership sector; and 42 percent for the shoreside sector. No more than 5 percent of the shoreside allocation may be taken and retained south of 42° N. lat. before the start of the primary season north of 42° N. lat. These allocations are harvest guidelines unless otherwise announced in the **Federal Register**.

(ii) *Additional restrictions on catcher/processors*.

(A) A catcher/processor may receive fish from a catcher vessel, but that catch is counted against the catcher/processor allocation unless the catcher/processor has been declared as a mothership under paragraph (a)(4)(ii)(C) of this section.

(B) A catcher/processor may not also act as a catcher vessel delivering unprocessed whiting to another processor in the same calendar year.

(C) When renewing its limited entry permit each year under § 660.333, the owner of a catcher/processor used to take and retain whiting must declare if the vessel will operate solely as a mothership in the whiting fishery during the calendar year to which its limited entry permit applies. Any such declaration is binding on the vessel for the calendar year, even if the permit is transferred during the year, unless it is rescinded in response to a written request from the permit holder. Any request to rescind a declaration must made by the permit holder and granted in writing by the Regional Director before any unprocessed whiting has been taken on board the vessel that calendar year.

(iii) *Reaching an allocation*. If the whiting harvest guideline, commercial harvest guideline, or a sector's allocation is reached, or is projected to be reached, the following action(s) for the applicable sector(s) may be taken as provided under paragraph (a)(4)(vi) of this section and will remain in effect until additional amounts are made available the next fishing year or under paragraph (a)(4)(iv) of this section.

(A) *Catcher/processor sector*. Further taking and retaining, receiving, or at-sea processing of whiting by a catcher/processor is prohibited. No additional unprocessed whiting may be brought on board after at-sea processing is prohibited, but a catcher/processor may continue to process whiting that was on board before at-sea processing was prohibited.

(B) *Mothership sector*. (*1*) Further receiving or at-sea processing of whiting by a mothership is prohibited. No additional unprocessed whiting may be brought on board after at-sea processing is prohibited, but a mothership may continue to process whiting that was on board before at-sea processing was prohibited.

(*2*) Whiting may not be taken and retained, possessed, or landed by a catcher vessel participating in the mothership sector.

(C) *Shoreside sector*. Whiting may not be taken and retained, possessed, or landed by a catcher vessel participating in the shoreside sector except as authorized under a trip limit specified under § 660.323(b).

(D) *Shoreside south of 42°* N. lat. If 5 percent of the shoreside allocation for whiting is taken and retained south of 42° N. lat. before the primary season for the shoreside sector begins north of 42° N. lat., then a trip limit specified under paragraph (b) of this section may be implemented south of 42° N. lat. until the northern primary season begins, at which time the southern primary season would resume.

(iv) *Reapportionments*. That portion of a sector's allocation that the Regional Director determines will not be used by the end of the fishing year shall be made available for harvest by the other sectors, if needed, in proportion to their initial allocations, on September 15 or as soon as practicable thereafter. NMFS may release whiting again at a later date to ensure full utilization of the resource. Whiting not needed in the fishery authorized under § 660.324 also may be made available.

(v) *Estimates*. Estimates of the amount of whiting harvested will be based on actual amounts harvested, projections of amounts that will be harvested, or a combination of the two. Estimates of the amount of whiting that will be used by shoreside processors by the end of the fishing year will be based on the best information available to the Regional Director from state catch and landings data, the survey of domestic processing capacity and intent, testimony received at Council meetings, and/or other relevant information.

(vi) *Announcements*. The Assistant Administrator will announce in the **Federal Register** when a harvest guideline, commercial harvest guideline, or an allocation of whiting is reached, or is projected to be reached, specifying the appropriate action being taken under paragraph (a)(4)(iii) of this section. The Regional Director will announce in the **Federal Register** any reapportionment of surplus whiting to other sectors on September 15, or as soon as practicable thereafter. In order to prevent exceeding the limits or to avoid underutilizing the resource, prohibitions against further taking and retaining, receiving, or at-sea processing of whiting, or reapportionment of surplus whiting may be made effective immediately by actual notice to fishermen and processors, by phone, fax, Northwest Region computerized bulletin board (contact 206–526–6128), letter, press release, and/or U.S. Coast Guard Notice to Mariners (monitor channel 16 VHF), followed by publication in the **Federal Register**, in which instance public comment will be sought for a reasonable period of time thereafter. If insufficient time exists to consult with the Council, the Regional Director will inform the Council in writing of actions taken.

(vii) *Processing fish waste at sea*. A vessel that processes only fish waste (a ''waste-processing vessel'') is not considered a whiting processor and therefore is not subject to the allocations, seasons, or restrictions for catcher/processors or motherships while it operates as a waste-processing vessel. However, no vessel may operate as a waste-processing vessel 48 hours immediately before and after a primary season for whiting in which the vessel operates as a catcher/processor or mothership. A vessel must meet the following conditions to qualify as a waste-processing vessel:

(A) The vessel makes meal (ground dried fish), oil, or minced (ground flesh) product, but does not make, and does not have on board, surimi (fish paste with additives), fillets (meat from the side of the fish, behind the head and in front of the tail), or headed and gutted fish (head and viscera removed).

(B) The amount of whole whiting on board does not exceed the trip limit (if any) allowed under paragraph (b) of this section.

(C) Any trawl net and doors on board are stowed in a secured and covered manner, and detached from all towing lines, so as to be rendered unusable for fishing.

(D) The vessel does not receive codends containing fish.

(E) The vessel's operations are consistent with applicable state and Federal law, including those governing disposal of fish waste at sea.

* * * * *

[FR Doc. 97–13120 Filed 5–14–97; 4:59 pm]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 660

[Docket No. 960614176–7112–03; I.D. 041797B]

RIN 0648–AI19

Fisheries Off West Coast States and in the Western Pacific; Western Pacific Crustacean Fisheries; Technical Amendment

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS announces a final rule to correct regulations implementing the Fishery Management Plan for the Crustacean Fisheries of the Western Pacific Region (FMP) to clarify what records must be made available by first-level buyers upon request by an authorized officer.

EFFECTIVE DATE: May 20, 1997.

FOR FURTHER INFORMATION CONTACT: Mr. Alvin Katekaru, NMFS, (808) 973–2985 or Mr. Svein Fougner, NMFS, (562) 980–4034.

SUPPLEMENTARY INFORMATION: Upon request, a first-level buyer must allow an authorized officer to access, inspect, and copy all records relating to the harvest, sale, or transfer of management unit species taken by vessels in the fishery. The original FMP regulations at 50 CFR part 681.11 stated this explicitly.

On July 2, 1996, the regulations at 50 CFR part 681 were consolidated with regulations for fisheries off west coast states and in the western Pacific; the regulations were codified at 50 CFR part 660 (61 FR 34570). In part 660, paragraph 660.14(f)(2) was not transferred correctly from § 681.11 (i.e., text was inadvertently left out). This rule corrects that paragraph to include: The name of the vessel involved in each transaction and the owner or operator of the vessel; the amount, number, and size of each management unit species involved in each transaction; and prices paid by the buyer and proceeds to the seller in each transaction.

Classification

This final rule is issued under the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C 1801 *et seq*.

In that this rule merely clarifies an existing requirement without creating

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON INITIAL CONSIDERATION OF OPENING DATE OF CALIFORNIA SHORE-BASED WHITING FISHERY

The Groundfish Advisory Subpanel (GAP) reviewed the proposal to open the California shore-based whiting fishery south of 40E30' on March 15.

In general, the GAP agrees with the proposal, subject to the following conditions:

1. The fishery meets the same requirements for monitoring and shore sampling as other shore-based whiting fisheries conducted currently under an exempted fishing permit (EFP) and in the future under Amendment 10 to the Pacific groundfish fishery management plan.

2. The whiting taken in this area be included as part of the 5% allocation of shore-based whiting assigned to California.

3. Opening at the earlier date will not result in an unacceptable level of salmon bycatch.

On the last point, the GAP has no information that salmon bycatch will be higher, but notes a later opening date (April 15) was originally set based on those concerns.

PFMC
06/14/05

GROUNDFISH MANAGEMENT TEAM REPORT ON INITIAL CONSIDERATION OF OPENING DATE OF CALIFORNIA SHORE-BASED WHITING FISHERY

The Groundfish Management Team (GMT) reviewed the request by Mr. Barry Cohen to change the start date of the California shore-based whiting fishery south of 40°30' N latitude from April 15 to March 15 in 2006. It is the GMT's understanding that this date change affects one processor and potentially one to three shore-based whiting vessels.

To facilitate a discussion of this issue, the National Marine Fisheries Service (NMFS) provided the GMT with a brief history of the location and seasonality of the whiting fishery. During the 1980s, foreign processors were prohibited from operating south of 39° N latitude, primarily to minimize the harvest of rockfish and juvenile whiting. Foreign fishing was prohibited before June 1. Joint ventures (small U.S. trawlers delivering to foreign processing vessels at sea) did not have a season, but generally started one to two months earlier. In general, shore-based processors operated from April through September and were eventually regulated with different start dates along the coast.

During the early spring, Pacific whiting migrate north through California before reaching Oregon and Washington in late spring and early summer. In the late 1990s, an April 15 start date was proposed for California. To accommodate regional whiting availability, an early shore-based whiting fishery was provided starting April 1 for northern California (north of 40˚30' N latitude), which was the only area of California with an active fishery at that time. There has been recent interest in fishery participation south of 40˚30' N latitude, which still maintains a start date of April 15, two weeks after the northern California fishery. In 2005, Mr. Cohen was designated as a processor under the whiting exempted fishing permit (EFP) and attempted to prosecute the fishery after the start date. Mr. Cohen reported that only one small landing was made in early May and attributed this to starting after whiting had already moved through the area. Therefore, he requests the opportunity to commence fishing on March 15 to match the timing of the whiting migration through this area.

Historically, there has not been much of a whiting fishery south of 40°30' N latitude, but historical groundfish bycatch information suggests, that in the Monterey area, the bycatch of widow rockfish was greater than in other sections of the coast and was usually highest during June and July. Chilipepper rockfish was also taken as bycatch in the whiting fishery in the Monterey area, and catch was generally higher earlier in the year.

There are no data to indicate the species and catch rates likely to occur if the fishery occurred during March, except that offshore species (such as mackerel) are more likely to be encountered in southern waters.

By shifting the start of the southern whiting harvest from April 15 to March 15 south of 40°30' N latitude, the GMT anticipates the fishery may encounter younger, smaller whiting, as well as those whiting that are more emaciated following spawning. Historical catch suggests larger, older fish are proportionately more abundant in the catch in more northern areas than in southern areas. During the first two weeks of this year's California shore-based whiting fishery, which operates between 42° N latitude and 40°30’ N latitude with an April 1 start date, the vessels encountered a mixed grade of whiting that was predominately small fish. By week four of the fishery, the vessels encountered a larger, more desirable grade of whiting. The likelihood of encountering small whiting is variable and is not always an issue for this fishery.

NMFS also provided the GMT with a review of the Groundfish Fishery Management Plan (FMP) for the whiting fishery in particular, taking into consideration the Endangered Species Act (ESA) related biological opinions or reinitiated consultations in 1990, 1991, 1992, 1993, 1996, 1999, and 2002. Management constraints that still exist as a result of those consultations include (1) a delay in the start of the at-sea whiting season until May 15 north of 42° N latitude, (2) no targeted harvest of whiting shoreward of 100 fm in the Eureka area (the Eureka area extends from 43º30' to 40º N latitude), and (3) an overall annual bycatch limit of 11,000 chinook.

The current biological opinion prohibits targeted whiting harvest shoreward of 100 fm in the Eureka area (approximately 40º N latitude), but does not restrict fishing inside of 100 fm in the Monterey area. A depth restriction in the Monterey area was not previously considered because there was little or no fishing for whiting in the area at the time. However, the depth-based restriction for the Eureka area was put in place because chinook bycatch rates were generally found to be higher in shallow water. Although there are little data regarding the effect of depth on chinook bycatch in the Monterey area, a depth restriction in the area may be an appropriate consideration.

There are no data on the bycatch rate of chinook in the whiting fishery from recent years in the Monterey area. However, NMFS reviewed information available from the joint venture fishery when the effects of the whiting fishery on Sacramento winter-run chinook were first considered in 1991(November 26, 1991 Biological Opinion). From 1981 – 1990, the average bycatch rates in the Monterey and Eureka areas were 0.027 and 0.147 salmon per mt of whiting, respectively. As a frame of reference, the current bycatch rate for the entire whiting fishery that may reinitiate a consultation is 0.05 salmon per mt of whiting. In that same opinion, NMFS reported the probability of encountering a winter-run chinook was generally lower in the Monterey area than in the Eureka area (1/1,500 versus 1/5,500 chinook caught).

Opening dates for salmon fisheries are constrained because of concerns related to Sacramento winter-run chinook. Recreational salmon fisheries south of Point Arena (38º57'30" N latitude) open no earlier than the first Saturday of April. Commercial fisheries south of Point Arena open no earlier than May 1, and fisheries north of Point Arena are not constrained by these delayed opening dates. Because the shore-based fishery operates south of Point Arena, the Council may want to be aware of these season restrictions.

The GMT is aware of the goals of the Groundfish FMP, specifically those to promote year-round opportunities, extend fishing and marketing opportunities as long as practicable; and to encourage full utilization of groundfish resources. Changing the start date would be in keeping with promoting year-round fisheries and extending fishing and marketing opportunities. In the last eight years, the cap set for the California shore-based whiting fishery (5% of the total shore-based allocation) has been achieved three times (1997, 2000, 2004). Allowing the fishery to begin earlier in the year may encourage full utilization, if inadequate access to fish moving northward in April is the reason the cap is not being achieved.

The GMT did not consider how changing the whiting season start date south of 40°30’ N latitude could be affected by the ratification of the U.S./Canada whiting treaty. If an analysis is developed for this proposal as part of the rule-making process, implementation of the treaty should be considered in that analysis.

Given the above information, the GMT believes that changing the start date for the shore-based fishery south of 40°30’ N latitude April 15 to March 15 should be explored, but also recommends that the Council proceed cautiously. NMFS is in the process of evaluating whether or not it is possible to transition the shore-based whiting fishery from an EFP into federal regulations. Because this process is complex, it is possible the shore-based fishery will operate under an EFP in 2006. In 2006, the EFP could be used to exempt the fleet from the April 15 start date and evaluate the bycatch of groundfish, especially overfished species, and salmon associated with starting the fishery a month earlier. In 2004 and 2005, electronic monitoring systems have been deployed in the shore-based whiting fishery to document compliance with full retention/maximized retention requirements. Because of funding and contracting constraints, electronic monitoring systems have not been available for the April 1 shore-based whiting fishery (the fishery that occurs between 42°’ N latitude and 40°30’ N latitude) and may not be available earlier than March 15, 2006. NMFS is still evaluating the adequacy of electronic monitoring to document compliance with full retention/maximized retention requirements. Because this EFP would be collecting information on groundfish and salmon bycatch as well as gathering information on the size and condition of whiting south of 40°30’ N latitude, the GMT believes that observers, specifically 100% observer coverage, may be a more appropriate option for monitoring this sector of the shore-based whiting fishery. An increase in plant sampling would also be useful for this sector of the shore-based whiting fishery, but the GMT believes that any increase in plant sampling does not replace the need for observer coverage during harvesting.

If an EFP conducted in 2006 indicates that changing the start date from April 15 to March 15 does not increase the bycatch of groundfish or salmon or negatively affect the product quality and catch per unit effort of whiting, then a permanent date change could be considered through notice and comment rule making. The results of the 2006 EFP would likely not be available for inclusion in the 2007 – 2008 biennial specifications and management measures process, so the date change would need to be implemented in a separate rule making.

The GMT would like to bring to the Council’s attention the work load associated with this action. Adequate resources will need to be available to conduct the shore-based whiting EFP next year. In the event the shore-based EFP will not go forward in 2006, a separate EFP for the shore-based whiting fishery south of 40°30’ N latitude would need to be developed, conducted, and the results analyzed. Additional resources would need to be available to provide observer coverage for this EFP as well as for the rule making and environmental assessment process associated with this action.

In summary, if adequate resources are available, the GMT recommends that the effects associated with changing the start date be evaluated as part of the shore-based whiting EFP and that, if appropriate, the date change be considered through a full rule-making process. The current biological opinion requires a 100 fm depth restriction in the Eureka area (from 40°30’ N latitude to 40° N latitude). Therefore, the GMT recommends that a depth restriction to minimize salmon bycatch, similar to the one specified in the current biological opinion for the Eureka area, be considered for the Monterey area. Because of the uncertainty around salmon bycatch in southern areas, the GMT also recommends consideration of a salmon bycatch cap for this portion of the fishery.

PFMC
06/14/05

INITIAL CONSIDERATION OF OPENING DATE OF CALIFORNIA SHORE-BASED WHITING FISHERY

Mr. Barry Cohen, a processor from central California and member of the Groundfish Advisory Subpanel, requested Council consideration of a change in the California shore-based whiting season start date from April 15 to March 15 beginning in 2006. The area affected under this proposal are waters south of 40°30' N latitude. The request for an earlier start date for this fishery is predicated on the higher abundance of Pacific whiting in these waters early in the year. Whiting migrate north as the season progresses and are in low abundance south of 40°30' N latitude when the California shore-based fishery opens on April 15. The shore-based whiting fishery south of 40°30' N latitude used to open as early as March 15 but, as interest in the southern fishery waned, the season started later to meet the needs of the California shore-based trawl fleet operating in waters north of 40°30' N latitude. Now, with renewed interest in targeting whiting south of 40°30' N latitude, the earlier start date is requested. It is also noteworthy that the California shore-based whiting fishery south of 42° N latitude operates under an annual 5% cap of the whiting allocated to the coastwide shore-based whiting sector. This ensures that the California fleet, which starts targeting whiting earlier than the northern fleet, will not usurp the whiting quota and prohibit opportunities for the more northern shore-based whiting fleets operating off of Oregon and Washington.

The task under this agenda item is to consider this request for an earlier season start date south of 40°30' N latitude for the shore-based whiting sector. This requires a two-meeting process since changing the primary whiting season is not defined as a routine management measure under the Groundfish Fishery Management Plan or in regulations. If the Council opts to recommend this change in the season start date, then this tentative decision will be announced to the general public subsequent to the June Council meeting. Notice will then be given that final Council consideration will be scheduled for the September Council meeting.

Council Action:

Consider and Recommend the Season Start Date for the 2006 Shore-based Whiting Fishery for Public Review.

Reference Materials: None.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Consider an Adjustment in the Opening Date for 2006 for Public Review

PFMC
05/24/05

Summary of the Alternatives in the Groundfish Essential Fish Habitat DEIS

List of the Alternatives

Alternatives to Identify and Describe EFH

Alternative 1: No Action

✓ Alternative A.2: Depths less than 3,500 m (Preliminary Preferred Alternative)

✓ Alternative A.3: 100% HSP Area (Preliminary Preferred Alternative)

Alternative A.4: HSP Based on Management Status

Alternative A.5: 70% HSP Area

Alternative A.6: 30% HSP Area

Alternatives to Designate HAPC

Alternative B.1: No Action

✓ Alternative B.2: Estuaries (Preliminary Preferred Alternative)

✓ Alternative B.3: Canopy Kelp (Preliminary Preferred Alternative)

✓ Alternative B.4: Seagrass (Preliminary Preferred Alternative)

Alternative B.5: Core Habitat

✓ Alternative B.6: Rocky Reefs (Preliminary Preferred Alternative)

Alternative B.7: Areas of Interest

Alternative B.8: Oil Production Platforms

Alternative B.9: Process for New HAPC Designations

Alternatives to Minimize Adverse Impacts to EFH

Alternative C.1: No Action

Alternative C.2: Depth-based Gear-specific Restrictions

- Option C.2.1: Large footrope prohibited inside 200 fm, fixed gear inside 100/150 fm
- Option C.2.2: Large footrope prohibited in EEZ, fixed gear inside 100/150 fm
- Option C.2.3: Large footrope prohibited inside 200 fm, fixed gear inside 60 fm

Alternative C.3: Close Sensitive Habitat

- Option C.3.1: Close areas where $S \geq 2$ and $R \geq 1$ with trawl effort adjustment
- Option C.3.2: Close areas where $S \geq 0.5$ and $R \geq 0.5$ with trawl effort adjustment
- Option C.3.3: Close areas where $S \geq 2$ and $R \geq 1$ without trawl effort adjustment
- Option C.3.4: Close areas where $S \geq 0.5$ and $R \geq 0.5$ with trawl effort adjustment

✓ Alternative C.4: Prohibit the Geographic Expansion of Fishing (Preliminary Preferred Alternative)

✓ Option C.4.1: Prohibit expansion of trawl fishing

✓ Option C.4.2: Prohibit expansion of all bottom-tending gear

Alternative C.5: Prohibit a Krill Fishery

Alternative C.6: Close Hotspots

Alternative C.7: Close Areas of Interest

Option C.7.1: Close areas of interest to bottom trawling.

Option C.7.2: Close areas of interest to all bottom-contacting fishing activities.

Alternative C.8: Zoning Fishing Activities

Option C.8.1: Zoning for mobile bottom-contacting gear

Option C.8.2: Zoning for all bottom-contacting gear

✓ Alternative C.9: Gear Restrictions (Preliminary Preferred Alternative)

✓ C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls.

✓ C.9.2: Prohibit the use of flat trawl doors (i.e., require cambered doors).

✓ C.9.3: Limit the length of a single longline groundline to 3 nm.

✓ C.9.4: Employ habitat-friendly anchoring system.

✓ C.9.5: Prohibit dredge gear.

✓ C.9.6: Prohibit beam-trawl gear.

✓ C.9.7: Prohibit set-gillnets in waters deeper than 60 fm.

✓ C.9.8: Prohibit dingle bar gear (troll groundfish gear).

✓ Alternative C.10: Central California No-trawl Zones (Preliminary Preferred Alternative)

✓ Alternative C.11: Relax Gear Endorsement Requirements (Preliminary Preferred Alternative)

✓ Alternative C.12: Close Ecologically Important Areas to Bottom Trawl (Preliminary Preferred Alternative)

✓ Alternative C.13: Close Ecologically Important Areas to Bottom-contacting Gear (Preliminary Preferred Alternative)

✓ Alternative C.14: Close Ecologically Important Areas to Fishing (Preliminary Preferred Alternative)

Research and Monitoring Alternatives

Alternative D.1: No Action

Alternative D.2: Expanded Logbook Program

Option D.2.1: All fishing vessels maintain a logbook

Option D.2.2: A sub-sample of fishing vessels maintain a logbook

Alternative D.3: Expanded Vessel Monitoring System

Alternative D.4: Research Reserve System

Description of the Alternatives

Alternatives to Identify and Describe EFH

Alternative 1: No Action

The no action alternative would maintain the current EFH identification and description, incorporated into the groundfish FMP by Amendment 11 in 1998. The more than 80 groundfish species in the management unit occupy diverse habitats at all stages in their life histories. As a consequence of the large number of groundfish fishery management unit (FMU) species and their diverse habitat associations, when all the individual EFHs are taken together, all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California to the seaward boundary to the U.S. EEZ become EFH.

The FMP groups the various EFH descriptions into seven units called composite EFHs. This approach focuses on ecological relationships among species and between the species and their habitat, reflecting an ecosystem approach in defining EFH. Seven major habitat types are proposed as the basis for such assemblages or composites. These major habitat types are readily recognizable by those who potentially may be required to consult about impacts to EFH, and their distributions are relatively stationary and measurable over time and space. The seven composite areas identified as EFH are as: Estuarine; Rocky Shelf; Nonrocky Shelf; Canyon; Continental Slope/Basin; Neritic Zone; and, Oceanic Zone. Because it designates the entire EEZ including areas shoreward to the mean higher high water line, this alternative encompasses the largest area, 317,690 square miles.

✓ Alternative A.2: Depths less than 3,500 m (Preliminary Preferred Alternative)

In this alternative, EFH would be identified as 100% of the area where Habitat Suitability Probability (HSP) is greater than zero for all species and any additional area in depths less than or equal to 3,500 m (1,914 fm). HSP refers to the probability that the habitat is suitable for a managed species. This alternative would designate 187,741 square miles in the EEZ, and to the mean higher high water line and upriver extent of salt water, as EFH. By including areas out to the 3500 m depth curve, this alternative includes all habitats where groundfish have been observed with the addition of 100 m depth as a precautionary adjustment in case of unobserved species.

✓ Alternative A.3: 100% HSP Area (Preliminary Preferred Alternative)

Designate 100% of the area where HSP is greater than zero for all species. HSP refers to the probability that the habitat is suitable for a managed species. This alternative would designate 87,160 square miles as EFH, all of it within the area that would be designated by Alternative A.2.

Alternative A.4: HSP Based on Management Status

Designate the upper 90% of the HSP area of overfished species HSP, upper 80% of the HSP area for precautionary zone species, and upper 60% of the HSP area for all other groundfish, and all seamounts. HSP refers to the probability that the habitat is suitable for a managed species. The alternative would designate 79,481 square miles as EFH, most of which falls within the area described by the previous alternatives, with the addition of some deeper areas around seamounts

Alternative A.5: 70% HSP Area

Designate the upper 70% of the area where HSP is greater than zero. HSP refers to the probability that the habitat is suitable for a managed species. The alternative would designate 78,569 square miles as EFH, all of which falls within the area described by alternatives A.1, A.2, and A.3.

Alternative A.6: 30% HSP Area

Designate the upper 30% of the area where HSP is greater than zero for all species. HSP refers to the probability that the habitat is suitable for a managed species. The alternative would designate 66,589 square miles as EFH, all of which falls within the area described by the previous alternatives.

Alternatives to Designate HAPC

Alternative B.1: No Action

No HAPCs are currently designated for groundfish. Choosing this alternative would maintain no HAPC designations.

✓ Alternative B.2: Estuaries (Preliminary Preferred Alternative)

Estuaries are protected nearshore areas such as bays, sounds, inlets, and river mouths, influenced by ocean and freshwater. GIS data on West Coast estuaries were derived primarily from the USFWS' National Wetlands Inventory (NWI). Where digital data for the NWI were unavailable, data from NOAA's Coastal Assessment Framework were used.

✓ Alternative B.3: Canopy Kelp (Preliminary Preferred Alternative)

Areas where kelp has been documented and mapped would be designated as HAOC. GIS data for the floating kelp species, *Macrocystis* spp. and *Nereocystis* sp., are available from state agencies in Washington, Oregon, and California. These data have been compiled into a comprehensive data layer delineating kelp beds along the West Coast. Because kelp abundance and distribution is highly variable, these data do not necessarily represent current conditions. However, data from multiple years were compiled together with the assumption that these data would indicate areas where kelp has been known to occur.

✓ Alternative B.4: Seagrass (Preliminary Preferred Alternative)

Seagrass species found on the West Coast of the U.S. include eelgrass (*Zostera* spp., *Ruppia* sp.) and surfgrass (*Phyllospadix* spp.). These grasses are vascular plants, not seaweeds, forming dense beds of leafy shoots year-round in the lower intertidal and subtidal areas. Eelgrass is found on soft-bottom substrates in intertidal and shallow subtidal areas of estuaries. Surfgrass is found on hard-bottom substrates along higher energy coasts.

Alternative B.5: Core Habitat

This alternative designates core areas, defined as the upper 10% of area with an HSP greater than 0%, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species. HSP refers to the probability that the habitat is suitable for a managed species.

✓ Alternative B.6: Rocky Reefs (Preliminary Preferred Alternative)

This alternative designates all rocky reef areas. Rocky habitat may be composed of bedrock, boulders, or smaller rocks such as cobble and gravel.

Alternative B.7: Areas of Interest

This alternative would designate areas that are of special interest due to their unique geological and ecological characteristics. The areas are: the northern portion of the northwest Olympic Coast National Marine Sanctuary (NMS), Grays Canyon, Astoria Canyon, Thompson Seamount, Daisy Bank, Heceta Bank, President Jackson Seamount, Rogue Canyon, Eel River Canyon, Mendocino Canyon, Gorda Escarpment, Cordell Bank, Gumdrop Seamount, Pioneer Seamount, Guide Seamount, Monterey Canyon, Monterey Bay, Taney Seamount, Davidson Seamount, Morro Ridge, San Juan Seamount, and the Cowcod Conservation Area(s). The Council could choose any combination of these areas as part of a preferred alternative.

Alternative B.8: Oil Production Platforms

This alternative designates areas around oil production platforms in Southern California waters. According to a report submitted to the Council by the California Artificial Reef Enhancement Program (CARE 2004), currently there are 27 such platforms remaining out of the 34 constructed since the late 1950s. Twenty-three of these are in federal waters and four are in California state waters.

Alternative B.9: Process for New HAPC Designations

This alternative establishes a streamlined process for designating new HAPCs, based on proposals submitted to the Council. The process would allow organizations and individuals to petition the Council at any time to consider a new designation and ensures, provided they submit a complete package as described below, that the Council will consider their proposal.

Alternatives to Minimize Adverse Impacts to EFH

Alternative C.1: No Action

There is a broad range of regulatory measures in effect on the West Coast, including areas that are closed to fishing or non-fishing activities, fishing gear restrictions, and measures to reduce fishing effort that may have a beneficial effect on EFH.

Alternative C.2: Depth-based Gear-specific Restrictions

This alternative contains three options closing waters shoreward of specific depth contours to large footrope trawl gear and fixed gear. The footrope runs along the bottom of the net opening and its size is regulated to dictate the maximum size of rollers that can be affixed to the footrope. Without larger footrope gear, bottom trawl nets snag more easily on rough, irregular terrain; thus restrictions on footrope size discourage fishing in rocky areas.

This alternative has three options:

Option C.2.1: Large footrope prohibited inside 200 fm, fixed gear inside 100/150 fm

Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N latitude.

Option C.2.2: Large footrope prohibited in EEZ, fixed gear inside 100/150 fm

Prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N latitude.

Option C.2.3: Large footrope prohibited inside 200 fm, fixed gear inside 60 fm

Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 60 fm coastwide.

Alternative C.3: Close Sensitive Habitat

Area closures are defined using these gear and habitat specific sensitivity and recovery index values. Habitat areas above index value thresholds for any gear type, as specified in the following options, are closed to all fishing. This alternative has four options:

Option C.3.1: Close areas where S ≥ 2 and R ≥ 1 with trawl effort adjustment

For each gear type, those areas where the sensitivity index value is greater than or equal to two and the recovery index value is greater than one are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types).

Option C.3.2: Close areas where S ≥ 0.5 and R ≥ 0.5 with trawl effort adjustment

For each gear type, those areas where both the sensitivity and recovery index values are greater than or equal to 0.5 are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types).

Option C.3.3: Close areas where S ≥ 2 and R ≥ 1 without trawl effort adjustment

The same as Option 1 except no adjustment is made for trawl effort.

Option C.3.4: Close areas where S ≥ 0.5 and R ≥ 0.5 with trawl effort adjustment

The same as Option 2 except no adjustment is made for trawl effort.

✓ Alternative C.4: Prohibit the Geographic Expansion of Fishing (Preliminary Preferred Alternative)

Under this alternative, areas that have not been fished recently (2000-2002) would be closed to fishing to protect areas that are potentially pristine. This alternative has two options:

✓ Option C.4.1: Prohibit expansion of trawl fishing

Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002.

✓ Option C.4.2: Prohibit expansion of all bottom-tending gear

Apply the expansion limit to all bottom-tending gear types. The closure would extend west from a line approximating the 2,000 m (1,094 fm) depth contour to the seaward margin of the EEZ.

Alternative C.5: Prohibit a Krill Fishery

This alternative would designate krill as a component of EFH as part of this EIS and prohibit fisheries that target it.

Alternative C.6: Close Hotspots

This alternative prohibits trawling in hotspot areas, where–in this case–hotspots are defined as habitat that has high probability of being EFH for a large number of groundfish. Areas that are associated with 50 or more species/lifestage combinations would be closed to bottom trawling.

Alternative C.7: Close Areas of Interest

This alternative closes any combination of the areas of interest HAPCs designated under Alternative B.7 to fishing by specified gear types. (The 21 areas of interest listed under Alternative B.7 are underwater features, such as seamounts and submarine areas, or are currently under some form of protection.) Closures affect the following activities:

Option C.7.1: Close areas of interest to bottom trawling.

Option C.7.2: Close areas of interest to all bottom-contacting fishing activities.

Alternative C.8: Zoning Fishing Activities

Under this alternative NMFS limits the use of bottom-tending fishing gear to specified zones where the agency determines that such activities can be conducted without altering or destroying a significant amount of habitat. First, all areas deeper than the 2,000 m (1,094 fm) contour along the continental slope extending to the maximum westward range of groundfish EFH are closed to certain bottom-tending fishing gear types, according to the options described below. Second, a five-year transition period to gear specific zones is established for the remaining area inside the 2,000 m contour, which remains open to these activities, subject to any other restrictions, for the five years from implementation (e.g., 2007-2011). Third, during this five-year period, NMFS conducts the research necessary to delineate zones where specified fishing activities would be permitted. At the end of the five-year transition period, the gear-specific zones come into effect and any remaining unzoned area is closed to affected gear types, according to the options described below. (Restrictions applied outside 2,000 m remain in effect.)

In identifying fishing zones, NMFS must demonstrate that any unavoidable adverse impacts would be minimal and temporary, based on the best scientific information available.

Option C.8.1: Zoning for mobile bottom-contacting gear

Fishing zones are established for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear types are unaffected by the zoning system, including the prohibition outside 2,000 m.

Option C.8.2: Zoning for all bottom-contacting gear

Fishing zones are established for all bottom-contacting gear types, including bottom longlines, traps, and pots. The immediate closure outside of 2,000 m applies to all bottom-contacting gear types.

In addition to establishing the zoning system, NMFS will conduct a gear substitution and modification research program, intended to redesign bottom fishing gear to reduce damage to habitat. This program will have a significant cooperative research element by employing fishermen in the design and testing of new gear.

The zoning system will be regularly modified to incorporate new information about habitat sensitivity and recovery factors, gear impacts on habitat, and to accommodate use of newly developed or modified gear.

✓ Alternative C.9: Gear Restrictions (Preliminary Preferred Alternative)

This alternative includes specific gear modifications and prohibitions that are based on that interaction. Under this alternative the following gear restrictions would be implemented in areas identified as EFH for groundfish:

- ✓ C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls.
- ✓ C.9.2: Prohibit the use of flat trawl doors (i.e., require cambered doors).
- ✓ C.9.3: Limit the length of a single longline groundline to 3 nm.
- ✓ C.9.4: Employ habitat-friendly anchoring system.
- ✓ C.9.5: Prohibit dredge gear.
- ✓ C.9.6: Prohibit beam-trawl gear.
- ✓ C.9.7: Prohibit set-gillnets in waters deeper than 60 fm.
- ✓ C.9.8: Prohibit dingle bar gear (troll groundfish gear).

✓ Alternative C.10: Central California No-trawl Zones (Preliminary Preferred Alternative)

This alternative is based on a project being undertaken by two environmental advocacy organizations, The Nature Conservancy (TNC) and Environmental Defense Fund (EDF). and involves a public-private partnership under which private funds are used to purchase groundfish limited entry trawl licenses and vessels in concert with the designation, through the Council and NMFS, of no-trawl zones off the central

California coast. The project area extends from Point Conception to Davenport, California, and includes adjacent offshore seamounts (Gumdrop, Guide, Pioneer, Davidson, and Rodriguez).

TNC/ED have identified 23 permit holders they believe regularly trawl inside the project area. Most home port in Morro Bay, Moss Landing, Monterey, or Half Moon Bay. TNC/EDF intend to purchase a significant majority of the bottom trawling permits and vessels in this region if the Council/NMFS designates a significant portion of the project area as no-bottom-trawl zones. TNC/ED will identify areas they think should be designated no-trawl zones using the GIS data developed as part of this EIS in combination with a participatory process involving trawl fishermen in the project area. If this alternative is adopted as an FMP and regulatory amendment, these areas will be closed to bottom trawling by NMFS once TNC/EDF have negotiated purchase contracts or options for at least half of the limited trawl permit holders they have identified as operating in the project area.

✓ Alternative C.11: Relax Gear Endorsement Requirements (Preliminary Preferred Alternative)

Vessels holding a groundfish limited entry permit account for a large portion of groundfish landings. Currently, limited entry permits include a gear endorsement specifying the type of gear the permit holder may use. These endorsements identify three gear categories: trawl, longline, and pot. In addition, longline and pot gear permit holders may also have a sablefish endorsement. Permit holders with this species-specific endorsement may participate in the high-value primary sablefish fishery and are allocated vessel-specific catch quotas, known as tier limits because the endorsements fall into one of several categories, or tiers, with different catch quotas. Under this alternative, gear endorsements are relaxed but the sablefish endorsement is not. This would allow permit holders to switch gear types, providing fishermen greater flexibility in changing strategies based on prevailing conditions in the fishery.

✓ Alternative C.12: Close Ecologically Important Areas to Bottom Trawl (Preliminary Preferred Alternative)

This alternative was proposed by the environmental group Oceana and adopted by the Council. The alternative would close a network of areas to bottom trawling; set a maximum footrope size of eight inches on bottom trawl gear within open area; require Vessel Monitoring Systems on all bottom trawl vessels with positions recorded every 5 minutes; increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates; establish a process for setting a limit on the bycatch of habitat-forming invertebrates; require ongoing research including comprehensive benthic mapping.

✓ Alternative C.13: Close Ecologically Important Areas to Bottom-contacting Gear (Preliminary Preferred Alternative)

Under this alternative, the areas identified in Alternative C.12 are closed to all bottom-contacting gear types, defined as both fixed gear (longlines, pots, and traps) and bottom trawl.

✓ Alternative C.14: Close Ecologically Important Areas to Fishing (Preliminary Preferred Alternative)

Under this alternative, the areas identified in Alternative C.12 are closed to all fishing.

Research and Monitoring Alternatives

Alternative D.1: No Action

NMFS conducts extensive fishery-related research relevant to groundfish and has a variety of methods to monitor these fisheries. Section 7.1 in the 2005-2006 groundfish harvest specifications FEIS (PFMC 2004) describes groundfish monitoring programs carried out by NMFS, the states, and tribes, and is hereby incorporated by reference. Current monitoring programs especially relevant to the alternatives described here include the limited entry trawl logbook program, the West Coast Groundfish Observer Program, and VMS covering limited entry trawl and fixed gear vessels. These programs are primarily intended to monitor discards and landings of groundfish and to enforce current harvest limits and area restrictions. There is no component specifically intended to monitor the effects of fishing on EFH.

Alternative D.2: Expanded Logbook Program

Under this alternative vessels in all commercial sectors, including recreational charter (for hire) boats, will participate in an expanded logbook program.

Option D.2.1: All fishing vessels maintain a logbook

All fishing vessels maintain a logbook, recording information on fishing time, location, and catch composition similar to the current trawl logbook program.

Option D.2.2: A sub-sample of fishing vessels maintain a logbook

A representative, random sample of all fishing vessels is required to maintain logbooks, gathering the information described above.

Alternative D.3: Expanded Vessel Monitoring System

This alternative will identify expansion of the Vessel Monitoring Program to cover all West Coast groundfish commercial and recreational charter vessels as an important program objective to be implemented through tiered actions.

Alternative D.4: Research Reserve System

This alternative will establish a system of areas that are closed to fishing to foster habitat-related research and comparison of fished areas with unfished areas.

Summary of Public Comment on Specific Alternatives in the Groundfish EFH DEIS

The following tables summarize public comment received and reproduced under Agenda Item C.3.d. Only comments that are clearly in reference to one of the alternatives are summarized here. Where appropriate, qualified support or opposition to the adoption of a preferred alternative is noted. It should be noted that a lot of the public comment expressed general support or opposition to the intent, general measures, methodology, and analysis in the DEIS, which is not reflected here. The reader should refer to the public comment letters themselves for details on the recommendations summarized here, as well as the broader range of comments and recommendations the public made on the groundfish EFH DEIS.

A. Alternatives to Identify and Describe EFH (Alternatives A.1–A.6)

	A.1	A.2	A.3	A.4	A.5	A.6
Audubon Society of Portland		Choose as preferred				
Coos Bay Trawlers' Association	Choose as preferred	Second choice as preferred				
Craven, Robert				Choose as preferred		
Independent Scientific Review Panel			Received the most support of the panel with additional recommendations	Supported by 2 panel members		
Natural Resources Defense Council/The Ocean Conservancy		Choose as preferred, modified to include seamounts				
Oregon Anglers		Choose as preferred				
Pacific Marine Conservation Council		Choose as preferred*				
Port San Luis Harbor District	Does not support	Does not support	Does not support	May support with qualifications	May support with qualifications	May support with qualifications
Retherford, Michael				Most logical alternative		

*The comment states "PMCC recommends adopting *Alternative A.3, Depths less than 3,500 m* as Essential Fish Habitat." Alternative A.2 identifies EFH as depths less than 3,500 m and it is assumed the commenter intended to identify that alternative.

B. Alternatives to Designate HAPCs (Alternatives B.1–B.9)

	B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8	B.9
Audubon Society of Portland		Choose as preferred	Choose as preferred	Choose as preferred		Choose as preferred	Choose as preferred	Choose as preferred	Choose as preferred
California Artificial Reef Enhancement Program								Choose as preferred	
Coos Bay Trawlers' Association	Choose as preferred	Second choice as preferred, combine B.2, B.3, B.4, and B.6				Second choice as preferred, combine B.2, B.3, B.4, and B.6			
Heikkila, Paul		Strongly supports	Strongly supports	Strongly supports		Strongly supports			
Independent Scientific Review Panel		Supports combined B.2, B.3, B.4, B.6, & B.7 as preferred			Consider if species-specific relative abundance data available	Supports combined B.2, B.3, B.4, B.6, & B.7 as preferred		Did not support	Support with "delisting" mechanism
Mendonoma Marine Life Conservancy		Include Big River Estuary							
Natural Resources Defense Council/The Ocean Conservancy					Choose as preferred				
Oregon Anglers		Many of these alternatives have enough data to support designation							Modify to include process to remove HAPC designation
Pacific Marine Conservation Council		Choose as preferred	Choose as preferred	Choose as preferred		Choose as preferred	Choose as preferred		Choose with process to remove HAPC designation included
Port San Luis Harbor District	Does not support	Supports with qualifications	Supports with qualifications	Supports with qualifications	Supports with qualifications	Supports with qualifications	Supports with qualifications	Supports with qualifications	Supports with "un-designation" option
Retherford, Michael		Supports this alternative							

C. Alternatives to Minimize Impacts to EFH (Alternatives C.1–C.7)

	C.1	C.2	C.3	C.4	C.5	C.6	C.7
Audubon Society of Portland				Choose C4.2 as preferred	Choose as preferred	Choose as preferred	Choose C.7.2 as preferred
Coos Bay Trawlers' Association	Choose as preferred			C.4.1 second choice as preferred			
Craven, Robert			C.3 not acceptable (C.3.1 or C.3.2 more rational approach)				
Fishing Vessel Owners' Association		Opposes options C.2.1 & C.2.2; supports C.2.3 with qualifications		C.4.2 would not affect member longline vessels	Supports this alternative		Does not support
Independent Scientific Review Panel			C.3.4 and C.13 best consider spatial distribution of habitats, impacts, sensitivity				HAPC Areas of Interest should be protected
Port San Luis Harbor District		Supports elements of C.2.1 & C.2.2 representing status quo. Do not support C.2.3	Supports all options with qualifications	Supports	Supports with qualifications	Supports with qualifications	Supports with qualifications
Retherford, Michael	All item C alternatives problematic						

C. Alternatives to Minimize Impacts to EFH (Alternatives C.8–C.14)

	C.8	C.9	C.10	C.11	C.12	C.13	C.14
Audubon Society of Portland		Choose 9.5 & 9.6 as preferred	Choose as preferred		Choose a combination of C.12, C.13, & C.14 as preferred	Choose a combination of C.12, C.13, & C.15 as preferred	Choose a combination of C.12, C.13, & C.16 as preferred
Capozzelli, J.					Choose as preferred		
Coastside Fishing Club					Endorses the findings and proposed actions contained in Alternative 12	Unnecessarily restricts recreational fishing	Unnecessarily restricts recreational fishing
Cobb, Leesa					Supports this alternative		
Craven, Robert							Not acceptable
Diller, Bill			Fully endorses				
Fishermen's Marketing Association					Submitted Trawl Industry Proposal as modification of C.12		

	C.8	C.9	C.10	C.11	C.12	C.13	C.14
Fishing Vessel Owners' Association		C.9.3 may have unintended adverse effects; supports C.9.4		Supports with proposed modifications		Opposes	
Heikkila, Paul		Opposes 9.8				Would eliminate important recreational & hook & line fishing in Bandon-Coos Bay, OR area	Would eliminate important salmon troll, recreational & hook & line fishing in Bandon-Coos Bay, OR area
Independent Scientific Review Panel		Gear modifications should be encouraged with field testing	Supports solutions to reduce economic hardship and encourage partnerships			C.3.4 and C.13 best consider spatial distribution of habitats, impacts, sensitivity	
Moss Landing Harbor District			Supports efforts of NGOs and 23 commercial fisherman trying to agree on designated zones (such as Alternatives C.10 and C.12)		Supports efforts of NGOs and 23 commercial fisherman trying to agree on designated zones (such as Alternatives C.10 and C.12)		
Natural Resources Defense Council/The Ocean Conservancy					Choose as preferred combined with specified features of C.13		
Oceana					Submitted Revised Alternative C.12		
Oregon Anglers	Supports C.8.1 with qualifications						
Pacific Marine Conservation Council		Qualified support for C.9.1, C.9.5, C.9.6			Qualified support if further refined		
Port of Bandon					Does not support (reference to closed area near port)	Does not support (reference to closed area near port)	Does not support (reference to closed area near port)
Port San Luis Harbor District	Supports either option with qualifications	Supports	Support if a majority of limited entry permit holders cooperate with NGOs	Supports	Support if a majority of limited entry permit holders cooperate with NGOs	Opposes	Opposes
Retherford, Michael	All item C alternatives problematic						

	C.8	C.9	C.10	C.11	C.12	C.13	C.14
Rock, Joseph		Opposes 9.2, 9.5, & 9.8					
Southern California Trawlers' Association					Proposes alternative closed areas in Monterey/SCB		

D. Research and Monitoring Alternatives (Alternatives D.1–D.4)

	D.1	D.2	D.3	D.4
Audubon Society of Portland		Choose a combination of D.2.1 & D.4 as preferred		choose a combination of D.2.1 & D.4
Coos Bay Trawlers' Association	Choose as preferred			
Craven, Robert		Opposes D.2.1	Opposes	
Fishing Vessel Owners' Association		Supports D.2.1 with qualification		
Independent Scientific Review Panel		Supports expanded logbook coverage	Supports VMS effort distribution analysis	Supports research reserves
Natural Resources Defense Council/The Ocean Conservancy		Choose D.2.1 as preferred	Choose as preferred	Choose as preferred
Oregon Anglers				Supports with modifications on funding and reauthorization elements
Pacific Marine Conservation Council		Supports D.2.2	Supports	Strongly supports
Retherford, Michael	Appropriate alternative			

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

May 25, 2005

Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220

Dear Chairman Hansen: Don

We appreciate the recent efforts of the Pacific Fishery Management Council (PFMC) to consider the request from the National Oceanic and Atmospheric Administration (NOAA) that the PFMC draft fishing regulations under the National Marine Sanctuaries Act to protect the Cordell Bank National Marine Sanctuary and for the proposed addition of the Davidson Seamount to the Monterey Bay National Marine Sanctuary. Your efforts reflect a positive level of partnership between the PFMC and the national marine sanctuaries on the west coast. I thank you and your colleagues for their leadership.

Your April 22, 2005 letter to the National Marine Sanctuary Program (NMSP) suggests that the fishing regulations proposed to protect these sanctuaries are more properly adopted under the Magnuson-Stevens Fisheries Conservation and Management Act. We understand that the June 2005 meeting of the PFMC will consider the Draft Environmental Impact Statement (EIS) for the Pacific Groundfish Essential Fish Habitat (EFH) program, and later meetings will address the regulatory strategies necessary to implement the selected alternatives.

Staff of the NMSP and NOAA Fisheries Service are actively discussing the proposal to adopt fishing regulations under the Magnuson-Stevens Act to protect the Cordell Bank and Davidson Seamount. Should NOAA adopt this approach, it will be important that your actions on EFH allow for adoption of fishing regulations that can meet the goals and objectives established for the Cordell Bank and Davidson Seamount. The purpose of this letter is to provide technical advice on the combination of EFH alternatives presently under consideration.

Based on an initial review, Alternative A.2, and management Alternatives C.13 and C.14, in the Draft EIS for EFH appear to accomplish the regulatory solution described in your April 22, 2005 letter for the protection of Cordell Bank and Davidson Seamount. We note, however, that portions of the Davidson Seamount area for which the NMSP proposes protection extend to 3,875 m water depth, beyond the 3,500 m water depth described in Alternative A.2. We suggest you consider adding this extra depth for the Davidson Seamount area to Alternative A.2.

Please note that this represents our preliminary assessment of what can be done under this particular pending Council action to promulgate fishing regulations for Cordell Bank and Davidson Seamount. However, this does not preclude the need for possible further action under the Magnuson-Stevens Act to achieve the goals and objectives of the Sanctuaries with respect to fishing regulations. Thank you for your consideration of this technical advice.

Don,
As I've conveyed to the "other" Don. We sincerely appreciate the Council's perspective and willingness to find the "common ground."

Sincerely,

Daniel J. Basta, Director
National Marine Sanctuary Program

cc: Rebecca Lent, Deputy Assistant Administrator, NOAA Fisheries
Rod McInnis, Southwest Regional Administrator
Robert Lohn, Northwest Regional Administrator
Donald McIsaac, Executive Director, PFMC
Dan Howard, Manager, Cordell Bank National Marine Sanctuary
William J. Douros, Superintendent, Monterey Bay National Marine Sanctuary

CALIFORNIA DEPARTMENT OF FISH AND GAME GROUNDFISH ESSENTIAL FISH HABITAT (EFH) ENVIRONMENTAL IMPACT STATEMENT: FINAL PREFERRED ALTERNATIVES

Alternative A.2: Depths less than 3500m

California supports the EFH Alternative 2 plus those seamounts within the EEZ in waters deeper than 3,500m. This provides for the greatest extent of known habitat supporting the ecosystem in which groundfish flourish or could flourish. This would provide habitat consideration and protection to all groundfish habitats within this zone. California supports adding or removing such habitat descriptions as information becomes available.

Alternative B.7: Areas of interest

California supports HAPC designations for the following areas only:
Seamounts within state borders - Unique, sensitive habitats which support rich communities of invertebrates and serve as habitat for some groundfish.
Monterey Canyon - Unique and diverse habitats in the largest submarine canyon off California.
Specific areas of the Cowcod Conservation Area (as designated on DFG proposed map) - Invertebrate (Gorgonian and coral) concentrations have been identified in four areas in and around the CCAs during recent submersible surveys. These include the Eastern CCA, Cherry Bank, Potato Bank, and Kidney/Hidden Banks. These are the only actual location data for concentrations of these invertebrates that are currently available.
Federal Waters MPAs in the CINMS as designated on DFG proposed map – (see further discussion below under C.14)
Cordell Bank - A productive high relief rocky reef area that is important to a number of overfished species including Canary rockfish.
Mendocino Ridge - An extensive high relief rocky reef area extending across depth zones in a transition area between biogeographic regions.

Alternative B.8: Oil Production Platforms

California is supporting HAPC designation for those platforms that show consistent high abundances of various groundfish living on or around these structures. Several PFMC designated "overfished species" are found in measurable concentrations on specific platforms. Currently, this would include 13 such structures in the Santa Barbara Channel area. Other platforms may be considered on a case-by-case basis as more information on their relationship to groundfish becomes available.

Alternatives C.4.1: C.9.6: C.10; C.12; C.13; and C.14

California supports alternatives to minimize adverse impacts on EFH due to fishing as the following prohibitions:

Alternative C.4.1: Prohibit geographic expansion of fishing

Trawl foot print designation – Use 700 fm as the outer boundary of the trawl foot print for areas north of Pt. Conception and 300 fm for areas south of Pt. Conception. These isobaths include nearly all recent trawl tracks and would also leave some "unfished" areas within that zone which would provide future opportunities for fishery flexibility, while closing all areas in deeper waters to protect habitats from future expansion of trawl fishing. Future justifiable requests could be considered to modify these boundaries to allow beyond these depths. This might involve establishing a process involving technical and regulatory review committees to consider and make recommendations on such proposals.

C.9.1: Gear restrictions: prohibit roller gear larger than 15"

Roller gear larger than 15" to prevent damage from trawl gear to high relief rocky reefs and sensitive attached invertebrates.

C.9.5: Gear restrictions: prohibit dredge gear

Dredge gear to prevent damage to soft bottom substrates and sensitive invertebrate communities. (This gear is currently not allowed in California.)

C.9.6: Gear restrictions: prohibit beam trawl gear

Beam trawl except for San Francisco Bay bait shrimp fishery – long established fishery in highly altered habitat. Prevents damage to soft bottom communities, low relief rocky substrates, and sensitive attached invertebrates.

C.9.8: Gear restrictions: prohibit dingle bar gear

Dingle-bar gear to prevent damage to rocky reefs and sensitive attached invertebrates

C.10: Central California no-trawl zones

Support the most up to date collaborative version of the agreement between the Nature Conservancy and Industry areas 1,2,and 3 off central California between Point Sur and Point Conception including Davidson seamount.

C.12: Close ecologically important areas to bottom trawl

Trawl gear prohibition - Oceana revision maps including the Trawl industry maps (version 8 am 6/15/2005) as follows: (N to S)

Areas of agreement – In federal waters accept all areas of agreement between the Oceana/ Industry proposals and any other areas of agreement in state waters (e.g. Monterey Bay, state waters extend 3 miles seaward of a line between Pt. Santa Cruz and Pt. Pinos in this area). This would provide protection to areas of known or expected sensitive habitats while limiting the economic impacts to those acceptable to the fishery.

These include the areas of substantial overlap between the Oceana and Industry proposals for:

Northern and Southern California -
Crescent City Deep Biogenic Area (32)
Eel River Canyon (34) with state modification
Blunts Reef (35)
Mendocino Ridge (36)
Delgado Canyon (37)
Tolo Bank (0)
Point Arena Offshore (39)
Biogenic Area 12 (40)
Cordell Bank (41)
Farallon Is./Fanny Shoal (42)
Half Moon Bay (42) with state modification
Monterey Bay/Canyon (45) with state modification
Point Sur Deep (44)
TNC/ED areas between Pt. Sur and Pt. Conception

Southern California - California proposes fishing gear closures for the areas designated as MPAs in state and federal waters in the CINMS, trawl gear closures in three sub areas in the Cowcod Conservation Area West (CCA) and the CCA East based on their designation as HAPC, and an area surrounding Catalina Island (51) proposed by Oceana. This would protect large areas of rocky habitat, a submarine canyon and occurrences of some deep water invertebrates.

CCA West Sub-Areas (from 50):
  Potato Bank (50-1)
  Cherry Bank (50-2)
  Hidden Reef/Kidney Bank (50-3)
Catalina Island (51)
CCA East (52)

<u>C.13: Close ecologically important areas to bottom-contacting gear</u>
Davidson Seamount – Support prohibiting all bottom contact fishing gear to prevent damage from future fishing or other resource exploitation activities.
Cordell Bank - Support prohibiting all bottom contact fishing gear in depths shallower than 50 fm.

C.14: Close ecologically important areas to fishing
Implement federal waters portions of Channel Islands MPAs.

The Channel Islands MPAs are a proportional representation of habitat types that occur in a unique area of high productivity, biodiversity and biogeographic and oceanographic mixing. This would be the completion of the federal waters phase of the Channel Islands MPA process which implemented MPAs in state waters that were designed to protect habitat and resources in that region. This was a six-year partnership process between the state and the CINMS involving extensive stakeholder input and involvement and continues as a multi-party collaborative effort. All MPAs except the western Anacapa Island marine protected area would be complete no take areas. With the exception of the proposed “Foot Print” MPA in Federal waters all others would be contiguous with existing state MPAs.

Alternative D.1: No Action
California supports the no action alternative which continues to collect fishery monitoring data through a trawl logbook program, the groundfish observer program, and vessel monitoring systems. California does support continued identification of important data gaps for effective management of the groundfish fisheries and efforts to identify and commit funding to adequately address those research needs.

Alternative D.2: Expanded logbook program
California has concerns about the practicality, logistical requirements, and funding needed to implement an industry-wide logbook program and ability to productively use the data generated from such a program.

Alternative D.4: Research Reserve System
A separate research reserve system is not be needed since the proposed MPAs in the CINMS and other proposed gear closures which may be implemented could serve that function, especially on issues of fished and non-fished habitat comparisons.

CDFG-proposed modifications to four areas proposed for closure under C.12

The following provide descriptions of modifications proposed by CDFG in Figure 1 (depicted by an asterisk (*)) to address areas where discrepancies occur between Oceana and Trawl Industry proposals under C.12.

Crescent City Deep Biogenic Area (32):
Modification: Adopt Oceana Area boundaries westward of Trawl Industry-proposed western boundary.
Concerns addressed: The eastern portion proposed for removal is frequently trawled and would make compliance with the closure boundary difficult.

Eel River Canyon (34):
Modification: Adopt Trawl Industry proposal seaward of the deep RCA boundary and adopt Oceana proposal shoreward of the deep RCA boundary.
Concerns addressed: Provide enforceable size closure in shoreward area and extend habitat protection along canyon and into deeper waters.

Half Moon Bay (42):
Modification: remove area shoreward of line proposed by Oceana (see figure)
Concerns addressed: Eastern section is sandy habitat that is needed for a trawl corridor. Easternmost tip offers rocky habitat that may be too small to enforce as a separate closure.

Monterey Canyon (45):
Modification: Adopt Oceana proposed boundaries in western half of area; adopt Trawl Industry proposed boundaries in eastern half along canyon and southeast.
Concerns addressed: Trawling for California halibut occurs along areas that would otherwise be closed if the entire Oceana area was adopted.

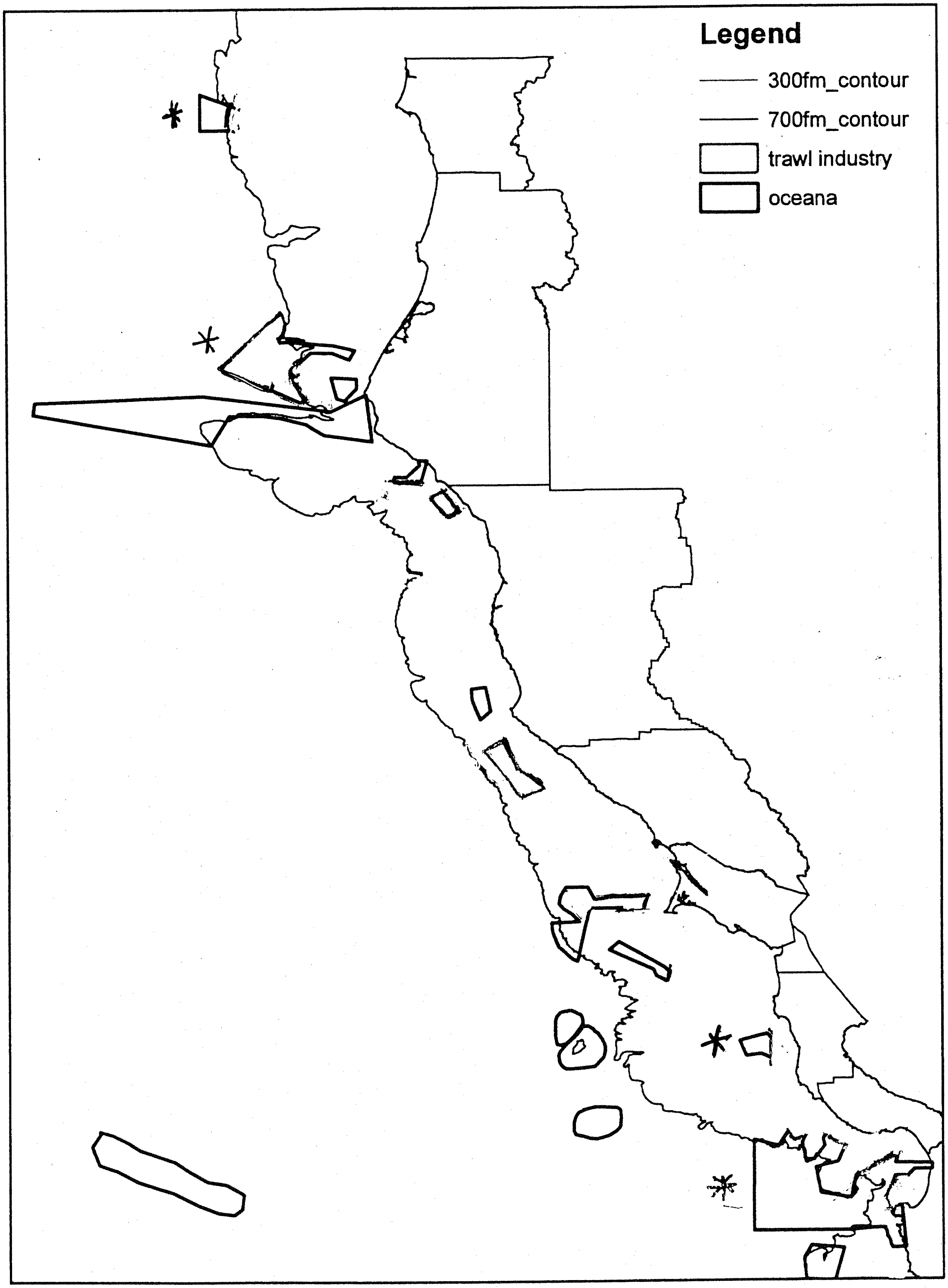


Figure 1: CDFG-supported proposed trawl closure areas under C.12
Boundaries represent areas agreed upon by Oceana and the Trawl Industry.
Areas with an asterisk (*) represent CDFG-modified proposed boundaries where discrepancies occur.

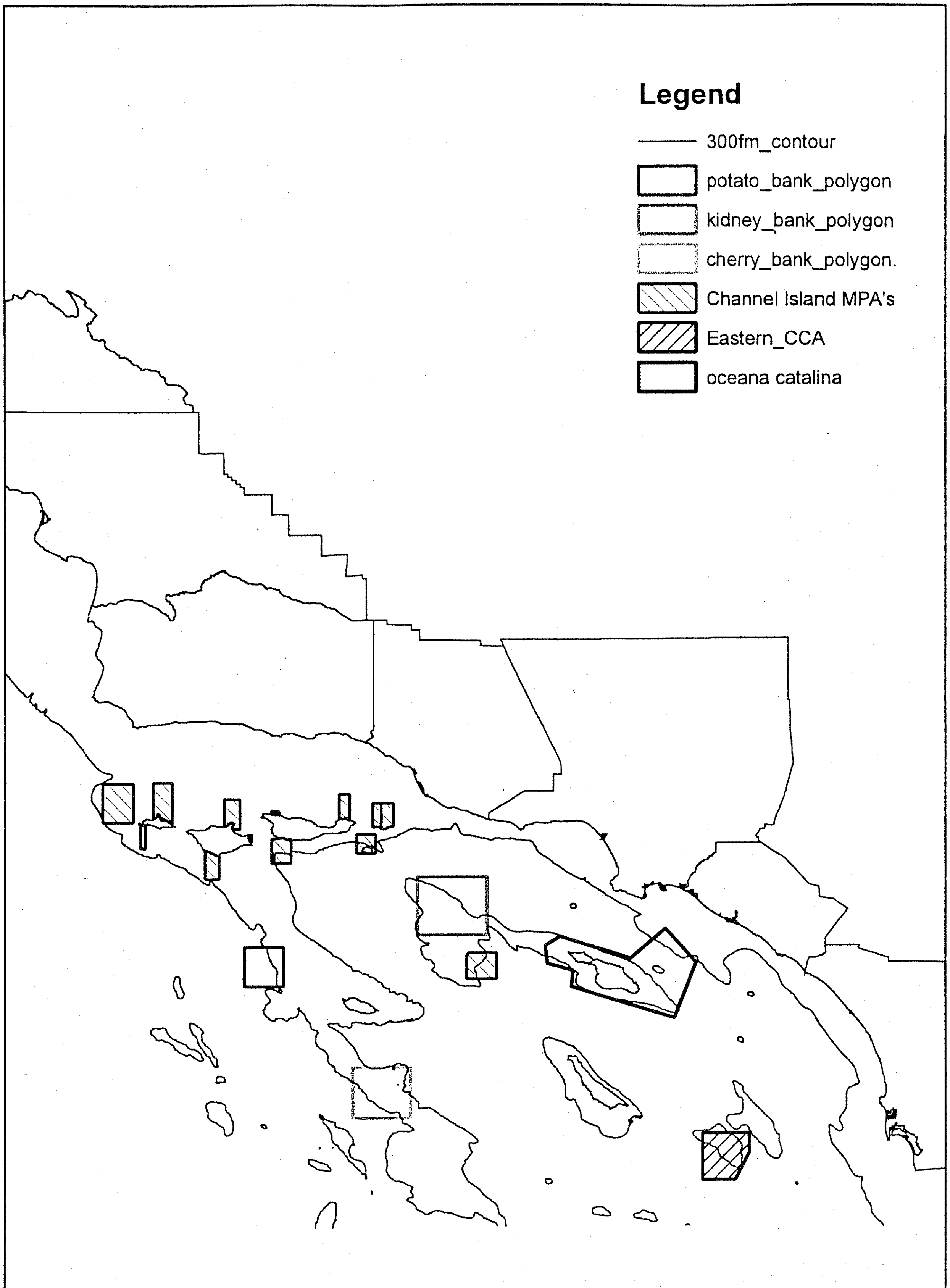


Figure 2: CDFG-supported proposed trawl closure areas under C.12
Boundaries represent areas agreed upon by Oceana and the Trawl Industry.
Areas with an asterisk (*) represent CDFG-modified proposed boundaries where discrepancies occur.

**OREGON DEPARTMENT OF FISH AND WILDLIFE
GROUNDFISH ESSENTIAL FISH HABITAT (EFH) ENVIRONMENTAL IMPACT STATEMENT : FINAL PREFERRED ALTERNATIVES**:

The Oregon Department of Fish and Wildlife (ODFW) has conducted significant public outreach and analysis of the various Essential Fish Habitat (EFH) options for review and selection at the June 2005 Pacific Fishery Management Commission (PFMC) meeting. Efforts were made to provide analysis and review public comment on as many of the options feasible within the time constraints of this process.

ODFW conducted initial technical review sessions with various interested entities, including commercial trawlers, commercial fixed gear and recreational fishery representatives. Because of concerns regarding state fisheries, the options were discussed and reviewed with the Oregon Dungeness Crab Commission, and analysis of pink shrimp tows vs. various geographical options were conducted in consultation with representatives of the pink shrimp fishery. In partnership with the Oregon Sea Grant Extension, ODFW conducted three public meetings in Mid-April (Astoria, Newport and Bandon). The meetings were attended by commercial and sport fishers as well as conservation group representatives and the general public. National Marine Fisheries Service (NMFS) staff were in attendance and provided information at these public meetings. Follow up meetings were held with representatives of the commercial and sport sectors to discuss additional alternatives which were received from Oceana and the trawl industry after the above-referenced public meetings.

The public was concerned about the lack of ongoing education and public outreach regarding this federal process and the fact that options were continuing to be drafted for consideration after the draft environmental impact statement was released for comment on February 11, 2005.

ODFW and the public share the concern that the states have had difficulty adequately analyzing options (to back-up/ground truth federal analysis) which were submitted during and after the DEIS comment period. As a result, ODFW has focused on options that have had adequate public review and analysis wherever possible.

With those caveats, ODFW has, in this exhibit, recommended some criteria for the selection of options. We believe that this is a first step. A formal and timely review process is critical so that final alternatives selected by the PFMC at this June 2005 meeting. Additionally, a system for adequate review of future additions/deletions and changes to these final alternatives is essential.

A. Essential Fish Habitat (EFH): ODFW supports the combination of alternative A2 (waters in depths < or = to 3500 meters/1914 fm) and A3 (100% of habitat suitability profiling). These options were recommended by the PFMC Habitat Committee and the Groundfish Management Team. This designation is reasonable, given data uncertainties and the scope of these options provides a precautionary coverage for EFH consultation. A combination of these two mutually exclusive options provides the wide breadth of habitat designation which is appropriate and necessary for the productivity of groundfish life stages, given current limitations to our information base (biological and habitat). ODFW recommends that any HAPC or fishing mitigation measure not included in this definition of EFH be included as EFH at the time of adoption.

B. Habitat Areas of Particular Concern (HAPC): Within Alternative B7 (Areas of interest), there are distinct locations that can be clearly defined in waters off of the coast of Oregon. The following areas, as currently understood, are likely to be important ecological systems for groundfish life stages, may be sensitive to human-induced impacts, may be at risk should ocean development options take place and are significant habitats for groundfish.

The following areas are appropriate for initial designation as HAPC: Daisy Bank/Nelson Island, Thompson Seamount, President Jackson Seamount. Other option-B7 areas of interest may be included as HAPC as defined geographically under the Oregon option for C-12 below (Rogue Canyon, Heceta Bank and Astoria Canyon).

ODFW's position is that estuaries (B2), canopy kelp (B3), sea grass (B4) and rocky reefs (B6) also meet the criteria for consideration as habitat areas of particular concern and should be designated as HAPC.

Because HAPC designation is a subset of EFH and is primarily a consultation trigger (vs. regulatory), specific locational information is relevant only if HAPC areas are included in specific regulatory actions. In order to identify these habitat types locationally (defining borders), additional information and definitions are necessary. Kelp beds and sea grass locations are not static and there may be problems with designating a living, moving habitat type. Mapping of these areas is not at a level of detail that allow for accurate designation geographically. Rocky reefs, as mapped in the DEIS, are general and there are known reefs missing from the maps currently in the EIS. Since these habitat types occur primarily in state waters, we recommend a state/federal specification/review process by which these will be more specifically defined geographically in the event of regulatory action in these areas. This process should be conducted in a timely manner in collaboration with the states.

C. Alternatives to Minimize Adverse Impacts on EFH Due to Fishing:

ODFW has reviewed and analyzed options within this set of alternatives. This is in addition to the analysis done by NMFS in the DEIS. State/ODFW analysis included:

* Trawl start points (2000-2003) were mapped on options that were relevant to those data: C-2 (options 1 and 2), C-3 options 1-4, C-6, C-7 and C-12.
* Ex- vessel landed value associated with each option: C-2, C-3, C-6, C-7 and C-12 (as proposed in the February 2005 DEIS)
* Ex-vessel landed value of the C-12 options prepared after the DEIS was released for comment: (i.e., the second Oceana option and the trawl industry option).
* All trawl related impact minimization options were analyzed for catch per unit effort in the trawl fishery (2000-2003 logbook information).
* Alternative C-4 (trawl footprint) was analyzed against historic (1993-1996) trawl data in the area west of the RCA.
* Historic trawl data from "no footprint" areas nearshore in Oregon waters (Option C-12, Oceana #2) was not able to be analyzed adequately for decision-making at this time.

* 2003-2004 trawl tow line/landed catch analysis in areas within the second Oceana and trawl industry proposals.
* Maps of historical shrimp tow starts (1980, 1989, 1992) off of Oregon and Southern Washington.
* Maps that overlay the C-12 Oceana and Trawl Industry alternatives as well as rocky substrate data base (NMFS), the bottom trawl RCA, 2003 tow line data (for a sample view of the trawl routes), areas of interest and Oceana no-trawl history footprint option.

A black and white copy of these overlay maps is attached to this statement. Colored maps and additional data/summary charts mentioned above are available from ODFW.

Criteria ODFW used to evaluate options to minimize fishing input include:

* Focus on documented habitat areas of value to groundfish life stages.
* Emphasize locations with unique/high relief topographic features with best available data
* Support balanced use of data sets: e.g., for biogenic/corals need both presence <u>and absence</u> analysis per SSC advice.
* Geographic sites chosen to minimize adverse fishing practices must be selected and regulations designed for enforcement practicability (see Enforcement Consultants' Statement on EFH) and are cost feasible to implement/enforce.
* Fishing impact minimization alternatives should focus on fisheries with adequate locational and economic impact data bases/analysis (e.g., logbook information).
* Data must allow for adequate analysis of impacts/economic value of displaced Fisheries balanced with EFH habitat protection.
* Designate unique habitats as no-trawl areas within the current bottom trawl RCA as priority areas for research on the results of reduced bottom trawl impacts.
* Accommodate/do not pre-empt ongoing state habitat preservation/designation processes in state waters.
* Use both scientific and fisher knowledge of no-trawl site habitat area dimensions when various sitting options overlap.

A critical component of this process:

* Establish a 'star panel'-like review process to review and fine-tune these initial locations/fishing practices and to establish criteria and recommendations on future additions/modifications.

ODFW recommends the inclusion of the following locations in waters off of the Oregon coast for inclusion as no-bottom-trawl areas in the final EIS as a modification to option C-12. These locations are described with the provision that exact and appropriate lat/long information shall be established in the regulatory implementation phase of this process.

I. 'No-trawl' sites within the 75 fm to 200 fm bottom trawl RCA which should serve as priority locations for ongoing research into the results of removal of bottom trawl gear from ecological/habitat areas of interest (numbers preceded by "O" are Oceana-described option C-12 areas; numbers preceded by "T" are trawl industry described option C-12 areas)

* O-11 [11] (Nahelem Bank/Shale Pile) 100% within the bottom trawl RCA
* O-18 [18] (Daisy Bank/Nelson Island): 100% within the bottom trawl RCA
* O-28 [28] (Bandon High Spot), area that is within the bottom trawl RCA only

II. No-trawl sites outside of the bottom trawl RCA:

* T-5 (Portion of Astoria Canyon)
* T-6 (Siletz-deepwater)
* T-7 (Siletz Bay nearshore)
* T-8: (Newport Rockpile/Stonewall Bank)
* T-9: (Portion of Heceta Bank)
* T-10 (Deepwater off Coos Bay)
* T-12 (Portion of Rogue Canyon)

III. Gear-types prohibited:

* Bottom Trawl roller gear larger than 19" in diameter (C-9-1)
* Beam trawl gear (Option C-9-6)

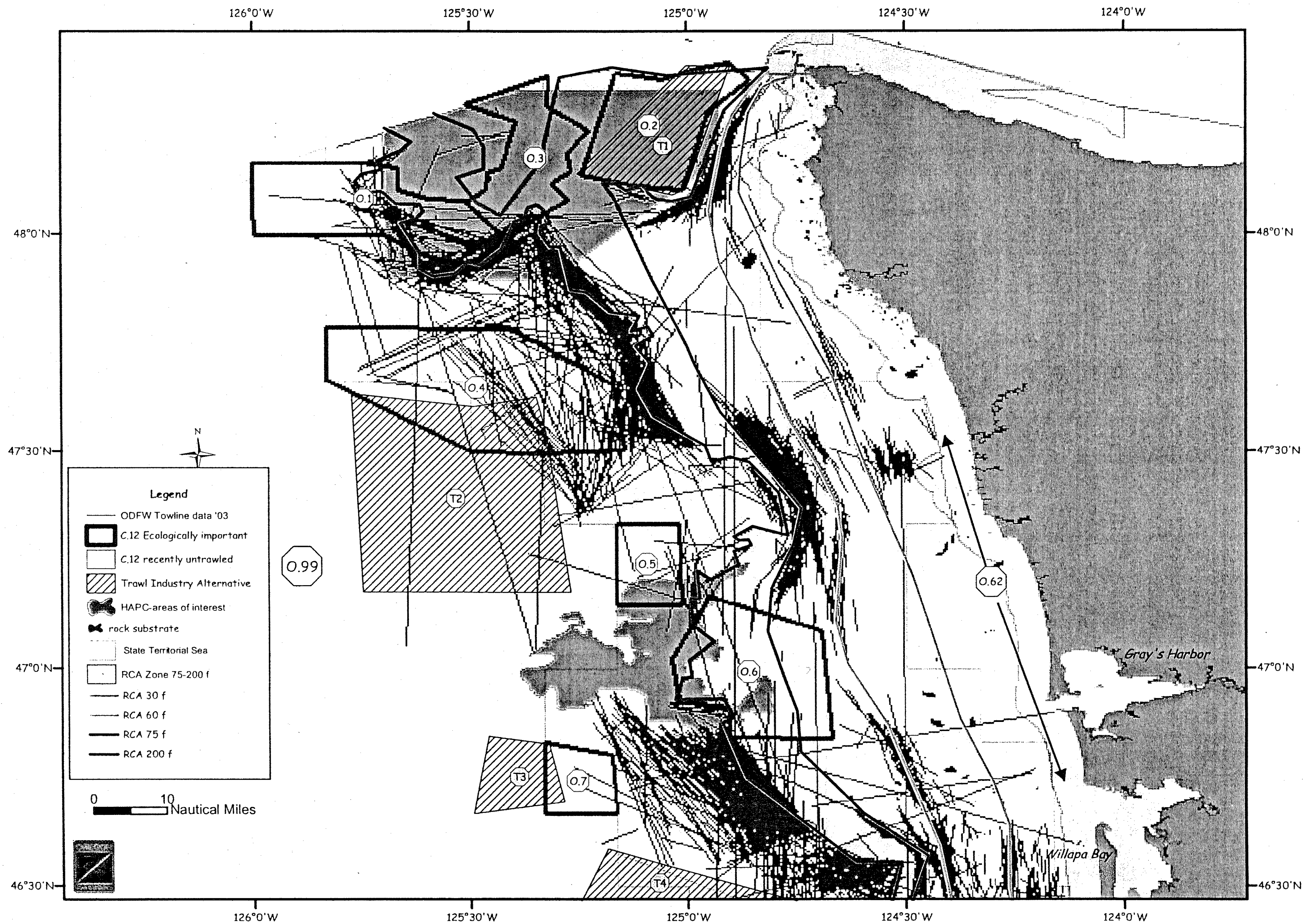
D. Alternatives for Research and Monitoring

* ODFW supports the establishment of a NMFS-State-Fishery "star-panel"-like process (or similar entity that may exist currently) which would convene to review and refine the June 2005 PFMC/NMFS approved alternatives for EFH, HAPC and fishing impact minimization. This process would also serve to review and prepare updates to the Groundfish EFH for the mandatory 5 year review in 2010.

* Research on the impact/results of trawl closures is recommended. The ODFW-priority areas within the RCA serve to provide excellent research opportunities to analyze the impact of the new EFH-related regulations. This is supported by the Habitat Committee report/recommendations.

* Support the expansion of logbook programs to non-trawl fisheries.

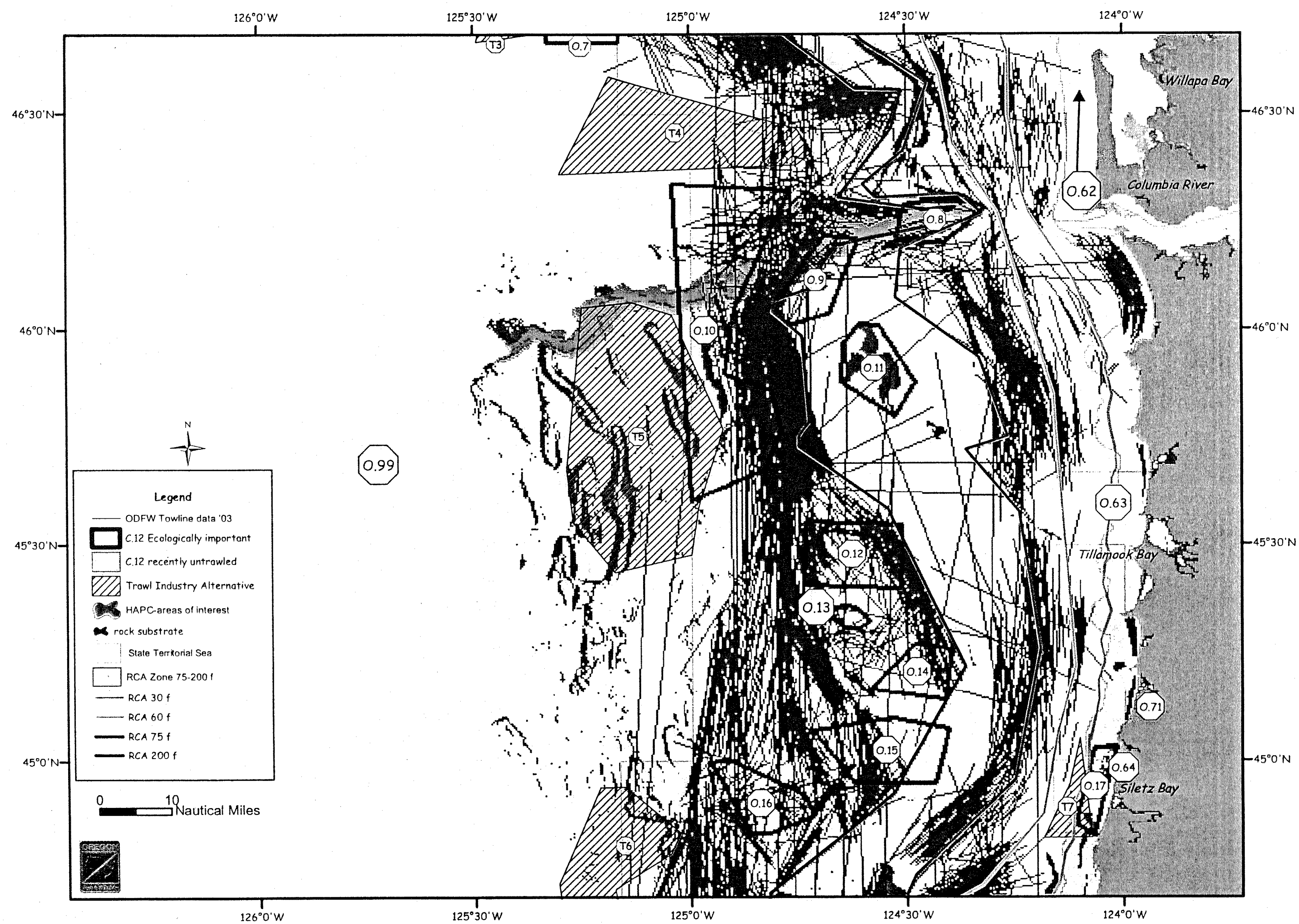
Trawl Industry Alternative and Oceana Alternative (C.12)



Oregon Department of Fish and Wildlife, Marine Resources Program

ODFW towline data prepared by Marlene Bellman and Scott Heppell, OSU

Trawl Industry Alternative and Oceana Alternative (C.12)



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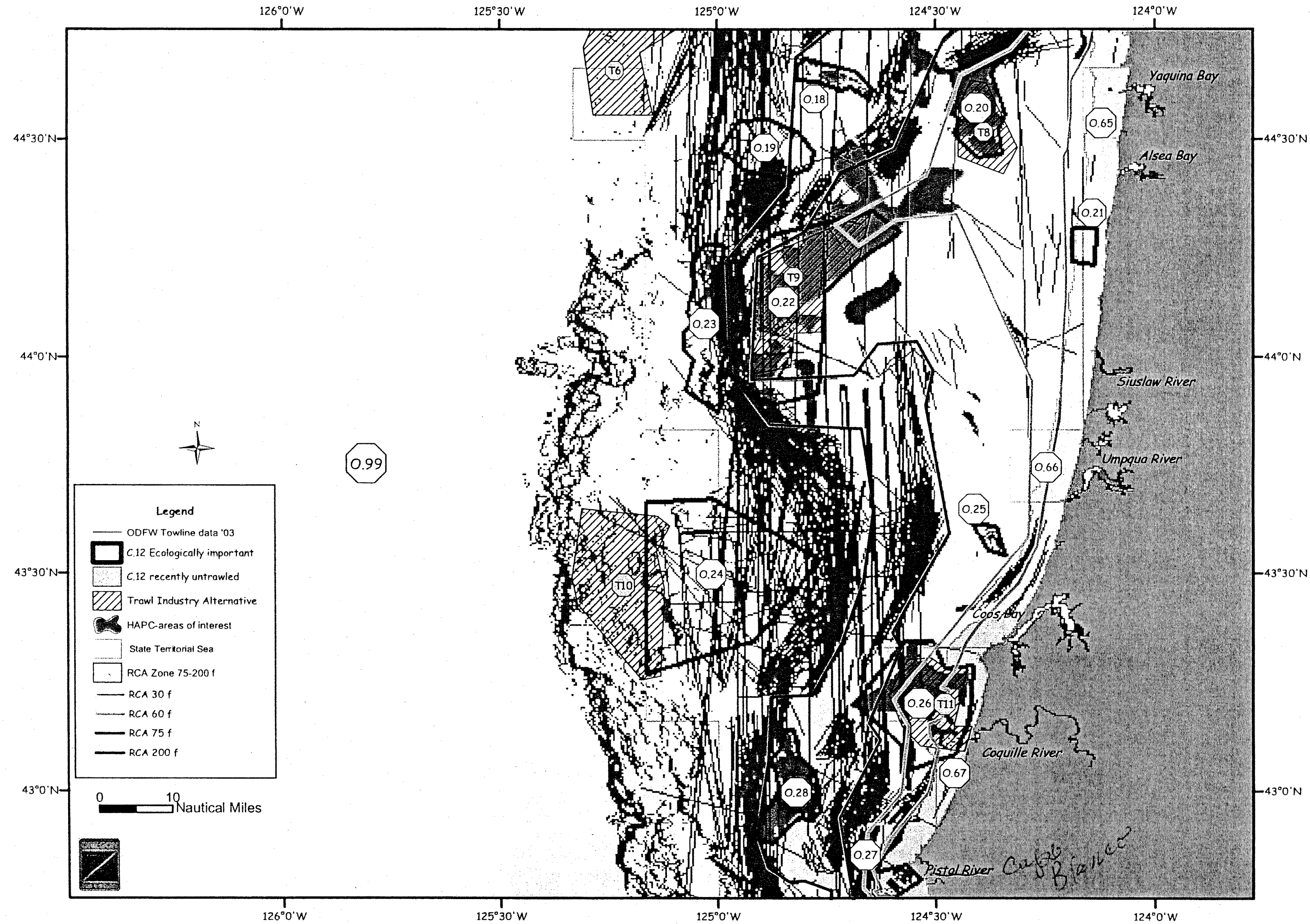
ODFW towline data prepared by Marlene Bellman and Scott Heppell, OSU

Trawl Industry Alternative and Oceana Alternative (C.12)



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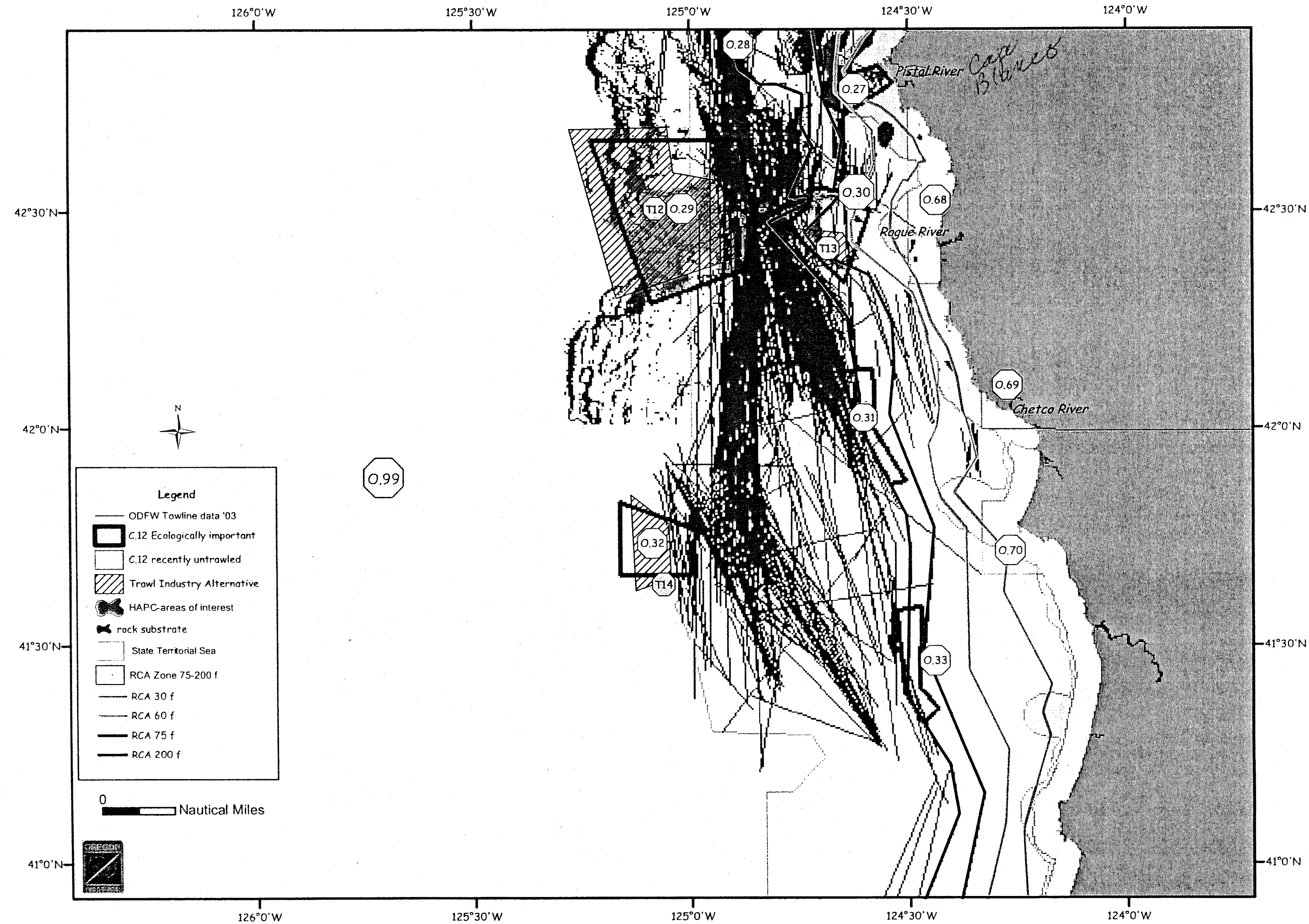

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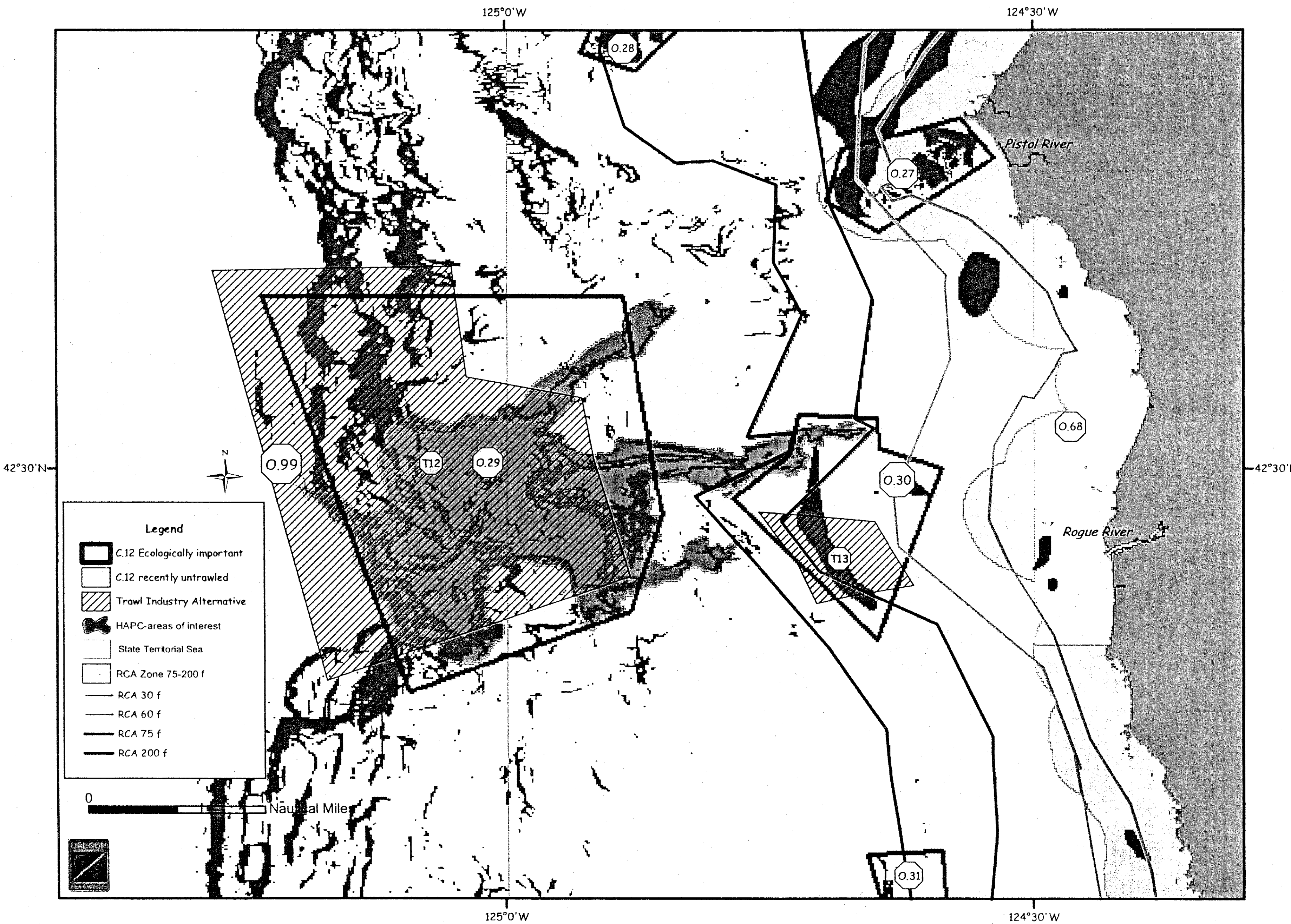
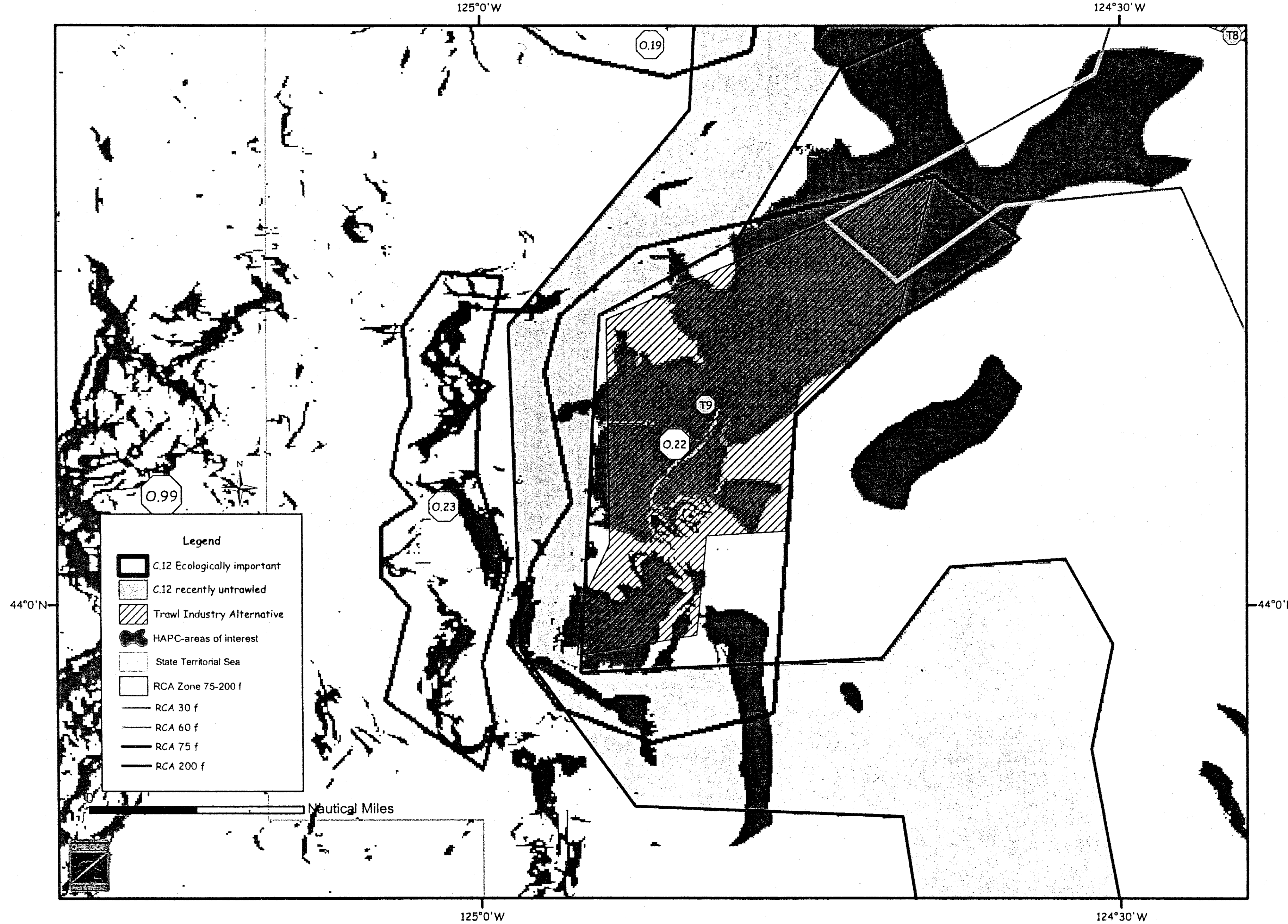


Oregon Department of Fish and Wildlife, Marine Resources Program

ODFW towline data prepared by Marlene Bellman and Scott Heppell, OSU

Trawl Industry Alternative and Oceana Alternative (C.12)



Oregon Department of Fish and Wildlife, Marine Resources Program

ODFW towline data prepared by Marlene Bellman and Scott Heppell, OSU

Mr. Chairman,

The EFH DEIS currently contains language stating that, "NMFS does not intend for any of the alternatives described below to apply to tribal fisheries in U&A grounds described in 50 C.F.R. 660.324(c)." The tribes would like to reiterate that treaty fisheries be recognized as exempt from any alternative going forward in the EFH FEIS that would negatively impact treaty fishing rights. We will continue working with NOAA Northwest Region Staff to develop and/or specify appropriate habitat protections within usual and accustomed areas (U&As).

The tribes also note that NOAA has a procedural duty to consult with us on matters affecting our interests in U&A areas (Executive Order 13175)[1]. As such no closure should be established in a U&A area without consultation and agreement of the affected tribe(s). Finally, we recognize the importance of assessment and monitoring programs developed in conjunction with the tribes to measure the appropriateness and effectiveness of habitat protections within U&As.

1 Consultation and Coordination with Indian Tribes, American Indian and Alaska Native Policy of the U.S. Department of Commerce, dated March 30, 1995

Highlights by Phil anderson

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE REPORT ON ESSENTIAL FISH HABITAT ALTERNATIVE C.12

The Washington Department of Fish and Wildlife (WDFW) has reviewed and analyzed Alternative C.12, which includes a proposal to close specific areas to bottom trawling as a measure to minimize adverse impacts to essential fish habitat (EFH). WDFW staff used coastal groundfish trawl logbook tow location and catch data from 2003 and 2004 to analyze the effects of closing the proposed areas in waters adjacent to the Washington consistent with the approach described in Exhibit C.3.b, WDFW Report.

WDFW staff analyzed the proposed closed areas off Washington which were contained in the original Oceana alternative, the trawl industry proposal, the revised Oceana alternative, and a WDFW proposal. The results of this analysis are presented in Attachment 1.

As Council is well aware, it is not easy to determine which choices to make that provide adequate habitat protection while minimizing impacts to the fishing industry. We realize the importance of setting aside areas that represent a diversity of habitat types, areas that are particularly susceptible to human disturbance, and areas that are currently undisturbed. We recognize the National Marine Fisheries Service's effort to collate and present the available information to aid this decision-making process; however, we struggled with the sparseness of the information with which to identify all of the areas needing protection and evaluate the impacts to the trawl fishery resulting from closing those areas.

Essentially, the WDFW proposal includes those areas contained in the revised Oceana alternative that have < 5% of the catch of any target species category (e.g., DTS, petrale, dogfish). These areas are: Olympic 2, and Biogenic Areas 1, 2, and 3. The WDFW proposal also includes a modified Grays Canyon area, which closes the majority of the canyon between 100 and 200 fms (see attached map).

We believe our recommended closures represent an important first step in protecting the essential habitat of the groundfish resource while maintaining access for the Washington fishing industry to healthy groundfish stocks, and we offer the following rationale for our proposal:

Olympic 2

- EFH Protection – This proposed closed area contains the only known location in the Northwest Pacific of *Lophelia pertusa,* a reef-forming deep-sea coral. A total of 18 records of habitat-forming invertebrates have been recorded in the revised closed area by NOAA trawl surveys. These include *Alcyonacea* soft corals, other gorgonian corals, scleractinian corals, and Hexactinellid sponges.

- Impacts to Trawlers – The revised boundaries of Olympic 2 are similar to the trawl industry proposal, which avoid important arrowtooth flounder and petrale sole fishing grounds in the northern and southern ends of the original Oceana alternative.

Biogenic 1

- EFH Protection – Every NOAA trawl survey haul performed in the proposed area has recorded the presence of habitat-forming invertebrates, including black corals, scleractinian corals, Hexactinellid sponges, bamboo corals, and sea whips.

- Impacts to Trawlers – The revised boundaries exclude a heavily fished area in the eastern portion of the previously proposed closure, which accounted for much of the estimated economic impact to the trawl industry.

Biogenic 2

- EFH Protection – Every NOAA trawl survey haul performed in the proposed area has documented the presence of habitat-forming invertebrates, including black corals, gorgonians, Hexactinellid sponges, and sea pens.

- Impacts to Trawlers – The revised boundaries exclude a small, but important, fishing area along the eastern edge, and extend the area north and south into unfished and lightly fished areas, as well as deeper waters.

Biogenic 3

- EFH Protection – Every NOAA trawl survey haul performed within the proposed area has documented habitat-forming invertebrates, including black corals, gorgonian corals, sea whips, and sponges.

- Impacts to Trawlers – The revised boundaries encompass the area proposed by the trawl industry (Willapa area), and also include area not recently trawled.

WDFW Grays Canyon

- EFH Protection – The proposed area contains underwater obstructions, trawl hangs and "untrawlable" areas. Most NOAA trawl survey hauls in the proposed closed area documented habitat-forming invertebrates, including records of black corals, gorgonian corals, scleractinian corals, and Hexactinellid sponges.

- Impacts to Trawlers – WDFW is specifically excluding portions of the Oceana revised Grays Canyon alternative because that larger area to the east is primarily soft bottom habitat and contains important pink shrimp grounds. The WDFW-proposed Grays Canyon falls within the boundaries of the current trawl rockfish conservation area (i.e., between 100 fms and 200 fms), so the impacts to the trawl industry are expected to be negligible.

WDFW Catch Analysis of EFH EIS C.12 Alternatives

Percent Catch Within Areas off WA

0.0% represents >.1% or no tows

DTS	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	1.6%	20.3%	0.0%	0.0%	0.7%	7.9%	---	---
Olympic 2 (Olympic 2)	0.0%	12.7%	0.0%	5.7%	0.0%	4.2%	0.0%	4.2%
Olympic 3	---	---	---	---	0.2%	5.4%	---	---
Biogenic 1 (Deepwater 1)	1.4%	1.8%	0.0%	0.0%	0.6%	0.8%	0.6%	0.8%
Biogenic 2	0.0%	1.9%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%
Grays Canyon	0.0%	0.2%	0.0%	0.0%	0.2%	0.5%	0.0%	0.0%
Biogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**3%**	**37%**	**0.0%**	**5.7%**	**1.7%**	**18.3%**	**0.6%**	**5.2%**

Petrale Sole	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	1.8%	48.4%	0.0%	0.0%	0.2%	0.8%	---	---
Olympic 2 (Olympic 2)	0.6%	4.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Olympic 3	---	---	---	---	0.1%	3.3%	---	---
Biogenic 1 (Deepwater 1)	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 2	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grays Canyon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'iogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**3%**	**53%**	**0.0%**	**0.1%**	**0.3%**	**4.1%**	**0.0%**	**0.0%**

Arrowtooth Flounder	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	1.3%	15.0%	0.0%	0.0%	0.2%	1.6%	---	---
Olympic 2 (Olympic 2)	0.0%	9.4%	0.0%	1.3%	0.0%	1.5%	0.0%	1.5%
Olympic 3	---	---	---	---	1.1%	16.9%	---	---
Biogenic 1 (Deepwater 1)	1.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 2	0.3%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%	0.0%
Grays Canyon	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
Biogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**3%**	**25%**	**0.0%**	**1.3%**	**1.9%**	**20.0%**	**0.3%**	**1.5%**

Pacific Cod	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	0.1%	3.1%	0.0%	0.0%	0.0%	0.3%	---	---
Olympic 2 (Olympic 2)	1.8%	4.4%	0.0%	0.2%	0.0%	0.3%	0.0%	0.3%
Olympic 3	---	---	---	---	0.1%	7.9%	---	---
Biogenic 1 (Deepwater 1)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grays Canyon	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Biogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**2%**	**7%**	**0.0%**	**0.2%**	**0.2%**	**8.5%**	**0.0%**	**0.3%**

Spiny Dogfish	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	0.0%	9.8%	0.0%	0.0%	0.0%	3.5%	---	---
Olympic 2 (Olympic 2)	0.0%	3.8%	0.0%	0.6%	0.0%	1.8%	0.0%	1.8%
Olympic 3	---	---	---	---	0.0%	4.8%	---	---
Biogenic 1 (Deepwater 1)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grays Canyon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**0%**	**14%**	**0.0%**	**0.6%**	**0.0%**	**10.1%**	**0.0%**	**1.8%**

Rockfish	Oceana		Industry		Rev Oceana		WDFW	
Area - Oceana (Trawler)	OR	WA	OR	WA	OR	WA	OR	WA
Olympic 1	4.8%	23.5%	0.0%	0.0%	1.0%	6.0%	---	---
Olympic 2 (Olympic 2)	0.5%	5.0%	0.0%	0.6%	0.0%	0.4%	0.0%	0.4%
Olympic 3	---	---	---	---	0.2%	9.5%	---	---
Biogenic 1 (Deepwater 1)	1.8%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biogenic 2	0.0%	0.9%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%
Grays Canyon	0.1%	0.0%	0.0%	0.0%	0.8%	0.2%	0.0%	0.0%
Biogenic 3 (Willapa)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**7%**	**30%**	**0.0%**	**0.6%**	**2.0%**	**16.4%**	**0.0%**	**0.7%**


Washington and Oregon Trawl Locations
Biogenic 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

May 11, 2005

Reply To
Attn Of: ETPA-088 Ref: 05-008-NOA

D. Robert Lohn, Regional Administrator
NMFS/NOAA - Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115-0070

Dear Mr. Lohn:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (EIS) for **Essential Fish Habitat Designation and Minimization of Adverse Impacts** (CEQ No. 20050049) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and the document=s adequacy in meeting NEPA requirements.

The draft EIS evaluates the effects of a strategy to conserve and enhance essential fish habitat (EFH) for fish managed under the Pacific Coast Groundfish Fishery Management Plan (FMP). The EIS includes alternatives for identification of EFH and Habitat Areas of Particular Concern (HAPC), measures to minimize adverse impacts to EFH from fishing activities, and research and monitoring actions to encourage the conservation and enhancement of EFH. The proposed action is to ensure compliance with section 303(a)(7) of the Magnuson-Stevens Act and will amend the Pacific Coast Groundfish FMP.

The EIS provides six alternatives for identifying and designating EFH, nine alternatives for designating HAPC, fourteen alternatives with various options for minimizing adverse fishing impacts to EFH and four alternatives with two expanded logbook program options for research and monitoring. The following tables provide ratings for each of the alternatives and options provided in the EIS.

An overall rating of EC-2 (Environmental Concerns - Insufficient Information) along with a summary of our comments will be published in the *Federal Register*. A copy of the rating system used in conducting our review is enclosed for your reference.

Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement			
Alternative Designation	**Alternative Name**	**Preliminary Preferred Alt. (Yes/No)**	***Rating**
Category: Essential Fish Habitat			
A.1	No Action	No	LO
A.2	Depths less than 3,500 m	Yes	EC-2
A.3	100% Habitat Suitability Probability Area	Yes	EC-2
A.4	Habitat Suitability Probability Based on Management Status	No	EC-2
A.5	70% Habitat Suitability Probability Area	No	EC-2
A.6	30% Habitat Suitability Probability Area	No	EC-2
Category: Habitat Areas of Particular Concern			
B.1	No Action	No	EC-2
B.2	Estuaries	Yes	LO
B.3	Canopy Kelp	Yes	LO
B.4	Seagrass	Yes	LO
B.5	Core Habitat	No	EC-2
B.6	Rocky Reefs	Yes	LO
B.7	Areas of Interest	No	LO
B.8	Oil Production Platforms	No	EC-2
B.9	Process for new Habitat Areas of Particular Concern	No	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement			
Alternative Designation	**Alternative Name**	**Preliminary Preferred Alt. (Yes/No)**	***Rating**
Category: Minimize Adverse Fishing Impacts to Essential Fish Habitat			
C.1	No Action	No	EC-2
C.2.1	Depth-based Gear Restrictions – Option 1	No	EC-2
C.2.2	Depth-based Gear Restrictions – Option 2	No	LO
C.2.3	Depth-based Gear Restrictions – Option 3	No	EC-2
C.3.1	Close Sensitive Habitat – Option 1	No	EC-2
C.3.2	Close Sensitive Habitat – Option 2	No	EC-2
C.3.3	Close Sensitive Habitat – Option 3	No	EC-2
C.3.4	Close Sensitive Habitat – Option 4	No	EC-2
C.4.1	Prohibit Geographic Expansion of Fishing – Option 1	Yes	EC-2
C.4.2	Prohibit Geographic Expansion of Fishing – Option 2	Yes	LO
C.5	Prohibit a Krill Fishery	No	LO
C.6	Close Hotspots	No	EC-2
C.7.1	Close Areas of Interest – Option 1	No	EC-2
C.7.2	Close Areas of Interest – Option 2	No	EC-2
C.8.1	Zoning Fishing Activities – Option 1	No	EC-2
C.8.2	Zoning Fishing Activities – Option 2	No	EC-2
C.9.1	Gear Restrictions: Prohibit Roller Gear Larger than 15 inches	Yes	LO
C.9.2	Gear Restrictions: Prohibit Flat Trawl Doors	Yes	LO
C.9.3	Gear Restrictions: Limit Longline Groundline Length to 3 nm	Yes	LO
C.9.4	Gear Restrictions: Employ Habitat-Friendly Anchoring Systems	Yes	LO
C.9.5	Gear Restrictions: Prohibit Dredge Gear	Yes	LO
C.9.6	Gear Restrictions: Prohibit Beam-Trawl Gear	Yes	LO
C.9.7	Gear Restrictions: Prohibit Set-Gillnets in Waters Deeper than 60 fm	Yes	LO
C.9.8	Gear Restriction: Prohibit Dingle Bar Gear (Troll Groundfish Gear)	Yes	LO
C.10	Central California No-Trawl Zones	Yes	LO
C.11	Relax Gear Endorsement Requirements	Yes	LO
C.12	Close Ecologically Important Areas to Bottom Trawl	Yes	EC-2
C.13	Close Ecologically Important Areas to Bottom-Contacting Gear	Yes	EC-2
C.14	Close Ecologically Important Areas to Fishing	Yes	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement			
Alternative Designation	**Alternative Name**	**Preliminary Preferred Alt. (Yes/No)**	***Rating**
Category: Research and Monitoring			
D.1	No Action	No	EC-2
D.2.1	Expanded Logbook Program – All Fishing Vessels	No	LO
D.2.2	Expanded Logbook Program – Random Sample	No	EC-2
D.3	Expanded Vessel Monitoring System Program	No	LO
D.4	Research Reserve System	No	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Our concerns with the EIS focus on data limitations and inaccuracies, the roles of NOAA-Fisheries and the Pacific Fisheries Management Council in the development and selection of alternatives, and the need for additional information on the Fisheries Economic Assessment Model and the Environmental Justice analysis. Detailed comments discussing our concerns and the alternatives are provided in the enclosure. EPA recognizes it might not be possible to address all data limitations prior to completion of the final EIS. Consequently, our ratings of the alternatives presented in the EIS reflect our concerns and recommend a protective approach to identifying and minimizing impacts to EFH in light of the stated uncertainties.

Thank you for the opportunity to review this draft EIS. If you would like to discuss these comments in detail, please contact Mike Letourneau at (206) 553-6382.

Sincerely,

/S/ Peter Contreras for

Christine Reichgott, Manager
NEPA Review Unit

cc: J. DeVore, PFMC
K. Dahl, PFMC

Enclosure

Pacific Coast Groundfish Fishery Management Plan
Essential Fish Habitat Designation and Minimization of Adverse Impacts
Draft Environmental Impact Statement

General Comments

We support the Habitat Suitability Probability (HSP) approach utilized in the EIS for identifying Essential Fish Habitat (EFH) and the associated sensitivity index approach used for identifying habitat for closure under Alternative C.3. However, due to the current data limitations and reported inaccuracies in some of the data used in the HSP and sensitivity indices, we have concerns about selecting alternatives that utilize these approaches.

We support your efforts to obtain additional high quality data and correct inaccuracies. In addition to expanding the logbook, vessel monitoring system (VMS) and research reserve programs, we support increasing observer coverage and manned and remote sensing devices that are nondestructive to marine habitats. We agree that combining VMS, logbook and observer data would result in a more complete picture of fishing activities and that VMS data with a higher resolution track line of trawl and fixed gear sets would be a significant benefit. We also support efforts to develop new fishing gear that is less destructive of EFH.

We appreciate the discussion on the non-fisheries related activities in the EIS. These activities described in the upland, riverine, estuarine, coastal and marine sections provide good information for evaluating cumulative impacts to EFH. While the suite of groundfish does not include anadromous species, like krill, they are prey species of groundfish and are impacted by the groundfish fishing activities. Consequently, the EIS would benefit from evaluating the extent to which freshwater habitats should be considered essential groundfish habitat and techniques and opportunities for identifying freshwater HAPC.

The EIS states that EFH recommendations from the National Marine Fisheries Service (NMFS) or a Fisheries Management Council (Council) to federal or state agencies are non-binding. The EIS needs to clarify that only the NMFS, not the Council, can provide EFH recommendations to federal or state agencies. In addition, the EIS should discuss how EFH recommendations from NMFS will impact the Council and its processes.

Alternatives for Identification and Description of Essential Fish Habitat (EFH)

As discussed above, we support the HSP approach utilized for identifying EFH, however, the limitations and inaccuracies of the data utilized in this approach could leave some essential habitat for groundfish species unprotected. Therefore, we support the No Action alternative that designates all waters from the mean higher high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California to the seaward boundary to the U.S. Exclusive Economic Zone (EEZ) as EFH.

The EIS states that some of the essential fish habitat maps generated from the information collected on the managed species and utilized in some of the Identification and Description EFH alternatives were incorrect. The final EIS should discuss if the essential fish habitat maps generated from the information collected on the managed species inaccuracies have been corrected and if so, the results of those corrections.

The EIS states that the Council and NMFS will attempt to have the methodology for calculating “biogenic areas” peer-reviewed by the Council’s Scientific and Statistical Committee (SSC) during the draft EIS review period, and that the methodology may be incorporated into the formal adoption of a Fisheries Management Plan (FMP) amendment and regulatory action. The EIS should clarify if such an action would require the development of a supplemental EIS.

The EIS discusses how the Scientific and Statistical Committee (SSC) approved the methodology for developing the indices used in the HSP model, but did not approve the impact function component of the model used for developing the alternatives. The EIS needs to explain why the SSC did not approve the impact function component of the model and if there are plans to obtain their approval prior to the selection of preferred alternatives by the NMFS.

Alternatives for Habitat Areas of Particular Concern (HAPC)

The EIS states that the HAPC alternatives are not mutually exclusive and that all of the action alternatives could be included in a final preferred alternative, even if some of the designated areas were to overlap. While the EIS is clear that HAPC must be a subset of EFH, it must also be clear that if all of the HAPC action alternatives (Alternatives B.2 through B.9) were selected, selection of a preferred EFH alternative would be limited. While the discussion and figures in Chapter 4 of the EIS provide information on what HAPC areas would be excluded under each EFH alternative, it is not clear which EFH alternatives would be excluded by selecting all of the HAPC alternatives. This needs to be clarified in the EIS.

While we support the approach of combining alternatives into a final preferred alternative, we have concerns with Alternatives B.5 (Core Habitat) and B.8 (Oil Production Platforms). The Core Habitat under Alternative B.5 is defined as the upper 10% area of an HSP greater than 0%, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species. Because of the limitations and inaccuracies of the data utilized in the HSP analyses, there is a potential that some HAPC for some of the overfished and precautionary zone groundfish might not be protected under this alternative. Consequently, we have environmental concerns with this proposed alternative.

While there have been high concentrations of groundfish observed in association with many of the oil platforms off the coast of California, including overfished species, it is uncertain if this is a net benefit to the ecosystem. These unnatural structures may be attracting fish populations away from natural reefs, exposing fish to mercury contamination, attracting predators resulting in a net loss to the fish populations, and increasing fishing effort in the area. We recommend that Alternative B.8 be modified to address these concerns. Once it is determined that decommissioned platforms scheduled for removal do not pose a mercury contamination threat, we recommend that the platforms remain in place until such time that it is demonstrated that adequate natural habitat exists and overfished species meet maximum sustainable yield (MSY). Such an alternative would include the benefits these platforms provide to the groundfish species, address the mercury contamination and the potential attraction of fish from natural reefs, and protect the species from increased effort by fishers.

We support a process for new HAPC designations such as the one proposed in Alternative B.9. As additional information is obtained there is the potential for identifying new areas that are important to the survival and sustainability of a species. This information should undergo a technical and public review for consideration as HAPC. Alternative B.9 provides for such reviews in a streamlined process for designating new HAPC.

Alternatives to Minimize Adverse Fishing Impacts to EFH

The proposed alternatives for minimizing adverse fishing impacts on EFH include gear modifications, area closures and fishing effort reductions. Alternative C.2 includes three options for

Depth-based Gear Restrictions. Alternative C.2.2 would prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N and consequently would be the most protective of EFH. We recommend that Alternative C.2.2 be selected as the preferred alternative.

Alternative C.3 (Close Sensitive Habitat) includes four options all based on sensitivity and recovery indices developed as part of the fishing impact model component of the comprehensive risk assessment. Of the four options, Alternative C.3.4 would provide the most protection, however, because of the limitations and inaccuracies of the data utilized in this modeling effort, there is a potential that some sensitive habitats might not be protected under this alternative. Therefore, we have concerns with these proposed alternatives.

Alternative C.4 (Prohibit Geographic Expansion of Fishing) has two options which generally cover the same geographic area. However, Alternative C.4.1 prohibits fishing in areas that were not trawled between 2000 and 2002, leaving some 10 minute blocks westward of the 2000m contour vulnerable to fisheries impacts. In addition, Alternative C.4.2 accounts for all bottom-tending gear and addresses the lack of geo-referenced fishing effort data for fixed-gear fisheries. Therefore, we recommend that that Alternative C.4.2 be selected as the preferred alternative.

Despite the prohibition of krill fishing in Washington, Oregon and California waters and the lack of a krill fishery in Council managed waters, we believe Alternative C.5 (Prohibit a Krill Fishery) would be a good preventative measure to protect this important prey species and its habitat. We understand that the Council has elected to address this issue by incorporating krill as a management unit species in the Coastal Pelagic Species FMP, potentially eliminating the need for Alternative C.5. The EIS should discuss if incorporating krill as a Coastal Pelagic Species in the FMP would be as effective as Alternative C.5 and which process could be implemented in the shortest amount of time. If both processes are equally protective of krill, the least time consuming process should be implemented.

Alternative C.6 (Close Hotspots) would prohibit trawling in habitat that has a high probability of being EFH for a large number of groundfish based on the HSP modeling analyses. Because of the limitations and inaccuracies of the data utilized in the HSP modeling, there is a potential that some EFH might not be protected under this alternative. Alternative C.2.2 would prohibit trawling and all fixed gear over a larger geographic area including the area that would be protected by Alternative C.6. Therefore, we recommend selecting Alternative C.2.2 as the preferred alternative instead of Alternative C.6.

Alternative C.7 (Close Areas of Interest) calls for closing the areas of interest designated under Alternative B.7 to fishing either to bottom trawling (Alternative C.7.1) or to all bottom-contacting activities (Alternative C.7.2). These areas of interest would be based on various HSP sensitivity values depending on gear types. While we recommend that Alternative C.7.2 be given preference above C.7.1 as it would protect more EFH from impacts by fishing gear, we have concerns that some areas might not be protected due to the limitations and inaccuracies in the data utilized in the HSP analyses.

Alternative C.8 (Zoning Fishing Activities) would limit the use of bottom-tending gear to specified zones where the agency determines that such activities can be conducted without altering or destroying a significant amount of habitat. Bottom tending fishing gear would be prohibited in all areas deeper than the 2,000 m contour along the continental slope extending to the maximum westward range of groundfish EFH. There would be a five-year transition period to gear specific zones for the remaining area inside the 2,000 m contour, which would remain open to bottom-tending fishing gear.

During the five-year transition period, NMFS would conduct research to delineate zones where specified fishing activities would be permitted. Alternative Option C.8.1 would establish fishing zones for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear including bottom longlines, traps, and pots would not be restricted. Alternative Option C.8.2 would establish fishing zones for all bottom-contacting gear types including bottom longlines, traps, and pots. This alternative would include a gear modification and substitution program that cooperatively involves fishers in the design and testing of new gear. The western boundary of the geographic area covered by Alternative C.8 would be dependent on the Identification and Description EFH alternative selected. If the Alternative A.1 (No Action) Identification and Description EFH were selected, the western boundary of Alternative C.8 would be the boundary of the EEZ.

Alternative C.8 in combination with Alternative A.1 would provide a protective approach westward of the 2000 m contour and control fishing activities within the 2000 m through the establishment of fishing zones that would not be significantly impacted by various bottom contact gear types. While we support the adaptive management approach and the inclusion of fishers in the gear research aspects of the program, the EIS does not provide information on how the NMFS will define 'significant' when determining the amount of habitat that can be altered or destroyed under this alternative. The EIS states that the best scientific information available will be utilized for determining whether unavoidable adverse impacts would be minimal and temporary, however, it does not discuss if the HSP model inputs or other information will be used to make these determinations. It is recommended that the EIS provide additional information on potential approaches for determining the significance of habitat impacts under this alternative.

We support the selection of Gear Restriction Alternative C.9 (all options) as a preferred alternative and believe that all the options should be combined into a single alternative. We also support Alternatives C.10 (Central California No-Trawl Zones), and C.11 (Relax Gear Endorsement Requirements). Alternatives C.12 (Close Ecological Important Areas to Bottom Trawl), C.13 (Close Ecological Important Areas to Bottom-Contacting Gear), and C.14 (Close Ecologically Important Areas to Fishing) are variations of the Comprehensive Collaborative Mitigation Alternative. While Alternatives C.12 and C.13 would restrict trawl fishing and bottom contact gear fishing in these ecologically important areas, they would be left vulnerable to some fisheries impacts. Therefore, we recommend that Alternative C.14 be selected as the preferred alternative.

Research and Monitoring Alternatives

Currently, there is limited data on the distribution of groundfish species and their associated habitats, and habitat-specific productivity. In addition, habitat-specific densities are only available for a few species. We agree that there is a critical need for comprehensive, detailed and accurate information on benthic habitats and associated groundfish assemblages on spatial scales relevant to fisheries management and habitat production. Core nursery grounds and spawning areas need to be identified and protected and there is a need to better understand the relationship between climatic events and abundance, growth, spawning success and survival of groundfish species.

We support the Research and Monitoring alternatives that will obtain information that will better define and minimize impacts to EFH. Including all fishing vessels in the Expanded Logbook Program Alternative (Alternative D.2.1) would provide the largest amount of data for updating and increasing the precision and accuracy of the model inputs used for identifying and minimizing EFH. We acknowledge the added economic impacts expanding the Vessel Monitoring System (VMS) Program (Alternative D.3) would have on fishers. However, the EIS is clear that minimizing impacts to EFH will increase enforcement needs and the VMS program could be utilized to address some of these needs. In addition, combining VMS, logbook and observer data would result in a more complete picture of fishing activities and VMS data with a higher resolution track line of trawl and fixed gear sets would be a significant benefit. Finally, we support the Research Reserve System (Alternative D.4) as a means of better understanding the effects of fishing on habitat. The EIS is clear that additional information is needed regarding the length of time needed for habitat features and functions to cover from fisheries impacts. Alternative D.4 provides a mechanism to obtain such information.

Fisheries Economic Assessment Model

The EIS needs to provide additional information on the Fisheries Economic Assessment Model. Specifically, the EIS should include a detailed description of the model, the assumptions used in the model and the process that was utilized to rectify the model with groundfish fishery economic data. While the EIS discusses potential economic impacts to fishers, processors and fishing communities based on this model, it also needs to discuss the uncertainty of these predicted economic impacts and how the model, originally developed for the limited entry trawl sector, has been adapted to project economic impacts in all groundfish fisheries.

Environmental Justice

While we agree that the geographic scope of the EIS results in some difficulties in identifying and determining if low income or minority populations will be disproportionately impacted by the proposed actions, we believe that the EIS would benefit from additional discussion on how it obtained meaningful public participation from low income and minority populations that may be impacted by the proposed action. The information presented in Appendix E demonstrates that some areas have higher minority and low income populations than others. For example, The Hispanic Population by State, Port Group, County and Port data presented in Appendix E shows that the percentage of the population in Santa Barbara that is Hispanic (54.28%) is higher than any other area. The EIS should discuss what measures were taken to assure that the Hispanic population in the Santa Barbara area was afforded the opportunity for meaningful participation in the process for the proposed action. In particular, the EIS should describe what was done to target the Hispanic communities of Santa Barbara, whether materials regarding the proposed action were translated into Spanish, and if there were translators present during public meetings held in the Santa Barbara area. In addition, the EIS should describe what feedback was received from the Santa Barbara Hispanic communities and how that was incorporated into the decisions for the proposed action.

The EIS should describe what was done to inform all low income and minority communities about the proposed action and the potential impacts in will have on their communities (notices, mailings, fact sheets, briefings, presentations, exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on scene information), what input was received from the communities, and how that input was utilized in the decisions that were made regarding the proposed action.

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections
The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns
EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections
EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory
EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Agenda Item C.3.b
WDFW Report
June 2005

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE SUMMARY ANALYSIS OF TRAWLER-PROPOSED AND OCEANA-PROPOSED BOTTOM TRAWL CLOSED AREAS USING 2003 WEST COAST TRAWL LOGBOOK DATA

The Washington Department of Fish and Wildlife has reviewed and analyzed the potential impacts to fishers by closing areas proposed by the trawl fishing industry and by Oceana to bottom trawling, based on trawl logbook data. Washington Department of Fish and Wildlife staff used West Coast groundfish trawl logbook data from 2003, extracted from PacFIN in March 2005, to plot the locations of trawl tows relative to the closed areas proposed by the trawl fishing industry and under the Oceana alternative (EFH EIS Alternative C.12), for the areas off Washington state (i.e., north of the Columbia River).

Set points and haul-out points were plotted when available; however, in some instances, only set points were available. Because haul-out data were incomplete, the resulting catch data analysis was based on set point locations only (i.e., if a tow began within the proposed closed area, then the catch data associated with that tow is described as coming from within that area; if a tow began outside of the closed area, then the catch data associated with that tow is excluded from the area). We realize that tows set outside the closed area may have traversed and/or ended within the proposed closed area, particularly tows set adjacent to or near the closed area; conversely, catches associated with tows set within the area may have occurred outside the area and, to some extent, these conditions could offset one another. As mentioned above, haul-out data are incomplete and we wanted to use the available data to evaluate potential fishing impacts.

The trawl tows were plotted on maps relative to the proposed closed areas, and the trawl rockfish conservation area (RCA) boundaries for 2005 are also overlaid, for reference purposes. As the RCA boundaries change between fishing periods, the boundaries for the majority of the fishing year (March-October) were plotted. It is important to note that the trawl RCA boundaries were first implemented in September 2002; however, trawl activity shown to occur within the RCA are likely the result of changes in the RCA boundaries and/or are associated with exempted fishing permits (EFPs). The RCA boundaries have also changed from year-to-year; however, the 2005 boundaries are relatively comparable to the 2003 boundaries.

Department staff produced a set of tables that summarizes the amount of area covered under the trawl proposal and the Oceana proposal, number of tows that occurred in each area, and the amount of catch by area, based on logbook data. Catch data were summarized for the following species categories—petrale, DTS (Dover sole/ thornyheads/sablefish), rockfish, arrowtooth flounder, spiny dogfish, and Pacific cod. A blank cell represents no trawl activity, and a value of 0.0% indicates a value of < 0.1%.

Based on our discussions with groundfish fishery representatives, the Department is willing to include the state waters off the Washington coast (i.e., the area from the shoreline to three miles) as a HAPC alternative. This area represents key habitat for juvenile rockfish and other groundfish species, and adult nearshore species (e.g., black rockfish). This area is currently closed under Washington State regulations to trawl (since 2001) and groundfish-directed fixed gear (since 1996) fisheries and we are proposing that this area be closed to these activities through federal essential fish habitat regulations as well. Inclusion of Washington's coastal state waters would add a significant amount of overall area, which would be closed to trawl and groundfish-directed fixed gear, without additional impact to fishing.

Percent Catch Within Areas off WA and Northern OR

Total Catch

Area Name - Oceana (Industry)	Oceana OR	Oceana WA	Oceana Total	Industry OR	Industry WA
Olympic 1	1.4%	9.7%	1.8%		
Olympic 2 (Olympic 2)	0.1%	12.3%	1.4%	0.0%	0.7%
Biogenic Area 1 (Deepwater 1)	1.1%	0.7%	0.6%	0.0%	
Biogenic Area 2	0.0%	0.8%	0.1%		
Grays Canyon	0.0%	0.1%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**3%**	**24%**	**4%**	**0.0%**	**0.7%**

DTS

Area Name - Oceana (Industry)	Oceana OR	Oceana WA	Oceana Total	Industry OR	Industry WA
Olympic 1	1.6%	20.3%	2.0%		
Olympic 2 (Olympic 2)	0.0%	12.7%	0.8%	0.0%	5.7%
Biogenic Area 1 (Deepwater 1)	1.4%	1.8%	0.8%	0.0%	
Biogenic Area 2	0.0%	1.9%	0.1%		
Grays Canyon	0.0%	0.2%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**3%**	**37%**	**4%**	**0.0%**	**5.7%**

Petrale Sole

Area Name - Oceana (Industry)	Oceana OR	Oceana WA	Oceana Total	Industry OR	Industry WA
Olympic 1	1.8%	48.4%	13.0%		
Olympic 2 (Olympic 2)	0.6%	4.1%	1.3%	0.0%	0.1%
Biogenic Area 1 (Deepwater 1)	0.4%	0.0%	0.2%	0.0%	
Biogenic Area 2	0.1%	0.0%	0.0%		
Grays Canyon	0.0%	0.0%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**3%**	**53%**	**15%**	**0.0%**	**0.1%**

Arrowtooth Flounder

Area Name - Oceana (Industry)	Oceana OR	Oceana WA	Oceana Total	Industry OR	Industry WA
Olympic 1	1.3%	15.0%	10.4%		
Olympic 2 (Olympic 2)	0.0%	9.4%	6.3%	0.0%	1.3%
Biogenic Area 1 (Deepwater 1)	1.4%	0.1%	0.5%	0.0%	
Biogenic Area 2	0.3%	0.0%	0.1%		
Grays Canyon	0.0%	0.0%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**3%**	**25%**	**17%**	**0.0%**	**1.3%**

Pacific Cod

Area Name - Oceana (Industry)	Oceana OR	Oceana WA	Oceana Total	Industry OR	Industry WA
Olympic 1	0.1%	3.1%	2.3%		
Olympic 2 (Olympic 2)	1.8%	4.4%	3.7%	0.0%	0.2%
Biogenic Area 1 (Deepwater 1)	0.0%	0.0%	0.0%	0.0%	
Biogenic Area 2	0.0%	0.0%	0.0%		
Grays Canyon	0.0%	0.0%	0.0%		

Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**2%**	**7%**	**6%**	**0.0%**	**0.2%**

Spiny Dogfish	**Oceana**			**Industry**	
Area Name - Oceana (Industry)	**OR**	**WA**	**Total**	**OR**	**WA**
Olympic 1	0.0%	9.8%	7.1%		
Olympic 2 (Olympic 2)	0.0%	3.8%	2.7%	0.0%	0.6%
Biogenic Area 1 (Deepwater 1)	0.0%	0.0%	0.0%	0.0%	
Biogenic Area 2	0.0%	0.0%	0.0%		
Grays Canyon	0.0%	0.0%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**0%**	**14%**	**10%**	**0.0%**	**0.6%**

Rockfish	**Oceana**			**Industry**	
Area Name - Oceana (Industry)	**OR**	**WA**	**Total**	**OR**	**WA**
Olympic 1	4.8%	23.5%	7.9%		
Olympic 2 (Olympic 2)	0.5%	5.0%	1.5%	0.0%	0.6%
Biogenic Area 1 (Deepwater 1)	1.8%	0.7%	0.9%	0.0%	
Biogenic Area 2	0.0%	0.9%	0.2%		
Grays Canyon	0.1%	0.0%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**7%**	**30%**	**11%**	**0.0%**	**0.6%**

Size Comparison of Areas off WA and Northern OR

(in hectares)

Area Name - Oceana (Industry)	Oceana	Industry	% Diff
Olympic 2 (Olympic 2)	76,005	43,516	-43%
Olympic 1	70,270	0	
Biogenic Area 1 (Deepwater 1)	75,105	168,384	224%
Biogenic Area 2	11,698	0	
Grays Canyon	20,626	0	
Biogenic Area 3 (Willapa)	9,124	12,041	132%
Total	**262,828**	**223,941**	**-15%**

Percent Tows Within Areas off WA and Northern OR

	Oceana			Industry	
Area Name - Oceana (Industry)	**OR**	**WA**	**Total**	**OR**	**WA**
Olympic 1	1.2%	13.1%	2.8%		
Olympic 2 (Olympic 2)	0.2%	5.2%	1.0%	0.0%	1.4%
Biogenic Area 1 (Deepwater 1)	0.8%	0.4%	0.4%	0.0%	
Biogenic Area 2	0.1%	0.6%	0.1%		
Grays Canyon	0.1%	0.1%	0.0%		
Biogenic Area 3 (Willapa)	0.0%		0.0%	0.0%	
Total	**2%**	**19%**	**4%**	**0.3%**	**1.4%**

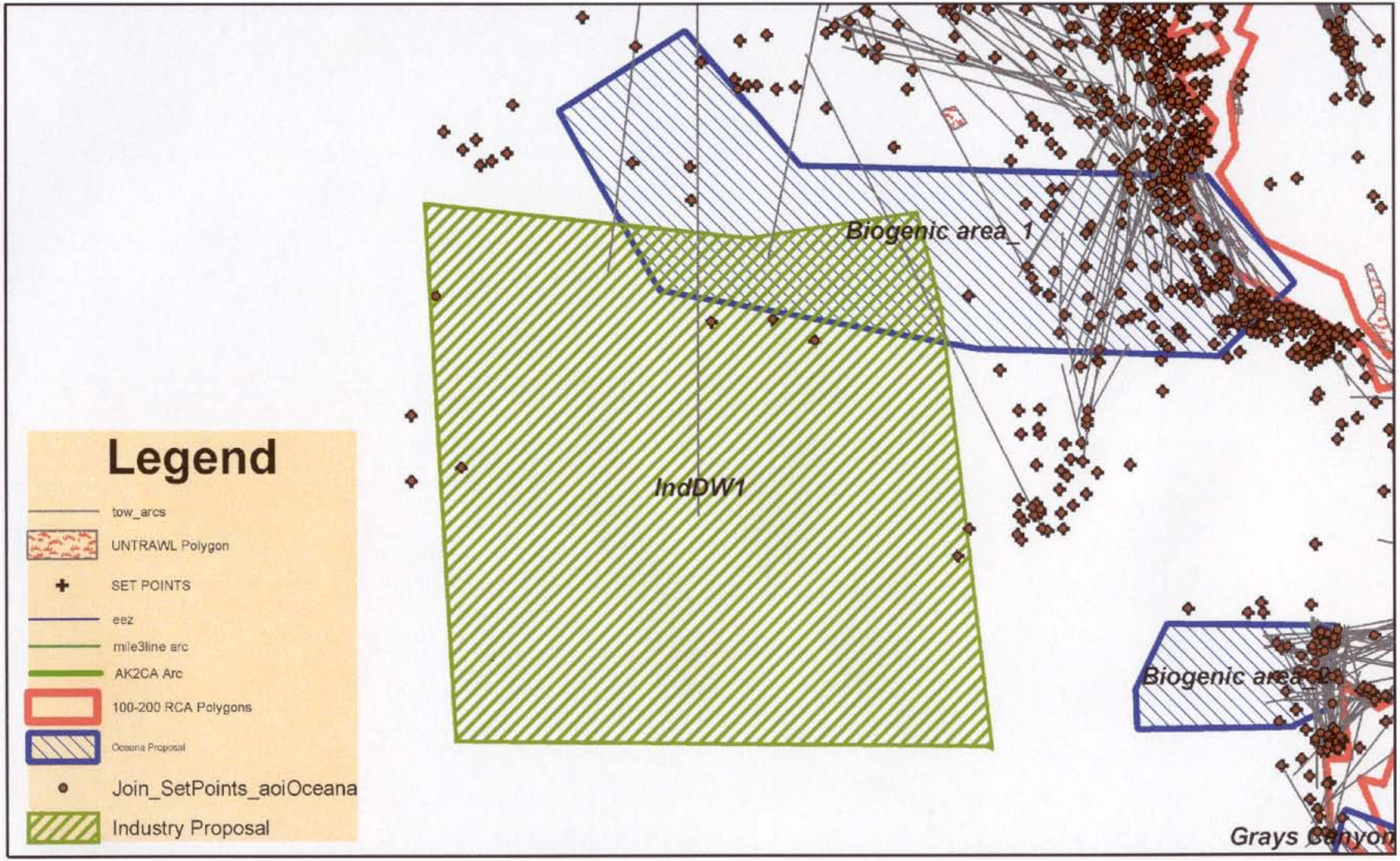
(Note: Blank cells represent no tows; 0.0% is < 0.1%)

Number of Tows Within Areas off WA and Northern OR

	Oceana			Industry	
Area Name - Oceana (Industry)	**OR**	**WA**	**Total**	**OR**	**WA**
Olympic 1	111	548	659		
Olympic 2 (Olympic 2)	21	217	238	2	60
Biogenic Area 1 (Deepwater 1)	76	17	93	3	
Biogenic Area 2	6	24	30		
Grays Canyon	6	3	9		
Biogenic Area 3 (Willapa)	2		2	2	
Total	**222**	**809**	**1,031**	**7**	**60**

(Note: Blank cells represent no tows; 0.0 is < 0.1)

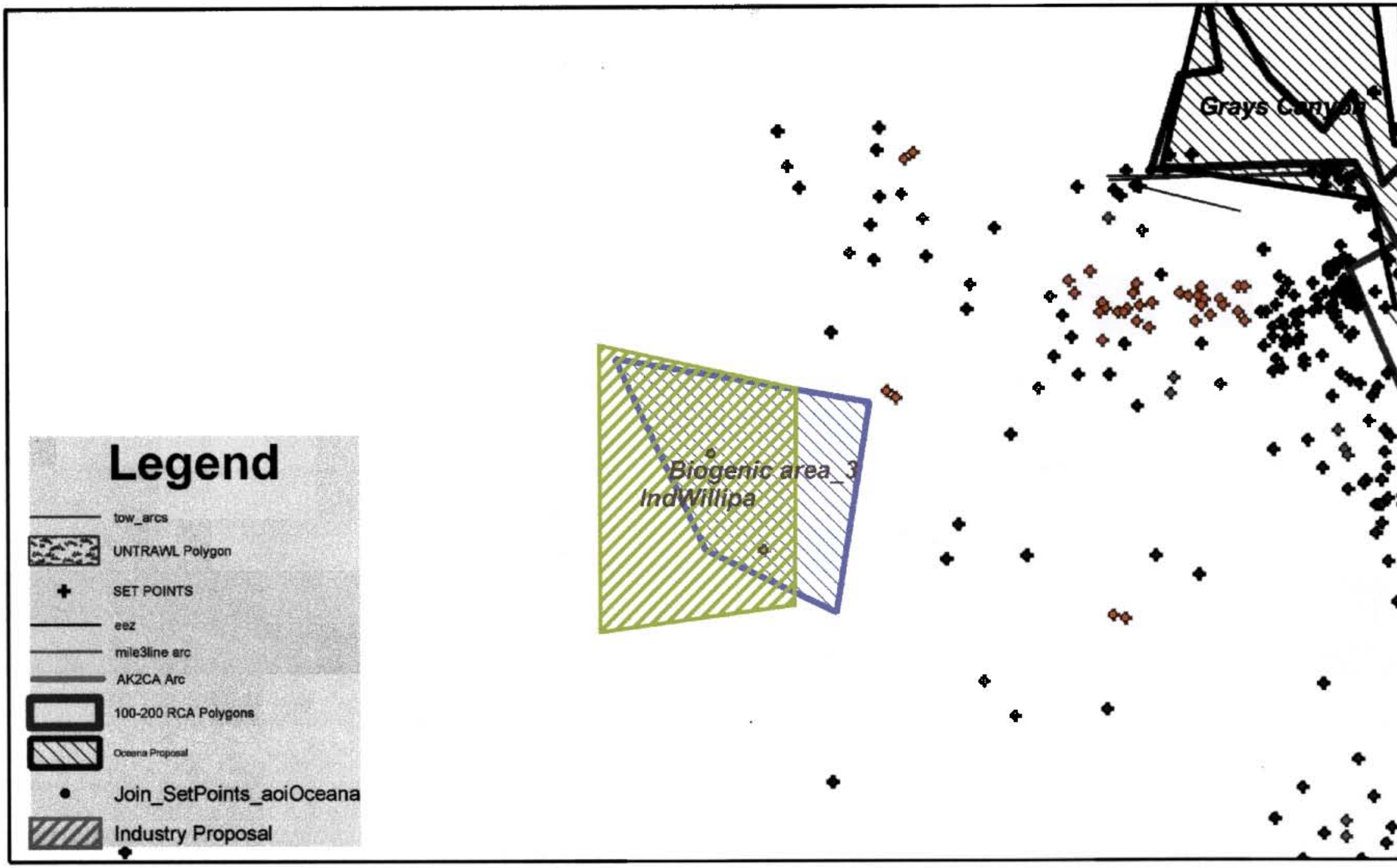
Trawl Closures Biogenic Areas 1 & 2



WDFW 04/12/05

Washington, Oregon and California Trawl Logbook Data from 2003

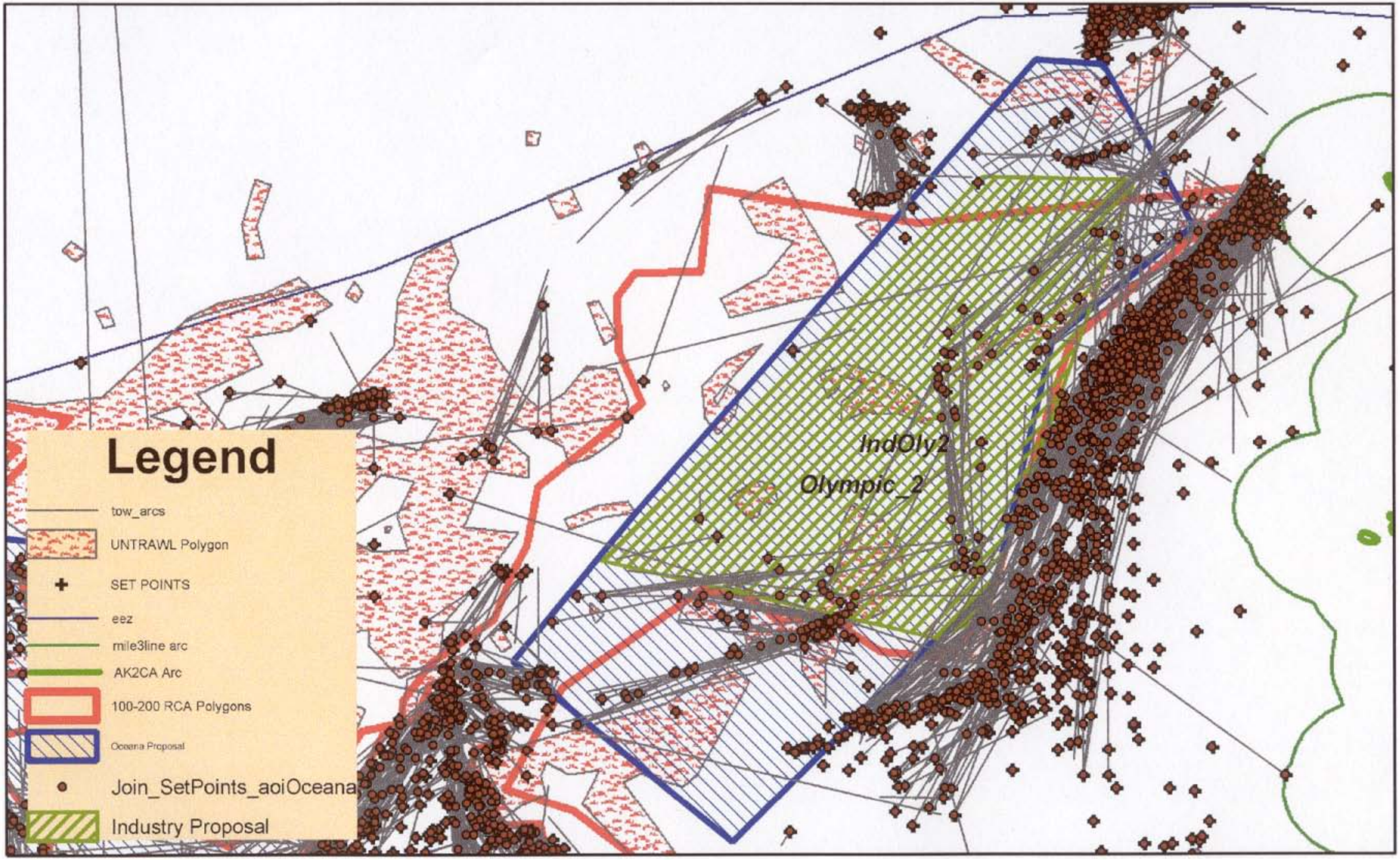
Trawl Closures Biogenic Area 3



WDFW 04/12/05

Washington, Oregon and California Trawl Logbook Data from 2003

Trawl Closures Olympic Area 2



WDFW 04/12/05

Washington, Oregon and California Trawl Logbook Data from 2003

Agenda Item C.3.c
GMT Report
June 2005

GROUNDFISH MANAGEMENT TEAM REPORT ON ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT

At the May Groundfish Management Team (GMT) meeting, the GMT had conversations with Eileen Cooney and Steve Copps from NOAA Fisheries regarding the timeline for Essential Fish Habitat (EFH) implementation and clarification of joint state/federal management; and received presentations from the trawl industry and Oceana regarding their new and revised alternatives to C.12. The GMT believes the current Draft Environmental Impact Statement (DEIS) contains sufficient information for the Council to take final action at this meeting. This is a preliminary GMT report on the EFH EIS. The GMT anticipates having further discussions and presenting a supplemental report at the June Council meeting.

To facilitate the development of regulations for implementing EFH, the GMT believes Council action in June should be as specific as possible relative to the action that will be taken, provided there is flexibility to address overlaps and gaps with existing regulations (e.g., Rockfish Conservation Areas [RCAs]) for management and the ease of enforcement. The GMT cautions the Council against selecting alternatives that are difficult to translate into regulations, such as selecting depth contours instead of coordinates to define areas.

The GMT recommends the results of Council action in June (i.e., the impacts of the preferred alternative) be presented at the September Council meeting to facilitate Council action on the draft plan amendment and implementing regulations. The GMT requests that the resulting habitat protection, trawl impact, and economic impacts of the preferred action be included. Additionally, the GMT recommends NMFS dedicate resources to conduct Geographic Information System (GIS) analyses of the preferred alternative and implementing regulations and that development and review of implementing regulations would be jointly developed by the GMT, Groundfish Advisory Subpanel, and Enforcement Consultants at the September and November Council meetings.

The GMT also recommends that EFH and Habitat Areas of Particular Concern (HAPC) designations be included in the Groundfish Fishery Management Plan (FMP) and then be specified in regulations.

Alternatives for Designation of EFH

The GMT understands that designating EFH results in a definition of the area in which consultation requirements would apply (i.e., consultation on fishing and non-fishing activities which may adversely affect EFH). The GMT notes that, while the DEIS is a thorough compilation of existing groundfish habitat data, the quantity of data in many instances is sparse and the level of resolution is coarse. The GMT believes that habitat for all groundfish species in the FMP needs to be protected, regardless of status (i.e., overfished and non-overfished stocks); therefore the GMT supports the Council's preferred alternatives (Alt. A.2 and Alt. A.3) for the designation of EFH.

Alternatives to Designate Habitat Areas of Particular Concern

The GMT supports the Council's preferred alternatives (Alts. B.2, B.3, B.4, and B.6) for designation of HAPC (estuaries, canopy kelp, seagrass, and rocky reefs). The habitat areas which have been determined to need the most protection at this time are covered within the current suite of preferred alternatives. The GMT understands the need for the Council to have maximum flexibility in regards to HAPC designation, as habitat and stock information becomes available that may guide future designations as well as adjustments to current HAPC areas.

The GMT recommends that the Council consider selecting a combination of HAPC alternatives, even if the resulting maps of the areas overlap one another. This is because, as more stock information becomes available and species move in and out of the overfished and/or precautionary categories, the additional designation of nearshore rocky reef areas would still afford protection to the current area of overlap.

As stated previously in November 2004, the GMT also recommends that a consistent approach be applied to HAPC alternatives. Specifically, with regard to HAPC alternative B.7 (designating certain areas of interest as HAPCs), the criteria for these areas is not apparent, and their selection appears random. It appears these areas were not selected by a pre-determined set of criteria, but were chosen and then justified based on the results.

The GMT understands that the process to adjust EFH designations and components such as HAPCs would require an amendment to the Groundfish FMP. The GMT recommends a four-year review period that aligns with the biennial management and specifications process. This gives the Council flexibility to adjust EFH and HAPC designations as new and improved habitat data become available. However, it is unclear as to whether the maps depicting the areas designated as HAPCs would automatically be updated as more habitat data become available. If the maps are automatically revised with new data, then the GMT does not believe that alternative B.9 (a process to consider proposals for HAPC designation outside the review period) would be necessary.

Alternatives to Minimize Adverse Impacts to EFH

In November 2004, the GMT clarified that the commercial and most of the recreational area closures that are currently in place are for the purposes of protecting overfished species. In recommending those area closures, the GMT did not consciously propose them as habitat protection measures. The depth contours chosen for RCA boundaries—both trawl and non-trawl—are proxies for the areas in which specific rockfish species occur and are most abundant in their adult life stage (based on fishing and survey data), and are used in conjunction with available NMFS observer data (stratified by depth of fishing activity) to assist the Council in estimating impacts to overfished species. As new stock status information becomes available and/or as more information becomes available to further refine the closed area (e.g., through the use of "hotspots" or "coldspots"), areas which were previously closed may become accessible in the future. Therefore, the GMT does not believe the RCA boundaries should form the bases for habitat protection measures, such as those specified in C.2.

However, the GMT does note that, until sufficient information is collected to manage the groundfish fisheries through the use of hotspots, the current RCAs (or some form of them) will likely remain in place to achieve rebuilding strategies for overfished rockfish. In order to adequately manage fisheries by strictly using hotspots (as a replacement for RCAs), the GMT would need spatial data on habitat types and information on the relationship between different habitat types and groundfish stocks. It is anticipated that, given the long-lived nature of most of the overfished species and the length of time needed for those stocks to rebuild, and the lack of data needed for hotspot management, the RCAs will likely remain in place for an extended period of time, and the cumulative economic impact of these trawl closures should be considered in conjunction with any additional measures related to habitat protection.

In reviewing the draft EIS, there was little to no discussion about how proposed measures to mitigate fishing impacts on EFH would be implemented in conjunction with current management. The GMT recommends that a discussion of how the proposed closed areas would mesh with current closed areas, such as RCAs, from a management (and enforcement) perspective be included in the final EIS.

Also, the GMT does not support alternative C.3 (close 25% of representative habitat to all fishing) as the GMT does not believe that sufficient data are available to demonstrate that areas need to be closed to all fishing for the purposes of habitat protection; this alternative would be better addressed in the Council's discussions on marine reserves.

With regard to "hotspots" (alternative C.6), as described above, the GMT believes this management tool should be used to address species-and-gear-specific areas based on fishing and/or research data (such as those data collected through exempted fishing permits). The use of "hotspots" is currently available to the Council and should be considered as part of the broader biennial management process. However, the GMT notes that the use of the term "hotspots" in alternative C.6, and in the EFH EIS in general, is different because it refers to areas of high biodiversity.

The GMT does not support alternative C.7 as it is linked with HAPC alternative B.7 for the reasons described above.

With regard to alternative C.8 (zoning), the GMT recommends that fishing restriction alternatives be limited to the area within the HAPC-designated area (i.e., not be broader than the HAPC area). This alternative would require zoning to be considered within the entire EFH-designated area. Secondly, the zoning and evaluation criteria are undefined making it difficult to predict (and subsequently analyze) the possible outcomes of this effort. As with alternative C.3, this alternative may be better addressed as part of the Council's consideration of marine reserve initiatives.

The GMT understands that legally the Council does have the ability to take mitigation measures outside of whatever is designated as EFH and that re-evaluation is for designation of EFH as well as the management measures associated.

The GMT anticipates having further discussions in June on alternatives to minimize adverse impacts to EFH and may include further recommendations in a supplemental statement.

The GMT believes that the preferred alternatives to minimize adverse impacts to EFH all have merit from a habitat perspective; however, the GMT does not support alternative C.11 (relax gear endorsements) in it's present form, but we would support a modification to alternative C.11 which only permits fishers with a trawl gear endorsement to switch to fixed gear. The GMT believes alternative C.14 (close ecologically important areas to all fishing) is better addressed through the Council's marine reserves initiatives.

Alternatives for Research and Monitoring

The GMT believes that alternatives D.2 (expanded logbook program), D.3 (expanded Vessel Monitoring System [VMS]), and D.4 (research reserve system) all have merit and would enhance the understanding of spatial fishing effort, habitat condition, and the relationship of habitat to stock productivity.

Spatial data on fisheries other than Limited Entry (LE) trawl are currently not collected or are not made available in a database to managers. Given that non-trawl fisheries occur in locations that often differ from trawl fisheries and given a lack of information on the location of other fisheries, it is difficult to identify the non-trawl footprint, and to identify areas that are economically critical to the continued survival of fisheries other than LE trawl. While systems like VMS are necessary for enforcement and would certainly enhance the understanding of spatial effort, the GMT believes that spatial data systems linking catch to fishing location – such as logbooks – would prove more useful for research as these systems could be used to a) establish the current footprint for those fisheries, b) enhance knowledge regarding fishing within certain areas by collecting information such as catch per unit of effort, and c) identify areas that are economically critical for those fisheries to better address practicability considerations under EFH management. However, it is the GMT's understanding that current agency resources may not be adequate to expand logbook systems. Therefore, the GMT recommends that logbook systems be expanded to the extent feasible as resources become available. In addition, in order to adequately analyze existing and future spatial information, the GMT requests that NMFS increase its GIS capabilities for use in groundfish management.

The current understanding of habitat recovery and habitat's relationship to groundfish management is not well understood. A system of research reserves would prove valuable in furthering this understanding. The GMT believes that a well designed research reserve system would take into account existing reserves, encompass a variety of habitat types across depths and latitudes, and would exclude certain bottom impacting gear types from those areas–to varying degrees–in order to assess the impact specific gears have on habitat. Some of those reserves may prohibit all gears that interact with groundfish, others may exclude all bottom-tending gear, and some may exclude or include individual gear types. In addition, any research system should correspond to fishing impact mitigation measures in order to assess the success of those measures.

Finally, the GMT believes that existing programs would prove valuable in increasing the understanding of habitat and location of fishing effort. The GMT believes that VMS and observer data should be made readily available so that managers are better able to assess issues such as coral catch and location of fishing effort to assist in meeting the multiple mandates of the groundfish FMP and Magnuson-Stevens Act.

HABITAT COMMITTEE REPORT ON THE GROUNDFISH ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT

The Habitat Committee (HC) developed this statement on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS) through email communication. We reiterate some of the HC's earlier statements, particularly on description of Essential Fish Habitat (EFH), designation of habitat areas of particular concern (HAPC), and research and monitoring, but also have refined our thinking on measures to minimize adverse impacts to EFH due to fishing, after review of the DEIS (February 11, 2005).

Summary of Recommendations of Habitat Committee

A. Designation of EFH: Adopt Alternative A2
B. Designation of HAPC: Adopt B2, B3, B4, B6, B7 and B.9.
C. Measures to Minimize Impacts of Fishing:
Adopt <u>elements of</u> C4.2, C7.2, C9.5, C9.6, C.10, and C.12, 13 and 14.
D. Research and Monitoring: Adopt a combination of D.2. and D.4.

The HC believes that the designation, description and protection of EFH, as mandated by the 1996 Sustainable Fisheries Act, is a helpful tool for the Pacific Fishery Management Council. It helps moves fishery management into a broader ecological context and is a step forward in the incorporation of the principles of ecosystem-based management as called for by the U.S. Commission on Ocean Policy (2004), the Pew Ocean Commission (2003) and the U.S. Department of Commerce report to Congress on Ecosystem-based Management (1999).

The preparation of the DEIS to support the Council's upcoming decisions on EFH has focused a great deal of effort and has brought information together that would not otherwise have been available to managers in a usable format. While there are significant gaps and uncertainties in our understanding of marine habitat and the specifics of how changes in habitat condition lead to changes in fishery resource productivity, the process of compiling the available information has been integral in bringing these gaps and uncertainties to light. This, in turn, suggests priority areas for future monitoring and research efforts. The authors of the DEIS have done a remarkable job assembling and depicting alternatives and supporting information with very limited time and resources; they cannot be faulted for the data gaps and uncertainties that remain. Consequently, the DEIS represents a comprehensive compilation of the best information currently available, and is an adequate basis for decision-making by the Council.

The HC understands that industry and environmental groups are likely to come forward with new alternative formulations as refinements to those already presented in the draft DEIS for fishing impact minimization. While we are unable to comment on these hypothetical and unseen alternatives, we offer recommendations on the four decision areas based on the existing published alternatives. We provide a rationale for these recommendations and have prepared a matrix (attached) showing how the existing alternatives help to meet some of these principles.

We hope this is a useful tool that the Council can use to review new alternatives against. In arriving at our recommendations, we considered how each alternative would help achieve the following six principles or objectives:

General Principles

1. **Understand impacts of fishing**

All habitats, whether marine or terrestrial, experience natural disturbances. Fishing can also represent a disturbance to habitat, and management and conservation attention should be most concerned with disturbances that are quantitatively and/or qualitatively unlike the natural disturbances that marine habitats and constituent organisms experience and are presumably better able to withstand.

We must act with precaution as we seek improved understanding of fishing impacts to habitat of various types and under differing energy regimes. Study of impacts and recovery require areas where specific fishing disturbances can be studied experimentally as well as two types of control areas that are not impacted by any fishing and areas that are open to fishing impacts of all kinds.

As noted in the DEIS, most studies of fishing gear impacts on habitat have been conducted outside of the West Coast region. The HC supports the concept that ecological principles can be applied to data collected during studies of fishing gear impacts on marine habitats in other areas. However, specific studies conducted in this region will strengthen our understanding, particularly in the context of the unique and complex assemblage of species managed under the Council's groundfish FMP.

Areas chosen for study should be broadly representative of all habitat types in which PFMC managed groundfish occur. In particular, they should represent this diversity based on depth, substrate type, latitude and ecoregion (e.g. both above and below Pt. Conception). Many areas in the West Coast Exclusive Economic Zone (EEZ) are not currently fished. We recommend that unfished study areas be selected in collaboration with fishermen from all gear sectors in order to take advantage of these unfished areas and to minimize additional areas closed by regulation (see #6, below).

2. Focus on Priority Habitats

The HC feels that priority habitats that are vulnerable to disturbance by fishing gear, and that warrant protective measures include canopy kelp, seagrasses, seapens, and biogenic structure forming organisms such as corals and sponges that are associated with high relief rocky habitats, canyons, and seamounts.

As noted in the Scientific and Statistical Committee report to the Council in March 2005, the distribution and abundance of priority habitats is poorly understood and warrants further investigation.

3. Protect undisturbed areas

There may be other areas that hold unique habitats that are as yet undiscovered or poorly understood and potentially fragile. These areas should be candidates for future protection. As a precautionary step, the HC recommends that areas that are presently undisturbed should remain that way until better mapping information is available. A number of recent discoveries along the West Coast of unique and poorly studied habitats with associated species support this principle, including: a common, conspicuous, and previously undescribed species of black coral living in the Southern California Bight; multispecies aggregations of a deep-dwelling sculpin and a deep-sea octopod brooding eggs in a fluid seep area on the Gorda Escarpment off California; and methane seeps with associated carbonate rock structures and chemosynthetic communities along the shelf break off Oregon. These recent observations suggest that there are undiscovered unique areas scattered along the West Coast that warrant protection by limiting the expansion of existing fisheries.

4. Protect the forage base

The HC understands that prohibiting a directed krill fishery will take place through another management approach by the Council. The HC is very supportive of this action and encourages the Council to expand protection to all of the currently non-managed forage species as well. Preservation of a healthy forage base that is relied upon by managed groundfish species is an important element in the broader context of habitat protection and ecosystem-based management.

5. Timely implementation of protection measures

While there is substantial learning to be done on this topic, the HC feels that action on EFH protection proceed with a plan for effectiveness monitoring. This would be a precautionary approach with adjustments expected during each 5-year review period.

6. Utilize existing restricted areas to also achieve habitat objectives.

In working to select areas for habitat protection, we encourage the consideration of areas that have already received some protection for other purposes (e.g., bycatch reduction and stock rebuilding) so as to both realize the benefits that are already accruing to habitat from these measures, and to minimize the imposition of new regulatory restrictions on the fishing industry.

The HC understands that the Council has the flexibility to adopt any alternative, or blend of alternatives, provided that it is within the scope of the analyses contained in the draft DEIS. We note how helpful the GIS tool has been in dealing with the habitat-based management options in the DEIS and encourage the Council to use this tool during deliberations considering the various new and existing options. Our recommendations are explained below and accompanied by an attached table.

HC Recommendations on the Alternatives

A. Designation of EFH: Adopt Alternative A.2

The HC recommends adopting EFH Alternative A.2 (identified as 100% of the area where habitat suitability probability (HSP) is greater than zero for all species and any additional area in depths less than or equal to 3,500 m or 1914 fathoms) as its final Preferred Alternative. This recommendation reflects our belief that the maximum probabilistic approach to determining EFH, as is represented in this alternative, is reasonable given data uncertainties, and that the added precaution of including some areas beyond depths where data become particularly uncertain is also wise. It is our understanding that the proposed EFH designation includes not only substrate, but also the water column above that substrate, including surface waters.

B. Designation of HAPC: Adopt B.2, B.3, B.4, B.6, B.7. and B.9

The purpose of HAPC is to identify areas that 1) possess important ecological functions for groundfish, 2) are sensitive to human-induced environmental degradation, 3) are at risk of stress due to development actions, and/or 4) are rare habitat types for groundfish. We are aware that designating HAPC serves to concentrate attention on potential threats to these habitats, but provides no explicit protection.

The HC recommends that the Council adopt as its final alternative an amalgamation of Alternatives B.2, B.3, B.4, and B.6 (estuaries, canopy kelp, seagrass beds, and rocky reef areas). We also note that areas identified under Alternative B.7.(areas of interest) that are not already encompassed in the previous four draft alternatives have unique geological and ecological features of special value to fisheries and accordingly, many of these are also currently being used as research areas. As such, the HC believes that these areas merit the special attention afforded HAPC designation and deserve incorporation into the Council's final alternative. In addition, the HC recommends that the Council include Alternative 9 in its final alternatives as a mechanism to streamline future HAPC designations based on new information.

C. Measures to Minimize Impacts of Fishing to EFH: Adopt elements of C4.2, C7.2, C9.5, C.10, and C.12, 13 and 14.

The HC notes that while the importance of habitat to marine fishery resources is increasingly recognized, detailed understanding of the relationship of habitat condition to fishery resource productivity on the one hand, and to the individual and cumulative impacts of fishing activities on the other, is still being developed.

In light of the principles and considerations outlined above, the HC recommends adopting some elements of:

Alternative C.4.2 limits expansion of fisheries for all bottom tending gear

Alternative C.7.2 protects areas of interest as identified by HAPC alternative B.7 from all bottom tending gear. We note that this alternative specifically takes advantage of the cowcod closure area and we recommend identification of a subset of the RCAs also to be identified for closure to encompass all habitat types, depths, and latitudes.

Alternative C.9.5 prohibits the use of dredge gear. Dredge gear is little used, has been or is being phased out, and is known to be destructive to habitat.

Alternative C.10 (Central California buyout and closure) has merit and is very progressive in its approach, but is limited in geographic scope. However, if the private parties involved (fishermen and the Nature Conservancy) jointly agree that this is a productive proposal, we believe that there are habitat benefits that deserve support.

Alternative C.12 is the Oceana alternative relating only to bottom trawl gear, while Alternatives C.13 contains the same areas but closes them to all bottom contacting gear and C.14 closes these areas to all fishing. (The HC thinks that all three approaches should be used in various combinations to meet its principles of allowing protection and research).

Discussion

It is clear that the Council, the scientific community, and the public are developing an increasing awareness that complex habitats of relief, including biogenic habitats such as seagrasses, kelp, corals, sponges and sea-pens are important to the growth and survival of managed species. Consequently, we recommend that the Council's Final Alternative include measures that will afford protection to these priority habitat types. The most direct method to protect these habitat types would be to identify measures that would prohibit fishing with mobile bottom tending gear in these areas. Because many of these features are associated with rocky substrate, the Council may prefer to focus its primary attention on this substrate type.

A comprehensive alternative that addresses specific habitat protection goals and criteria would be useful. One of the Council's most difficult decisions will be whether and how to apply habitat protection measures to only trawl gear or to other bottom-contacting fisheries as well. Our base of information on the spatial distribution and intensity of fixed gear commercial and recreational fisheries, as well as of the habitat impacts of these fisheries, is much less robust than it is for mobile, bottom-tending gear.

The HC recognizes that the Council has been placed in an extraordinarily difficult position of balancing the benefits of habitat protection against the costs of displaced fisheries, in the face of this uncertainty. Fixed gear and recreational fisheries target different species occupying different habitats than many trawl fisheries. However, we understand that fixed gear can impact habitat features through contact of gear, and shearing of lines as gear is retrieved. The HC recommends that the Council take initial measures in a precautionary fashion to protect priority habitat types. The Council should also assure that there is some full and on-going protection of areas that represent a full suite of habitat types, depth and latitude ranges to reflect uncertainty. However, all-encompassing depth-based measures that may have negative consequences to fisheries may be overly broad.

While we think Alternative C.8 to zone fishing activities is an interesting idea, it requires NOAA to do extensive research to demonstrate that any unavoidable adverse impacts would be minimal and temporary. Lack of available funds makes this option impractical. Further, it is silent on criteria to be employed to determine whether an area should be open or closed and much of its protective force would be deferred to the future.

The HC believes that habitat protection through new gear restrictions (Alternative C.9) can be appropriate, particularly if they are readily enforceable and accepted by the fishing industry. The HC recognizes that the Council's action to reduce catch of overfished species, using restrictions on large footrope trawl gear, has also seemed to have had the added benefit of protecting habitat by moving trawl effort off of high relief habitat.

In general, the HC cannot speak to the habitat benefits of the several options under this alternative. Much depends on where the gear is fished, and how it is fished. For example, in high relief areas with abundant emergent invertebrates (e.g. sponges or corals), or low energy environments with little disturbance, infrequent bottom contact by any gear may have a significant habitat impact.

We note that fishing gear is constantly evolving; development of habitat friendly fishing gear should be encouraged. While gear restrictions may act to protect habitat under present conditions and configurations, there are no assurances that the habitat protections envisioned will be maintained through time as gear configurations change. Much will depend on how legal and prohibited gear is defined in future regulations.

D. Research and Monitoring : Adopt a combination of D.2. and D.4.

The HC recommends that the Council adopt a combination of Alternative D.2, option 1 (mandatory logbooks for all groundfish operations) and Alternative D.4 (a system of research closures to provide areas for experimentation and observation of habitat condition in open and closed areas) as its final alternative for research and monitoring.

The HC believes that it is essential that the mandatory five year review of the Council's measures to identify and protect EFH be conducted with a much better understanding of the spatial distribution of habitat types and functions, the spatial distribution fishing activities, and the relationship of habitat condition to fishing activities and the productivity of fishery resources.

Collection of accurate spatial information on non-trawl fisheries is a significant need for the next EFH update. This information needs to provide a comprehensive picture of activity showing seasonal and interannual variability, effort and catch across a wide representation of the fleet. We believe a logbook program provides the best vehicle to collect the needed comprehensive information linking effort, harvest and location, Additionally we suggest the Council retain the option of requiring vessel monitoring systems (VMS) for circumstances where automated collection of precise locational information addresses management or enforcement questions. As the technology becomes available and affordable, adoption of an electronic logbook format should be encouraged to facilitate more broad and rapid use of logbook data.

Evaluation of the Council's measures to protect habitat from adverse effects of fishing, and of fishing impacts to habitat are essential to understanding whether any restrictions to fishing activities are warranted and justified. Developing these evaluations through carefully structured comparisons of open, closed and experimental areas that are matched for habitat type (substrate, depth and latitude) is necessary in order to clearly differentiate changes that are the result of Council management and conservation actions, as opposed to changes that may result from broader changes in oceanographic conditions and recruitment events. Clearly, implementation of research or conservation closures requires that goals and objectives be identified, as well as mechanisms for siting and monitoring. This is a topic the Council has endorsed in its MPA policy white paper. The HC encourages the Council to actively support funding to the participating agencies and universities for the necessary research to meet this goal.

Additionally, a specific plan for monitoring the effectiveness of the adopted EFH measures should be identified and funded so we can evaluate their effectiveness during the mandatory 5 year EFH review.

Habitat Committee Analysis of
Groundfish EFH DEIS Fishing Impact Minimization Alternatives

(alternatives shown in bold outline are Council preliminary preferred Alternatives)

Principles → **Fishing Impact Minimization Alternatives↓**	Provides on-going protection of sensitive or special habitats from gear with bottom contact		Areas with little disturbance remain undisturbed		Utilizes existing closed or unfished areas		Considers prey base (other food chain interactions?)	Implementation to begin near-term
	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear		
C.1 No action								X
Depth Based								X
C.2. 1. No large footrope trawl shoreward of 200 fm and no fixed gear shoreward of 100 fm								X
C.2.2. no large footrope trawl throughout the EEZ and no fixed gear shoreward of 100 fm								X
C.2.3. no large footrope trawl gear shoreward of 200 fm and no fixed gear shoreward of 60 fm								X
Close Sensitive Habitat								X
C.3.1. sensitive areas with low existing trawling efforts (higher threshold) closed to all fishing (all gear types)	X	X	X	X				X
C.3.2. sensitive areas (lower threshold) with low existing trawl effort closed to all fishing (all gear types)	X	X	X	X				X
C.3.3.same as .1 except no adjustment made for trawl effort	X	X	X	X				X
C.3.4. same as .2 except no adjustment made for trawl effort	X	X	X	X				X

Principles → Fishing Impact Minimization Alternatives↓	Provides on-going protection of sensitive or special habitats from gear with bottom contact		Areas with little disturbance remain undisturbed		Utilizes existing closed or unfished areas		Considers prey base (other food chain interactions?)	Implementation to begin near-term
	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear		
Prohibit Geographic Expansion of Fishing								
C.4.1. Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002		X		X		X		X
C.4.2. All bottom tending gear types prohibited from fishing west from the 1094 fm contour	X	X	X	X	X	X		X
Prohibit a Krill Fishery								
C.5.Designate krill as a component of EFH and prohibit fisheries that target it.							X	X
Close Hotspots								
C.6. Prohibit bottom trawling in areas that have high habitat suitability (great then 20%) for more than 50 species or life stages (results in most waters shallower than 200 m being closed to bottom trawling)		X						X
Close Areas of Interest								
C.7.1 close certain HAPC areas (Alt. B.7 areas) to bottom trawling		X				X (cowcod closure area)		X
C.7.2. close certain HAPC areas (Alt. B.7) to all bottom contacting fisheries	X	X			X (cowcod closure)	X (cowcod closure)		X

Principles → **Fishing Impact Minimization Alternatives↓**	Provides on-going protection of sensitive or special habitats from gear with bottom contact		Areas with little disturbance remain undisturbed (limits expansion of fisheries)		Utilizes existing closed or unfished areas		Considers prey base (other food chain interactions?)	Implementation to begin near-term
	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear		
Zoning Fishing Activities								
C.8.1. Fishing zones established for bottom tending mobile gear within 5 years where research shows unavoidable impacts would be minimal and temporary; no fishing outside 2000 m contour immediately		?		X (outside of 2000 m only)		?		outside of 2000 m only
C.8.2 Fishing zones established for all bottom contacting gears within 5 years where research shows unavoidable impacts would be minimal and temporary; no fishing outside 2000 m for all bottom contacting gear immediately	?	?	X (outside of 2000 m only)	X (outside of 2000 m only)	?	?		outside of 2000 m only
Gear Restrictions in areas identified as EFH for groundfish								
C.9.1. prohibit roller gear larger than 15 inches								X
C.9.2. prohibit the use of flat trawl doors								X
C.9.3. Limit the length of a single longline groundline to 3 nm								X
C.9.4. employ habitat friendly anchoring								X
C.9.5. prohibit dredge gear	dredge gear only							X
C.9.6. prohibit beam trawl gear	beam trawl gear only							X
C.9.7. prohibit set gillnets beyond 60 fm	set net gear only							X
C.9.8. prohibit dingle bar gear	dingle bar							X

(troll groundfish gear)	gear only							
Principles → **Fishing Impact Minimization Alternatives↓**	Provides on-going protection of sensitive or special habitats from gear with bottom contact		Areas with little disturbance remain undisturbed (limits expansion of fisheries)		Utilizes existing closed or unfished areas		Considers prey base	Implementation to begin near-term
	All bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear	all bottom contacting gear	all bottom trawl gear		
Central California No Trawl Zones								
C.10. buyout of 50% of groundfish trawl permits with corresponding bottom trawling closure		X		X		X		?
Relax Gear Endorsement Requirements								
C.11. allows permit holders to switch gear types; may benefit habitat if trawl gear fishermen switch to pot or trap gear								X
Close Ecologically Important Areas to Bottom Trawl Gear								
C.12. Alternative restricts bottom trawling to existing open areas, closes sensitive habitat areas and areas closed to trawling 2000-2003 (existing management closures), limits roller gear size, requires ongoing research and monitoring (Oceana alternative)		X		X		X		X
C.13. Same as C.12 but areas closed to all bottom-contacting gear	X	X	X	X	X	X		X
C.14 Same as C.12 but areas closed to all fishing	X	X	X	X	X	X		X

Agenda Item C.3.c
Habitat Committee Report
June 2005

Habitat Committee Report

on the

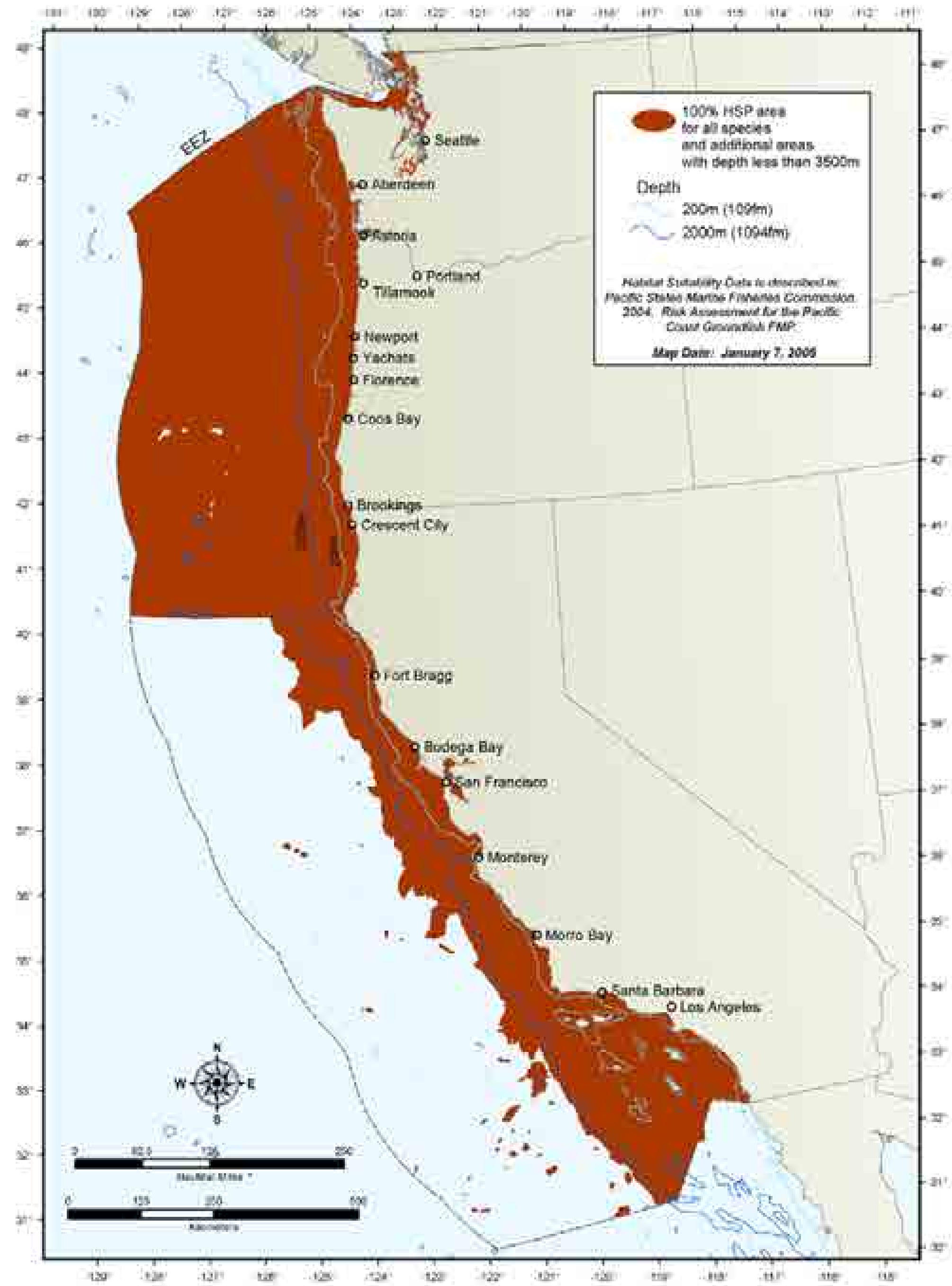
Groundfish Essential Fish Habitat Environmental Impact Statement

Olympic Coast National Marine Sanctuary

Habitat Committee Recommendations

EFH Designation

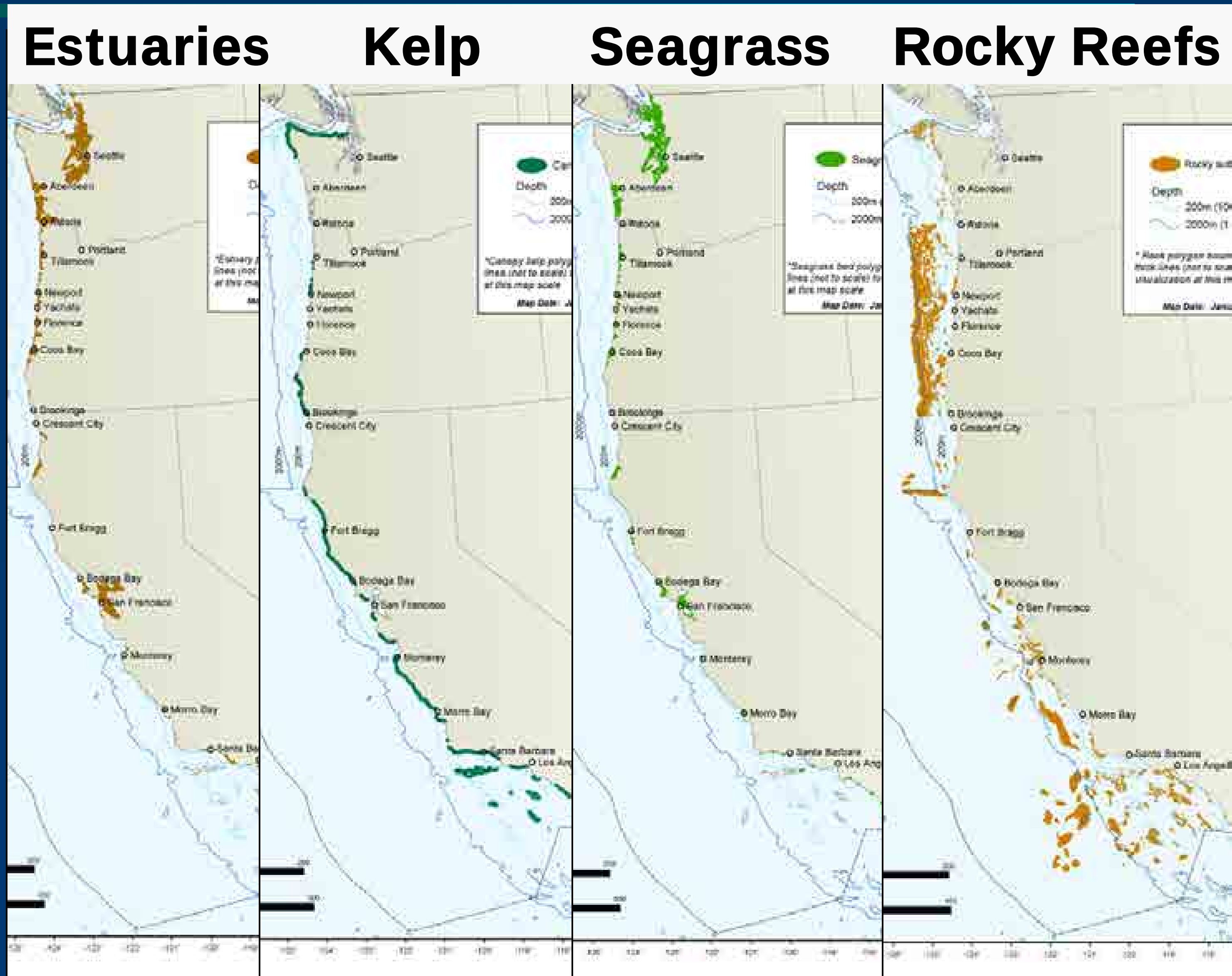
- A.2: Depths less that 3,500 m



Habitat Committee Recommendations

HAPC

- Alts. B.2,3,4,6: Estuaries Kelp Seagrass Rocky Reefs
- Alt B.7: Areas of Interest
- Alt B.9: HAPC Process



Habitat Committee Recommendations

Minimize Adverse Impacts

- C.4.2: no expansion all bottom-tending gear
- C.7.2: close Areas of Interest to bottom-contacting gear
- C.9.5: Prohibit dredge gear
- C.10: Central Calif. No-Trawl Zones

Habitat Committee Recommendations

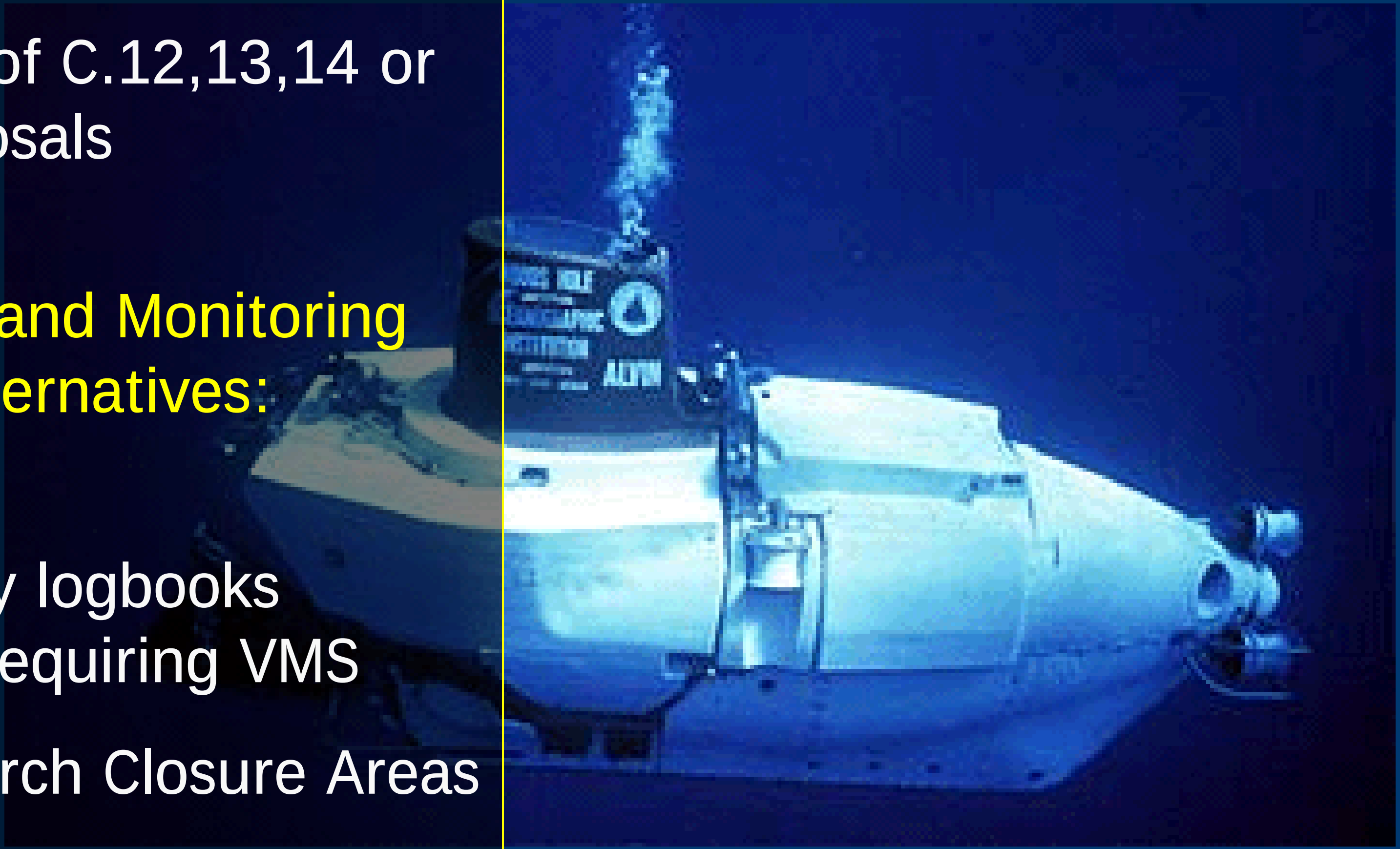
Close Ecologically Important Areas:

- Elements of C.12,13,14 or new proposals

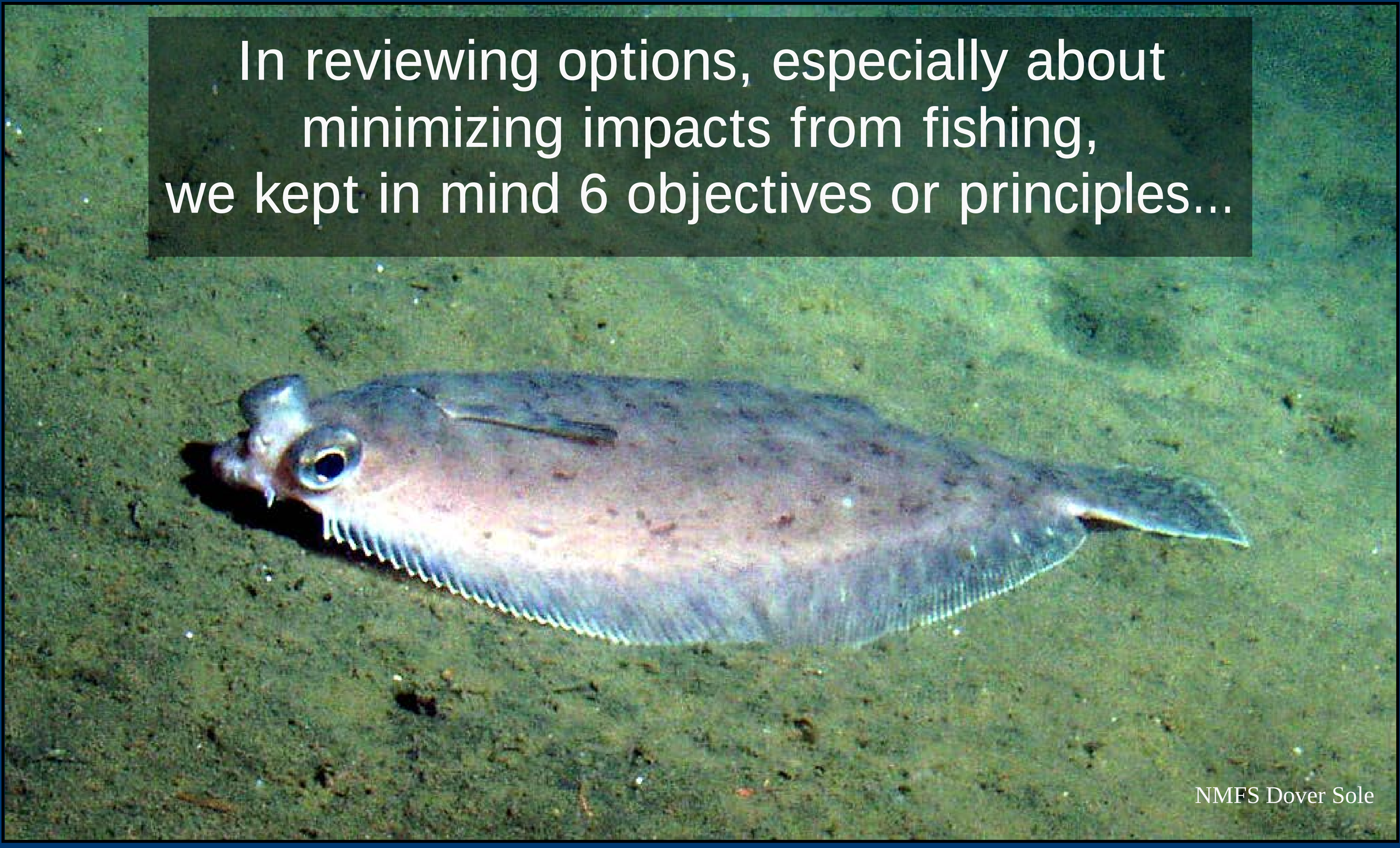
Research and Monitoring Alternatives:

- D.2.1

  Mandatory logbooks
  Consider requiring VMS
- D.4 Research Closure Areas



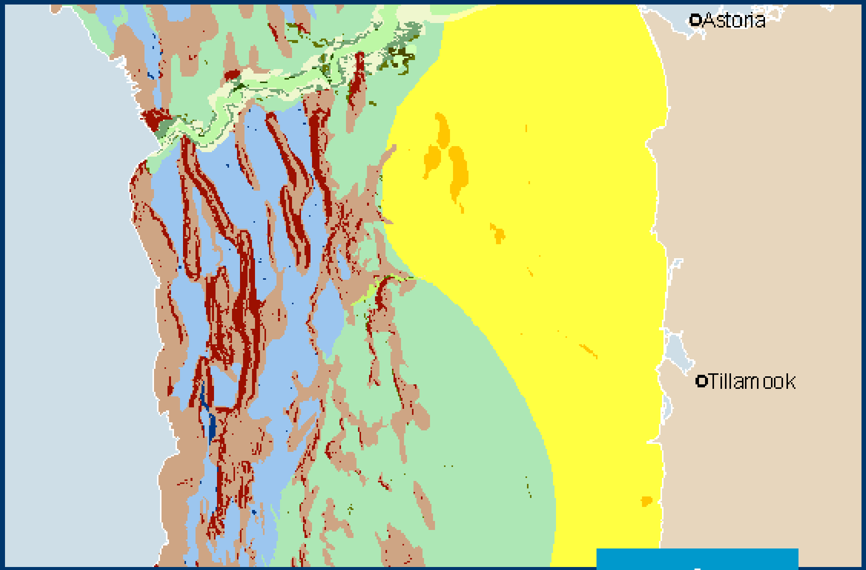
Principles to Assist Decision Making



1. Understand Impacts of Fishing

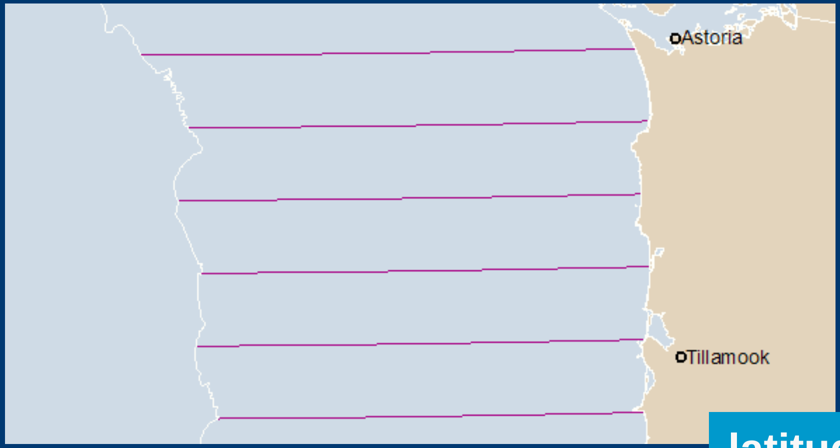
- Focus where fishing impacts differ from natural disturbances
- Precaution; seek improved understanding
- Comparative study – fished vs. unfished
- West coast-specific studies needed

Study fishing impacts over a broad representation of habitat types & locations



geology

depth



latitude

2. Prioritize Vulnerable Habitats

- Canopy kelp
- Seagrasses
- Seapens
- Structure-forming organisms
  - High-relief rocky habitats
  - Canyons
  - Seamounts

Steve Fisher OCNMS

Gorgonian coral; Channel Islands NMS

3. Protect Undisturbed Areas

NMFS rosethorn rockfish

May contain habitats that are:

- Unique and undiscovered
- Poorly understood
- Potentially fragile

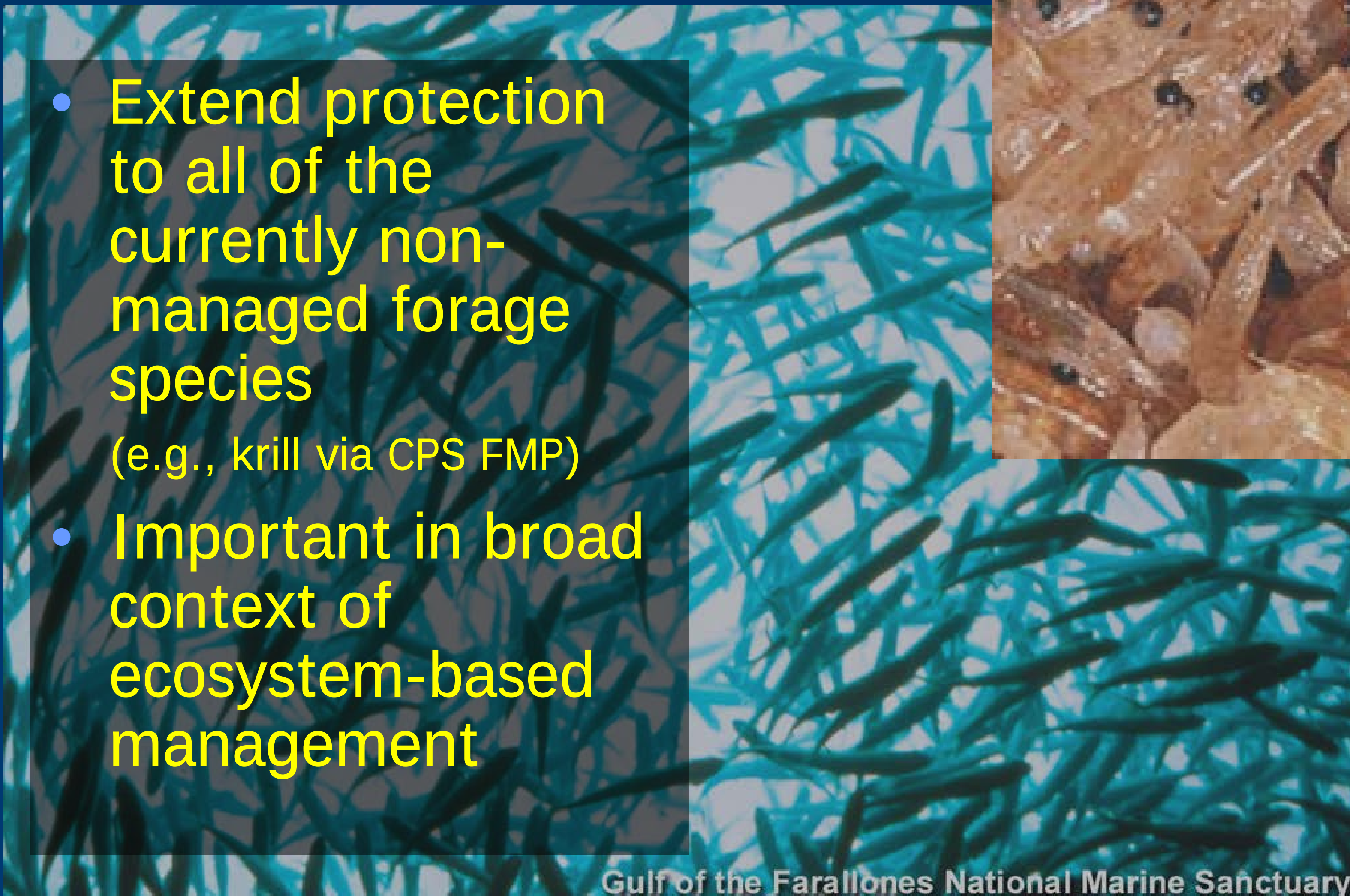
Precautionary approach:

Undisturbed areas should remain undisturbed until better information is available.

4. Protect Forage Base

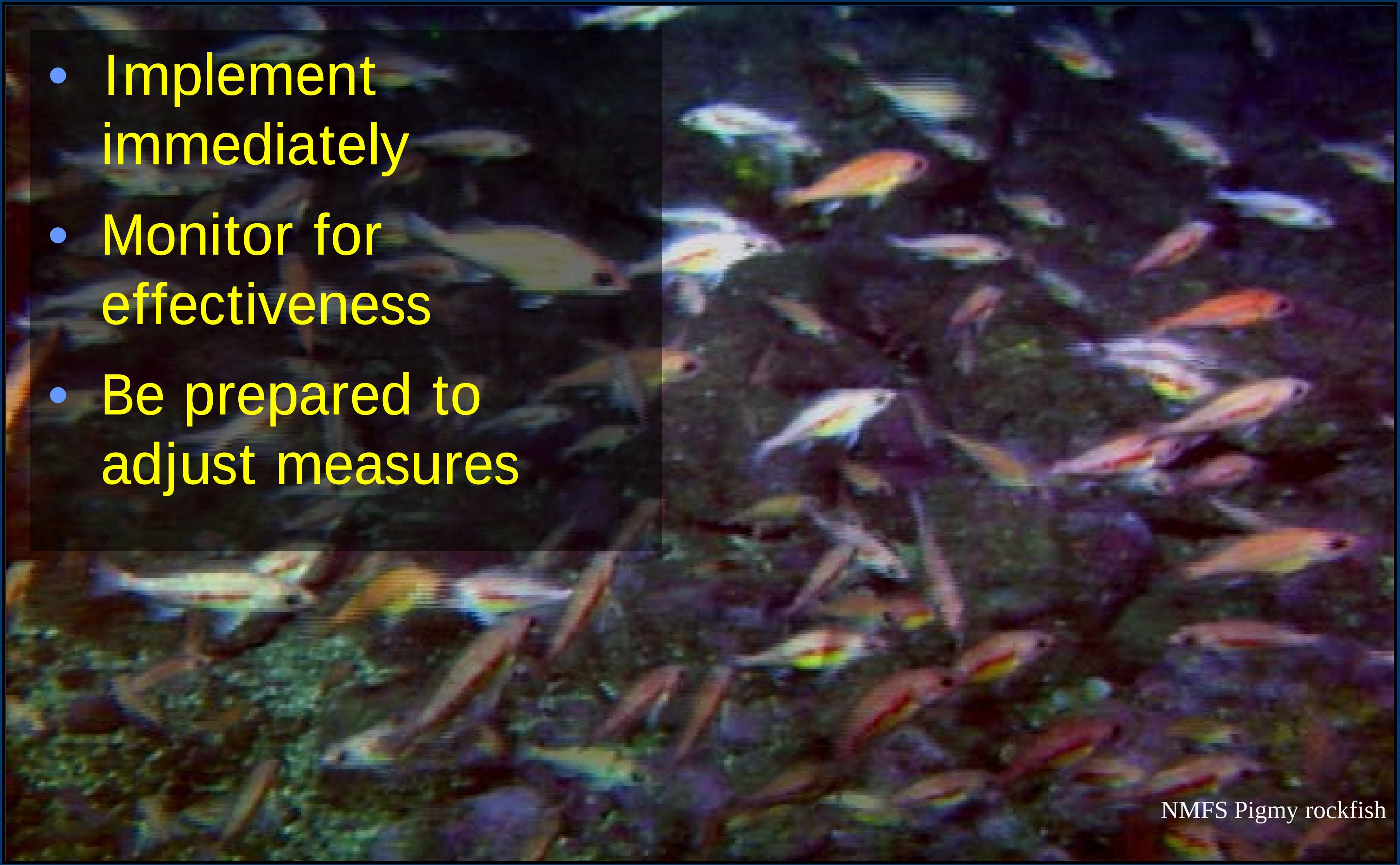
- Extend protection to all of the currently non-managed forage species

  (e.g., krill via CPS FMP)
- Important in broad context of ecosystem-based management



5. Timely implementation of protection

- Implement immediately
- Monitor for effectiveness
- Be prepared to adjust measures



NMFS Pigmy rockfish

6. Use Existing Restricted Areas

- Minimize imposition on fishers
- Optimize benefits
- Take advantage of habitat recovery that may be already occurring

Black rockfish; Monterey Bay NMS; Kip Evans

Application of Principles

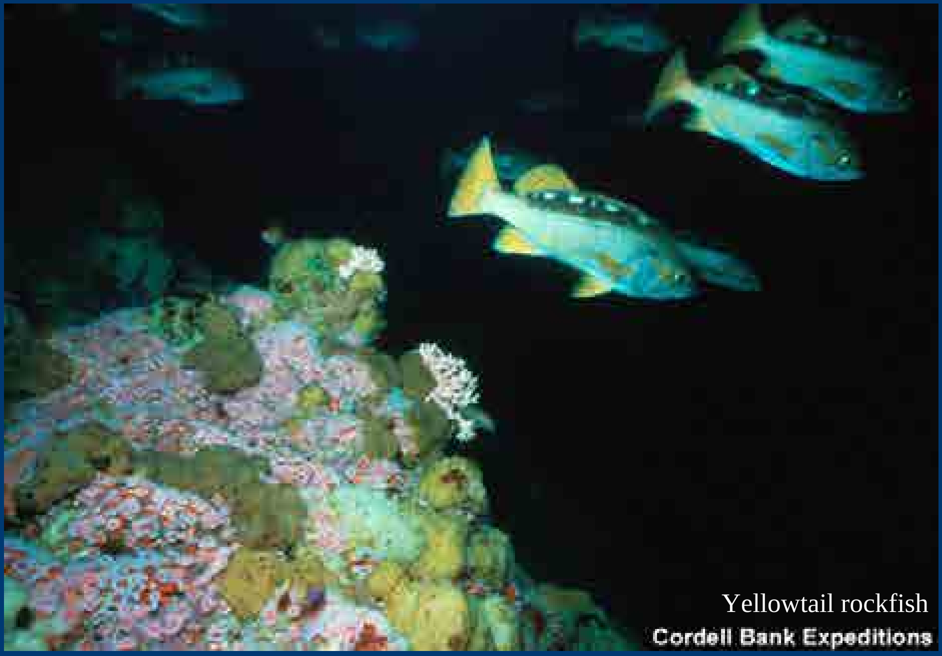
Does the alternative:

1. Help understand the impacts of fishing?
2. Focus on priority habitats?
3. Protect undisturbed areas?
4. Protect forage base?
5. Provide timely implementation?
6. Build upon existing restricted areas?

When in Doubt:

- Is it precautionary in favor of habitat protection?
- Is the habitat type involved currently under- or over-represented?
- Is there opportunity for comparative study?
- How will it be evaluated for effectiveness? (clear goals and objectives)

NMFS Yellowtail rockfish



Yellowtail rockfish
Cordell Bank Expeditions


Gulf of the Farallones National Marine Sanctuary
Sylvia Earle

Agenda Item C.3.c
SSC Report
June 2005

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON GROUNDFISH ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT – FINAL PREFERRED ALTERNATIVE

At the March 2005 meeting, the SSC heard an update from Mr. Steve Copps (NMFS) on recent progress in preparing the groundfish EIS for EFH. The updated draft EIS document was distributed in March for further consideration at the April Council meeting. He noted that the present draft of the EIS is substantially changed and addresses many of the concerns expressed previously by the SSC.

Also at the March 2005 meeting, the SSC reviewed the Oceana Methodology for identifying areas of EFH that would be closed to bottom trawling and listened to presentations by Jim Ayers and Jon Warrenchuck (Oceana), and Geoff Shester (Stanford). Oceana's stated objective for EFH is to protect habitat while maintaining vibrant fisheries. The Oceana alternative is included as one of the alternatives in the draft EIS. The Council included the Oceana alternative as preliminary preferred Alternative number 12.

The Oceana approach considers coral and sponge habitats to be of particular importance to groundfish and referred to the EFH final rule, which states that it is not appropriate to require definitive proof of a link between fishing impacts to EFH and reduced stock productivity before Councils can take action to minimize adverse fishing impacts to EFH to the extent practicable.

The Oceana alternative seeks to establish an open trawling area by subtracting the area to be protected from the total fishing area, effectively freezing the bottom trawl footprint. Trawl logbook data from 2000-2003 were used to establish the proposed bottom trawl footprint. Areas within the proposed bottom trawl footprint were identified as areas of EFH that would be closed to bottom trawling based on 5 criteria. Observer data were not explicitly used to identify biogenic habitat, rather they were used to corroborate determinations from other sources. Approximately 14,000 km^2 of 90,000 km^2 within the bottom trawl footprint were identified as areas of EFH that would be closed to bottom trawling.

Oceana used multiple criteria to evaluate areas for closure, not just records of structure-forming invertebrates from trawl and submersible surveys. These additional criteria included; 1) a database of areas considered untrawlable during the shelf survey, 2) substrate characteristics (hard bottom habitat, including rocky ridges and rocky slopes), 3) bathymetric features (canyons, gullies and seamounts), and 4) areas with high habitat suitability from the EFH analysis. Areas labeled biogenic in the Ocean alternative were identified primarily from records of structure-forming invertebrates.

At the March meeting a considerable amount of SSC discussion focused on what criteria were used to define areas to be closed to fishing. The SSC noted that trawl survey data are not adequate to formulate a comprehensive model of coral and sponge distribution. An analysis of the density of positive trawl samples (for invertebrates) was used as a basis for drawing polygons enclosing discrete areas. The SSC noted that the analysis, because it is an analysis of positive tows only, is probably not the best metric of habitat forming invertebrate distribution; a presence/absence analysis may be more robust. It is clear that groundfish trawl surveys are not the ideal tool for sampling invertebrate distribution and abundance.

Observer data from bottom trawl fishing vessels, aggregated in blocks, were also analyzed as a secondary data source. Oceana reported that these data corroborated the trawl survey analysis and recommended increased observer coverage to document invertebrate distribution. The SSC noted that increased observer coverage may not be the solution. Special studies are essential to further understand the biogenic structure and its linkage to groundfish production.

Oceana indicated to the SSC its expectation that the Council would provide an analysis of long-term economic benefits of their alternative in the Draft EFH EIS. The SSC notes that such analysis is not feasible without more definitive information on long-term effects of habitat protection on fishery yield.

At the April meeting of the SSC, discussion on EFH again focused on the Oceana methodology. The SSC noted that, while Oceana's work is a good start in beginning the process to identify locations where biogenic habitats may exist, much work is needed to produce reliable and detailed maps showing the spatial distribution of biogenic habitats.

The SSC recommends new, scientifically designed surveys be developed to explicitly assess EFH. Such surveys could employ new technologies utilizing undersea quantitative video deployed on Autonomous Underwater Vehicles (AUV's), Remote Operated Vehicles (ROV's), and manned submersibles.

The SSC recommends that the Council explore an adaptive approach as it enters into the realm of spatial fisheries management. If planned carefully, incremental gains in knowledge could follow from studies designed to evaluate the effects of fishing (and not fishing) on a habitat-specific basis.

In conclusion:

1. There remains scientific uncertainty as to whether or not sponge and corals are essential fish habitat for the species in the groundfish FMP, but they are longlived and undoubtedly easily damaged by bottom trawling.

2. Trawls were not designed to sample sponge and coral organisms.

3. The NMFS groundfish trawl survey was not designed to identify or sample sponge and coral habitat.

4. Trawl fishery data may not adequately identify biogenic habitat.

5. Given these caveats and data limitations, the SSC considers the Oceana methodology to be a reasonable first attempt at identifying invertebrate distributions. However, the SSC cautions that if this approach is used to designate EFH these designations should be reviewed and modified, if necessary, as data from more appropriate surveys become available.

6. The SSC will incorporate research and data needs with regard to groundfish EFH into the next update of the Council's Research and Data Needs document.

ENFORCEMENT CONSULTANTS REPORT ON GROUNDFISH ESSENTAIL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT – FINAL PREFERRED ALTERNATIVE

The Enforcement Consultants (EC) have reviewed the proposals and have the following comments. I will be referring to Agenda Item C.3, Attachment 1, June 2005, Summary of the Alternatives in the Groundfish Essential Fish Habitat DEIS.

1. Close sensitive habitat. We would repeat our long-standing comments about describing areas.
   a. Use latitude and longitude.
   b. Avoid numerous small areas; keep areas at a minimum.
   c. If identified areas are very small, additional restrictions, such as no transit required, might be necessary to protect the integrity of the area.

Alternatives C.2.1, C.2.2, and C.2.3 have a large number of vessels impacted that currently do not carry vessel monitoring systems (VMS) (i.e., open access line gear, Dungeness crab pot). Creating numerous areas that restrict these vessels, while not including VMS requirements, will exceed enforcement capabilities.

Option C.4.2 Currently, there is no definition of **bottom tending gear** in the regulations.

Option C.7.2 Currently there is no definition in the regulations for **bottom contacting** fishing activities.

C.8.1 Currently, there is no definition in the regulations for **Mobile bottom contacting gear**.

The EC would encourage somebody to work through the above gear types to describe or define them. We would hope that definitions be kept to a minimum and be very specific to avoid confusion.

C.9.3 is unenforceable. We are unable to measure the length of a 3 NM longline groundline. At best, we may be able to measure the distance between terminal ends, but this would not result in the actual groundline length.

C.9.4 Employ habitat friendly anchor system. We need more information and definition. Additionally, our concern is how a habitat-friendly anchoring system is used or deployed versus a legal description of a specific anchor. There may be safety issues if this a break-a-way type anchor. This may be something to recommend or use as a guideline, but this may not be enforceable.

C.9.8 Definition issue. We need more information on how dingle bar gear is defined.

D.3 Expanded VMS. The EC would recommend VMS be selected as a preferred alternative to be evaluated. Many of these alternatives would impact vessels that currently are not required to carry VMS. This would create enforcement issues, as we would be limited to at sea enforcement.

It would not take many areas being designated to exceed enforcements ability to maintain the integrity of these areas if people had an incentive to violate regulations.

PFMC
06/15/05

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON GROUNDFISH ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT - PREFERRED ALTERNATIVE

The Groundfish Advisory Subpanel (GAP) spent several hours over the course of two days reviewing the available material on groundfish essential fish habitat (EFH). We appreciate the time taken by Mr. Steve Copps of NMFS, the staff of Oceana, Mr. Pete Leipzig of Fishermen's Marketing Association, and Ms. Michele Culver of the Washington Department of Fish and Wildlife (WDFW) to provide us with information on the various options.

Because there are numerous options and alternatives to consider, the GAP used Agenda Item C.3, Attachment 1 - "Summary of the Alternatives in the Groundfish Essential Fish Habitat EIS" - as a checklist to work through decisions. Our comments will follow the list laid out in that document.

<u>Alternatives to identify and describe EFH</u>

The GAP recommends Alternative A.2 - depths less than 3,500 meters - as the preferred alternative, with the understanding that this area includes both bottom habitat and the water column. The GAP rejected alternatives based on habitat suitability potential (HSP) because the data on habitat is extremely uncertain in much of the area on the West Coast. By using a depth-based line that covers all known observations of Pacific groundfish, we are better assured that we include sufficient area. The GAP notes that the area included in this alternative is larger than in all other proposed alternatives except "no action."

<u>Alternatives to designate habitat areas of particular concern (HAPC)</u>

The GAP recommends that four habitat types - Estuaries (Alternative B.2), Canopy Kelp (Alternative B.3), Seagrass (Alternative B.4), and Rocky Reefs (Alternative B.6) - generally be considered for inclusion as HAPCs. However, because the exact locations of these types are uncertain (two GAP members from two states noted that well-known rocky reefs were missing from the maps provided in the draft environmental impact statement [EIS]), because there may be additional types or areas that should be included based on future scientific research, and because there might be areas that should be de-designated based on future research, the GAP recommends a designation process, such as the one described in Alternative B.9, be included in the FMP amendment. The GAP believes that the EFH Technical Review Group established by NMFS and the Council would be an excellent body to review areas and make specific site determinations. The GAP urges the Council and NMFS to maintain the Technical Review Group for this purpose.

A majority of the GAP also recommended including certain oil production platforms (Alternative B.8) in HAPC designation. The majority believes that scientific studies have demonstrated the value of existing platforms to increasing availability of habitat and productivity of various rockfish species.

A minority of the GAP believes that oil production platforms should not be included at this time, but should be candidates for future designation under the process available under Alternative B.9.

A sub-minority of the GAP believes it is inappropriate to include oil production platforms or other man-made structures in HAPC designation.

Finally, the GAP notes that it had recommended, in March 2005, that certain specific areas in Channel Islands, Cordell Banks, and Monterey Bay National Marine Sanctuaries be included as HAPCs.

The GAP rejected alternative B.5 because it is based on the uncertain data used to develop HSP. The GAP rejected Alternative B.7 because it has a long and not well-defined list of areas to be designated without regard as to what habitat types may or may not be present in those areas.

<u>Alternatives to minimize adverse impacts to EFH</u>
As a way of narrowing the process, the GAP rejected all alternatives that had not been identified by the Council as "preliminary preferred" alternatives (Alternatives C.1, C.2, C.3, C.5, C.6, C.7, C.8) based on the reasoning they had been given sufficient discussion by the Council at the November 2004 meeting, and the remaining alternatives provided a sufficient range for consideration.

The GAP rejected Alternative C.4 because the alternative for prohibiting the expansion of bottom trawl fishing is included as part of the GAP recommendations under Alternative C.12.

The GAP recommends inclusion of a modified Alternative C.9 that would have individual gear type decisions made after a review by Council advisory bodies and approval by the Council. The GAP notes that several of the specific gear type recommendations made under this alternative do not necessarily provide additional protection for habitat, but do result in economic losses. For example, roller gear larger than 15 inches can safely be used in many bottom habitats, and there is little difference in protection between 15 inch and 14 inch roller gear. One experienced trawler noted that extremely small diameter footropes, if used in some habitat, could actually cause more damage than larger roller gear. Similar arguments could be made about flat trawl doors, longline groundlines, and depth restrictions on gillnets. The GAP strongly believes that any gear restrictions of this type need to be carefully and expertly examined on a case-by-case basis through a formal process.

The GAP believes Alternative C.10 should be examined in the overall context of the GAP recommendation on Alternative C.12. There was no way the GAP could correlate this alternative with other closed areas under Alternative C.12. The GAP reserves final comment on this alternative until it can be examined comprehensively with other proposed areas.

The GAP rejected Alternative C.11 because it is a management measure that should be examined in the context of the ongoing groundfish management process, including the development of trawl individual quotas (IQs). Although there might be some ancillary habitat benefits to this alternative, the GAP believes it should more properly be examined as a management option.

The GAP rejected Alternatives C.13 and C.14 because the ecologically important areas where closures would occur were designed specifically under Alternative C.12 to apply to bottom trawl impacts. If the Council at a later date wishes to close areas to other gear types, those areas should be identified in relation to those gears using the same processes (identification of ecological features, examination of fishing history, extensive consultation with users, and utilization of fishermen's knowledge and experience) as were used in developing the GAP recommendations for Alternative C.12.

In examining Alternative C.12, the GAP looked at two comprehensive options (Oceana and the Trawl Industry) and two sub-options (WDFW and tribal usual and accustomed (U&A) areas), as well as potentially combining elements of Alternatives C.4 and C.10. Both of the comprehensive options were based on the same general premise: balancing the protection of physical and biogenic habitat features with the economic livelihood of the bottom-trawl fishery. How this balance was accomplished, and what resources were utilized to achieve the balance, were the main differences between the proposals.

All but one member of the GAP recommended using the Trawl Industry option as the base model for identifying closed areas and the depth line beyond which no future bottom trawling may occur. In rejecting the Oceana option, the majority of the GAP noted that one of the studies used to identify sensitive habitat was used improperly (the Zimmermann paper cited was written to demonstrate why swept area trawl surveys are of questionable value in surveying rockfish abundance, not as a means of identifying specific habitat features), that the trawl track data used was not ground-truthed with working trawlers, but instead, relied on logbook start and stop points, that the consultation with industry did not involve a significant coastwide sampling of working trawl fishermen, and that the Oceana option would prevent any modification to existing trawl location or practices, regardless of whether any essential habitat protection occurred. In contrast, the Trawl Industry option - while using the same identification of ecological features, with the same possible incorrect results - did look at actual trawl tow data from working bottom trawl fishermen and resulted from a series of meetings with working trawl fishermen all along the coast.

Regarding the depth beyond which no bottom trawling should expand, the GAP believes the 1,000 fathom contour in the Trawl Industry option better reflects the depth beyond which no trawling presently occurs. The GAP also notes that fathom lines plotted on a chart do not necessarily represent the limits of fishing areas. As a practical matter, most vessels allow themselves a buffer to avoid drifting over a line while fishing or retrieving gear. Thus, a 650 fathom line becomes a 550 fathom line in terms of actual operations. Using the 1,000 fathom contour will still provide substantial protection.

Regarding the WDFW sub-option for areas of the coast of Washington, the GAP believes the proposed refinements should be examined in the context of the base option of the Trawl Industry proposal. Unfortunately, the GAP had no means readily available to overlay the coordinates of the WDFW proposal with other options.

In regard to closed areas within the tribal U&A areas, the GAP recommends that none be established unless they have the concurrence of the appropriate tribal government. The GAP encourages treaty tribes to examine habitat within their U&A areas for habitat protection.

Although the GAP is recommending the Trawl Industry option as the basis for this alternative, the GAP notes that there may be time for the Trawl Industry, Oceana, WDFW, and proponents of Alternative C.10 to meet and potentially develop a combined option in time for final Council action in September. Regardless of whether or not this occurs, the GAP strongly encourages

NMFS to develop a single chart which can be used to accurately delineate and compare the various options prior to final Council action.

Although the Trawl Industry proposal is silent on the subject, there no doubt will be an effort to consider modifications to closed areas or to establish new areas, perhaps based on other gear types. At such time as these changes are considered, the GAP believes that they need to be reviewed by Council advisory bodies and that meaningful consultation occur with states and affected fishermen who possess local knowledge.

<u>Alternatives for research and monitoring</u>
A majority of the GAP supports Alternative D.2 requiring an expanded logbook program to cover all commercial and charterboat fisheries. While logbooks have their limitations, the majority believes that they can be a useful secondary source of data for future management and habitat protection measures.

A minority of the GAP rejected this alternative, suggesting that in the absence of ample observer coverage and shore-side sampling, logbooks can be helpful, but in areas where sampling and observer programs are strong logbook data becomes redundant.

The GAP rejected Alternatives D.3 and D.4. Both vessel monitoring systems and marine reserves are already being considered by the Council under separate management actions. Since these efforts are on-going and involve a wide range of affected parties, the GAP believes these alternatives should be considered under more appropriate processes.

Finally, the GAP notes that whatever set of alternatives is adopted by the Council, significant additional research will need to be conducted. The GAP urges NMFS to send money in order to fully carry out the final Council recommendations.

SUMMARY OF GAP RECOMMENDATIONS ON EFH PREFERRED ALTERNATIVE

Identify and describe EFH -	**Alternative A.2**
Designate HAPC -	**Alternatives B.2, B.3, B.4, B.6, B.8 (majority); B.9 to create a designation and review process**
Minimize impacts -	**Revised Alternative C.9 (process for examining future gear restrictions on a case-by-case basis); Alternative C.12 using the Trawl Industry proposal with potential modifications based on WDFW concerns and Alternative C.10; no closed areas in tribal U&A areas without the concurrence of the affected tribal governments**
Research and Monitoring -	**Alternative D.2 applying to all commercial fishing vessels and charterboats.**
In general -	**NMFS: send money!**

PFMC
06/15/05

GROUNDFISH MANGEMENT TEAM REPORT ON GROUNDFISH ESSENTAIL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT - FINAL PREFERRED ALTERNATIVE

In the June Briefing Book, the GMT provided a report on the Essential Fish Habitat (EFH) Environmental Impact Statement (EIS), including recommendations for the designation of EFH and Habitat Areas of Particular Concern (HAPC), some of the alternatives to minimize adverse impacts to EFH, and alternatives for research and monitoring. During the current June meeting, the GMT has had further discussions on the EFH EIS. These discussions have focused on management issues and the feasibility of alternatives to minimize adverse impacts to EFH. This statement outlines the key points generated from these discussions and builds on the statement provided in the briefing book.

<u>EFH General Comments:</u>

The GMT is concerned that the current inadequacy of spatial data for many fisheries limits our ability to fully evaluate the impact of many of these alternatives.

The GMT is not clear where there is flexibility in the implementation and future evaluation of EFH habitat designations and area closures when new information becomes available. We believe that the Council and Council community need to be made cognizant of this as they make their decisions.

The GMT supports provisions that would allow for changes in habitat protection measures in response to new information on potential impacts of different gear types.

The GMT also would appreciate clarification on the exact areas (e.g. state versus federal waters) in which these measures may or may not apply, particularly as concerns state jurisdictions.

<u>Alternatives to Minimize Adverse Impacts to EFH</u>

The GMT does not support using broad coastwide area and depth closures such as decribed in Alternative C.2. for protection of habitat. Rather, such closures (e.g. RCAs), are used for managing the take of overfished species and should continue to be used in this manner.

As efforts are made to streamline RCAs, the GMT recognizes that it may be possible to configure RCAs to serve joint purposes. However, doing so would require an analysis of both dimensions, bycatch and habitat. This analysis is currently not available. The GMT long term objective is to minimize area closures while still meeting our bycatch and EFH objectives.

The GMT notes that Alternative C.4.1 uses federal groundfish trawl logbook data (and does not include state trawl logbook data) from the years 2000-2002 to separate trawled areas (referred to as a trawl footprint) from untrawled areas. However, this time period does not include years, such as during the mid-1990s, when catches of deeper trawl species such as sablefish and thornyheads were higher. From a review of coastwide trawl logs from 1993-1996, over 99% of the tows off Oregon and California occurred inside of 700 fathoms. If the Council decides to adopt Alternative C.4., and thus freeze a trawl footprint, then the GMT recommends only freezing the westward boundary for trawl fishing to 700 fathoms from Point Conception (34°27' N Latitude) to the U.S./Canada border and to 300 fathoms from the U.S./Mexico border to Point Conception to prevent expansion of directed groundfish bottom trawl fishing into deeper waters. Any boundaries eastward of this line, however, may not capture the actual footprint since we do not have comprehensive trawl location data from state fisheries.

With respect to non-trawl gear (Alternative C. 4.2.), the GMT is supportive of the concept of a non-trawl footprint, but is concerned that the analysis of spatial effort patterns has focused almost exclusively on trawl gear, and there has been little or no analysis or inventory of available spatial data for non-trawl bottom-contacting gear.

Regarding Alternative C.6., the GMT sees great value in closing areas of high groundfish diversity (defined within the draft EIS as "hotspots"); however, the GMT believes that data are insufficient at this time to identify these areas of high diversity and recommends that this be an area for future research.

Regarding Alternative C.9., the GMT notes the following:

Several of the gear restrictions have the probability of severely impacting or even eliminating state trawl fisheries, most notably C.9.2 prohibiting flat trawl doors, C.9.5 prohibiting dredge gear, C.9.6 prohibiting beam trawl gear, and C.9.7 prohibiting set gill nets in waters deeper than 60 fathoms.

Flat trawl doors are used coastwide to take pink shrimp over sediment habitat. Other trawl door types have been found to be ineffective at catching pink shrimp within this habitat. Also, fishermen targeting pink shrimp are not currently aware of this proposed restriction to their fishery. Dredge gear is currently used in Washington to target oysters in Grays Harbor and Willapa Bay while beam trawl gear is used in both Puget Sound and San Francisco Bay to target shrimp. In regards to the beam trawl gear, it is possible that this gear could be modified to reduce impacts to EFH. Set gill nets are prohibited within California state waters, but are used outside of 3 miles in waters deeper than 60 fathoms to take state species such as California halibut and groundfish species such as blackgill rockfish. As a consequence, Alternative C.9.7 essentially eliminates this fishery.

The GMT also notes that these minimization measures would apply to fisheries within EFH which could include state waters. If these measures are adopted by the Council, then states would have to notice and adopt compliance regulations through their state regulatory processes before implementing them within state waters.

In regard to Alternative C.9.1., restricting large roller gear would impact the coastwide DTS fishery. Trawling over continental slope sediments requires larger roller gear. Smaller roller gear tends to dig into the soft sediment resulting in a greater impact and creating a safety issue for fishermen using this gear.

The GMT believes that Alternative C.11 could have habitat benefits only if it were modified to allow trawl vessels to switch to fixed gear. However, the GMT is concerned that such an alternative would be initially difficult to implement with current administration and management systems, and believes that relaxing the gear endorsement would likely function better under an

IFQ program. For example, anticipating when trawl vessels would switch to fixed gear without a declaration mechanism would be difficult, and predicting the fishing success of those vessels would initially be complicated. In addition, allocations for sablefish, trawl, DTL, and tier fisheries may need to be adjusted and tracking catches against allocations would add another layer of complexity to an already complex tracking system.

With respect to Alternative C.12 and the conservation areas recommended in both the Oceana Alternative and the Trawl Industry Alternative, the GMT recognizes that the states have spent considerable time and expertise evaluating fisheries trawl data in the federal waters fished by their state's vessels. The GMT believes that this is the appropriate way to evaluate these data and to adjust area boundaries to minimize impacts to fisheries while ensuring that multiple habitat types are covered in closed areas. Thus, the GMT recommends consideration of state proposals for modification of closed areas based on state fishery data.

The GMT recommends an exemption for Scottish seine from trawl closures south of 40˚10' that target sanddabs. This gear is used by a small number of vessels and has less impact on bottom habitat and low bycatch rates of rockfish.

The GMT also recommends requiring VMS on all bottom trawl vessels for enforcement purposes, noting that there are currently state trawl fisheries without VMS.

The GMT would like to commend Oceana on their efforts to incorporate fishery-specific location data and adjust areas to reduce impacts while not compromising their objectives under EFH. We also appreciate the efforts by the industry to balance their need to maintain fishing opportunities with Oceana's proposals for protecting habitat. We believe that both Oceana and the trawl industry's efforts represent movement in the appropriate direction for considering alternative configurations of protected areas under C.12.

With respect to action on deepwater structures (seamounts, atolls), the GMT recognizes that closing these regions to bottom-contacting gear would have no foreseeable impact on current fishing activities.

The GMT recognizes that the main focus of the current impact minimization effort is on the impacts of bottom trawling on essential groundfish habitat, as trawling impacts have the most habitat-impact related research available. The GMT would like to avoid inadvertently restricting other gears by closing areas without evaluating both the impacts to these fisheries, and the cumulative impacts of other gears on EFH.

The GMT believes that there is a need in the future to direct more NMFS resources and contributions in the process of evaluating alternatives such as C.12.

In regard to Alternative C.13, the GMT recommends that this measure apply only to the Davidson Seamount Area and Cordell Bank as discussed by the Council under the National Marine Sanctuaries. Area included is within the coordinates of the Davidson Seamount Area, and at Cordell Bank, this is depths less than a 50 fm isobath as approximated by series of waypoints. (not the way Oceana drew out Cordell). Prohibit bottom-tending gear (with exceptions noted in Cordell Bank NMS language). For consistency recommend that this also be adopted for the federal portion of the Channel Islands National Marine Sanctuary.

Recommend that could incorporate various fishing provisions that have already been agreed upon between the State of California and the Sanctuary and public process.

GMT RECOMMENDATIONS:

A. Designation of EFH: Adopt one of the Council's preliminary preferred alternatives (Alt. A.2 A.3)
B. Designation of Habitat Areas of Particular Concern (HAPC):
   Adopt Council's preliminary preferred alternatives (Alts B.2, B.3, B.4 and B.5) to designate HAPC (estuaries, canopy kelp, seagrass, and rocky reefs), and Alt. B.9 to review and modify HAPC (4-year period)
C. Measures to Minimize Impacts of Fishing on EFH:

- Adopt Alternative C.4.1 as modified in the statement (westward boundary at 700 fathoms north of Point Conception and 300 fathoms south of Point Conceptions with no eastward boundary)
- Adopt elements of Alternative C.12 based on recommendations from states. Include:
    - Scottish seine exemption
    - Requirement for VMS on all bottom trawl vessels
- Adopt Alternative C.13: Close ecologically important areas to bottom-contacting gear for
    - Davidson Seamount Area
    - Cordell Bank to 50 fm (vertical hook and line exempted)
    - Federal portion of Channel Islands National Marine Sanctuary with allowances for state-sanctuary agreements

D. Research and Monitoring: Adopt elements of alternatives D.2, D.3, and D.4 as far as practicable.
E. Address C.6, C.7, C.8, and C.14 under Council discussion of Marine Reserves; C.11 under an IFQ program

Public Comment Received From Organizations

- Oceana (Modified Alternative C.12)
- Coastside Fishing Club
- California Coastal Commission
- Moss Landing Harbor District
- California Lobster and Trap Fishermen's Association
- Mendonoma Marine Life Conservancy
- Coos Bay Trawler' Association, Inc.
- Port of Bandon
- Oregon Anglers
- Rouge Valley Audubon Society
- Audubon Society of Portland
- City of Morro Bay
- Natural Resources Defense Council/Oceania/The Ocean Conservancy
- Southern California Trawlers Association
- Fishing Vessel Owners' Association, Inc.
- Pacific Marine Conservation Council
- Natural Resources Defense Council/The Ocean Conservancy
- California Artificial Reef Enhancement Program
- Pacific Marine Conservation Council–Independent Scientific Review Panel
- Fishermen's Marketing Association (Trawl Industry Proposal)

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May 11, 2005

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Re: Comments on Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement

Dear Mr. Lohn and Mr. Hansen:

Thank you for the opportunity to comment on the Essential Fish Habitat Draft Environmental Impact Statement for Pacific Coast groundfish. We urge the National Marine Fisheries Service (Fisheries Service) to adopt and implement designation Alternative A.2 plus seamounts. We further urge adoption and implementation of Revised Alternative C.12 as the minimization alternative. Revised Alternative C.12 is thoroughly documented and discussed in Attachment 1: Detailed Description, Discussion, and Comparison of Original Alternative C.12 and Revised Alternative C.12. This attachment includes detailed maps of Revised Alternative C.12. We will fax and mail copies to your office since the file size exceeds the capacity for many email systems to accommodate.

The National Environmental Policy Act ("NEPA") is the "basic national charter for protection of the environment." 40 C.F.R. 1500.1. Congress' goal in enacting the statute was "to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore and enhance the environment." Id. To meet this purpose, NEPA requires that agencies prepare an Environmental Impact Statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. 4332(C); see also American Oceans Campaign v. Daley, 183 F.Supp.2d 1 (D.D.C. 2000). One of the cornerstones of NEPA is the solicitation and consideration of informed public views of agency decisionmaking.

Since the original development of Alternative C.12, we have gathered and analyzed more data and information to refine the alternative to better reflect the current bottom trawl footprint, decrease potential displacement to bottom trawl fishermen, and provide practicable protection for Essential Fish Habitat on the West Coast. We have ensured that the alternative is based on the best available information and protects sensitive habitats while maintaining vibrant fisheries. As part of our public comments on the Essential Fish Habitat Draft Environmental Impact Statement ("EFH DEIS"), Oceana is submitting an updated, revised Alternative C.12. Revised Alternative C.12 is well within the scope of the original Alternative 12 as described in the EFH DEIS, and is fully consistent with NEPA's purposes in soliciting public comment. 40 C.F.R. 1503.4. Inclusion, selection and implementation of Revised Alternative C.12 in the Final EFH EIS does not require a supplemental Environmental Impact Statement.

The changes reflected in Revised Alternative C.12 are the result of recommendations by the Scientific and Statistical Committee to pay closer attention to the presence of corals, sponges, and other living seafloor substrates in NOAA trawl survey and other data; analysis of spatial distribution of trawl track information from logbooks; and information provided by the bottom trawlers on areas they suggest be open or closed. By adopting the Revised Alternative C.12, the Fisheries Service and Pacific Fishery Management Council (Council) are able to maintain vibrant fisheries and provide important practicable mitigation measures for protecting Essential Fish Habitat.

The Revised Alternative C.12 is based on the Oceana Approach and is substantially similar to the version submitted in 2004 with some boundary changes which accommodate information referenced above. Though some boundaries have been modified to accommodate commercial trawlers and protect habitat, all management provisions proposed in the original Alternative C.12 remain intact in the Revised Alternative C.12.

As a steward for public resources, the Fisheries Service has an obligation to conserve, protect, and manage living marine resources responsibly. In the Sustainable Fisheries Act of 1996, Congress amended the federal statute governing fishing in the waters off of America's coasts by adding conservation provisions. The Magnuson-Stevens Act requires that the Fisheries Service describe and identify Essential Fish Habitat, and minimize the adverse effects of fishing on that habitat to the extent practicable. It was the Fisheries Service's non-compliance with the law that resulted in a court order to conduct the EFH EIS process now in progress. In particular, the Court noted, "There is no substantive discussion of how fishing practices and gear may damage corals, disrupt fish habitat, and destroy benthic life that helps support healthy fish populations." (District Court Order at 41).

The Fisheries Service has acknowledged the importance of living benthic substrates in a variety of fora. In addition, numerous scientific papers, including those published by Fisheries Service scientists, describe the importance of corals, sponges, and other living substrates to both commercial and noncommercial fish species and marine life. Further, over the past several years, the body of science concerning both the importance of intact marine habitat and the effects of fishing gear on habitat has grown substantially. The National Academy of Sciences (2002) clearly identifies the adverse impacts of bottom trawling on corals, sponges, and other living seafloor animals. The Academy recommends fishing effort reduction, gear modifications, and area closures to mitigate the adverse impacts of bottom trawling on seafloor habitats.

Despite the recognition of the importance of corals, sponges, and other living substrates as keystones of the ocean ecosystem and Essential Fish Habitat; and the clear scientific reports of threats of bottom trawling to this sensitive long-lived habitat, the Fisheries Service still has not adopted or implemented measures for mitigation to stop this destruction. Revised Alternative C.12 provides a strong, viable, practicable action to do so.

The Fisheries Service and the Pacific Fishery Management Council urged Oceana privately and criticized us publicly to move away from litigation and become more involved in the EFH EIS process by helping develop viable and practicable alternatives. We have done so in good faith. Over the past three years, we have developed a viable and practicable management alternative for the Pacific by working with the Fisheries Service, the Pacific Fishery Management Council, other conservation organizations, commercial fishermen, recreational fishermen, state officials from Washington, Oregon, and California, scientists, local residents, and critics. Revised Alternative C.12 recognizes both the importance of corals, sponges, and other living seafloor animals as essential fish habitat, and the importance of maintaining healthy vibrant fisheries in the Pacific.

As the Fisheries Service and the Pacific Fishery Management Council consider adoption and implementation of minimization alternatives, we ask that you keep in mind that bottom trawling is a privilege granted by the American people through the Secretary of Commerce and the Council. It is not the right of a few to risk unmitigated destruction with long-term consequences to ocean ecosystems simply to achieve a short-term financial gain. We request the agency and Council adopt Revised Alternative C.12 as the preferred alternative in the Final EIS and implement it through regulations.

Sincerely,

Jim Ayers

Jim Ayers
Oceana, Pacific Regional Director

cc: Pacific Fishery Management Council Chair Don Hansen and Council Members

Attachments:

1. Detailed Description, Discussion, and Comparison of Original Alternative C.12 and Revised Alternative C.12
2. Displacement Comparison Chart of Original Alternative C.12 and Revised Alternative C.12
3. Detailed Support and Justification of Revised Alternative C.12
4. Bibliography
5. AAAS International Scientist Letter, February 15, 2004
6. North Pacific EFH EIS Scientist Letter, April 15, 2004

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Revised Alternative C.12 **May 11, 2005**

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Revised Comprehensive Alternative C.12

Preface: Overview of Modifications to the November 2004 original Alternative C.12 proposal

Modifications based on Washington, Oregon, and California Trawl Logbook Analysis

The Washington Department of Fish and Wildlife (WDF&W) generated maps of the areas closed to bottom trawling proposed in original Alternative C.12 overlaid with all 2003 bottom trawl logbook data, which mostly consisted of set points and haul out points, however in some cases, only the set points were available. WDF&W also performed an economic analysis using the set points only of the trawl logbook data, which attributed catch to a closed area when the set point fell within that closed area. It is interesting to note that the displaced 2003 revenue estimated by WDF&W with the set point method was higher than Oceana's estimate using the proportional overlap method using the mean revenue from 2000 to 2003 in 10 by 10 minute blocks. For original Alternative C.12, WDF&W estimated the 2003 displaced bottom trawl revenue represented by the proposed bottom trawl closures at $5,463,659 and Oceana estimated the annual displaced revenue at $4,810,730. The Oregon Department of Fish and Wildlife (ODF&W) provided tables with an economic analysis of the 2000-2003 trawl logbook set points contained within the closed areas proposed in original Alternative C.12. The California Department of Fish and Game (CDF&G) provided maps of the entire California coast that displayed all bottom trawl logbook data, including set points and haul points. Also displayed were the state fisheries for California halibut, and some shrimp and sea cucumber trawl information.

The information provided above was used to modify the boundaries of the proposed closed areas, and to improve the accuracy of the existing bottom trawl footprint. Modifications to the boundaries of closed areas where made by visually comparing the spatial pattern of the 2000-2004 trawl set points to the existing boundaries. With the finer level of detail, it was possible to identify specific important fishing areas within the 10 by 10 minute blocks and modify boundaries as appropriate to reopen areas containing clusters of set points and to exclude additional untrawled areas from the trawl footprint. The finer level of detail also allowed for greater refinement of the bottom trawl footprint, particularly in California. The result is Revised Alternative C.12, a practicable, comprehensive conservation alternative that protects essential fish habitat while maintaining vibrant fisheries.

Modifications based on greater incorporation of presence/absence information on habitat forming invertebrates (Scientific and Statistical Committee suggestion)

At the March Pacific Fishery Management Council (PFMC) meeting, the Scientific and Statistical Committee suggested paying greater attention to presence/absence data from the National Marine Fisheries Service (NMFS) trawl survey information that was used in the identification of biogenic areas. As such, a few additional closure areas were identified using information on habitat-forming invertebrates as the primary criterion.

Other modifications

- An additional seamount (located outside of the trawl footprint), Rodriguez Seamount, is included in Alternative C.12.
- Some proposed closed areas were split into parts by reopening high value trawl areas.
- Several nearshore rocky reefs were added to the proposed closed areas.
- Canyons in Northern California were added to the suite of trawl closures based on additional habitat information.
- Based on input from trawl fishermen at the March PFMC meeting in Tacoma, an area of rugged bottom terrain with pinnacles outside of the Rogue Canyon area was added.
- Based on input from trawl fishermen at the April 29 Morro Bay EFH Meeting, a significant area in the northern area of the proposed Monterey Bay trawl closure was reopened, as well as a section of the "Morro Ridge" proposed closure.
- The trawl industry also suggested some areas for closure in April 2005, and we attempted to include consideration of those boundaries.
- Some of the previously proposed areas were renamed to better describe the habitat features in question.

Introduction

Revised Alternative C.12, the Comprehensive Collaborative Alternative seeks to maintain vibrant fisheries while protecting habitat and biodiversity. The Alternative focuses on reducing the impacts of bottom trawling on Essential Fish Habitat (EFH). Using the mandate of the Sustainable Fisheries Act of 1996 to identify and protect EFH, Oceana developed this science-based alternative using all available data and information which included a comprehensive literature review of fish habitat studies, habitat-fishery linkages, and fishing impacts. This approach was recently used by the North Pacific Fishery Management Council to minimize adverse impacts to EFH in Alaska's Aleutian Islands region. The currently available fisheries data, habitat data, and economic data from the U.S. West Coast, while not perfect, allowed us to design a cost-effective Alternative that is precautionary yet practicable.

According to the National Academy of Sciences (2002), bottom trawling reduces habitat complexity, causes shifts in benthic (bottom-dwelling) communities, and reduces productivity of benthic habitats. The Academy recommends three management measures to reduce the effects of bottom trawling: area closures, gear modifications, and effort reduction. Revised Alternative C.12 employs all three of these management measures while maintaining commercial fishing opportunities.

Specifically, the Revised Alternative C.12 includes the following management measures:

1. Prohibit bottom trawling outside the current trawl footprint (defined by using spatially explicit trawl logbook data from 2000-2004 with methodology to draw boundaries as described in this document).
2. Implement 61 year-round bottom trawl area closures in known sensitive habitat areas (identified in maps appended to this document).
3. Extend the 8 inch maximum roller size trawl footrope restriction to all bottom trawling. throughout the U.S. West Coast EEZ. The footrope restriction is made permanent instead of re-authorized on an annual basis.
4. Bottom trawl effort reductions as developed by the Pacific Fisheries Management Council ("PFMC").
5. Consideration by the PFMC of gear conversion opportunities for bottom trawlers.
6. Comprehensive monitoring of individual vessel performance and habitat damage including:
    a. Increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates and quantify habitat interactions with fishing gear;
    b. Require vessel Monitoring Systems (VMS) on all vessels using bottom trawl gear to catch groundfish in the U.S. West Coast EEZ with positions recorded at a time stamp of every 5 minutes (time);
    c. Improve electronic logbooks to provide better fishing effort information to NOAA and state authorities;
    d. Annual publication of a NMFS *West Coast Groundfish Habitat Status Report* to make habitat impact and bycatch data available to the Council, the public and the fleet at as high a spatial and temporal resolution as possible; and
    e. Establish baseline data and a process for setting and implementing bycatch limits on structure-forming invertebrates and/or other habitat performance standards.
7. Comprehensive research and benthic mapping program to improve EFH information levels.

a. Funding for additional gear impacts research;
b. Coastwide biogenic seafloor mapping project; and
c. Ecological and behavioral studies of habitat use by commercial fish and invertebrate species.

This document provides a summary of the approach, science, methodology, and data used to develop and modify Alternative C.12.

The Precautionary Approach

Revised Alternative C.12 is a precautionary approach to mitigate the effects of fishing on habitat. When undertaking the task of identifying and protecting EFH in Alaska, NMFS contracted the Center for Independent Experts (CIE) to review their assessment of fishing effects on EFH in the North Pacific Region (Drinkwater 2004). The CIE panel repeatedly emphasized the need to be precautionary, both when assessing effects on habitat and when taking management actions.

> *Use the **precautionary approach** especially where the data are unclear, where recovery times are long (e.g. for corals and sponges), or where habitat reduction is high even if the abundance levels are above MSST. Since it is likely difficult to detect an influence on the stock until after the habitat is damaged, perhaps even until much of the habitat is destroyed, the use of the **precautionary approach** is paramount. This is especially true for those habitats with long recovery times, e.g. hard corals and sponges*

(Drinkwater 2004).

On the U.S. West Coast, the recent discovery of a new species of deep-sea coral (*Antipathes dendrochristos*) (Opresko 2005), is an example that highlights the very real possibility that Essential Fish Habitat may be destroyed before researchers know anything about it. Since very little benthic habitat on the U.S. West Coast has been explored to date, the potential for adverse impacts is enormous. The loss of Essential Fish Habitat may have devastating long-terms consequences for U.S. West Coast fisheries. Therefore, the high risk inherent in conducting the groundfish fisheries with bottom trawl gear justifies prescriptive, precautionary management measures to protect EFH.

Spatial Management Measures

The spatial management measures of the Comprehensive Alternative define the areas that are open and closed to bottom trawling. These management measures are in addition to all existing closures in the Pacific Groundfish Fishery Management Plan (“FMP”) and implementing regulations. These areas are determined based on several criteria described in detail in the following sections. Areas closed to bottom trawling are based on the locations of sensitive and complex habitat areas and/or areas with low economic value to the bottom trawl fleet. Boundaries were drawn to minimize overlap with high value fishing areas and to follow closely the sensitive habitat features. The proposed closures incorporate the Pew Oceans Commission (2003) Final Report (Ch 11, Sections 3-4) recommendations to:

- Prohibit bottom trawling on corals, sponges, and seamounts;
- Allow bottom trawling only in designated areas; and

- Close all other areas to bottom trawling.

The overall formulation of the spatial management measures is based on a combination of various data layers provided by NMFS and other data sources.

Summary of Methods

1. Determine the spatial extent of recent bottom trawl effort (setting the existing bottom trawl footprint);
2. Assess the distribution of fishery value within the footprint;
3. Determine where areas containing complex sensitive habitat occur;
4. Close areas of complex sensitive habitat within the footprint with consideration of displaced revenue; and
5. Establish bottom trawl permitted open area.

[Area of bottom trawl footprint] **minus** [Complex sensitive habitats] **minus** [Existing management closures] **equals** [Area open to bottom trawling]

Spatial Management Summary

Delineating the bottom trawl footprint

To define the boundaries of the U.S. West Coast bottom trawl footprint, we examined bottom trawl logbook records from PACFIN of groundfish catch occurring from 2000-2003. We selected this time span to include annual variability of trawl activity, which incorporates transitions that may have resulted from recent management measures. For example, in 2000 a footrope restriction in some areas altered the distribution of trawl effort (Bellman and Heppell, EFH DEIS Appendix 19). Trawl restrictions in the Rockfish Conservation Areas ("RCA") also altered distribution of trawl effort over this period. However, Bellman and Heppell (Appendix A-19) conclude that trawl effort along the U.S. west coast is patchy and has been consistent in its overall distribution over their entire study period (1995-2002). They state (p. 30):

> *Overall, fishing effort exhibited patchy distribution and maintained similar statewide patterns over the entire study period. This consistency is common when fishermen return to areas previously known to harbor high abundances of target species and suitable seafloor for trawling.*
>
> *From a conservation standpoint, this patchiness may be desired if fishing efforts do not also expand into the unaffected areas. Patchy distribution of trawl effort disturbs the same areas of seabed frequently, but in turn leaves large areas unaffected by the impacts of fishing gear. Spatial management measures, such as closed areas, can have the effect*

of shifting fishing activity to areas that were previously lightly fished or very rarely fished.

This provides both rationale and justification for identifying the bottom trawl footprint as accurately as possible to protect "previously lightly fished or very rarely fished" areas. Therefore, the objective of closing all areas outside the trawl footprint is threefold:

1. To prevent further geographic expansion of bottom trawling;
2. To prevent unintended displacement of trawl effort into new areas; and
3. To maintain the trawl industry's ability to harvest their allocated quota in remaining open areas.

Fishing vessels are required to record their catches in electronic logbooks and/or fish tickets which are then gathered and maintained by the Fisheries Service. The agency provided a dataset aggregated in 10 by 10 minute blocks with species or species group resolution, and excluding any information which the Fisheries Service asserted to be confidential. Given these constraints, a spatial resolution of 10-minute blocks was selected to ensure consistency with the analyses performed by Terralogic and MRAG for the Pacific Groundfish EFH EIS, and to minimize data loss due to confidentiality. Data with a finer resolution is preferable and is much more useful for spatial analysis, but the public faces a tradeoff when requesting spatial fishery data from the Fisheries Service. Requesting data on a fine scale results in a significant loss of data, since the Fisheries Service withholds information if fewer than 3 fishing vessels operate in the area for which fishing information is requested.

The footprint was further refined in 2005 by analyzing the spatial arrangement of trawl track information within the blocks. State agencies provided maps of the proposed areas closed to bottom trawling overlaid with set point and haul back points of commercial bottom trawl hauls. This information confirmed that trawl effort is not uniform across a block, but occurs in specific discrete, patchy areas. The footprint was refined by removing portions of blocks where no or very little trawl effort was recorded. The footprint excludes the area within 3 nm of shore in the state waters of Washington and California that are already closed to bottom trawling. The total area of the revised delineated bottom trawl footprint was estimated at 82,000 km^2 using the best available data.

Distribution of bottom trawl fishery ex-vessel revenue

The dataset described above was also used to estimate the distribution of fishery value within the footprint. For each 10 by 10 minute block, we calculated the total catch of each species throughout the four-year period. The dollar value for each unit of catch of each species was determined from the *PFMC INPFC Area Report: Groundfish Estimated Ex-vessel Prices-per-pound for 2004 for all Gears*. We multiplied the total catch of each species in each block over the four year period by each species' respective value per unit, and summed the values for all species in each block. This allowed us to calculate the total ex-vessel value for the total bottom trawl catch in each block for the four year period from 2000-2003.

Due to data limitations, this method inherently assumes an even distribution of trawl effort throughout each entire block. Since the modified closed areas are intentionally drawn to avoid the concentrations of trawl effort within each block, the results of this method will consistently overestimate the actual displaced revenue in the analysis of our proposed closures.

Areas of sensitive habitat

Boundaries of areas of complex sensitive habitat were identified using the best available datasets (see footnotes) and applying the following criteria:

- Hard substrate, including rocky ridges and rocky slopes[1]
- Habitat-forming invertebrates[2]
- Submarine canyons and gullies[1]
- Untrawlable areas (trawl hangs and abandoned trawl survey stations)[3]
- Seamounts[1]
- Highest 20% habitat suitability for overfished groundfish species as defined by NOAA[4]

Boundaries were developed to reflect most precisely the specific habitat features identified, while attempting to minimize the number of way points for the sake of enforceability. The justifications for considering these areas as complex sensitive habitat are discussed below.

Hard substrates

Hard substrates, which include rocky ridges and rocky slopes, are one of the least abundant benthic habitats, yet they are among the most important habitats for fishes (Hixon et al. 1991, Pacific EFH PDEIS 2005). Hard substrates are also the seafloor substrate type most sensitive to bottom trawling and take the longest to recover (NAS 2002, Pacific EFH PDEIS 2005).

The EFH DEIS states:

> *Many managed species are dependent on hard bottom habitat during some portion of their life cycle. Typically, deeper water hard bottom habitats are inhabited by large, mobile, nektobenthic fishes such as rockfish, sablefish, Pacific hake, spotted ratfish, and spiny dogfish (MMS 2002). Cross and Allen (1993) estimated that about 30% of the fish species and 40% of the families occur over hard substrates. Many managed groundfish species use hard bottom habitats during one or more life stages including aurora rockfish, bank rockfish, black rockfish, black-and-yellow rockfish, blackgill rockfish, blue rockfish, bocaccio, bronzespotted rockfish, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, chilipepper, China rockfish, copper rockfish, cowcod, dusky rockfish, flag rockfish, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, harlequin rockfish, honeycomb rockfish, kelp greenling, kelp rockfish, leopard shark, lingcod, Mexican rockfish, olive rockfish, Pacific cod, Pacific ocean perch, pink rockfish, quillback rockfish, redstripe*

[1] *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003).
[2] AFSC slope and shelf trawl surveys from 1977 to 2001; NWFSC slope and shelf trawl surveys from 2001 to 2003; MCBI's database of deep sea coral records (Etnoyer and Morgan 2003).
[3] Zimmerman (2003).
[4] Habitat Comprehensive Risk Assessment (PFMC 2004).

> *rockfish, rosethorn rockfish, rosy rockfish, rougheye rockfish, sharpchin rockfish, shortbelly rockfish, shortraker rockfish, silvergray rockfish, speckled rockfish, spotted ratfish, squarespot rockfish, starry rockfish, stripetail rockfish, tiger rockfish, treefish, vermilion rockfish, widow rockfish, yelloweye rockfish, yellowmouth rockfish, and yellowtail rockfish.*
>
> *Ch.3, p. 3-7*

> *Managed species known to use hard bottom habitat in the coastal zone include black rockfish, black-and-yellow rockfish, brown rockfish, cabezon, calico rockfish, California scorpionfish, chilipepper, copper rockfish, gopher rockfish, kelp greenling, leopard shark, lingcod, olive rockfish, quillback rockfish, redstripe rockfish, rosethorn rockfish, shortbelly rockfish, silvergray rockfish, and spotted ratfish.*
>
> *Ch3. p. 3-5*

Over 10,000 hard substrate polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS to determine where hard substrate habitat occurred.

Habitat-forming invertebrates

> *The planet's life-support systems are the source of stability for all peoples, all nations. Cold-water coral reefs are emerging as a new piece in this vital web of life which now requires our urgent attention.*
>
> *-Klaus Toepfer, Executive Director, UNEP*

Deep sea corals and sponges provide three dimensional structures that form habitat for commercial groundfish, shellfish, and other marine life in the Pacific (Krieger and Wing 2002; Malecha et al. 2002; Heifetz 2002) and other parts of the world (Costello et al. 2003; Scott and Risk 2003; Sulak et al. 2003; Rocha et al. 2000; Mortensen et al. 1995; Buhl-Mortensen and Mortensen 2004; Husebo et al. 2002; Sainsbury 1987). Structure-forming invertebrates (or biogenic habitat) are sensitive to impacts from bottom trawl gear (NAS 2002, Anderson et al. 2003, Engel and Kvitik 1998, Krieger 2001, Malecha and Stone 2003, MacDonald et al. 1996, Kaiser et al. 2000, Mortensen et al. 2003, Van Santbrink and Bergman 1994). Deep-sea corals and sponges, including species found on the U.S. West Coast, have been shown to be extremely long-lived (Leys and Lauzon 1998, Risk et al. 2002, Roark et al. 2005, Andrews et al. 2003). Recently, more than 1,100 scientists from around the world signed a statement (attached) on protecting deep sea coral and sponge ecosystems:

> "*In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas.*"

Throughout this DEIS process, perhaps no other criterion has generated as much discussion as the data on habitat-forming invertebrates. Despite the growing global concern for these species evidenced by the United Nations Report on Cold-water corals (Freiwald et al. 2004), consideration of the available data on habitat forming invertebrates has been viewed with trepidation and skepticism during the Pacific EFH process. We recognize that there are some limitations with the coral and sponge data, as with all marine and fisheries databases.

Nevertheless, because of the importance and sensitivities of these habitats, and the recognized need to be precautionary in management decisions in general and with regard to sensitive habitats in particular, we developed a reasonable approach using all available data.

In fact, a repeated criticism of the Alaska Region EFH DEIS by the Center for Independent Experts was that coral, sponge, and bryozoan bycatch from observer records were not analyzed, utilized, or incorporated (Drinkwater 2004). Specifically, the Center for Independent Experts recommended that NMFS "…analyze catch and effort data, observer bycatch data, field studies and consult with the industry to assess the damage done to the long-lived corals and sponges as well as the possible encroachment of fishing trawls into new areas containing corals and sponges" (Drinkwater 2004). It is worth noting that several studies to date have used trawl survey and observer bycatch records to assess distribution of these invertebrates and adverse impacts of trawling (Heifetz 2002, Heifetz et al. 2005, Anderson and Clark 2003).

Due to apparent confidentiality constraints, NMFS has not shared the Pacific observer bycatch dataset with the public. However, an analysis of the data images shows that the observer bycatch records for habitat-forming megafaunal invertebrates corroborates the areas identified for mitigation measures in the Comprehensive Alternative.

The validity of any data source depends on whether the methods used to collect the data are able to meet the objective of its use. Our specific policy objective in using the trawl survey data is to determine areas have high likelihood of containing corals and sponges within "trawlable" areas of the bottom trawl footprint. This is because areas outside the footprint and "untrawlable" areas are already protected in Revised Alternative C.12.

While direct submersible observations are the most accurate source of data for coral and sponge locations, the extremely limited spatial extent of submersible exploration on the U.S. west coast and the need to use the best available data requires the use of additional data sources. The most extensive data source containing records of habitat-forming invertebrates is the trawl survey database. Since sampling effort in the Pacific has not been uniformly distributed across habitat types, our intent in utilizing this data is not to predict the distribution of these animals across unsampled habitats, but merely to focus on regions where repeated samples have occurred. We are aware of the potential limitations in using bottom trawl surveys to identify precise abundances of habitat-forming invertebrates. Therefore, we have been extremely cautious in our use of the data. It stands to reason that an area which contains repeated samples of corals and sponges contains habitat suitable for corals and sponges. In fact, the PFMC's Science and Statistical Committee recommended that a reasonable approach is to focus on areas where corals and sponges have been documented, either from trawl surveys or other sources.

Coral and sponge records from trawl surveys must be considered a conservative estimate of the presence of biogenic habitat. Unfortunately, little information exists to ground-truth the extensive trawl survey databases with seafloor habitat. Of the thousands of NOAA trawl survey hauls that have occurred through the years, only one trawl survey track has been crossed by known submersible dive transects. The survey track, which occurred in 1986, was crossed by three dive transects on Heceta Bank in 2002. That 1986 trawl survey haul recorded 4 kg of an unidentified sponge species, or an estimated CPUE of 1 kg/hr. In 2002, the three dive transects that crossed this survey track recorded high densities of sponge of up to 167 vase sponges/ $100m^2$ (Wakefield, unpublished data). This reflects that a coral or sponge record from a trawl survey is indicative of areas of biogenic habitat. An initial focus on regions where corals and sponges have been documented, either from trawl surveys or other sources, is a reasonable approach, and was specifically recommended by the PFMC Scientific and Statistical Committee in its review of Alternative C.12. Given the importance and sensitivities of these habitats, and the recognized need to be precautionary in management decisions, we developed a responsible and reasonable approach to consider all available data in making management decisions.

We also recognize the trawl survey sampling and statistical design creates a possibility for false negatives. In other words, the data sets may fail to identify habitat-forming invertebrates in many places where they actually occur. We are aware that sampling invertebrates is not the primary goal of trawl surveys. This may result in failing to sample "untrawlable" areas where habitat-forming invertebrates occur and/or failing to record occurrences at sampled sites. The former, as discussed, does not appear to pose a problem since we are only using the data for identifying positive locations. The latter possibility is likely to be reduced significantly by repeated sampling at the same location, which is a sampling strategy used in the trawl survey.

Trawl surveys do not pinpoint exact locations, but rather transects. Therefore a positive record of habitat-forming invertebrates means that the habitat may be found anywhere along the trawl track. Therefore, in drawing boundaries, we attempted to include the entire trawl track inside the closure boundary for each record we used to justify a biogenic area closure. Furthermore, invertebrate identification is recorded at the taxonomic group level rather than at the species level. This does not pose a significant problem because identification to taxonomic group level is sufficient to classify an invertebrate as "habitat-forming".

An extensive database was used to determine "hotspots" where the presence of habitat-forming invertebrates (corals, sea whips, sea pens and sponges) was frequently recorded or large samples of these invertebrates occurred. The database comprised records from Alaska Fisheries Science Center slope and shelf trawl surveys from 1977 to 2001, Northwest Fisheries Science Center slope and shelf trawl surveys from 2001 to 2003, and MCBI's database of deep-sea coral records. MCBI's database was commissioned by NOAA and includes coral records from the California Academy of Sciences, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003).

Two types of point density analyses were performed using the ArcView 9.0 Spatial Analyst Point Density Tool (ESRI 2004) to determine clusters of coral and sponge records. The first analysis explored the density of records, with each point weighted equally. A total of 3,691 coral and sponge records were used in the analysis. For trawl survey data (3,291 records), the start point of the trawl was used to plot points. For other coral and sponge data (400 records from MCBI dataset) the sample location point was plotted. Using a cell size of 2,000 meters and a search radius of 10,000 meters, the point density function outputs the mean density per kilometer of coral and sponge records. This approach identifies areas that have had numerous records of habitat-forming invertebrates.

The second analysis explored clusters of coral and sponge records with high survey catches. Only trawl survey data, with associated records for catch weight and CPUE, were used in the analysis. A total of 3,291 survey start points from NOAA trawl surveys from 1977-2003 were plotted. This density analysis weighted the points by the rounded integer of the catch of coral or sponge. For example, a CPUE of 10 kg/km^2 would be counted ten times. This approach identifies areas with the highest relative weights of coral and sponge sample records. Both analyses were useful for identifying "hotspots" of records of habitat-forming invertebrates.

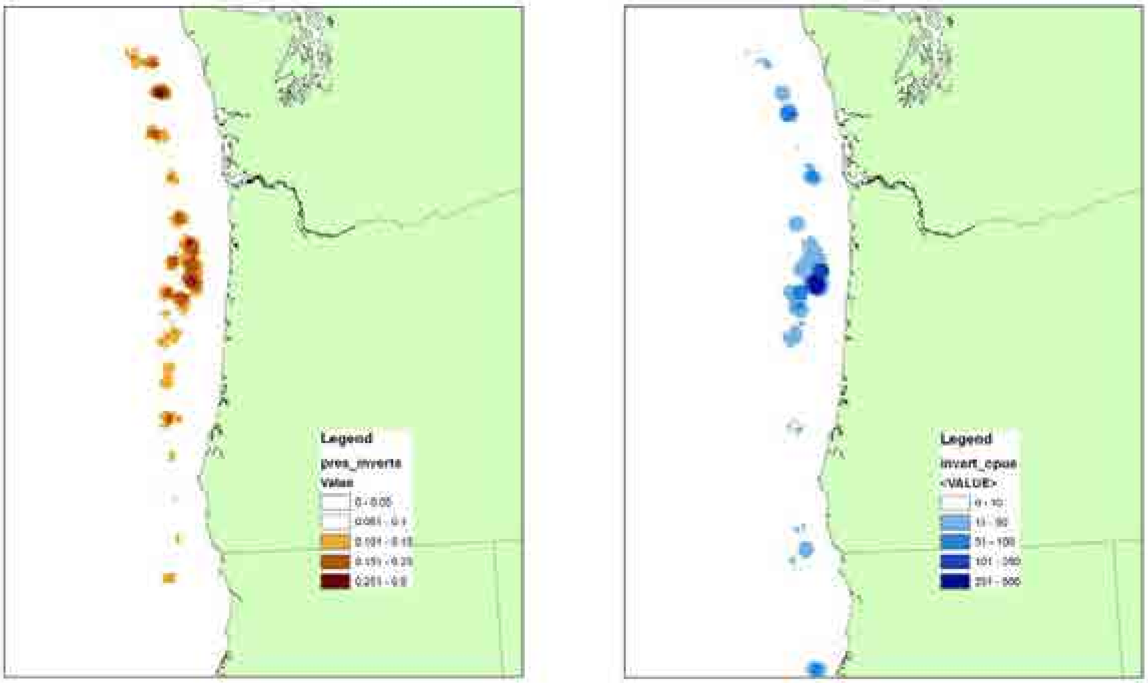

Figure 1: Point density analysis of coral and sponge records. The figure on the left displays output when all points are weighted equally. The legend shows density of points per square kilometer. The figure on the right displays output from point density analysis with points weighted by CPUE. The legend shows mean CPUE per square kilometer.

At the March 2005 PFMC meeting, the Scientific and Statistical Committee suggested paying greater attention to presence data from the NMFS trawl survey information that was used in the identification of biogenic areas. As such, a few additional closure areas were identified using information on habitat-forming invertebrates as the primary criterion.

Submarine canyons and gullies

Submarine canyons are known to be areas of enhanced productivity due to current upwelling zones (Freeland and Denman 1982). For this reason, canyons show enhanced concentrations of benthic invertebrates (Haedrich et al. 1980; Sarda et al. 1994; Vetter and Dayton 1999), plankton (Cartes et al. 1994; Macquart-Moulin and Patriti 1996), demersal fishes (Stefanescu et al. 1994), and whales (Kenney and Winn 1987; Schoenherr 1991) relative to surrounding areas on the slope and shelf. Brodeur (2001) found dense concentrations of Pacific ocean perch (*Sebastes alutus*) and krill associated with biogenic habitats in a Bering Sea submarine canyon, while areas with damaged biogenic structures had far fewer rockfish, and areas in the canyon without biogenic structure had no rockfish. In the North Pacific Ocean, rockfishes in the genus *Sebastes* often inhabit the offshore edges of banks or canyons and are known to capitalize on advected prey resources such as euphausiids (Pereyra et al. 1969; Brodeur and Pearcy 1984; Chess et al. 1988; Genin et al. 1988). Therefore, submarine canyons provide essential habitat for groundfish that is highly vulnerable to fishing impacts.

Vetter and Dayton (2001) found that submarine canyons in Southern California provide large quantities of food in aggregated form on the deep sea floor by acting as conduits for marine macrophyte production produced in the intertidal and shallow subtidal zone. This study also found elevated abundance of Pacific hake and turbot in these canyons. Starr et al. (2002) found evidence for site fidelity in green-spotted rockfish (*S. chlorostictus*) and suggested large-scale reserves for boccacio (*S. paucispinus*) at a canyon in Monterey Bay.

Submarine canyons provide habitat for larger sized rockfish that seem to prefer structures of high relief such as boulders, vertical walls, and ridges. Yoklavich et al. (2000) found high abundance of large rockfish associated with complex structural habitat in Soquel Canyon with lower size and abundance in fished areas. Canyon heads are the upper, shallower portions of submarine canyons where coastal upwelling fronts have been shown to contain high abundance of rockfish larvae (Bjorkstedt 2002). Additionally, Hooker (1999) found higher abundance of cetaceans in a submarine canyon known as “The Gully” off Nova Scotia relative to surrounding areas of the shelf and slope. The cover and protection offered by submarine canyons allow pockets of rockfish populations to flourish, in contrast to more exposed areas where the populations are more easily fished. Because submarine canyons on the U.S. West Coast are typically upwelling zones, they often contain higher abundances of filter feeding invertebrates, such as corals, sponges, tunicates, and bryozoans, which contribute to the structural complexity of the seafloor.

Canyon habitat polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS.

Untrawlable areas

The Zimmerman (2003) database includes all records from the NMFS West Coast Triennial Trawl Survey where major trawl net hangs and untrawlable survey stations were recorded. These areas are considered unsuitable for trawling due to areas of high structural complexity, such as boulders or rock outcrops (Zimmerman, pers. com.). Substrates or structures that induce a trawl hang provide habitat for juvenile fish (Link and Demarest 2003). The study found that a buffer of 3.7 km (2 nautical miles) around these features would encompass 17-30% of juvenile fish. Since most trawl net hangs are concentrated, these authors recommend a methodology of identifying these concentrations and establishing a no-trawl buffer around them. Other work on this topic suggests that such a methodology would only close 1-4% of the ocean bottom to trawling (Link 1997).

Furthermore, it is expensive to fisherman to replace trawl gear that has been damaged or lost due to contact with benthic structure. Since fishermen wish to avoid hangs, closing areas with high relative densities of areas known to be “untrawlable” will help avoid damage to trawl nets and close areas fishermen probably avoid anyway. Therefore, the economic effects of bottom trawl closures based on the Zimmerman dataset are likely to be negligible.

The GIS data used in the manuscript by Zimmerman (2003) was plotted in GIS.

Seamounts

Seamounts are sites of enriched biological activity relative to the surrounding waters (Mullineaux and Mills 1997, Dower and Perry 2001, Haney et al. 1995). Koslow et al. (2001) conducted a survey of Tasmanian seamounts where 30% of species identified were new to science and 30-60% were found nowhere else on earth. Studies indicate that seamounts function as deep-sea islands of localized species distributions, dominated by suspension feeders like corals and sponges which can be easily damaged by fishing gear that makes contact with the bottom (Monterey Bay National Marine Sanctuary, Sanctuary Integrated Monitoring Network, URL: www.mbnmssimon.org/sections/seamounts/overview.php).

Recent studies conducted by the Monterey Bay Aquarium Research Institute on West Coast seamounts have documented unique and diverse biological communities. (http://www.mbari.org/volcanism/seamounts/seamountsresearchtop.htm). Along the crests and slopes of several seamounts, MBARI scientists observed long-lived coral and sponge habitats. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount off California and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. Guyots are a type of volcanic seamount with a flat top or plateau. Because the tops are flat, they may be particularly vulnerable to trawling due to the relative ease of setting trawl gear. The rarity, uniqueness, and vulnerability of seamount faunal communities provide strong scientific justification for a highly precautionary approach (de Forges et al. 2000, Stocks 2004, Probert et al. 1997).

Eight seamounts have been identified within the jurisdiction of the PFMC. These are President Jackson, Thompson, San Juan, Guide, Pioneer, Gumdrop, Davidson, and Rodriguez Seamounts. The location and area delineation of most of the seamounts were plotted in GIS from data on the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003). Rodriguez Seamount was not included in the dataset but has been incorporated into the revised alternative.

Highest 20% habitat suitability for overfished groundfish species

Several major groundfish species have been designated as overfished and are currently being fished pursuant to rebuilding plans. Most of these species have been documented to use complex structural habitat. Protecting habitats specifically for these species will aid in their recovery.

Habitat suitability modeling performed in the Habitat Comprehensive Risk Assessment (PFMC 2004) identified areas of the highest suitability for overfished groundfish species. The proposed spatial management measures in Alternative C.12 were selected to ensure protection of habitat important for overfished groundfish species.

Consideration of all available data

With data in hand, we began to construct the spatial management component of Alternative C.12, identifying areas that would be open or closed to bottom trawling. Because we recognized that it was not practicable to close every area of sensitive habitat to bottom trawling, we attempted to reach a reasonable solution that is as cost-effective and equitable as possible. In other words, we attempted to protect as much important habitat as possible while minimizing short-term economic costs. Many factors were carefully considered while drawing boundaries for the open/closed areas to bottom trawling:

- Avoid high fishery value areas when considering closed areas;
- When habitat features overlapped high fishery value areas, minimize the overlap of the resultant boundary;
- Distribute open/closed areas equitably among regions; and
- Draw closed area boundaries that conform to the habitat feature, minimizing closure area

Results

Overview

Table 1: Summary Statistics of Revised Alternative C.12

Area Description	Square kilometers	Square miles (nautical)
Area within Pacific EEZ	826,680	241,021
Area of existing bottom trawl footprint (fished area)	82,000	23,908
Area remaining open to bottom trawling	70,000	20,409
Area to be closed within the existing footprint	12,000	3,499
Area closed outside existing footprint (unfished)	745,000	217,207
Total area closed	757,000	220,706

Freezing the existing bottom trawl footprint resulted in approximately 745,000 km^2 of untrawled or lightly trawled habitat within PFMC jurisdiction closed to bottom trawling. Most of this area comprises habitat prohibitively deep for trawl fisheries to fish with current technology. Additionally, 61 areas of sensitive habitat were identified for potential bottom trawl closures. In many cases, portions of the above-mentioned areas were located outside of the trawl footprint, and would be closed by freezing the footprint. Sensitive habitat areas proposed for closure within the trawl footprint (i.e. trawled areas that would be closed) totaled approximately 12,000 km^2 of habitat. The total area where bottom trawling would be permitted (the "open" area) totaled approximately 70,000 km^2.

The spatial management component of Revised Alternative C.12 provides substantial protection of sensitive habitat features while allowing for continued bottom trawling opportunities. A large proportion of sensitive habitat types are protected by the areas selected. In other words, Revised Alternative C.12 is a practicable alternative to minimize the adverse impacts of bottom trawling on Essential Fish Habitat. The following maps (Figure 2 to Figure 7) display the spatial management component of Revised Alternative C.12 and illustrate the areas open or closed to bottom trawling. For a detailed illustration of individual areas and the criterion used to develop boundaries of the open or closed areas, see the figures at the end of this document (Figures 8 through 61).

Overview maps of Revised Alternative C.12

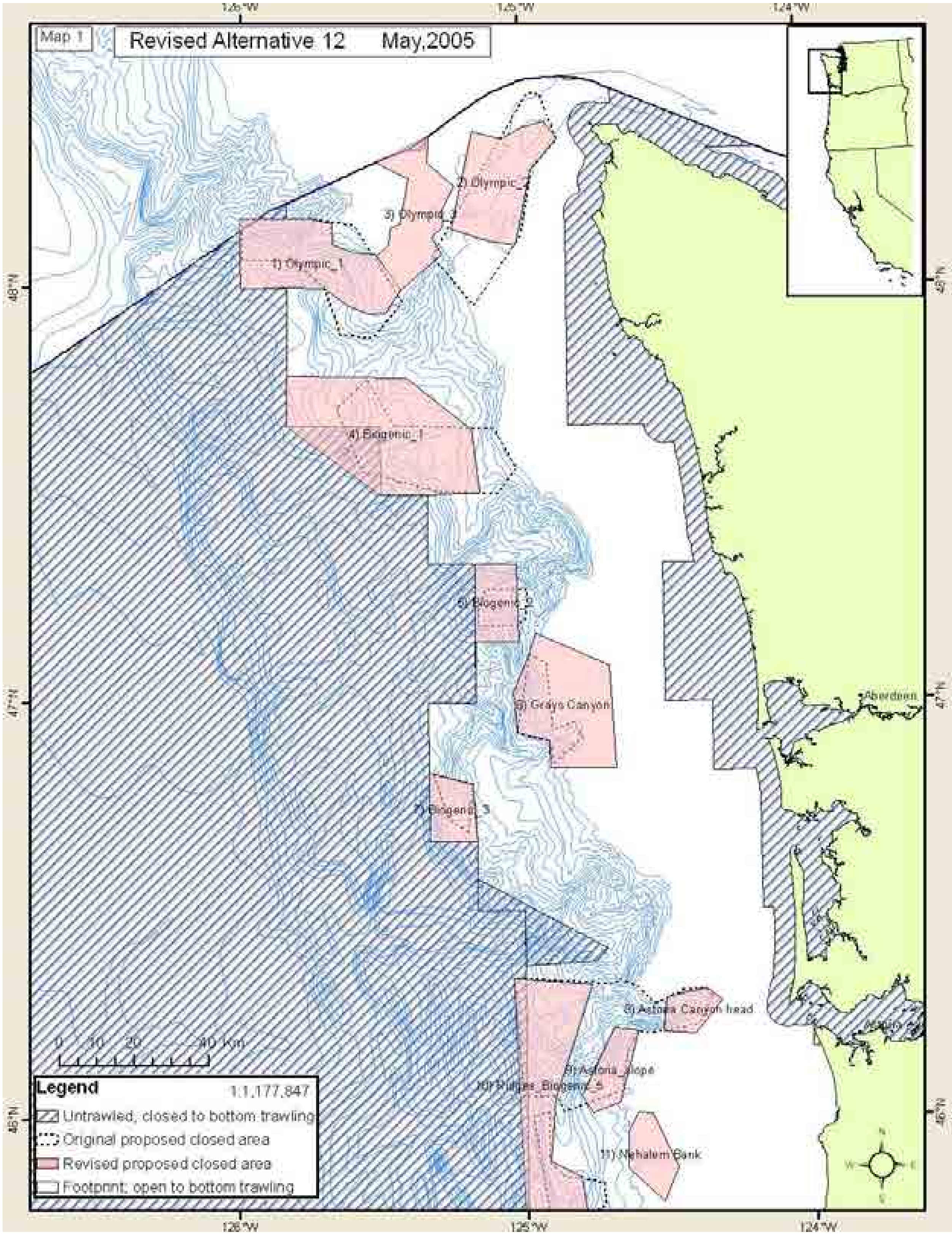

Figure 2: Revised Alternative C.12, Overview Map 1

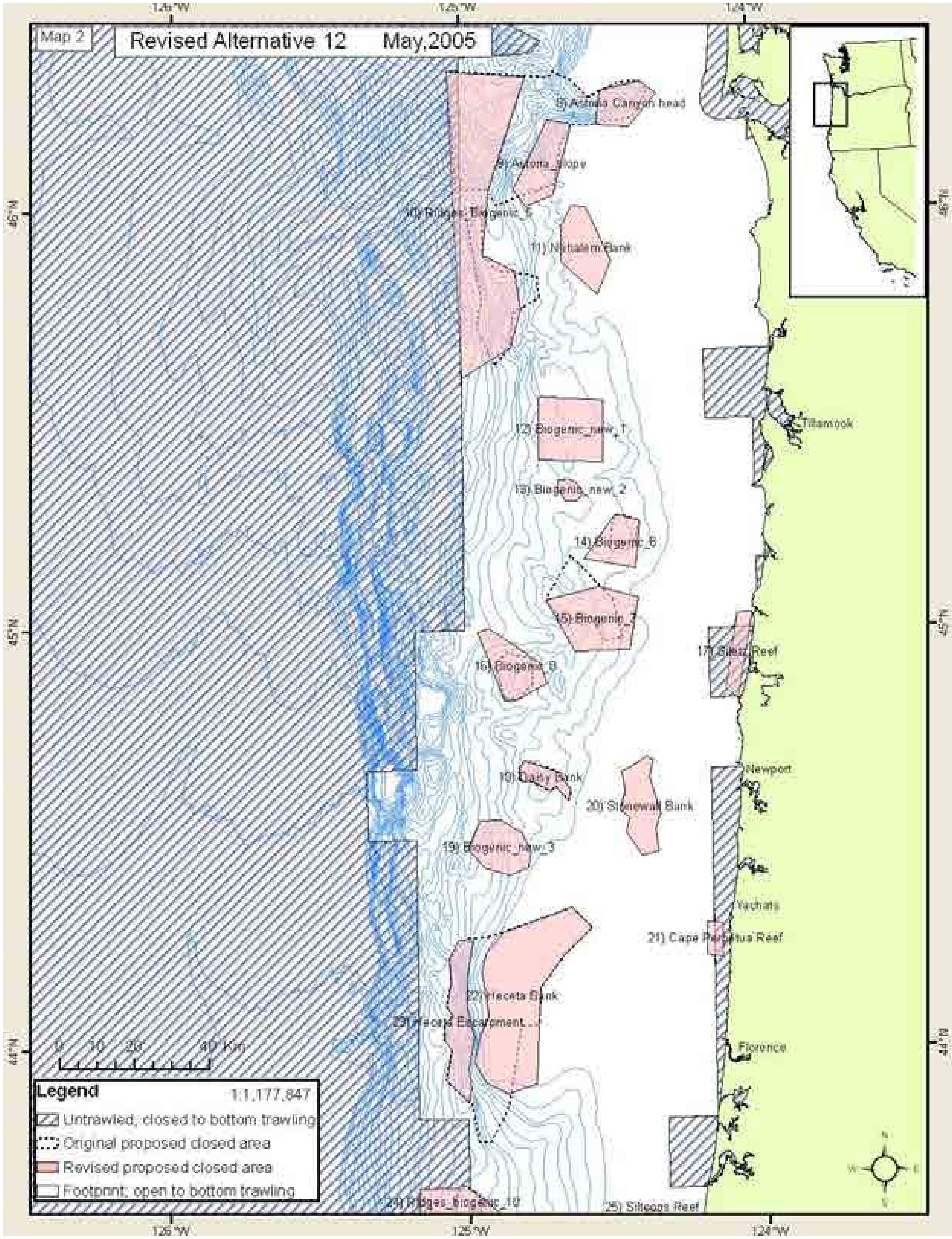

Figure 3: Revised Alternative C.12, Overview Map 2

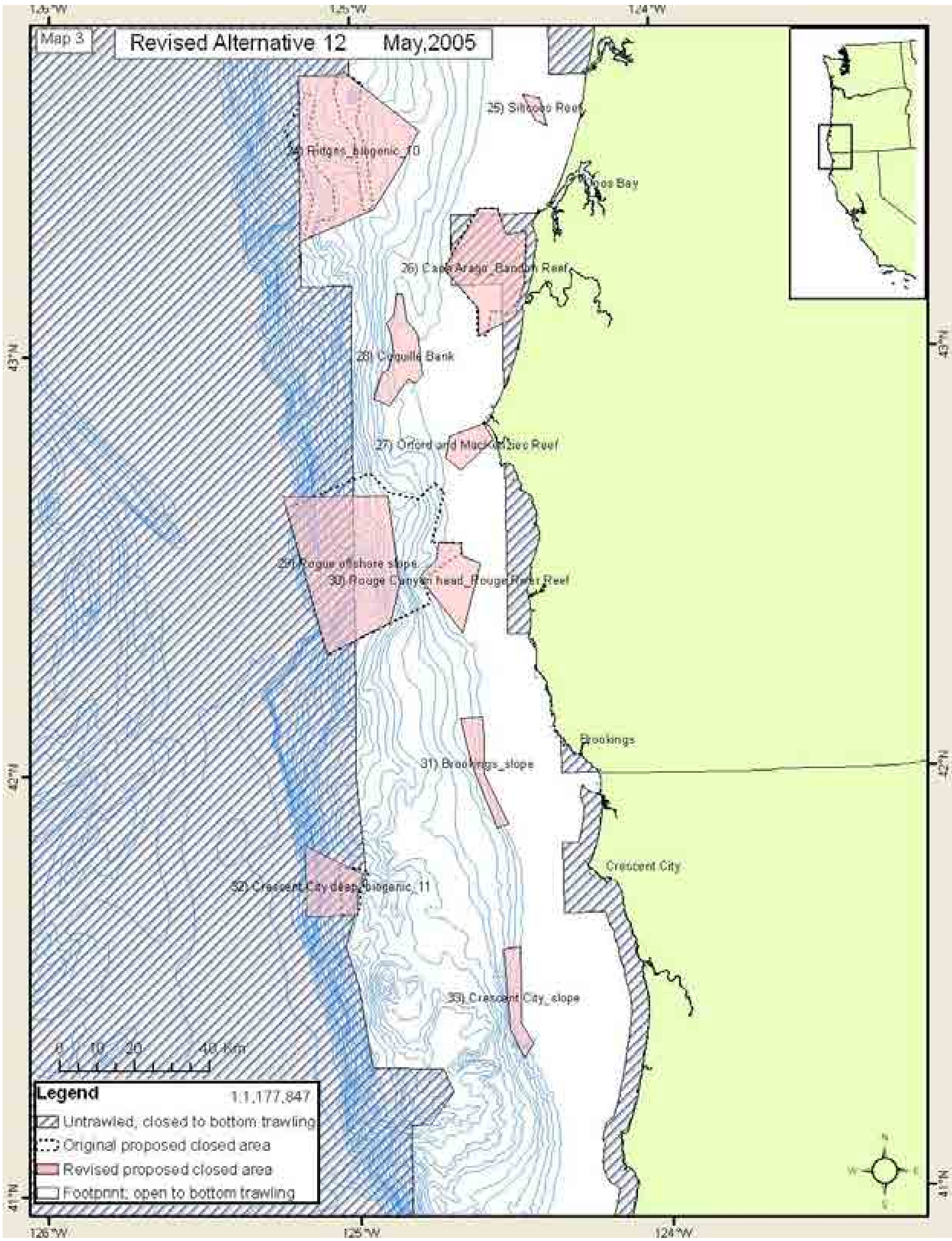

Figure 4: Revised Alternative C.12, Overview Map 3

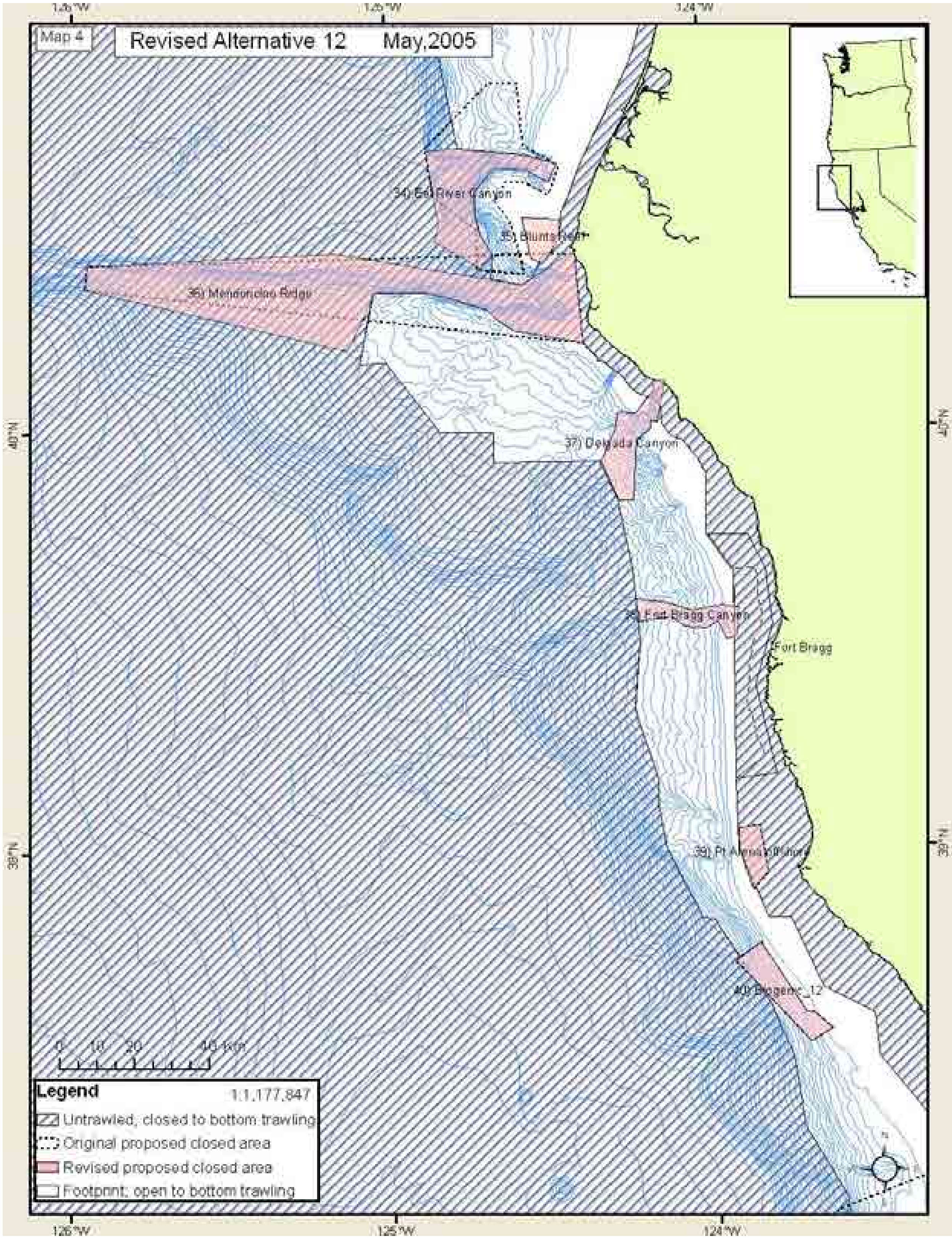

Figure 5: Revised Alternative C.12, Overview Map 4

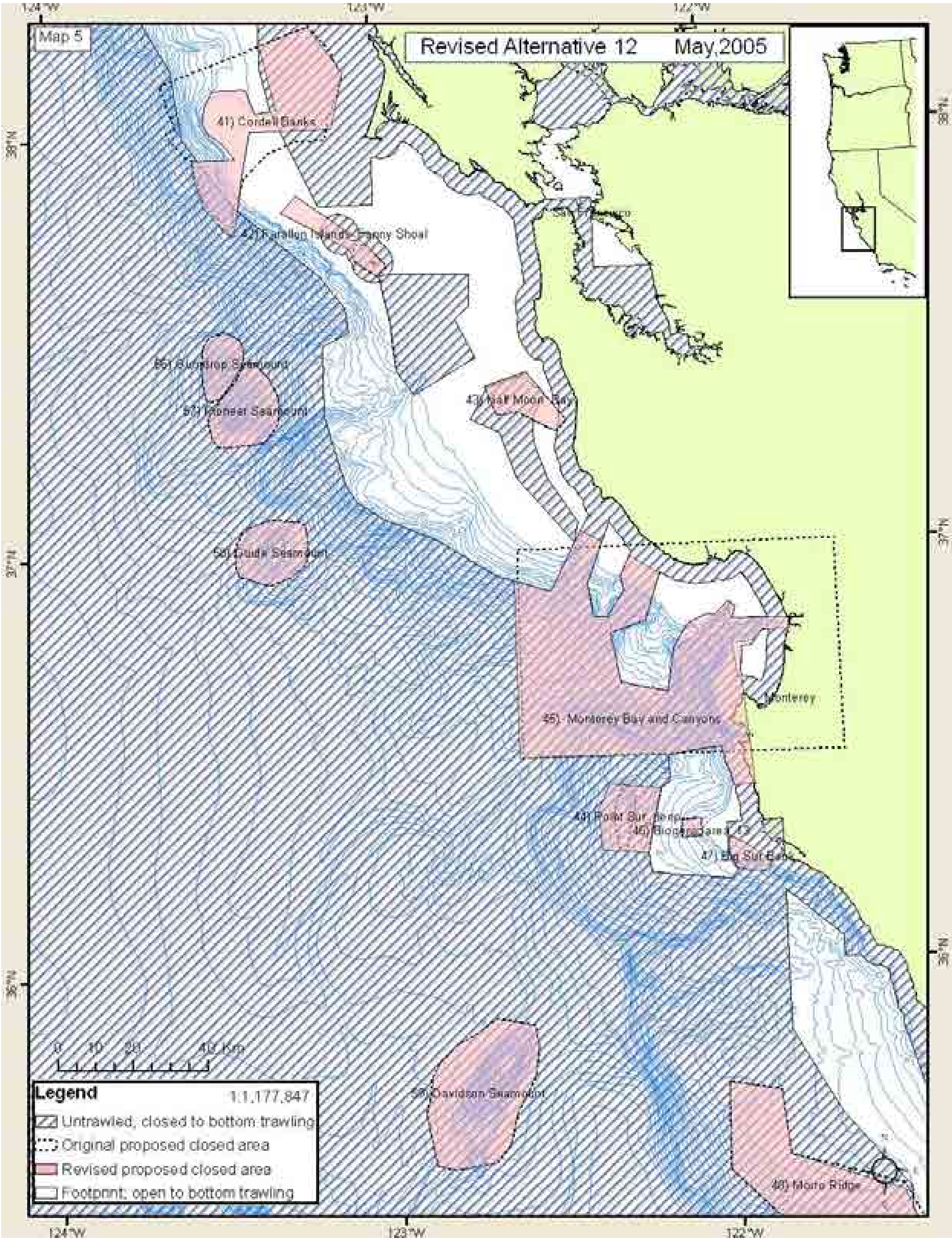

Figure 6: Revised Alternative C.12, Overview Map 5

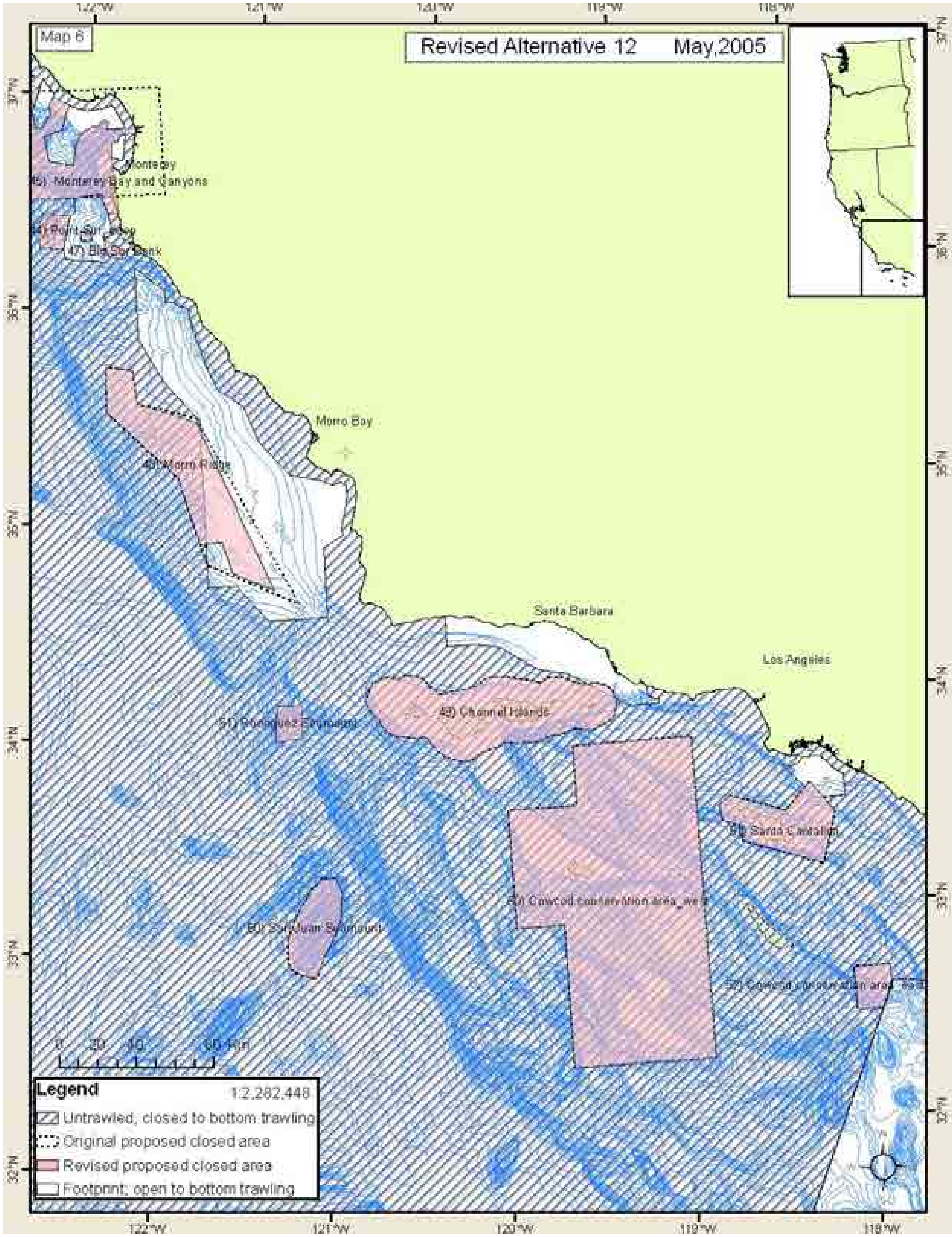

Figure 7: Revised Alternative C.12, Overview Map 6

Habitat-forming invertebrate data

NOAA bottom trawl surveys from 1977 to 2003 document 3,270 occurrences, totaling 16,765 kilograms, of habitat-forming invertebrates (corals, sponges, sea whips and sea pens) off the Pacific coast. Revised Alternative C.12 would close a significant portion of areas where those animals occurred. The area closed to bottom trawling under Revised Alternative C.12 contains 1,288 records of habitat-forming invertebrates (39% of all occurrences documented during NOAA trawl surveys). Further, the proposed closed areas contain a larger proportion of high density records, encompassing areas where 11,275 kg, or over 67% of the invertebrate biomass, was sampled. Deep sea coral records from other sources (Etnoyer and Morgan 2003) are well represented in the proposed closed areas with 356 of 400 coral records (89%) located within the proposed closed areas.

Unfortunately, this metric of analysis to consider important seafloor habitat was not used in the EFH DEIS to evaluate most of the other mitigation alternatives. As such, Revised Alternative C.12 encompasses far more records of this habitat type than other alternatives that did not consider this criterion.

Table 2: Records[5] of habitat-forming invertebrates (corals, sponges, sea whips and sea pens) in proposed areas. Areas where no or low numbers of records exist are likely due to lower sampling effort and do not indicate the absence of these animals in that area.

Number	Name	total records
1	Olympic_1	54
2	Olympic_2	18
3	Olympic_3	9
4	Biogenic_1	140
5	Biogenic_2	64
6	Grays Canyon	48
7	Biogenic_3	46
8	Astoria Canyon head	10
9	Astoria_slope	13
10	Ridges_Biogenic_5	118
11	Nehalem Bank	4
12	Biogenic_new_1	77
13	Biogenic_new_2	26
14	Biogenic_6	24
15	Biogenic_7	71
16	Biogenic_8	50
17	Siletz Reef	0
18	Daisy Bank	7
19	Biogenic_new_3	39
20	Stonewall Bank	2
21	Cape Perpetua Reef	0
22	Heceta Bank	16

[5] The database comprised records from Alaska Fisheries Science Center slope and shelf trawl surveys from 1977 to 2001, Northwest Fisheries Science Center slope and shelf trawl surveys from 2001 to 2003, and MCBI's database of deep-sea coral records. MCBI's database was commissioned by NOAA and includes coral records from the California Academy of Sciences, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003).

23	Heceta Escarpment	50
24	Ridges_biogenic_10	103
25	Siltcoos Reef	0
26	Cape Arago_Bandon Reef	2
27	Orford and MacKenzies Reef	1
28	Coquille Bank	6
29	Rogue offshore slope	26
30	Rogue Canyon head_ Rogue River Reef	2
31	Brookings_slope	4
32	Crescent City deep_ biogenic_11	35
33	Crescent City_slope	5
34	Eel River Canyon	7
35	Blunts Reef	0
36	Mendocino Ridge	6
37	Delgada Canyon	7
38	Fort Bragg Canyon	0
39	Pt Arena offshore	0
40	Biogenic_12	40
41	Cordell Bank	20
42	Farallon Islands_ Fanny Shoal	3
43	Half Moon Bay	0
44	Point Sur_deep	11
45	Monterey Bay and Canyons	303
46	Biogenic area_13	21
47	Big Sur Bank	1
48	Morro Ridge	81
49	Channel Islands	10
50	Cowcod conservation area_west	5
51	Santa Catalina	10
52	Cowcod conservation area_east	0
53	Thompson Seamount	0
54	President Jackson Seamount	0
55	Taney Seamount	0
56	Gumdrop Seamount	1
57	Pioneer Seamount	1
58	Guide Seamount	0
69	Davidson Seamount	27
60	San Juan Seamount	0
61	Rodriguez Seamount	0
	Total records in revised closed areas	1624

Untrawlable areas

The closed areas in Revised Alternative C.12 encompass 4,935 of 8,943 polygons, or 1,057 km^2 (over 57%) of 1,847 km^2, of "untrawlable" area (trawl hangs, pinnacles) as defined by Zimmerman (2003).

Estimated displaced tows, catch, and ex-vessel revenue

The estimates of displaced revenue of the original Alternative C.12 proposal were provided by the WDF&G, who estimated displaced revenue by summing catch from 2003 trawl logbook set points contained within the closed area. The estimates of the revised Alternative C.12 were made by determining the proportional overlap of a closed area with 2000-2003 trawl effort data that was provided in 10 x 10 minute blocks. The proportional method assumes a uniform distribution of fishing effort across a block. However, the revised closed area boundaries were made with the spatial distribution of trawl tracks. The estimates of displaced revenue from the revised Alternative C.12 reported below are likely grossly overestimated (Table 3). The methodology used to determine displaced revenue relied on the assumption that trawl effort and catches were distributed uniformly within the block area for which economic information was provided. Analysis of trawl logbook set and haul back points indicated that this is not the case. Trawl activity is patchy, and is located in discrete areas. This was confirmed by the overlay maps of the set points with the proposed closed areas. Since the boundaries of closed areas were refined to avoid patches of heavy trawl effort, the actual displaced revenue is minimized much more than simply reducing the area would indicate. Nonetheless, even assuming uniform fishing effort across a block, our modified closed areas reduced the previously estimated displaced revenue by over 30% from displaced revenue of $5.4 million in original Alternative C.12 to $3.4 million in Revised Alternative C.12 (Table 3).

As a result of analyses of the spatial distribution of trawl track information from logbooks, input from trawl fishermen, and comments from the SSC, areas of Alternative C.12 were revised to provide for expanded trawl grounds while protection of habitat areas. This revised Alternative C.12 reduces revenue displacement across the EFH area while maintaining integrity of protection/mitigation. The revised Alternative C.12 results in displacement of less than 15% and far less loss in any actual revenue.

Table 3: Revised Alternative C.12 revenue displacement comparison to original Alternative C.12

<table>
<tr><th rowspan="2">Number</th><th rowspan="2">Name</th><th colspan="2">Estimated displaced ex-vessel revenue</th></tr>
<tr><th>Original</th><th>Revised</th></tr>
<tr><td>1</td><td>Olympic_1</td><td>1,286,058</td><td>431,115</td></tr>
<tr><td>2</td><td>Olympic_2</td><td>326,284</td><td>280,685</td></tr>
<tr><td>3</td><td>Olympic_3</td><td>N/A *</td><td>395,676</td></tr>
<tr><td>4</td><td>Biogenic_1</td><td>172,849</td><td>36,486</td></tr>
<tr><td>5</td><td>Biogenic_2</td><td>31,982</td><td>15,438</td></tr>
<tr><td>6</td><td>Grays Canyon</td><td>5,917</td><td>34,512</td></tr>
<tr><td>7</td><td>Biogenic_3</td><td>2,351</td><td>4,554</td></tr>
<tr><td>#8</td><td>Astoria Canyon head</td><td rowspan="2">509,857</td><td>33,399</td></tr>
<tr><td>#9</td><td>Astoria_slope</td><td>74,755</td></tr>
</table>

10	Ridges_Biogenic_5	189,585	136,537
11	Nehalem Bank	N/A *	8,824
12	Biogenic_new_1	N/A *	69,960
13	Biogenic_new_2	N/A *	5,969
14	Biogenic_6	3,585	29,402
15	Biogenic_7	76,470	91,908
16	Biogenic_8	36,172	41,852
17	Siletz Reef	N/A *	132
18	Daisy Bank	0	11,768
19	Biogenic_new_3	N/A *	70,573
20	Stonewall Bank	N/A *	7,252
21	Cape Perpetua Reef	N/A *	125
#22	Heceta Bank	379,291	200,810
#23	Heceta Escarpment		28,665
24	Ridges_biogenic_10	12,121	94,628
25	Siltcoos Reef	N/A *	383
26	Cape Arago_Bandon Reef	2,016	12,018
27	Orford and MacKenzies Reef	N/A *	3,929
28	Coquille Bank	N/A *	75,004
#29	Rogue offshore slope	491,706	81,296
#30	Rouge Canyon head_ Rouge River Reef		63,876
31	Brookings_slope	N/A *	48,884
32	Crescent City deep_biogenic_11	2,734	9,635
33	Crescent City_slope	N/A *	49,779
34	Eel River Canyon	551,397	201,696
35	Blunts Reef	N/A *	25,495
36	Mendoncino Ridge	201,902	108,769
37	Delgada Canyon	N/A *	79,978
38	Fort Bragg Canyon	N/A *	51,128
39	Pt Arena offshore	N/A *	47,324
40	Biogenic_12	109,117	61,321
41	Cordell Banks	140,883	49,064
42	Farallon Islands_Fanny Shoal	78	9,967
43	Half Moon Bay	580	41,073
44	Point Sur_deep	0	10,173
45	Monterey Bay and Canyons	645,196	191,468
46	Biogenic area_13	26,257	11,282
47	Big Sur Bank	N/A *	1,694
48	Morro Ridge	258,779	30,125
49	Channel Islands	0	11,016
50	Cowcod conservation area_west	0	0
51	Santa Cantalina	0	2,315
52	Cowcod conservation area_east	0	0
53	Thompson Seamount	0	0
54	President Jackson Seamount	0	0
55	Taney Seamount	0	0
56	Gumdrop Seamount	0	0
57	Pioneer Seamount	0	0
58	Guide Seamount	0	0
59	Davidson Seamount	0	0

60	San Juan Seamount	0	0
61	Rodriguez Seamount	0	0
	Grand Total	5,463,659	3,408,709
Percent of annual revenue displaced		22%	14%

* Indicates areas in the revised Alternative C.12 proposal which were not identified in the original Alternative C.12.
# Indicates areas in the original Alternative C.12 proposal which were split into component areas in the revised Alternative C.12

Table 4: Estimated annual displaced tows, catch, and ex-vessel revenue for Revised Alternative C.12 based on the proportional overlap of closed areas with fishing effort blocks generated from logbook data from 2000-2003.

Number	Name	Estimated tows	Estimated catch (mt)	Estimated value ($)
1	Olympic_1	1,972	597.9	431,115
2	Olympic_2	1,809	277.2	280,685
3	Olympic_3	1,990	595.9	395,676
4	Biogenic_1	248	20.3	36,486
5	Biogenic_2	57	9.7	15,438
6	Grays Canyon	1,051	56.7	34,512
7	Biogenic_3	8	2.0	4,554
8	Astoria Canyon head	686	30.7	33,399
9	Astoria_slope	534	61.6	74,755
10	Ridges_Biogenic_5	675	83.4	136,537
11	Nehalem Bank	71	6.7	8,824
12	Biogenic_new_1	390	50.9	69,960
13	Biogenic_new_2	32	3.8	5,969
14	Biogenic_6	172	18.0	29,402
15	Biogenic_7	518	57.8	91,908
16	Biogenic_8	189	27.8	41,852
17	Siletz Reef	1	0.1	132
18	Daisy Bank	81	9.4	11,768
19	Biogenic_new_3	344	47.8	70,573
20	Stonewall Bank	53	5.7	7,252
21	Cape Perpetua Reef	1	0.1	125
22	Heceta Bank	873	151.5	200,810
23	Heceta Escarpment	98	18.1	28,665
24	Ridges_biogenic_10	294	62.2	94,628
25	Siltcoos Reef	4	0.4	383
26	Cape Arago_Bandon Reef	109	12.8	12,018
27	Orford and MacKenzies Reef	27	3.6	3,929
28	Coquille Bank	401	59.5	75,004
29	Rogue offshore slope	204	49.4	81,296
30	Rogue Canyon head_Rogue River Reef	310	52.1	63,876
31	Brookings_slope	347	39.4	48,884
32	Crescent City deep_biogenic_11	15	4.5	9,635

33	Crescent City_slope	318	36.0	49,779
34	Eel River Canyon	630	147.6	201,696
35	Blunts Reef	86	21.3	25,495
36	Mendocino Ridge	248	77.6	108,769
37	Delgada Canyon	261	56.4	79,978
38	Fort Bragg Canyon	145	30.7	51,128
39	Pt Arena offshore	226	34.3	47,324
40	Biogenic_12	137	45.8	61,321
41	Cordell Bank	262	33.0	49,064
42	Farallon Islands_Fanny Shoal	42	4.3	9,967
43	Half Moon Bay	292	12.1	41,073
44	Point Sur_deep	24	5.6	10,173
45	Monterey Bay and Canyons	913	156.7	191,468
46	Biogenic area_13	35	7.8	11,282
47	Big Sur Bank	2	1.5	1,694
48	Morro Ridge	52	22.6	30,125
49	Channel Islands	265	1.8	11,016
50	Cowcod conservation area_west	0	0.0	0
51	Santa Catalina	142	0.5	2,315
52	Cowcod conservation area_east	0	0.0	0
53	Thompson Seamount	0	0.0	0
54	President Jackson Seamount	0	0.0	0
55	Taney Seamount	0	0.0	0
56	Gumdrop Seamount	0	0.0	0
57	Pioneer Seamount	0	0.0	0
58	Guide Seamount	0	0.0	0
69	Davidson Seamount	0	0.0	0
60	San Juan Seamount	0	0.0	0
61	Rodriguez Seamount	0	0.0	0
	Grand Total	17,653	3,114.4 mt	$3,408,709

Overall, the spatial management components of Revised Alternative C.12 represents an estimated displacement of $3,408,709 in annual trawl revenue, protects areas containing 1,624 records of habitat-forming invertebrates (corals, sponges, sea whips, and sea pens). Of the approximately 82,000 km^2 bottom trawl footprint identified using the best available logbook data, 12,000 km^2 (under 15%) is closed to bottom trawling in this alternative leaving a total open area to bottom trawling of 70,000 km^2**.**

Other management measures

Trawl effort reduction

Dinmore et al. (2003) found that without commensurate reductions in fishing effort, closing off a heavily trawled area may result in significant displacement of trawled effort into remaining open areas, including previously untrawled areas. For this reason, the NRC (2002) report on the effects of bottom trawling notes that effort reduction is the "cornerstone of habitat protection". While there may be several ways to reduce bottom trawl effort, the crucial factor is that the total area swept by bottom trawl gear is reduced. Alternative C.12 specifically attempts to avoid closing heavily trawled areas in order to minimize displacement of trawl effort in to new areas. Also, recent measures enacted by the PFMC have reduced trawl effort to rebuild overfished species. Recent buyouts have also reduced the total annual trawl effort on the U.S. west coast. However, as stated in the NRC (2002) recommendations, trawl effort may still need to be reduced to ensure the adequacy of any measures to fully mitigate the adverse impacts of trawl gear. Revised Alternative C.12, therefore, recommends Council-developed bottom trawl effort reductions.

Gear restrictions

In 2000, the Pacific Fishery Management Council adopted regulations designating where different size bottom trawl gear may be fished. Only bottom trawls with footrope diameter 8 inches or smaller (including rollers, bobbins, or other material along the length of the footrope) may be used shoreward of the Rockfish Conservation Areas (RCA). Footrope restrictions are linked to fish trip limits as a means of management by the PFMC. The Bellman and Heppel study (Appendix A-19) provides evidence that an 8 inch roller maximum roller size gear restriction can be an effectively reduce trawl effort over rocky substrate. This study suggests that adverse impacts in some specific areas have been reduced as an indirect effect of roller size restrictions. It is crucial that this gear restriction remain permanent to ensure continued protection to Essential Fish Habitat, and be expanded to encourage further mitigation of adverse impacts.

A loophole exists in that while fishing for species without trip limits, the footrope restrictions do not apply. Also, the existing footrope restrictions area not permanent, and be reinstated annually by the PFMC. Seaward of the RCA, there are no restrictions on trawl gear. A four seam Aberdeen trawl is commonly used for the deepwater fleet with rollers or rockhoppers up to 14 inches in diameter (Recht, 2003). These vessels target dover sole, sablefish, and thornyheads.

The Revised Comprehensive Alternative includes an 8 inch roller size restriction for all bottom trawl gear deployed in the U.S. West Coast EEZ. Limitations on the roller size of bottom trawl gear provide an effective management measure to reduce bottom trawl effort on rocky substrates with substantial structural complexity. Bellman and Heppell (in press) found that the 8 inch roller size restriction implemented by the Pacific Fishery Management Council in 2000 effectively reduced bottom trawl effort at five sites with hard, rocky substrate on the U.S. West Coast by 86%. This gear restriction, however, was only implemented in specific depth ranges and therefore does not protect rocky substrate types in areas where it was not implemented. Therefore, expanding this existing gear restriction throughout the entire U.S. west coast EEZ is an effective way to prevent trawl damage to complex rocky substrates in areas that remain open in this alternative.

The Comprehensive Alternative includes the following footrope restrictions:

- Bottom trawling within the open bottom trawl area may only use footropes 8 inches or smaller in diameter;

- The footrope restriction must be applied for all bottom trawling, regardless if the target species has trip limits; and
- Footrope restrictions are made permanent instead of re-authorized on an annual basis.

While gear modifications must be an integral component of a comprehensive strategy to mitigate the adverse effects of trawling on Essential Fish Habitat, they are not a substitute for bottom trawl closures. The International Council for the Exploration of the Seas (ICES) released a statement that "the only proven method of preventing damage to deep-water biogenic reefs from fishing activities is through spatial closures to towed gear that potentially impact the bottom" (cited in Christiansen and Lutter 2003).

Comprehensive research and benthic mapping

Basic biology and life history information is lacking for many deep sea coral and sponge species. Understanding growth rates, reproduction, dispersal, and ages of deep sea corals and sponges and other habitat-forming invertebrates will provide estimates of recovery time for different habitat types. EFH identification research should explore the community ecology of coral and sponge habitats, including the production functions between the biogenic habitat features and commercial fish species, and prey species for commercial fish species, among other functions. Basic biology and life history information is lacking for many deep sea coral and sponge species. Understanding growth rates, reproduction, dispersal, and ages of deep sea corals and sponges will provide estimates of recovery time for different habitat types.

The distribution of sensitive habitat types off the Pacific Coast can be determined through a combination of seafloor mapping projects and developing Habitat Suitability Indices for biogenic substrates. Leverette (2003) developed a methodology for predicting likely areas of deep sea coral concentrations off Atlantic Canada by identifying key ecological determinants of the known distribution of these habitat types. Using sidescan sonar and multibeam scanning techniques, these habitat suitability models can be ground-truthed to determine their precision and accuracy. While the habitat suitability modeling approach is being used for fish species in the current EFH EIS, the Comprehensive Alternative explicitly includes this type of modeling and groundtruthing for living habitat features that are vulnerable to trawling.

Research and benthic mapping should be also designed to provide opportunity for reevaluating the open and closed areas to bottom trawling to protect EFH. Criteria for opening areas would include that they have been mapped or thoroughly observed in situ, do not contain sensitive habitats, and it can be demonstrated that bottom trawling may occur in the area without adversely impacting habitat. In addition, new areas of sensitive habitat may be discovered within the open-bottom trawl areas and become candidates for new closed areas.

The components of Revised Alternative C.12 described in this section emphasize the need for adequate funding dedicated specifically to EFH research, mapping, and observer coverage. While this research will require a substantial allocation of agency resources, the rationale for this expenditure is that more spatially explicit information will allow more cost effective management in the future. This is because higher spatial resolution can be used to develop fine scale management measures that allow fishermen to adequately obtain their catch without damaging the habitat, its ecological functions, or the underlying productivity of the fish they are harvesting.

Monitoring the habitat impacts of the bottom trawl fleet

NMFS and the PFMC must include in any mitigation alternative a framework to measure and monitor habitat impacts. A direct approach for measuring habitat impacts of fishing is to examine bycatch, or incidental catch, of habitat-forming invertebrates. Bycatch can be monitored by onboard observers. While it may be difficult to estimate the total reduction in habitat quality caused by each per unit reduction in these habitat indicators, this approach allows a comparison of habitat damage over different areas and using different gear types.

The Revised Comprehensive Alternative includes the following monitoring and enforcement components:

1. Increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates and quantify habitat interactions with fishing gear;
2. Require vessel Monitoring Systems (VMS) on all vessels using bottom trawl gear to catch groundfish in the U.S. West Coast EEZ with positions recorded at a time stamp of every 5 minutes (time);
3. Improve electronic logbooks to provide better fishing effort information to NOAA and state authorities;
4. Annual publication of a NMFS *West Coast Groundfish Habitat Status Report* to make habitat impact and bycatch data available to the Council, the public and the fleet at as high a spatial and temporal resolution as possible; and
5. Establish baseline data and a process for setting and implementing bycatch limits on structure-forming invertebrates and/or other habitat performance standards.

Monitoring habitat impacts of individual vessels allows fishery managers to evaluate the effectiveness of management measures, reveal vessels or areas of concern, and provide future management options that utilize performance standards and incentive-based regulations. Fishermen control many factors that determine the degree to which their activities impact the seafloor. The placement (physical location) of their nets and the specific type of gear they use are largely at the discretion of individual vessel captains. The various factors that play into this decision are the likelihood of catching valuable target species and the likelihood that they will damage the gear they are using. By using state-of-the-art sounders and fish-finders, fishermen are able to identify schools of particular species of fish and obtain information about bottom type before setting their gear. While some seafloor types cause major damage to trawl nets, such as large, sharp boulders, there is little evidence that vulnerable habitat types such as living substrates damage trawl gear. Therefore, there exists no immediate incentive to avoid such habitats in the pursuit of fish, particularly if there are higher abundances of fish in these areas.

A direct approach for measuring habitat impacts of fishing is to examine bycatch, or incidental catch, of habitat features. Since each habitat feature may vary in its catchability, indicators that are caught by fishing gear should be used. Bycatch can be monitored by onboard observers. In Alaska, for example, observers routinely report bycatch of corals and sponges. While it may be difficult to estimate the total reduction in habitat quality caused by each per unit reduction in these habitat indicators, this approach allows a comparison of habitat damage over different areas and using different gear types.

Bycatch data availability

There is no question that observer bycatch data should be used to the fullest extent in groundfish management. Habitat-related observer bycatch data are important tools for protecting sensitive habitats and the long-term productivity and sustainability of the groundfish fisheries. Such data should be made available on a regular basis to the Council, the fleet and the public in as spatially and temporally explicit a format as possible. We recommend this information be released annually by NMFS in a *West Coast Groundfish Habitat Status Report.*

Monitoring habitat impacts with VMS

The Comprehensive Alternative includes a vessel monitoring system (VMS) requirement with positions recorded at a time stamp of every 5 minutes for all vessels fishing for groundfish using bottom trawl gear. Vessel monitoring systems (VMS) track the location and speed of vessels in real time, allowing managers to assess more accurately where trawling actually occurs. This data can be used to enforce bottom trawl closed areas and can be combined with other data to provide detailed spatial information on individual vessel catch, bycatch, and habitat impacts.

Conclusion

Revised Alternative C.12 considers the interrelatedness and spatial arrangement of complex sensitive habitat criteria in relation to areas prosecuted by bottom trawl fisheries to develop an approach to manage the effects of bottom trawling on habitat. Revised Alternative C.12 is a comprehensive approach to protect Essential Fish Habitat, as required by law, while maintaining vibrant commercial fisheries for the Pacific Coast.

Descriptions of specific closed areas
Detailed maps of the respective areas for Revised Alternative C.12 reflect the modifications to boundaries for each area.

1. Olympic_1
Original Alternative C.12 estimated displaced revenue= $1,286,058
Revised Alternative C.12 estimated displaced revenue= $431,115 (likely overestimated, trawl tracks fall outside of area, see Figure below)

According to 2003 bottom trawl logbook data, several heavily fished areas were located within the proposed closed area of *Olympic_1* (Figure A) in Original Alternative C.12. Boundaries to *Olympic_1* were adjusted in Revised Alternative C.12 to avoid heavily trawled areas in the northeast and southern end of the original proposed closed area (Figure 8). The closed area in Revised Alternative C.12 also expands eastward to encompass deeper, lightly fished areas.

Revised Alternative C.12 contains 330 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

As indicated by databases supplied by NOAA, every trawl survey haul performed within the proposed area has recorded habitat-forming invertebrates. A total of 54 records of habitat-forming invertebrates have been recorded in the area since 1979. These include *Calcigorgia sp.* and *Swiftia sp.* gorgonian corals, black corals, sea pens, sea whips, and Hexactinellid sponges.

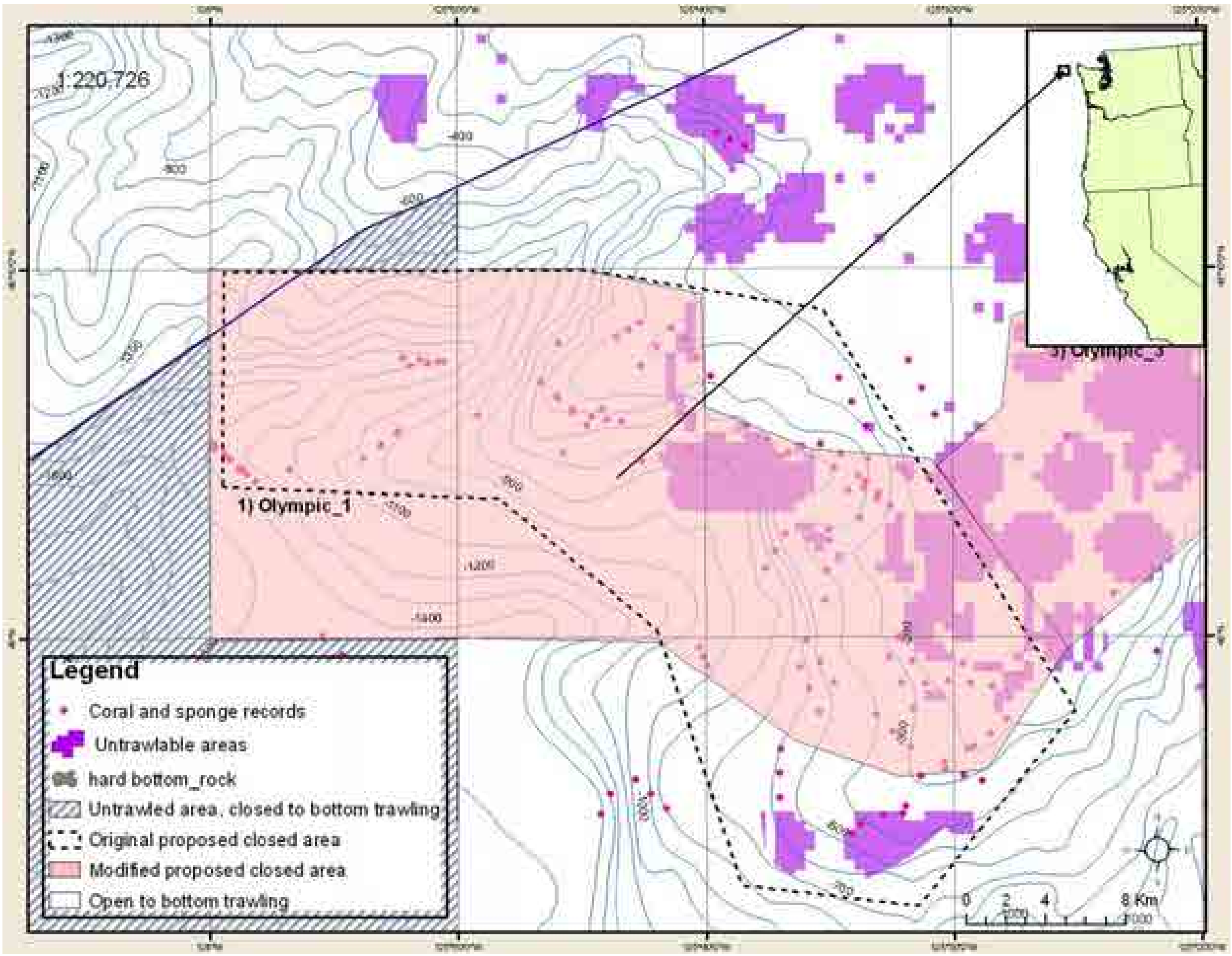

Figure 8: Olympic_ 1

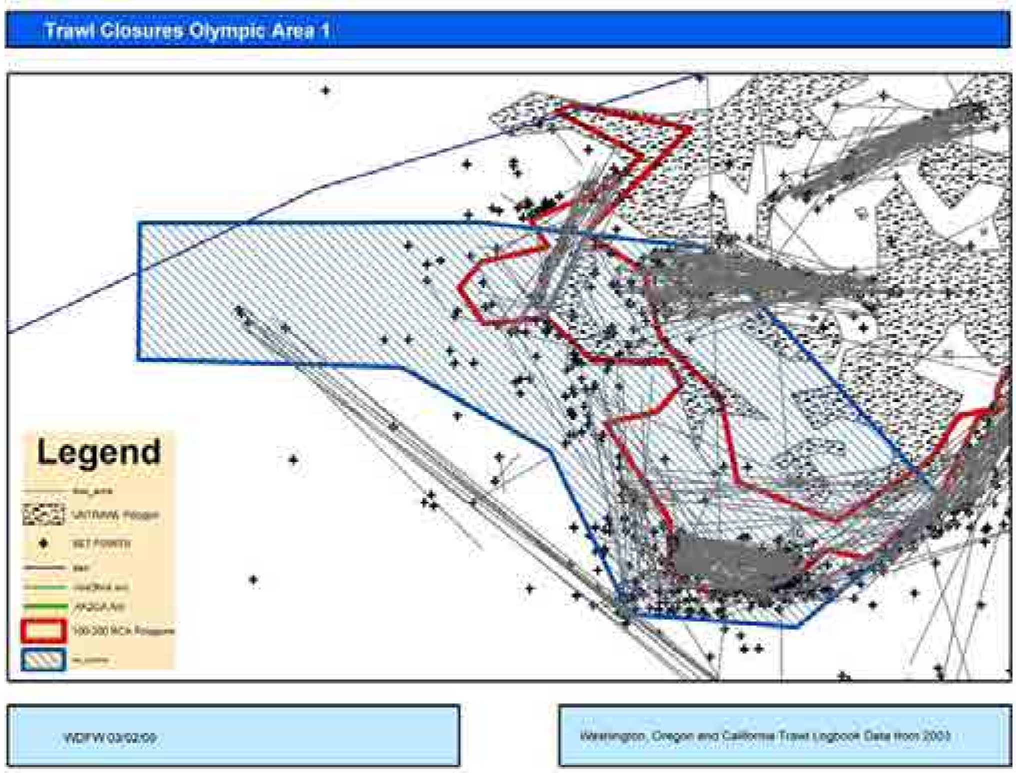

Figure A: 2003 bottom trawl logbook set points (courtesy WDF&W).

2. Olympic_2
Original Alternative C.12 estimated displaced revenue= $326,284
Revised Alternative C.12 estimated displaced revenue= $280,685 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Trawl logbook data from 2003 indicated some fishing in the northern and southern portion of the Original Alternative C.12 closed area (Figure B). The boundary for the proposed closed area in Revised Alternative C.12 was adjusted to avoid those fishing areas (Figure 9).

The proposed closed area contains the only known location in the Northwest Pacific of *Lophelia pertusa,* a reef-forming deep-sea coral. Observation of the reef in 2004 indicated a large proportion of the reef was broken, and both trawl tracks and derelict fishing gear were observed nearby (Hyland et al. 2004). Research in the Atlantic shows that reefs of *Lophelia* are extremely susceptible to damage by bottom trawl gear (Fossa et al. 1999).

A total of 18 records of habitat-forming invertebrates have been recorded in the Revised Alternative C.12 closed area by NOAA trawl surveys. These include *Alcyonacea* soft corals, other gorgonian corals, scleractinian corals, and Hexactinellid sponges. A larger number of records and greater sample weights occurred in the 1980's than more recent surveys, which may indicate evidence of habitat destruction.

The proposed closed area contains 523 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

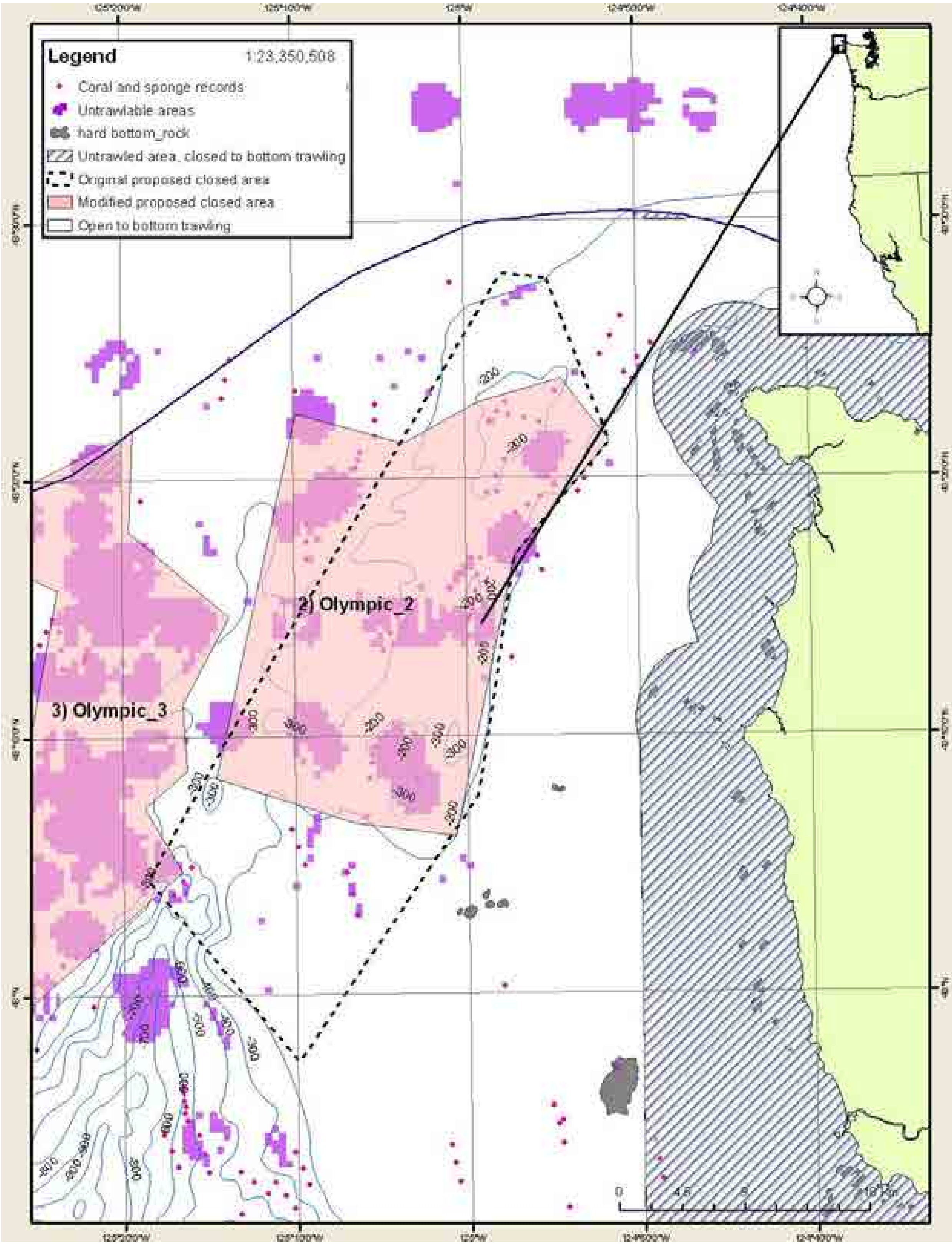

Figure 9: Olympic_2

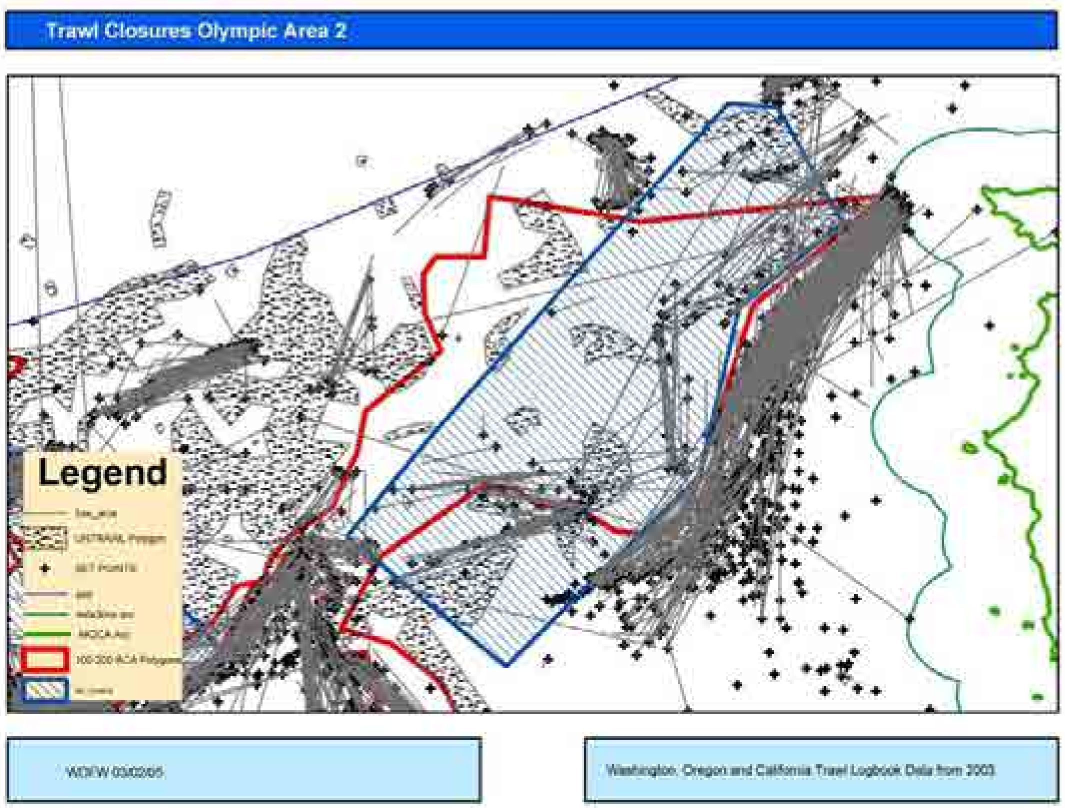

Figure B: 2003 bottom trawl logbook set points (courtesy WDF&W).

3. Olympic_3_untrawlable

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $395,676 (likely overestimated, trawl tracks fall outside of area, see Figure C below)

This portion of the Olympic Marine Sanctuary is located between proposed areas *Olympic_1* and *Olympic_2* (Figure 10). This area had not been previously identified as a closed area.

Localized multibeam mapping indicates the area contains pinnacles and high relief, rocky habitat (Steve Intelmann, GIS analyst, Olympic Marine Sanctuary, pers. comm.). Zimmerman (2003) indicates that much of this area is untrawlable, as very few NOAA trawl surveys have successfully been deployed in this area. Trawl logbook data from 2003 shows that the area appears to be avoided by the bottom trawl fleet (Figure C). This is corroborated by the Zimmerman (2003) "untrawlable areas" database, which shows the area to contain 1,098 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up. Although the area is not well surveyed, a total of nine records of habitat-forming invertebrates have been recorded in the area by NOAA trawl surveys. These include scleractinian corals, sea pens, and Hexactinellid sponges. A larger number of records and greater sample weights occurred in the 1980's than more recent surveys, which may indicate evidence of habitat destruction.

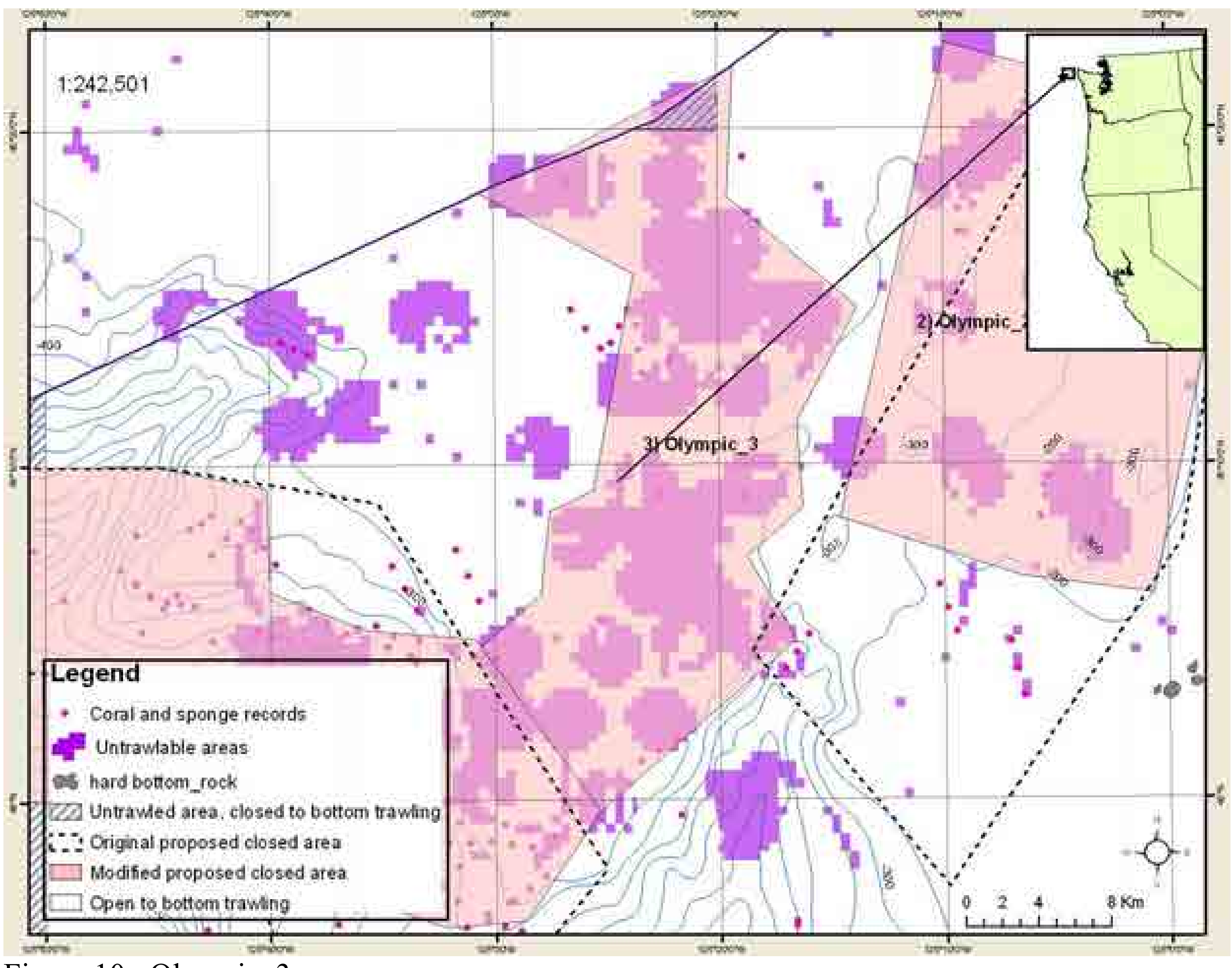

Figure 10: Olympic_3

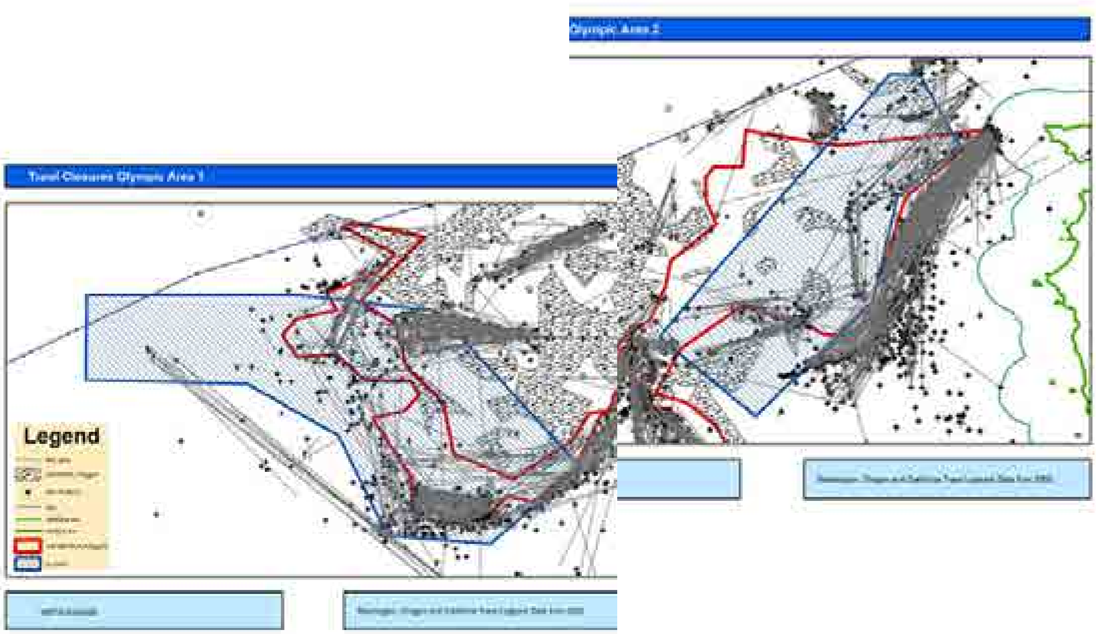

Figure C: 2003 bottom trawl logbook set points (courtesy WDF&W).

4. Biogenic_1

Original Alternative C.12 estimated displaced revenue= $172,849
Revised Alternative C.12 estimated displaced revenue= $36,486 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Bottom trawl logbook data from 2003 indicates that bottom trawling mainly occurred in the eastern portion of the previously proposed closed area (Figure D). The boundary for the proposed closed area in Revised Alternative C.12 excludes this fished area (Figure 11). It is likely that the displaced revenue previously attributed to the closed area is mitigated by excluding that eastern portion. The new boundary also expands northward and deeper to include lightly fished and unfished areas, and include more records of habitat-forming invertebrates.

Every NOAA trawl survey haul performed in the proposed area has recorded the presence of habitat-forming invertebrates. NOAA slope surveys from 1992 onwards have documented 141 records of habitat-forming invertebrates in the proposed area including black corals, scleractinian corals, Hexactinellid sponges, bamboo corals, and sea whips. Records were more numerous and sample weights of sponges were larger in earlier surveys than more recent ones, which may indicate that habitat has been impacted.

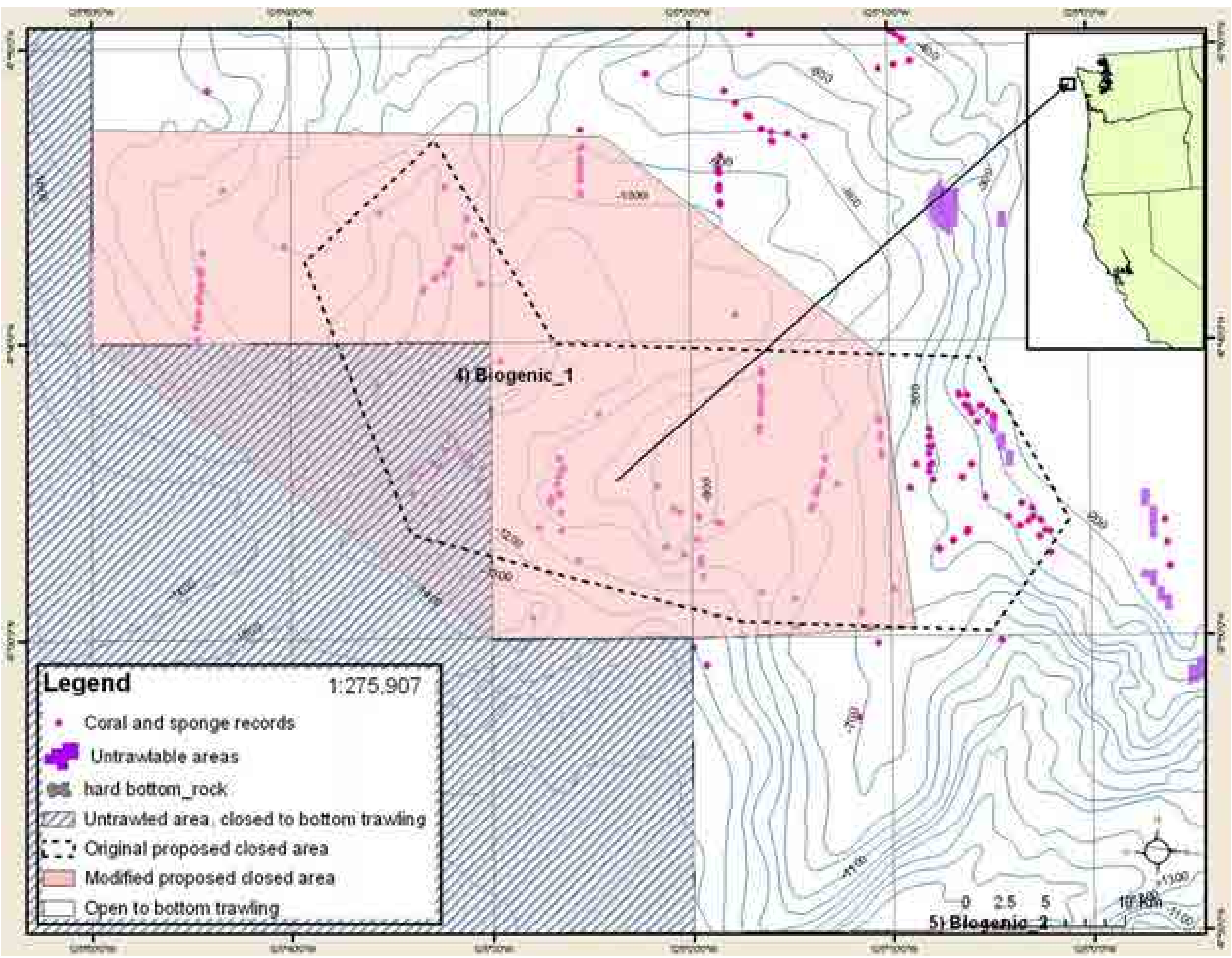

Figure 11: Biogenic_1

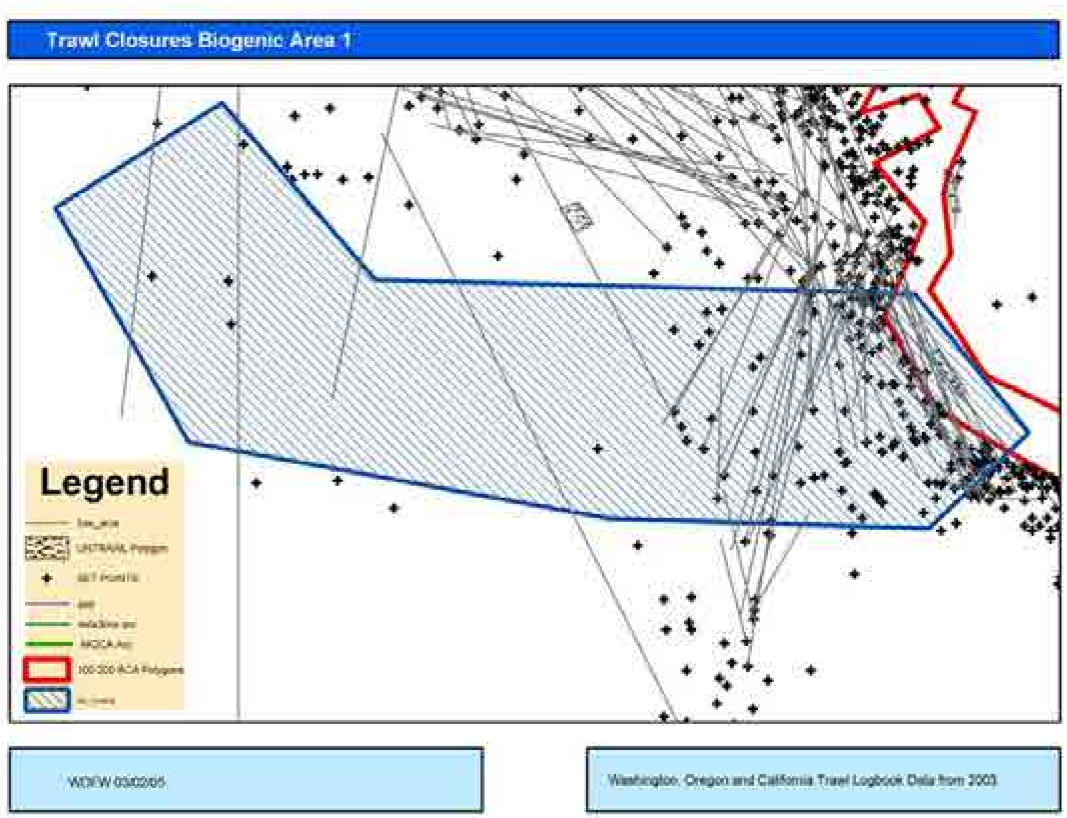

Figure D: 2003 bottom trawl logbook set points (courtesy WDF&W)

5. Biogenic_2
Original Alternative C.12 estimated displaced revenue= $31,982
Revised Alternative C.12 estimated displaced revenue= $15,483 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Bottom trawl logbook data from 2003 indicates that bottom trawling occurred across a small eastern portion of the previously proposed closed area (Figure E). The Revised Alternative C.12 boundary for the proposed closed area excludes this fished area (Figure 12). The new boundary also extends north and south into unfished and lightly fished areas, as well as deeper to provide continuity with the area closed by freezing the trawl footprint.

Every NOAA trawl survey haul performed in the proposed area has documented the presence of habitat-forming invertebrates. NOAA trawl surveys have documented 64 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonians, Hexactinellid sponges, and sea pens.

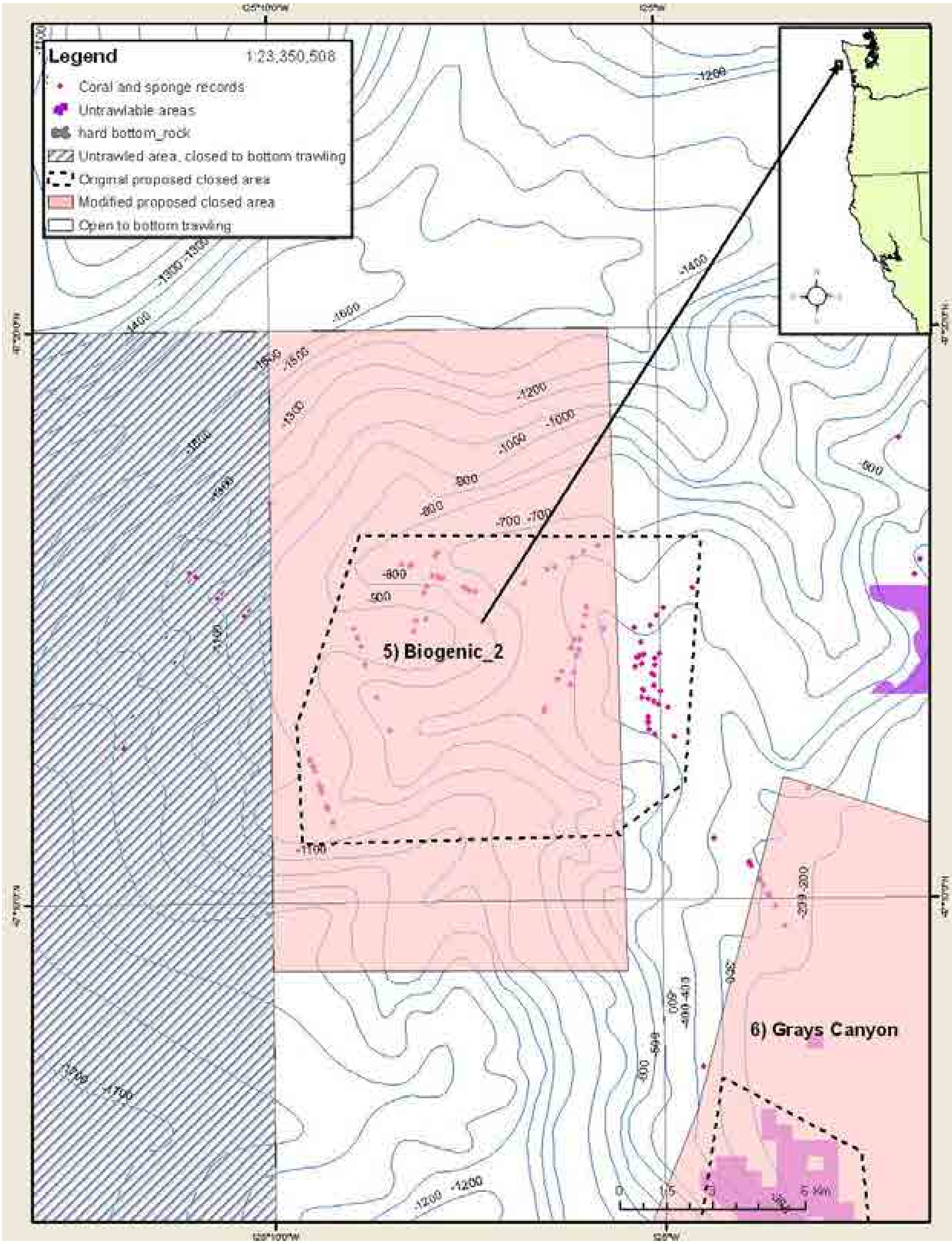

Figure 12: Biogenic_2

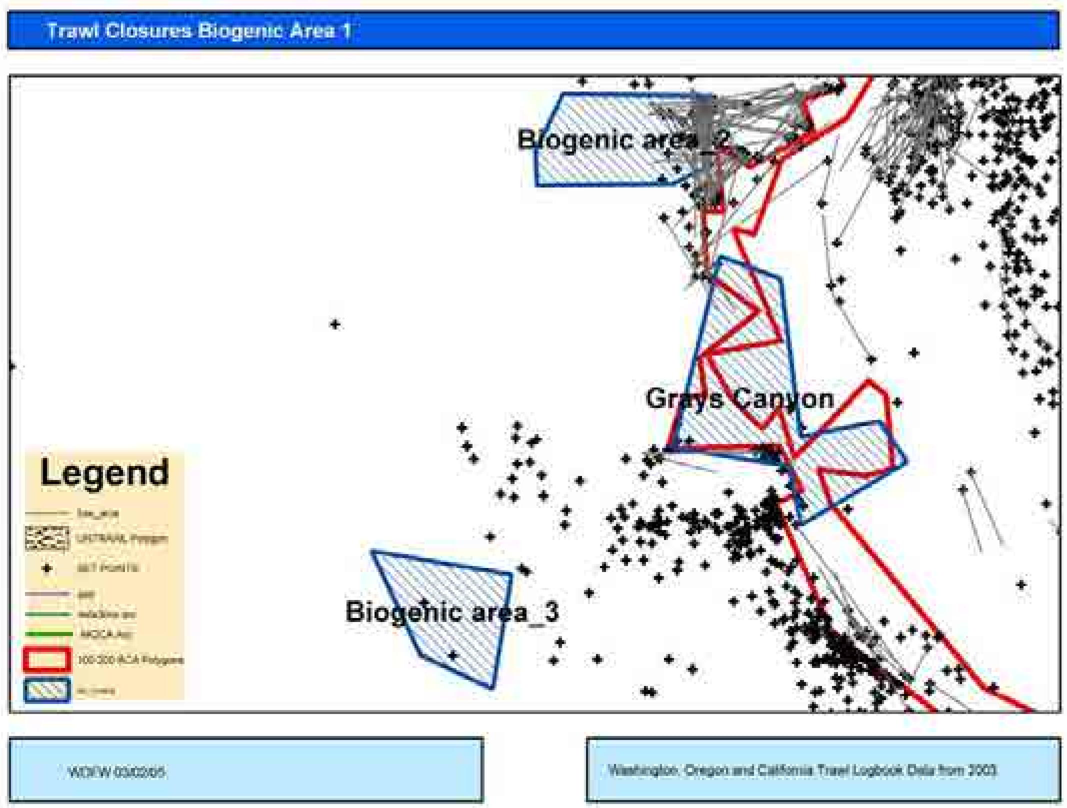

Figure E: 2003 bottom trawl logbook set points (courtesy WDF&W)

6. Grays Canyon

Original Alternative C.12 estimated displaced revenue= $5,917
Revised Alternative C.12 estimated displaced revenue= $34,512 (likely overestimated, trawl tracks fall outside of area, see Figure below)

This canyon was selected based on its high abundance of hard substrate and “untrawlable areas.” This site is known to have high upwelling and to be one of the most productive offshore sites off the Washington coast. It is also the site of major ecotourism and birdwatching operations.

Bottom trawl logbook data from 2003 indicates little bottom trawling occurred in the region of the proposed closed area (Figure E). The boundary for the Revised Alternative C.12 proposed closed area follows bathymetric contours and encompasses more of the canyon area (Figure 13).

Most NOAA trawl survey hauls in the proposed closed area documented habitat-forming invertebrates. There have been 48 records of black corals, gorgonian corals, scleractinian corals, and Hexactinellid sponges. In some cases, individual survey hauls recorded large densities of sponges, up to 907 kg per haul in 1985 and 505 kg per haul in 1983. There have been fewer records and lower sample weights of sponges in the more recent surveys, which may be an indication of adverse impacts of fishing on this habitat.

The proposed area contains 344 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003).

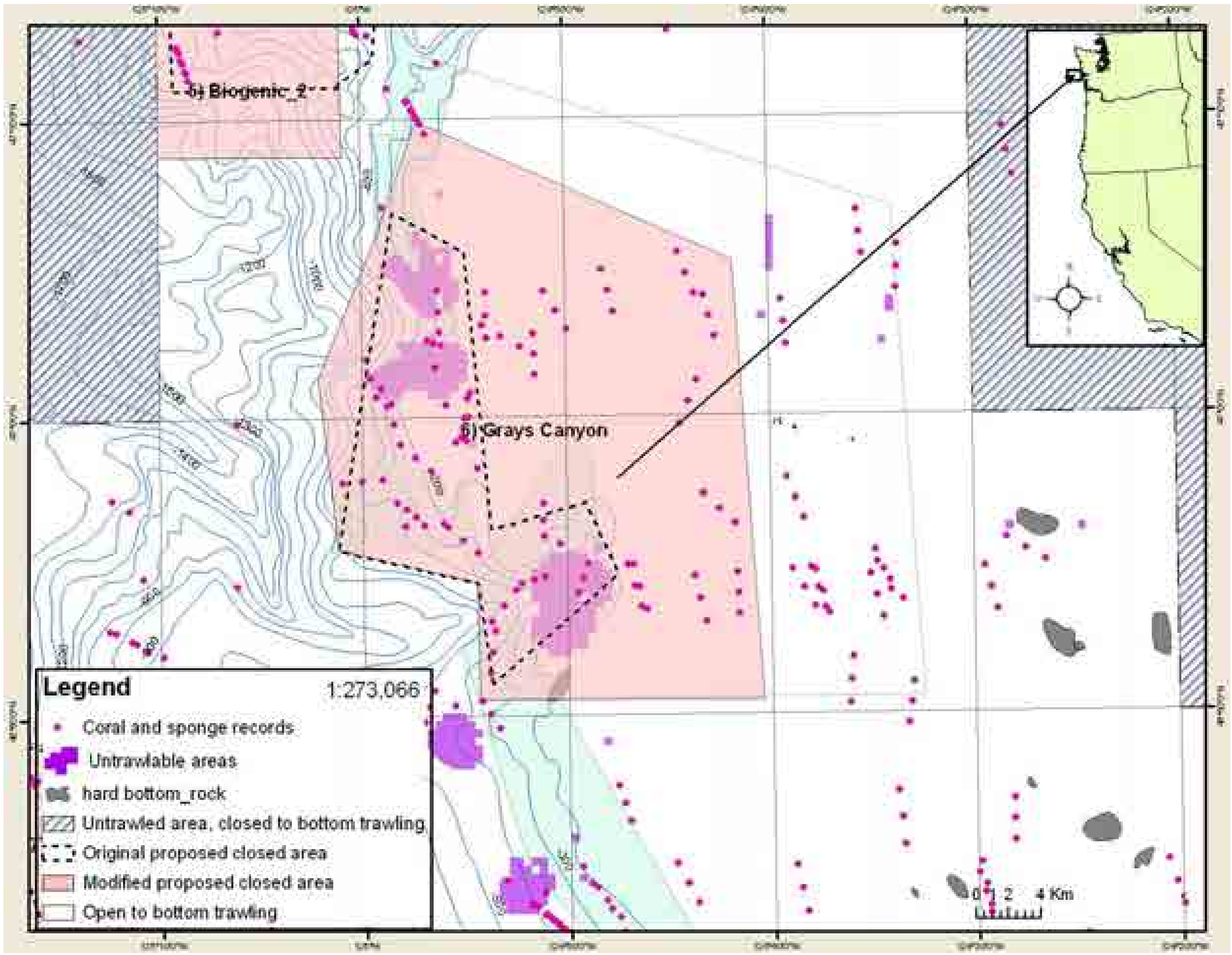

Figure 13: Grays Canyon

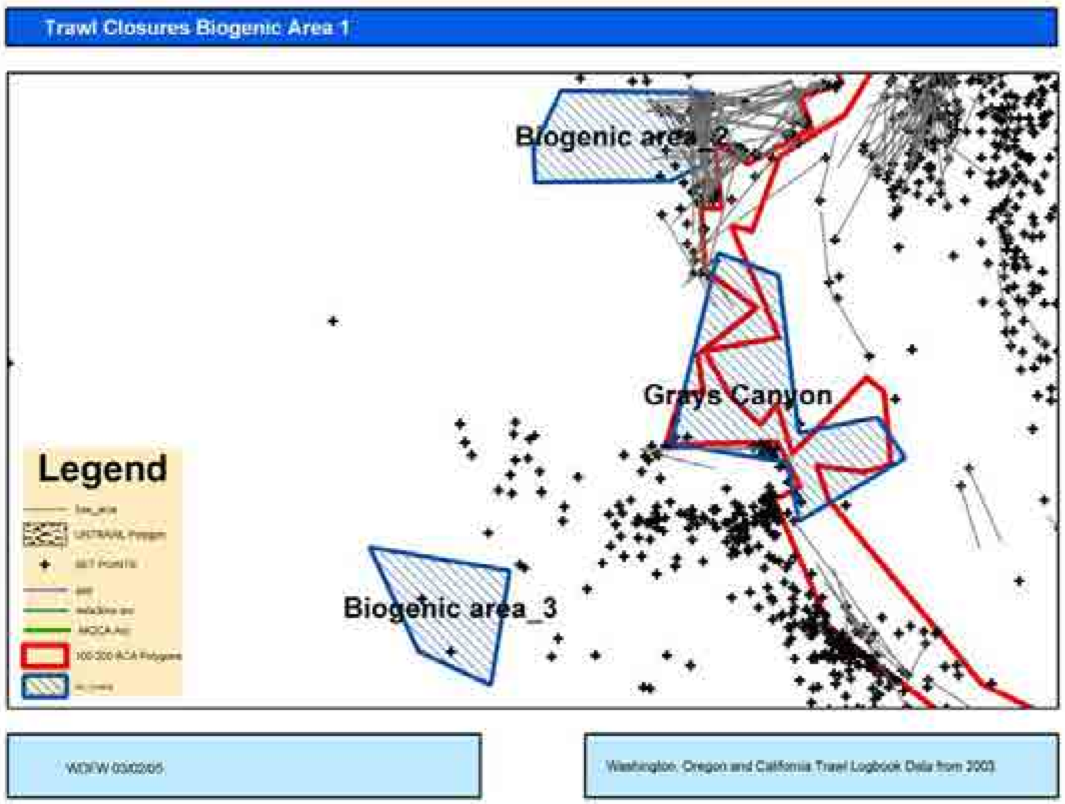

Figure E: 2003 bottom trawl logbook set points (courtesy WDF&W)

7. Biogenic_3

Original Alternative C.12 estimated displaced revenue= $2,351
Revised Alternative C.12 estimated displaced revenue= $4,554

According to trawl logbook data, little bottom trawling occurred in 2003 in the proposed closed area (Figure E). The boundary of the proposed area was expanded to provide continuity with areas closed by freezing the trawl footprint (Figure 14). The proposed closure spans an area of the slope from 900 to 1600 meters depth.

Every NOAA trawl survey haul performed within the proposed area has documented habitat-forming invertebrates. NOAA trawl surveys have documented 46 records of habitat-forming invertebrates within the proposed area, including black corals, gorgonian corals, sea whips, and sponges.

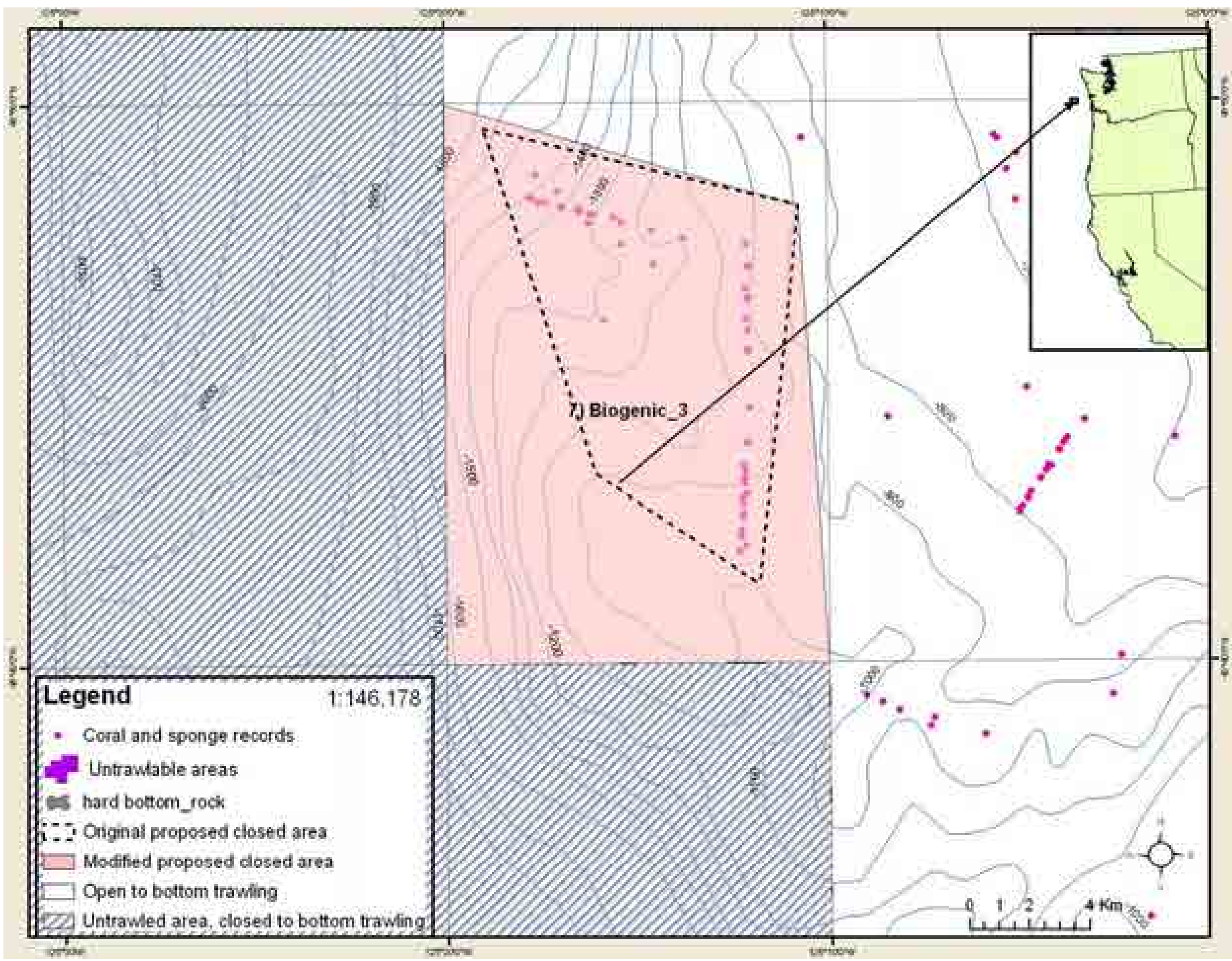

Figure 14: Biogenic_3

8. & 9. Astoria Canyon Region

Original Alternative C.12 estimated displaced revenue= $509,857
Revised Alternative C.12 estimated displaced revenue= $108,154 (likely overestimated, trawl tracks fall outside of area, see Figure below)

The largest submarine canyon in the Pacific Northwest is Astoria Canyon, off the mouth of the Columbia River. This canyon contains a range of habitat types from sand and mud bottom to hard rock canyon walls. There are several records of biogenic habitats in this canyon from the NMFS dataset (Clarke 2004). This canyon has been studied using ROPOS submersibles.

According to analysis of trawl logbook data by the WDF&W, a significant amount of bottom trawl catches were made 2003 in the previously proposed closed area encompassing Astoria Canyon (Figure F). We attempted to mitigate displaced catches by splitting the previously closed area of Astoria Canyon into two areas while avoiding fishing areas identified by WDF&W's logbook analyses (Figure 15).

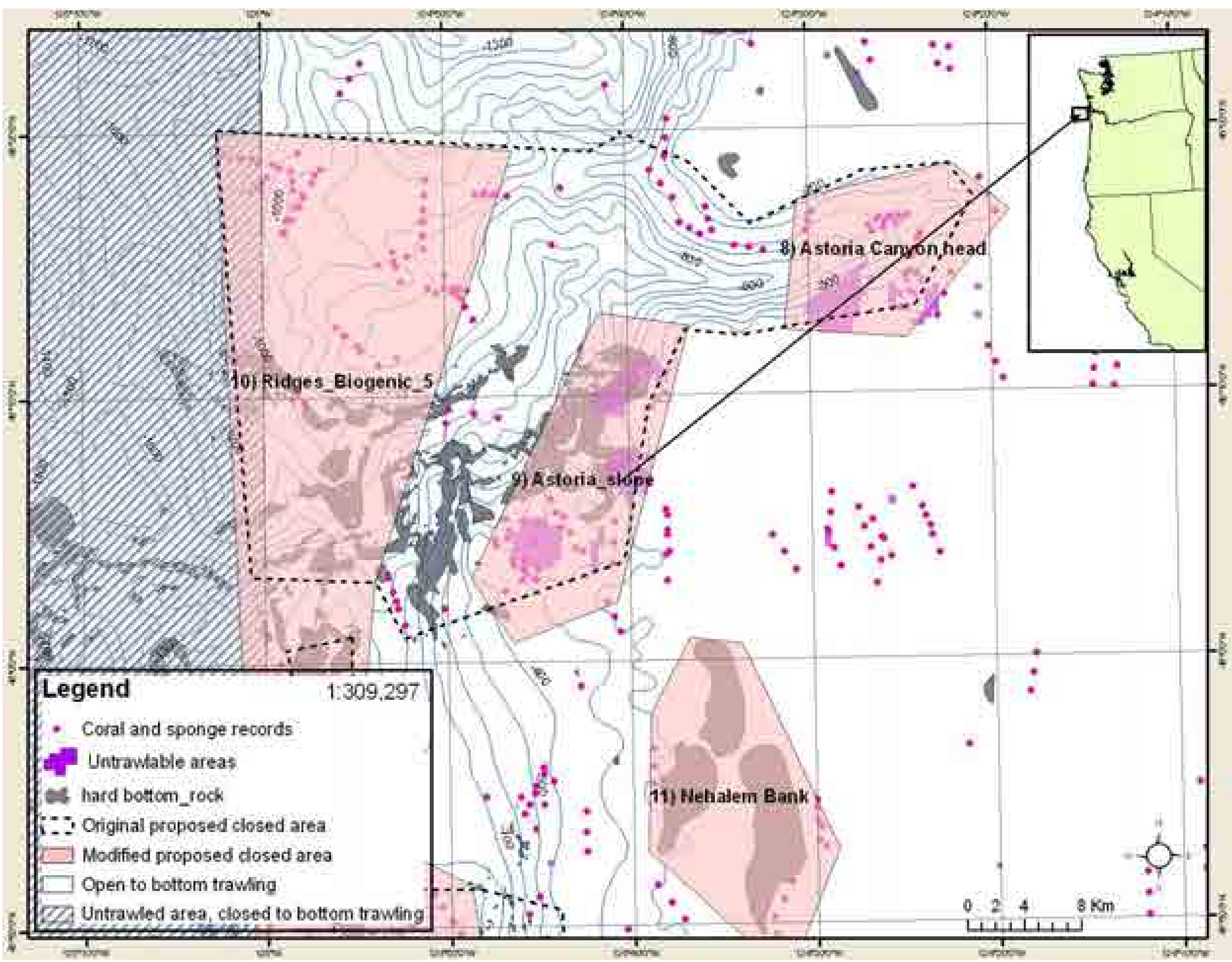

Figure 15: Astoria Canyon_head and Astoria_slope

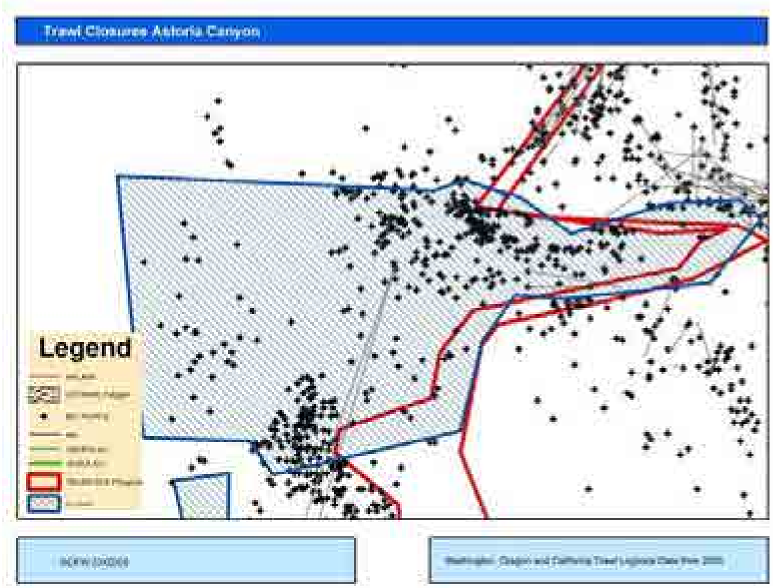

Figure F: 2003 bottom trawl logbook set points (courtesy WDF&W)

8. Astoria Canyon head

This area encompasses the head of the deepwater Astoria Canyon. Areas of untrawlable habitat (17.5 km^2) and habitat-forming invertebrates are located within the Revised Alternative C.12 proposed closed area (Figure 15). The proposed area contains 108 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Habitat-forming invertebrates were documented in 10 of 33 NOAA trawl survey hauls in the proposed closed area of the Astoria Canyon head. The largest sample weights of sponges and scleractinian corals occurred in the 1980's. The area spans canyon habitat from 200 to 500 meters depth.

9. Astoria Canyon slope

Areas of untrawlable habitat (31.8 km^2) and habitat-forming invertebrates are located within the Revised Alternative C.12 proposed closed area (Figure 15). Habitat-forming invertebrates were documented in 14 of 21 NOAA trawl survey hauls in the proposed closed area, and include records of sea pens, sea whips, and Hexactinellid sponges. The proposed area contains 170 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The area spans habitats from 200 to 800 meters depth.

10. Ridges_biogenic_5

Original Alternative C.12 estimated displaced revenue= $189,585
Revised Alternative C.12 estimated displaced revenue= $136,537 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Trawl logbook data indicates bottom trawl activity in the eastern portion of the previously proposed closed area (Figure G). The boundary in Revised Alternative C.12 excludes this area of fishing and expands over lightly fished area to be continuous with the area closed by the trawl footprint and the Astoria canyon closure above (Figure 16).

The proposed closed area contains habitat-forming invertebrates. NOAA trawl survey hauls have documented 118 records of habitat-forming invertebrates in the proposed closed area, and up to 249 kg of sponges per survey haul. Black corals, sea pens, sea whips, and sponges have been documented here.

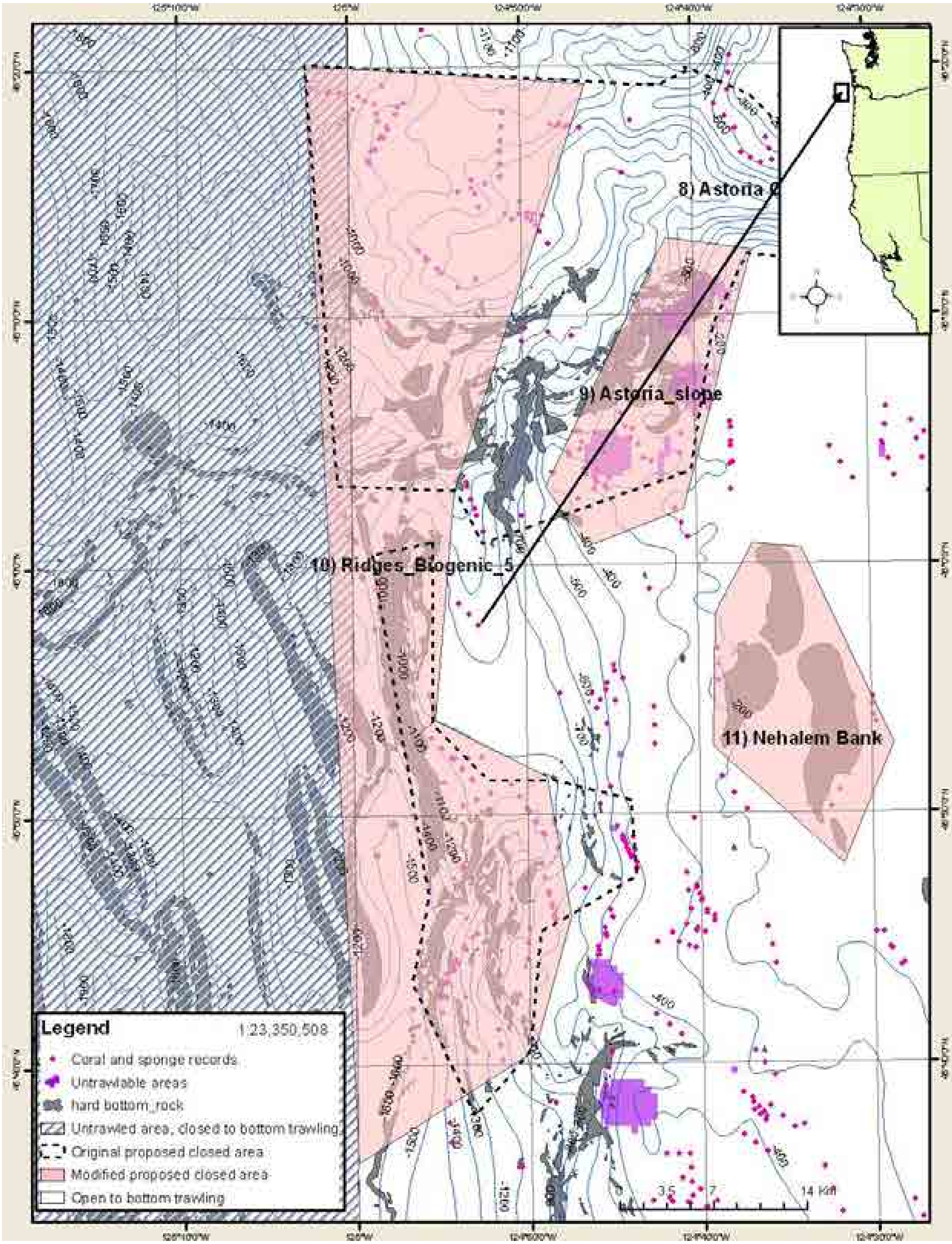

Figure 16: Ridges_biogenic_5

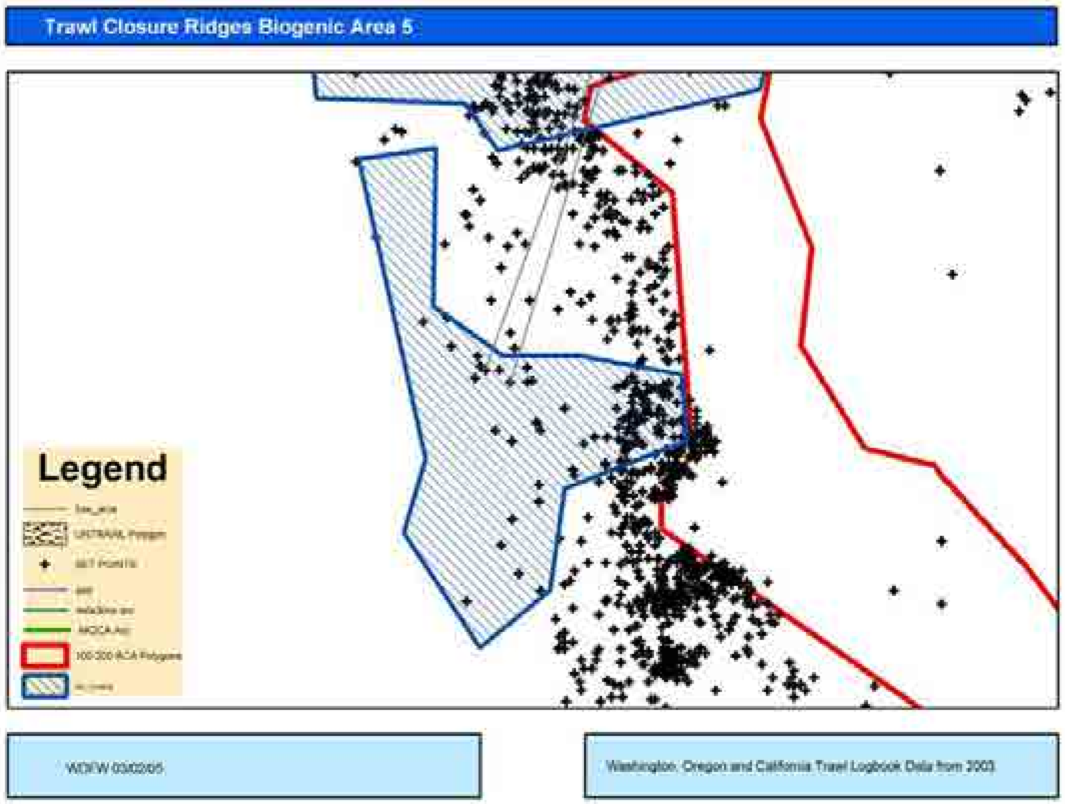

Figure G: 2003 bottom trawl logbook set points (courtesy WDF&W)

11. Nehalem Bank
Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $8,824 (likely overestimated, trawl tracks fall outside of area, see Figure below)

These rocky banks are 23 offshore of the Oregon coast (Figure 17). Marine nautical charts designate the features as rocky shale. The area has not been well sampled by NOAA trawl surveys, but 4 records of habitat-forming invertebrates (sponges and sea pens) have been recorded in the area. In the past, these banks were trawled upon by commercial fishing boats. Since trawl footrope restrictions were enacted in 2000, much less trawl effort has focused on the banks (Figure H) (Bellman and Hepel 2004). However, logbook information indicates that the occasional trawl was set on the bank even while footrope restrictions were in place (Figure H). Closing these banks to trawling would allow for recovery of previously impacted habitat, and prevent the occasional trawl set from compromising habitat recovery. Little current bottom trawl effort would be displaced by this proposed closure.

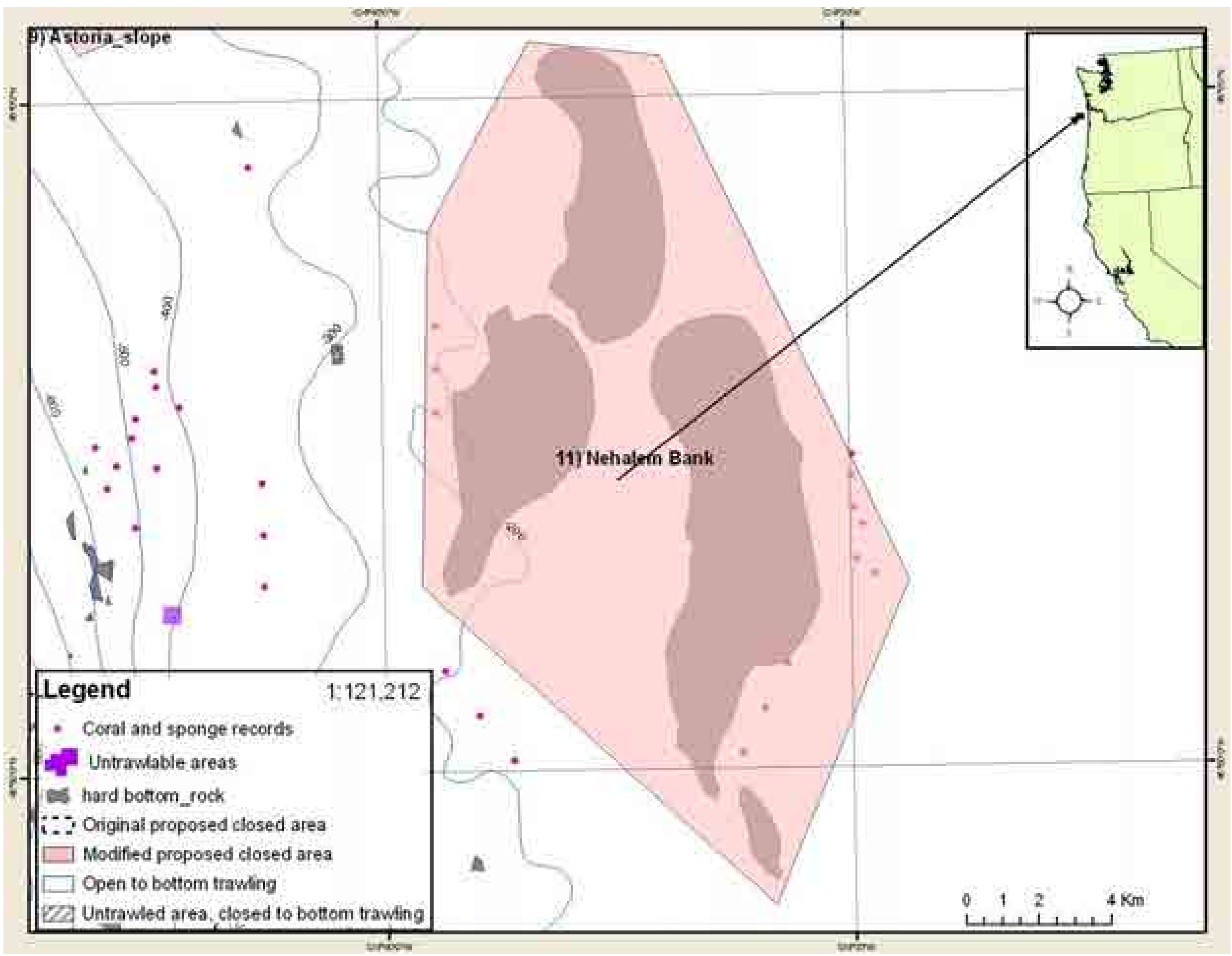

Figure 17: Nehalem Bank

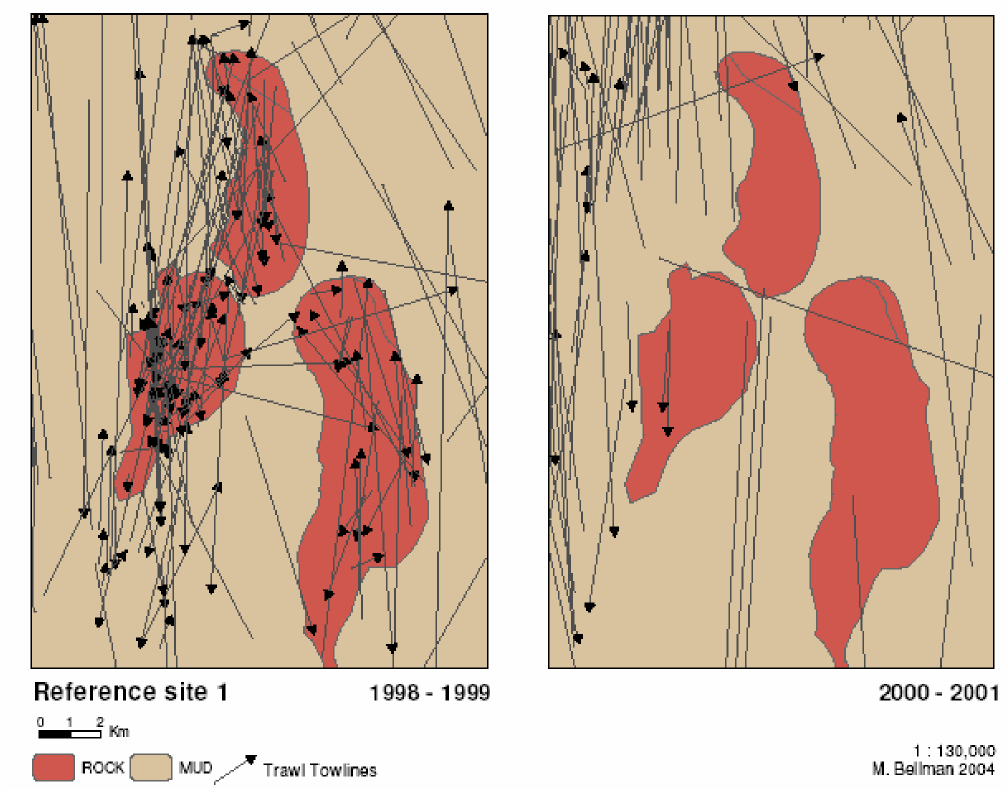

Figure H: Nehalem Bank reference site showing trawl logbook set and haul points prior to and following footrope restrictions (Bellman and Heppel 2004).

12. Biogenic_new_1

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $69,960

This area contains spans habitat from 400 to 600 meters depth and contains records of habitat-forming invertebrates (Figure 18). NOAA trawl surveys have documented 77 records of habitat-forming invertebrates in the proposed closed area, including sponges, sea whips, sea pens, and gorgonian corals. Every trawl survey haul performed in the area has documented habitat-forming invertebrates. Trawling that has occurred in the area has impacted habitat. Data from the West Coast Observer Program in the area noted a mean of 105 pounds of corals and sponges per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch.

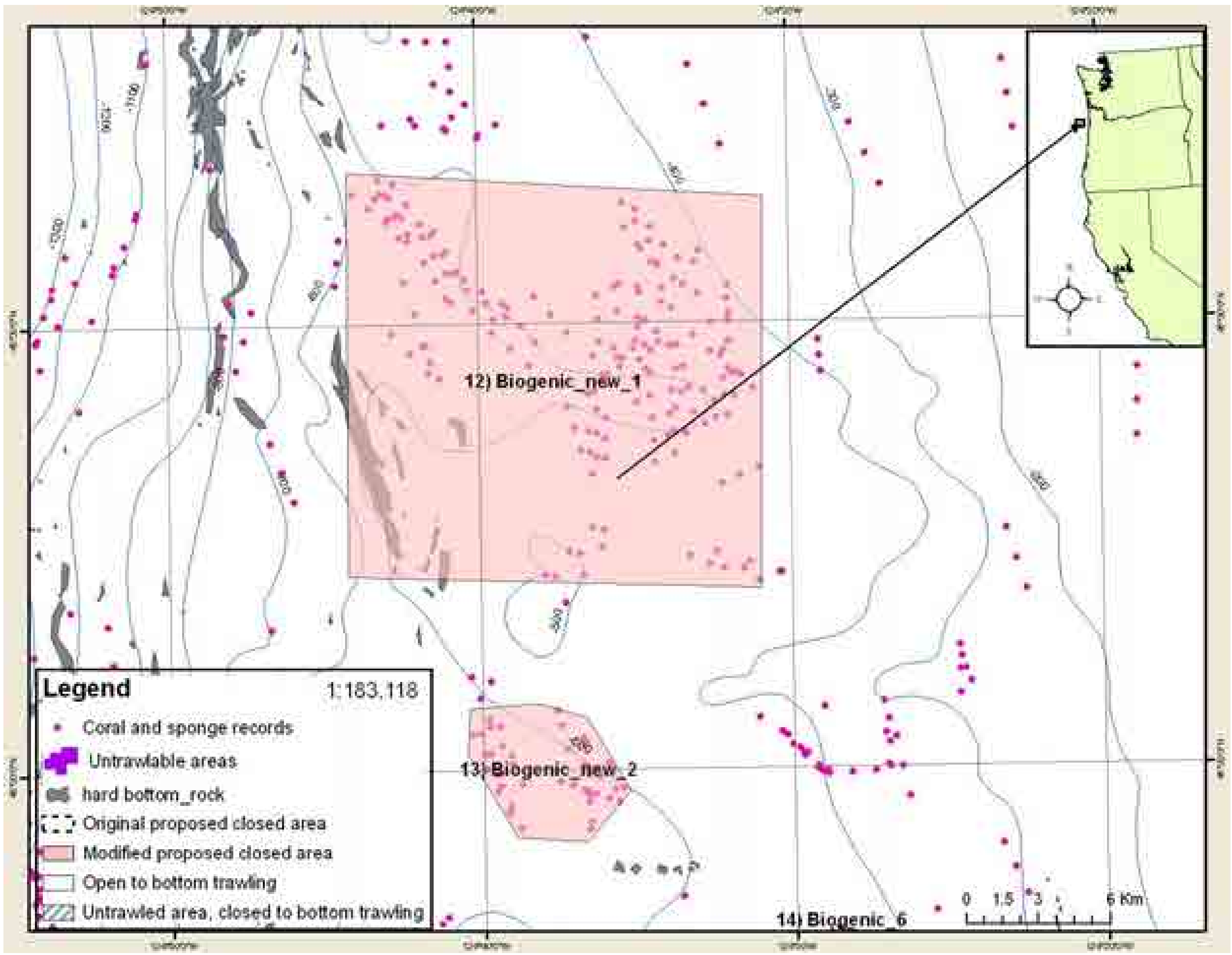

Figure 18: Biogenic_new_1 and Biogenic_new_2

13. Biogenic_new_2

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $5,969

This area is located at 500 meters depth and contains records of habitat-forming invertebrates (Figure 18). Every NOAA trawl survey haul in the proposed area has recorded habitat-forming invertebrates. NOAA trawl surveys have documented 26 records of habitat-forming invertebrates in the proposed area, and up to 118 kg (260 lbs) of sponges per survey haul.

14. Biogenic area_6

Original Alternative C.12 estimated displaced revenue= $3,585
Revised Alternative C.12 estimated displaced revenue= $29,402 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Analysis of trawl logbook data from 2003 indicated that little bottom trawling activity occurred in the vicinity of the proposed area (Figure I). As such, the boundaries of the proposed area were expanded in Revised Alternative C.12 to include more records of habitat-forming invertebrates (Figure 19).

This area contains habitat conducive to the growth of Hexactinellid sponges. NOAA trawl surveys have documented 25 records of habitat-forming invertebrates in the proposed area, and particularly dense records of sponges. Survey hauls have documented up to 312 kg (686 lbs) of sponges per haul in 1988, 281 kg (618 lbs) per haul in 1984, and 226 kg (497 lbs) per haul in 1977. Survey hauls in 2001, however, recorded a maximum of 22 kg (48 lbs) of sponges per haul, which may indicate habitat degradation in recent years that needs to be mitigated. Data from the West Coast Observer program in the proposed area noted a mean of 103 pounds of corals and sponges per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch (NWFSC, unpublished data).

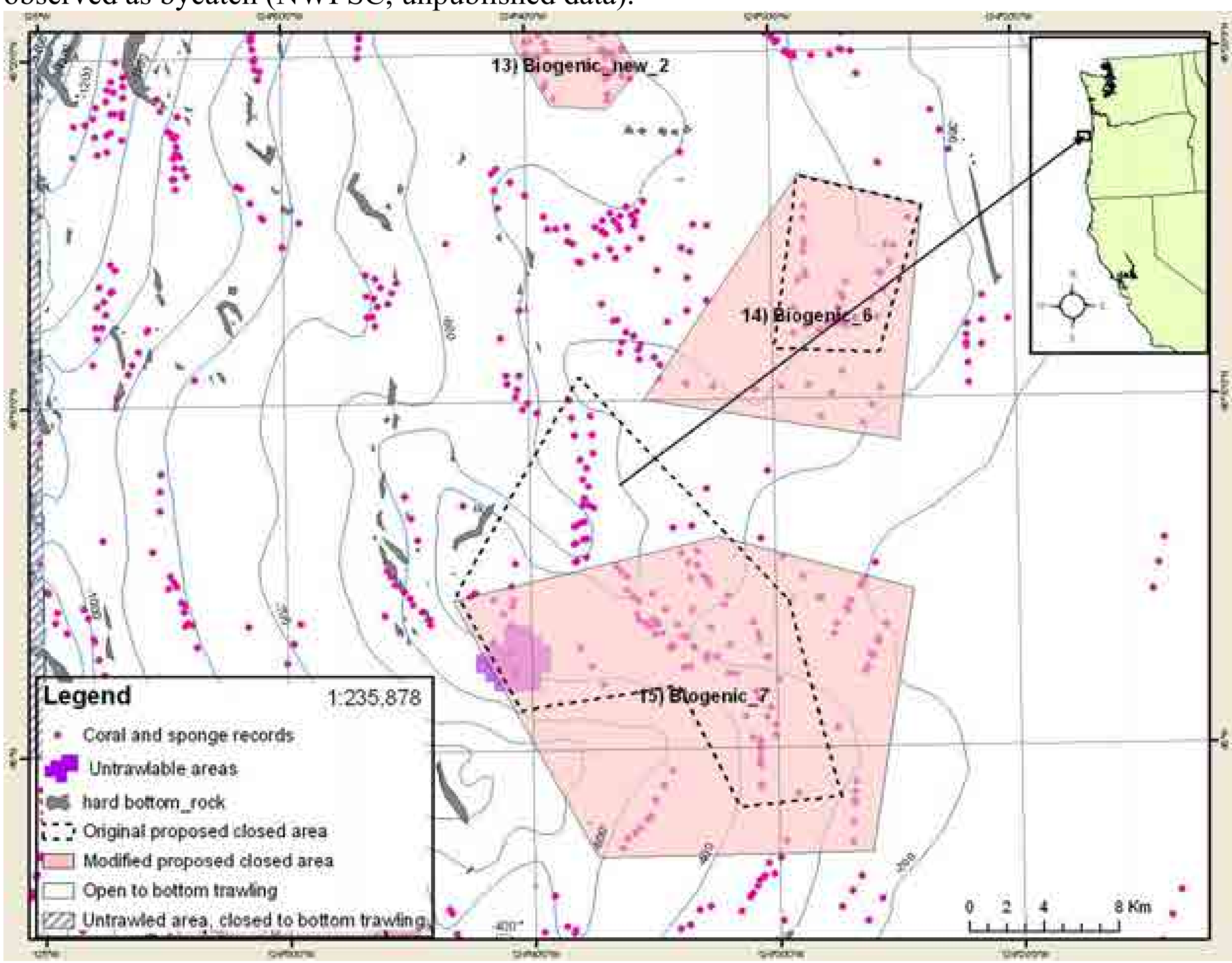

Figure 19: Biogenic area_6 and Biogenic area_7

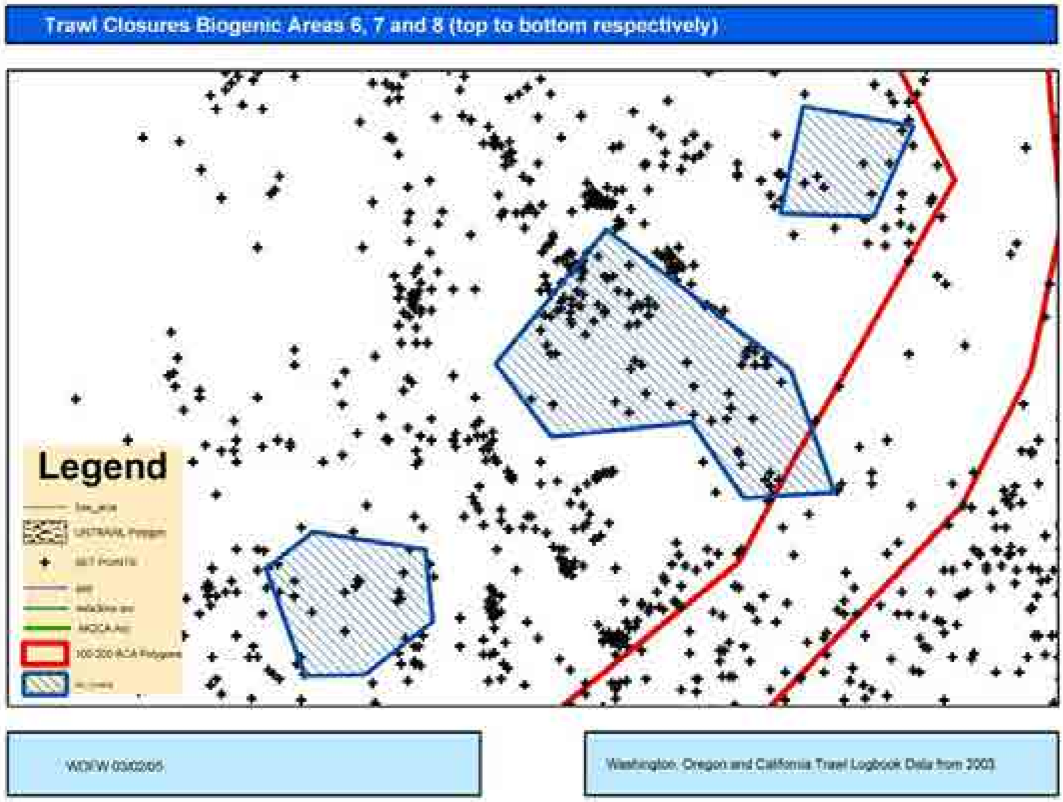

Figure I: 2003 bottom trawl logbook set points (courtesy WDF&W)

15. Biogenic area_7

Original Alternative C.12 estimated displaced revenue= $76,470
Revised Alternative C.12 estimated displaced revenue= $91,908 (likely overestimated, trawl tracks fall outside of area, see Figure I above)

Analysis of trawl logbook data from 2003 indicates some bottom trawl effort occurred in the northern portion of the proposed area and little activity south and east of the area (Figure I). The boundaries of Revised Alternative C.12 exclude the fishing area in the northern portion, and expand south and east to include more records of habitat-forming invertebrates in the less trawled area (Figure 19).

NOAA trawl surveys have documented 73 records of habitat-forming invertebrates in the proposed area, including dense records of sponges. Survey hauls documented up to 1,274 kg (2,803 lbs) of sponges per haul in 1988 and 334 kg (735 lbs) of sponges per haul in 1996. Survey hauls in 2001 recorded a maximum of 61 kg (134 lbs) of sponges per haul, which may indicate habitat degradation in recent years. Data from the West Coast Observer Program in the proposed area noted a mean of 304 pounds per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch (NWFSC, unpublished data).

The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

16. Biogenic area_8

Original Alternative C.12 estimated displaced revenue= $36,172
Revised Alternative C.12 estimated displaced revenue= $41,852 (likely overestimated, trawl tracks fall outside of area, see Figure I above)

The boundaries of the proposed closed area in Revised Alternative C.12 expand northward to include more records of habitat forming invertebrates (Figure 20). Trawl logbook information indicated little activity in the area (Figure I). Every NOAA trawl survey haul in the proposed area has documented habitat-forming invertebrates, including gorgonian corals, sea pens, and Hexactinellid sponges. A total of 51 records of habitat-forming invertebrates have been documented in the proposed area, with up to 160 kg (352 lbs) of sponges per haul.

The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

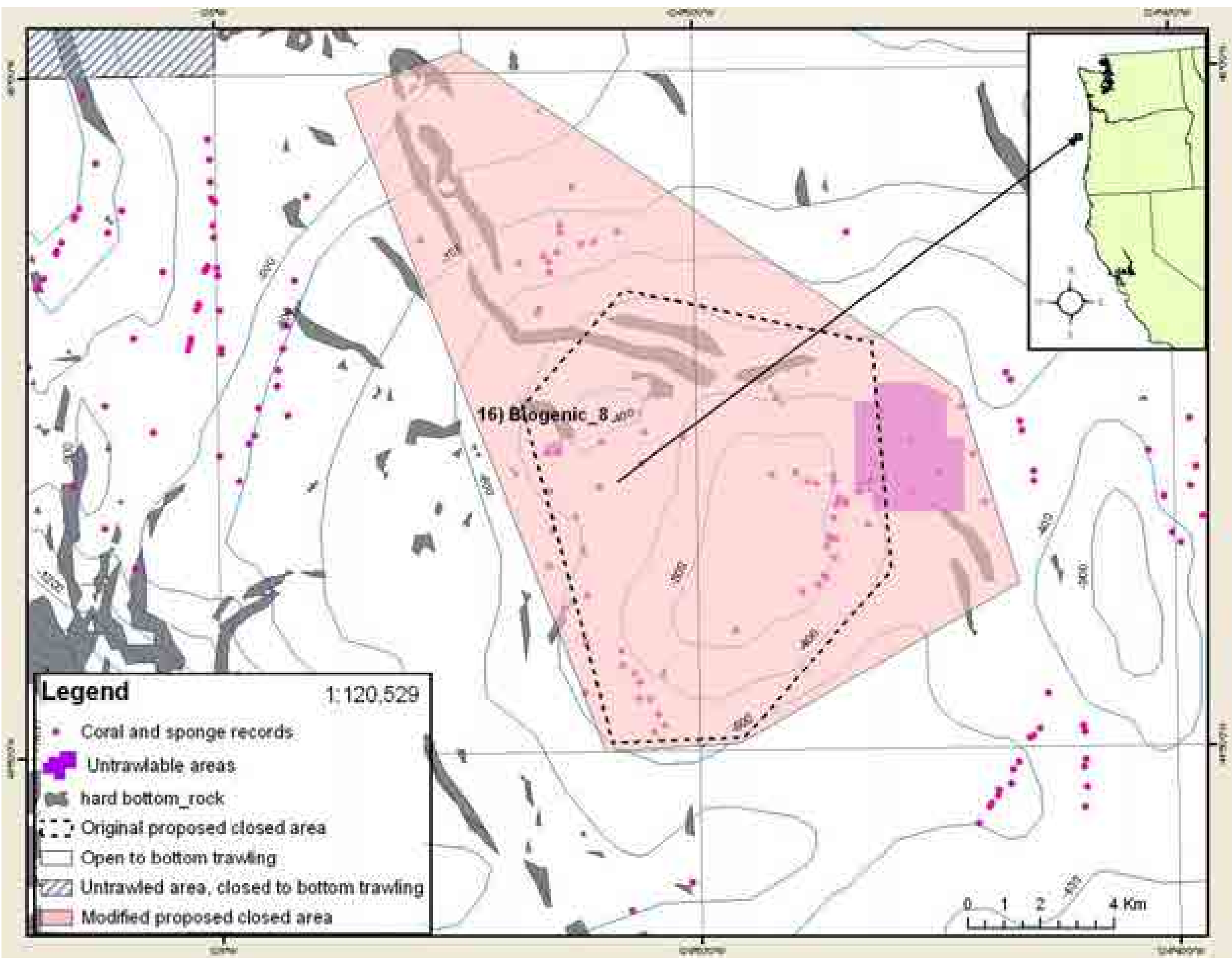

Figure 20: Biogenic area_8

17. Siletz Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $132

Siletz Reef is a rocky reef located within the 3 nm Oregon state waters boundary (Figure 21). While it is unlikely that this reef is targeted by bottom trawl fishermen, the 2000-2003 bottom trawl logbook data indicated that the northern portion of the reef fell within the bottom trawl footprint. Part of the reef is known locally as "Tacklebuster Reef" as massive rock structures easily snag fishing gear. Depths range from 10-45 meters with vertical relief at the northern end punctuated by dramatic, massive structures up to 20m high and tens of meters across.

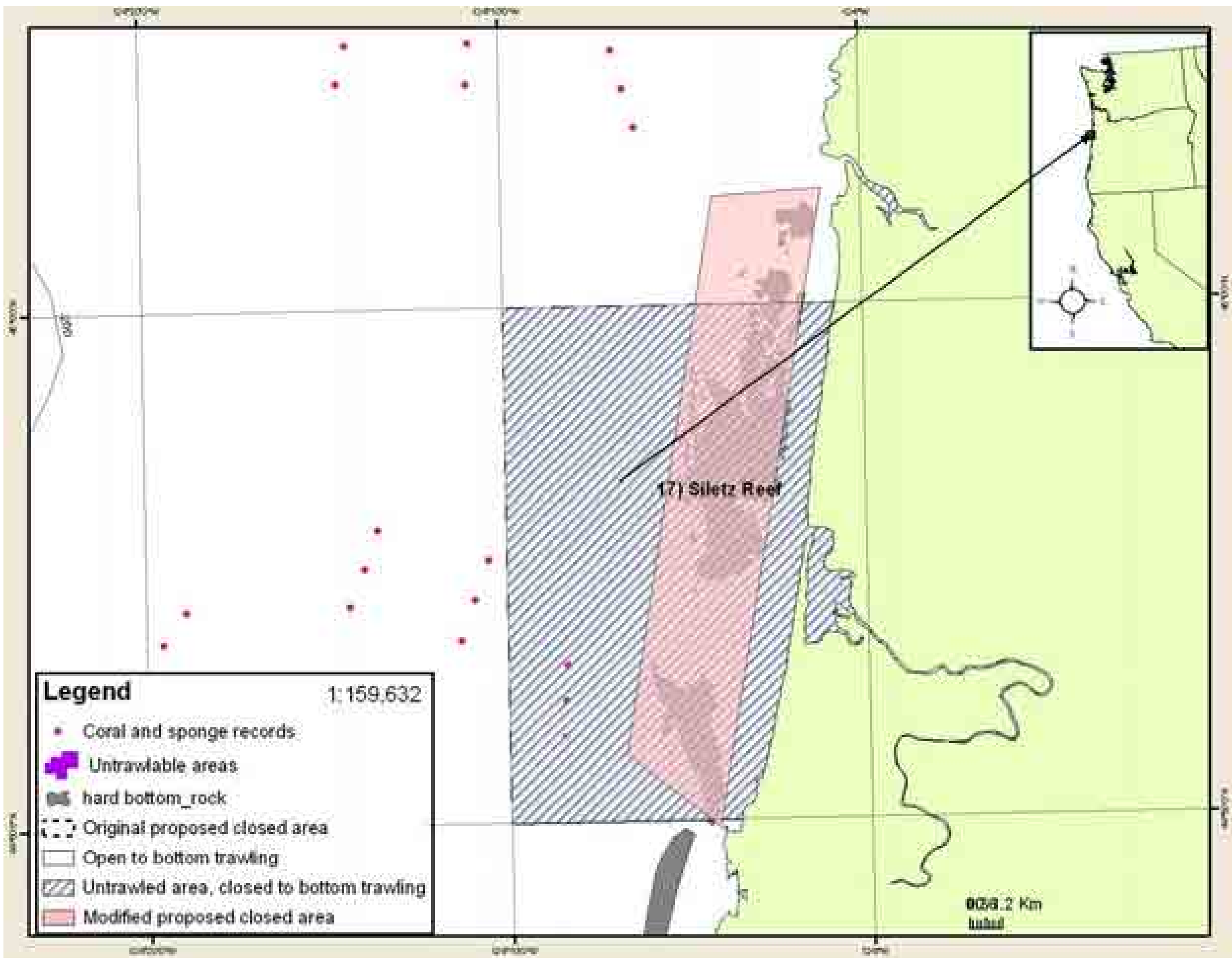

Figure 21: Siletz Reef

18. Daisy Bank

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $11,768 (likely overestimated, trawl tracks fall outside of area, see Figure J below)

Daisy Bank, a 100 km^2 area north of Heceta Bank, has been less heavily fished and is also comprised largely of hard bottom habitat (Figure 22). Hixon (1991) documented large sponge beds on this bank. Since it is less heavily fished than Heceta Bank, a larger portion of Daisy Bank can be protected from bottom trawling with fewer negative impacts.

NOAA trawl surveys have documented 7 records of habitat forming invertebrates on the bank, including sponges, black coral, and scleractinian coral. However, the bank is not easily sampled with trawl gear. The proposed area contains 15 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The bank has been explored with submersible and video; Hixon et al. (1990) observed sponges to be prevalent on Daisy Bank, with some over a meter tall. Daisy bank is currently located within the fishery closures associated with the Rockfish Conservation Area, yet some trawl setpoints in 2003 did approach the bank (Figure J).

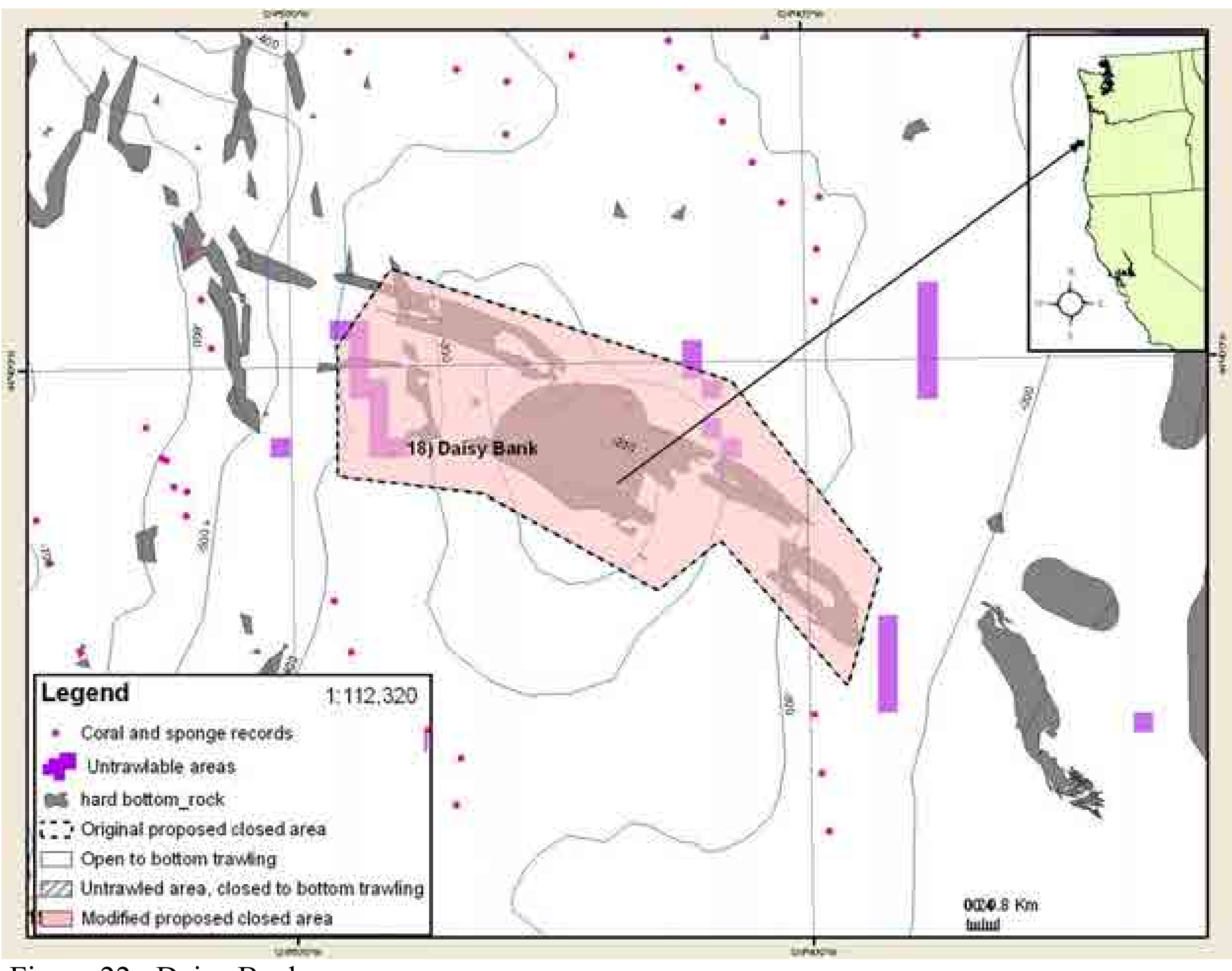

Figure 22: Daisy Bank

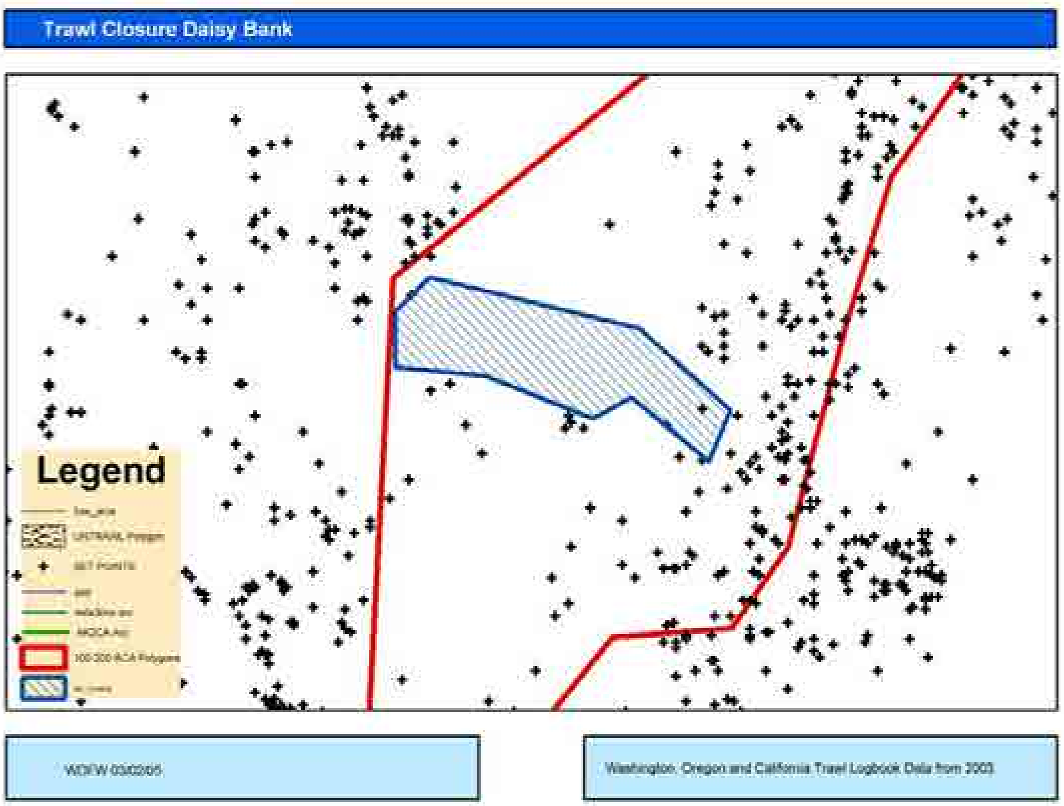

Figure J: 2003 bottom trawl set points from logbook data compiled by WDF&G

19. Biogenic_new 3

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $70,573

This area contains records of biogenic habitat (Figure 23). NOAA trawl surveys have documented 39 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonian corals, sea whips, sea pens, and sponges. Sampling by the West Coast Observer program indicates that the area contains records where up to 211 pounds of corals or 55 pounds of sponges were recorded as bycatch per haul.

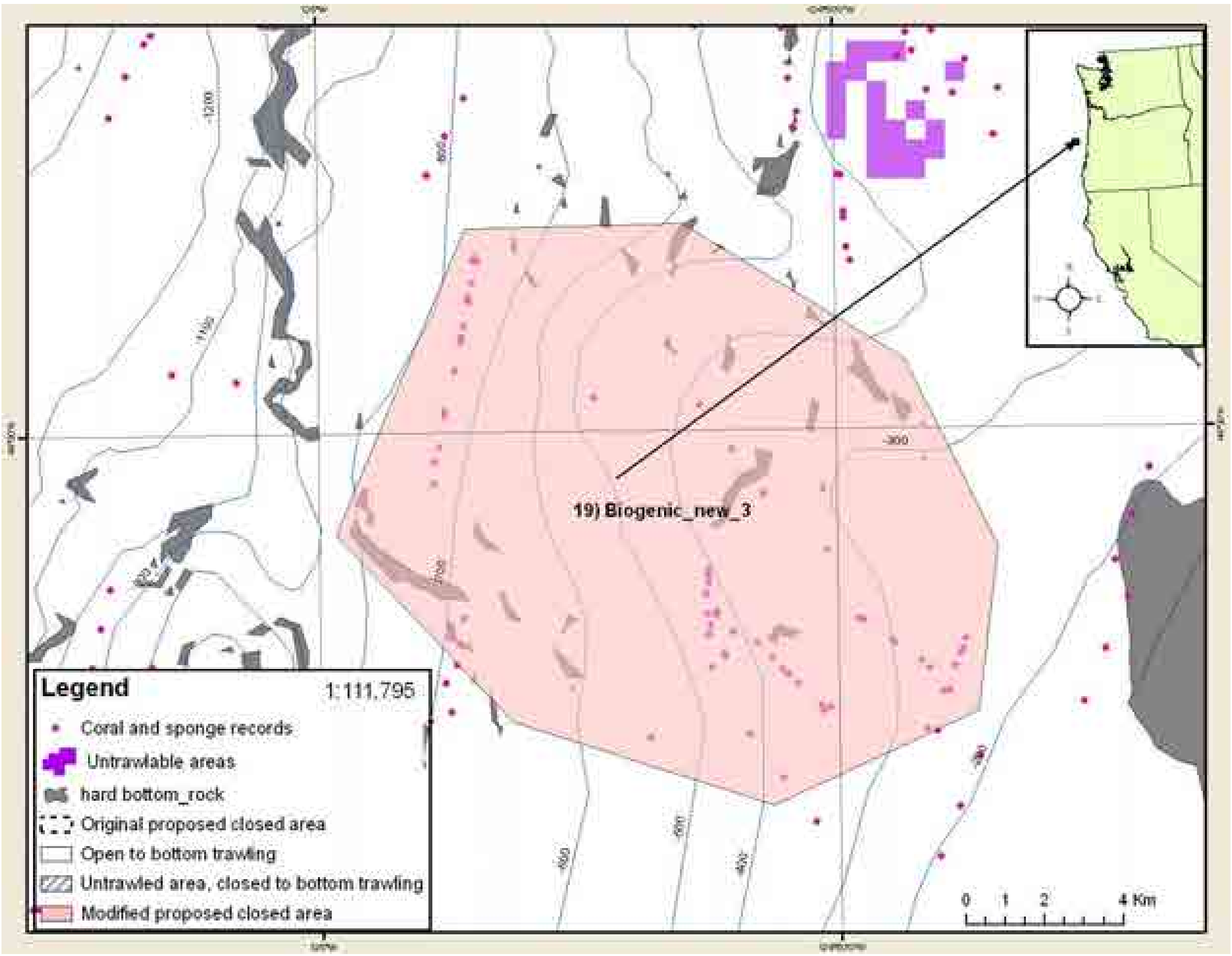

Figure 23: Biogenic_new_3

20. Stonewall Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $7,252

Stonewall Bank is designated as a Rockfish Conservation Area to protect yelloweye and canary rockfish (Figure 24). Little bottom trawl activity occurs on the bank, and closing the bank to trawling would result in minimal displaced revenue.

The proposed area contains 116 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). As it is difficult to trawl here, the bank has not been well sampled by NOAA trawl surveys. However, 2 records of sponges were documented here.

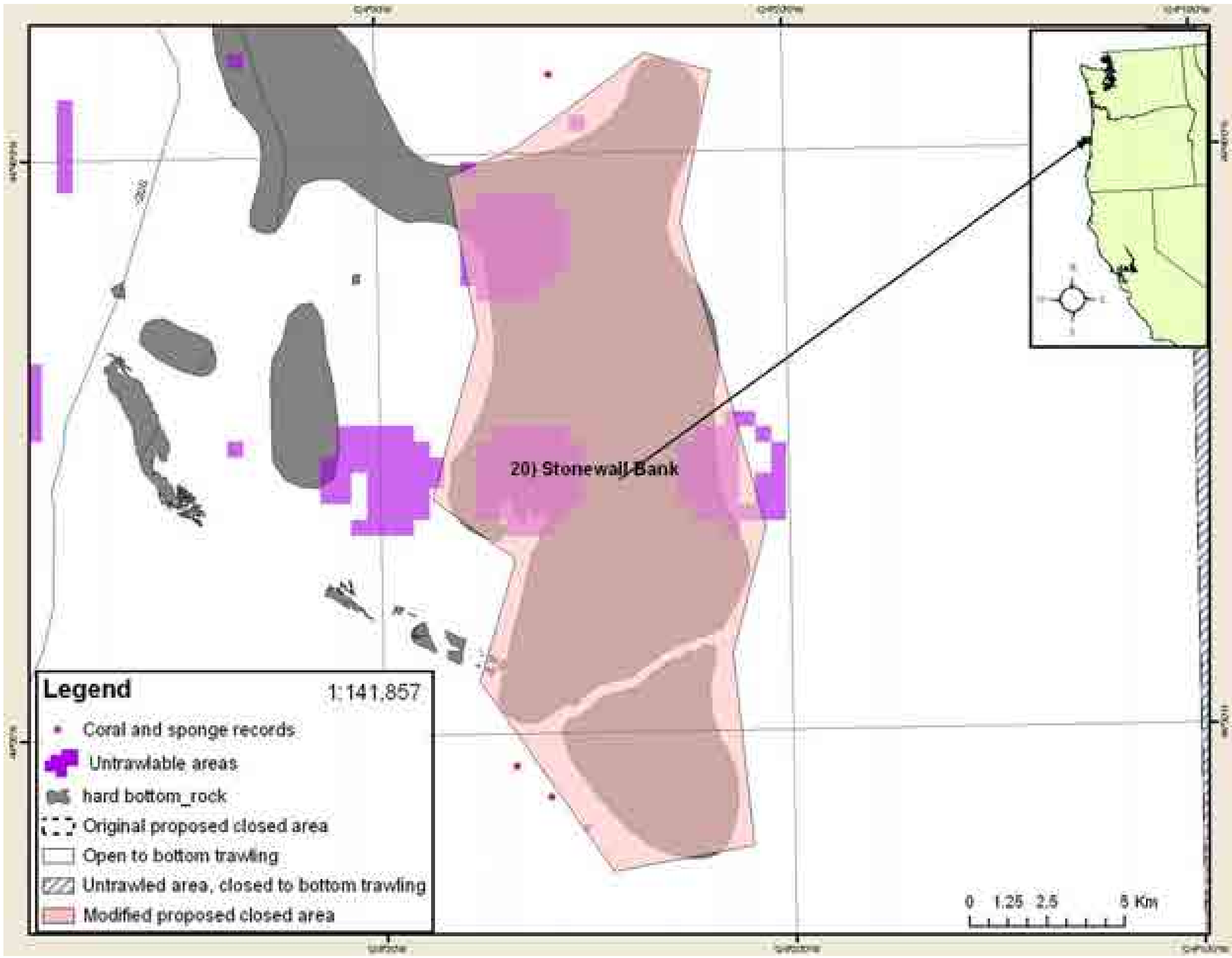

Figure 24: Stonewall Bank

21. Cape Perpetua Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $125

Cape Perpetua Reef is a rocky reef off the Oregon coast (Figure 25). Oregon State's Nearshore Rocky Reef Project mentions the Cape Perpetua Reef as the most undisturbed and pristine reef off the Oregon coast Little trawl activity occurs near the bank and closing the bank to bottom trawling would result in minimal displaced revenue. As it is likely difficult to trawl here, the bank has not been sampled by NOAA trawl surveys.

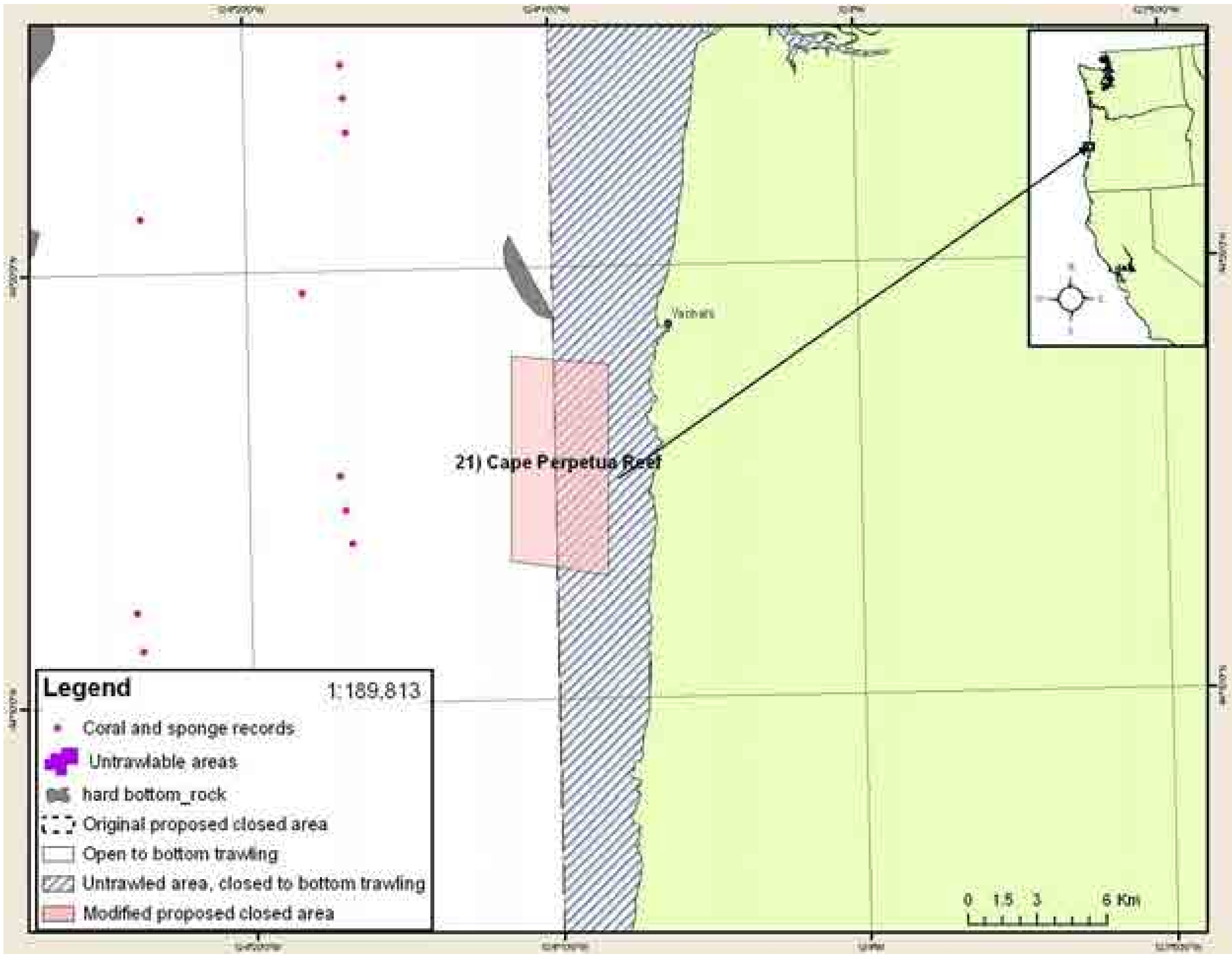

Figure 25: Cape Perpetua Reef

22. & 23. Heceta Bank area

Original Alternative C.12 estimated displaced revenue= $379,291
Revised Alternative C.12 estimated displaced revenue= $229,475 (likely overestimated, trawl tracks fall outside of area, see Figure K below)

Trawl logbook data indicated trawl activity within the previously proposed boundaries of the Heceta bank closed area. Trawl effort appeared concentrated on the slope off Heceta Bank and south (Figure K). The proposed area was split into the 2 areas below, which avoids much of the trawl effort and likely results in less displaced effort from the closure (Figure 26).

22. Heceta Bank

Revised Alternative C.12 estimated displaced revenue= $200,810 (likely overestimated, trawl tracks fall outside of area, see Figure K below)

Heceta Bank is the largest rocky reef off the U.S. Pacific Coast. It is composed largely of hard bottom substrate. The proposed area contains 591 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 16 records of sponges on the bank, but the bank has not been well-sampled with trawl survey gear. Recent explorations have documented key areas of sponges and crinoids. Video from submersible dives have noted some dense areas of habitat forming invertebrates on the bank (Hixon et al. 1990, Waldo Wakefield unpublished data).

23. Heceta Escarpment

Revised Alternative C.12 estimated displaced revenue= $28,665

NOAA trawl surveys have documented 50 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonian corals, sea whips, sea pens, and sponges.

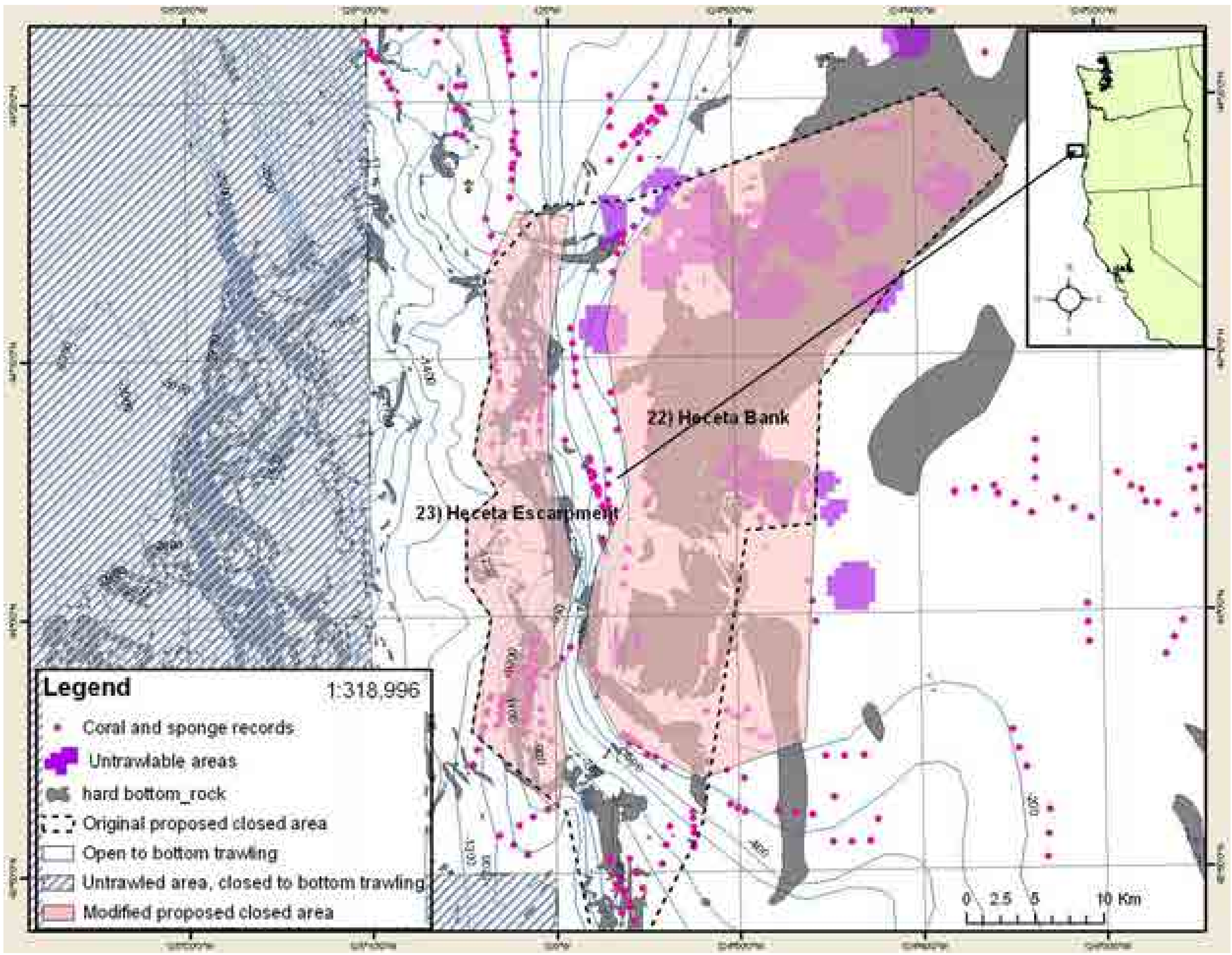

Figure 26: Heceta Bank and Heceta Escarpment

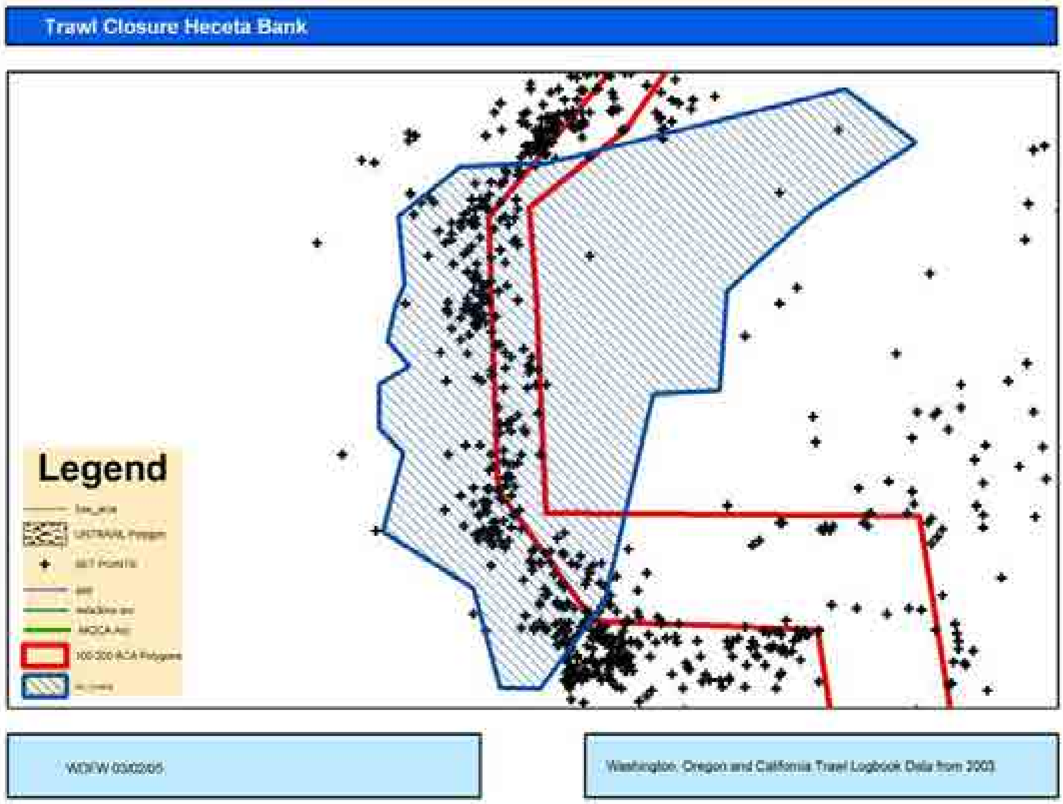

Figure K: 2003 bottom trawl logbook set points (courtesy WDF&W)

24. Ridges_biogenic_10
Original Alternative C.12 estimated displaced revenue= $7,114
Revised Alternative C.12 estimated displaced revenue= $94,628 (likely overestimated, trawl tracks fall outside of area, see Figure L below)

The two previously proposed closed areas were combined into one area and boundaries extended to encompass more records of habitat-forming invertebrates (Figure 27). Trawl logbook data from 2003 indicated little overlap of bottom trawl activity within the proposed area (Figure L). The proposed closed area encompasses habitat from 700 to 1500 meters depth. NOAA trawl surveys have documented 103 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and bubblegum corals have been documented in the proposed area.

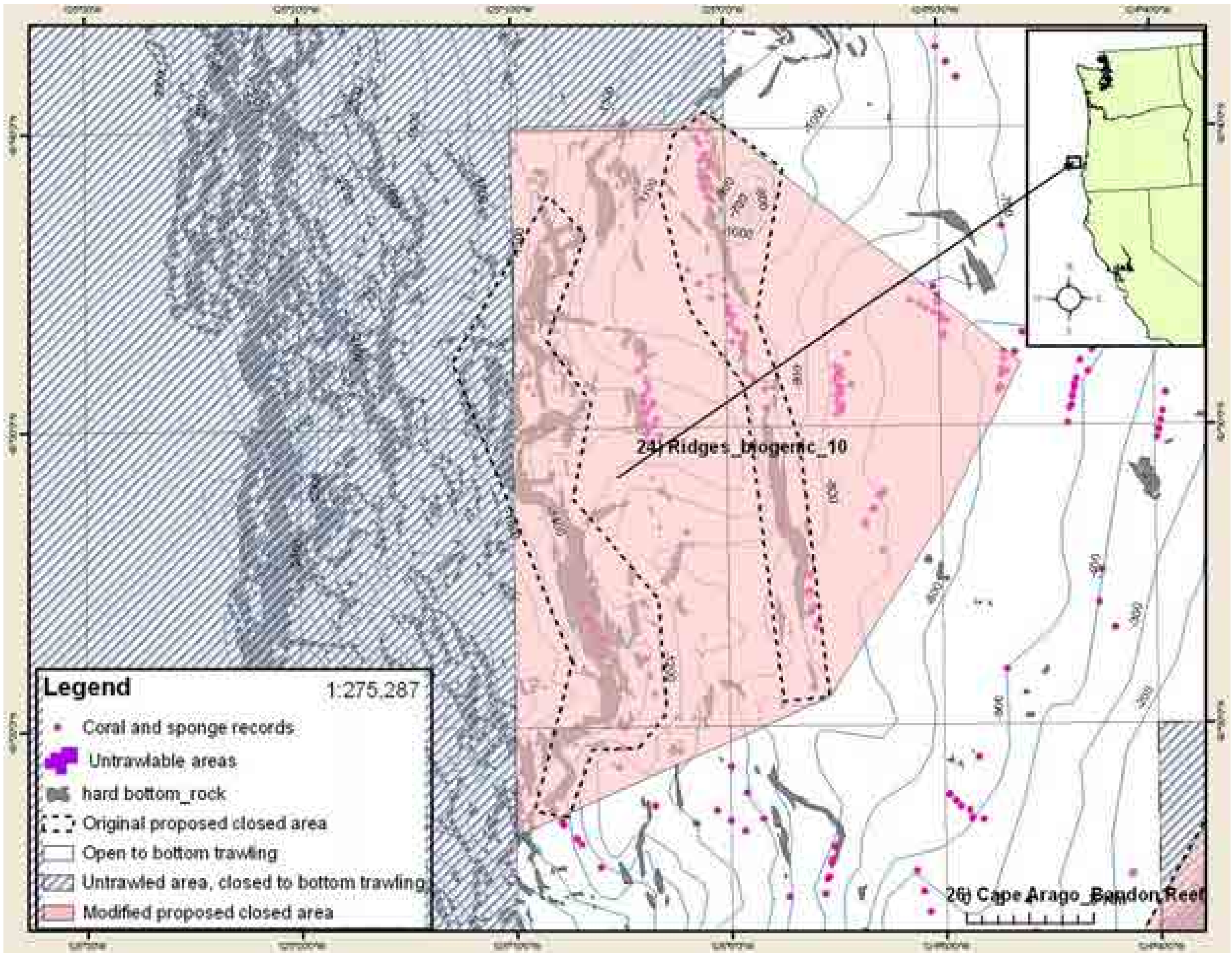

Figure 27: Ridges_biogenic_10

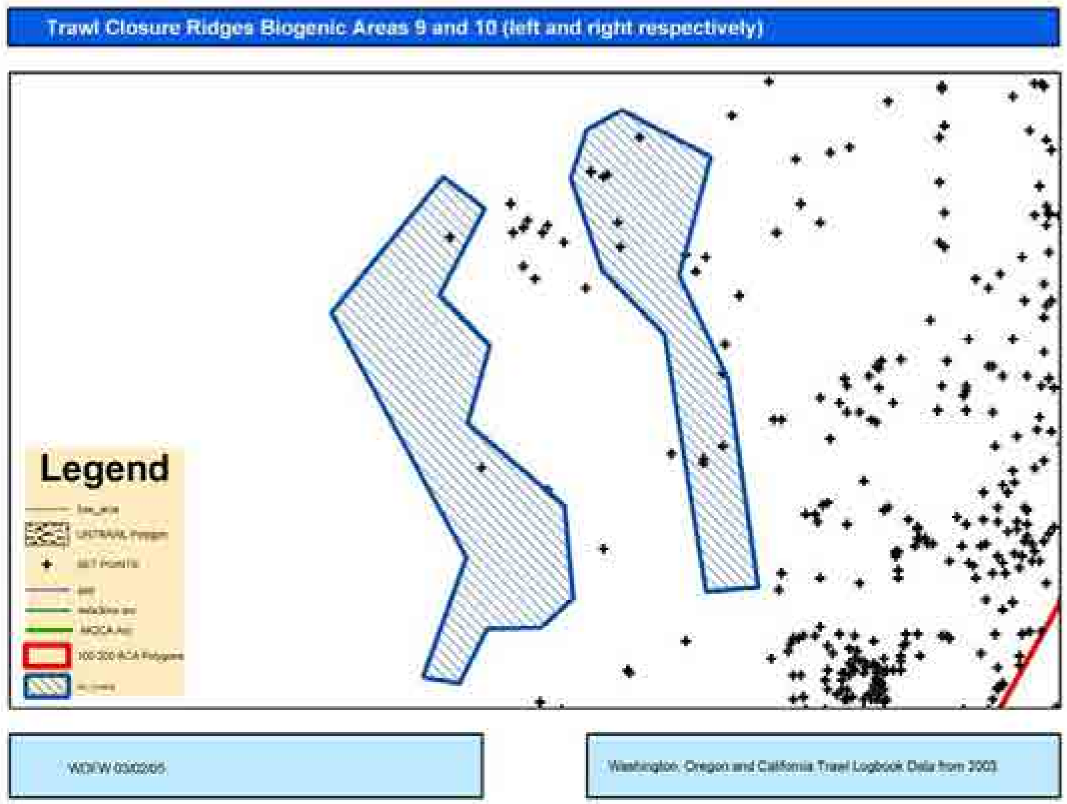

Figure L: 2003 bottom trawl logbook set points (courtesy WDF&W)

25. Siltcoos Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $383

Siltcoos Reef is a rocky reef off the Oregon Coast (Figure 28). The proposed area contains 30 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). As it is difficult to trawl here, the area has not been well surveyed by NOAA trawl surveys. It is also likely that little bottom trawling occurs on the reef, and closing the area would result in minimal displaced effort.

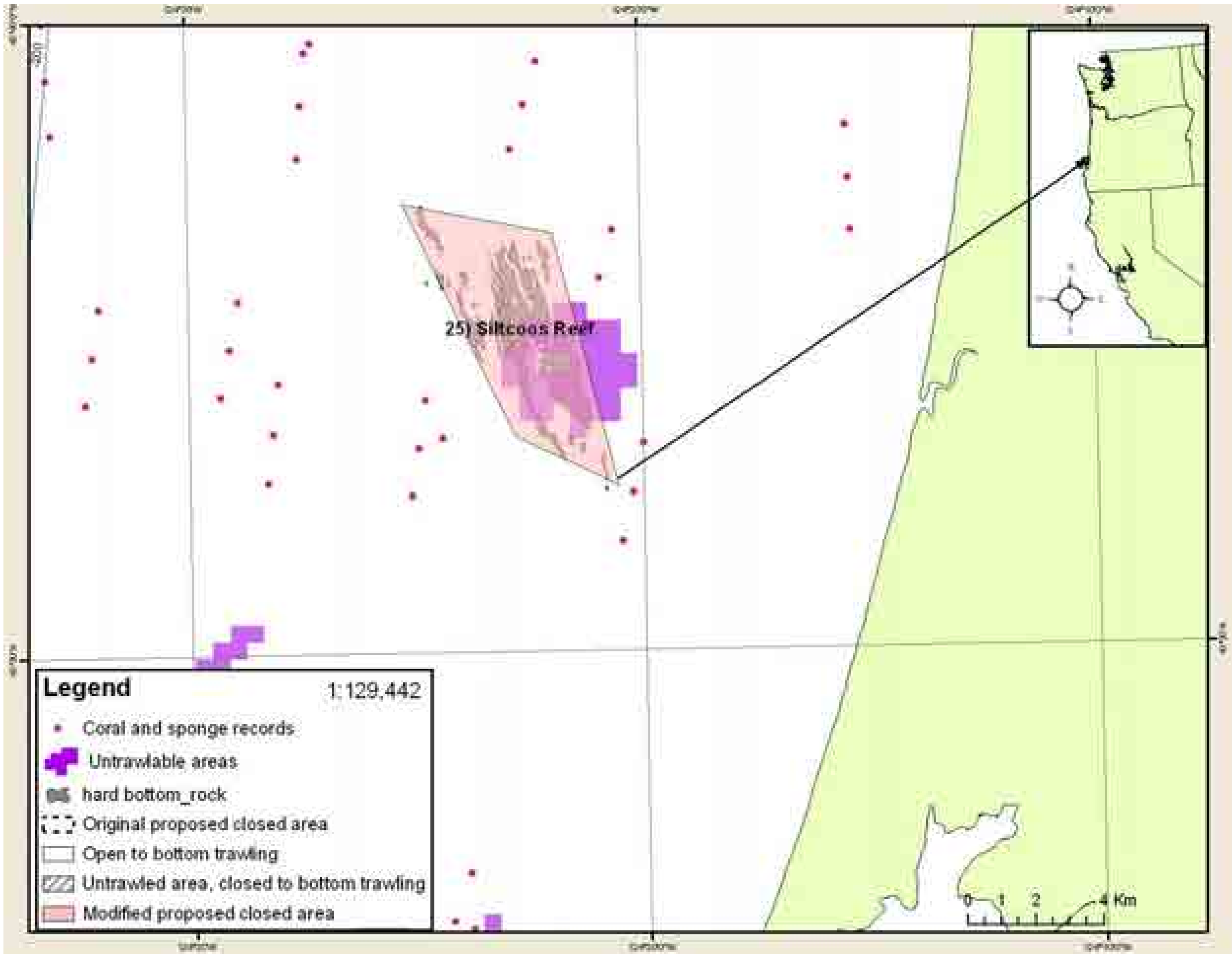

Figure 28: Siltcoos Reef

26. Cape Arago_Bandon Reef

Original Alternative C.12 estimated displaced revenue= $2,016
Revised Alternative C.12 estimated displaced revenue= $12,018

This area was previously identified as "hard-bottom feature_1". The proposed area contains a large proportion of rocky and hard bottom habitat and pinnacles (Figure 29). The proposed closed area in Revised Alternative C.12 contains 253 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). As it is difficult to trawl here, the area has not been well surveyed by NOAA trawl surveys, but 2 records of sponges were documented in 1980.

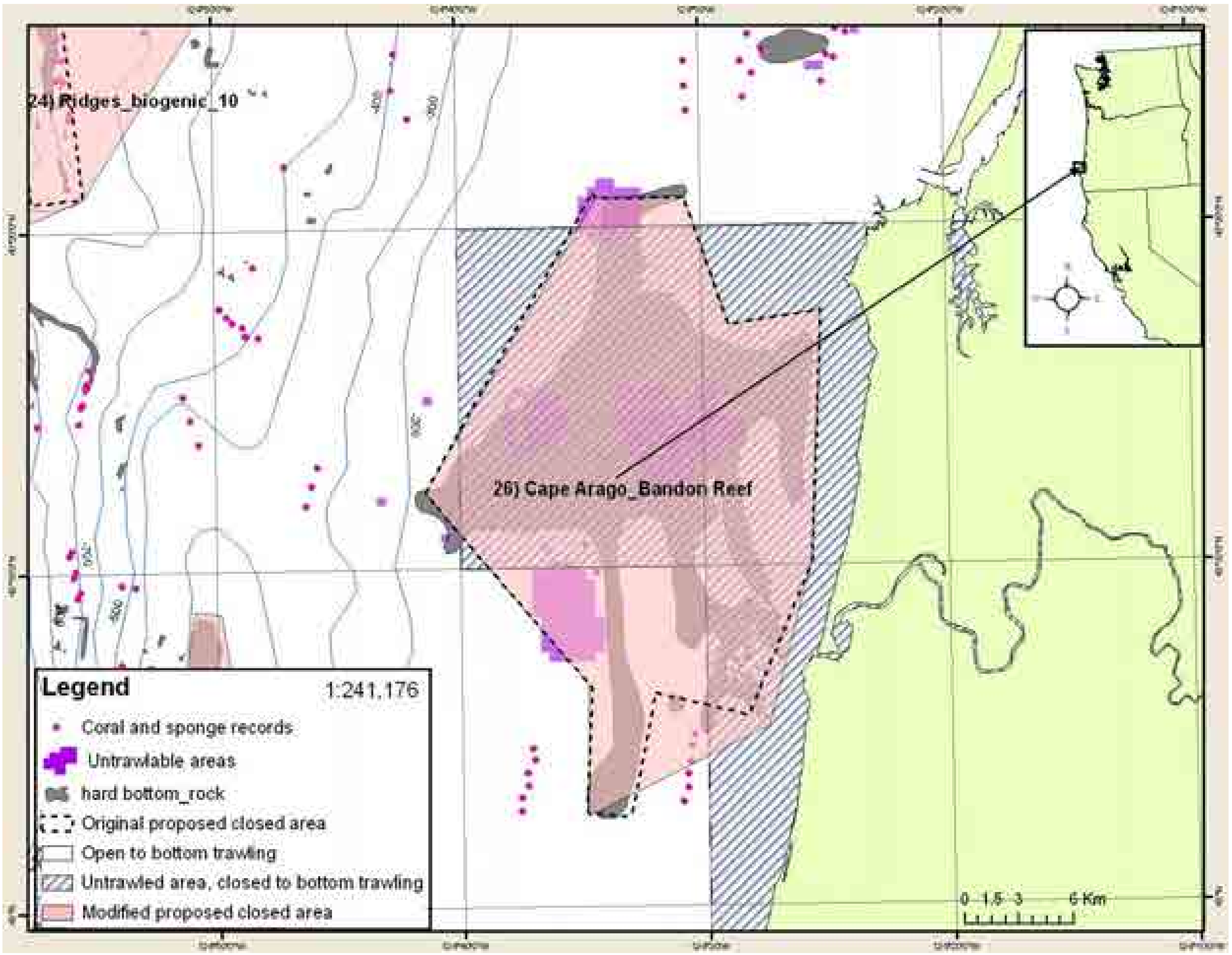

Figure 29: Cape Arago_Bandon Reef

27. Orford and McKenzies Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $3,929

The area around Orford Reef contains extensive bull kelp beds and rockfish habitat. Orford Reef is also an important rookery for the endangered Steller sea lions and is the second largest rookery south of Alaska. This area is located within the 3nm limit of Oregon state waters. Trawl logbooks from 1997-2002 did not document any trawling activity on the reef (Bellman and Heppel 2004). It is likely that it is difficult to trawl on the reef complex. The proposed area contains 108 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Few successful NOAA trawl survey hauls have occurred on the bank, but one record of sea pens was noted.

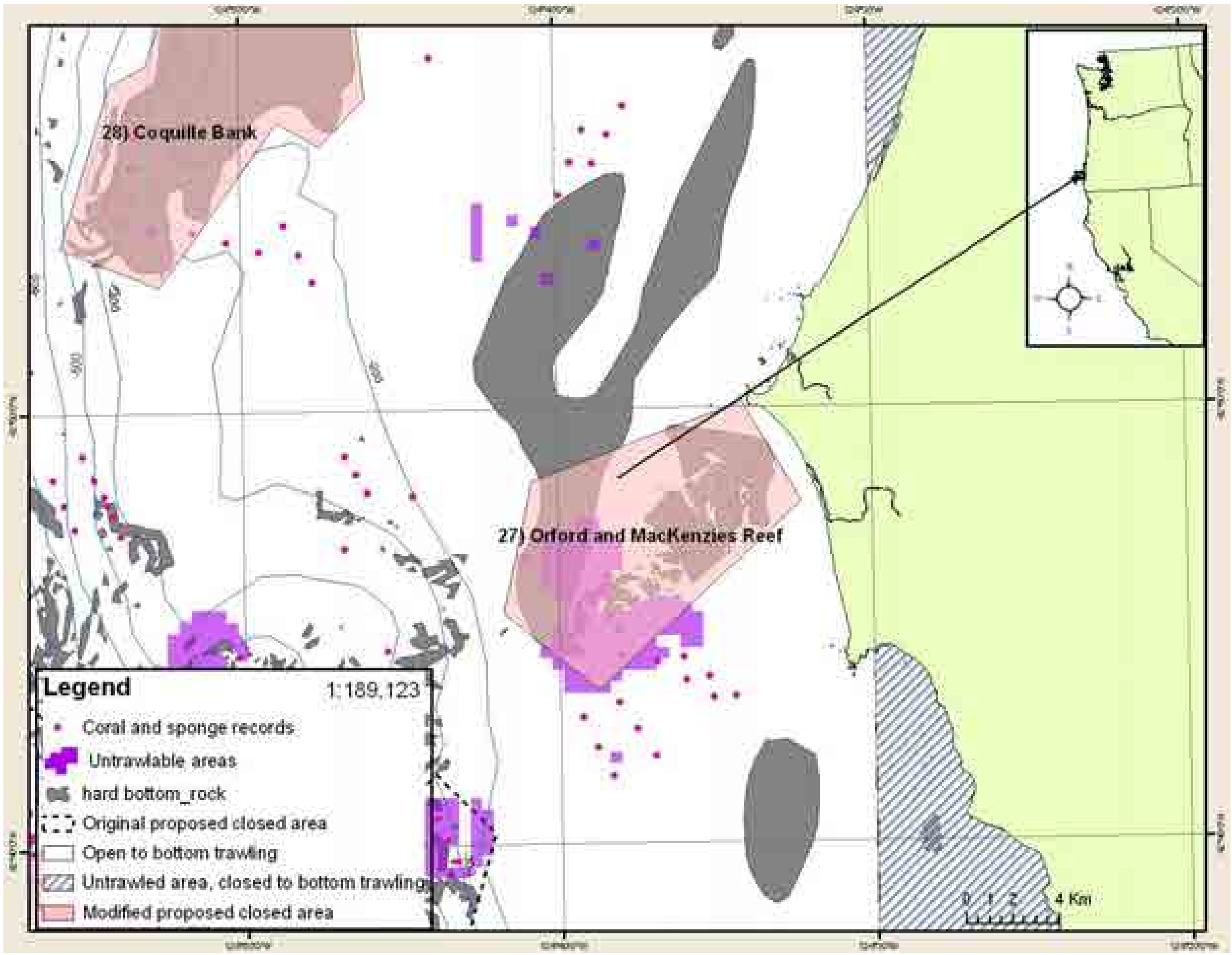

Figure 30: Orford and McKenzies Reef

28. Coquille Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $75,004

The proposed area contains 3 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Six records of sponges were documented on the bank by NOAA trawl surveys, and four of the six records occurred in the 1980's.

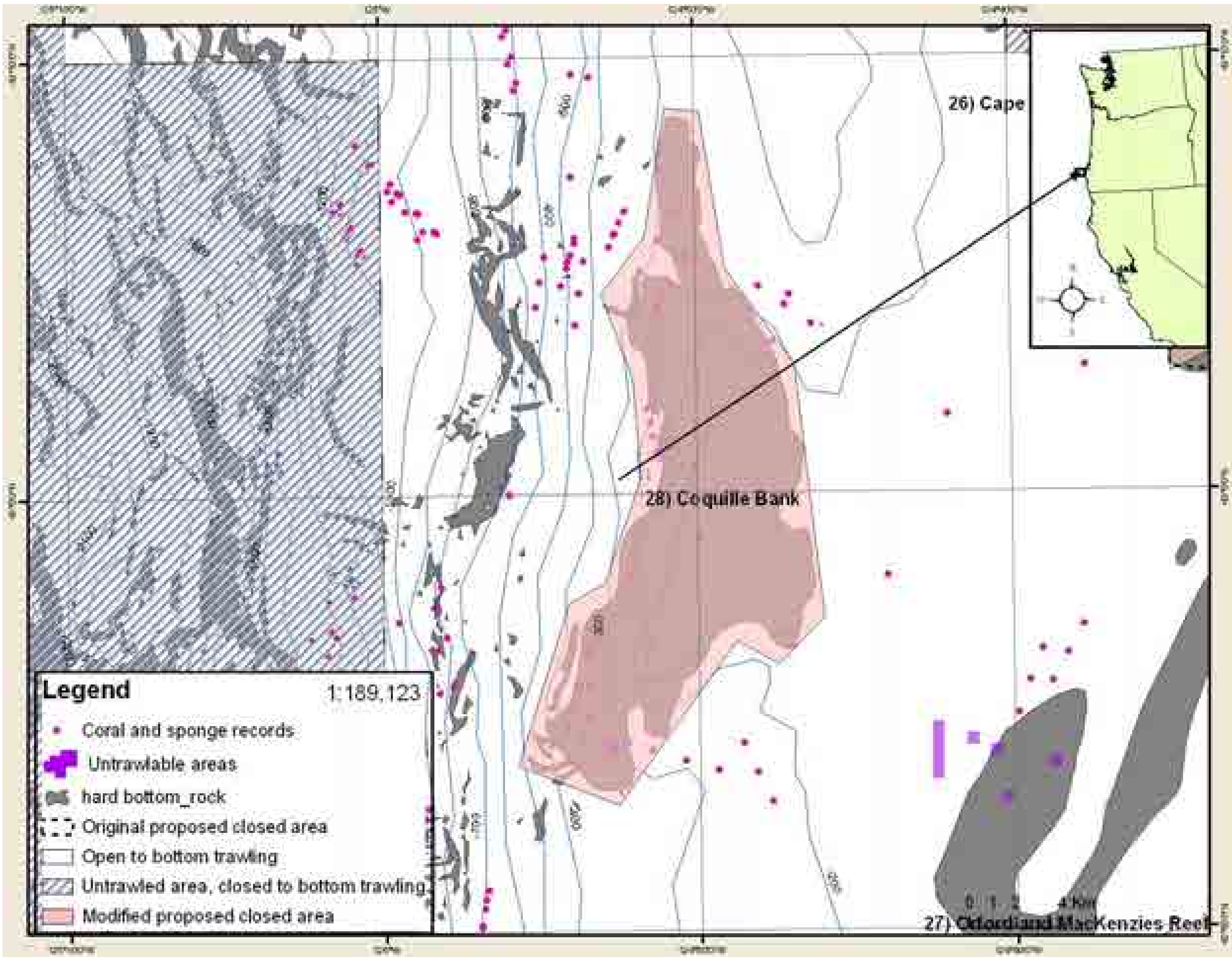

Figure 31: Coquille Bank

29. & 30. Rogue Canyon area

Original Alternative C.12 estimated displaced revenue= $491,706
Revised Alternative C.12 estimated displaced revenue= $145,172 (likely overestimated, trawl tracks fall outside of area, see Figure M below)

Trawl logbook data indicated trawl activity within the previously proposed boundaries of the Rogue Canyon closed area (Figure M). Bottom trawl fishermen indicated a preferred tow area within the proposed closed area, and suggested some areas for change. The proposed closed area was split into the two areas below for Revised Alternative C.12, which avoids much of the trawl effort and likely results in less displaced effort from the closure (Figure 32).

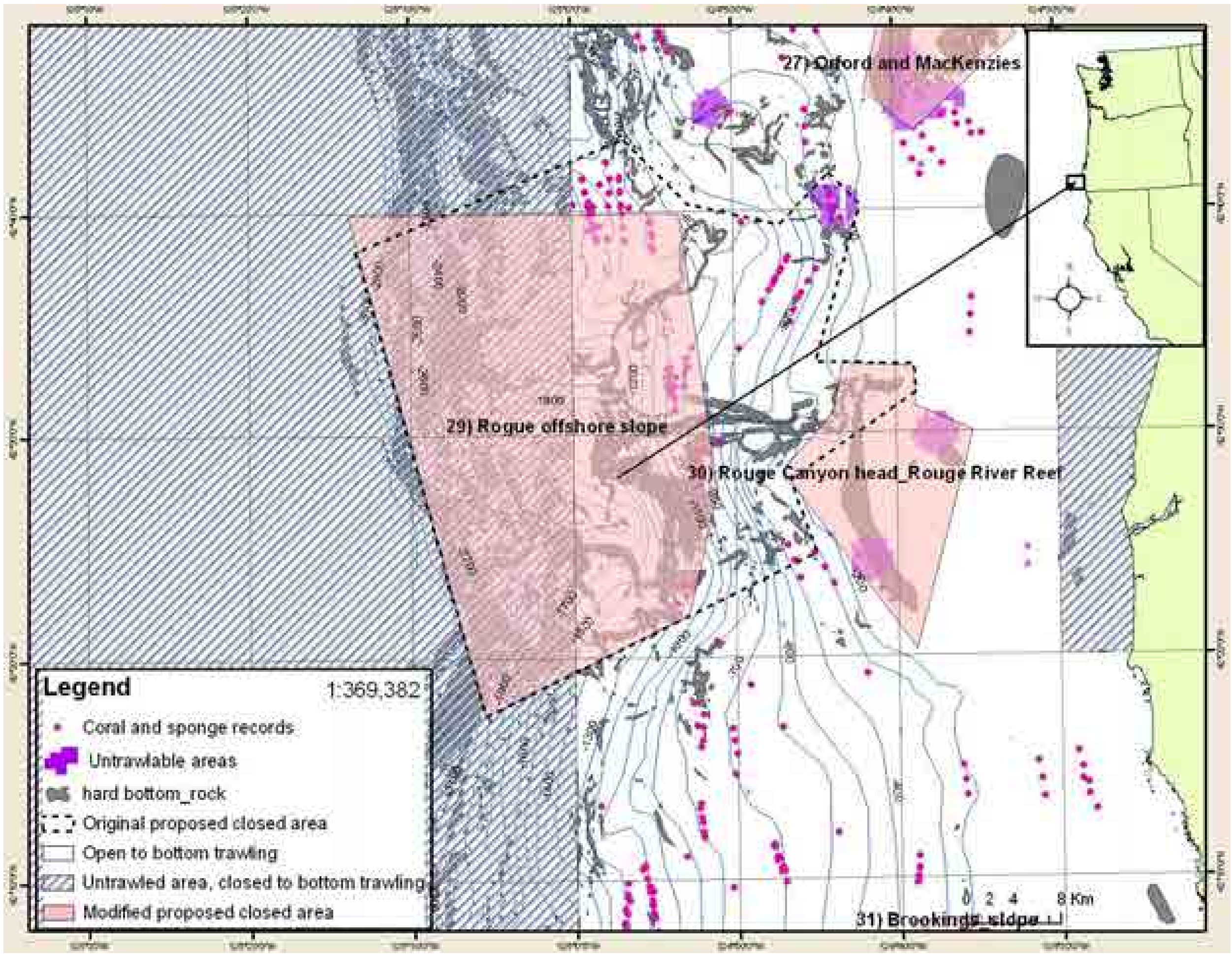

Figure 32: Rouge offshore slope and Rogue canyon head

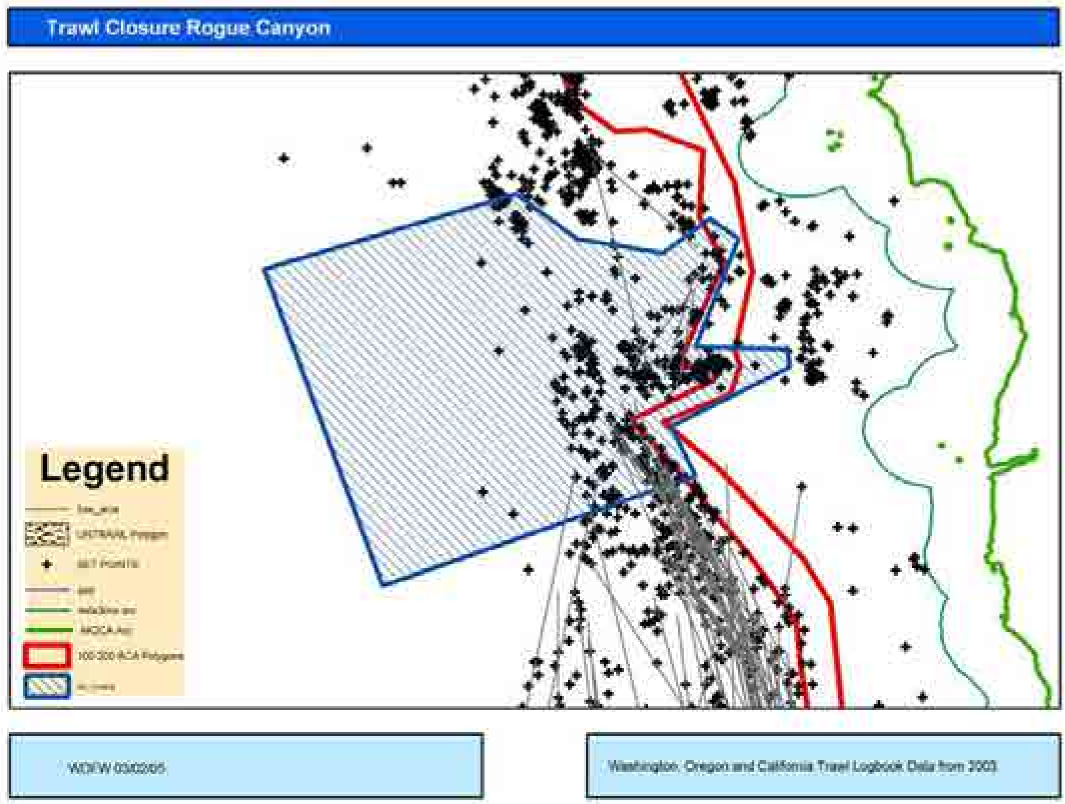

Figure M: 2003 bottom trawl logbook set points (courtesy WDF&W)

29. Rogue offshore slope
Revised Alternative C.12 estimated displaced revenue= $81,296

NOAA trawl surveys have documented 26 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and gorgonian corals have been documented in the proposed area.

30. Rogue Canyon head_ Rogue River Reef
Revised Alternative C.12 estimated displaced revenue= $63,876

The proposed area contains 86 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). NOAA trawl surveys have not sampled the area well, as the area is likely difficult to trawl. However, two records of sponges have been noted by successful survey hauls (Figure 33).

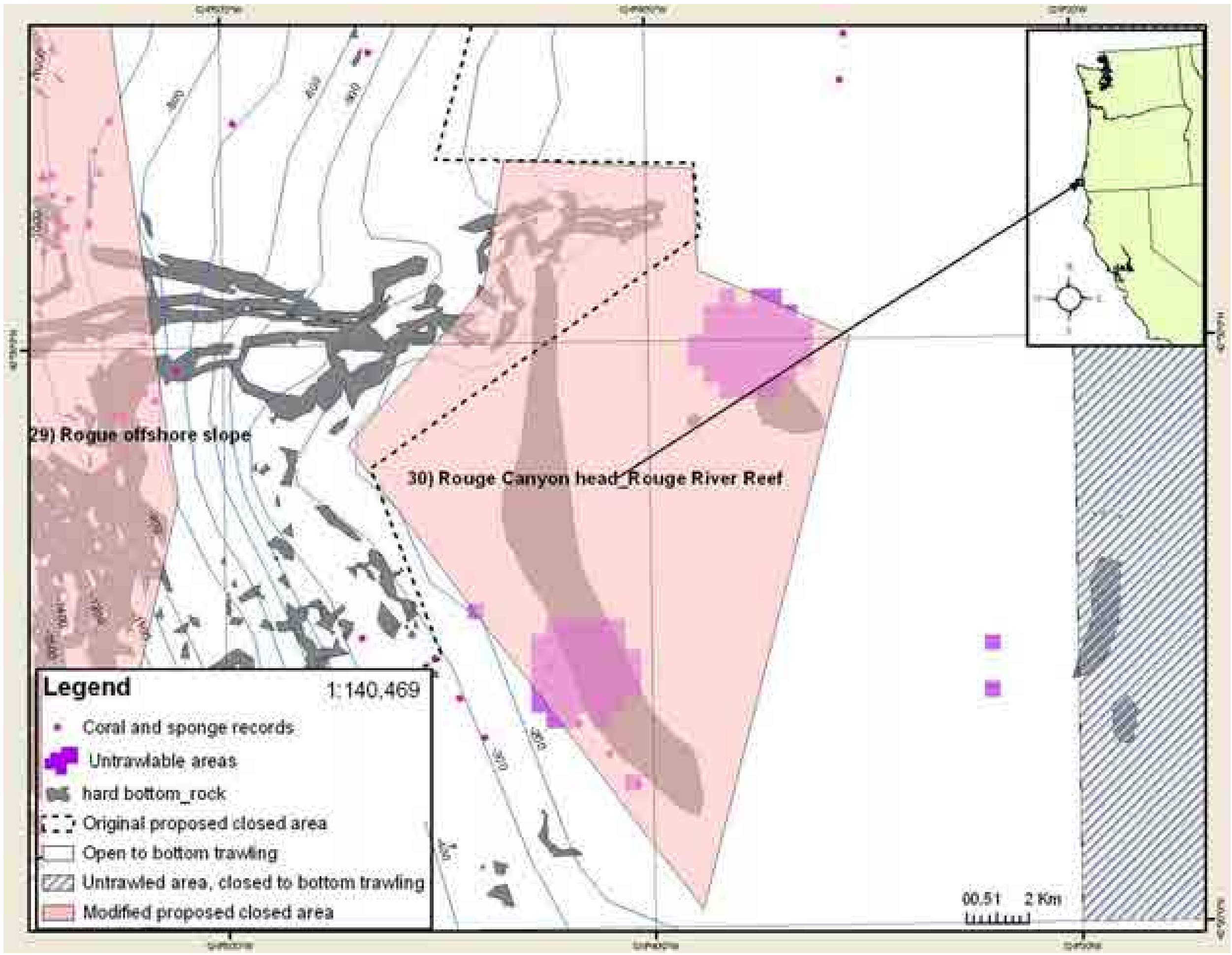

Figure 33: Rogue Canyon head_Rogue River Reef

31. Brookings_slope

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $48,884

This area encompasses slope habitat that is currently closed to bottom trawling in the rockfish conservation area (RCA), and as such, there is likely to be much less displace revenue than estimated. The proposed area contains 55 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). NOAA trawl surveys have not sampled the area well, but four records of sponges and sea pens have been documented in the proposed area (Figure 34).

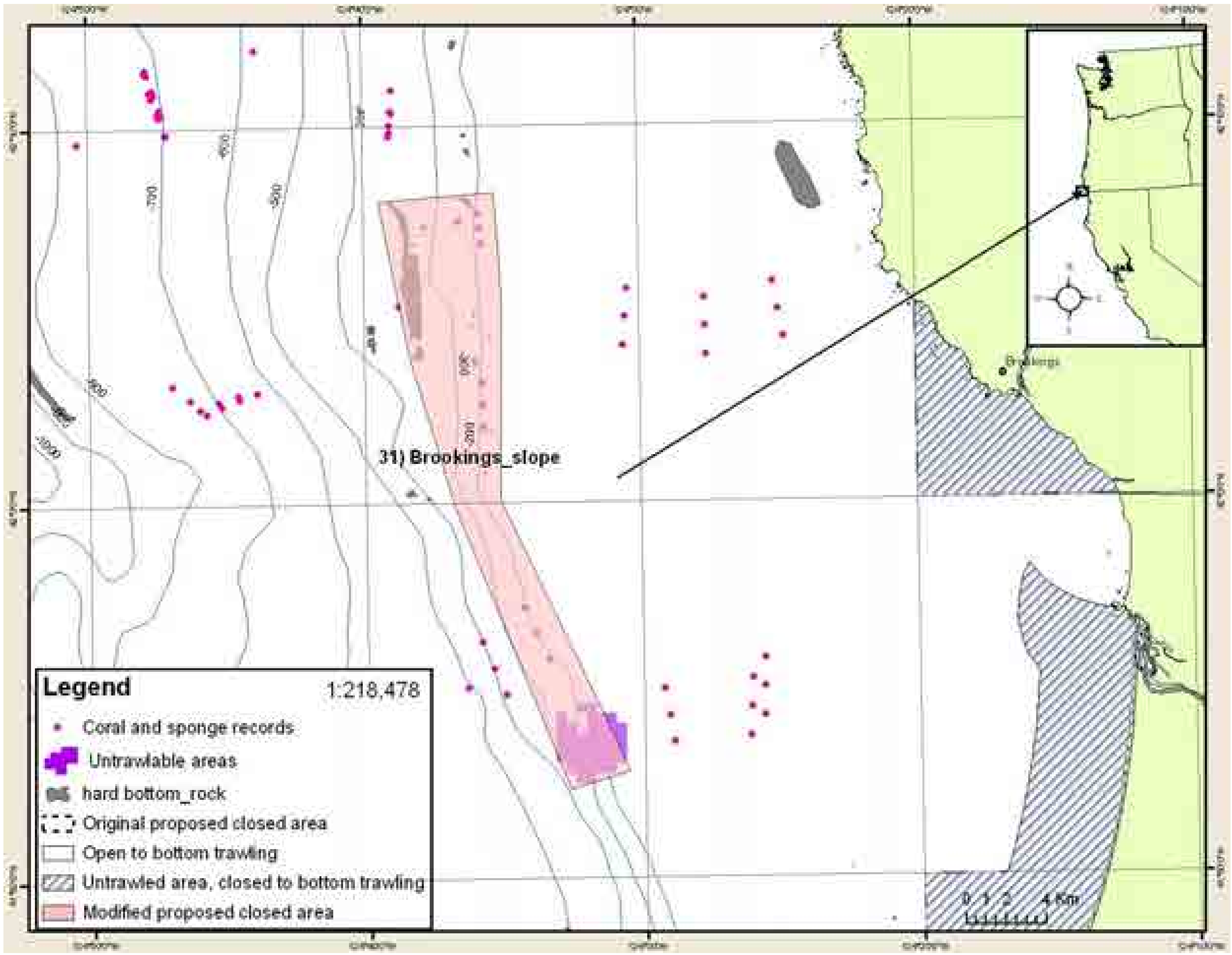

Figure 34: Brookings_slope

32. Crescent City deep_Biogenic_11

Original Alternative C.12 estimated displaced revenue= $2,734
Revised Alternative C.12 estimated displaced revenue= $9,635

This area is in deep water, and is located outside of the bottom trawl footprint (Figure 35). As such, there is likely to be much less displaced revenue than estimated here. This area was also proposed by the trawl industry as a candidate for closure. NOAA trawl surveys have documented 35 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and gorgonian corals have been documented in the proposed area.

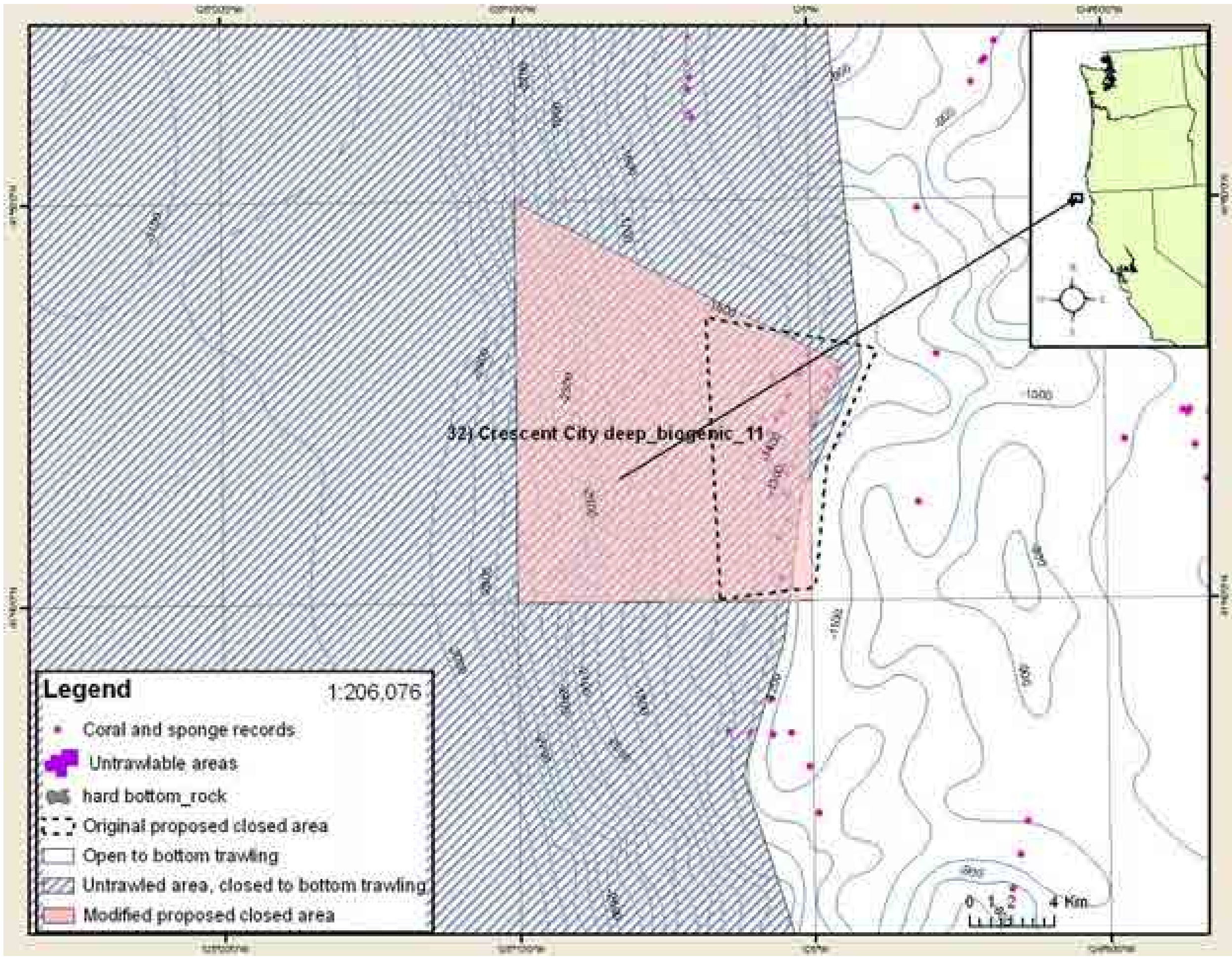

Figure 35: Crescent City deep_Biogenic_11

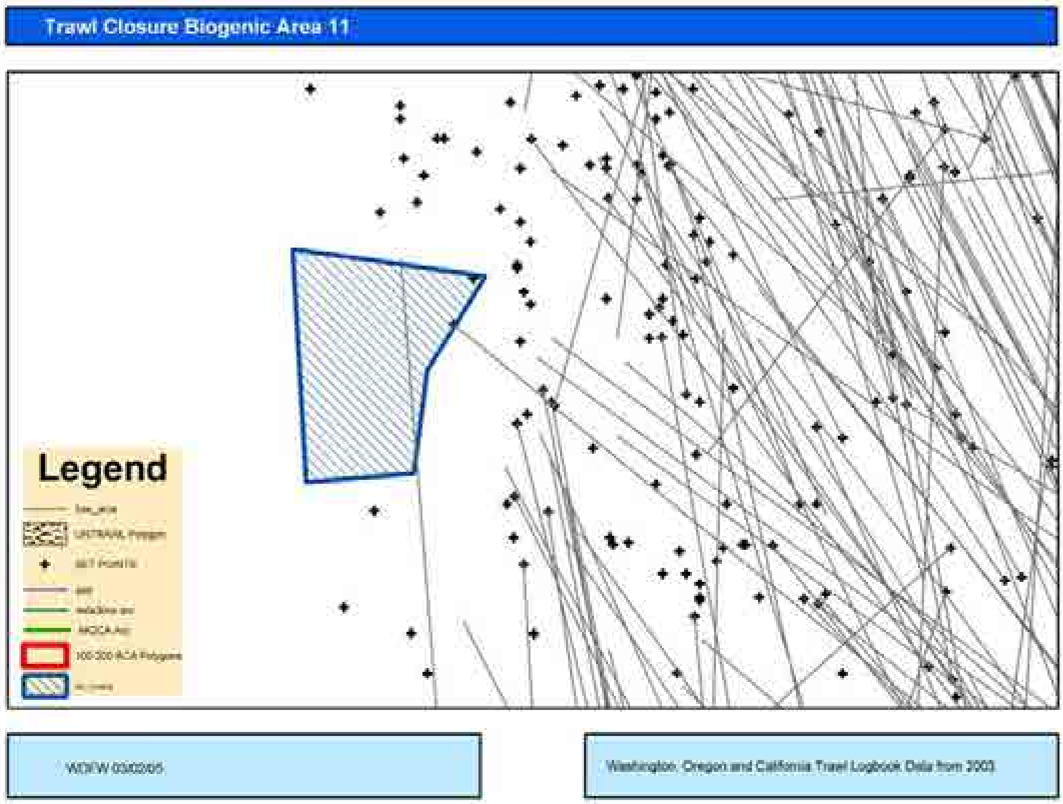

Figure N: 2003 bottom trawl logbook set points (courtesy WDF&W)

33. Crescent City slope

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $49,779

This area encompasses slope habitat located within the rockfish conservation area that is currently closed to bottom trawling. As such, there is likely to be much less displaced revenue than estimated here. The proposed area contains 72 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). While the area is not well sampled by NOAA trawl survey gear, 5 records of sponges and sea pens have been documented (Figure 36).

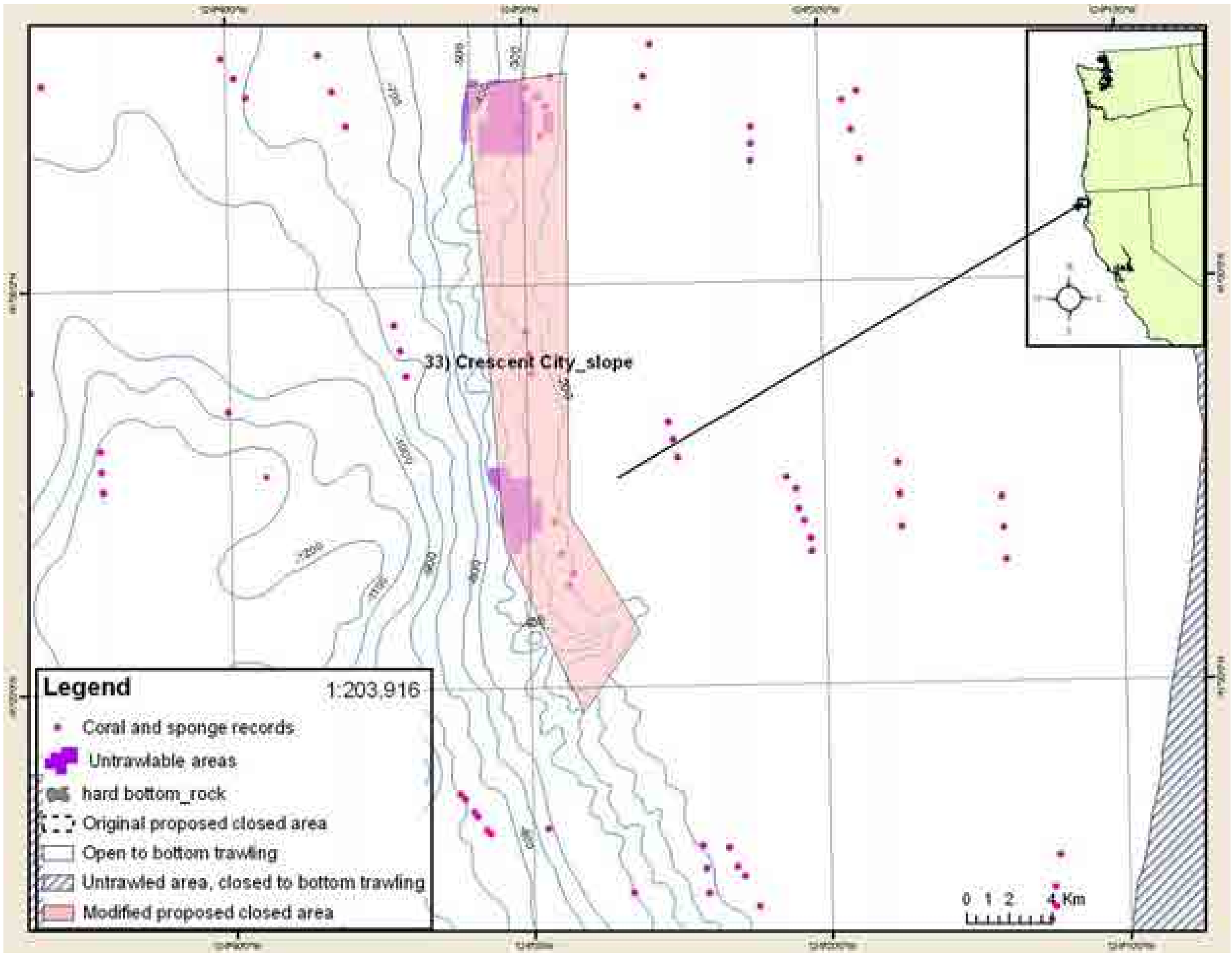

Figure 36: Crescent City slope

34. Eel River Canyon

Original Alternative C.12 estimated displaced revenue= $551,397
Revised Alternative C.12 estimated displaced revenue= $201,696 (likely overestimated, trawl tracks fall outside of area, see Figure O below)

Eel River canyon is a deepwater canyon located north of Mendoncino Ridge (Figure 37) The boundary of this area for Revised Alternative C.12 avoids some trawled areas along the canyon edge (Figure O). The boundary closely follows the closed area boundary suggested by representatives of the bottom trawl industry. Therefore, the closure should result in minimal displaced bottom trawl effort, probably much less than we estimate here. The proposed area contains 53 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 7 records of gorgonian corals and sea pens.

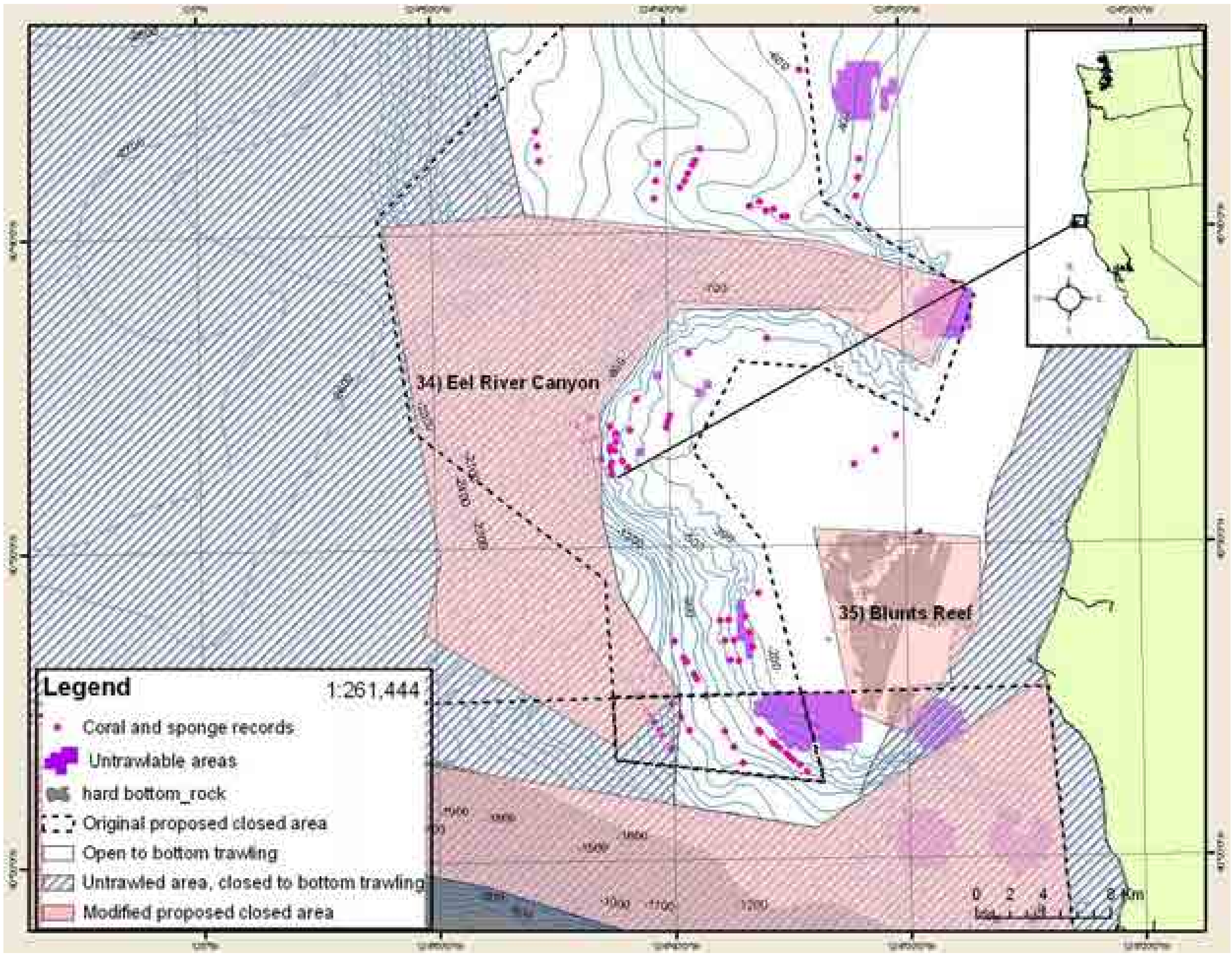

Figure 37: Eel River Canyon

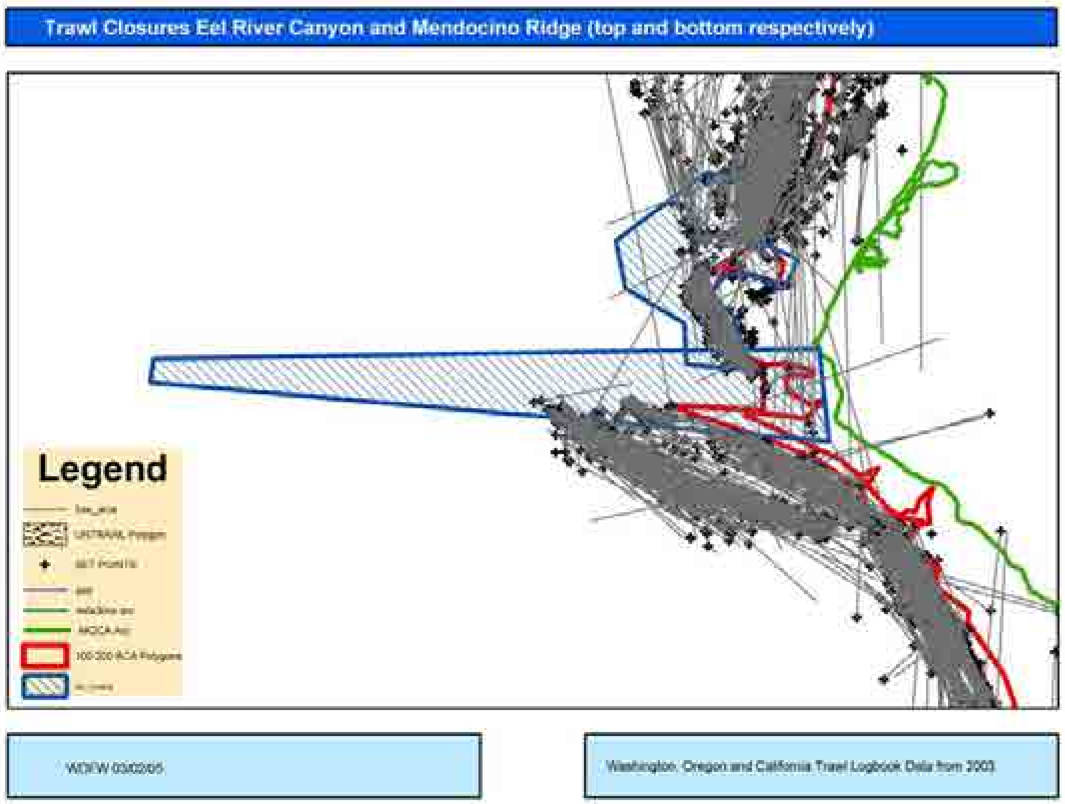

Figure O: 2003 bottom trawl logbook set points (courtesy WDF&W)

35. Blunts Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $25,495 (likely overestimated, trawl tracks fall outside of area, see Figure O above)

This rocky reef off the shelf is located north of Mendocino Ridge (Figure 38). The proposed area contains 13 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Logbook information (Figure O) indicates that little bottom trawling occurred in the area, and little effort should be displaced by this suggested closure.

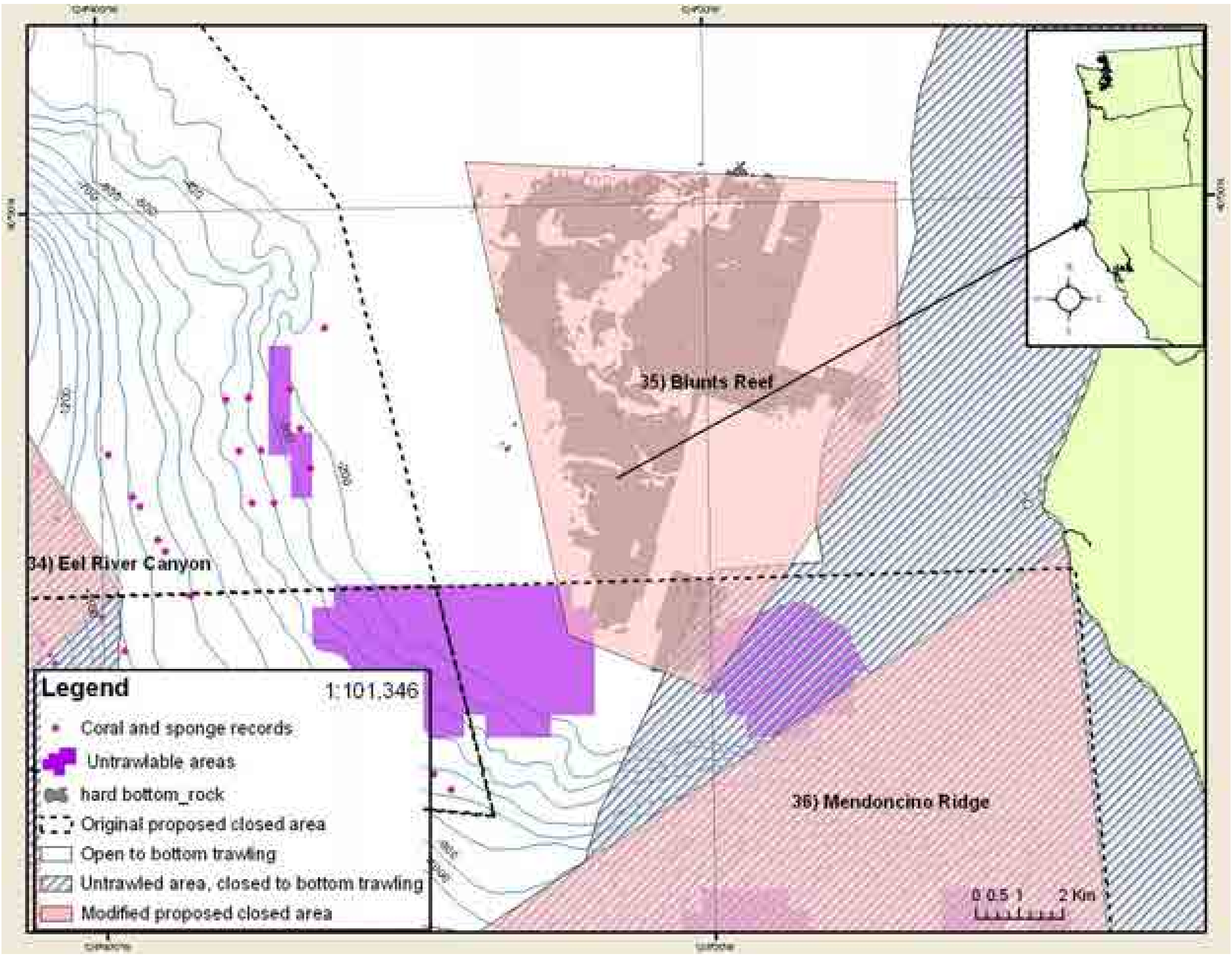

Figure 38: Blunts Reef

36. Mendocino Ridge

Original Alternative C.12 estimated displaced revenue= $201,902
Revised Alternative C.12 estimated displaced revenue= $108,769 (likely overestimated, trawl tracks fall outside of area, see Figure O above)

Mendocino Ridge, also known as the Gorda Escarpment, is a large underwater ridge running east to west separating two major marine ecological provinces (Figure 39). The boundary of the area as it was previously proposed contained some trawl activity (Figure 0). The boundary in Revised Alternative C.12 was modified to avoid some trawled areas along the north and south end of the ridge and this closely follows the closed area boundary suggested by representatives of the bottom trawl industry (Figure 39). As such, little bottom trawl effort should be displaced by this suggested closure and displacement is probably less than what is estimated here. The proposed area contains 279 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The area has not been well sampled by NOAA trawl surveys, but 5 records of gorgonian corals, sea pens, and sponges have been documented.

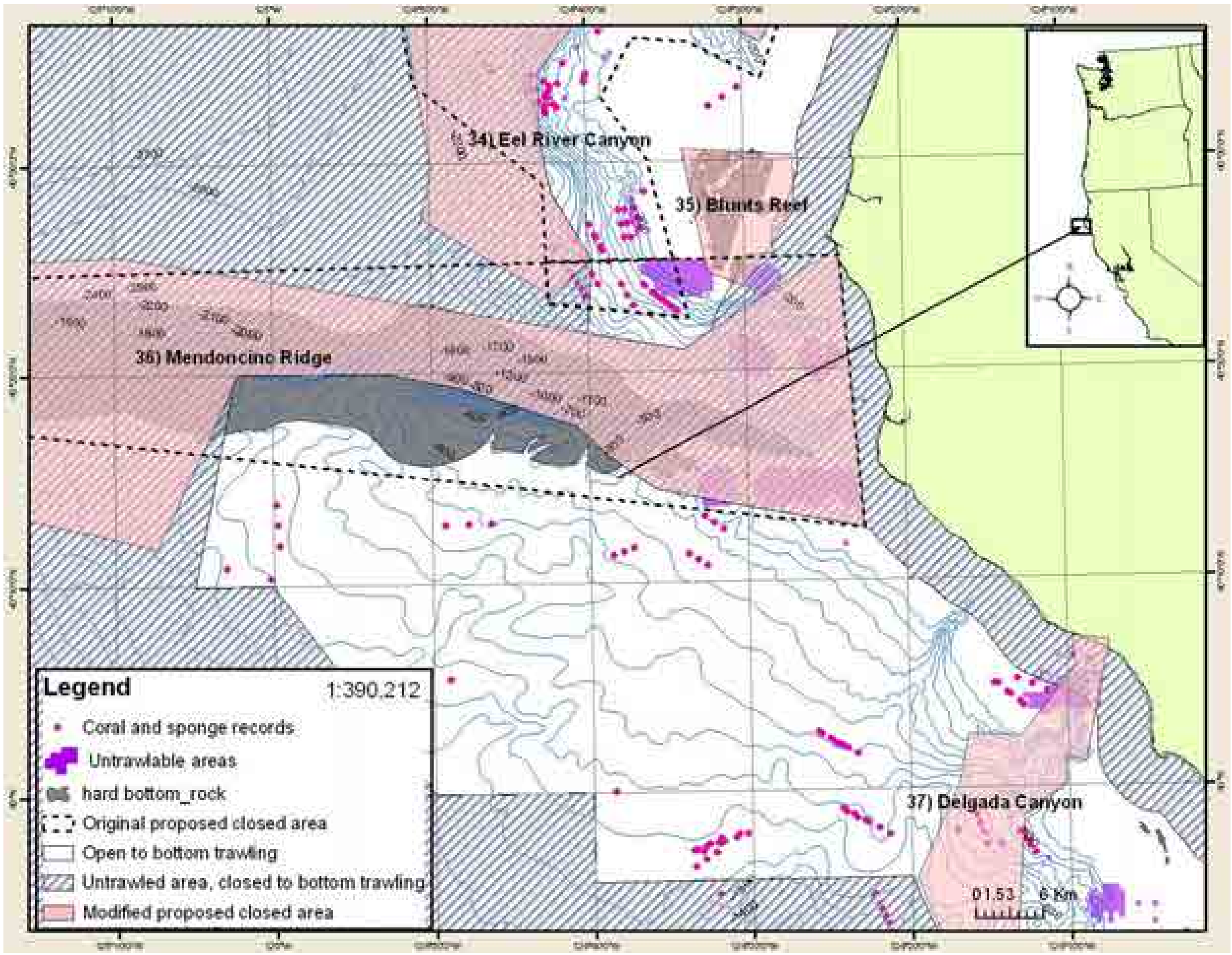

Figure 39: Mendocino Ridge

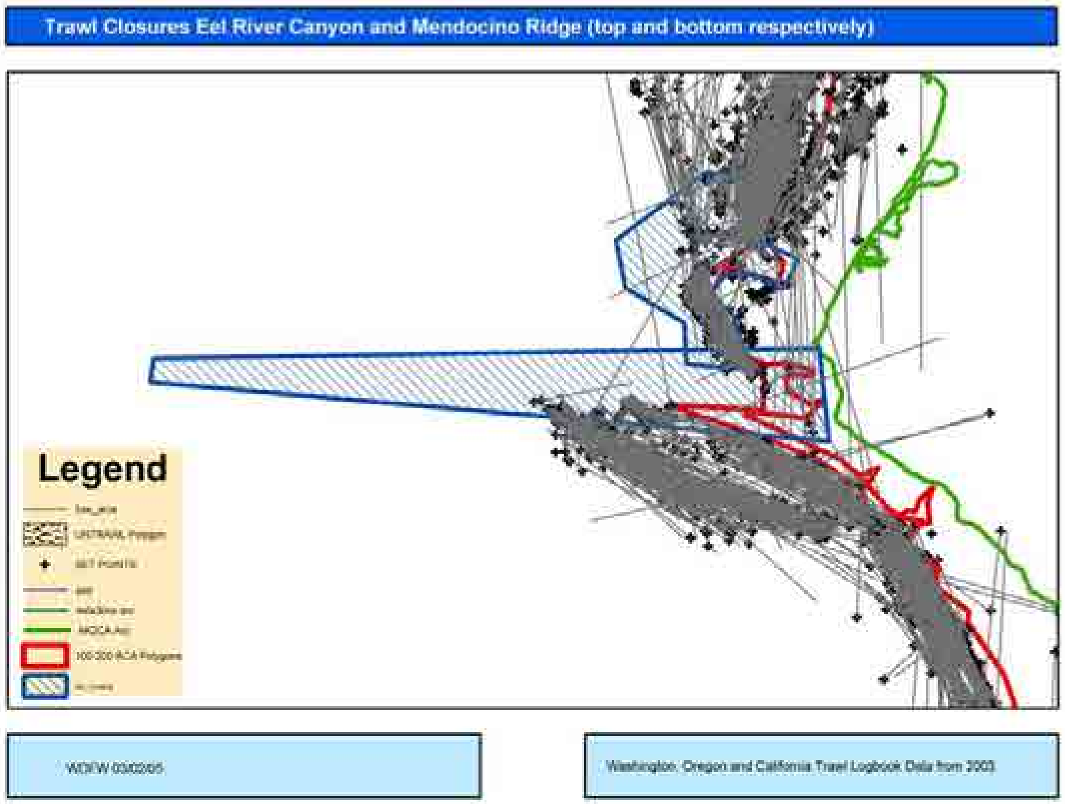

Figure P: 2003 bottom trawl logbook set points (courtesy WDF&W)

37. Delgada Canyon

Original Alternative C.12 estimated displaced revenue=N/A
Revised Alternative C.12 estimated displaced revenue= $79,978

This deep canyon begins close to shore on the Northern California coast (Figure 40). The proposed area contains 99 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). While no NOAA trawl surveys have sampled within the canyon itself, 7 records of sea pens and sea whips have been documented along the edge of the canyon. To our knowledge, the canyon has not been explored by scientific surveys, but scuba divers have noted some fantastic sights in the canyon head:

> *I have never seen areas of filter feeding organisms so thick in one spot in my life. Strawberry anemones so thick that it would make Amentos Reef in Monterey look barren…. As I shined my light into the cracks more I was seeing all sorts of baby rock fish of 6-8 different species laying inverted on the shelves…. It was essentially nothing more than a giant maternity ward for sea life…. I wonder if any marine scientists know about this place?*

http://diver.net/seahunt/fend/f_ericdelgada.htm

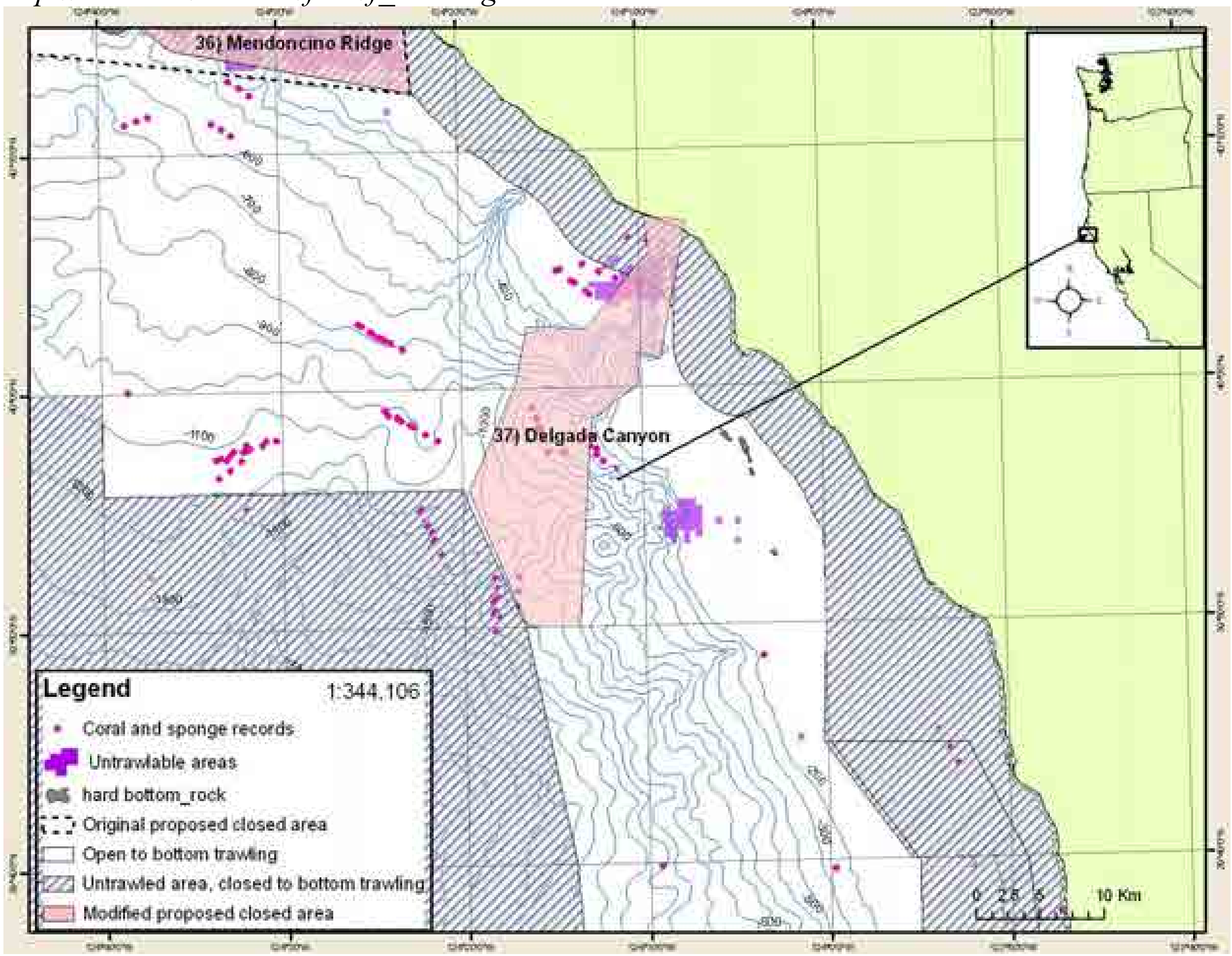

Figure 40: Delgada Canyon

38. Fort Bragg Canyon

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $51,128

This canyon begins offshore of Fort Bragg and extends into deep water outside the bottom trawl footprint (Figure 41). While no NOAA trawl surveys have sampled within the canyon itself, two records of sea pens and sea whips have been documented along the edge of the canyon.

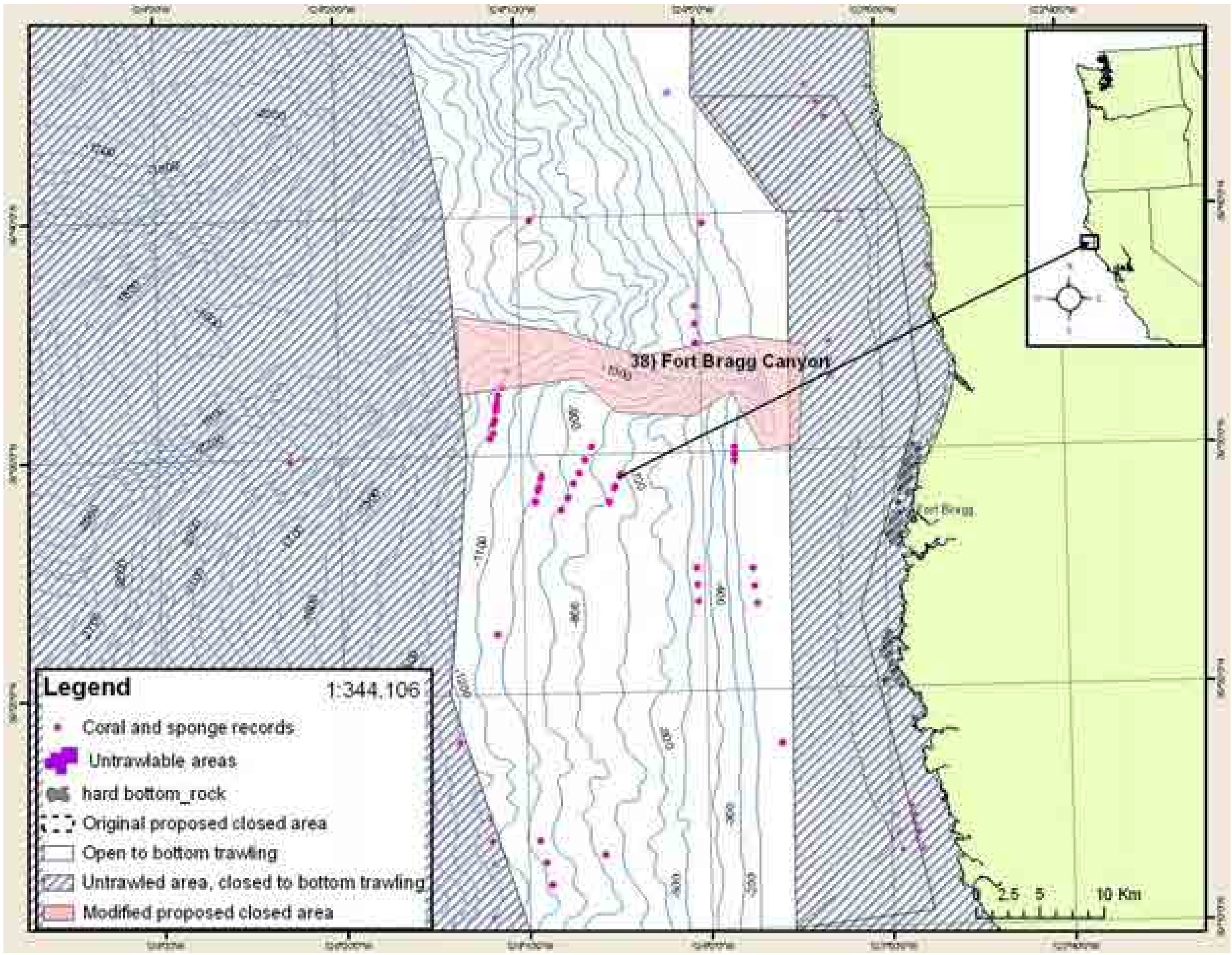

Figure 41: Fort Bragg Canyon

39. Point Arena offshore

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $47,324 (likely overestimated, trawl tracks fall outside of area, see Figure below)

This rocky shelf area is located offshore of Point Arena (Figure 42). Trawl logbook information indicates that no activity occurred in the area (Figure Q), and the area is located outside of the bottom trawl footprint. Minimal bottom trawl effort should be displaced by this suggested closure and the displaced revenue reported here is likely overestimated.

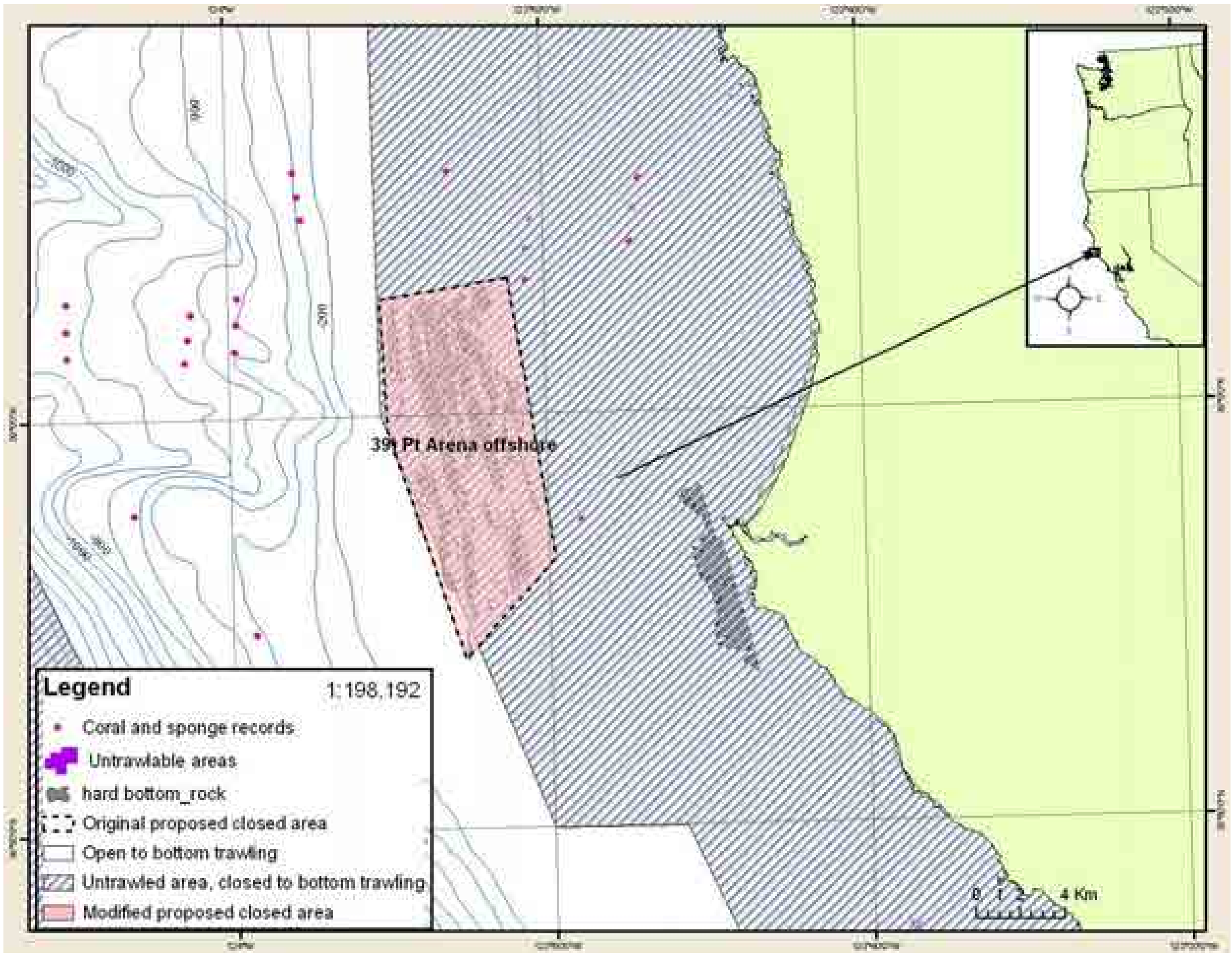

Figure 43: Point Arena offshore

40. Biogenic_ 12

Original Alternative C.12 estimated displaced revenue= $109,117
Revised Alternative C.12 estimated displaced revenue= $61,321 (likely overestimated, trawl tracks fall outside of area, see Figure Q below)

This proposed closed area in Revised Alternative C.12 spans slope habitat from 300 to 1200 meters in depth (Figure 44). NOAA trawl surveys have documented 40 records of habitat-forming invertebrates, including gorgonian corals, sea pens, sea whips, and sponges. The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Logbook information indicates that little bottom trawling occurs in the area, and minimal bottom trawl effort should be displaced by this suggested closure (Figure Q).

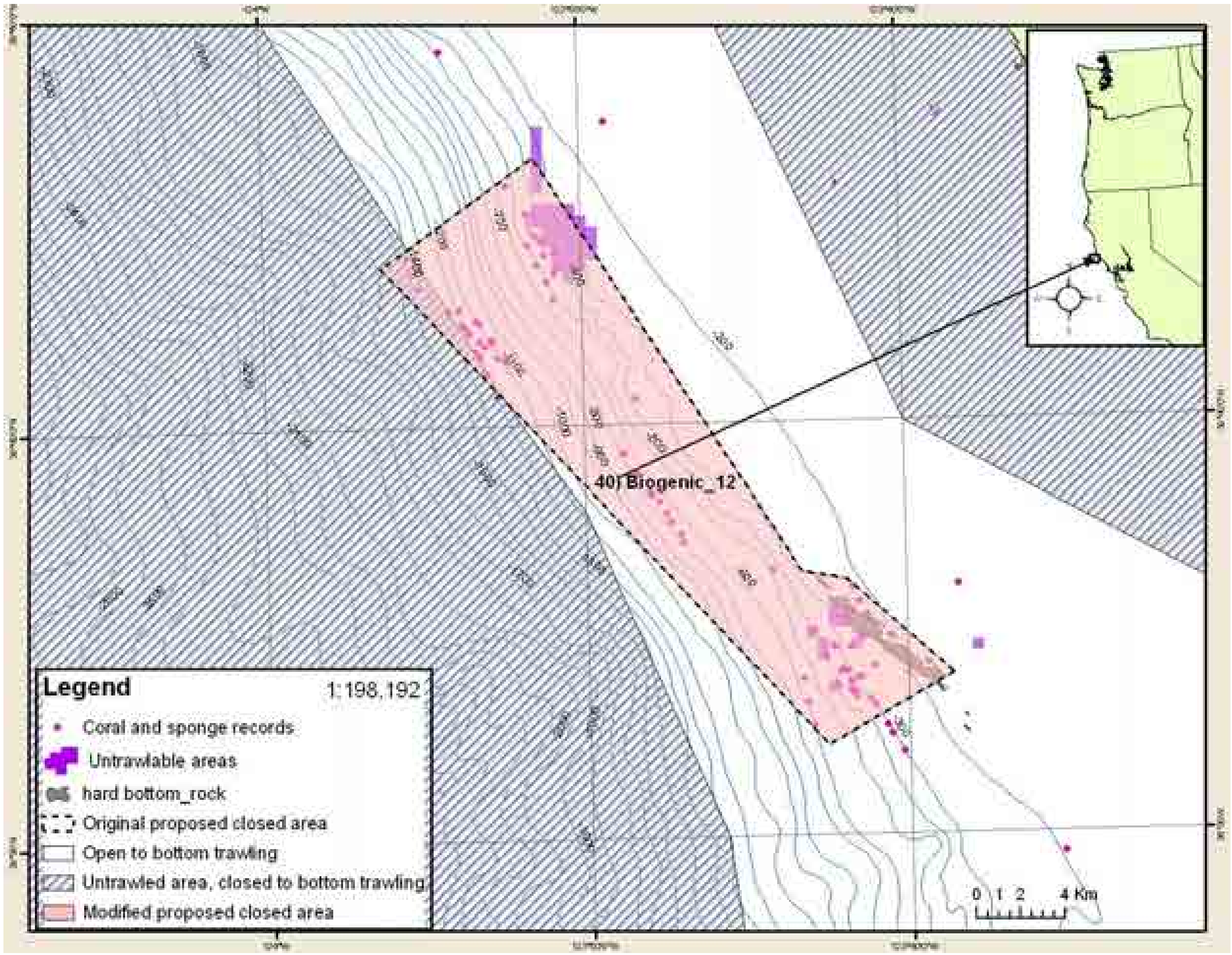

Figure 44: Biogenic_12

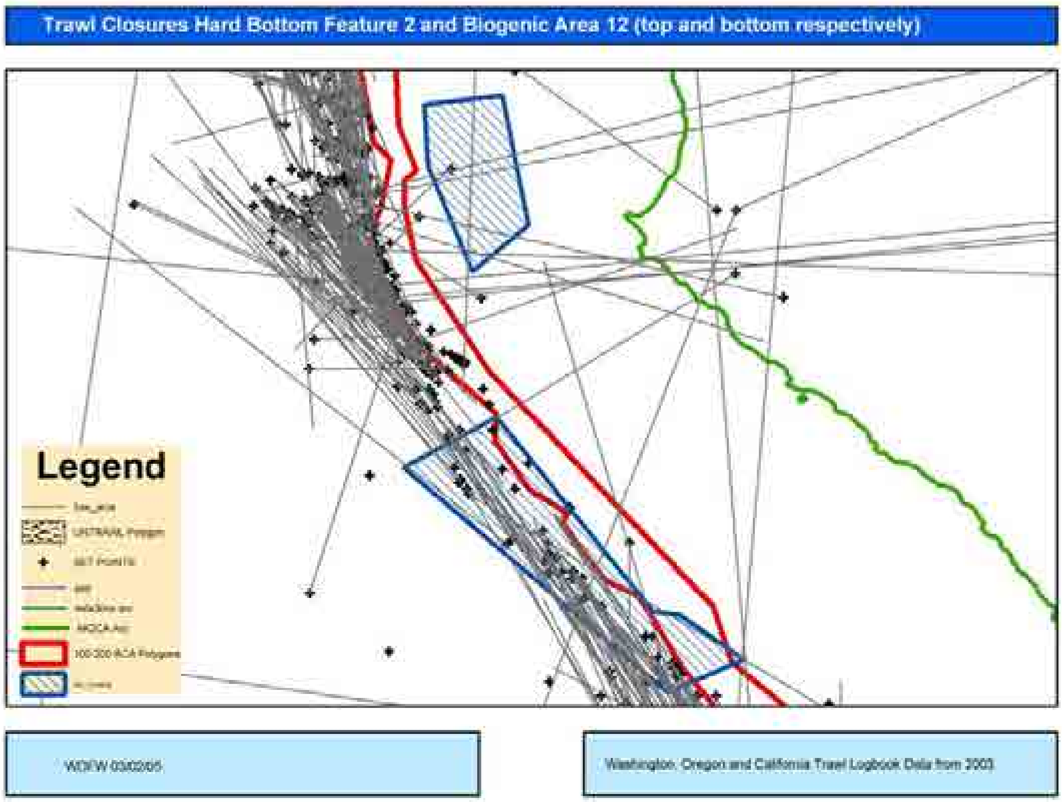

Figure Q: 2003 bottom trawl logbook set points (courtesy WDF&W)

41. Cordell Bank

Original Alternative C.12 estimated displaced revenue= $140,883
Revised Alternative C.12 estimated displaced revenue= $49,064 (likely overestimated, trawl tracks fall outside of area, see Figure R below)

Cordell Bank is an underwater island 7 km by 15 km surrounded by deep water on three sides. Due to a unique combination of topographic and oceanographic features, this area is extremely productive. At depths between 35 and 50 meters, the rocky habitats are carpeted with sponges, ascidians, hydrocorals, anemones, and sea stars. Fed by the productive currents, this seafloor habitat creates complex living structures for juvenile rockfish, lingcod, and many species of adult rockfish.

Designated as a National Marine Sanctuary in 1989, Cordell Bank is one of the most productive offshore areas in the United States. The combination of the California current, upwelling of nutrient rich ocean waters and the topography of the area provides for a flourishing ecosystem. This area is thickly covered by sponges, anemones, hydrocorals, and other invertebrates. It also hosts 180 species of fish, providing spawning habitat for lingcod. Finally this area hosts twenty six resident and migratory species of marine mammals.[6]

[6] Cordell Bank State of the Sanctuary Report. http://sanctuaries.nos.noaa.gov/oms/omscordell/omscordell.html

The boundary of area as it was proposed in Original Alternative C.12 was modified in Revised Alternative C.12 to avoid some trawled areas (Figure R) along the western slope and a south portion of the shelf. The Revised Alternative C.12 boundary closely follows the closed area boundary suggested by representatives of the bottom trawl industry (Figure 45). As such, minimal bottom trawl effort should be displaced by this suggested closure.

The ridges and pinnacles covered with structure forming invertebrates provides complex habitat which is sensitive to bottom tending gears. The proposed area contains 58 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 20 records of habitat-forming invertebrates, including gorgonian corals, sea pens, sea whips, and sponges.

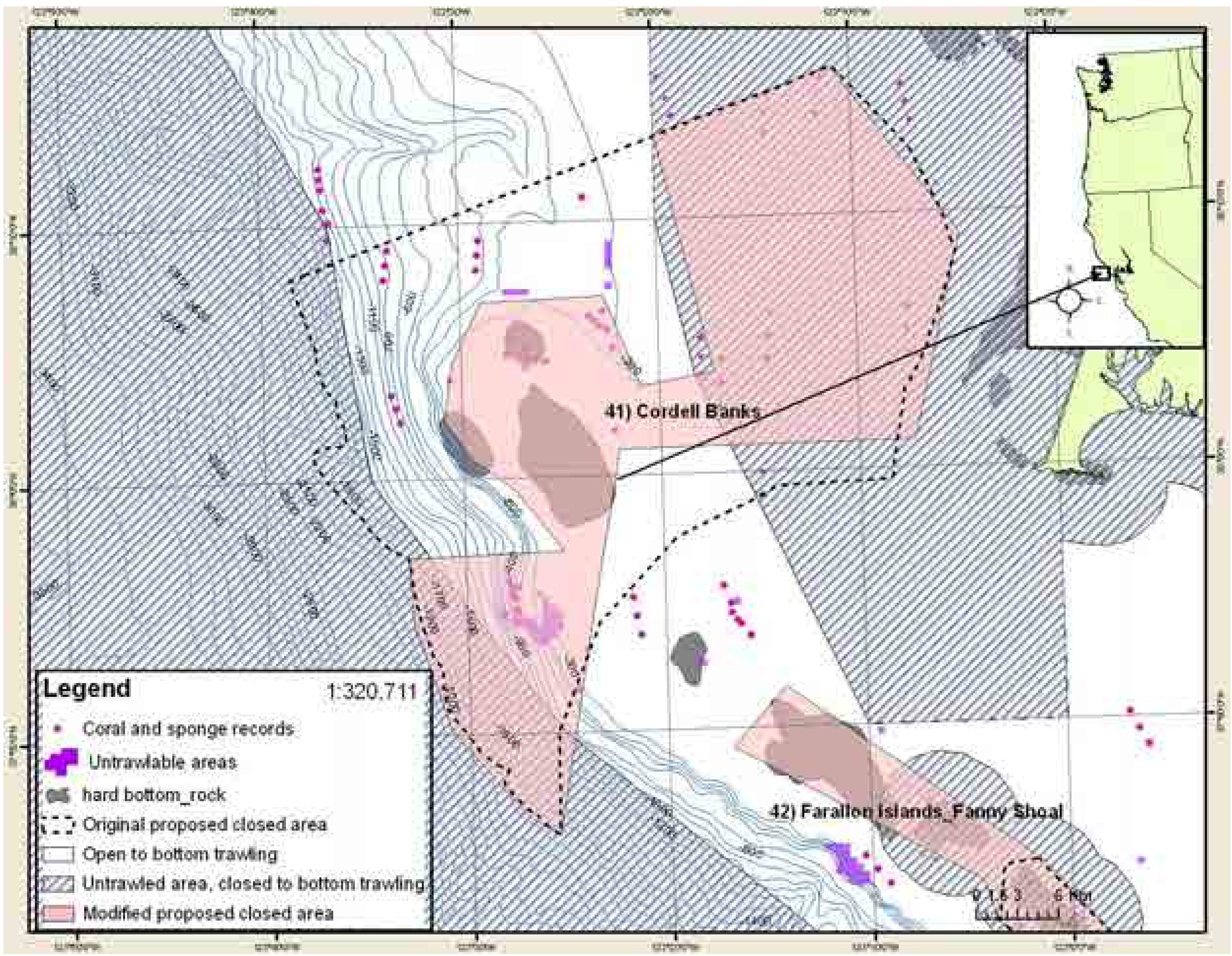

Figure 45: Cordell Bank

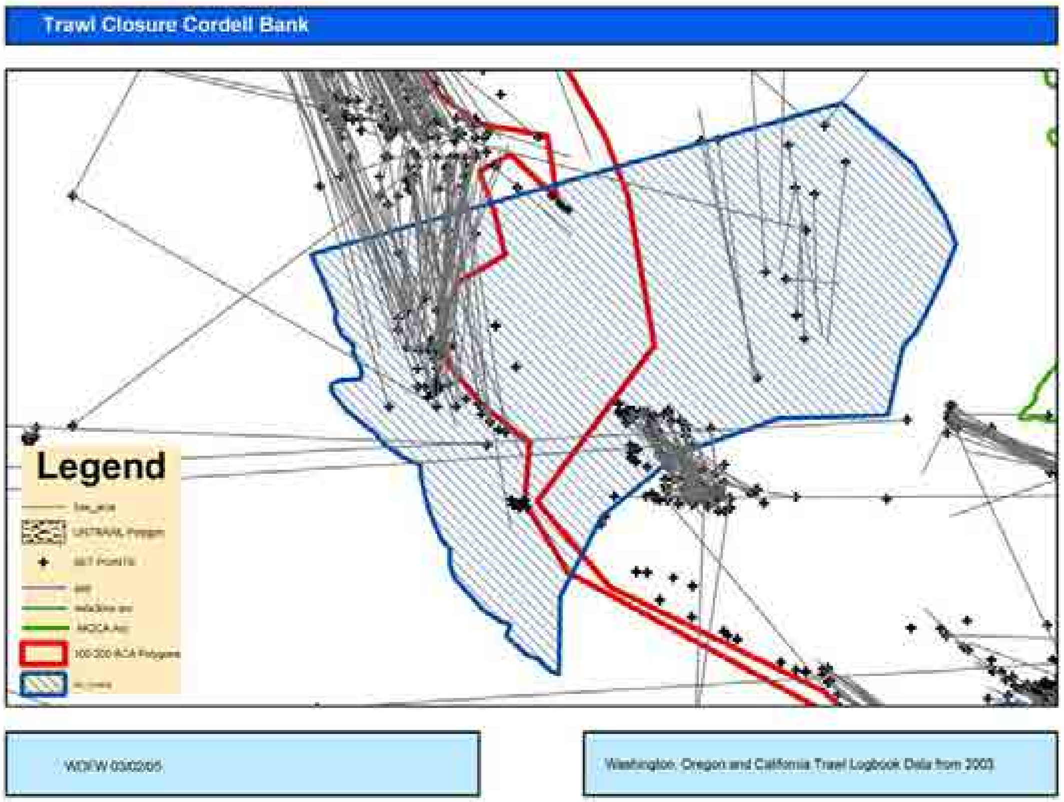

Figure R: 2003 bottom trawl logbook set points (courtesy WDF&W)

42. Farallon Islands_Fanny Shoal

Original Alternative C.12 estimated displaced revenue= $78
Revised Alternative C.12 estimated displaced revenue= $9,967 (likely overestimated, trawl tracks fall outside of area, see Figure S below)

This area was previously proposed as "*hard bottom feature_3*". The boundary of the proposed closure was modified to encompass more areas of hard bottom habitat to the north (Figure 46). Much of the proposed area falls within existing state of California bottom trawl closures. Trawl logbook information indicates little bottom trawl effort occurs in the area (Figure S), and minimal effort should be displaced by this suggested closure. The displaced revenue reported here is likely overestimated. This area around the Farallon Islands has not been well sampled by NOAA trawl surveys. The proposed area contains one record of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The California Academy of Sciences collected 3 specimens of coral in the area; the bubblegum coral *Paragorgia*, *Callagorgia*, and the stylasteridae coral *Stylantheca sp*.

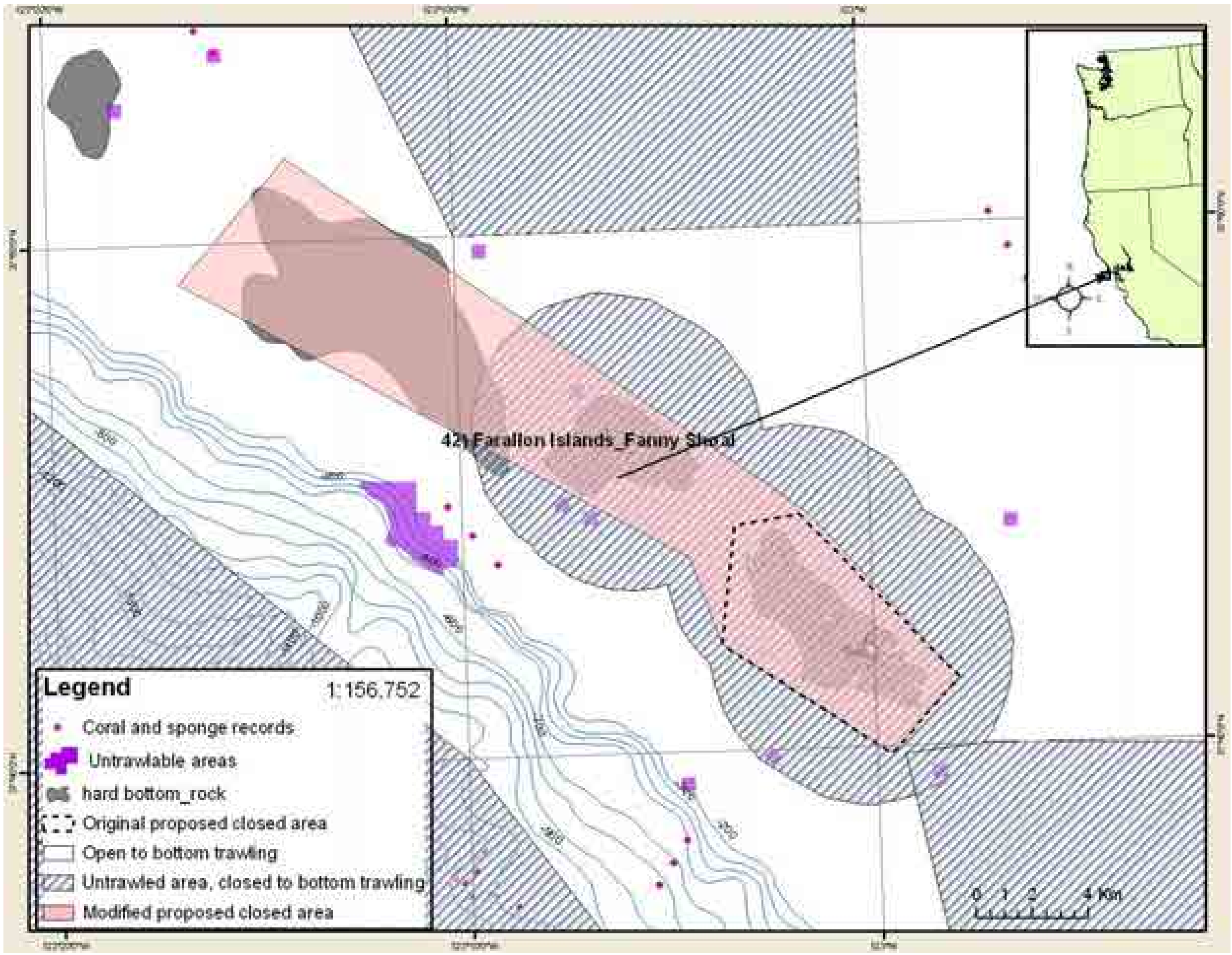

Figure 46: Farallon Islands_Fanny Shoal

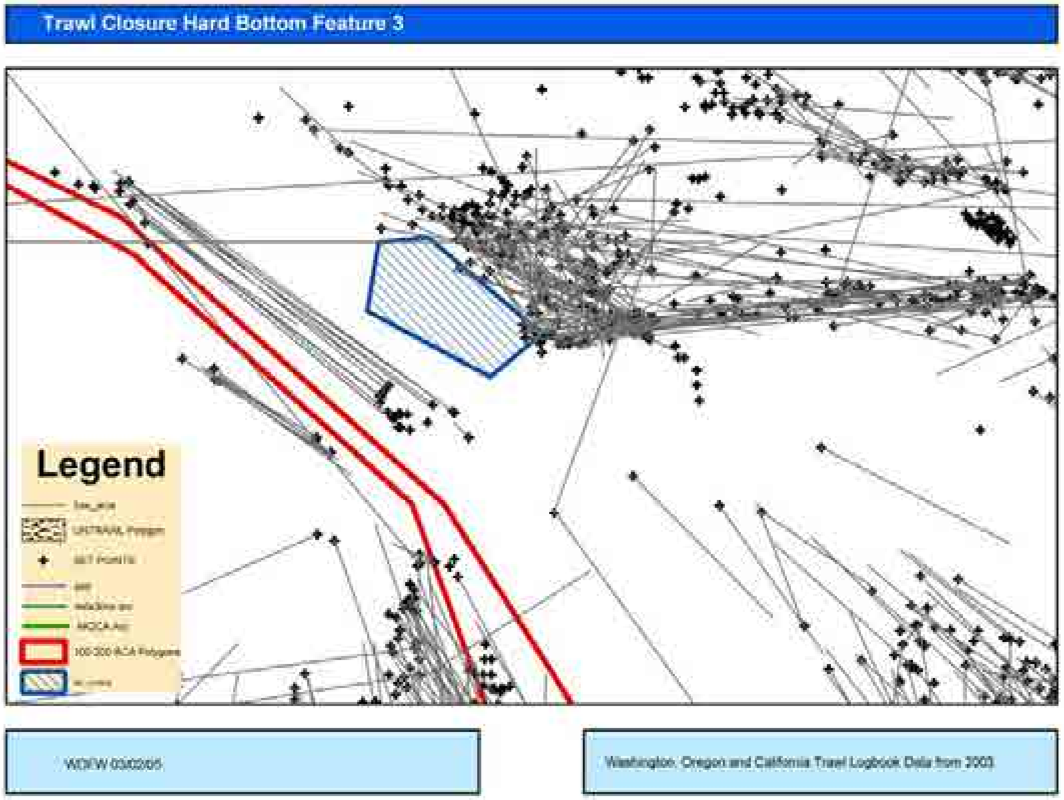

Figure S: 2003 bottom trawl logbook set points (courtesy WDF&W)

43. Half Moon Bay

Original Alternative C.12 estimated displaced revenue= $580
Revised Alternative C.12 estimated displaced revenue= $41,073 (likely overestimated, trawl tracks fall outside of area, see Figure T below)

This area was previously proposed as "*hard bottom feature_4*". This area of rocky shelf habitat is located offshore of Half Moon Bay (Figure 47). It is likely difficult to trawl in this area, and logbook information indicates that little bottom trawl effort occurred in the area. As such, the displaced revenue reported here is likely overestimated. The proposed area contains 6 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

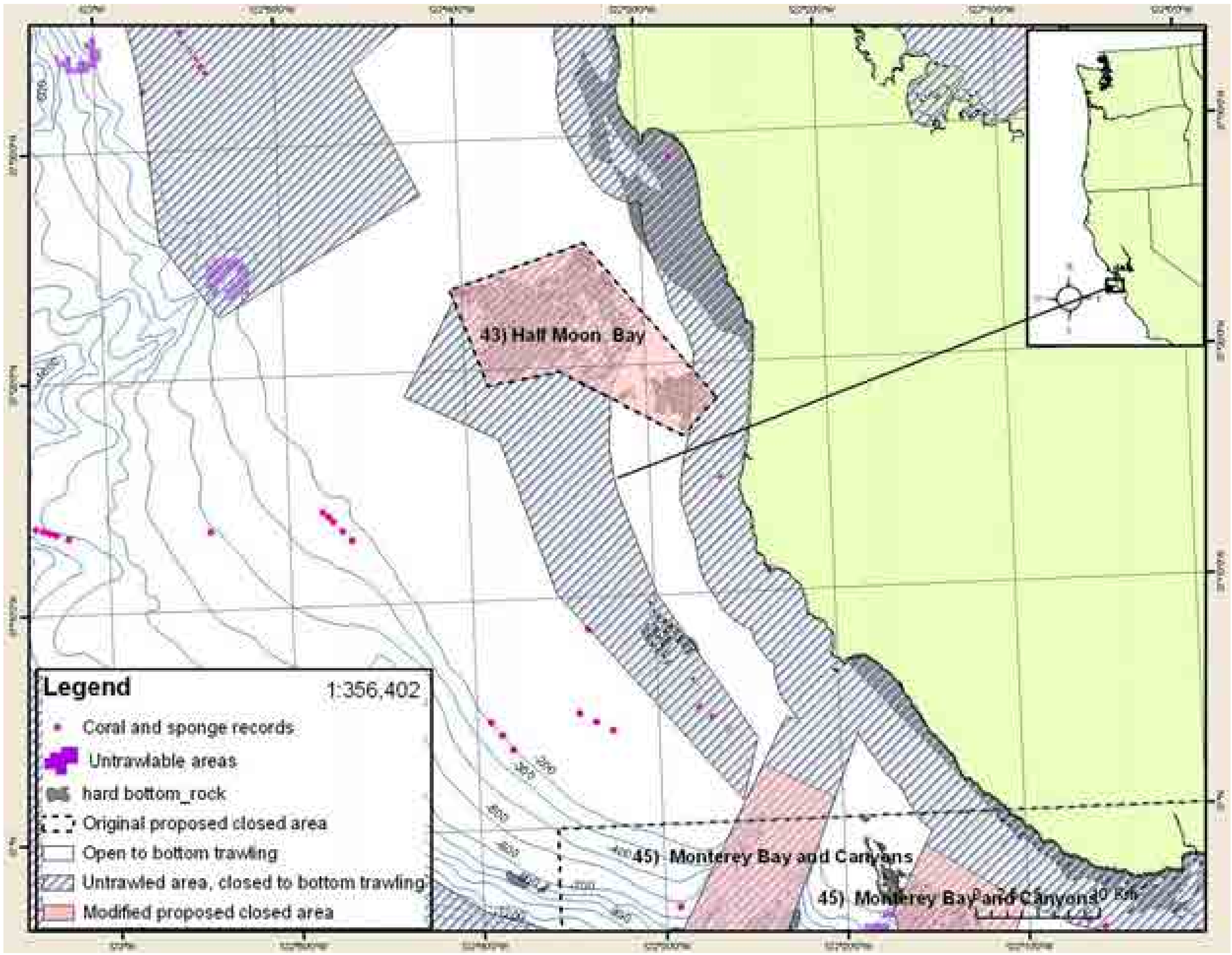

Figure 47: Half Moon Bay

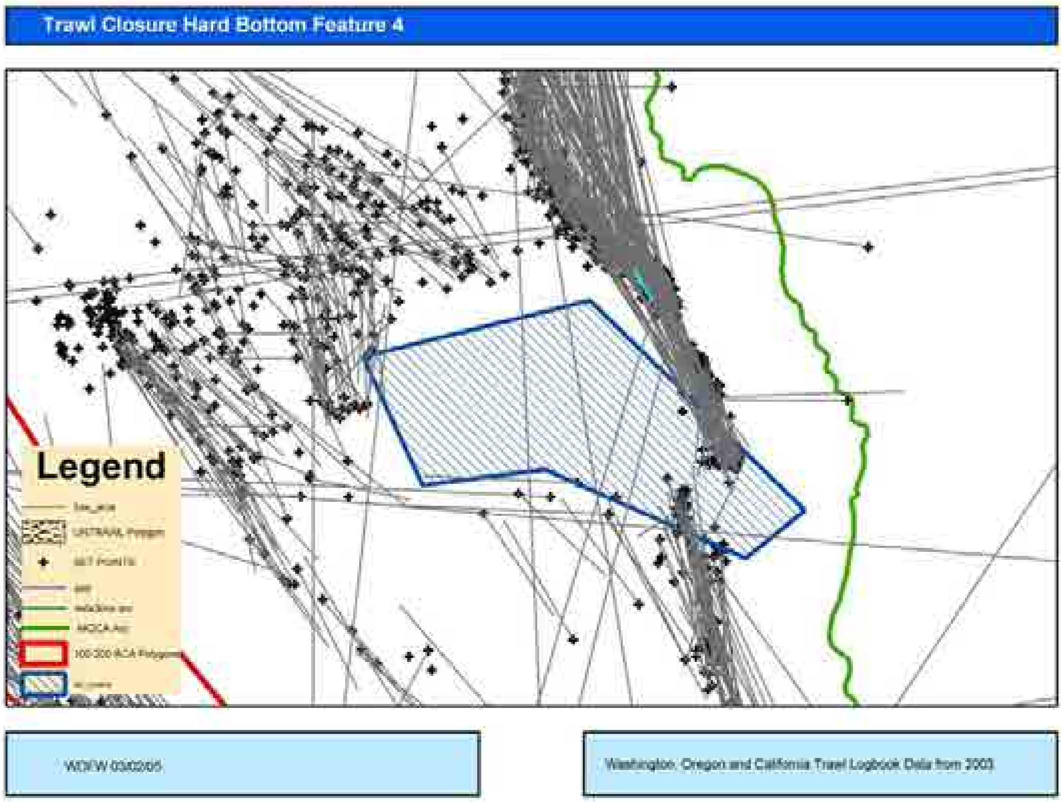

Figure T: 2003 bottom trawl logbook set points (courtesy WDF&W)

44. Point Sur_deep

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $10,173 (likely overestimated, trawl tracks fall outside of area, see Figure U below)

This area is located offshore in deep water, and was also suggested as an area for closure by the bottom trawl industry. A rocky escarpment rises 400 meters in the middle of the area, and the proposed area contains habitat from 1000 to 1400 meters depth (Figure 48). Eleven records of habitat-forming invertebrates, including sea pens and sea whips, have been documented in the area by NOAA trawl surveys. The proposed area is located outside the trawl footprint, and minimal effort should be displaced by this suggested closure.

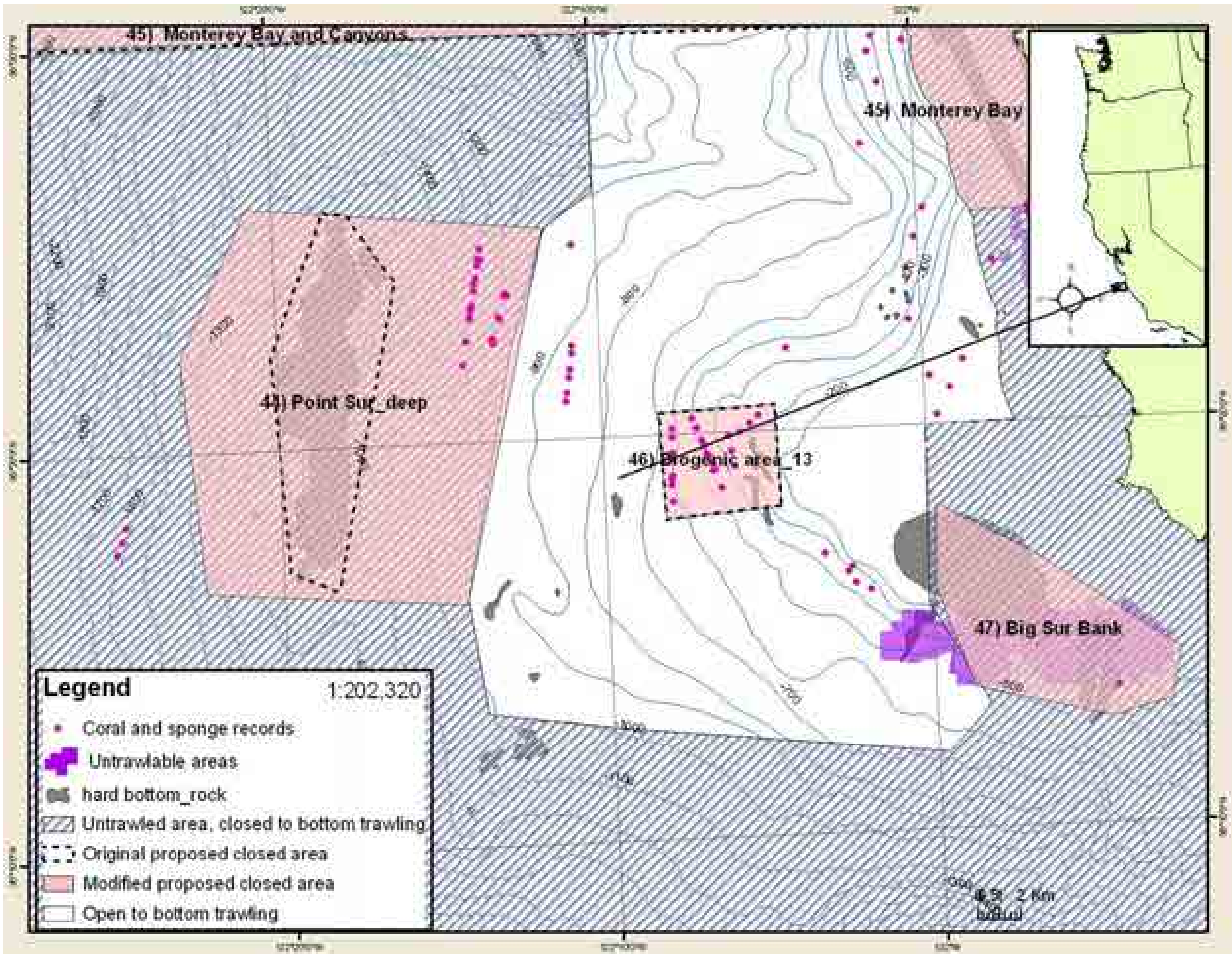

Figure 48: Point Sur_deep

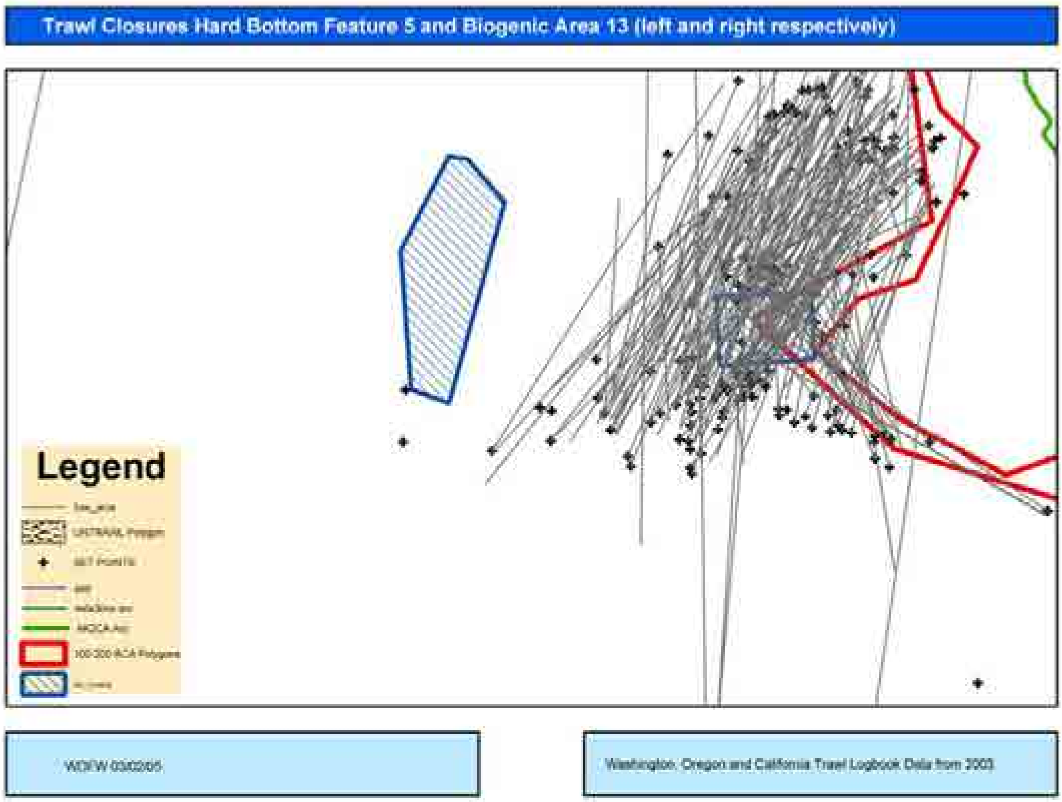

Figure U: 2003 bottom trawl logbook set points (courtesy WDF&W)

45. Monterey Bay and canyons

Original Alternative C.12 estimated displaced revenue= $645,196
Revised Alternative C.12 estimated displaced revenue= $191,468 (likely overestimated, trawl tracks fall outside of area, see Figure V below)

The deepest and largest submarine canyon on the coast of North America is the Monterey Canyon, just south of San Francisco, California (Figure 48). This canyon is 470 km long, approximately 12 km wide at its widest point, and has a maximum rim to floor relief of 1700 m, making it much larger than Arizona's Grand Canyon.

Monterey Bay and Canyon are part of the Monterey Bay National Marine Sanctuary designated in 1992. These areas contain a rich array of habitats from rugged rocky shores and lush kelp forests and one of the largest underwater canyons in North America. The sanctuary supports thirty three species of marine mammals, ninety-four species of seabirds, 345 species of fish, four species of sea turtles and thousands of species of invertebrates.[7] The area contains complex, canyon habitat and pinnacles. The proposed closed area in Revised Alternative C.12 contains 185 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

[7] State of the Sanctuary Report. Monterey Bay National Marine Sanctuary. http://www.mbnms.nos.noaa.gov

Trawl logbook information indicated that bottom trawling occurs in several discrete areas of the bay and off the slope (Figure V). The bottom trawl industry suggested a closure for the area that avoided closing any of these areas. As such, the boundaries of the original proposal were modified to avoid most of the trawled areas, and follows much of the boundary proposed by the trawl industry. Therefore, minimal displaced effort should result from the proposed closure and the displaced revenue reported here is likely overestimated.

The area is rich in records of habitat-forming invertebrates. NOAA trawl surveys have documented nine records of gorgonian corals, sea pens and sponges. Submersible dives by MBARI have documented 290 records of deep-sea corals in the proposed area, including bubblegum corals, black corals, and bamboo corals. The California Academy of Sciences has collected samples of hydrocorals, *Plumerella sp*., *Callogorgia sp*., *Paragorgia sp*., and bamboo corals.

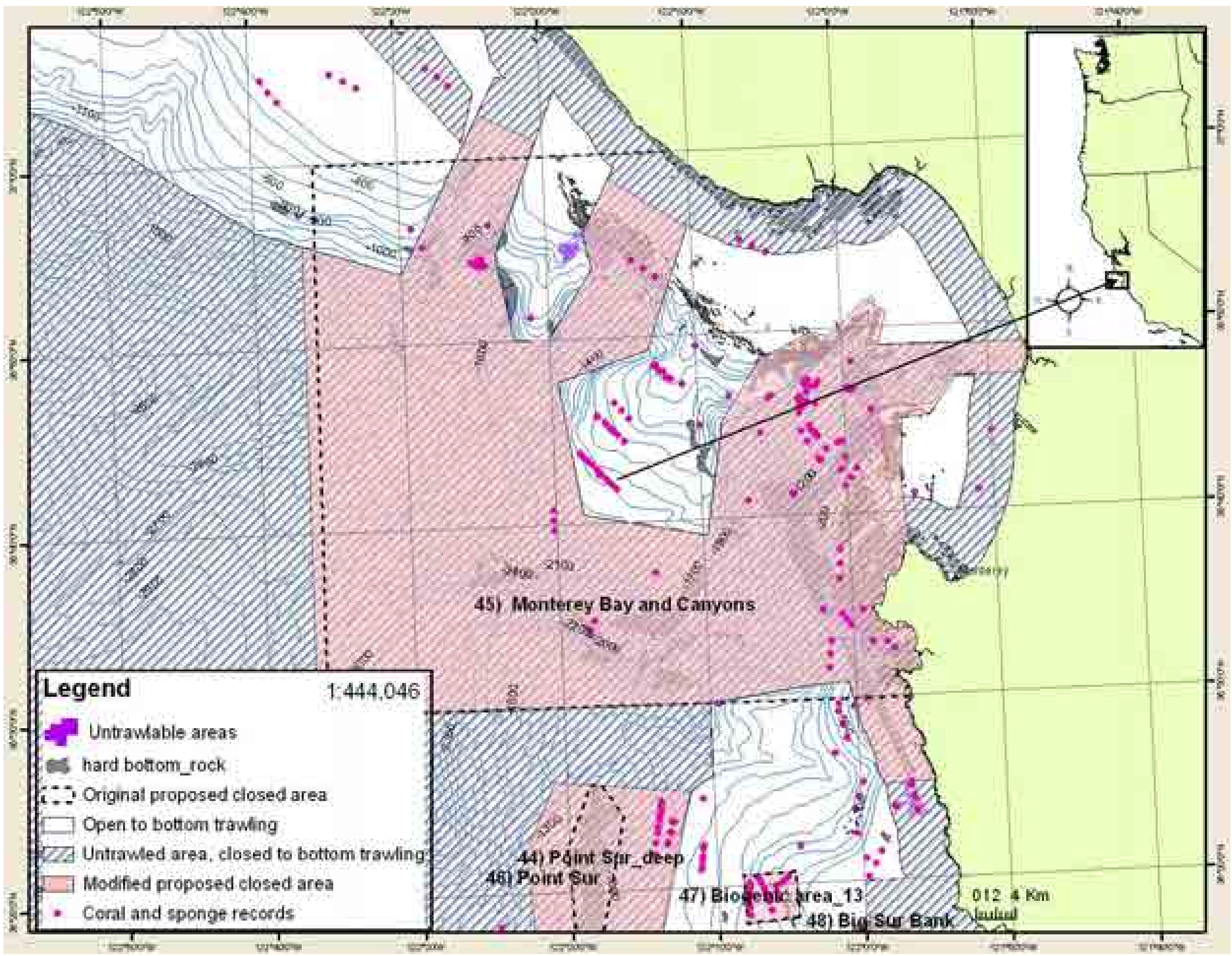

Figure 48: Monterey Bay and Canyon

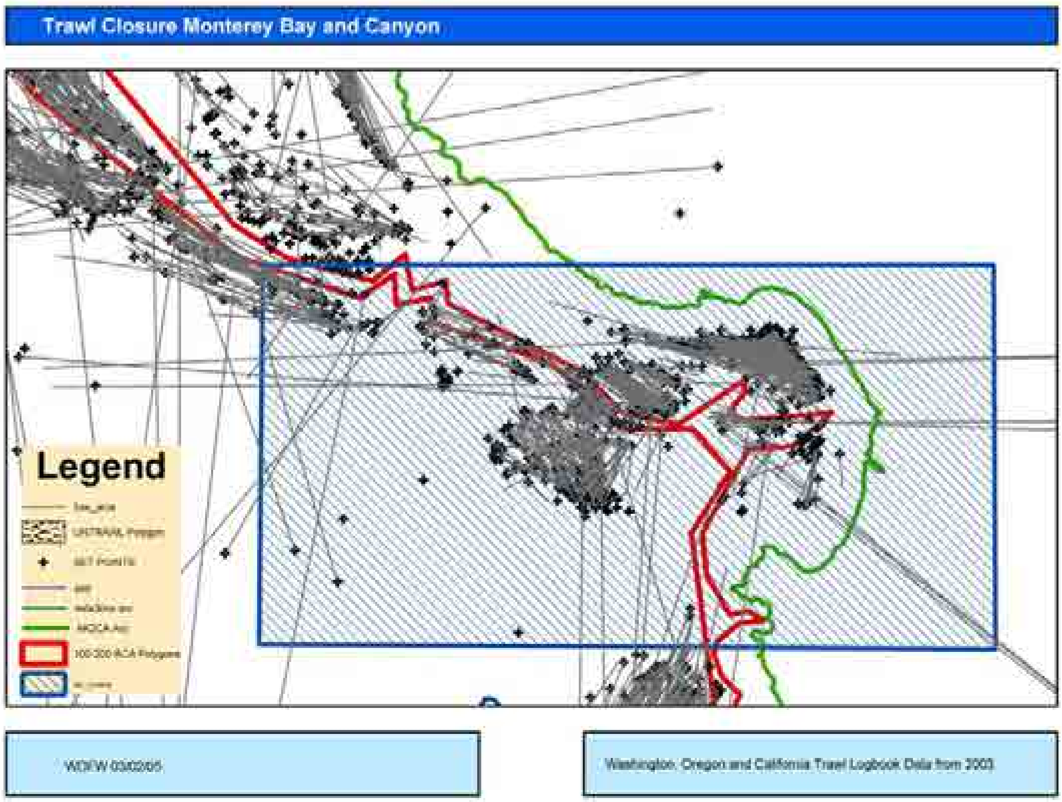

Figure V: 2003 bottom trawl logbook set points (courtesy WDF&W)

46. Biogenic_13
Original Alternative C.12 estimated displaced revenue= $26,257
Revised Alternative C.12 estimated displaced revenue= $11,282

The proposed area contains several rocky habitat features, and spans habitat from 300 to 700 meters depth (Figure 49). NOAA trawl surveys within the proposed area have documented 21 records of habitat-forming invertebrates, including black corals, gorgonian corals, sea pens, and sponges. Trawl logbook information indicates that trawling occurs across the proposed area (Figure U). However, the area suggested for closure is small relative to surrounding trawled area. This proposed area would be a good candidate for a control study site to assess the effects of bottom trawling on habitat.

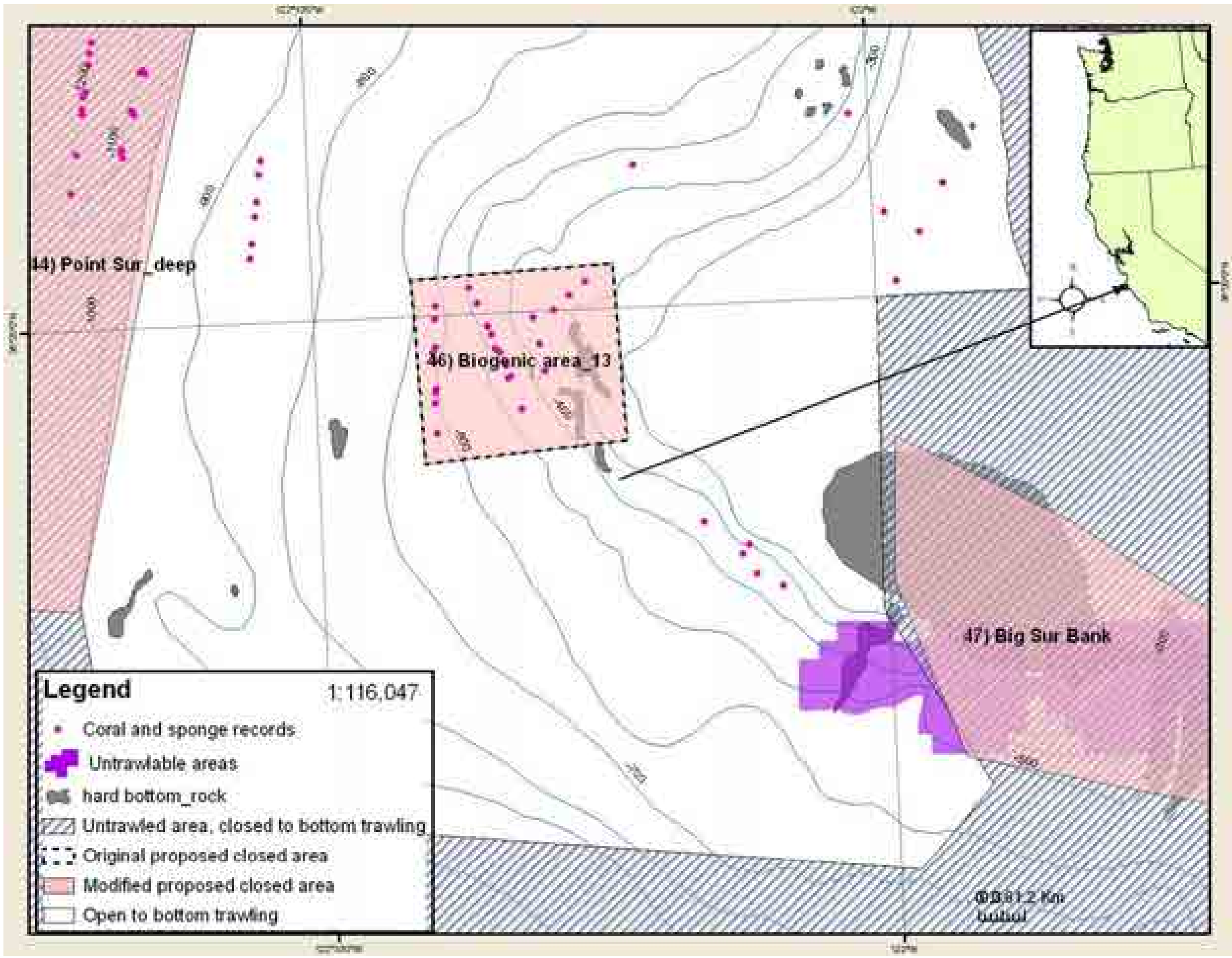

Figure 49: Biogenic_13

47. Big Sur Bank

Original Alternative C.12 estimated displaced revenue= N/A

Revised Alternative C.12 estimated displaced revenue= $41,694 (likely overestimated, trawl tracks fall outside of area, see Figure V above)

This area contains rocky shelf habitat under 200 meters depth off the coast of Big Sur point (Figure 50). Trawl logbook information indicates no trawl activity in the area, and the area is located outside the bottom trawl footprint. Therefore, minimal displaced effort should result from the proposed closure. The displaced revenue reported here is likely overestimated. The proposed area contains 175 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

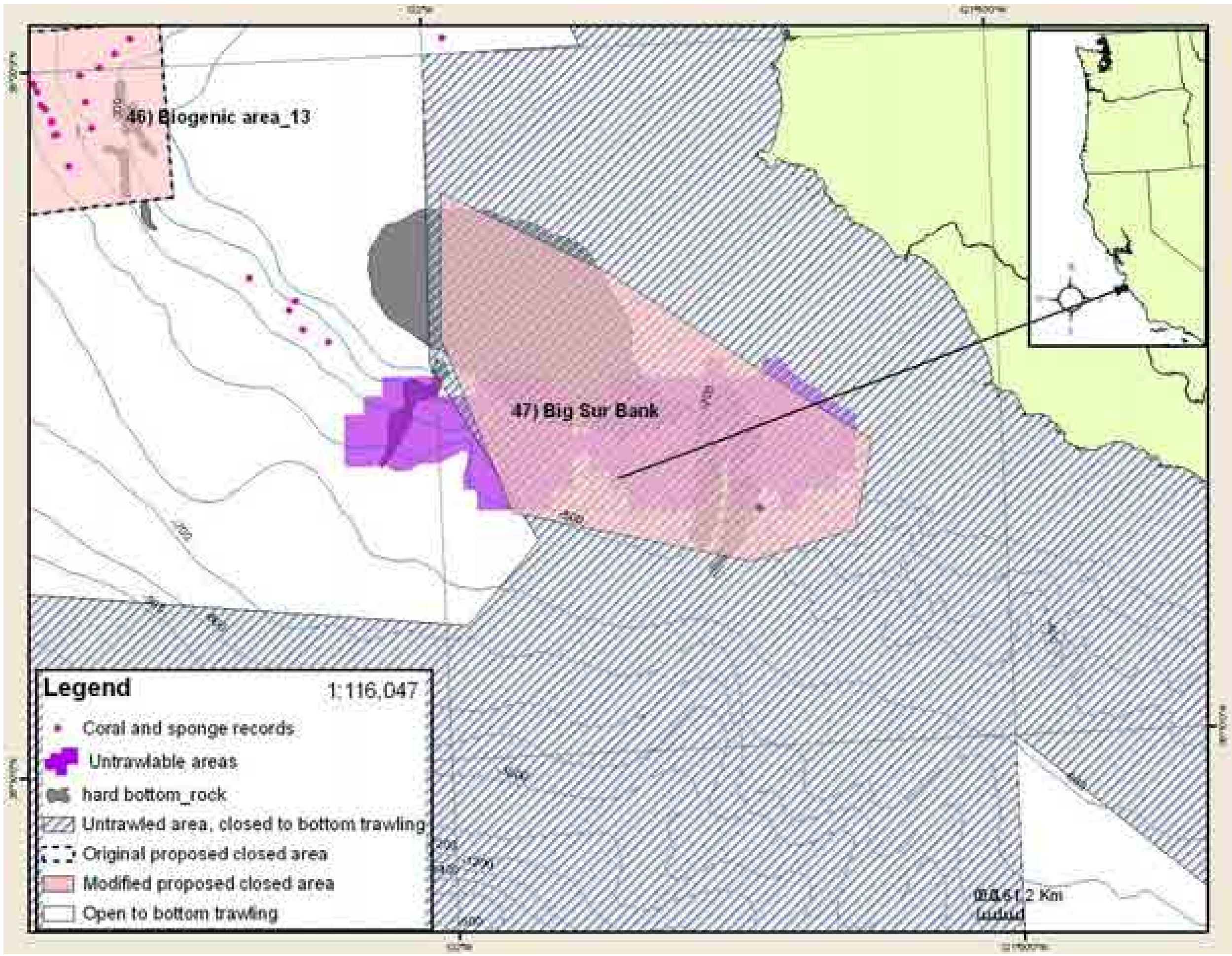

Figure 50: Big Sur Bank

48. Morro Ridge

Original Alternative C.12 estimated displaced revenue= $258,779
Revised Alternative C.12 estimated displaced revenue= $30,125 (likely overestimated, trawl tracks fall outside of area, see Figure W below)

Morro Ridge is a long ridge of hard substrate off the Central California coast (Figure 51). The southern portion of the ridge rises to 500 meters depth while the northern portion drops to 1000 meters. Trawl logbook information indicated that some trawl effort occurred along the eastern edge and south western point of the previously proposed closed area (Figure W). The proposed closed area for Revised Alternative C.12 avoids these areas, and minimal displaced effort should result from the proposed closure.

The Revised Alternative C.12 closed area contains numerous records of habitat-forming invertebrates from NOAA. NOAA trawl surveys have documented 81 records of gorgonian corals, sea pens, sea whips, and sponges. The proposed area contains 26 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

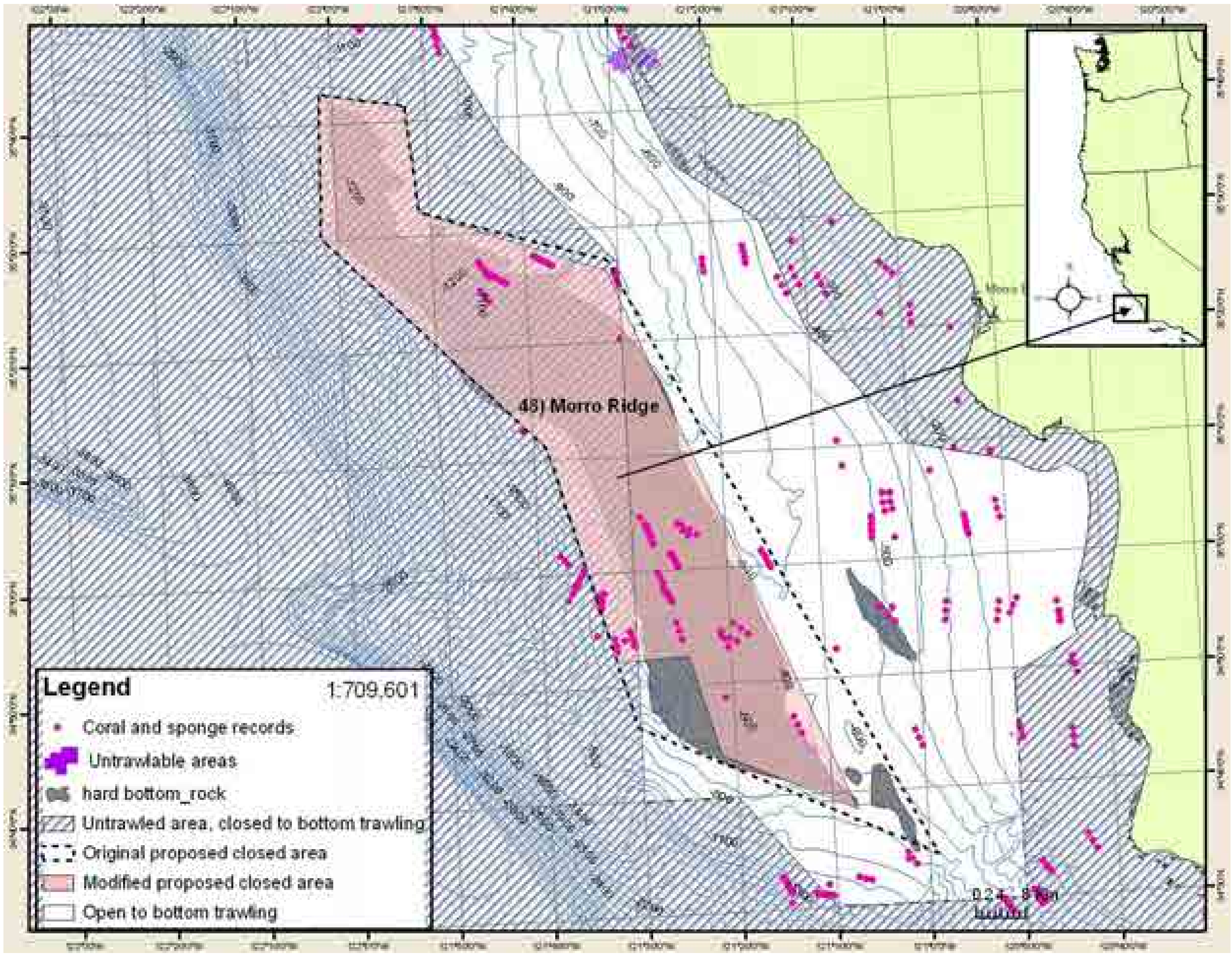

Figure 51: Morro Ridge

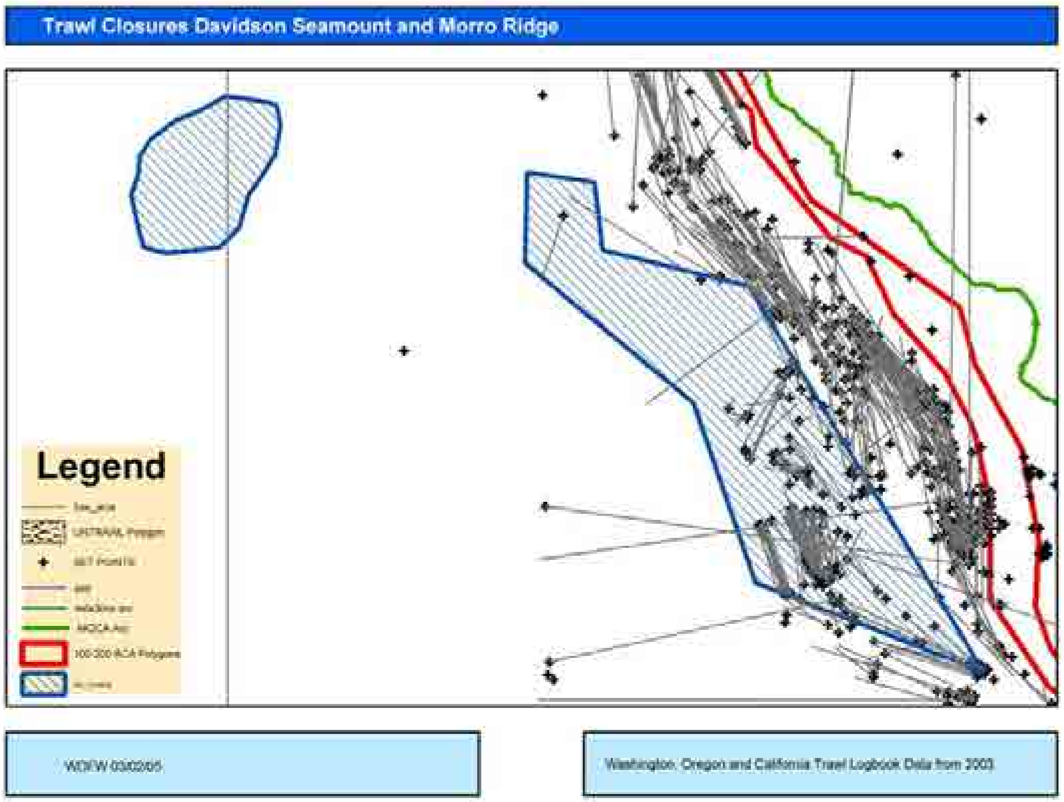

Figure W: 2003 bottom trawl logbook set points (courtesy WDF&W)

49. Channel Islands

Original Alternative C.12 estimated displaced revenue= 0
Revised Alternative C.12 estimated displaced revenue= $11,016 (likely overestimated, trawl tracks fall outside of area, see Figure X below)

The Channel Islands National Marine Sanctuary contains numerous records of biogenic habitat, particularly gorgonian corals (Figure 52). It is located at the meeting point between two major oceanographic currents, and therefore has a relatively high diversity of marine life from both tropical and temperate marine ecosystems. While the area has not been well sampled with trawl gear, NOAA trawl surveys within the proposed area have documented 6 records of Hexactinellid sponges at up to 296 kg per survey haul. The California Academy of Sciences has documented hydrocoral in the area. The Smithsonian Institution has documented three rare collections of the reef building deep-sea corals *Lophelia pertusa* and *Madrepora occulata.* Trawl logbook information indicates little trawl activity (Figure x). The proposed closed area encompasses existing state of California bottom trawl closures, therefore minimal displaced effort should result from the proposed closure. The estimated displaced revenue reported here is likely overestimated.

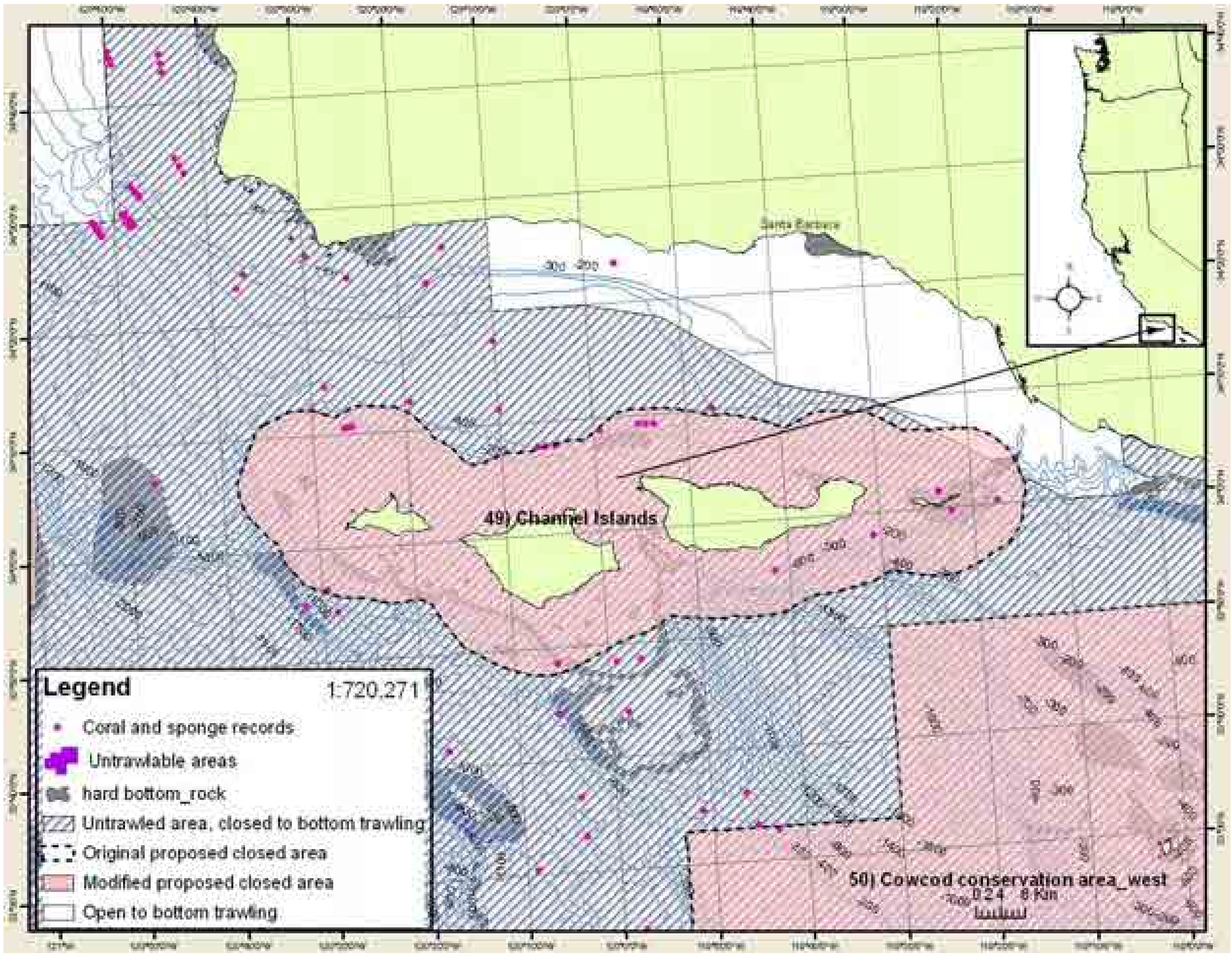

Figure 52: Channel Islands

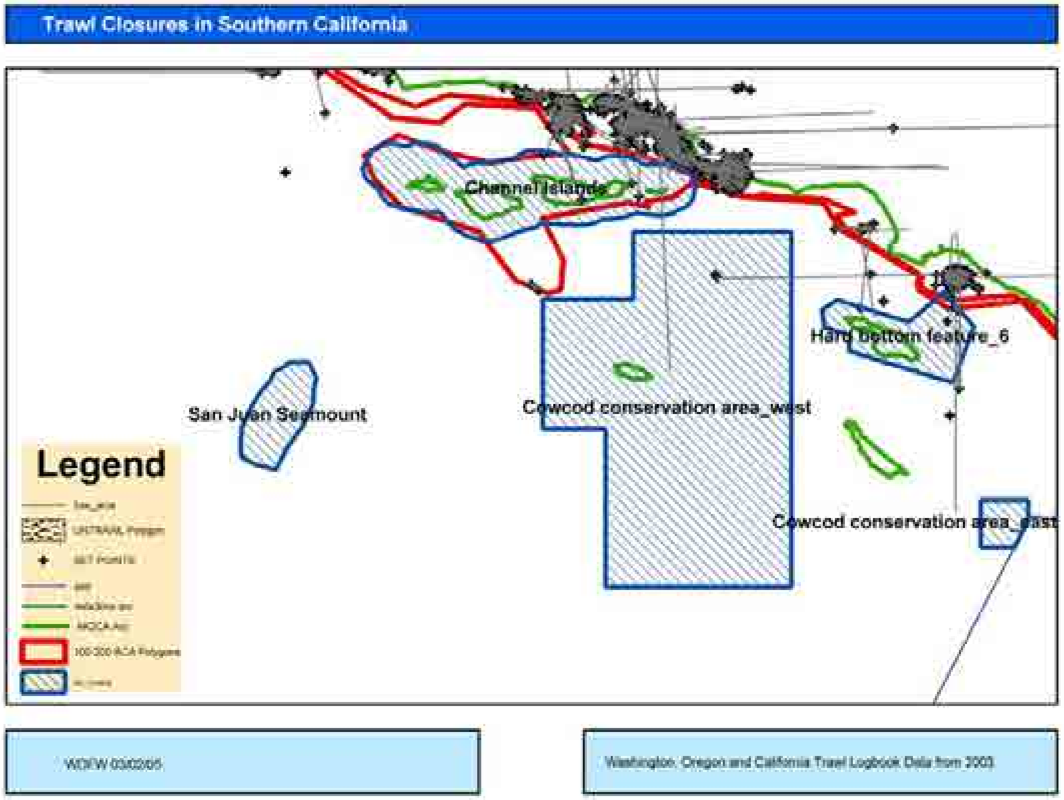

Figure X: 2003 bottom trawl logbook set points (courtesy WDF&W)

50. Cowcod conservation area_west
52. Cowcod conservation area_east
Original Alternative C.12 estimated displaced revenue=$0
Revised Alternative C.12 estimated displaced revenue= $0

The Cowcod Conservation Areas (Figure 53) were established by the Pacific Fishery Management Council and the National Marine Fisheries Service in 2001 to help protect and rebuild cowcod which have been driven down by 89 to 96 percent of unfished levels. Cowcod is a long-lived species with low productivity requiring almost a century to rebuild the population.[8] Due to the low levels of allowable mortality necessary to rebuild cowcod, the primary rebuilding strategy is avoidance.[9] These areas contain hard bottom habitats including a number of offshore banks.[10] While the area has not been well sampled with trawl gear, NOAA trawl surveys within the area have documented three records of Hexactinellid sponges. Submersible dives have also

[8] Final Environmental Impact Statement for Amendment 16-3 to the Pacific Coast Groundfish Fishery Management Plans for Bocaccio, Cowcod, Widow rockfish and Yelloweye Rockfish. July 2004. Pacific Fishery Management Council. at p. 63.
[9] *Id*. at 45.
[10] Analysis provided by NMFS for the EIS Oversight Committee in Portland, OR on August 16-18, 2004.

documented occurrences of black corals.[11] The area is not trawled due to the current closure, and logbook information indicates that little trawling has occurred in the recent past (Figure X). Therefore minimal displaced effort should result from the proposed closure.

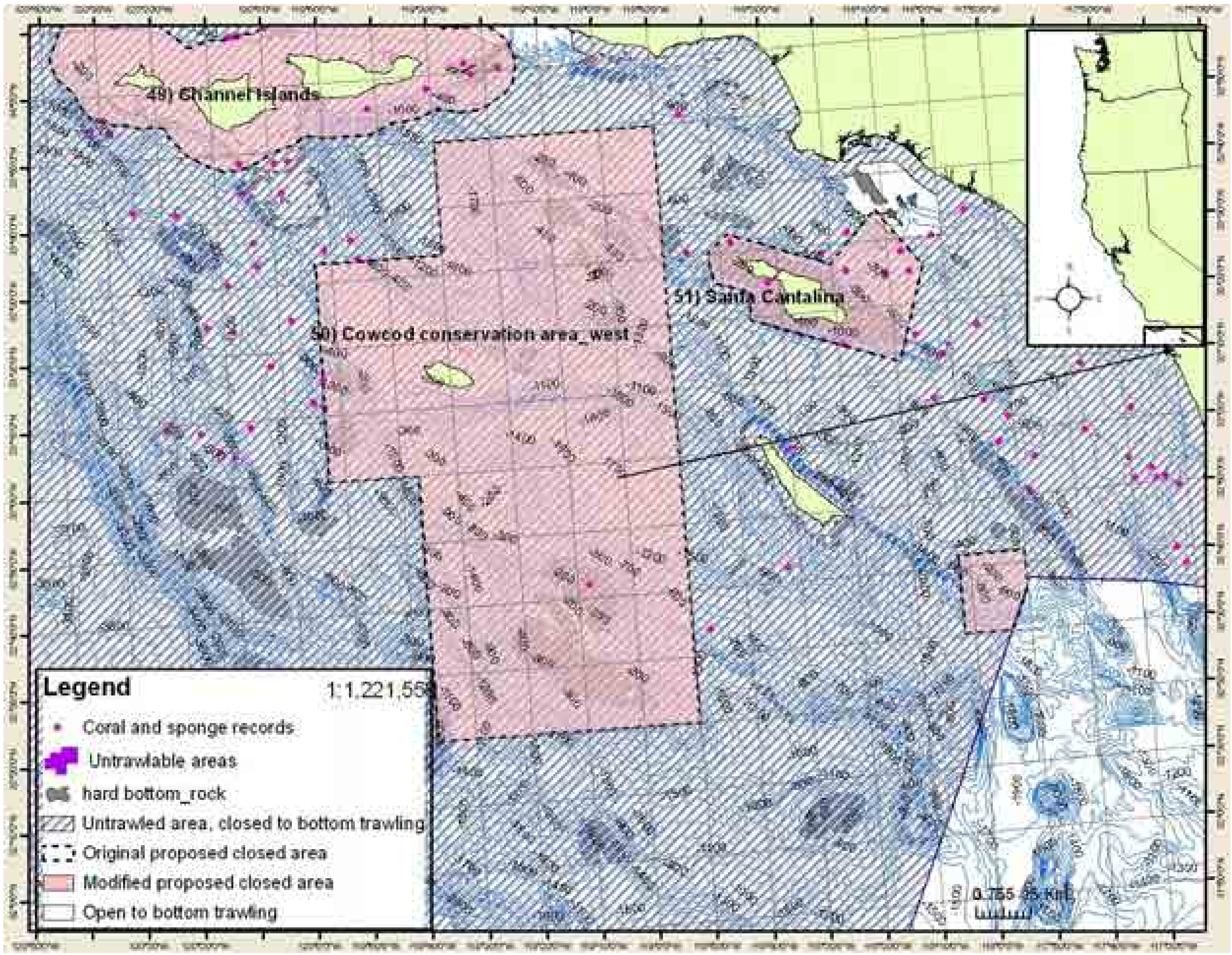

Figure 53: Cowcod conservation areas east and west

51. Santa Cantalina

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $2,315

This area contains habitat around Santa Cantalina (Figure 54). This area had previously been proposed as "*hard bottom feature_6*". While the area has not been well sampled with trawl gear, NOAA trawl surveys within the area have documented 9 records of habitat-forming invertebrates including Hexactinellid sponges, sea pens, and black corals. The Santa Barbara Museum of Natural History has documented the rare reef-building deep-sea coral *Lophelia pertusa* in the proposed closed area. Trawl logbook information indicates that little trawl activity occurs in the proposed area, and most of the area is located outside the trawl footprint (Figure X). Therefore

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[11] Preliminary Report on Occurrences of Structure-Forming Megafaunal Invertebrates off the West Coast of Washington, Oregon and California. Northwest Fishery Science Center. August 2004.

minimal displaced effort should result from the proposed closure and the displaced revenue reported here is likely overestimated.

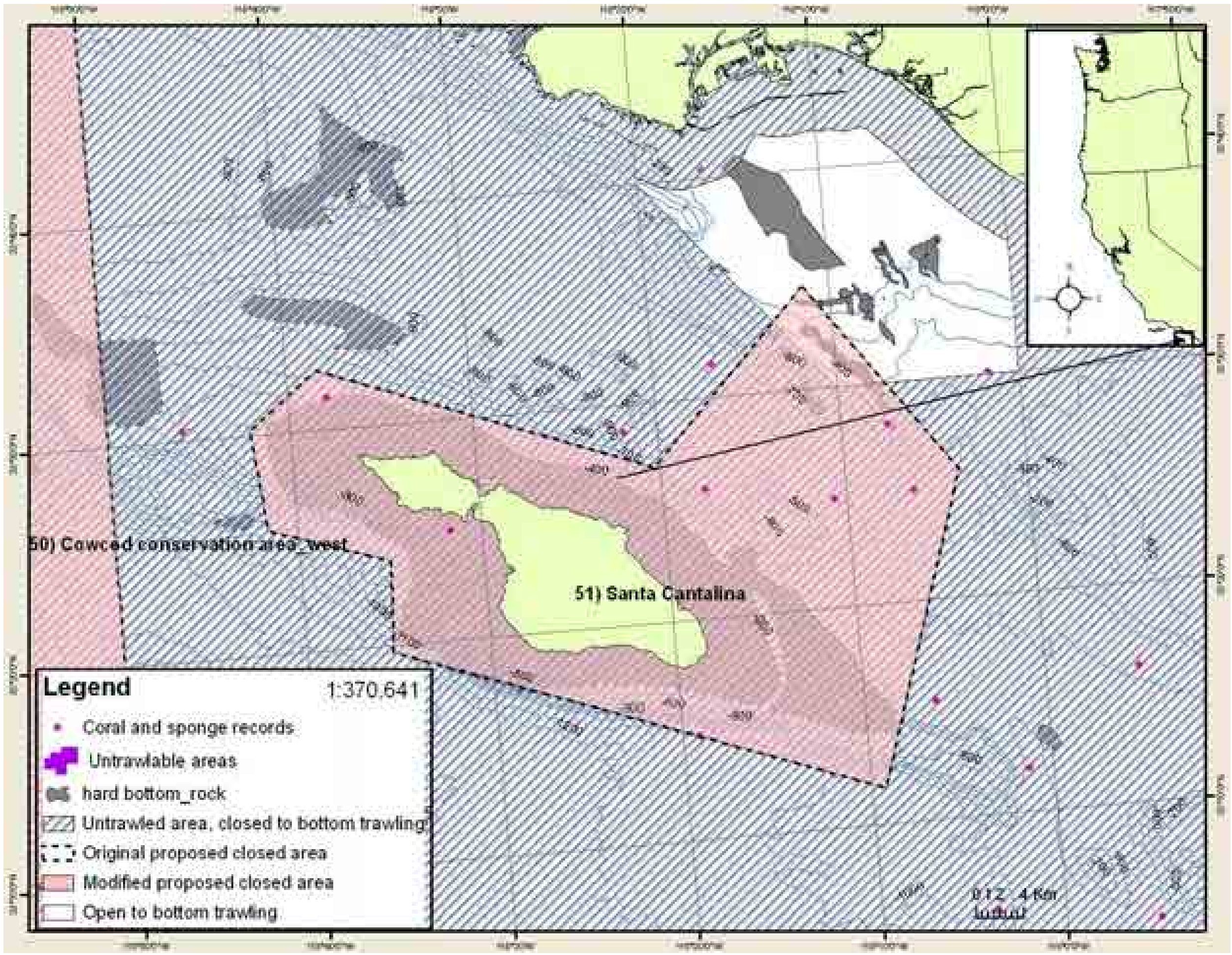


Figure 54: Santa Cantalina

Seamounts

Eight undersea structures of volcanic origin that meet the definition of seamount (those that rise up more than 1000 meters from the seafloor) have been identified within the jurisdiction of the PFMC. These are President Jackson, Thompson, San Juan, Guide, Pioneer, Gumdrop, Rodriguez, and Davidson Seamounts. The location and areal delineation of seven of the seamounts were plotted in GIS from data provided on the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003). An additional seamount, Rodriguez Seamount, was not included in the GIS data disk, but was later identified and incorporated into the Revised Alternative.

Davidson Seamount has been the most well explored of the seamounts, and numerous records of bubblegum corals, black corals, and Hexactinellid sponges have been documented. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. All of the seamounts off the Pacific coast have not been subject to bottom trawling and all are located outside the bottom trawl footprint. Logbook data documented no trawling on any seamounts on the U.S. West Coast. Therefore, there would be no economic impacts from bottom trawl closures that prevent future damage to these unique communities.

53. Thompson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

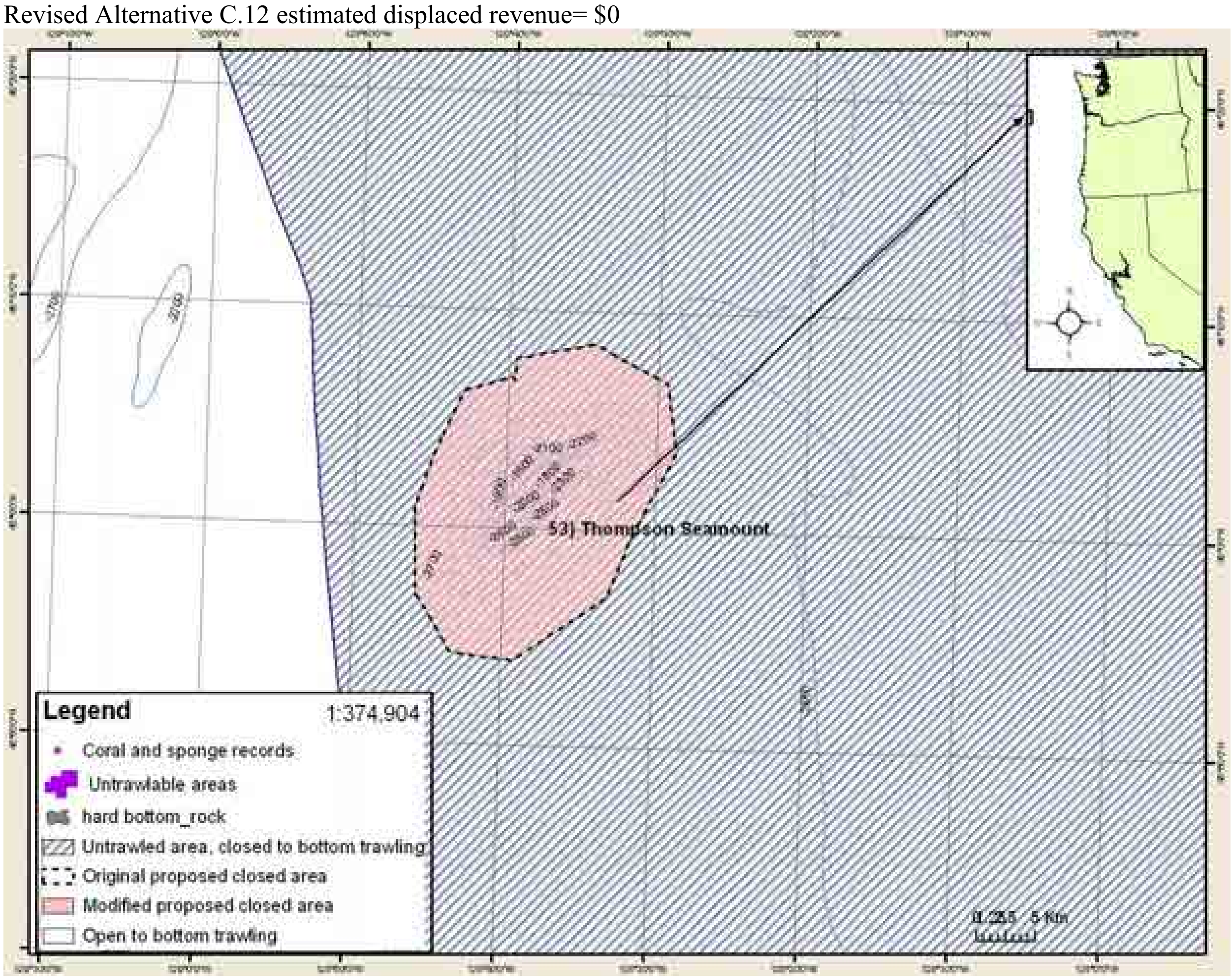


Figure 54: Thompson Seamount

54. President Jackson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

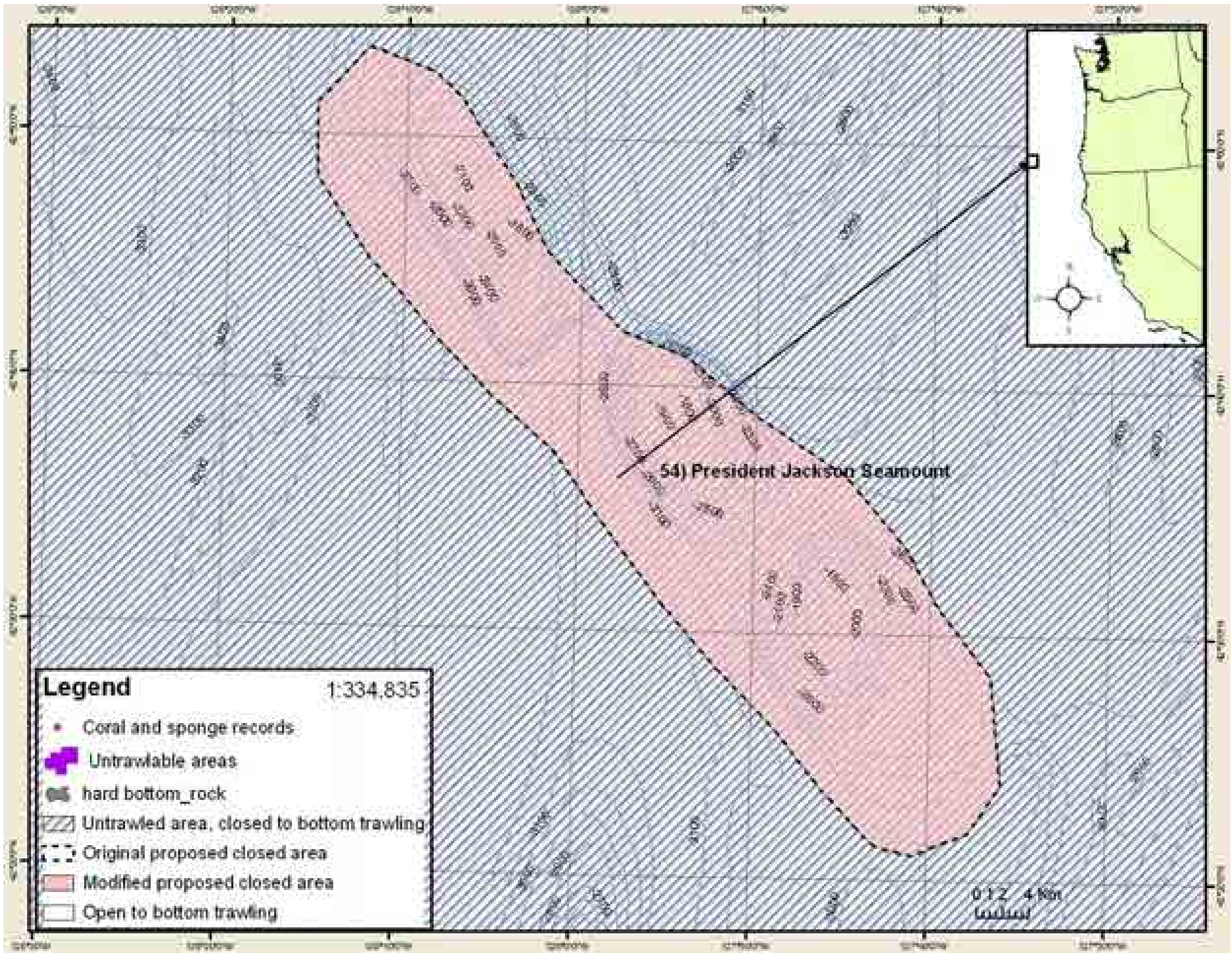


Figure 55: President Jackson Seamount

55. Taney Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

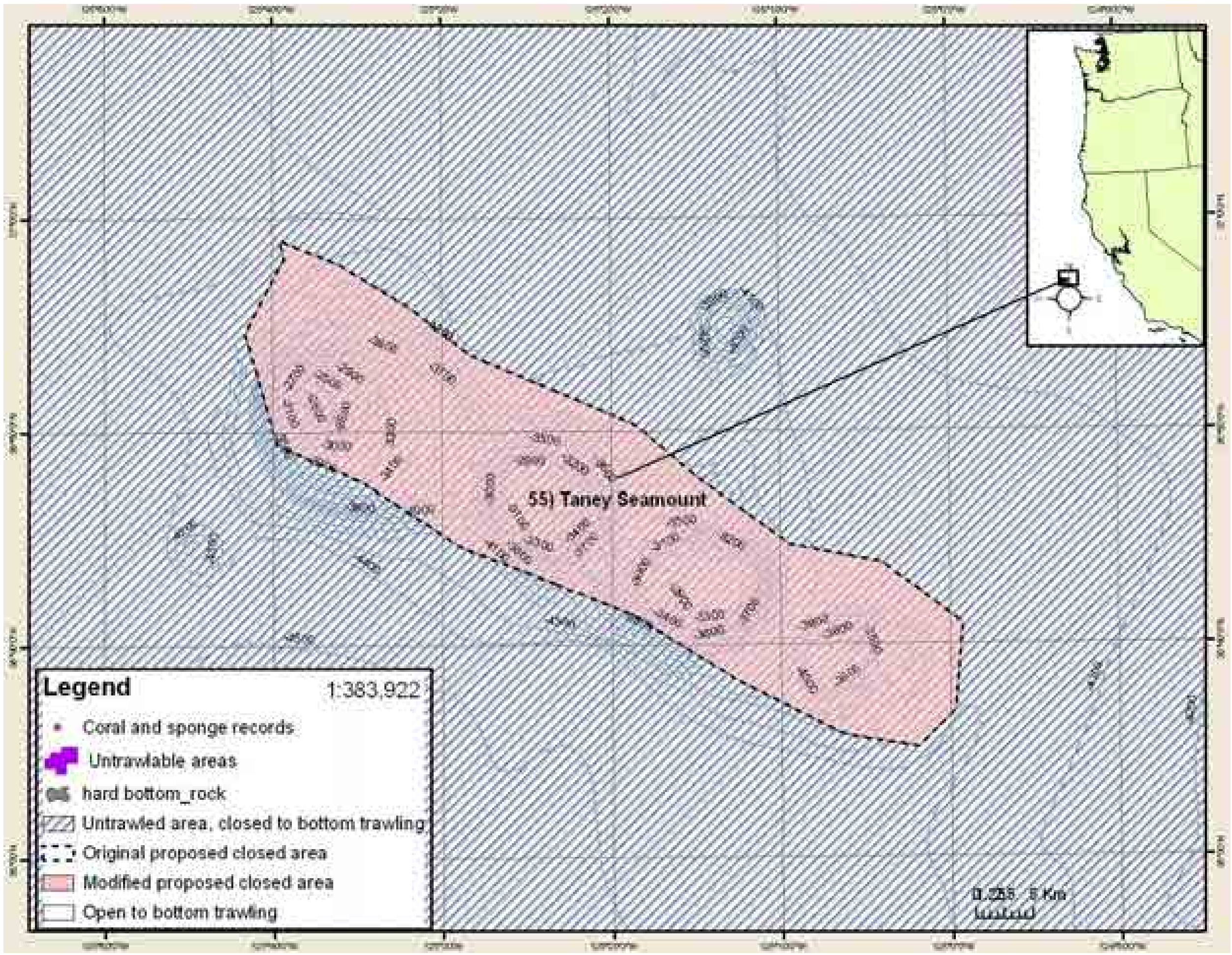


Figure 56: Taney Seamount

56. Gumdrop Seamount
57. Pioneer Seamount
58. Guide Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

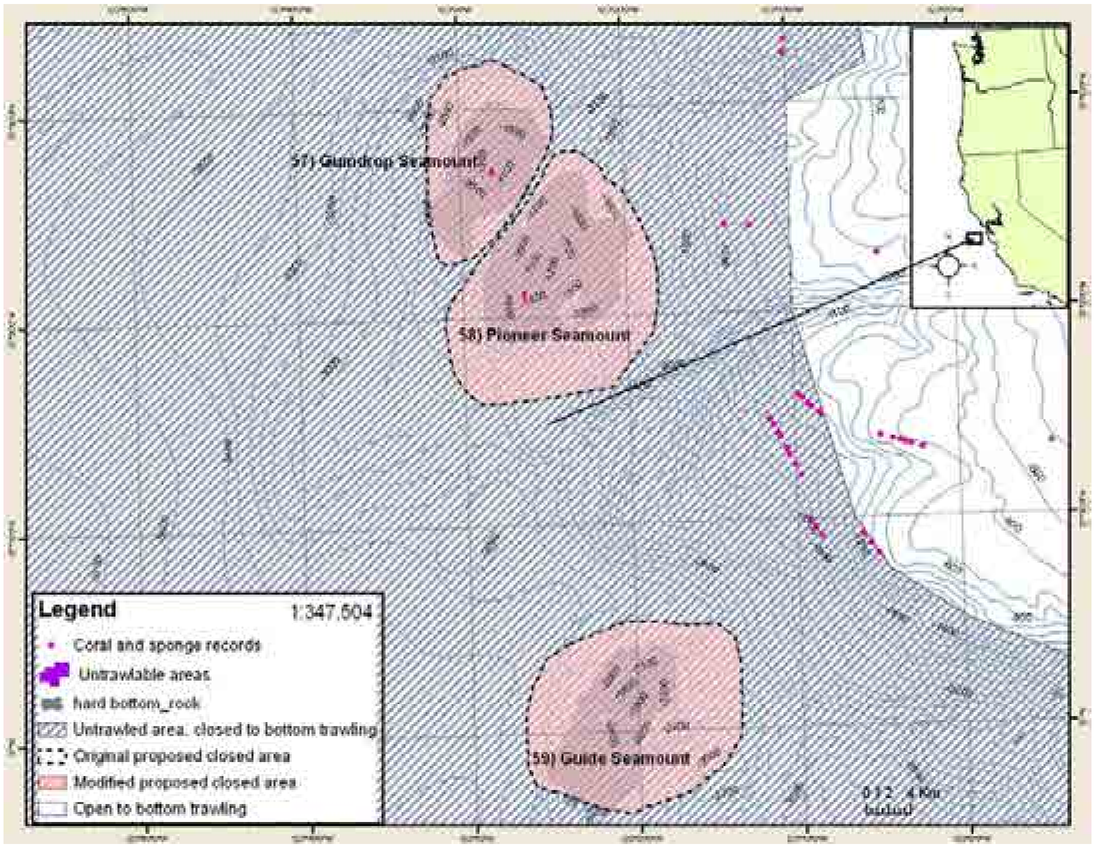


Figure 57: Gumdrop, Pioneer, and Guide Seamount

59. Davidson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

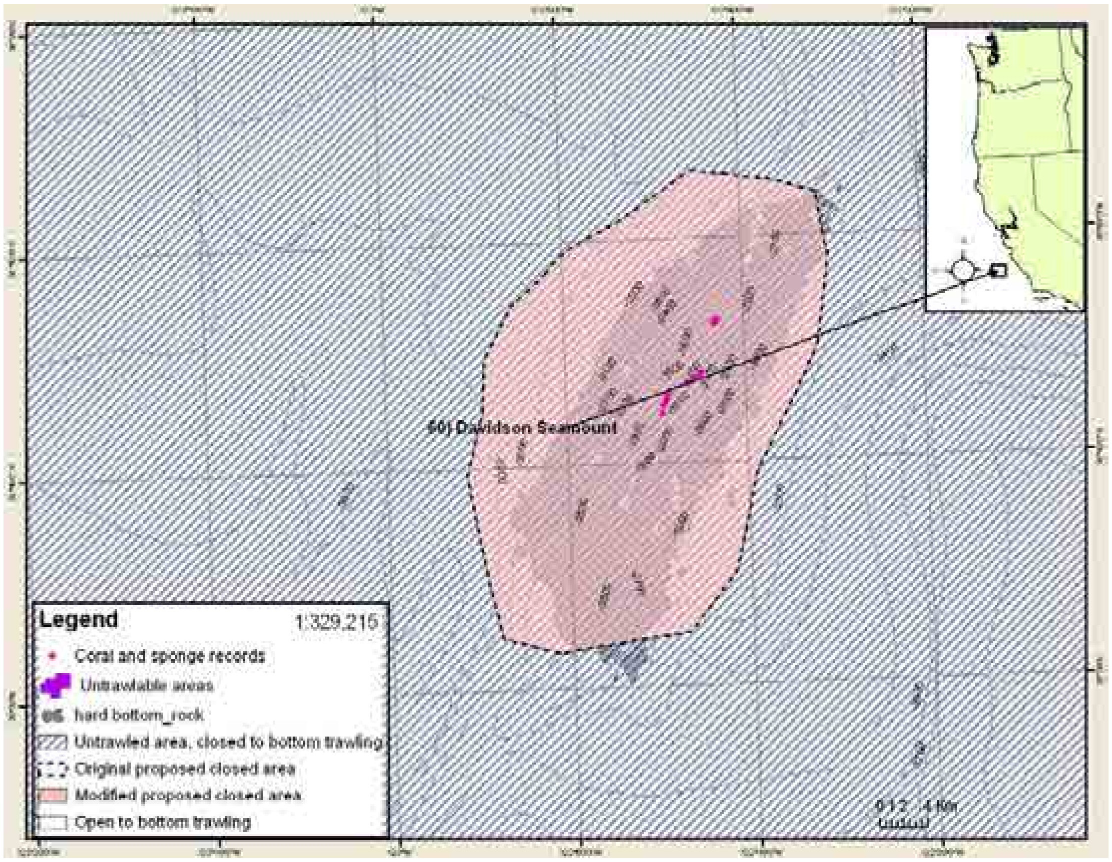


Figure 58: Davidson Seamount

60. San Juan Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

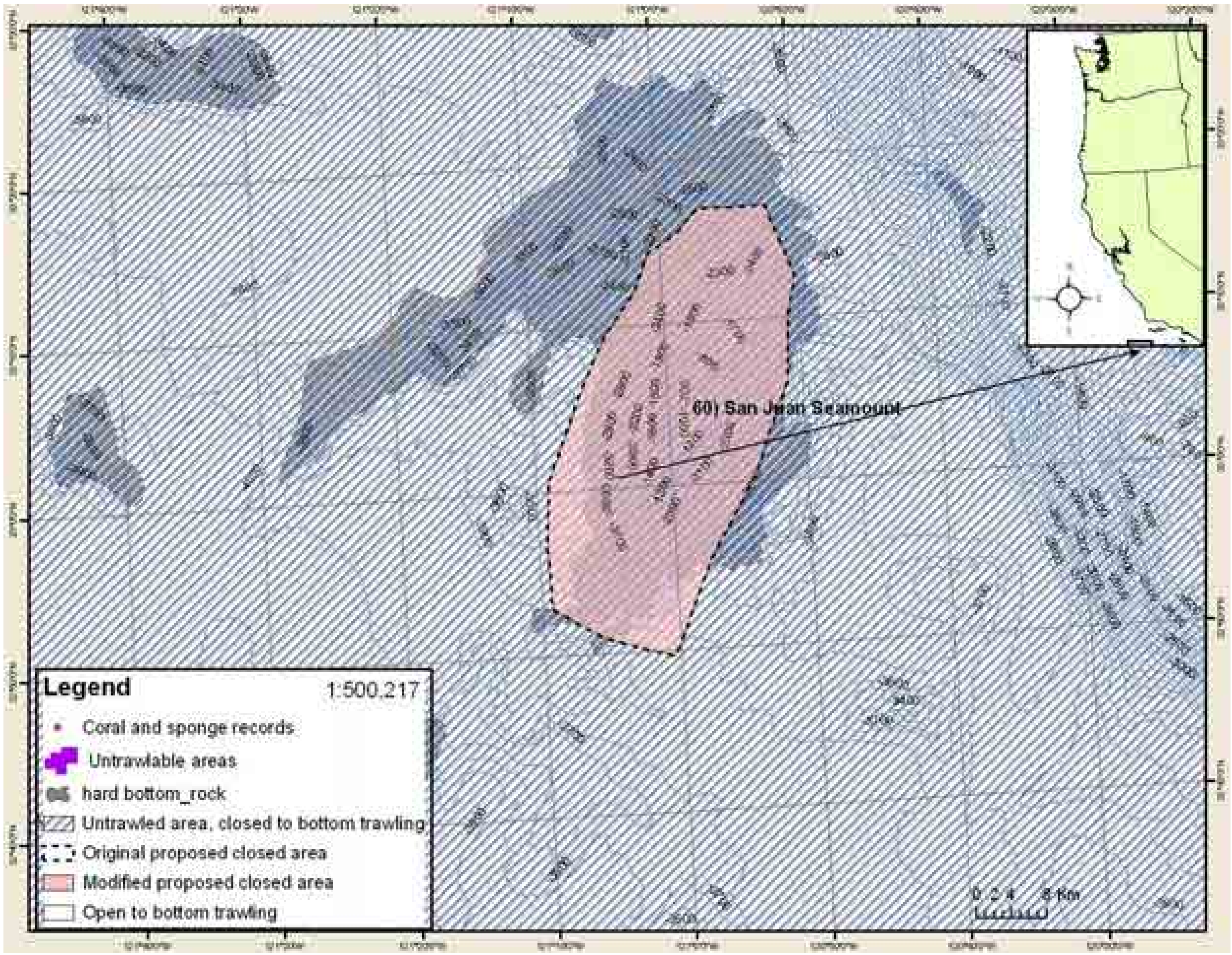
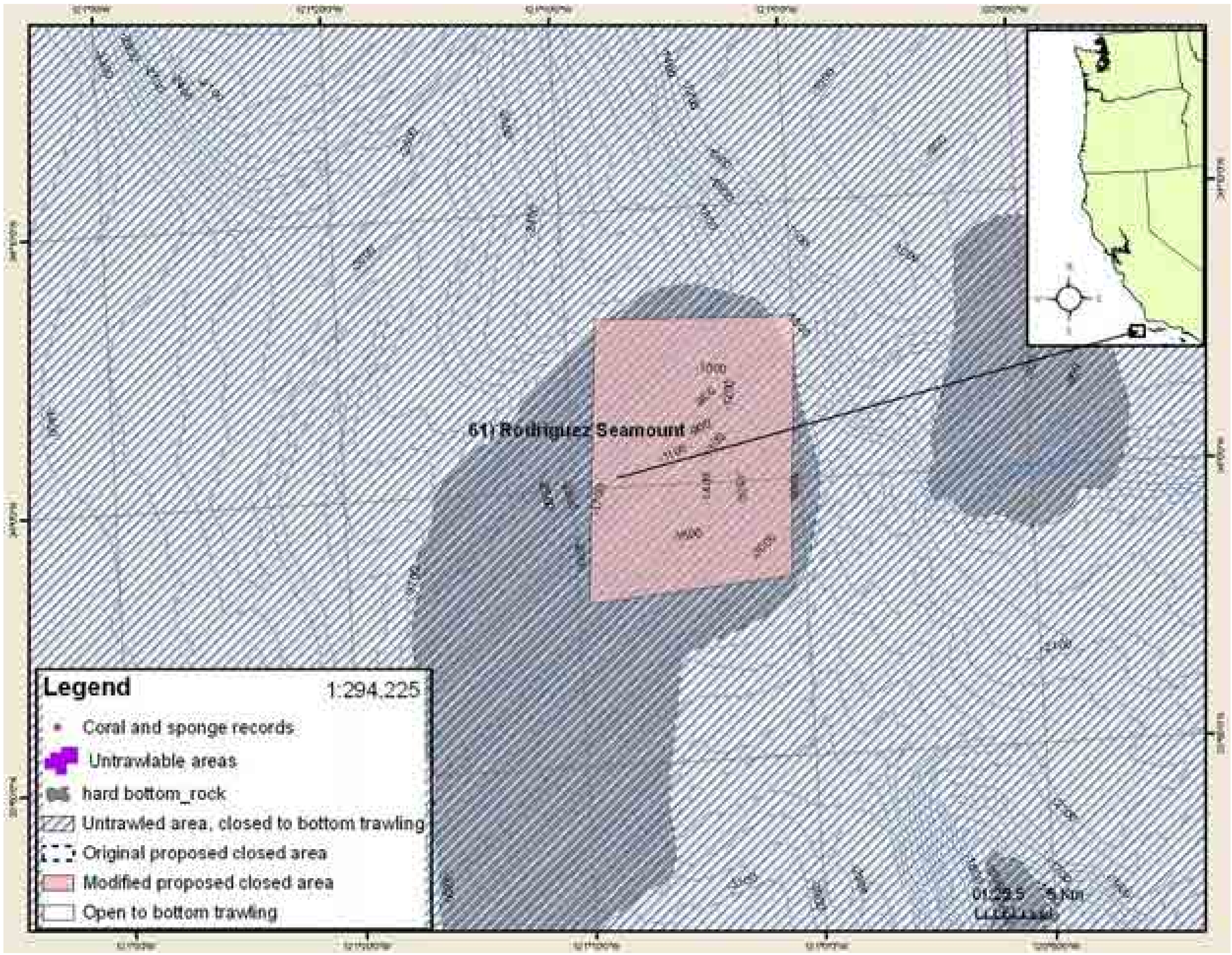


Figure 59: San Juan Seamount

61. Rodriguez Seamount

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $0



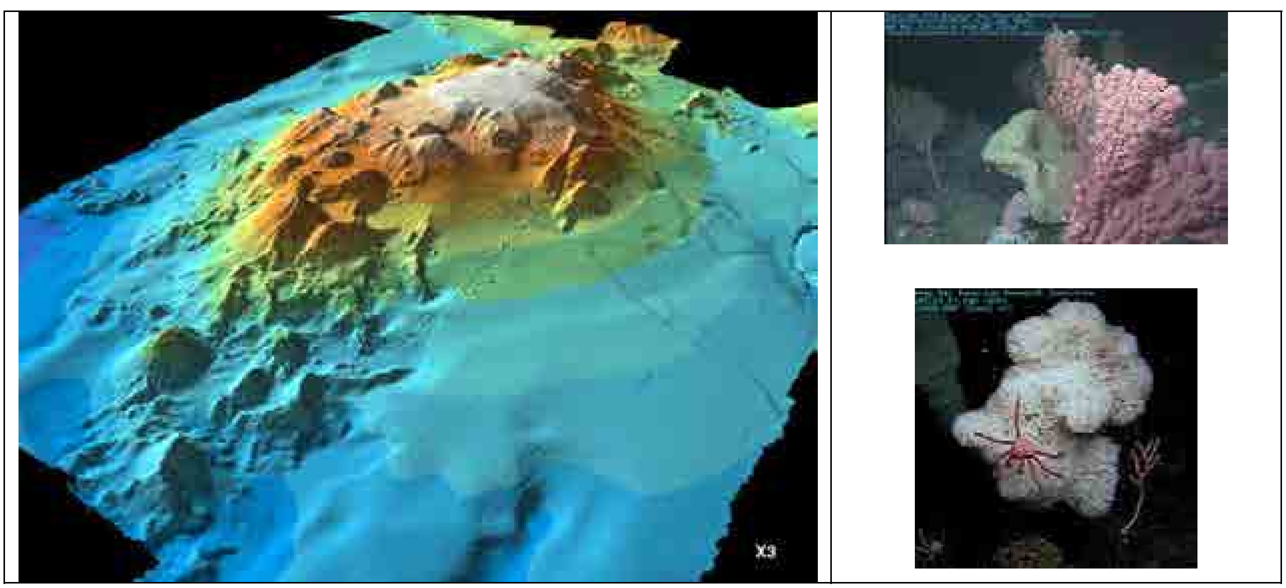


Figure 60: Multibeam image of Rodriguez Guyot off Southern California (left). Large paragorgia sp. corals (right top) and glass sponges (right bottom) are common on this guyot. Courtesy MBARI

Figure 61: San Juan Seamount

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Displacement Comparison Chart of Original Alternative C.12 and Revised Alternative C.12

		Estimated displaced ex-vessel revenue	
Number	Name	Original	Revised
1	Olympic_1	1,286,058	431,115
2	Olympic_2	326,284	280,685
3	Olympic_3	N/A *	395,676
4	Biogenic_1	172,849	36,486
5	Biogenic_2	31,982	15,438
6	Grays Canyon	5,917	34,512
7	Biogenic_3	2,351	4,554
8	Astoria Canyon head #	509,857	33,399
9	Astoria_slope #		74,755
10	Ridges_Biogenic_5	189,585	136,537
11	Nehalem Bank	N/A *	8,824
12	Biogenic_new_1	N/A *	69,960
13	Biogenic_new_2	N/A *	5,969
14	Biogenic_6	3,585	29,402
15	Biogenic_7	76,470	91,908
16	Biogenic_8	36,172	41,852
17	Siletz Reef	N/A *	132
18	Daisy Bank	0	11,768
19	Biogenic_new_3	N/A *	70,573
20	Stonewall Bank	N/A *	7,252
21	Cape Perpetua Reef	N/A *	125
22	Heceta Bank #	379,291	200,810
23	Heceta Escarpment #		28,665
24	Ridges_biogenic_10	12,121	94,628
25	Siltcoos Reef	N/A *	383
26	Cape Arago_Bandon Reef	2,016	12,018
27	Orford and MacKenzies Reef	N/A *	3,929
28	Coquille Bank	N/A *	75,004
29	Rogue offshore slope #	491,706	81,296
30	Rouge Canyon head_ Rouge River Reef #		63,876
31	Brookings_slope	N/A *	48,884
32	Crescent City deep_biogenic_11	2,734	9,635
33	Crescent City_slope	N/A *	49,779
34	Eel River Canyon	551,397	201,696
35	Blunts Reef	N/A *	25,495
36	Mendoncino Ridge	201,902	108,769
37	Delgada Canyon	N/A *	79,978
38	Fort Bragg Canyon	N/A *	51,128
39	Pt Arena offshore	N/A *	47,324
40	Biogenic_12	109,117	61,321
41	Cordell Banks	140,883	49,064

42	Farallon Islands_Fanny Shoal	78	9,967
43	Half Moon Bay	580	41,073
44	Point Sur_deep	0	10,173
45	Monterey Bay and Canyons	645,196	191,468
46	Biogenic area_13	26,257	11,282
47	Big Sur Bank	N/A *	1,694
48	Morro Ridge	258,779	30,125
49	Channel Islands	0	11,016
50	Cowcod conservation area_west	0	0
51	Santa Cantalina	0	2,315
52	Cowcod conservation area_east	0	0
53	Thompson Seamount	0	0
54	President Jackson Seamount	0	0
55	Taney Seamount	0	0
56	Gumdrop Seamount	0	0
57	Pioneer Seamount	0	0
58	Guide Seamount	0	0
59	Davidson Seamount	0	0
60	San Juan Seamount	0	0
61	Rodriguez Seamount	0	0
	Grand Total	**5,463,659**	**3,408,709**
Percent of annual estimated revenue		**22%**	**14%**

* Indicates areas in the revised Alternative C.12 proposal which were not identified in the original Alternative C.12.
\# Indicates areas in the original Alternative C.12 proposal which were split into component areas in the revised Alternative C.12.

As a result of analyses of the spatial distribution of trawl track information from logbooks, input from trawl fishermen, and comments from the SSC, areas of Alternative C.12 were revised to provide for expanded trawl grounds while protection of habitat areas. This revised Alternative C.12 reduces revenue displacement across the EFH area while maintaining integrity of protection/mitigation. The revised Alternative C.12 results in displacement of less than 15% and far less loss in any actual revenue.

The estimates of displaced revenue of the original Alternative C.12 proposal were provided by the WDF&G, who estimated displaced revenue by summing catch from 2003 trawl logbook set points contained within the closed area. The estimates of the revised Alternative C.12 were made by determining the proportional overlap of a closed area with 2000-2003 trawl effort data that was provided in 10 x 10 minute blocks. The proportional method assumes a uniform distribution of fishing effort across a block. However, the revised closed area boundaries were made with the spatial distribution of trawl tracks

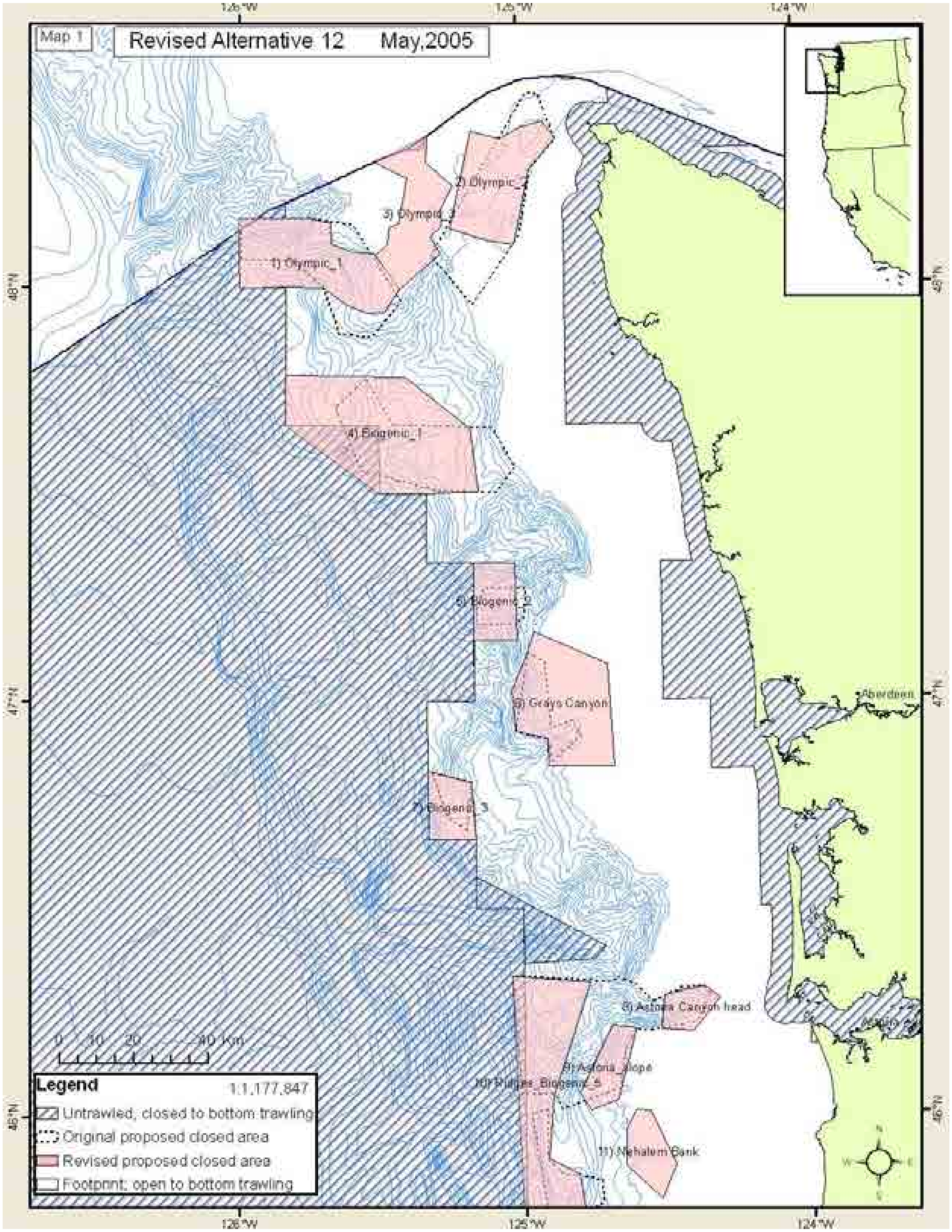

Figure 2: Revised Alternative C.12, Overview Map 1

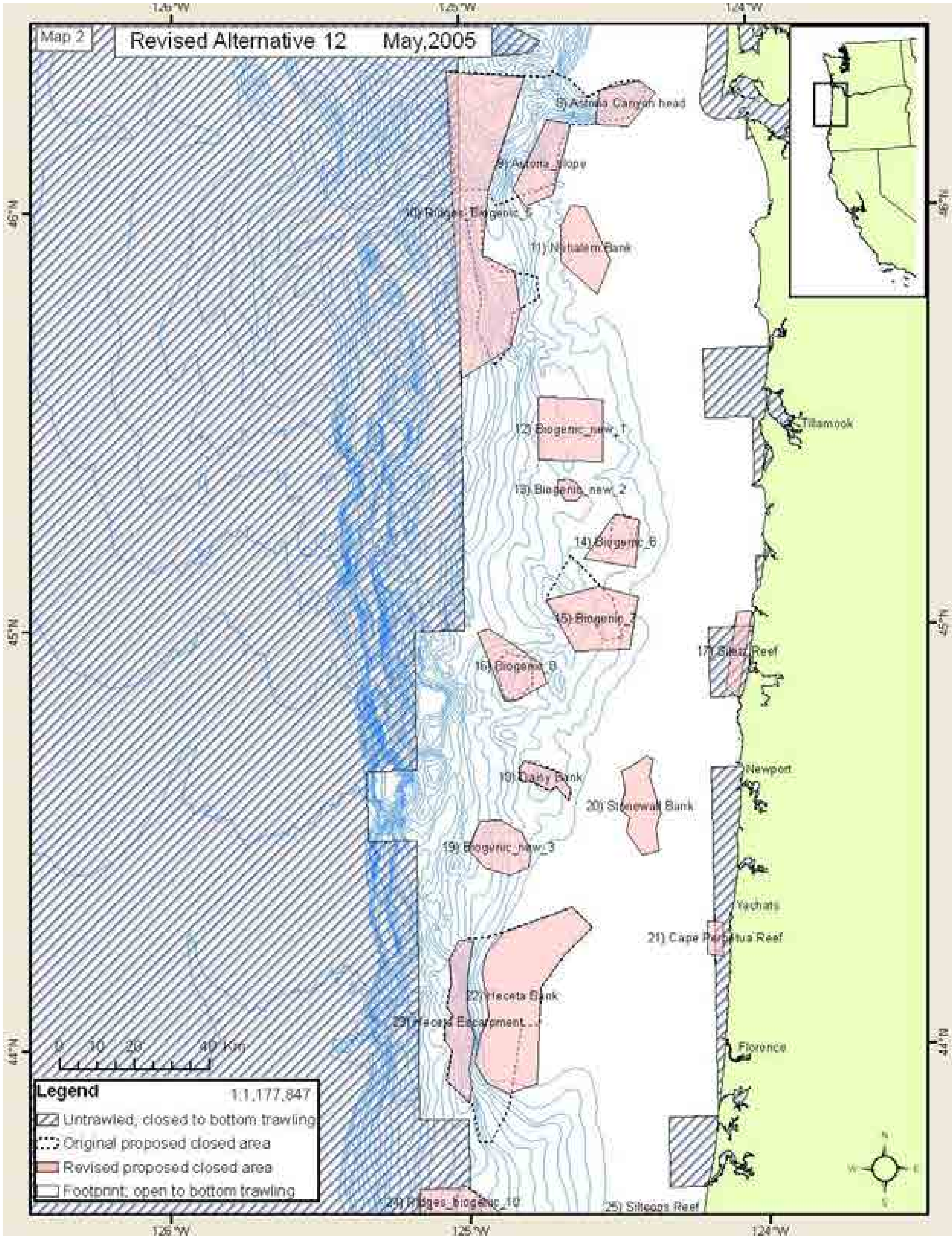

Figure 3: Revised Alternative C.12, Overview Map 2

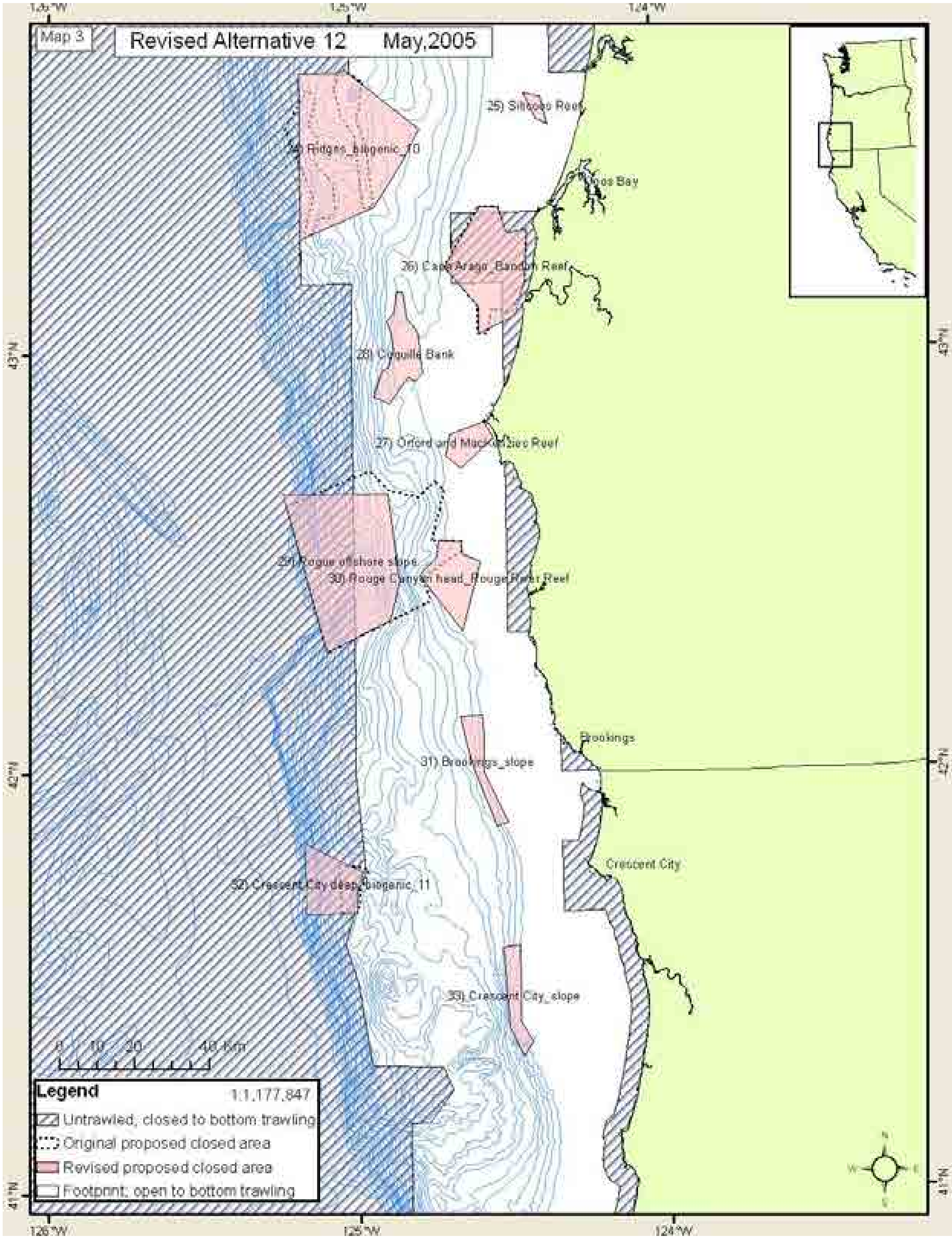

Figure 4: Revised Alternative C.12, Overview Map 3

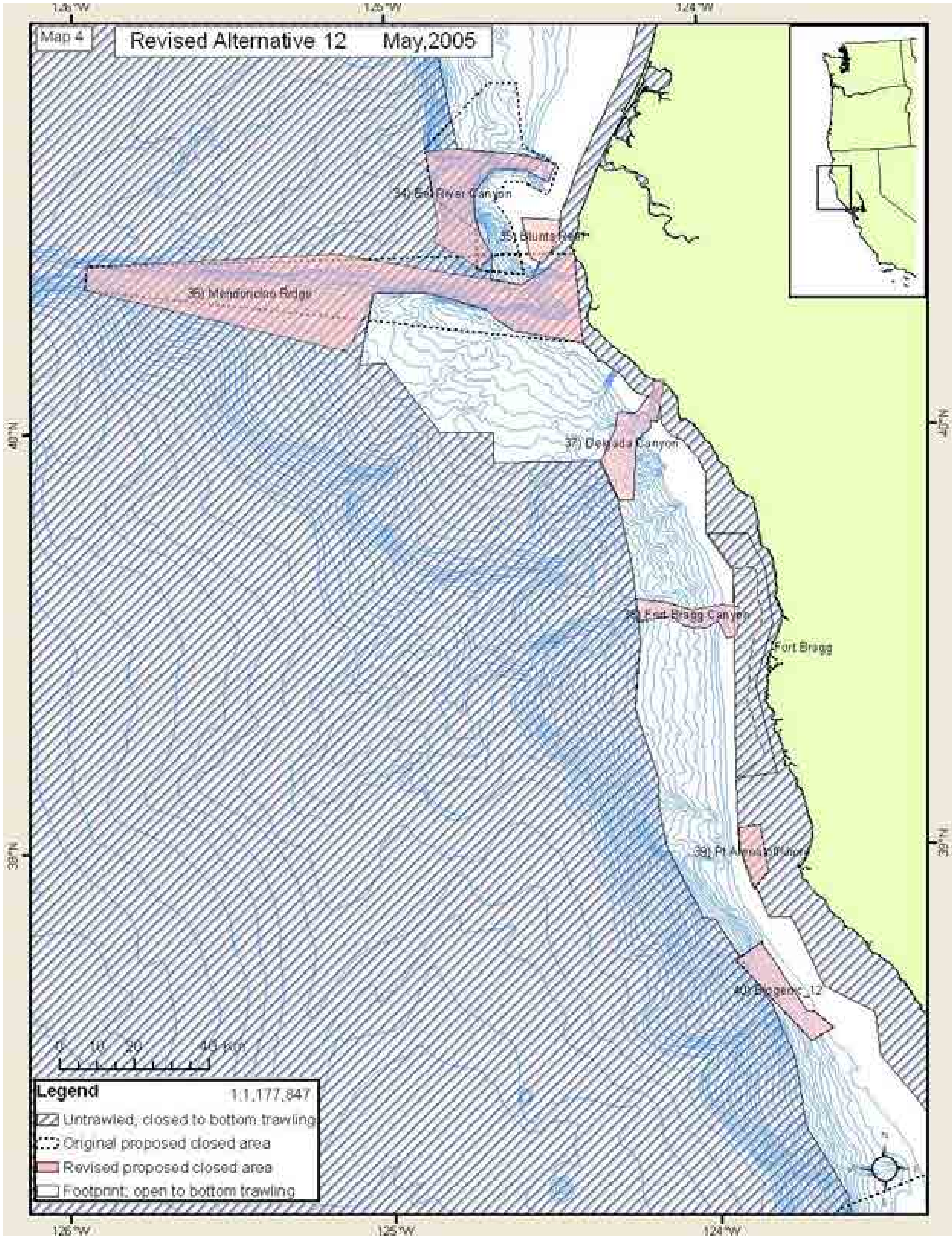

Figure 5: Revised Alternative C.12, Overview Map 4

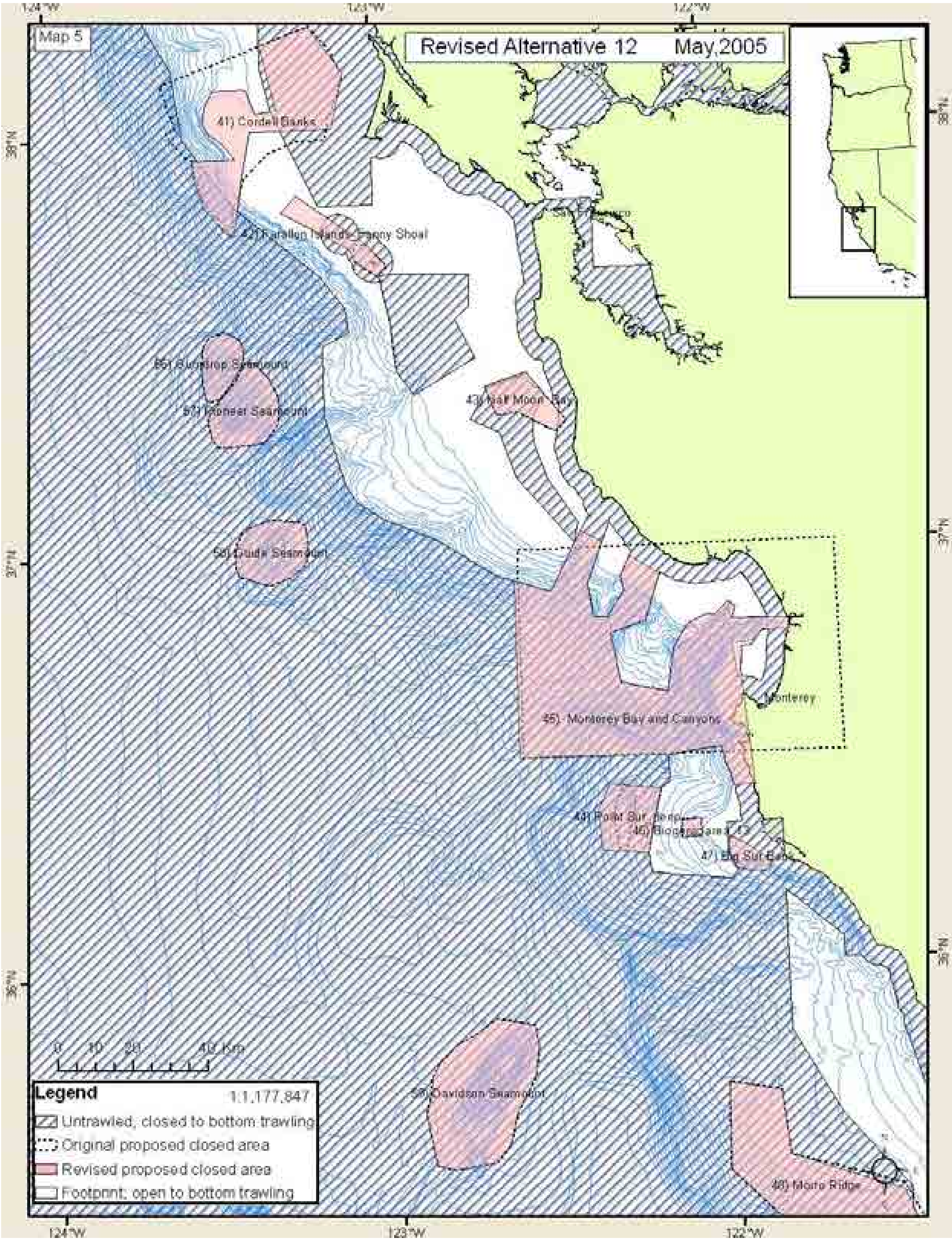

Figure 6: Revised Alternative C.12, Overview Map 5

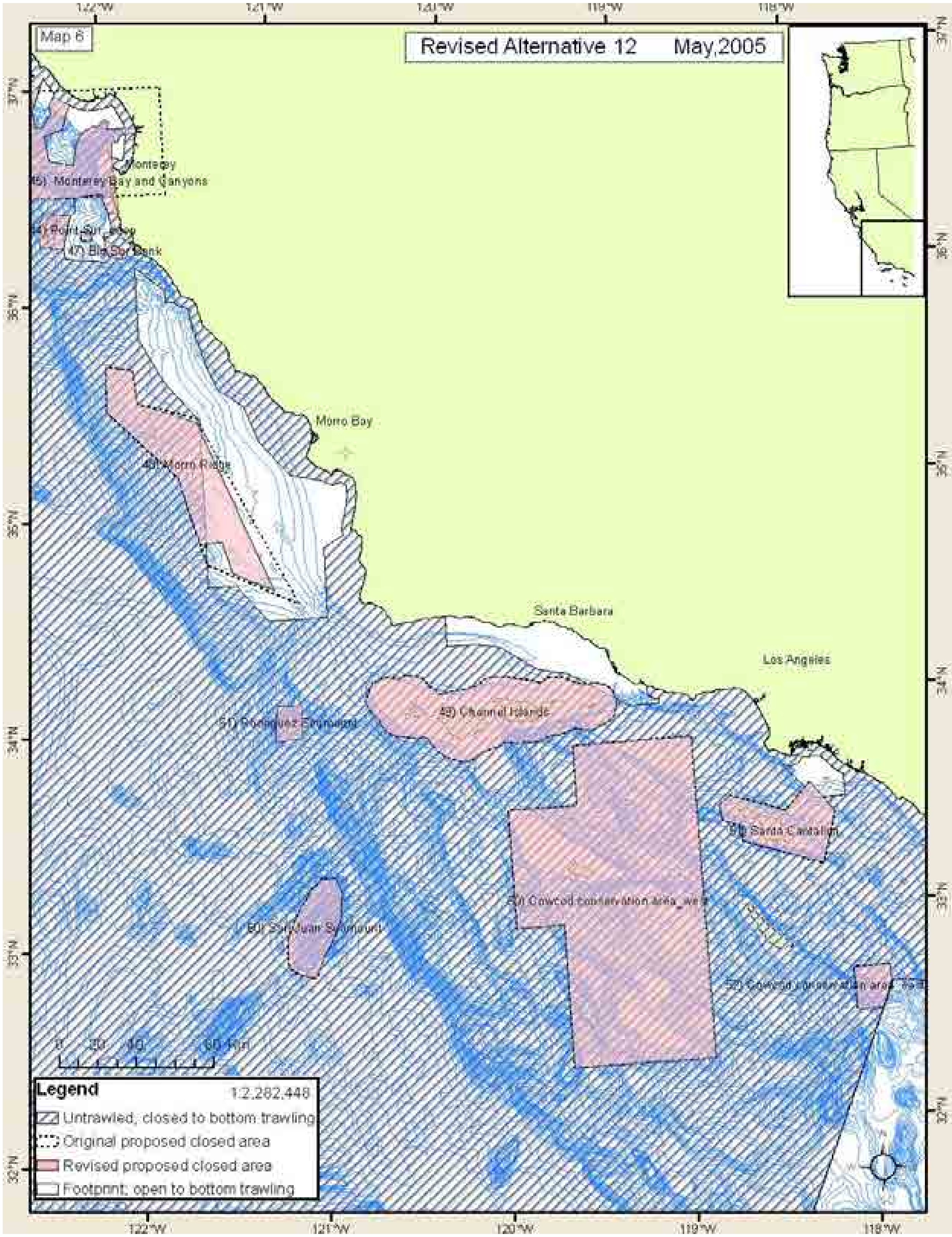

Figure 7: Revised Alternative C.12, Overview Map 6

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DETAILED SUPPORT AND JUSTIFICATON OF REVISED ALTERNATIVE C.12

While perfect information is not available for the designation of Essential Fish Habitat, or the determination of adverse impacts to that habitat, the potential for long-term and perhaps irreversible adverse impacts demands that precautionary action be taken immediately to reduce the impact of bottom trawling on the U.S. West Coast seafloor. The literature on environmental policy generally concludes that higher uncertainty justifies stronger policy intervention to avoid damages than certainty-equivalent cases (i.e. Nordhaus 1994). The reason for this result is that the amount of damage is non-linear. In other words, the increases in damages are greater in the worst case scenario than the decreases in the best-case scenario. This result is highly applicable to the analysis of EFH designation and mitigation measures because of the severity of economic damages in the worst case scenario. For example, if it turns out that commercial fish productivity is strongly tied to the presence of biogenic habitat structures (as suggested in the literature), the long-term effects of continued damage to these habitats would be extremely severe and irreversible from a fisheries perspective. Therefore, even if there is a low probability of this outcome, a comprehensive policy analysis should pay strong attention to this outcome in the evaluation of different policy interventions to minimize adverse impacts to EFH.

While there continue to be uncertainties, a substantial amount of scientific studies and data are available, both to designate Essential Fish Habitat and mitigate the adverse effects of fishing to the extent practicable. Based on the information currently available, it is clear that bottom trawling is causing adverse impacts to Essential Fish Habitat on the U.S. West Coast and that the revised Alternative C.12 (presented in this document) is the most practicable solution to minimize these adverse impacts.

Designation of Essential Fish Habitat

Given the available information concerning designation of Essential Fish Habitat, the alternative most consistent with a precautionary, ecosystem-based management approach to fisheries is Alternative A.2 with the addition of seamounts. This alternative is also consistent with the EFH Final Rule, which speaks directly to the various levels of information which may be available to determine EFH. Section 600.815(a)(1) recognizes four levels of EFH information for each life stage of each species:

(*1*) *Level 1: Distribution data are available for some or all portions of the geographic range of the species.*
(*2*) *Level 2: Habitat-related densities of the species are available.*
(*3*) *Level 3: Growth, reproduction, or survival rates within habitats are available.*
(*4*) *Level 4: Production rates by habitat are available.*

Based on the information presented in the EFH DEIS, it is clear that EFH information is currently at or below Level 1 for most groundfish in the Pacific Coast groundfish fishery. The EFH Final Rule describes how "habitat use" is to be inferred when information is Level 1:

In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred on the basis of distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.

This section also defines the burden of proof standard to be used by the Councils:

Councils should interpret this information in a risk averse fashion to ensure adequate areas are identified as EFH for managed species. Level 1 information, if available, should be used to identify the geographic range of the species at each life stage. If only Level 1 information is available, distribution data should be evaluated (e.g., using a frequency of occurrence or other appropriate analysis) to identify EFH as those habitat areas most commonly used by the species.

Use of the term "risk averse" in this context makes clear that the law and regulations do not require proof of causality before designating EFH, but rather use of whichever level of information is available. When information is at Level 1, any habitat that fish are associated with should be designated as EFH.

Observations of fish outside any given habitat type does not provide evidence that these habitats are not EFH. First, habitat use does not need to be obligate to affect the population of fish. For example, facultative and fortutious habitat use has been shown to enhance fish populations even if the habitat use is not obligate (Mumby et al. 2004). Second, there may be various forms of complex habitat in a given area, giving fish several options to use as shelter, for example. In this case, removal of some of the complex habitat (i.e. corals) decreases the availability of suitable habitats, even though other suitable habitats still remain. Basic ecological theory states that reduction in the availability of suitable habitat reduces the carrying capacity of the species that uses the habitat, even if other suitable habitat remains. This theory is supported by Rubec et al. (1999). Fishery management science in the U.S. is based on the premise that carrying capacity is proportional to maximum productivity (i.e. MSY). Therefore, even if corals are not the only type of complex habitat available to fish, their removal may reduce the productivity of fish. Furthermore, even if biogenic habitat is only utilized by fish at certain times of the year, it may have a strong influence on survivorship or reproductive success. For example, a fish may depend on the presence of biogenic habitat only at specific events such as spawning periods. Even though these events may be infrequent, they have a strong effect on population dynamic processes that determine productivity. Therefore, the absence of fish in biogenic habitat at one specific moment in time is not evidence that the habitat is not linked to the survivorship or fecundity of commercial fish and invertebrates.

Seamounts provide an area of vertical relief from the relatively flat and featureless abyssal plain. As such, seamounts are sites of enriched biological activity with enhanced biomass of pelagic and benthic organisms relative to the surrounding waters (Mullineaux and Mills 1997; Dower and Perry 2001; Haury et al. 2000). Studies indicate that seamounts function as deep-sea islands of localized species distributions, dominated by suspension feeders like corals and sponges which can be easily damaged by fishing gear that makes contact with the bottom (Monterey Bay National Marine Sanctuary, Sanctuary Integrated Monitoring Network, URL: www.mbnmssimon.org/sections/seamounts/overview.php). Recent studies conducted by the Monterey Bay Aquarium Research Institute on West Coast seamounts have documented unique and diverse biological communities. (http://www.mbari.org/volcanism/seamounts/seamountsresearchtop.htm).

Along the crests and slopes of several seamounts, MBARI scientists observed long-lived coral and sponge habitats. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount off California and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. Guyots are a type of volcanic seamount with a flat top or plateau. Because the tops are flat, they may be particularly vulnerable to trawling due to the relative ease of setting trawl gear. The rarity and uniqueness of seamount faunal communities provides strong scientific justification for a highly precautionary approach. Koslow et al. (2001) conducted a survey of Tasmanian seamounts where 30% of species identified were new to science and 30-60% were endemic to particular seamounts.

Accordingly, we support Alternative A.2 with the addition of seamounts as the EFH Description and Identification alternative.

Importance of Structure-forming Megafaunal Invertebrates as Key Components of the Ecosystem and Essential Fish Habitat

Corals, sponges, and other habitat-forming invertebrates provide three-dimensional structure on the seafloor that increases the complexity of benthic substrates. While corals and sponges are the most conspicuous and easily observable biogenic structures, they generally occur in diverse biological communities with other invertebrates such as crinoids, basket stars, ascidians, annelids, and bryozoans. Henry (2001) found thirteen hydroid species collected from only four coral specimens, suggesting that northern corals support highly diverse epifaunal communities. Beaulieu (2001) observed 139 taxa associated with deep-sea sponge communities in the northeast Pacific. Buhl-Mortensen and Mortensen (2004) found 17 species of Pandalus shrimp, isopods, amphipods, copepods, and decapods associated with *Paragorgia arborea* and *Primnoa resedaeformis* in Nova Scotia, including an obligate associated copepod. Removal of habitat structure in relatively low-structure soft-sediment systems significantly decreases biodiversity, and consequently that of the wider marine ecosystem (Thrush et al. 2001). Therefore, protecting known areas of coral and sponge habitat inherently protects areas of high benthic diversity and a host of benthic organisms that provide habitat for fish in the form of food and shelter.

Deep sea corals and sponges provide three dimensional structures that form habitat for commercial groundfish, shellfish, and other marine life (Husebo et al. 2002; Krieger and Wing 2002; Malecha et al. 2002; Heifetz 2002). Deep sea corals and sponges are found at depths from 30 meters to over 3,000 meters (Krieger and Wing 2002). Many cup corals, hydrocorals, and *Metridium* anemones are found at depths as shallow as 15 m. Some larger species of deep sea corals, such as *Paragorgia sp*. can grow over 3 m tall. Because these long-lived filter feeders are attached to the seafloor, they may be important indicators of areas in the ocean that have consistently favorable ecological conditions, such as areas of high upwelling that are worth protecting for other reasons as well.

Based on the best available science, cold water corals and sponges are important Essential Fish Habitat that are vulnerable to the impacts of bottom trawling. In February 2004, over 1,100 scientists signed a consensus statement declaring that "In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas." This statement is corroborated by numerous scientific studies documenting the importance of cold-water corals as habitat for fish and invertebrates. Here are 12 examples:

1. A recent study in the Olympic Coast National Marine Sanctuary (Hyland et al. 2004) corroborates the conclusion reached in other regions that coral and sponge ecosystems are valuable habitat for demersal fisheries on the U.S. West Coast and important "reservoirs of marine biodiversity" (Hyland et al. 2004). This study documented bottom trawl marks in the vicinity and a large proportion of dead or broken corals.
2. Krieger and Wing (2002) identified 10 megafaunal groups associated with *Primnoa sp*. deep sea corals, that use the corals for feeding, breeding, and protection from predators. Six rockfish species were either beneath, among, or above the coral colonies. Shrimp were among the coral polyps and a pair of mating king crabs was hiding beneath the coral. The authors conclude that removal of these slow-growing corals could cause long-term changes in associated megafauna.
3. Dr. Milton Love (pers. comm.) identified large schools of juvenile rockfish (including widow and squarespot rockfish) closely associated among the branches of the newly-discovered "Christmas tree coral", likely using the coral for protection. This deep sea coral species was named based on the numerous associated species that clung to the branches like Christmas ornaments (Opresko 2005).
4. Mortensen et al. (1995) identified megafauna associated with deep sea coral bioherms in Norway, including redfish, saithe, squat lobsters, sponges, and gorgonians (*Paragorgia arborea*, *Paramuricea placomus*, *Primnoa resedaeformis*).
5. Buhl-Mortensen and Mortensen (2004) documented 17 crustacean species associated with cold-water gorgonian corals off Canada, most of which were using the habitat as protection from predators and some were obligate to the corals. This suggests corals provide habitat for commercial fish prey.
6. Husebo et al. (2002) found that the largest catches of redfish (*Sebastes marinus*) were made with long-line fleets set in deep sea coral reef habitats. Ling and tusk were also most numerous in coral habitats, although not statistically significant. Fish caught in coral habitats tended to be larger in size than in non-coral habitats. Reasons for the associations were feeding and physical structure.
7. Christiansen and Lutter (2003) cite evidence that commercially caught demersal and pelagic fish species, mainly redfish, saithe, ling and tusk, have a higher abundance near deep sea coral reefs and patches.
8. Costello et al. (2003) found that fish species and abundance was greater on the deep sea coral habitat than surrounding seabed; 69% of species and 79% of abundance was associated with the reefs.
9. Koenig et al. (2003) state that important predatory fish species have been seen aggregating around the larger coral structures of *Oculina sp*. deep sea corals off Florida, and small fish have taken up residence inside the modules.
10. Scott and Risk (2003) found abundant fish associated with *Primnoa* which are not common in areas where coral is absent. The authors state that deep sea corals off Canada are being rapidly depleted by bottom trawling, which in turn appears to have an impact on fish stocks.
11. Sulak et al. (2003) listed economically important fish species observed in deep sea coral habitat, several of which were restricted to this habitat. The authors also found several poorly known fish species associated with deep sea corals.

12. Brodeur (2001) documented Pacific Ocean perch using sea whip forest habitat in the Pribilof Canyon in the Bering Sea on a diel cycle as resting areas.

Sponges represent a major component of biogenic fish habitat that has not received the level of attention as corals. However, sponges are a diverse group of large, slow-growing seafloor animals that provide habitat for fish and invertebrates on the U.S. West Coast. There are two major groups of sponges on the U.S. West Coast: hexactinellid (glass) sponges and demosponges. Sponges can reach sizes of 3 meters high and provide complex three dimensional structure on the seafloor. Large glass sponges found off the coast of British Columbia have been age dated to be 220 years old, and the average size based on current knowledge of growth rates is 35 years (Leys and Lauzon 1998). Several studies worldwide have documented the importance of sponges as fish habitat:

1. Freese and Wing (2003) documented that Aphrocallistes sponges provide habitat for juvenile red rockfish in the Gulf of Alaska. The authors state that the fish observed in the study benefited from the sponges through predator avoidance and that bottom trawl damage to sponge communities would be expected to have a negative impact on juvenile red rockfish survival rates.
2. Eastman and Eakin (1999) documented fishes of the genus Artedidraco are associated with sponge beds in the Ross Sea of Antarctica.
3. Tokranov (1998) described the association of the sponge sculpin (*Thyriscus anoplus*) with sponge beds in the northern Kuril Islands.
4. Konecki and Targett (1989) found that cod icefish (*Lepidonotothen larseni*) lay their eggs on the biogenic substrate provided by the spongocoel of the hexactinellid sponge *Rossella nuda* off Antarctica. The authors state that glass sponges serve as important nesting and refuge sites for Antarctic fishes and that destruction of sponge communities by bottom trawling could have an adverse impact of the fish ecology of the region.
5. Moreno (1980) and Daniels (1978) documented several species of fishes known to utilize sponges as spawning and nesting sites and for predator avoidance.
6. Munehara (1991) established that the silverspotted sculpin (*Blepsias cirrhosus*) uses the sponge *Mycale adhaerens* as a spawning bed and that the eggs benefit from the association through predator avoidance, oxygen supply, and the antibacterial and antifungal properties of the sponges.
7. Herrnkind and Butler (1994 identified sponges as “benthic juvenile shelter” for spiny lobster in Florida Bay that were found to be one of the most productive sites for survival of postlarvae.
8. Rocha et al. (2000) found that sponges are habitat 'oases' in a desert of rubble and flat rocky bottoms in Brazil. The study identified fish associations with shallow and deepwater sponges, including several obligate associations and and four endemic species of fishes associated with deepwater sponges.

The following species are known to associate with corals and sponges: rougheye rockfish, redbanded rockfish, shortraker rockfish, sharpchin rockfish, Pacific Ocean perch, dusky rockfish, yelloweye rockfish, northern rockfish, shortspine thornyhead, several species of flatfish, Atka mackerel, golden king crab, shrimp, Pacific cod, walleye pollock, greenling, Greenland turbot, sablefish, and various non-commercial marine species (Freese 2000; Krieger and Wing 2002;

Heifetz 1999; Else et al. 2002; Heifetz 2002). Red tree corals (*Primnoa sp.*) are known to provide protection from predators, shelter, feeding areas, spawning habitat, and breeding areas for fish and shellfish and are found throughout the U.S. West Coast (Krieger and Wing 2002). Stone (preliminary data, 2004) found an 87% rate of association between adult Alaskan FMP species and biogenic habitat and a 100% association rate for juveniles. Kaiser et al. (1999) found that biogenic habitat structure is an important component of demersal fish habitat, and observed higher densities of gadoid fish species associated with structural fauna such as soft corals, hydroids, bryozoans, and sponges in the southern North Sea and eastern English Channel. Husebo et al. (2002) found that the largest catches of redfish (*Sebastes marinus*) were made with long-line fleets set in deep sea coral reef habitats. Rocha et al. (2000) found that sponges are habitat 'oases' in a desert of rubble and flat rocky bottoms in Brazil. Reed (2002) in a study of deep water *Oculina* reefs along eastern Florida, noted extensive areas of *Oculina* rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990. Prevention of damage by bottom trawls to corals and other "living substrates" may increase the amount of protective cover available to slope rockfish to escape predation, increase survival of juvenile fish and thus have a positive impact on the stocks (Alaska Region EFH EIS).

Managed fish species in the PFMC management region using structure-forming invertebrates (such as corals, basketstars, brittlestars, demosponges, gooseneck barnacles, sea anemones, sea lilies, sea urchins, sea whips, tube worms, and vase sponges) as biogenic habitat include: Arrowtooth flounder, big skate, bocaccio, California skate, cowcod, Dover sole, flag rockfish, greenspotted rockfish, lingcod, longspine thornyhead, Pacific ocean perch, quillback rockfish, rosethorn rockfish, sablefish, sharpchin rockfish, shortspine thornyhead, spotted ratfish, starry rockfish, tiger rockfish, vermilion rockfish, yelloweye rockfish, and yellowtail rockfish (Pacific EFH DEIS).

Bottom Trawling Causes Adverse Impacts to Essential Fish Habitat

Adverse impacts to essential fish habitat from fishing that are more than minimal and not temporary is the legal trigger requiring mitigation measures. Based on the information included in the EFH DEIS and additional studies not considered in the document, it is clear despite the present uncertainties that bottom trawling taking place under the current Groundfish Fishery Management Plan is having adverse impacts on Essential Fish Habitat that are more than minimal and not temporary.

There is general scientific consensus that bottom trawling has wide ranging effects on habitats and ecosystems. According to the National Research Council (2002) Report on the Effects of Trawling and Dredging on Seafloor Habitat, these adverse impacts include:

- changes in physical habitat of ecosystems
- changes in biologic structure of ecosystems
- reductions in benthic habitat complexity
- changes in availability of organic matter for microbial food webs
- changes in species composition

• reductions in biodiversity.

These statements are corroborated by numerous scientific studies from around the world corroborate the conclusion that bottom trawling causes adverse impacts to biogenic habitat. Here are 31 examples of these studies:

1. Hyland et al. (2004) documented bottom trawl marks in the vicinity of coral and sponge beds in the Olympic Coast National Marine Sanctuary and observed a large proportion of dead or broken corals.
2. Engel and Kvitek (1998) compared heavily trawled and lightly trawled areas in otherwise similar regions off Big Sur, CA, finding lower epifaunal invertebrate densities at the more heavily trawled site. The authors conclude that intensive trawling significantly decreased physical habitat heterogeneity and biodiversity.
3. Grehan et al. (2003) found evidence that deep sea corals are being destroyed by trawling, as evidenced by trawl scars, flattened coral rubble, barren sediment, and lost trawl gear. The authors state that this provides irrefutable proof of a serious threat to the marine ecosystem caused by fishing that warrants immediate emergency measures to protect the remaining corals.
4. Conway et al. (2003) studied the environmental conditions where sponge reefs are found and discovered that like deep-sea coral reefs, many of the hexactinosan sponge reefs in British Columbia have been damaged or destroyed by the groundfish trawl fishery.
5. Hall-Spencer et al. (2002) document widespread trawling damage to cold-water coral reefs at 840-1300 m depth along the West Ireland continental shelf break and at 200 m off West Norway. The trawled coral matrix was at least 4550 years old. The authors discuss the need for urgent conservation measures to protect these corals.
6. Lundalv and Jonsson (2003) found about 50% of investigated coral sites in the Kosterfjord area to be destroyed by recent bottom trawling, while the remaining areas exhibit major signs of trawl damage.
7. Mortensen et al. (2003) found signs of fishing impact such as broken live corals, tilted corals, and scattered skeletons. Broken or tilted corals were observed along 29% of the transects.A total of 4 % of the coral colonies observed were impacted.
8. Fossa et al. (2002) developed an estimate of 30-50% of the deep sea coral *Lophelia* reefs in Norway have been damaged by bottom trawling and that fishermen claim that catches are significantly lowered in areas where the reefs are damaged.
9. Koslow et al. (2001) sampled the benthic fauna of Tasmanian seamounts finding high abundance and diversity of hard and soft corals, hydroids, sponges, ophiuroids, and sea stars, a large fraction of which were new to science. This study also found that heavy trawling has completely removed the reef aggregations.
10. Wassenberg et al. (2002) documented direct removal of sponges caused by trawling, accompanied by long-term changes in species composition over time.
11. Ardizzone and Pelusi (1983) and Ardizzone et al. (2000) found bottom trawling to reduce the quality and quantity of Posidonia oceania beds, a biogenic habitat in the Mediterranean Sea.
12. Hall-Spencer and Moore (2000) found a 70% reduction in maerl thalli habitats, which have important ecological functions, with no recovery after four years.
13. Kaiser et al. (1996) conducted a multivariate analysis showing that both beam trawling and dredging reduce the abundance of most epifaunal species in the Irish Sea.

14. Kaiser et al. (2000a) found that chronic fishing has caused a shift from communities dominated by relatively sessile, emergent, high biomass species to communities dominated by infaunal, smaller-bodied fauna. Removal of emergent fauna has thus degraded the topographic complexity of seabed habitats in areas of high fishing effort. The authors note that communities within these areas currently may be in an alternative stable state.
15. Ault et al. (1997) found conspicuous long-term damage to sponges and soft corals after one pass of a trawl and that the sponge *Ircina felix* and corals of the genus *Pseudoplexaura* appeared to be the taxa most vulnerable to breakage or dislodgement by trawling.
16. Collie et al. (1996), Collie et al. (1997), and Collie et al. (2000) found conspicuously and significantly reduced abundance of colonial epifaunal species that provide complex habitat for shrimp, polychaetes, brittle stars, and small fish at sites disturbed by bottom fishing in Georges Bank, and found that many species whose abundances were reduced were also prey for commercial fish.
17. DeAlteris et al. (2000) discuss physical impacts and biological alterations in community structure caused by trawling in New England and recommended closure areas to reduce the impact of mobile fishing gear on habitat and biodiversity.
18. Magorrian (1995) found otter trawling to remove emergent epifauna and reduce the structural complexity of mussel beds in Strangford Lough, and recommended marine reserves as a management tool.
19. McAllister and Spiller (1994) found that trawling and dredging have major impacts on marine habitats by removing protruding invertebrate animal life including sea anemones, sponges, sea squirts, crinoids and many others which provide shelter and food sources for juvenile fish and shellfish. Specific trawling effects in the study included shearing off higher hummocks, filling in low spots, changing the configuration of the bottom, removing areas more exposed to or protected from the current, exposing shellfish, worms and other sediment dwelling species to predation, and stirring up clouds of mud and other sediment that plug gills and similar structures of filter feeders. The authors recommend closures, control areas, and conversions to less damaging gear types.
20. Norse and Watling (1999) state that trawling damages refuges from predation and feeding places for demersal fish, which are correlated with species diversity and post settlement survivorship of some commercial species.
21. Pitcher et al. (2000) found that total annual removal of benthic fauna ranged from very low to over 80% in areas of highest trawl intensity in Australia's Great Barrier Reef. They found that highly vulnerable populations of epifaunal species may be depleted by about 55% overall and there will be a substantial alteration in most trawled grids with a shift to less vulnerable species.
22. Reed (2002) in a study of deep water Oculina reefs along eastern Florida, noted extensive areas of Oculina rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990.
23. Rumohr et al. (1994) found reductions in abundance of epifauna and absence of inner structures (feeding burrows, living chambers, tubes) in areas impacted by trawling in the German Bight.
24. Bavestrello et al. (1997) found fishing damage to gorgonian corals in the Ligurian Sea, found slow recolonization and recovery rates for these corals, and recommended special protection for these corals as a Natural Marine Park.

25. Stone and Malecha (2003) state that "gardens of corals, sponges, and other sessile invertebrates" were similar in structural complexity to tropical coral reefs with which they shared several important characteristics including complex vertical relief and high taxonomic diversity. The authors note the particular sensitivity of these habitats to disturbance and observed anthropogenic disturbance to corals.
26. Wheeler et al. (2003) found broken coral rubble and dead coral in areas of higher trawl intensity, whereas untrawled areas had a much higher abundance of undisturbed upright coral colonies.
27. Van Santbrink and Bergman (1994) documented 70% mortality to anthozoans after two passes of a beam trawl in the southern North Sea.
28. The NMFS Alaska Fisheries Science Center website (NMFS 2004) shows several underwater video clips taken with a Remotely Operated Vehicle. Clip 9 shows heavily trawled coral habitat containing "broken-up coral debris in this area -- heavily damaged". (http://www.afsc.noaa.gov/race/media/videos/vids_habitat.htm)
29. Anderson et al. (2003) documented high levels of coral and sponge bycatch in the New Zealand orange roughy trawl fishery.
30. MacDonald et al. (1996) made several estimates of habitat sensitivities to physical disturbance, concluding that fragile, slow recruiting animals are the most susceptible to disturbance.
31. Van Santbrink and Bergman (1994) documented mortality rates of several benthic species as a result of two passes of a trawl.

Bottom trawling is the leading, most widespread cause of reduced habitat complexity that is taking place among major fishing grounds along the North American continental shelf. As trawl gear can crush, displace, expose and bury marine life on the sea floor, habitats that are trawled are far more likely to have reduced overall species diversity. Those organisms remaining after extensive periods of trawling tend to be "comprised of large numbers of a few opportunistic species" (Norse and Watling 1999). The study found that the extent of the disruption of a habitat's complexity is dependent upon how long the area has to recover between trawls, how extensive the damage is from the trawling gear, and whether the habitat is constituted primarily of quick-recovering short-lived species or of slow growing, long-lived species.

The National Research Council (2002) Report concludes that the impacts of trawling can lead to measurable changes in benthic habitats over time, with the greatest impact on those communities which are ecologically most complex. Extended trawling over the same habitat can lead to "a shift from communities dominated by species with relatively large adult body size towards dominance by high abundances of small-bodied organisms." More significantly, areas of intense trawling activities have the potential to be permanently affected and will lead to the emergence of short-lived organisms which are "readapted to conditions of frequent physical disturbance." (NRC 2002).

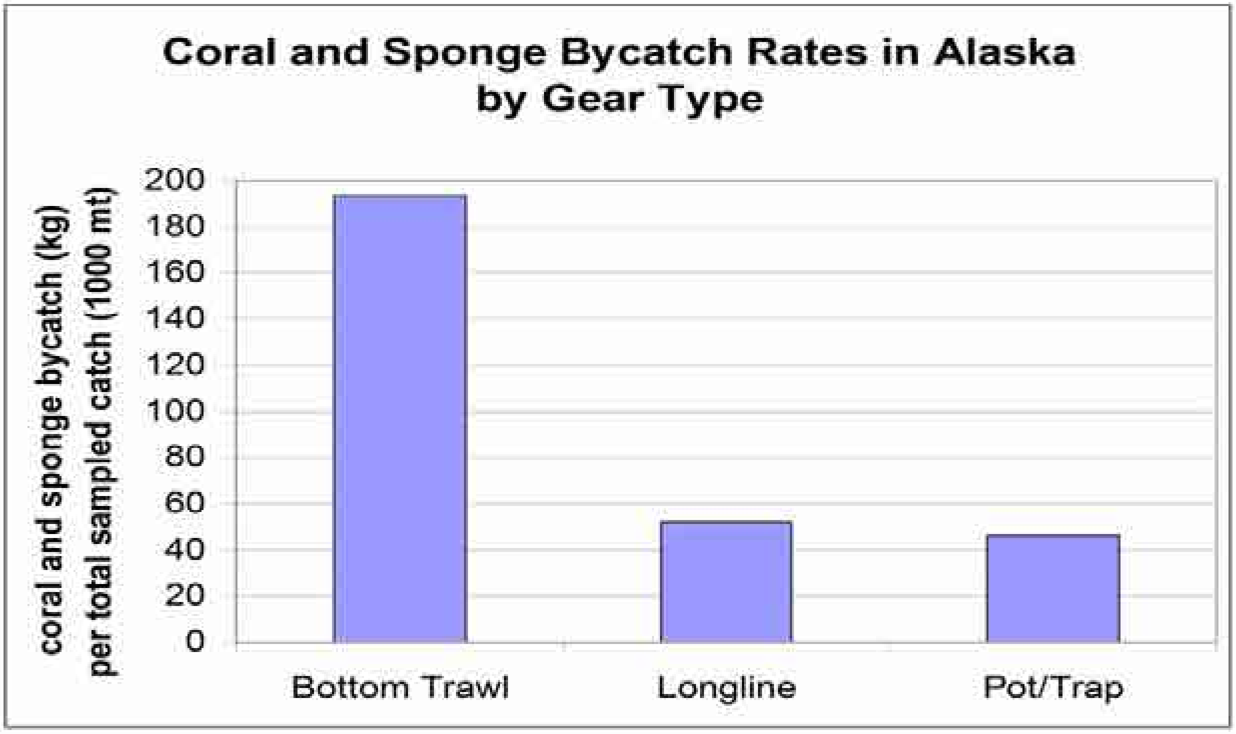

Figure 1: Bycatch rates for groundfish fishing gears in Alaska, based on data from 1990-2002. Bycatch rates are defined as the weight of reported bycatch divided by the weight of total sampled catch. These rates may not reflect actual damage to seafloor since fishing gears may not retain all corals and sponges that are impacted. However, they are useful for looking at relative impacts of different gears in a Benefit-Cost Analysis. Data source: NMFS (from Shester and Ayers 2005)

Bycatch of habitat-forming invertebrates constitutes direct evidence of adverse impacts of fishing to biogenic habitat (i.e. reduction in quality and quantity). The West Coast groundfish observer program (WCGOP) was established to obtain more precise estimates of fishery discards and total catch (NMFS 2003). For the same reasons that the data from the WCGOP improves the accuracy of catch estimates for overfished groundfish, observer data can and should be used to both evaluate the impacts of fishing on EFH and develop mitigation measures in the EFH EIS. In fact, a repeated criticism of the Alaska Region EFH DEIS by the Center for Independent Experts was that coral, sponge, and bryozoan bycatch from observer records were not analyzed, utilized, or incorporated (Drinkwater 2004).

Trawling will have the greatest impact upon marine flora and fauna that has adapted to exist in areas of low natural disturbance. Ecological disturbance theory suggests that the extent to which an organism within a habitat can recover from an anthropogenic disturbance (i.e. bottom trawling) is dependent upon the overall stability of the habitat prior to that disruption taking place. Organisms living in habitats that consist of easily dispersed sediments are far more likely to adapt more quickly to the new conditions following a trawl than would those organisms that normally do not experience extensive disruptions. Conversely, a habitat that consists of deep-water boulders or corals is far less likely to have extensive natural disruptions. Such "epifaunal communities that stabilize sediments, reef-forming species, or fauna in habitats that experience low rates of natural disturbance have been observed to be particularly vulnerable" to disruptive activities such as commercial bottom trawling (NRC 2002). This is especially important given that confluence of various advances in fishing technology – such as larger boats with more powerful engines, more robust mobile fishing gear and fish-finding technologies – has allowed fishers to seek out groundfish in areas, such as the deepwater slopes of the continental shelf, that just decades ago would have been impossible to reach.

These findings, taken together, indicate that the effects of highly-destructive fishing gears such as trawls will have a disproportionate impact upon structurally complex, interconnected ecosystems as found in shallow and deep-water coral habitats. These habitats which have grown over the period of several hundred years or more and exhibit a low capability to adapt to increased levels of disruption. That is, as trawling tends "to eliminate competitively dominant, long-lived but disturbance-sensitive structure-forming benthic species" and frees "up food and space for shorter-lived, disturbance-insensitive opportunistic (weedy) species" it represents a critical threat to corals, sponges, and other biogenic seafloor habitats that are clearly Essential Fish Habitat within the Pacific Fishery Management Region based on the best available science. (quotations from Watling and Norse 1999).

Adverse Fishing Impacts on the U.S. West Coast

This section outlines the rational basis for the determination that the adverse impacts of bottom trawling on U.S. West Coast Essential Fish Habitat are "more than minimal and not temporary".

The EFH Final Rule includes "site-specific or habitat-wide impacts" in its definition of adverse impacts on EFH. (50 CFR 600.810(1)). The Risk Assessment conducted in Appendix A of the EFH DEIS contains an analysis of the effects of fishing on Essential Fish Habitat. The main document includes the various data sources that were used in the analysis (p. 73-74). The strength of the model in its current form is that it provides generalized comparisons of different habitat types and fishing gears. Page 77 of the Appendix A main document states that

In terms of major habitats, biogenic habitats are more sensitive than hard bottoms (although we note that the former may occur on the latter) and these are much more sensitive than soft bottoms.

In terms of the major gear types, dredges are most impacting, followed by bottom trawls, and these are much more impacting than nets which are more impacting than pots & traps and hook & line (including longlines).

Therefore, consistent with the global literature, the model successfully identifies biogenic habitats and hard substrates as focus areas for mitigation measures and bottom trawls and dredges as the gear types with the greatest effect. Where the model stops short is in its estimation of actual impacts caused by the current groundfish management regime.

While the analysis overall has some merits, Appendix A of the EFH DEIS claims that there are two main limitations to current understanding of the impacts of fishing on habitat: 1) the relationship between fishing effort and habitat modification, and 2) the relationship between habitat modification and ecosystem productivity (including fish productivity). (Appendix A Risk

Assessment Main Document p.74). The document claims that "[p]resently there are very little data to fill either of these gaps". These "gaps" are used to justify the used of relative indices rather than actual numbers. These statements are simply unreasonable in a document that is intended to provide the public with a detailed understanding of the environmental impacts of federally authorized actions. Further, the reference to fish productivity unlawfully limits the inquiry and analyses:

"It is not appropriate to require definitive proof of a link between fishing impacts to EFH and reduced stock productivity before Councils can take action to minimize adverse fishing impacts to the extent practicable. Such a requirement would raise the threshold for action above that set by the Magnuson-Stevens Act."

67 Fed. Reg. 2343, 2345 (Jan. 17, 2002).

The EFH DEIS provides no justification that the two main limitations described in the Risk Assessment are valid nor does it provide a rationale for using relative indices rather than best estimates from the literature. On the contrary, there have been numerous studies providing direct quantifications of the relationship between trawl effort and habitat modification. Further, even were productivity an appropriate measure, there are also many methodologies in the literature that can be used to estimate the relationship between productivity and habitat features even in cases of high uncertainty.

Swallow (1990) presented a dynamic model for assessing the impacts of a renewable resource, fish, as a result of reductions in a non-renewable resource, habitat. The model result is that if habitat impacts are not considered in the coupled resource management system, the adverse impacts to habitat are systematically higher than the economic "optimal". This confirms the theoretical result that fish habitat damage externalities systematically increase the habitat damage above the optimal outcome, reducing the productivity of the renewable resource. Thus the failure to account for the externality causes a market failure. Due to the long recovery times of corals and sponges (approaching consideration as a "non-renewable resource", this model is appropriate and applicable to answer the question about fisheries productivity. Another example is provided in Mangel (2000), which developed a model based on Beverton-Holt and Ricker-like recruitment functions showing that loss of spawning habitat is equivalent to additional fishing mortality of the adult stock; or in other words, productivity loss.

Mangel's (2000) model indicates that there may be a lag time in habitat-mediated changes in fish productivity between when habitat damage occurs and fish productivity declines. This may occur based on demographic features of fish stocks, such as long life spans and/or lag times in the effects of density dependence on mortality. Mangel (2000: p 672) states that "…neither catch nor stock is a good indicator of what is happening to the habitat: the decline lags behind habitat destruction and the recovery lags behind habitat restoration. Habitat itself must be monitored." Mangel (2000) backs this statement through a mathematical model based on modern fishery models used in fishery management.

The use of indices rather than expected values is the fundamental flaw in the impacts model. When indices are used, impacts can only be determined relative to each other. While this may be a useful way to identify the most harmful activities, relative indices eliminate the ability to assess or evaluate the absolute impacts. While it is clear that there may be uncertainty with expected values, the data exists to provide numerical best estimates and standard deviations from available literature. In fact, the Alaska Region EFH DEIS contained an impacts model that compiled available information into "best estimates" of actual numerical figures based on literature on the impacts of trawling. While the ultimate conclusion in the Alaska EFH EIS was based on an unlawful definition and interpretation of the mitigation threshold, the model remains instructive. For example, Table B.2-4 in the Alaska EFH DEIS contains estimates of habitat sensitivity to each gear type as a percentage of the habitat in the affected area that is damaged with each unit of fishing effort. This clearly shows that it is not necessary to convert to an arbitrary relative scale of 0-3, as was done in the Pacific Region EFH DEIS. In particular, the use of a percentage in the Alaska model specifically allowed the analysts to develop absolute quantitative estimates of the loss of each habitat type as a result of current patterns of fishing effort, and eliminated the need to introduce an arbitrarily-defined "k-value" to estimate absolute impacts. This was precisely the problem pointed out by the PFMC Scientific and Statistical Committee which prevented the Pacific Region EFH DEIS impacts model. It is unclear why best estimates of percentages were not used in the Pacific Region model, when they were used successfully in the Alaska model based on the same literature.

In addition, another example of a quantitative model for incorporating sensitivity and recovery times is presented in DeAlteris et al. (1999). This study was aimed specifically at developing a methodology to identifying adverse impacts to EFH that are more than minimal and temporary and was not considered in the EFH DEIS. MacDonald et al. (1996) developed sensitivity indices for different benthic habitat types, and found that fragile, slow recruiting animals are most susceptible to fishing disturbance. Another study to add to the information on sponge sensitivity is Heifetz et al. (2003), which documented 50% damage to sponges in Eastern GOA one year after a trawl pass.

Furthermore, the EFH DEIS Risk Assessment (Appendix A) identifies category 3 Sensitivity Index score to be:

Major changes in bottom structure, such as re-arranged boulders; large losses of many organisms with differences between impact and control sites greater than 50% in most measured metrics.

Based on this statement alone, it would be unreasonable to claim that the "major changes" caused by gears that have a Sensitivity Score of 3 could be considered minimal.

Recovery rates for habitat types are the most important parameters to consider when determining whether known losses of habitats are "minimal and temporary". The Recovery Index used in the EFH DEIS omits several key studies and published information on the recovery of corals and sponges. The table on Page 16 in Appendix A-10 indicates the estimated recovery time for slope corals is "7.0+" years based on a study that showed no evidence of recovery for corals damaged by trawling in the Gulf of Alaska. However, it is clear that corals and sponges have growth rates on the order of millimeters per year, living to be hundreds of years old. In its Effects of Fishing model, the Alaska EFH DEIS used 100 years as its central estimate of the recovery time of hard corals (low estimate = 50 yrs; high estimate = 200 yrs) (Alaska Region EFH DEIS, 2004, Appendix B, Table B.2-5). In addition, the following studies justify a much higher estimate of coral and sponge recovery times (hence slower growth rates) than was presented in the Recovery Index, both on the continental slope and shelf.

1. Andrews et al. (2003) found growth rates of 1.74 cm/yr for Primnoa, 1 cm/yr for Corallium, and ages of 30 to over 200 years for deep-sea coral species of Davidson Seamount.
2. Cordes et al. (2001) found ages of 25-30 years for the deep sea coral *Anthomastus ritteri* in California's Monterey Bay, noting that the results agree with the general notion that growth rates are reduced and longevity increased in deep-sea species.
3. Roark et al. (2003) sampled corals from Hawaii and the Gulf of Alaska and dated a living *Gerardia* sp. to be 2700 years old and a black coral to be 2200 yrs old, using radiocarbon dating techniques.
4. Leys and Lauzon (1998) found large deep water Hexactinellid sponges to be 220 years old with average growth rates of 1.98 cm/year.
5. Probert et al. (1997) found recovery times greater than 100 years for deep sea corals.
6. Jones (1992) review of trawl impact literature revealed that recovery time for deep sea benthos with little natural disturbance is on the scale of decades.
7. Koslow et al. (2000) discusses the higher longevity and vulnerability of deepwater ecosystems to trawling, particularly on seamounts, which are known to have benthic fauna (i.e. corals) with high levels of endemism.
8. Risk et al. (2002) found ages of over 300 years for *Primnoa resedaeformis.*
9. Heikoop et al. (2002) found deep sea corals (*Primnoa*) in Alaska and elsewhere have lifespans of several centuries. The authors describe the potential of these corals to contain extended records of surface productivity, deep ocean temperature and chemistry of value to climatologists and fisheries managers.
10. Reed (2002) in a study of deep water Oculina reefs along eastern Florida, noted extensive areas of Oculina rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990. Coral growth rates averaged 16.1 mm/yr.

In addition, use of estimated ages of biogenic habitats as their recovery time is likely to be a significant underestimate of actual recovery because it omits the time necessary for recolonization. Specifically, if corals and sponges take a long time to settle and begin growth in damaged areas, overall recovery is much longer. Evidence for long recolonization times is presented in Koenig et al. (2003), which found no evidence of recolonization of Oculina deep sea corals into denuded areas and offered two explanations: continued trawling and the rubble areas do not provide suitable substrate for planular settlement of coral larvae. Additionally, the Krieger (2002) study cited in the EFH DEIS found no evidence for recolonization of corals seven years after trawling.

It is unclear why the recovery index distinguishes between gear types in its estimates of habitat recovery. Recovery should be based on the estimated time it takes for a fully damaged habitat to return to a pre-impacted state, independent from the source of damage. The differences between gears should be limited to the sensitivity of each habitat type to each unit of effort with different gear types. For example, whether a deep sea coral was removed by a bottom trawl or a researcher, the growth rate of each corals is the same. Furthermore, since age does not include recolonization time between impact and settlement of new biogenic structures, all recovery times used in the EFH DEIS that were derived from literature on ages are systematically underestimated.

It is also unfortunate that the Risk Assessment was not able to utilize the extensive trawl logbook data for the U.S. West Coast showing thousands of start and end points for recent years of trawl effort.

However, a simple calculation of habitat sensitivity and trawl effort illustrates that by any measure in the Pacific groundfish fishery, the more than minimal and not temporary threshold has been crossed. The following example represents a thought experiment to demonstrate the severity of habitat impacts using parameters from the Risk Assessment and scientific literature. The Risk Assessment states that the sensitivity of corals and sponges to one unit of bottom trawl effort is Sensitivity Level 3.0, which is defined on p. 75 to be a 50-100% loss of habitat-forming organisms. If we use the low value of 50%, this means that each area loses half of its habitat features every time it is trawled. Let's say an area containing corals is trawled once per year. This means in five years, the amount of available habitat will be reduced by $(0.50)^5$, which equals 3.1% of the original habitat. Even if we add in a rate of 1% recovery each year (which is equal to saying the recovery time for corals is 100 years), there is still only 5.1%. An optimistic (best case scenario), dynamic equation for this would be:

$$H_{t+1} = 0.5H_t + 0.01H_0, \qquad (1)$$

where H_0 is the initial amount of habitat and H_t is the amount of habitat after t years.

Note that this model contains a highly optimistic assumption that habitat recovers at a fixed rate regardless of how much is remaining. This ignores any potential delays in habitat recovery from recolonization, Allee effects, or ecological succession.

The following graph (Figure 2) shows 5 example trajectories of available habitat remaining in an area subject to one pass of a trawl per year and assuming a Sensitivity Rate of 50%. The first case, shown in pink is the trajectory for a habitat that does not recover from damage. The second case is shown in red (triangles) is the trajectory for a habitat with a recovery time of 100 years (1% recovery per year). If trawling stops at the end of year 4 due to a trawl closure, the habitat ceases to decrease and begins a slow trajectory toward total recovery (shown in green circles). For a case where habitat recovers in 10 years, the habitat is lost at a slower rate because it is compensated by recovery (shown in orange diamonds). If trawling continues, the habitat remaining at equilibrium is 20%. However, with a trawl closure enacted at the end of year 4, the habitat with a 10 year recovery time nears full recovery at year 14 (shown in blue squares).

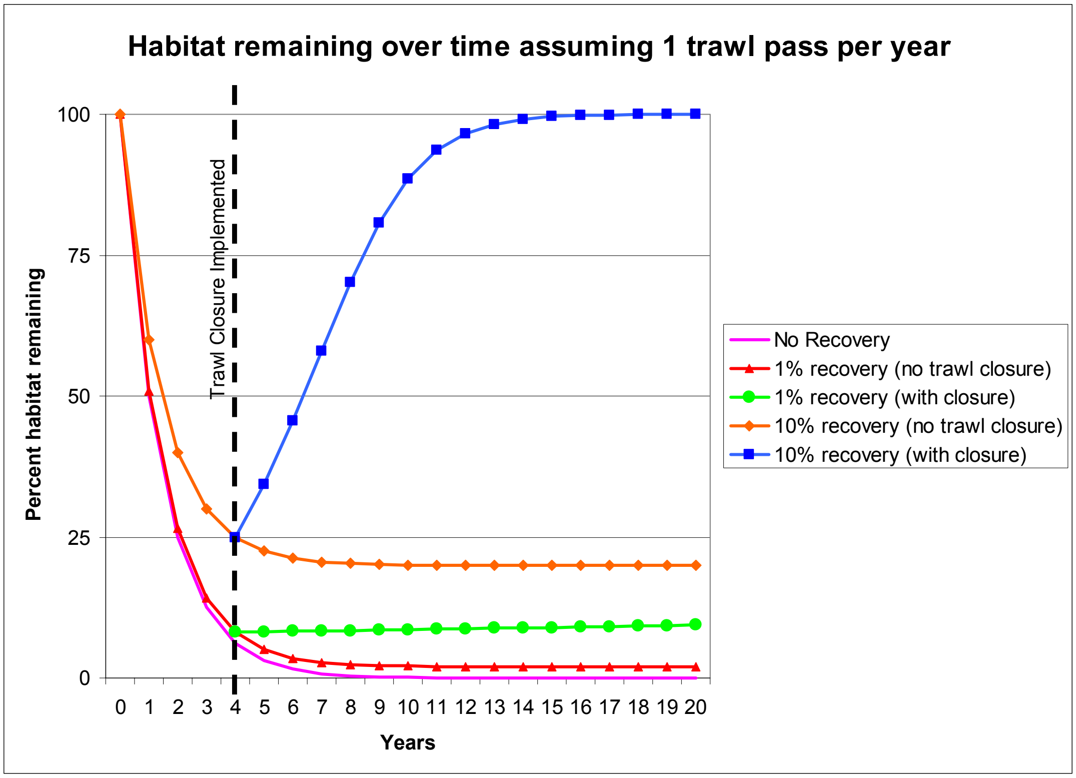

Figure 2: Results of hypothetical habitat damage model using actual parameters from the EFH DEIS and scientific literature on recovery rates. (Refer to text for further discussion).

For the case of many deep sea corals found off the U.S. West Coast, the recovery time is at least 100 years (see citations earlier in this Section). This recovery time (100 years) was used in the Alaska Region EFH DEIS "Effects of Fishing" habitat loss model. Using this estimate, all coral and sponge habitats where trawling occurs at least once per year with a 50% impact per pass, there will be less than 5% of this habitat type remaining after 5 years. (This is precisely the reason why the Alaska Region EFH DEIS showed long-term losses of corals on the order of 50-100% in all areas containing trawl effort. There is no reasonable way to justify that a 95% loss of corals and sponges at any specific biogenic habitat site is minimal (recall the EFH Final Rule's reference to "site-specific" adverse impacts and the CIE Report (Drinkwater 2004) reference to "localized impacts to corals and sponges"). Nor could any reasonable person justify that a 100 year recovery time is temporary from the standpoint of a fishery. Since there are many known areas of corals and sponges that are repeatedly trawled (i.e. observer bycatch data from WCGOP and overlay of trawl tracks on known records of corals and sponges documented in trawl surveys), these habitat features have been substantially reduced in both quantity and quality for the long-term. Therefore, it is clear based on the Sensitivity Level of >50% presented in the EFH DEIS for bottom trawling on corals and sponge and based on the published recovery times over 100 years that adverse impacts to biogenic coral and sponge habitats by bottom trawling authorized under the current Fishery Management Plan are occurring in a manner that is more than minimal and not temporary. This conclusion triggers the legal requirement to minimize adverse impacts of bottom trawling to the extent practicable.

The results of this simple thought experiment indicate that the first few passes of a trawl account for the biggest fraction of the total damage to habitats with long recovery times. The EFH DEIS (Ch.3, p. 3-16) confirms this result in its statement that:

Corals, anemones, sponges, sea pens, and sea whips are a highly sensitive habitat that may be substantially modified with relatively little fishing effort (NRC 2002). It may be that initial contact (i.e., the first time gear is deployed) is the most important due to the high sensitivity of the habitat to impact.

Therefore, even a single pass of a bottom trawl in sensitive habitat areas constitutes adverse habitat impacts that are more than minimal. This suggests that the most effective trawl closures are located in areas that are lightly-trawled or have not yet been trawled. Therefore, the best available scientific understanding of biogenic habitat sensitivity and recovery provides strong justification for closing all areas outside the trawl footprint.

Additional considerations beyond the EFH legal mandate

This section discusses the current state of scientific theories regarding the linkage between marine habitat and fisheries productivity and is simply designed to illustrate the potential effects of the adverse impacts described in the previous section. It is not intended to imply that productivity should be a consideration in the determination of adverse impacts. In fact, the linkage between EFH and commercial fish productivity is irrelevant from the standpoint of the law (see 67 Fed. Reg. at 2354), and from a factual standpoint, since corals and sponges constitute a component of EFH and we are nowhere near EFH Information Level 4 for these habitats and most others. However, the potential effects of habitat loss on fish productivity may be useful to consider.

Several ways to conceptualize this linkage are presented in the scientific literature. Many studies assume a one-to-one linear relationship between habitat availability and fish production (i.e. Naylor and Drew 1998; Costanza et al. 1997). Under this logic, a loss of 95% of habitat would result in a 95% loss in production. Another way to consider the issue is to assume that the habitat type only accounts for a certain proportion of the productivity of a fishery, say 20% as an arbitrary example. Under this logic, the damage to habitat would result in a loss of 19% of the landings produced in the trawled area (assuming all other habitat features are not impacted by trawling). Whether this would be considered "minimal" is an open question, but it suggests that management measures to mitigate the loss of coral and sponge habitat would pass a simple Benefit-Cost test from the fishermen's point of view as long as they represent less than a 19% economic loss to the trawl fleet due to increased fishing cost. While this is a simplified example, it represents the basic logic justifying habitat protection measures in a fisheries management regime that aims to maximize the value of the fisheries harvest.

The basic theory underlying the need to protect habitat from the perspective of the fishermen is that habitat damage may reduce the productivity of fish that are associated with the habitat. One way to illustrate this effect is to consider a basic Schaefer logistic growth equation:

$$dN/dt = rN(1-N/K) \quad (2)$$

where dN/dt is the production, r is the intrinsic rate of increase, N is the stock size, and K is the carrying capacity. Most fishery models view the r and K parameters as exogenous, determined by environmental factors. However, if habitat damage caused by fishing reduces r or K, the overall production decreases for any given stock size. Figure 3 shows potential effects of harvest with a destructive gear on the logistic production of a fishery, where the the amount of fishing effort (or harvest) reduces K by (represented by different production functions at equilibrium). The basic effect is that fishing effort increases (destroying more habitat) the entire productivity curve becomes smaller, particularly the apex of the curve, which is the maximum sustainable yield (MSY). Depending on the degree to which the fishing gear destroys habitat (determined by Sensitivity and Recovery Rates), this framework suggests that there can be quite significant reductions in MSY as the result of destructive fishing. This demonstrates the general result that reducing habitat impacts of fishing leads to an increased fishery yields and/or prevents further decreases in productivity.

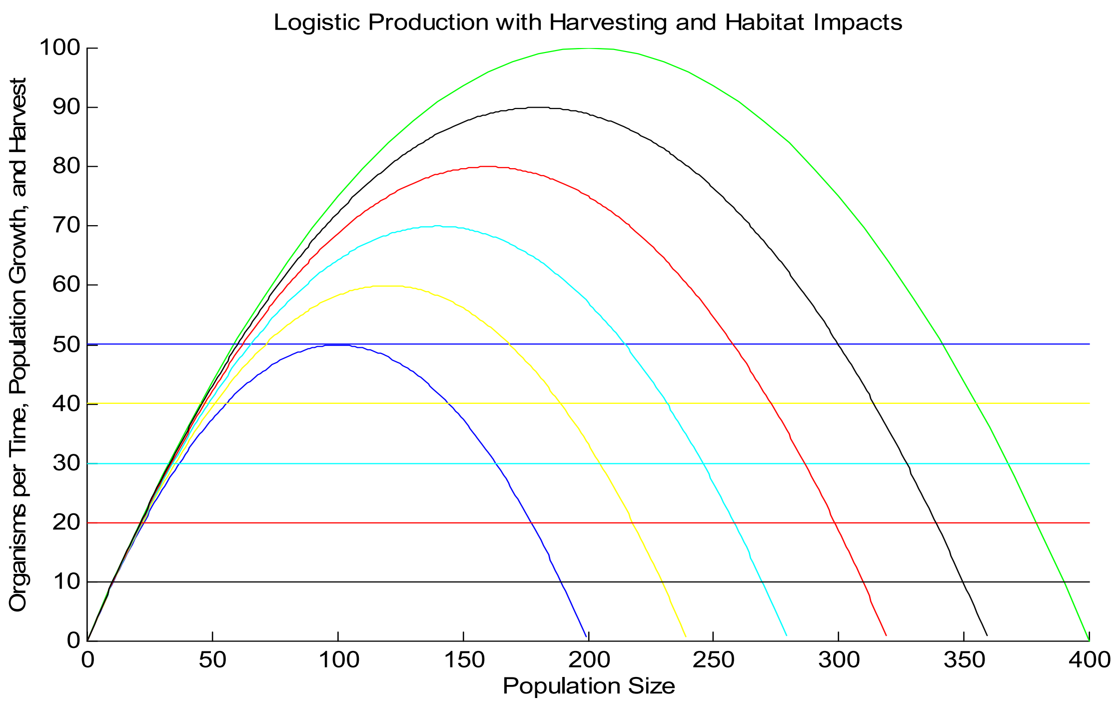

Figure 3. Effect of harvest on the logistic production function for the case where carrying capacity, K, is reduced by 4 times the level of harvest. Harvest rates (horizontal) correspond to production functions of the same color. The unfished carrying capacity is 400 with an potential MSY of 100 (green), while a harvest rate of 50 decreases the carrying capacity to 200 with an actual MSY of 50 (blue).

The time of managing fish stocks on a single-species basis without regard to their habitat is over. The inclusion of Essential Fish Habitat measures of the Sustainable Fisheries Act are a major step toward ecosystem-based fishery management. We now know that fish habitat is an essential driving force behind the production of commercial fish and maintenance of healthy ecosystems.

The "natural capital stock" of biogenic habitat must be managed explicitly. The Pacific Fishery Management Council has jurisdiction over which habitat areas are subjected to trawl impacts. From the standpoint of the Magnuson-Stevens Act and common sense, the Pacific Fishery Management Council must implement regulations that mitigate the adverse impacts of bottom trawling on Essential Fish Habitat in its final decision on this Environmental Impact Statement.

Mitigation Measures to Minimize Adverse Impacts to the Extent Practicable

The Sustainable Fisheries Act requires that if fishing activities are causing adverse impacts to EFH, Councils and NMFS must enact mitigation measures to minimize those adverse impacts to the extent practicable. It is clear from the above discussion that the adverse impacts of fishing on U.S. West Coast EFH are more than minimal and not temporary. Therefore, mitigation measures are required by law.

The US Commission on Ocean Policy, the PEW Oceans Commission, and many other scientists and administrative bodies have recognized the need to protect both the fish and the ecosystem in which the fish thrive. Current fishery management tools have largely focused on fishery conservation in its narrowest sense: avoid overfishing a species or a group of species. Gradually, the need to protect the fish *and* their associated habitat is being recognized. This need is imperative in Pacific Coast Groundfish management, given the legal mandate to minimize adverse impacts to the extent practicable.

As discussed in the Pew Oceans Commission Final Report, the goods and services from coastal and marine ecosystems, especially corals, sponges, and other biogenic habitats that are commonly damaged by benthic fishing gears are difficult, if not impossible, to replace. This suggests that if we destroy our nation's healthy ecosystems, we may well risk economic and social stability. In other words, there are costs associated with habitat destruction that go beyond the financial displacement of bottom trawlers, and eco-values beyond single species money fish. The value of a healthy ecosystem far outweighs the short-term economic gains of destructive bottom trawling.

Externalities in the Pacific Groundfish Trawl Fishery

An "externality" is generally defined as:

"An effect of one economic agent's actions on another, such that one agent's decisions make another better or worse off by changing their utility or cost. Beneficial effects are positive externalities; harmful ones are negative externalities."

(www-personal.umich.edu/~alandear/glossary/e.html)

Externalities are important in natural resource policy analysis because they cause market failures, justify policy intervention into markets, and suggest appropriate types of policy tools to correct market failures. Fish stocks and ocean habitats are subject to four distinct externalities from Pacific coast groundfish bottom trawl fisheries, largely as a result of their status as public goods. The first type is the ***stock externality***, which is the effect of an individual vessel's fish removals on the catch per unit effort of the rest of the fleet. This negative externality arises because the lower the stock size, the more effort is required to obtain a specific amount of catch. If this externality is not regulated, overfishing will occur in any circumstance where the cost of fishing is low enough. The market failure caused by this externality can be corrected with policy instruments that limit catch, including trip limits and total allowable catch quotas, many of which are already in place as a result of PFMC management. However, due to the uncertainty of fisheries stock assessments and enforcement capabilities, the effectiveness of these limits on target species catch depends on the degree to which fishery managers are precautionary in their quota decisions. The current Pacific groundfish fishery management plan uses catch limits and quotas to limit this catch. However, overfishing has occurred for nine Pacific groundfish species and current plans for stock rebuilding are on the order of several decades, so it is doubtful that the stock externality has been fully corrected.

The second type of externality is the ***habitat externality***. This negative externality occurs when the habitat impacts of harvesting fish affect the intrinsic growth rate and/or the carrying capacity of a fish stock. In the case of trawling, this may occur in several ways. Trawling is known to reduce the structural complexity of seafloor habitats, which in turn reduces the shelters from predation for juvenile groundfish. Less shelter from predation leads to higher mortality rates for young life stages with the overall effect of reducing the intrinsic rate of growth. Furthermore, if vulnerable habitats such as sponges, kelp, deep sea corals, or other biogenic substrates support higher densities of adult fish then if they are damaged or removed, the carrying capacity of the fish stock will be reduced by the act of harvesting fish with destructive gear. Decreases in the carrying capacity and growth rate reduce both the maximum sustainable yield and the maximum economic yield proportionally. In a legal context, this externality reflects the reduction in fish habitat that is "necessary" or "essential" to "support a population adequate to maintain a sustainable fishery" (EFH Final Rule (50 CFR Part 600)).

Since the costs of such destructive activity are dispersed throughout the entire fleet, this externality prevents an incentive to reduce the damage. Conversely, if one fisherman reduced his rate of habitat damage, the benefit would be distributed throughout the entire fishery. This externality is inherently a "collective action problem" as described in Hardin's *Tragedy of the Commons* (1968), which to be corrected requires all vessels to collectively reduce their habitat damage rates. The most effective policy instruments available to reduce the habitat damage rates for the Pacific groundfish trawl fishery include permanent area closures and gear conversions which are the cornerstone mitigation measures of Alternative C.12.

The third externality in a destructive fishery is the ***ecosystem externality***, which results from reductions in the quality and/or quantity of habitat sufficient to support a healthy ecosystem. The consideration of this effect is mandated by the EFH Final Rule. This negative externality encompasses the various social and non-use costs of habitat damage. In practice, social costs may be expensive to quantify, but include reductions in existence value, biodiversity value, passive use value, option value, bequest value, scientific value, historical value, intrinsic value, or the value of the ecological services provided (other than the production of the target fishery). Brief descriptions and definitions of some of costs are provided in the EFH DEIS (Section 3.10.2 entitled "Non-Consumptive Non-Use Values"). Unfortunately, however, the EFH DEIS made no attempt to quantify these costs. However, these costs of habitat damage are real and evidenced in part by the tens of thousands of public comments that NMFS and the PFMC have received on this EFH DEIS.

The fourth externality in a destructive fishery is the ***technology externality***. This is a positive externality associated with the appropriability of innovations or technological improvements that reduce the damage rate of a fishery. The fact that this is a positive externality means that the a market failure is occurring because the current system does not sufficiently encourage technological improvements to reduce the impacts of bottom trawling. These technological innovations include developing new low cost gear types that catch fish without destroying habitat. The externality arises because the costs of technological innovation are born by an individual fisherman, but the benefits of the innovation are enjoyed by the entire fishing fleet. Therefore, the market failure is that there will be less technological innovation to reduce habitat impacts than there would be at the optimum for the fleet as a whole. Since this is a distinct externality from the habitat damage (negative) externality described above, the technology externality requires a distinct set of policy instruments to increase expenditures on technological innovation to economically efficient levels. The bottom line is that we need the motivation and incentive to develop ways to catch fish without destroying the habitat the fish depend on for survival.

These four externalities each lead to systematic biases preventing fishing activity from reaching its privately and socially optimal outcomes. Correcting these market failures in the Pacific groundfish fishery requires policy intervention to address each externality (see Table 1).

Table 1: Externalities addressed by the management tools proposed in Alternative C.12.

Management Measures	Externalities			
	Stock	Habitat	Ecosystem	Technology
Catch limits	X			
Area closures (incl. freezing trawl footprint)		X	X	
Gear conversions and restrictions		X	X	X
Research and Monitoring				X

As the table indicates, no single management tool can address all four externalities, suggesting the need for a combination of management tools. While the table shows which externalities can be addressed with each tool, the extent to which each tool fully corrects each externality depends on its specific application. The purpose of the table is to show how the proposed mitigation measures address the externalities that create a market failure of excessive habitat destruction.

One general rule in environmental policy development is that when designed properly, a combination of multiple policy instruments is a more cost-effective way to address the market failures associated with multiple externalities than any one management measure alone. On the U.S. West Coast, there are four distinct externalities with regard to EFH. By addressing these externalities on multiple fronts, the Comprehensive Alternative is the most cost-effective, precautionary, and practicable alternative that sufficiently mitigates the adverse impacts of fishing on EFH as required by the Sustainable Fisheries Act.

The Economic and Ecological Benefits of Bottom Trawl Closures

There has been substantially more effort focused on the potential costs of the trawl closures proposed in Alternative C.12 (and in fact all mitigation alternatives) than on its potential benefits. However, when making important decisions affecting the future of U.S. West Coast fisheries, it is essential that attention be focused on using the best available information to understand not only the short and long term fisheries benefits of protecting habitat, but also the long-term ecological costs of failing to do so. With regard to the former, several major scientific efforts have quantified the benefits of previous area closures. The EFH EIS should include a review of these studies to provide the public with a more complete understanding of the current state of knowledge on expected benefits of bottom trawl closures. With regard to the latter, any analysis of practicability must include a discussion of the long-term ecological costs and benefits of habitat protection.

The EFH EIS should include a discussion and estimation of avoided costs. Several studies found reductions in commercial fish populations as a result of habitat damage caused by trawling and/or increased landings in areas with un-impacted coral and sponge habitats (i.e. Reed 2002; Rellini et al. 2000; Rothchild 1994; Sainsbury et al. 1993; Thrush and Dayton 2002; Vassilopoulou and Papaconstantinou 2000; Husebo et al. 2002; Bradstock & Gordon 1983). These studies corroborate the hypothesis that biogenic habitats act as a component of "natural capital" that produces fish. The economic loss of a capital stock of habitat is calculated using the discounted present value of all future fish production that will no longer occur when the habitat is not available. Since the recovery rates of biogenic habitats in particular are so slow, the present value of all future losses can be quite significant. Therefore, the benefits of avoiding the loss of the habitat stock are the exact converse of the costs of the lost productivity if the habitat is lost. As such, benefits of habitat protection can be calculated by the avoided cost of habitat damage. Rudd et al. (2003) states that "Fully accounting for the value of ecological services flowing from marine reserves requires consideration of increased size and abundance of focal species within reserve boundaries, emigration of target species from reserves to adjacent fishing grounds, changes in ecological resilience, and behavioral responses of fishers to spatially explicit closures."

Second, there are several models available to estimate these avoided costs in the scientific literature. Specifically, Rodwell et al. (2003) developed a model whose results indicate that habitat protection in reserves can underpin fish productivity and, depending on its effects on fish movements, augment catches. The authors state that "Marine reserves increase total fish biomass directly by providing refuge from exploitation and indirectly by improving fish habitat in the reserve". Although Revised Alternative C.12 does not propose marine reserves, this type of model could and should be used to evaluate the effects of management measures. Conover et al. (2000) discusses the potential benefits of marine reserves including protecting critical habitats that have been depleted, conserving marine biodiversity, and enhancing the harvest of stocks outside the reserve. Soh et al. (2001) used GIS analysis and found that marine reserves can greatly protect shortraker and rougheye rockfish populations from habitat impacts, discards, and serial overfishing of substocks without reducing catch levels. White et al. (2000) showed that the costs of a marine reserve for tropical coral protection were greatly outweighed by the benefits from higher catches. Koslow et al. (2001) found that heavy trawling has completely removed the deep sea coral and sponge aggregations and that benthic biomass was 106% greater and species richness was 46% greater on unfished seamounts than fished seamounts. Wheeler et al. (2003) found broken coral rubble and dead coral in areas of higher trawl intensity, whereas untrawled areas had a much higher abundance of undisturbed upright coral colonies. The authors state that even small coral thickets provide "cover" for fish and that destructive removal of this cover may have major implications for local fish stocks and coral associated biodiversity. The authors recommend using the precautionary principle by implementing fisheries technical measures to prevent further damage to coral until more is known about the relationship between fish and corals.

In particular, a great deal of literature has attempted to quantify the economic value of the fishery production services provided by tropical mangrove habitats. While this specific habitat type does not occur on the U.S. West Coast, the valuation techniques provided by these studies are directly relevant to the valuation of all fish habitat types. The most common technique found in this literature is to identify all fisheries directly or indirectly associated with mangrove habitat and attribute the entire ex-vessel values of each fishery to the associated habitat (Naylor and Drew 1998, Ruitebeck 1988, Christensen 1982, Hamilton & Snedaker 1984, Gren & Soderqvist 1994, Ronnback 1999, Sathirathai & Barbier 2001, Ruitenbeck 1988; Costanza et al. 1997; Swallow 1990). For example, Naylor and Drew (1998) assumed one-to-one habitat fishery linkages for surgeonfish, rudderfish, jacks, parrotfish, grouper, squirrelfish, snapper, rabbitfish, mullet, emperorfish, goatfish, and octopus, based identifying either direct reliance of these fish species on mangroves for food, reproduction, or protection or indirect reliance on mangroves for nutrient supplies that flow into the near-shore zone. These studies establish the precedent that until higher levels of habitat-fishery linkages are known (i.e. EFH Level 4), the EFH EIS should assume a one-to-one relationship between fish productivity and associated habitats.

Adaptive Management and the Future of Pacific Coast EFH Protections

The Revised Alternative C.12 lays the groundwork for future improvements to the management of Essential Fish Habitat off the U.S. West Coast for generations to come. The following section discusses potential options and policy directions that NMFS and the PFMC will have the opportunity to take in the future as a result of implementing Alternative C.12 through the current EFH EIS process. The statements made in this section are not to be interpreted as additional components of Alternative C.12 for consideration in the current EFH EIS process, but rather as a long-term vision of the possibilities for future ecosystem-based fishery management actions that may be taken subsequent to the implementation of Alternative C.12.

Incentives to Minimize Trawl Impacts in Remaining Open Areas

With the proper incentives, fishermen can control many factors that determine the degree to which their activities impact the seafloor. The additional monitoring required as part of Alternative C.12 will provide baseline data with a tremendous potential to evaluate individual performance and enact performance standards to achieve additional conservation incentives in the Groundfish Fishery Management Plan. The placement (physical location) of trawl set locations and the degree of impact on the seafloor are largely at the discretion of individual vessel captains. The various factors that play into this decision may include the likelihood of catching valuable target species and the likelihood that they will damage fishing gear. While some seafloor types cause major damage to trawl nets, such as large, sharp boulders, there is little evidence that biogenic habitat types such as living substrates damage trawl gear. Therefore, there exists no immediate incentive to avoid such habitats in the pursuit of fish, particularly if there are higher abundances of fish in these areas.

In addition to technology-based standards, such as gear restrictions, there are ways to create disincentives to fish in ways that cause damage to ocean habitats. By establishing performance standards that either mandate or reward more desirable fishing behavior, fishery managers can leave it to the experts, the fishermen, to determine the locations and gear types with which they fish. The benefit of such performance standards are that they give fishermen more flexibility in terms of the manner through which they meet a given conservation objective, and therefore, fishermen can determine for themselves the most cost-effective way of doing so. The disadvantage, conversely, is that performance standards generally cost more to monitor and enforce than command and control regulations such as gear restrictions.

One example of a performance standard that would create a disincentive to destroy vulnerable habitat features is a hard limit on habitat bycatch. Since trawl nets will retain a portion of structural living habitats, such as sponges, bryozoans, anemones, corals, and tunicates, the bycatch of these invertebrates can be used as an indicator of damage to vulnerable seafloor habitat. The limitation of these indicators is that they represent a limited set of habitat types and may not reflect structural damage to physical substrates such as rocks, boulders, sand, and the many small invertebrates that are too small to be retained in the net. Moreover, there have been few studies examining how much actual damage to seafloor invertebrates by bottom trawling is reflected in bycatch samples. However, structural invertebrate bycatch has the benefit of showing actual damage to the seafloor and may be a more direct indicator of damage than other approaches, such as effects of fishing models that assume homogenous distribution of habitat types.

Such bycatch limits should provide opportunities for fishermen, scientists and stakeholders to provide their input concerning setting appropriate bycatch limits, altering bycatch limits over time, whether to apply bycatch caps by fleet, sector, or individual vessel, the appropriate spatial scale at which to apply bycatch caps, consequences of exceeding bycatch caps, and rewards for avoiding bycatch. Table 2 (below at the end of this section) provides an example framework of decision points that could be considered in a future process to establish and implement habitat bycatch limits.

Conversely, rewarding "clean" fishing can provide a positive, and potentially profitable, incentive for habitat conservation. Such rewards must be based on accurate information about the performance of fishing vessels, which is precisely the rationale for enacting the monitoring regime described as part of Revised Alternative C.12.

Another idea for the future that may be considered after the implementation of the current EFH EIS is the concept of Spatially-Explicit Dedicated Access Privileges (SEDAPs). SEDAPs could be tradeable ***area-specific*** permits allocated to specific permit holders granting an exclusive privilege of a specified amount of annual trawl effort in a specified area. This SEDAP approach would be combined with effort reduction (buyout) and could include gear transfer considerations.

Potential Future Uses of VMS Data to Protect Essential Fish Habitat

In addition to providing monitoring of compliance, VMS data will also provide significant data to develop adaptive management measures in the future. VMS is a powerful tool that provides many additional management options to reduce habitat impacts. Once they are in place, fishery managers can better understand how fish habitats are being affected and can develop performance standards that create incentives to reduce the overall footprint of each trawl vessel. Habitat impact monitoring can be used to identify areas where bycatch rates are highest within areas that remain open. Additionally, they may also reveal more spatially explicit information on which areas have higher and lower relative effort. These data may be used to develop additional closed areas based on areas of higher bycatch rates and/or areas that are outside the future footprint of the bottom trawl fishery. As enforcement and monitoring capabilities improve with technological innovations, the scale of management, or the size of the grid blocks, should decrease so that management can take place at a resolution that better fits the patchiness of the seafloor habitat types and the spatial resolution of fishing effort.

Conclusion

In summary, these comments have outlined the clear evidence that Essential Fish Habitat on the U.S. West Coast is being adversely impacted by bottom trawling in a manner that is more than minimal and not temporary. Ecosystem-based fishery management and the Sustainable Fisheries Act demand that Essential Fish Habitat be explicitly managed and protected. The Revised Alternative C.12 is a compilation of over three years of an iterative, constructive process to develop a practicable and precautionary habitat management regime that meets the standards of the law. Oceana has gone to great lengths to conduct extensive literature reviews and obtain the highest quality data to develop a comprehensive policy solution. Revised Alternative C.12 is explicit regarding its use of the best available data given the uncertainties and most up-to-date understanding of this complex interdisciplinary challenge. Ideally, the selection and implementation of Revised Alternative C.12 will broaden the management scope of the Pacific Fishery Management Council to explicitly include considerations of Essential Fish Habitat in the overall ecosystem-based management of U.S. West Coast Groundfish Fisheries.

Oceana's Comprehensive Alternative has survived the scrutiny of the Council's Scientific and Statistical Committee, rigorous analysis by the state fishery management agencies, and has continually been improved as the direct result of constructive feedback from fishermen, fishery managers, scientists, and conservation interests. In implementing the Comprehensive Alternative, NMFS and the Council can rest assured that the Alternative offers substantial protection to known seafloor habitats that are vulnerable to bottom trawl fishing gear. In fact, based on the strong scientific evidence presented in these comments, protecting these areas will maintain and enhance the productivity of U.S. West Coast fisheries and the health of our ocean ecosystems. At the same time, Revised Alternative C.12 legitimates the economic needs of coastal communities and has been significantly refined based on comments from the SSC and trawl fishermen to improve its practicability. Revised Alternative C.12 shows that we can indeed conduct healthy, sustainable fisheries while adequately protecting the very habitats and ecosystems that are responsible for the high productivity and biodiversity of U.S. West Coast marine environments. Please adopt the Revised Alternative C.12 presented in these comments as the Preferred EFH Mitigation Alternative in the EFH Final EIS.

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Scientists' Statement on Protecting the World's Deep-sea Coral and Sponge Ecosystems

As marine scientists and conservation biologists, we are profoundly concerned that human activities, particularly bottom trawling, are causing unprecedented damage to the deep-sea coral and sponge communities on continental plateaus and slopes, and on seamounts and mid-ocean ridges.

Shallow-water coral reefs are sometimes called "the rainforests of the sea" for their extraordinary biological diversity, perhaps the highest anywhere on Earth. However, until quite recently, few people - even marine scientists - knew that the majority of coral species live in colder, darker depths, or that some of these form coral reefs and forests similar to those of shallow waters in appearance, species richness and importance to fisheries. Lophelia coral reefs in cold waters of the Northeast Atlantic have over 1,300 species of invertebrates, and over 850 species of macro- and megafauna were recently found on seamounts in the Tasman and Coral Seas, as many as in a shallow-water coral reef. Because seamounts are essentially undersea islands, many seamount species are endemics - species that occur nowhere else - and are therefore exceptionally vulnerable to extinction. Moreover, marine scientists have observed large numbers of commercially important but increasingly uncommon groupers and redfish among the sheltering structures of deep-sea coral reefs. Finally, because of their longevity, some deep-sea corals can serve as archives of past climate conditions that are important to understanding global climate change. In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas.

In recent years scientists have discovered deep-sea corals and/or coral reefs in Japan, Tasmania, New Zealand, Alaska, California, Nova Scotia, Maine, North Carolina, Florida, Colombia, Brazil, Norway, Sweden, UK, Ireland and Mauritania. Because research submarines and remotely operated vehicles suitable for studying the deep sea are few and expensive to operate, scientific investigation of these remarkable communities is in its very early stages. But it is increasingly clear that deep-sea corals usually inhabit places where natural disturbance is rare, and where growth and reproduction appear to be exceedingly slow. Deep-sea corals and sponges may live for centuries, making them and the myriad species that depend on them extremely slow to recover from disturbance.

Unfortunately, just as scientists have begun to understand the diversity, importance and vulnerability of deep-sea coral forests and reefs, humans have developed technologies that profoundly disturb them. There is reason for concern about deep-sea oil and gas development, deep-sea mining and global warming, but, at present, the greatest human threat to coral and sponge communities is commercial fishing, especially bottom trawling. Trawlers are vessels that drag large, heavily weighted nets across the seafloor to catch fishes and shrimps. Scientific studies around the world have shown that trawling is devastating to corals and sponges. As trawlers become more technologically sophisticated, and as fishes disappear from shallower areas, trawling is increasingly occurring at depths exceeding 1,000 meters.

It is not too late to save most of the world's deep-sea coral and sponge ecosystems. We commend nations including Australia, New Zealand, Canada and Norway, which have already taken initial steps towards protecting some coral and sponge ecosystems under their jurisdiction. We urge the United Nations and appropriate international bodies to establish a moratorium on bottom trawling on the High Seas. Similarly, we urge individual nations and states to ban bottom trawling to protect deep-sea ecosystems wherever coral forests and reefs are known to occur within their Exclusive Economic Zones. We urge them to prohibit roller and rockhopper trawls and any similar technologies that allow fishermen to trawl on the rough bottoms where deep-sea coral and sponge communities are most likely to occur. We urge them to support research and mapping of vulnerable deep-sea coral and sponge communities. And we urge them to establish effective, representative networks of marine protected areas that include deep-sea coral and sponge communities.

The following 1,136 scientists have signed the *Scientists' Statement on Protecting the World's Deep-Sea Coral and Sponge Ecosystems*. Affiliations are for identification only, and do not imply endorsement by the signers' institutions.

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April 15, 2004

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Ms. Stephanie Madsen, Chair
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Dear Dr. Balsiger and Ms. Madsen:

Corals, sponges, and other living seafloor communities are important to the health of our oceans. The current Essential Fish Habitat Environmental Impact Statement process for the North Pacific provides the opportunity for the National Marine Fisheries Service (NMFS) and the North Pacific Fishery Management Council (NPFMC) to conserve corals, sponges, and other living seafloor communities that provide habitat for fishes from destructive fishing practices. We, the undersigned marine scientists and marine conservation biologists are concerned by the actions and rationale of the NMFS and NPFMC that fail to protect deep sea corals and sponges in North Pacific waters.

Presence of living benthic structure increases habitat complexity and sustains patterns of biodiversity in our ocean ecosystems. Cold water corals are among the most vulnerable and oldest seafloor habitats in Alaska. Many marine species, including commercially important species, utilize the vertical and three-dimensional structure provided by corals and sponges. Widely distributed in the Aleutians, Bering Sea, and Gulf of Alaska, these long-lived animals can protect fishes from strong currents and predators, as well as serve as nurseries for juveniles, and focal sites for feeding and reproduction.

Gorgonian corals, such as the red tree coral *Primnoa* spp. and the bubblegum coral *Paragorgia arborea,* are one of the most prominent groups of corals in Alaska. Both grow slowly, but can reach large sizes (3 m tall) and great ages (200+ years) if left undisturbed. Rockfish, Atka mackerel, walleye pollock, Pacific cod, sablefish, flatfish, crabs, and other economically important species in the North Pacific are found around red tree coral in the Gulf of Alaska (Krieger and Wing 2002). Among fish caught around corals during trawl surveys from 1975-1998, rockfish and Atka mackerel were most commonly caught around gorgonian, cup, and hydro- corals (Heifetz 2000). Eighty three percent of the rockfish observed during one study were associated with red tree coral (Krieger and Wing 2002). The removal or damage of red tree corals in Alaskan waters could have long term effects on associated faunal communities (Krieger and Wing 2002).

Video observation indicates that some managed fish species in the Aleutian Islands are highly associated with corals, sponges and other structure-forming invertebrates. One hundred percent of juvenile rockfish and eighty seven percent of all managed species counted in video from dives around the Aleutian Islands in 2002 were found within or very near these organisms (Stone, unpublished data). In recognition of their ecological importance and vulnerability to the adverse effects of fishing, coral, sponges, and other structure-forming seafloor communities have been identified as habitat areas of particular concern in Alaskan waters (Amendment 55/55/8/5/5 to the Fishery Management Plans for

BSAI Groundfish, GOA Groundfish, BSAI Crab, Alaska Scallop, and Salmon in the EEZ, pg 362-364, Jan.1999).

Bottom trawling destroys far more ocean habitat than any other fishing practice on the West Coast. The NMFS estimates about one million pounds of corals and sponges were removed from the seafloor of the Aleutian Islands and the Bering Sea annually between 1997 and 1999 by commercial fishing – over 90% by bottom trawlers (NMFS 2003). The impacts of this kind of destruction are neither minimal nor temporary. Both hard corals and soft corals can be extremely slow growing and sensitive to disturbance (*eg* Krieger 2001, Witherell and Coon 2000). For some species, it could take hundreds of years, if ever, for these animals to recover from the destruction of bottom trawling (*eg* Witherell and Coon 2000, Risk *et al.* 1998, Andrews *et al.* 2002). Vase sponges, morel sponges, and seawhips in deep, cold water habitats such as those in the Gulf of Alaska are also very vulnerable and slow to recover from bottom trawling (Freese *et al.* 1999, Freese 2001).

As documented in the National Academy of Sciences, National Research Council report of 2002, "Effects of Trawling & Dredging on Seafloor Habitat," bottom trawling reduces the complexity and biological diversity of seafloor habitats. The Academy recommends closures, gear modifications, and fishing effort reductions to mitigate the detrimental impacts of bottom trawling. Further, in February 2004, more than 1,100 of the world's foremost biologists signed a consensus statement calling for governments and the United Nations to protect imperiled deep sea coral and sponge ecosystems.

Currently in the North Pacific, NMFS is using the argument that bottom trawling in Alaska has no more than a "minimal" impact on habitat. The agency is using the rationale that in order to be more than minimal, habitat degradation must be so severe as to cause commercial fish stocks to collapse below sustainable levels. NMFS is measuring habitat effects by gauging the stock status of commercial fish, an inappropriate proxy as fisheries scientists cannot separate the effects of overfishing from those of habitat destruction on the status of fish populations. Rather, the effects on habitat should be directly measured, using observation and experiment.

NOAA scientists have said that the deep-sea corals in the Aleutians in particular are likely unparalleled in the world and that they have observed areas of damaged corals and associated organisms. Further, NMFS' own analysis shows that habitat-structuring organisms like corals, sponges, bryozoans, tunicates, crinoids, and anemones will be reduced 70-90% in thousands of square kilometers of habitat if current fishing practices continue. These losses are not inconsequential. Ecosystems are naturally resilient, but only to a point. Waiting to cross that threshold is dangerous. If the resiliency of a system is exceeded, the change can be irrevocable.

The time is now to protect Alaska's corals. We strongly urge the Council and NMFS to protect sensitive benthic habitat from destructive fishing practices.

Sincerely,

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Coastside Fishing Club
666 Brighton Road, Pacifica, CA 94044

28 March 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson, NMFS,
7600 Sand Point Way NE, BIN C15700, Bldg. 1,
Seattle, WA 98115-0070
206-526-4490.
GroundfishEFHDEIS.nwr@noaa.gov;

Don McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS

Recreational fishermen have long been the stewards of ocean and fishery conservation. We support a healthy ocean environment, since without it we would not enjoy a meaningful recreational experience, either now or in the future.

The Coastside Fishing Club supports measures that will protect our Essential Fish Habitat (EFH). Our priorities are 1) public access and utilization of this public resource for recreational purposes before any commercial extraction. 2) That any fishing gear and techniques allowed in such an area must pose no threat to the environment. 3) That recreational fishing, and in particular mid-water and surface trolling for game species (e.g. salmon, tuna, etc), not be impacted by EFH restrictions except where there is strong scientific evidence that it would be harmful. We have consistently advocated that vertical hook and line fishing methods pose no threat to EFH. However, we acknowledge that essential bottom habitat is directly threatened by the commercial groundfish trawl industry, and that EFH protection must address the impacts caused by such destructive fishing practices.

The Coastside Fishing Club has reviewed the Essential Fish Habitat (EFH) DRAFT Environmental Impact Statement, and evaluated the various alternatives adopted by the PFMC. Of all the alternatives considered, only Alternative 12 represents a comprehensive approach towards protecting EFH, while preserving the publics right to access and utilize this public resource. Developed by Oceana and others, this alternative addresses all three objectives of the Sustainable Fisheries Act, is easy to comprehend, and is an effective response to the federally mandated protection of essential fish habitat. Our assessment of the alternative finds that the Oceana plan accurately identifies habitat areas sensitive to fishing impacts, and that the included maps and descriptions are complete. The Oceana plan, in accordance with findings from the NRC (National Academy of Sciences, National Research Council 2002: *The Effects of Trawling and Dredging on*

Seafloor Habitat) correctly identifies that ground trawl gear, practices, and operations are the primary threat to essential fish habitat; and proposes to mitigate those effects through closures, gear modification, and effort reduction. Finally, Alternative 12 proposes other reasonable and effective actions to encourage the conservation and enhancement of essential habitat areas.

The two variations to Alternative 12, Alternatives 13 and 14, unnecessarily restrict recreational fishing, without demonstrating a need for such restrictions or indicating how such restrictions would actually enhance EFH protection. While Alternative 13 does not specifically address recreational fishing, the language might be construed as doing so. Because of these restrictions we do not support either Alternative 13 or 14. The other 11 alternatives are not comprehensive and are therefore difficult to evaluate without knowing how they might be combined into an overall EFH protection package. Additionally, instead of doing a scientific analysis of biogenic habitat these other alternatives rely too heavily on identification of sites where fish are currently found, rather than embracing a broader ecosystem management approach. The Oceana analysis is habitat-based: they looked for places were corals, sponges, or other animal life exist and then drew lines around those areas – a more comprehensive ecosystem approach than found in the other 11 original alternatives.

The Coastside Fishing Club endorses the findings and proposed actions contained in Alternative 12. We encourage its adoption by the Council and by NMFS; either as the single preferred alternative, or fully incorporated into a new alternative that eliminates bottom trawling in EFH designated areas. Bottom trawling is the primary threat to essential fish habitat, and Alternative 12 specifically mitigates this threat while preserving recreational mid water, surface, and bottom fishing utilizing vertical hook and line gear.

Dan Wolford, Science Director

orig /s/ D L Wolford

Coastside Fishing Club

Copies to
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STATE OF CALIFORNIA – THE RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
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VOICE AND TDD (415) 904-5200
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May 4, 2005

Mr. D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0700

RECEIVED
MAY 09 2005
PFMC

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. Lohn and Mr. Hansen:

The California Coastal Commission works to protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations.

The Commission supports precautionary approaches to managing federal fisheries to protect sensitive marine habitats. It is critical to protect important seafloor habitat like corals and sponges, and other special places such as seamounts and deep sea canyons, from damaging fisheries practices, such as bottom trawling, in order to protect ocean ecosystems while maintaining vibrant fisheries.

As you consider the Pacific Groundfish Essential Fish Habitat Environmental Impact Statement, we encourage the Pacific Fishery Management Council and the National Marine Fisheries Service to adopt a precautionary alternative to minimize adverse effects of fishing on essential fish habitat.

Sincerely,

Meg Caldwell

MEG CALDWELL
Chair
California Coastal Commission

Subject: [Fwd: Comment on 2005 Pacific Coast Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Mon, 09 May 2005 10:36:12 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comment on 2005 Pacific Coast Groundfish DEIS
Date: Mon, 09 May 2005 10:14:58 -0700
From: Steve Bodnar, Coos Bay Trawlers Association <c.trawl@verizon.net>
To: GroundfishEFHDEIS <GroundfishEFHDEIS.nwr@noaa.gov>
CC: Hal Weeks <hal.weeks@state.or.us>, Pacific Fishery Comment lin <pfmc.comments@noaa.gov>

Coos Bay Trawlers' Association, Inc.

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A Non-Profit Organization Since 1997

May 9, 2005

Mr. D. Robert Lohn

Regional Administrator, National Marine Fishery Service

c/o Maryann Nickerson

7600 Sand Point Way, NE

Bin C15700

Seattle, WA 98115-0070 Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn;

The lawsuit litigation that forced the Pacific Fishery Management Council to develop an Essential Fish Habitat Environmental Impact Statement did not challenge the content of the FMP but only the process used to develop the FMP. The judge ruled that the FMP fell short of following NEPA procedure and therefore the

Council needed to revisit the development of the FMP using correct NEPA procedures. However, the Council, fearing further lawsuits or perhaps even a directive from NMFS or by NOAA Fisheries Office of General Council, made the decision that NEPA compliance, or over-burdening the management system, is now a priority. This became obvious when Alternative 1, status quo, was eliminated from the Council's preferred options. What we should be asking is whether NEPA, and how NOAA Fisheries has started implementing it, fosters or hinders timely, high quality federal fisheries management and whether it could disrupt the intent and goal of the best management decisions for fishermen and conservation.

To quote attorney David Frulla's recent testimony to the U.S. House of Representatives Committee on Resources, "NEPA is a procedural statute. It imposes no substantive conservation obligations. That said, the environmental community has often used NEPA as a litigation device to attempt to force a substantive reconsideration of an agency action with which it did not agree. Accordingly, there are two elements of NEPA that should concern the Subcommittee: (1) whether it serves as an effective independent mechanism to ensure quality agency decision-making; and (2) whether it actually also serves to improve the quality of NOAA Fisheries decision-making. Regarding the first point, the litigation record shows that NEPA is, quite simply, over-rated as an enforcement tool. As to the latter, I submit that a wide array of substantive statutes independently help to ensure environmentally-aware decision-making. In fact, NEPA obligations may actually inhibit timely, science-based management."

While status quo for many may mean no change, business as usual, that is certainly not at all the case with our Pacific Fishery Management Council or the west coast fishing fleet. Status quo here means a continuation of heavy management measures while the resources continue to rebuilding. For the trawl fleet, this has meant: Fleet reduction via the buy-back program; Prohibited large roller gear use; Restrictions of use of large footrope gear areas; Implementation of small footrope gear and areas of use; Development of the selective flat fish net and restriction on deployment; Introduction and mandatory use of excluders in all shrimp trawls; Forced to carry observers for data collection activities; Coerced to operate under "house arrest" with the unfunded mandatary VMS program; Forced to develop the RCA and boundary modifications; Engaged in collaborative research to help improve the science; Current development of ITQ program to reduce discards with industry funding; Reduced time on the water by 75 to 80 percent; Reduced our earnings by at least 75%.

THE FACT OF THE MATTER IS THAT NO MATTER WHAT THE TRAWL FLEET DOES TO IMPROVE THE SITUATION, OCEANA AND NATURAL RESOURCE DEFENSE COUNCIL WILL NEVER BE SATISFIED. Look at either groups' website and you will see that their goal is to eliminate all net fishing. This is unreasonable. So how can any appeasement be made? We believe that you and the Council should take a stand against eco-terrorists by just saying no. Remember the judge didn't have a problem with the plan, just the technical NEPA procedure.

We encourage NMFS and the Council to select the following:

A. IDENTIFY AND DESCRIBE ESSENTIAL FISH HABITAT

CBTA preferred Alternative A.1 status quo

Second choice Alternative A.2 Depths less than 3500 meters

B. Designate Habitat Areas of Particular Concern

CBTA preferred Alternative B.1 status quo

Second choice Alternative B.2 Estuaries, 3 Canopy Kelp, 4 Seagrass, and 6 Rocky reefs combined

C. MINIMIZE ADVERSE IMPACTS ON EFH DUE TO FISHING

CBTA preferred Alternative C.1 status quo

Second choice Alternative C.4.1 Prohibit the geographic expansion of fishing for all bottom-tending gear and if other alternatives are also going to be adopted then it has to be the "Trawl Industry's Proposal" developed through meetings on the west coast with Pete Leipzig.

D. RESEARCH AND MONITORING

CBTA preferred Alternative D.1 status quo

Second choice has not been developed by anyone. But we would prefer status quo with added collaborative research on fishing impacts.

The expanded logbook program really does not need to be an alternative. The current logbook law requires all commercial fishermen to keep logbooks but the government has chosen to enforce it with only one group, the trawlers. If logbooks are going to be used in the future, one type should be produced for the entire coast that emphasizes total catch for both commercial and sport fishing.

VMS alternative is already in motion. However, CBTA is still against this system, especially because the government refuses to pay for this mandated equipment.

Fishermen feel that the Council is operating in fear of environmental group lawsuits and are willing to sacrifice every coastal community to appease them, all over of a question of NEPA procedure. The Council and its family of support agencies and committees have worked hard to manage our fisheries. The fleet in particular has made the most extreme sacrifices to ensure a healthy sustainable resource and to ensure the Council met compliance requirements of the management laws. We are very frustrated to see that NOAA is willing to flush it all down the toilet. Its our communities jobs at stake, not NMFS', that these environmental groups are willing to sacrifice.

The nation needs to address the frustration level environmental groups are placing on our fishing communities. The nation needs to weigh the stress these groups are placing on our hard working families against the donations these groups receive from their appeals to the public that the oceans are in crisis. The nation needs to address the fact that they are being duped by the desire to fund environmental groups effort to free the waters of nature loving fishermen.

Sincerely,

Steve Bodnar, Executive Director

Pacific Fishery Management Council

COQUILLE RIVER
COQUILLE AND BANDON

PORT OF BANDON

P.O. BOX 206 • BANDON, OR 97411 • (541) 347-3206 • FAX (541) 347-4645

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MAY 10 2005
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May 10, 2005

TO: Members of the Pacific Fisheries Management Council

In April, National Marine Fisheries hosted a public meeting in Bandon, Oregon on essential fish habitat and options being considered by the Council. It was very alarming and discouraging to learn from this meeting that the near shore area from Coos Bay to Bandon could possibly end up being closed to all fishing if option C14 were adopted. We were also very surprised to see that this was the only area on the Oregon Coast to be designated as a hard bottom habitat. That is most certainly not the case.

We understand that this map was prepared by Oceana, and when asked why this area was singled out, it was stated by the Oceana representative in attendance that it was the only data they had.

While we in no way endorse Oceana's proposal in Option C12, it could possibly be understood why the area was identified on the map as a no bottom trawl zone. It is an area already avoided by the trawlers due to the AT & T substation and the Bandon cable that runs offshore in that location. The trawlers receive mitigation not to fish there. We do not feel it is necessary for the area to be identified on the map for that reason. Under Options C13 and C14, the area designated as it is would have devastating effects on the rest of the commercial and recreational fleets in both Coos Bay and Bandon as well as both ports. The Port of Bandon strongly urges the Council to revisit this map and remove the hard bottom designation that we were singled out with.

Sincerely,

Alex Linke
Port Director

Oregon Anglers

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MAY 1 0 2005
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Mr. D. Robert Lohn
Regional Administrator, National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-0070

Re: Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn,

These comments are submitted on behalf of Oregon Anglers and the Recreational Fishing Alliance (Oregon Group). We represent recreational fisherman in Oregon (Oregon Anglers) as well as at the national level (RFA). We appreciate the opportunity to present our views and concerns relating to Groundfish EFH

In the Magnuson-Stevens Fishery Conservation and Management Act we find a guideline for analyzing, and then choosing or suggesting alternatives relating to EFH. We are referring to the national standards, (Sec.301.)(a)(2) [*Conservation and management measures shall be based on the best scientific information available.*] (Sec.301)(a)(8) [*Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.*]

We find that many of the alternatives in the EFH DEIS do not comply with the standards mentioned above. Many are based on assumptions rather than applicable scientific information. Many have large economic impacts to the downside on fishing sectors and communities. The prevalent data sets come from one fishing sector while several alternatives affect all fishing sectors. All habitat interactions due to fishing are assumed to be detrimental to the marine ecosystem in this DEIS. While we support a precautionary approach to fishery management, we cannot support a zero human impact one.

Upon reviewing the EFH DEIS we find existing or modified alternatives that we do support. Our listing with modifications and explanations are as follows:

<u>Essential Fish Habitat Identification and Description</u>

Alternative A.2: Depths less than 3500m

We choose this alternative because it includes all habitat where groundfish have been observed. It would be, by default, the most accurate description of EFH based on current data.

<u>Habitat Areas of Particular Concern Designation</u>

Alternatives B.2 through B.8

Many of these alternatives have enough data to support designation. The rest relate to structural features which we can support on a precautionary management basis.

Alternative B.9 (modified) Process for new HAPC designation

It is our recommendation that this alternative be modified to include a process to remove a HAPC designation from an area. If the science used to support the original designation is no longer valid, then there should be an equivalent process to remove designation.

Minimize Adverse Fishing Impacts to EFH

Alternative C.8.1 (modified) Zoning Fishing Activities

Our support would be for this alternative with some changes. We believe that this alternative would be most in compliance with national standard; M-S Act(301)(a)(8). This alternative allows outcome-based management involving area closures. It allows fishers and management a process and some time to develop alternative gear to lessen EFH impacts. An incentive is offered to develop "clean" gear. Our suggested change concerns funding of gear development. *We recommend that funding for implementation of this alternative not be taken from that which is dedicated to any other fishing sector, nor cause a lowering of the percentage normally allocated to another sector.*

Research and Monitoring Activities

Alternative D.4 (modified) Research Reserve System

In our assessment of this alternative we believe that there is great value in a system of research reserves. They should encompass all habitat types designated as HAPC. All three zones of the EEZ should be included, nearshore, slope, and shelf. Reserves would need to be no larger in area than necessary to study the representative HAPC areas contained within. An allowance on shape would need to be made to comply with enforcement issues. Our addition to this alternative would be in the area of reserve management. *Management of research reserves shall be done only by NOAA Fisheries. All funding of reserve activities must be through federal tax revenues and/or fees. No private funding, as for instance grants from resource user organizations or from environmental organizations, may be used.Reserves must be reauthorized every 5 years through the Council process. No extractive activities will be allowed in a reserve except those necessary to conduct fisheries research.*

This alternative would allow for baseline and experimental data to be obtained in a controlled environment. Studies over time could help determine which habitat features are most important to a productive environment.

Summary:

Oregon Anglers and RFA believe that common sense can be used on this issue of EFH. We support an approach which relies on objective science and compliance with MSA national standards.

Thank you for considering these comments.

Regards,

John Holloway
John Holloway
Oregon Anglers
Recreational Fishing Alliance

Cc: PFMC
ODFW Marine Program

Subject: [Fwd: Comments 2005 Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:22:15 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comments 2005 Groundfish DEIS
Date: Tue, 10 May 2005 20:41:59 -0700
From: Pepper Trail <ptrail@ashlandnet.net>
To: GroundfishEFHDEIS.nwr@noaa.gov
CC:pfmc.comments@noaa.gov

To: Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

From: Pepper Trail, Ph.D.
Conservation Chair
Rogue Valley Audubon Society
2011 Crestview Drive
Ashland, OR 97520

These comments on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS) are submitted on behalf of the Rogue Valley Audubon Society, a chapter of the National Audubon Society with over 500 members in southern Oregon. We are concerned about the declining health of Oregon's fishery resources, and urge that management of groundfish on the Pacific coast be governed by the "precautionary principle." In other words, when data needed for informed decision-making are lacking, the most conservative alternative must be followed; the alternative that is most protective of the fisheries resource. Since there are many critical gaps in our understanding of groundfish ecology, this approach will necessitate significant changes in current management practices.

Specifically, we urge the Pacific Fisheries Management Council to take action in five critical areas:

* establish a network of reserves in order to better understand fishery impacts on all habitat types, * increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* make it easier for fishermen to change to less destructive gear,
* develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

Thank you very much.

Respectfully submitted,

Pepper W. Trail, Ph.D.

Pacific Fishery Management Council

17

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
C/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-0070

RE: Comment on 2005 Pacific Coast Groundfish Essential Fish Habitat Draft Environmental Impact Statement dated February 11, 2005.

Dear Mr. Robert Lohn,

Thank you for this opportunity to submit comments on the 2005 Pacific Coast Groundfish Essential Fish Habitat Draft Environmental Impact Statement dated February 11, 2005. The Audubon Society of Portland has 10,000 members throughout the state of Oregon who care deeply about the protection of coastal wildlife and habitat off of our coast. We applaud your efforts to compile the best available science, identify and designate essential fish habitat (EFH) and Habitat Areas of Particular Concern (HAPC), minimize adverse impacts that may result to EFH due to fishing, and identify further actions to encourage the conservation and enhancement of EFH. In the spirit of the PEW Ocean Commission Report of 2003 and the U.S. Commission on Ocean Policy Report of 2004, we believe this document seeks to incorporate the vital principles of ecosystem-based management into Pacific fishery management.

ALTERNATIVES TO IDENTIFY AND DESCRIBE EFH: ADOPT A.2

The Audubon Society of Portland recommends adoption of Alternative A.2, where EFH is identified as 100% of the area where the habitat suitability probability (HSP) is greater than zero for all species and any additional area in depths less than or equal to 3500 m (1914 fm).

We feel Alternative A.2 should be chosen as the Preferred Alternative because it is inclusive enough to cover all habitats where groundfish have been observed, with the addition of 100 m depth as a precaution for non-observed species and scientific uncertainty, but it is not so over-inclusive as to render the designation of EFH meaningless. Additionally, it will minimize restrictions to subsequent selections of HAPCs, which are to be subsets of designated EFH.

ALTERNATIVES TO DESIGNATE HAPC: ADOPT B.2, B.3, B.4, B.6, B.7, B.9

The Audubon Society of Portland recommends adoption of Alternatives B.2, B.3, B.4, B.6, B.7 and B.9. Although not required by the Magnuson-Stevens Act (MSA), Councils are encouraged to designate HAPCs, based upon the importance of the ecological function provided by the habitat, the extent to which the habitat is sensitive to human-induced environmental degradation, whether development activities are or will be stressing the habitat type and the rarity of the habitat type. These considerations are particularly germane in the context of the more than 80 species managed by the Pacific Fishery Management Council (PFMC). At a time when eight of the assessed 19 species of groundfish are declared overfished and offshore aquaculture and exploration activities are being hotly pursued on the federal level, the moment is ripe to move forward with designation of HAPCs in an effort to conserve and restore the most crucial habitat types, to be determined by the best available science.

In light of the importance of such designation, we recommend including Alternatives B.2, B.3, B.4 and B.6, which encompass essential estuaries, canopy kelp, seagrass and rocky reefs. These biologically productive areas have been shown to provide important habitat for many marine species, including groundfish, at various stages of life history, for reproduction, feeding and refuge. Although these habitat types are among the areas of highest productivity in the world, they can be particularly sensitive areas, due to proximity to the shoreline, inadequate mapping and vulnerability to certain gear types. Thus, designation as HAPCs would serve to concentrate attention on potential threats to these habitat types and would enable the PFMC to make informed future decisions regarding the management of Pacific groundfish.

Additionally, we recommend including Alternative B.7, a “catchall” designation for special interest areas that possess unique geological and ecological characteristics that may be critical for rockfish management. Seamounts and canyons supply a variety of unique ecological functions, perhaps the most important being the provision of high concentrations zooplankton, which is a principal food source for both juvenile and adult rockfish.

Finally, we recommend adopting Alternative B.9, which establishes a streamlined process for designating new HAPCs, based on proposals submitted to the PFMC. Based on the principles of adaptive management, this alternative recognizes that new future scientific information could call for inclusion of other critical habitat areas as HAPCs. It establishes a process for petition and PFMC consideration. This streamlined process will provide assurances that proposals submitted by organizations and individuals will be fully and fairly considered.

ALTERNATIVES TO MINIMIZE ADVERSE IMPACTS TO EFH: ADOPT C.4.2, C.6, C.7.2, C.9.5, C.9.6, C.10 AND A COMBINATION OF C.12, C.13 AND C14.

The Audubon Society of Portland recommends adoption of C.4.2, C.5, C6, C.7.2, C.9.5, C.9.6, C.10 and a combination of C.12, C.13 and C.14. Because Amendment 11 to the Fishery Management Plan did not include measures to minimize fishing impacts on EFH, it is essential to take steps to do so today. Although restrictions on the use of large footrope gear and Rockfish Conservation Areas have some mitigating benefits on the effects of fishing gear, these restrictions may only affect a small portion of habitat and are not necessarily determined by specific habitat type.

Under Alternative C.4.2, geographic expansion of fishing for all bottom-tending gear types would be prohibited, to protect areas that are potentially pristine. Because there is little data for areas in which there have historically been no fisheries, a precautionary approach should guide management in these unexploited areas, so as to truly adhere to the principles of sound science and provide valuable environmental baseline data for the future. As acknowledged by the DEIS itself, relatively little is known about organisms such as deep-sea corals that may occur in these areas and be particularly vulnerable to impacts associated with even a single fishing event. Recent discoveries such as new black coral species in close proximity to Los Angeles, multispecies aggregations of reproducing psychrolutid sculpins and deep-sea octopod, brooding eggs on the Gorda Escarpment off of California and methane seeps with associated carbonate rock structures and chemosynthetic communities along the shelf-break off of Oregon’s coast support this precautionary approach, suggesting there are diverse, yet scattered areas that warrant protection by limiting the expansion of existing fisheries. Thus, protecting presently undisturbed areas until better mapping information is available is critical. Additionally, applying the expansion limit to all bottom-tending gear types, not just trawl fisheries, is essential.

The PFMC should adopt Alternative C.5, which prohibits a krill fishery. Euphausiid shrimp are important prey for a wide range of species along the West coast and are inextricably linked to groundfish, both as primary prey for groundfish and in secondary ways through the food web. In the spirit of ecosystem-based management, we are supportive of preserving a healthy forage base for groundfish and their prey, and we encourage future actions by the PFMC to protect the full spectrum of currently non-managed forage species.

We recommend inclusion of Alternative C.6, which calls for closure of “hotspots,” as a Preferred Alternative for minimization of adverse impact on EFH. Used in conjunction with other alternatives, prohibiting trawling for the top 20% HSP areas associated with 50 or more species/lifestage combinations will ensure protection of the greatest possible number of groundfish populations.

Alternative C.7.2 closes off those special interest areas included under B.7 to all bottom-contacting activities, rather than just to the specific method of bottom trawling, thereby affording increased precautionary protection to these geographically unique and biologically productive areas.

Alternatives C.9.5 and C.9.6 prohibit the use of destructive dredge and beam trawl gear, which are being phased out anyway. Thus, these limitations will have little economic impact on fishing interests, but will seek to afford maximum protection to bottom habitat. That being said, we acknowledge that fishing gear is constantly evolving and that habitat protections envisioned may not be maintained through time as gear configurations change. We therefore support using gear restrictions in conjunction with the other protective measures to minimize adverse impact to EFH, as outlined above and below.

Alternative C.10 utilizes existing closed or unfished areas to eliminate bottom trawl gear. Through the use of public-private partnerships, private funds are used to buyout 50% of groundfish trawl permits, in concert with designation of no-trawl zones off the Central California coast. Progressive cooperative partnerships such as these are an essential and forward-thinking means of protecting habitat and fisheries for future generations, distributing the economic hardship of marine conservation more evenly onto a more diverse spectrum of interested stakeholders. Although geographically limited in scope, this alternative may have merit if the interested private parties (the Nature Conservancy and fishing interests) agree this is a productive proposal.

Alternatives C.12, C.13 and C.14 represent a broad spectrum of closures to ecologically important areas, either to just bottom trawl gear, all bottom-contacting gear or all fishing, respectively. We believe a combination of these alternatives should be utilized to achieve the PFMC's goals of protection and research. Integration of these approaches will also give the PFMC the opportunity to develop a network of research reserves, which can serve as a means to compare fishery management techniques and effects against benchmark data.

The Audubon Society of Portland recommends adoption of C.12, the "Oceana" alternative, in an effort to freeze the existing bottom trawl footprint. As stated by Oceana, the best science available from the National Academy of Sciences has found that bottom trawling reduces habitat complexity, causes shifts in benthic communities and reduces productivity of benthic habitats. By utilizing existing closed areas, denying expansion of trawling areas, closing sensitive areas within those currently being trawled, limiting roller gear size and engaging in ongoing research and monitoring, the PFMC can maintain healthy fisheries while protecting habitat and marine biodiversity. The Audubon Society of Portland also supports adoption of C.13, which limits use of bottom-contacting gear in ecologically important areas. Finally, we also recommend closure of specific ecologically important areas to all fishing. There is sound science to suggest that creating a network of discrete marine areas of biological significance that is off-limits to all fishing can allow adult fish to grow and reproduce in abundance, while their offspring help replenish populations outside closed boundaries where fishing is allowed. This alternative is supported by the principles of ecosystem-based management and moves fishery management into a broader ecological context.

RESEARCH AND MONITORING ALTERNATIVES: ADOPT A COMBINATION OF D.2.1 AND D.4

The Audubon Society of Portland recommends adoption of D.2.1. As stated above, one of the biggest challenges the PFMC faces today in the context of Pacific groundfish management is the relative lack of data, analysis and understanding of the species, their habitats and the effects of human disturbance. Data collected by fishing vessels can prove invaluable for gaining a future understanding of these complex interactions and gathering spatial data for future mapping. Thus, under this alternative, all fishing vessels will be required to maintain a logbook, recording information on fishing time, location and catch composition, similar to the current trawl logbook program. In addition, however, it is imperative that this data is not only collected, but also error-checked, entered into a database and analyzed in a meaningful way; one of the biggest complaints we have heard from fishing interests at public meetings related to this and other documents is that logbook data is gathered by individuals, but is not compiled and analyzed in a meaningful or timely manner.

We also strongly support Alternative D.4, which would restrict fishing in specific areas. These research reserves areas would not only minimize fishing impacts on habitat and marine wildlife, but would provide controlled benchmark data for determining extent of fishing impacts, differentiating natural versus human impacts and measuring the length of time necessary for habitat features and function to recover. By establishing a network of research reserves, the PFMC can engage in a comparative study of 1) areas open to and impacted by commercial and recreational fishing, 2) areas subject to only limited and controlled fishing disturbance and 3) areas not open to or impacted by any fishing. These areas should broadly represent all habitat types in which PFMC-managed groundfish occur, to allow comparison of the effects of fishing across these different types.

GUIDING PRINCIPLES

In general, we feel it is imperative for the PFMC to take a precautionary approach to management of Pacific groundfish, while we improve our limited understanding of the impacts of fishing on diverse habitats and the ability of habitats to recover from fishing impacts. In fact, the Oregon State of the Environment Report 2000 states, "the most significant risk to marine fisheries … is our insufficient understanding of the complex interactions of natural and human caused changes in stock health."[1] It is crucial, therefore, that the PFMC err on the side of caution in protecting and restoring Pacific groundfish and habitat.

We strongly encourage the PFMC to include a network of research reserves in its effort to designate, protect and understand present and future EFH. By monitoring and analyzing impacts and effectiveness in these reference sites, the PFMC can glean new

[1] **Oregon Progress Board.** 2000. Oregon State of the Environment Report, Statewide Summary, Salem, Oregon.

knowledge, engage in adaptive management and move forward more confidently with fishery management, basing its decisions on sound science.

Utilizing the principles of ecosystem-based management, the PFMC should develop an ecologically based management plan that considers the entire ecosystem, including humans, and protects the long-term health of the marine environment**.** This plan should think beyond protection of single species and should consider the inherently interrelated nature of all marine species and habitat types, as well as potential past, present, future and cumulative human impacts on these environments.

Finally, we feel it is important that all possible EFH protection measures be adopted in the near-term, rather than deferring measures for future understanding. This precautionary implementation should then be modified accordingly, based on the principles of adaptive management, as new information is gathered during the mandatory five-year review process.

CONCLUSION

In conclusion, we would again like to thank you for this opportunity to comment. As stated above, we applaud your efforts in creating this Draft Environmental Impact Statement and strongly support the designation and protection of EFH for Pacific groundfish. Specifically, we support the respective alternatives and general principles outlined above.

Thank you for considering these comments.

Sincerely,

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May 10, 2005

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MAY 13 2005
PFMC

Mr. D. Robert Lohn
Regional Administrator, National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle WA 98115-0070

RE: COMMENT ON 2005 PACIFIC GROUNDFISH DRAFT ENVIRONMENTAL IMPACT STATEMENT

The City of Morro Bay treasures its fishing heritage and local commercial fishing fleet that provides fresh seafood for this country in a highly regulated and sustainable environment. Our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on.

Currently there are 5 Class A permittees who operate out of our port. That represents trawl fishing effort over two hundred miles of coastline between Santa Barbara Harbor and Monterey Harbor. Each Class A permittee generally fishes between 5-8 days to make their 60 day quota; so on most of the days of the year there IS NO LONGER EVEN ONE DEEP WATER COMPLEX TRAWLER OPERATING ON THIS TWO HUNDRED MILES OF COASTLINE. Yet, the port still does get groundfish, and these are the consistent landings that allow our one remaining full service fish buying dock to keep employees working and pay the bills. The City is dedicated to supporting this remaining fish buying dock and is currently in the process of installing a new $700,000 ice making machine for commercial fishing use at this location.

Clearly the policy of subsidizing more and bigger trawlers in the 1970s was a disaster, but just as clearly the resource for 15 years now has been very lightly harvested compared to historic levels. Many of our local restaurants no longer can get local fresh fish and have turned, like most of the country, to frozen fish which is oftentimes harvested in environmentally damaging ways in unregulated countries. In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City. In this context, we learned about the groundfish essential fish habitat draft environmental impact statement (EFH DEIS).

Many of the alternatives in the DEIS would appear to close fishing grounds to the extent that would eliminate consistent landings in Morro Bay and finally put an end to our commercial fishing harbor. We do not believe it is the intent of the National Marine Fisheries Service to eliminate fresh seafood landings in our area and decimate our City and we urge you to:

♦Work with the fishing industry on alternatives that will protect Essential Fish Habitat, especially those grounds with deep water corals and critical bottom habitat so that we can increase access to the abundant sustainable fishery resources in our area for our City and the seafood consumer.

♦Implement EFH designation for groundfish that have no strings attached or unforeseeable implications for low/no impact vertical gear or traps.

♦Extend the timelines for adoption of groundfish EFH so that the coastal communities/fishing industry can fully engage the discussion with NMFS and the environmental community.

♦Improve the outreach to community and fishing businesses by considering an ombudsman program, enhancing your sustainable fisheries outreach effort or some mechanism to empower local fishermen to give input and build trust with NMFS and the environmental community.

I would close by pointing out that virtually 100% of our commercial fishermen are owner operated small businesses. We don't have the corporate interests that can hire lobbyists that the large processors and factory producers of some other areas have or the money and influence of the environmental NGOs. It is tremendously difficult for a small business owner/operator or a small city for that matter to take the time to become informed on these issues, much less to attend the many meetings that are needed to have an impact. Thus our voices are often not heard or we find that decisions are made at meetings we are unable to attend. Even when we do comment (such as our support of the Federal Buyback Program, provided that the buy-back vessels would not become problems for harbors and the overall science based quotas would remain the same) we have come to have low expectations for results. Currently, two buy-back boats in this harbor are in arrears to the City approximately $4700 and the reallocation in groundfish quotas that were "bought back" has not happened as we felt was promised.

All of the above facts lead to a feeling of lack of empowerment and even distrust of the process that is not conducive to a positive collaborative process. Still, we remain convinced that almost all involved have the same goals of protecting our environment and maintaining sustainable fisheries; so we will continue to try to work with all parties for mutually beneficial solutions.

Please consider our recommendations and help us preserve the important economic and cultural values of allowing an environmentally sound and sustainable fishery to stay on the central coast of California.

Sincerely,

Janice Peters

Mayor Janice Peters

cc: Conresswoman Capps
PFMC

Natural Resources Defense Council
Oceana
The Ocean Conservancy

May 11, 2005

VIA FACSIMILE: (206) 526-6426
VIA EMAIL: GroundfishEFHDEIS.nwr@noaa.gov

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
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Seattle, WA 98115-0070

Re: Comments on Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement

Dear Mr. Lohn:

The undersigned organizations submit these comments concerning the Draft Environmental Impact Statement for Pacific Coast groundfish ("DEIS") for consideration by the National Marine Fisheries Service.[1] While flawed, the analyses provided in the DEIS establish that current fishing practices and patterns cause significant long-term damage to essential fish habitat ("EFH"). Accordingly, the Fisheries Service and Pacific Fishery Management Council ("Council") are required to minimize these effects. Status quo measures are neither sufficient to meet the mandates of the Magnuson-Stevens Act nor responsive to the best available information.

These comments focus on some of the legal and analytical deficiencies of the DEIS. We believe that these deficiencies can be remedied between the draft and final Environmental Impact Statements, and most importantly that selection of a broad designation alternative and comprehensive minimization alternative is warranted by the facts, science, and the law.

The DEIS Does Not Satisfy the Requirements of the National Environmental Policy Act

I. The Statement of Purpose and Need is Impermissibly Narrow.

The Fisheries Service's statement of purpose and need in this DEIS is improperly narrow and vague. See City of Carmel-By-The-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997) (" . . an agency cannot define its objectives in unreasonably narrow terms."). The Fisheries Service states that the objectives for the Environmental Impact Statement ("EIS" or

[1] Some of the undersigned organizations have submitted additional independent comments, to be considered in conjunction with these comments.

"DEIS") are to consider alternatives for the designation of EFH and Habitat Areas of Particular Concern ("HAPCs"), to consider alternatives for the minimization of adverse effects of fishing on EFH, and to address gaps in the available data. DEIS at 1-4. The Magnuson-Stevens Fishery Conservation and Management Act ("MSA"), Fisheries Service's regulations, and the joint stipulation from AOC v. Daley require the Fisheries Service to do more than merely propose alternatives and identify gaps in the data. The Fisheries Service must implement all practicable measures to minimize adverse effects on EFH and must fully explore and evaluate those options in its EIS. Failure to include this fundamental objective within the purview of the DEIS violates NEPA, the MSA, and the agency's regulations and obligations under AOC v. Daley.

The MSA requires that the Fisheries Service minimize the adverse effects of fishing on EFH to the extent practicable. 16 U.S.C. § 1853(a)(7). The DEIS falls far short of analyzing the relative efficacy of the alternatives on minimizing adverse effects to EFH, not to mention recommending to the Council which measures the agency believes would be most practicable in achieving those goals. Instead, the reader is left with nothing more than a vague suggestion that the analysis contained within the DEIS might, someday, be incorporated into a decision that results in "on the water" EFH protections.

Additionally, the Joint Stipulation and Order from AOC v. Evans require that "NMFS will determine either that action is necessary or that action is not necessary to comply with the requirements of Section 303(a)(7) of the Magnuson-Stevens Act [16 U.S.C. § 1853(a)(7)]." AOC v. Daley, Joint Stipulation and Order at 5. This determination is one of the primary purposes of the DEIS and must be included in the statement of purpose and need, yet the DEIS is devoid of such a determination. The Fisheries Service must do more than merely consider and rate the alternatives under consideration and point out gaps in the available data; it must also decide which alternatives best satisfy its mandate to minimize adverse effects on EFH. The DEIS utterly fails to do so. The closest the agency gets to committing to whether it will take action (or require the Pacific Council to do so) is when it states that it will identify final preferred alternatives following the June 2005 Council meeting. DEIS at 2-1. By failing to include a determination of whether the findings contained within the DEIS merit action by the Pacific Council, NMFS has violated its obligations under AOC v. Daley to conduct full NEPA review of its efforts to minimize adverse effects to EFH. Joint Stipulation at 3-5. NMFS may not delay consideration of this decision until it issues its Record of Decision because the analysis that leads to the determination must be incorporated into the NEPA process. Failure to evaluate the environmental effects of the decision of whether or not NMFS will require action to be taken "would frustrate the fundamental purpose of NEPA, which is to ensure that federal agencies take a hard look at the environmental consequences of their actions early enough so that it can serve as an important contribution to the decision making process." California v. Norton, 311 F.3d 1162, 1175 (9th Cir. 2002) (internal citations and quotation marks omitted). We believe that conservation action is appropriate and required for the reasons stated below.

II. The Range and Quality of Alternatives Considered is Inadequate.

NEPA requires the Fisheries Service to consider "alternatives to the proposed action." 42 U.S.C. § 4332(2)(C)(iii). The alternatives analysis is the "heart" of the environmental review process. 40 C.F.R. § 1502.14. As such, agencies must "rigorously explore and objectively evaluate all reasonable alternatives." Id. As explained above, "an agency cannot define its objectives in unreasonably narrow terms," City of Carmel-By-The-Sea v. United States Dep't. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997), in order to limit the range of alternatives that it must consider. Alaska Wilderness Recreation & Tourism Ass'n v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995) (quoting Idaho Conservation League v. Mumma, 956 F.2d 1508, 1520 (9th Cir. 1992)). The Fisheries Service is obligated to consider all reasonable alternatives that fit squarely within the scope of identifying and describing EFH and HAPC, as well as identifying and recommending which minimization measures the Pacific Council should implement and when they will be implemented. While the agency and Council clearly may consider alternatives refined in response to public comment, and refine or combine alternatives in response to public comments, the Fisheries Service may not consider or adopt any alternate proposals not included within the range of alternatives presented within the DEIS absent full NEPA review. Doing so would violate NEPA's express purpose of informed decision making and public participation. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989); Metcalf v. Daley, 214 F.3d 1135, 1141 (9th Cir. 2000).

Before commenting on the issues raised by the EFH, HAPC, and minimization alternatives, we would like to voice a universal critique of the methodological approach taken by the Fisheries Service. By considering alternatives for EFH, HAPC, and minimization separately, the agency has greatly limited the number of alternatives available for consideration and adoption. This leads to arbitrary and illogical results. As the agency readily acknowledges in the section entitled "The Implications of the EFH Identification and Description Alternatives on HAPC and Affects Minimization," the choice of EFH alternative limits which HAPC and minimization alternatives remain available for implementation. DEIS at 4-11 – 4.12. Thus, the Fisheries Service could choose EFH, HAPC, and minimization alternatives that do not work together. As a result, the number and range of HAPC and minimization alternatives considered in this DEIS are far fewer and less broad than the agency would like the reader to believe. This approach violates NEPA's express requirement that the Fisheries Service consider a reasonable range of alternatives. To correct this methodological problem, the agency should either consider a range of HAPC and minimization alternatives within each EFH alternative so that the steps ultimately taken to minimize adverse impacts correspond to the EFH identified, or permit selection and implementation of any combination of alternatives.

A. The Fisheries Service Relies Too Heavily on HSP to Define EFH and Fails to Identify a Threshold for Determining Whether Habitat is Essential Under its HSP Alternatives.

The Fisheries Service relies exclusively on the Habitat Suitability Probability ("HSP") model in all but two of the alternatives considered for EFH identification and designation. DEIS at 2.3. As described further below, this raises great concerns about the adequacy of the range of EFH designation and identification alternatives. In addition, the HSP model does not include all relevant information, such as data layers concerning coral and sponge. The range of data used to select EFH also is truncated impermissibly by the overly-quantitative nature of the analysis and the focus on the abundance of managed species to the exclusion of other necessary components of EFH, such as prey species and their habitats. The Fisheries Service should include more information in its analysis in order to improve the precision of its EFH model.

Additionally, the agency explains that the HSP scores are used as a proxy for determining whether habitat is "essential," but fails to define the threshold level for making such a determination. DEIS at 2-3. Instead, the Fisheries Service asserts that "the higher the HSP, the more likely the habitat area should be identified as EFH." DEIS at 2-3. Applying this logic to the alternatives presented leaves the Council and the general public to guess whether essential habitat equates to 100% of the area with HSP above zero (Alternatives A.2 and A.3), the top 70% (Alternative A.5), or the top 30% (Alternative A.6), and whether distinctions should be made for overfished and precautionary zone species. The Fisheries Service's approach here is inadequate. See Morongo Band of Mission Indians v. F.A.A., 161 F.3d 569, 575 (9th Cir. 1998) ("The touchstone for our inquiry is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation.") (citation and internal quotations omitted).

The very purpose of the DEIS – to provide a management tool for developing conservation efforts and stewardship of EFH – is rendered meaningless if the tool relied upon fails to identify the point at which habitat should be considered "essential" within the meaning of the law. The Fisheries Service must provide more reasoning in its analysis and guidance to the Council than it has chosen to provide in the DEIS. Additionally, the nearly exclusive reliance on HSP as a means of describing and identifying EFH greatly limits the quality and range of EFH alternatives considered.

B. Considering HAPC as a Subset of EFH Leads to Illogical and Arbitrary Results.

Designation of HAPC should identify areas based on one or more of the following criteria: (i) the importance of the habitat's ecological function provided by the habitat; (ii) the extent to which the habitat is sensitive to environmental degradation; and (iii) whether development activities are, or will be, stressing the habitat type. 60 C.F.R. § 600.815(a)(8). The Fisheries Service's decision to consider HAPC as a subset of EFH could lead to illogical and arbitrary results. The Council's designation of HAPC could be circumscribed by its contemporaneous designation of EFH if the HAPC alternative selected does not fit within the chosen EFH. Alternatively, the Council could choose to avoid this inconsistency by only considering HAPC alternatives that fit within certain EFH alternatives, or vice versa. Either way, the number of HAPC alternatives that can be considered fully is limited by the agency's insistence that HAPC be a subset of EFH.

III. The Fisheries Service's Environmental Effects Analysis is Inadequate.

NEPA requires that agencies discuss "the environmental impacts of the proposed action and alternatives." 40 C.F.R. § 1508.9(b). Environmental impacts are defined to include "both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." 40 C.F.R. § 1508.8(b). The fundamental purpose of the DEIS is the detailed consideration of the environmental effects of implementing all practicable minimization measures. The DEIS fails to accomplish this. Indeed, the Fisheries Service admits that "[i]t is not possible to analyze the degree to which the function of habitat within the ecosystem or for groundfish will be affected by the alternatives." DEIS at 4-1. Although NEPA does not require agencies to "foresee the unforeseeable," it does require agencies to predict potential consequences of their actions before those consequences are fully known. Methow Valley

Citizens Council v. Regional Forester, 833 F.2d 810, 816-817 (9th Cir. 1987), rev'd on other grounds, Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989) (quoting City of Davis v. Coleman, 521 F.2d 661, 676 (9th Cir. 1975). The Fisheries Service may not shirk its responsibilities to consider environmental effects merely due to limitations in the available data. "Reasonable forecasting and speculation is . . . implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry." Kern v. U.S. Bureau of Land Management, 284 F.3d 1062, 1073 (9th Cir. 2002) (internal quotations and citations omitted).

NEPA also requires that the Fisheries Service fully consider the cumulative impacts of its decisions together with "other past, present and reasonably foreseeable future actions." 40 C.F.R. § 1508.7; see Klamath-Siskiyou Wildlands Center v. Bureau of Land Management, 387 F.3d 989, 993-94 (9th Cir. 2004) ("Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."). Accordingly, the agency is required to analyze all past, present, and reasonably foreseeable fishing efforts in terms of their cumulative impact to EFH. The Fisheries Service does not appear to have done so, especially with regard to a cumulative analysis of all past fishing activities within EFH.

The DEIS Does Not Satisfy the Requirements of the Magnuson-Stevens Act

One of the primary purposes of the 1996 Sustainable Fisheries Act amendments to the Magnuson-Stevens Act is to protect habitat. Accordingly, Congress imposes on the Fisheries Service the duties to describe and identify Essential Fish Habitat, and to minimize the adverse effects of fishing on EFH to the extent practicable.

The statute makes clear that the duty to minimize adverse effects focuses on the effects of fishing on habitat. See 16 U.S.C. § 1853(a)(7) (duty to "minimize...adverse effects on such habitat caused by fishing). The regulations similarly make clear that the inquiry regarding whether there are adverse effects to EFH focuses on whether a fishing activity has any affect on the quality or quantity of EFH:

> Adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

50 C.F.R. § 600.810(a). Thus, in order to determine the universe of adverse effects that may require measures to minimize, the Fisheries Service must examine any and all impacts that reduce the quality or quantity of the habitat itself. These impacts include considerations of benthic organisms, prey species and their habitat, and other ecosystem components. In other words, the adverse effects inquiry is a broad one, focused on the effects of fishing on habitat and elements of the ecosystem, and not limited to the effects of fishing on fish stocks themselves.

In addition, the agency must perform a cumulative impacts analysis, which is to consider impacts on the environment. 50 C.F.R. § 600.815(a)(5).

Based on the adverse effects evaluation and the cumulative impacts analysis, the "Council must prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature... ." 50 C.F.R. § 600.815(a)(2)(ii).

I. <u>NMFS Cannot Limit Its Analysis of Adverse Impacts to Managed Species Alone and Fails to Evaluate Properly MMNT.</u>

The MSA requires that the Fisheries Service and the Fishery Management Councils "minimize to the extent practicable adverse effects on [EFH] caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat." 16 U.S.C. § 1853(a)(7). The EFH rule requires that the Fisheries Service and the Councils "must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary ["MMNT"]." 50 C.F.R. § 600.815(a)(2)(ii). The agency acknowledges that "[p]racticable Council action is triggered by adverse effects that are more than minimal and not temporary in nature." DEIS at 2-15. The agency goes to great lengths in both the DEIS and the appended Risk Assessment to create a sensitivity and recovery index ("SRI") to value the impact to habitat by gear type. While this helpful first step provides ample justification for implementing a minimization alternative, the SRI model itself does not consider all relevant factors.

First, the SRI that forms the basis of all but three of the minimization alternatives limits its consideration of habitat primarily to benthic habitat. The EFH rule requires consideration of a much broader definition of habitat when considering adverse effects. 50 C.F.R. § 600.810(a) ("Adverse effects may include direct or indirect physical, chemical, or biological alternations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH."). The agency must include qualitative analysis in addition to its SRI index that considers all of the best available science pertaining to prey species and their habitat and other important ecosystem components not captured by the SRI model.

Second, the DEIS provides no guidance to the public, the Council, or the decision maker about which adverse effects of fishing on EFH must be minimized. The Fisheries Service asserts that the Risk Assessment was intended to define when impacts from fishing exceed the MMNT threshold, but "due to data and time constraints it was not possible . . . to create an analytical tool capable of identifying areas of impacted habitat and demonstrating the effects of minimization alternatives." DEIS at 2-12 – 2-13. In other words, the main tool relied upon to create the minimization alternatives is incapable of accomplishing the very thing it was designed to do. Nevertheless, it is clear from the analyses currently described in the EIS that there are effects of fishing that reduce the quality and quantity of EFH in a manner that is both more than minimal and not temporary and therefore, that minimization is required.

In addition, the Fisheries Service regulations recognize three categories of tools to address adverse effects on fishing: fishing equipment; time/area closures; and harvest limits. 50 C.F.R. § 600.815(a)(2)(iii)(A)-(B). None of the alternatives considered in the DEIS even considers the use of reduced harvest limits as a way of minimizing adverse effects to EFH. The DEIS also fails to explain the basis of the decision to omit this tool from consideration under any of the alternatives. This decision not only contravenes the agency's regulations, but also ignores the conclusion of the National Research Council that "[e]ffort reduction is the cornerstone of managing the effects of fishing, including, but not limited to, the effects on habitat." NRC, 2002. In addition to being contrary to law, the decision violates NEPA for failing to consider a reasonable range of minimization alternatives and violates the APA for failing to articulate a reasoned basis for its decisions. Effort reduction is a reasonable management tool that NMFS must add to its suite of minimization measures under consideration.

II. The DEIS Fails to Consider the Best Scientific Information Available.

As described further below, the DEIS fails to consider the best scientific information available. This failure violates not only NEPA's mandates, but also the MSA and National Standard 2. 16 U.S.C. § 1851(a)(2); 50 C.F.R. § 600.315.

The DEIS Analysis is Deficient

In addition to the legal failures outlined above, the DEIS's analyses and conclusions are substantively and analytically flawed. While the DEIS contains valuable information that provides ample basis for a broad EFH designation and demonstrates clearly that minimization measures are necessary, the analyses should be improved to meet relevant legal and scientific standards.

I. EFH Identification: Description of the Alternatives

The rationale for Alternative A.1 should be revised to include more than simply a description of the status quo EFH identification alternative to describe fully why this alternative was chosen in the initial EFH identification decision. The discussion should pay special attention to depths greater than 3400 meters which are part of the status quo but not included in Alternatives A.2-A.6. Furthermore, as Alternative A.1 is the only alternative not based on the HSP model, it must be fully compared and contrasted with the HSP model-based alternatives, including the number of uncertainties in the HSP model output and how this alternative addresses these uncertainties.

Similarly, the description of Alternative A.2 should be enhanced to include a more explicit description of how this alternative provides better assurance that groundfish essential fish habitat is properly identified. The description of this alternative in its current form notes only that the addition of 100 meter depth provides a precautionary adjustment in case of non-observed species. This description should also clearly convey that the extra 100 meter depth helps buffer the uncertainties surrounding the HSP modeling effort and major prey species habitat requirements that are noted below.

A. The Shortcomings of the HSP Models Should be Clearly Stated in the Description of Alternatives and Environmental Analysis.

Only two of the six EFH identification alternatives are not solely based on the Habitat Suitability Probability (HSP) model. It is therefore imperative that the description of the alternatives and the environmental analysis provide the public with a clear understanding of the limitations and uncertainties involved in this modeling effort.[2] The following major uncertainties should be clearly defined in an accessible format to aid the decision maker and public in understanding the differences between alternatives:

1. The HSP modeling effort only includes depths out to 3000 meters. The discussion in Alternative A.2 and information from the groundfish life history appendix clearly illustrate that groundfish have been observed at depths up to 3400 meters;
2. Of the possible 328 maps of groundfish species and their life stages, only 160 HSP maps can be produced resulting in roughly half of the maps needed to adequately identify EFH by life stage for each of the eighty-two groundfish species.[3] The primary life stage where little information is available is larvae and eggs. This is particularly important for overfished species;
3. The trawl surveys utilized in the HSP model provide limited information concerning the function of habitat for a species for the following reasons. First, temporal aspects of the survey data may omit important habitats (for example, winter breeding grounds for lingcod using summer trawl surveys). Second, trawl surveys are of limited value for identifying EFH for juvenile stages (evident by a review of the HSP model outputs). Third, there is a strong bias towards habitats that can be trawled which can result in under representation of species that associate with untrawlable substrates for purposes of modeling the effects of depth and latitude[4]; and
4. The limited mapping of organisms that form biogenic habitats, which are particularly vulnerable to impacts and may have long recovery times, may result in these areas not being identified as EFH.

B. The Treatment of Groundfish Prey Species is Improperly Limited.

The EFH final rule states that:

> Loss of prey species may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. FMPs should list the major prey species for the species in the

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2 We note that Appendix A, the Risk Assessment provides a fuller discussion of the HSP modeling process and applicable limitations and uncertainties. However, this information should be stated clearly in the main body of the EIS to help ensure the public and decision makers can make an informed decision.

3 50 CFR 600.815(a)(1)(iv).

4 Appendix A at 91.

fishery management unit and discuss the location of prey species' habitat. Adverse effects on prey species and their habitats may result from fishing and non-fishing activities.

50 C.F.R. 600.815 (a)(7). Accordingly, the groundfish FMP must include a list of major prey species for groundfish and discuss the location of prey species' habitat. The discussion of prey species in the main text of the EIS is currently limited to one section[5] describing primary prey species and a general statement that prey species utilize the same habitats as groundfish. The EIS currently includes only one alternative focused on protection of a prey species. The EIS should be revised to include a better discussion of the habitat requirements of major prey species to be included in the range of alternatives to aid the public in fully analyzing these alternatives. If information does not exist, this must be stated clearly in the EIS.

C. Habitat Areas of Particular Concern Should not be Limited to Essential Fish Habitat Alternatives.

The EIS should make clear that the identification of HAPCs for groundfish should not be limited by alternatives for identifying and describing EFH. If an area is identified as a HAPC but is located outside of an area included in a EFH identification alternative, this area can be identified as both EFH and a HAPC. For example, if the PFMC or public identifies an area that meets the requirements for designation of a HAPC but this area is located deeper than preliminary preferred Alternative A.2 (3400 meter depth designation for EFH), this area can still be designated as both a HAPC and EFH.

II. Effects of Fishing on Essential Fish Habitat: Description of Alternatives

The description of the development of alternatives to minimize adverse impacts of fishing on essential fish habitat gives the public a misguided understanding of the proper management standard of the MSA and EFH regulations.[6] While the EIS provides the definition of adverse impacts from the final rule, it then goes on to provide a different standard for assessing adverse effects centered around the link between EFH and groundfish production, resulting in a "precautionary" label being applied to development of the alternatives.

The EIS bases this on the following rationale. First, the EIS discusses the purpose of the impacts model and its inability to model the relationship between the intensity of fishing effort and effects on habitat due to a lack of data. Next it states that the current state of habitats effects research only makes it possible to construct alternatives that are targeted at physical alteration of habitat and changes in biodiversity from the impact. It therefore concludes that alternatives cannot be quantitatively constructed to increase production of groundfish or enhance ecosystem function, leading to a precautionary approach being taken by NMFS and the Council in developing the alternatives. The EIS further elaborates on this point by stating:

[5] EIS at 3-30.
[6] EIS at 2-15; this same rationale is also presented in a summarized form at 4-1.

> [A]lthough the alternatives cannot be specifically targeted to promote sustainable fisheries with predictable population level results, the alternatives were developed to reduce adverse impacts in terms of physical modification to habitat and biodiversity. The paucity of quantified, spatially explicit data on adverse impacts, and the extent which adverse impacts have reduced the ability of groundfish to sustain themselves, functioned as the problem statement around which the alternatives were constructed. The alternatives were deliberately developed to reflect the broad range of available data and present the full spectrum of precautionary choices for decision makers to meet the purpose and need of action to minimize the adverse effects of fishing.[7]

The MSA obligation to minimize the adverse impacts of fishing on EFH is not based on a production standard. Rather, it is based on the definition of adverse impact or effect:

> Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences or actions.[8]

The EIS seems to put too much emphasis on the failure of the EFH impacts model to model the relationship between the intensity of fishing effort and effects on habitat. The model is not the only way (and not even the proper way considering available data) to assess adverse effects as defined by the MSA and EFH regulations. Studies analyzing the impacts of fishing gears on EFH can provide information to show an adverse effect necessary for developing a range of mitigation alternatives. Furthermore, the current state of the art habitat research, as defined by the EIS, provides the appropriate type of information to assess adverse effects. Quantitative studies linking gear impacts to production are not needed to meet MSA requirements.

Therefore, the proper standard and the one that guided development of these alternatives by the PFMC's EFH EIS Committee, is based on minimizing adverse impacts as defined in the EFH regulations using the best scientific information available. In this case, a review of the literature, the development of a sensitivity and recovery index (SRI) and guidance provided by the National Research Council ("NRC") are utilized to identify fishing operations that have adverse effects on habitat. Therefore, the description of the development of the alternatives should be revised to clearly state the definition of adverse impacts and that the tools necessary to identify and minimize the adverse effects of fishing gears on EFH are contained within the EIS as opposed to couching the alternatives as "precautionary" by using a groundfish production and quantifiable impacts standard.

The presentation of the sensitivity and recovery indices in the EIS discusses the decision to interpret global literature to help understand the effects of fishing on habitat. The EIS should cite the NRC report to support this choice and better inform the public on the basis of this

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[7] Id.
[8] 50 C.F.R. 600.810.

recommendation.[9] To do this the EIS should include a general discussion on the NRC report, as well as the Auster and Langton paper and others, by incorporating the discussion in Appendix A to help better inform the decision maker as to how the adverse impacts were identified and a range of alternatives for minimizing them was developed.

The description of Alternative C.1 includes the potential mitigative effect of the rockfish conservation area ("RCA"). The description must also include the fact that the RCA is in place as a bycatch reduction management tool to help maximize fishing opportunities and that the RCA changes in size and shape frequently. This section of the EIS should make this clear by incorporating discussion of the use of the RCA contained in section 4[10] to help better inform the public about this alternative.

Finally, the EIS incorrectly states that Alternatives C.12-C.14 are mutually exclusive and that only one could be contained in a final preferred alternative.[11] This statement is misleading. While the areas identified in C.12, C.13, and C.14 are identical, the levels of protection afforded these areas could range from no bottom trawling to no fishing. Therefore, the mitigation strategies identified in the different alternatives can be mixed and matched for the specific areas contained in alternatives C.12-14.

III. Effects of Fishing on Essential Fish Habitat: Analysis of Adverse Impacts

The alternatives for minimizing the adverse impacts of fishing gear on EFH rely almost exclusively on a the SRI that displays in a numerical fashion the impact of a gear on a specific habitat in terms of how sensitive the habitat is to a particular gear type and the expected time needed for the habitat to recover from an impact. The main body of the EIS must include a discussion of the methodology utilized to develop this index in order to inform the public of key information that was not included. For example, it is our understanding that only literature that included quantifiable before and after differences of gear effects was included. There is ample literature on growth, age, biology, re-settlement and other relevant factors that should have been included. It is important that all available studies and sources of information are included in the EIS, regardless of whether or not they are considered useful for the SRI, to provide the public and the decision maker with the information necessary to make an informed choice.

The information presented in the SRI is treated as a range with standard errors based on the number of studies for each category. This methodology may result in certain values having a greater range of impact based on the number of applicable studies, not necessarily on the basis of the certainty provided in the original study. For example, only one study on the effects of bottom trawling on hard slope biogenic habitat showing major changes in bottom structure was considered. The sensitivity value for this category is given as 1.5-3 solely for the reason that it is one study as opposed to the impacts found.

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[9] We recognize that the NRC report is cited in various places in the document and should also be cited here for the reasons discussed.

[10] EIS at 4-14.

[11] EIS at 2-12.

The sensitivity index provides a relative measure of the likely changes to habitat caused by interactions with various fishing gears and therefore provides little information on subsequent impacts.[12] This makes the cumulative impacts analysis (see below) critical in determining adverse impacts. Furthermore, the sensitivity values do not incorporate the relationship between fishing impacts and depth. The gear impacts analysis notes that benthic communities in deeper waters are probably less adapted to resisting and recovering from physical disturbances generally.[13] Considering that over the last few years fishing effort has been redirected into deeper waters, this factor is a significant one and must be stated clearly in the environmental analysis discussion to ensure the public makes an informed decision. Finally, the SRI does not consider the issue of fishing intensity or frequency of disturbance of the bottom by fishing gear.

IV. Effects of Fishing on Essential Fish Habitat: Prey Species

The EFH final rule states that:

> Loss of prey species may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. FMPs should list the major prey species for the species in the fishery management unit and discuss the location of prey species' habitat. Adverse effects on prey species and their habitats may result from fishing and non-fishing activities.

50 C.F.R. 600.815 (a)(7). While the EIS describes major prey species and identifies their habitat requirements generally, it provides no information on direct harm or capture with the exception of krill. The EIS should utilize information in the Bycatch EIS and groundfish observer data to identify direct removal of prey species by fishing and incorporate discussion of adverse impacts to prey species and their habitats into the description and environmental consequences of alternatives to minimize adverse impacts of fishing on EFH.

V. Effects of Fishing on Essential Fish Habitat: More than Minimal and Not Temporary Threshold

The EFH Rule states that:

> Councils must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature, based on the evaluation conducted pursuant to paragraph (a)(5) of this section.

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[12] Appendix A Risk assessment at 124.
[13] Appendix A, Gear impacts analysis at 27.

50 CFR 600.815 (a)(2)(ii). In Section 2 of the EIS there is a discussion of the "minimal and temporary threshold" and how the risk assessment process sought to delineate where impacts exceeded this threshold.[14] At the conclusion of the discussion, the EIS does not define the "minimal and temporary threshold". Yet in Section 4 of the EIS a de facto "minimal and temporary threshold" is established for gear types with no rationale other than to "simplify the large amount of information for the analyses of individual alternatives".[15] These minimal and temporary thresholds are arbitrary. In the absence of evidence that can demonstrate that these values do in fact equate to minimal and temporary, the proper standard should be values of 0 for sensitivity and recovery in the SRI. In addition to being precautionary, an approach the EIS touts often to describe the range of alternatives to minimize adverse impacts of fishing on EFH, there is precedence for this approach in another region. In the EIS for EFH in the Gulf of Mexico NMFS and the Council utilized a similar metrics tool for assessing impacts of fishing gears on different habitat types based on a global literature search. In that EIS, anything above a value of 0 (no impacts) was considered to have crossed the minimal and temporary threshold unless proven otherwise. Furthermore, it is abundantly clear from the data presented in the EIS that by any rational measure, the more than minimal and not temporary threshold has been crossed, and that measures must be taken to minimize the adverse effects of fishing on essential fish habitat.

VII. Cumulative Effects Analysis

The EFH final rule states that:

> Cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. To the extent feasible and practicable, FMPs should analyze how the cumulative impacts of fishing and non-fishing activities influence the function of EFH on an ecosystem or watershed scale. An assessment of the cumulative and synergistic effects of multiple threats, including the effects of multiple threats, including the effects of natural stresses (such as storm damage or climate-based environmental shifts) and an assessment of the ecological risks resulting from the impact of those threats on EFH, also should be included.

50 CFR 600.815 (a)(5). To analyze cumulative impacts the EIS provides a brief discussion for each of the alternatives and a methodology to rank the cumulative impacts of the specific alternative. Section 3 of the EIS should provide an analysis of the past, present and reasonable foreseeable future actions on EFH and discuss the ecological risks posed by the cumulative impacts of these actions. Relevant discussions would include past, present and reasonably foreseeable future temporal and spatial patterns and trends of fishing in conjunction with the same considerations for spatial and temporal trends of non-fishing activities contained in the section 3.10. This analysis will better inform the decision maker as to the true status of groundfish EFH and the implications of impacts minimization alternatives in section 4.

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[14] EIS at 2-13.
[15] EIS at 4-2.

VIII. Economic Analysis

Any viable economic analysis of minimization measures should include not only the short-term direct costs of management measures, but also the long-term costs of continued habitat damage, as well as the long-term benefits of habitat protection. In addition, the economic impact analysis of section 4 must be revised to include the expected future economic gains by groundfish trawl vessels due to the buyback program. This program was established based on the premise that by reducing the number of fishing vessels in the trawl fishery, the remaining vessels would become more profitable. The EIS should consult the appropriate analysis from the groundfish trawl vessel buyback program to include in the EIS.

Conclusion

Industrial fishing off the West Coast causes serious impacts to habitat. Adverse effects to habitat are occurring in West Coast waters that are long-term and substantial. The Fisheries Service is legally required to minimize these effects. A comprehensive regulatory system specifically designed to protect habitat is necessary for the agency to live up to its legal mandates and its responsibility as steward of our public resources.

Sincerely,

David Newman
Attorney
Natural Resources Defense Council

Chris Dorsett
Director, Regional Fish Conservation
The Ocean Conservancy

Jim Ayers
Pacific Regional Director
Oceana

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Southern California
Trawlers Association

May 4, 2005

RECEIVED
MAY 16 2005
PFMC

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE, Bin C15700
Seattle, WA 98115-0070

RE: GROUNDFISH MANAGEMENT PLAN ESSENTIAL FISH HABITAT (EFH) DRAFT EIS

Dear. Mr. Lohn:

Our Association is composed of small trawl vessels in the 32 to 60 foot range, most being less than 45 feet long, who trawl for California halibut, ridgeback prawns and sea cucumbers, and formerly for spot prawns. We fish along the coastline from San Pedro, sometimes as far south as San Diego, up to Point Conception, from Point Arguello up to Pt. Buchon, and a few of our boats fish in Monterey Bay for halibut seasonally. Our boats are home-ported in Morro Bay, Port San Luis, Santa Barbara, Ventura, Channel Islands and San Pedro Harbors.

The purposes of this letter are 1) to fill in some serious information gaps in the DEIS regarding small-boat artisanal trawling that is done by our Association members in this region, and 2) comment on the various alternatives offered in the DEIS to mitigate impacts of fishing on EFH. Since most, if not all, of the information regarding trawling and its impacts in the DEIS relate to Groundfish Management Plan A-Permit trawl vessels, only one of which, home-ported in Morro Bay, is in our Association, we believe it is in the best interest of all for us to provide you with information about our fisheries.

In the Santa Barbara Channel area, particularly, there is no groundfish fishery to speak of, as described in the DEIS. This was not always the case: in the 1940s until about 1980 or so, groundfish were trawled in this region. Due to market and infrastructure changes, ***not*** stock decline problems, this fishery gradually moved out of the Southern California Bight (SCB). However, many, if not most, of the alternative proposals for management actions under the groundfish plan that address mitigation of impacts to EFH will certainly affect our small-boat artisanal fisheries for the remaining species we fish for, as well. So far, however, this is without including relevant information about our fisheries, to any appreciable extent, upon which the Pacific Fisheries Management Council (Council) can make an informed decision on EFH mitigation measures that accounts for our fisheries.

Habitat Mapping Discrepancies

The DEIS map scales are nearly useless for us to have any accuracy regarding exactly where EFH, HAPC or mitigation closure areas are. Larger scale maps need to be created in order for us to effectively understand and comment on the accuracy (or lack thereof) of habitat type information in the SCB.

Partly due to scale, partly due to very inappropriate assumptions on limited data, areas noted in DEIS maps as rocky or gravelly bottom are grossly inaccurate for the SCB. Our Association members have a combined, cumulative fishing experience history approaching a few hundred years of time on these seafloors, and pretty much know where the hard bottom habitat is. Unfortunately, we have not been consulted regarding these details of habitat type distribution. This information disconnect should be corrected prior to making decisions about closing areas of presumed habitat in the SCB based on mostly inaccurate habitat type geographic data.

As an example, and as far as we can determine given the small-scale of maps presented in the DEIS, Oceana's Alternative 12 mapping misses significant detail for water depths that we trawl, particularly with respect to mapping of bottom types (*see* DEIS Appendix C, Figure 42). It is clear that Alternative 12 wishes to place the entire Channel Islands National Marine Sanctuary in marine no-take reserve status, despite the extremely detailed habitat analysis undertaken by the CINMS Marine Reserve Working Group (MRWG) that resulted in the nearly-consensus array of no-take zones implemented by the California Fish and Game Commission. Much of the discussion in Alternative 12 lacks any of the habitat typing specificity that was readily available online from the CINMS web site, and makes erroneous assumptions about habitat types in those federally managed waters as a result.

What is unclear, however, is the status of the western Santa Barbara Channel. A green-blocked area is marked "open to bottom trawling" in the eastern half of the Channel, and a pink zone "Areas closed to bottom trawling" extends 6 miles around the Sanctuary, but the map is white (is that open?, closed? both?) in the western half of the southern part of the Channel, and western quarter of the coastal, northern part of the Channel. This area is currently open to trawling. This ambiguity must be resolved prior to making any meaningful comment on the proposal for the SCB, particularly the Channel.

Other conservation efforts have similarly mischaracterized large swaths of habitat type, and we are concerned that this misinformation made its way, by reference or by inappropriate use of this misinformation by the DEIS writing team: an area from Santa Barbara Point to Pitas Point from 1-2 miles offshore was mischaracterized as gravel bottom. This area is predominantly soft mud bottom, as any trawler would have been able describe. There is one reef structure, Carpinteria Reef, that everyone knows about and avoids, and there are a couple of hard bottom area outside of Carp Reef towards the oil platforms that we also know about and avoid to prevent damage to our nets. However, to characterize the entire area as gravel bottom is to ignore well-marked bottom type notations on the NOS charts, as well as failing to incorporate readily-available local fishing knowledge of the region.

Cumulative area closures in the SCB

This consideration of EFH is not happening in a vacuum, and should not be approached as if it were the only management measure that will reduce risk for groundfish EFH. A number of other actions have been taken by both State and Federal ocean regulatory agencies that bear directly on risk-averse, precautionary protection of groundfish EFH in the SCB. Some examples of these:

▪ State Waters Inside One Nautical Mile. This area is closed to trawling at all times throughout California. The bulk of nearshore rocky reefs occur in this zone, and this is some of the best essential fish habitat (EFH) along the coastline. It is completely protected from any impacts of trawl fishing.

▪ Channel Islands National Marine Sanctuary (CINMS) Marine Protected Areas (MPAs). This effort culminated in 2003 with a number of complete no-take marine protected areas (called marine reserves) around the northern Channel Islands. These areas were carefully selected to represent an array of habitat types, but the driving factor in discussions about these reserves was clearly the perceived status of groundfish stocks in the area. We say "perceived status" because at a time when conservation groups and state and federal marine resource regulators were saying that the SCB was devoid of bocaccio, our Association members were seeing startlingly large numbers of bocaccio in the region. Likewise with cowcod, hook and line fishermen repeatedly reported that there were many areas that were abundant in cowcod that were not being reported by scientists studying the area.

▪ Proposition 132 (Gillnet Ban) State Waters Marine no-take zones. Two of the four no-take zones in this regulation protect dozens of square miles of EFH in the SCB.

▪ CINMS Federal-waters MPAs. Currently, the Sanctuary Program (NMSP) is circulating a Sanctuary Designation Authority amendment document that proposes to give authority for the Sanctuaries Program to regulate commercial and sport fishing in ocean waters, traditionally the role of its sister agency, National Marine Fisheries Service (NMFS) or NOAA Fisheries. The purpose of this attempt to power-shift from NMFS to NMSP is to facilitate the implementation of "Phase 2" of the CINMS MPA plan in federal waters of the Sanctuary from 3 miles to 6 miles offshore of the four northern Channel Islands. Many of these areas are in places where our Association fishermen have traditionally fished for ridgeback or spot prawn, and this effort will, once again, further reduce the perceived risk to groundfish EFH in federal waters.

▪ Federal-State designated Cowcod Conservation Area. This area, some 5,200 square miles of ocean area is designated to, again, reduce risk to groundfish stocks (cowcod) and to protect EFH under the groundfish management plan (and California management consistency therewith) is closed to all trawling, and most other types of fishing as well.

▪ Federally-designated Rockfish Conservation Area (RCA) (Shelf Closure). In the SCB, the area has been somewhat of a "moving target," but currently is believed to be closed to fishing of all types for groundfish between shore and 150 fathoms, but changes seasonally to 60 or 75 fathoms and outward.

▪ California Halibut Trawl Bill. Enacted in 2004, these new regulations and management measures provide yet another risk-averse layer of gear, permitting and area closures that further protects groundfish EFH of concern to the Council. Some of the additionally precautionary measures include observers for California Halibut Trawl Grounds (CHTG) bycatch and habitat issues, excision of potential coral and sponge habitat from CHTG (all deepwater canyons in the CHTG), a permit system that declines or defers transferability until capacity goals/fleet reduction issues are considered, and a complete closure of the CHTG during the halibut spawning period (mid-March to mid-June, which no other halibut gear type observes), and others.

This accumulated suite of risk-averse, precautionary management actions taken together serve as a suitable array of areas that provide more-than-adequate protection for rebuilding groundfish stocks and the EFH upon which they depend. It should be considered as an offset for both the small-boat trawl fishery in the SCB, and as sufficient buffer for protection from impacts of fishing on groundfish EFH.

1. This array (See Figures 1 and 2) is hereby formally proposed as another alternative to be comprehensively and cumulatively analyzed in the EFH DEIS for the SCB region to protect groundfish EFH.

Monterey Bay

At a recent meeting in Morro Bay to discuss various alternatives, we learned that the Oceana Alternative 12 and the Nature Conservancy Alternative both have the entire Monterey Bay closed to trawling to protect hard bottom habitat, especially corals and sponges. However, this ignores the fact that in certain areas (see Attachment A), our Association members fish in highly storm-disturbed sandy bottom area (Terrace Point to the Pajaro River) for California halibut seasonally, and no deepwater coral or sponge habitat exists in the relatively shallow 25 to 60 fathom halibut flats used by our members. In order to achieve the stated goal of maximizing protection of EFH while minimizing socioeconomic impacts to fishing, further information sharing and a finer-scale closure proposal should be examined in the Monterey Bay. The areas currently used by halibut trawlers in our Association do not impact biogenic organisms or hard bottom substrate in Monterey Bay. Those areas should not be closed to trawling. The approximate bounds of this very small portion of the Monterey bay are as follows: outside the 3-mile line to the 60 fathom contour, from a point where these two lines intersect off Terrace Point (approximately 36° 53.61' x 122° 4.13') to a point where these two lines intersect again off the Pajaro River (approximately 36° 50.26' x 122° 52.37').

2. We respectfully request that this area be kept open to trawl fishing, as currently regulated, in any final proposal to protect groundfish EFH.

Avila Beach Area

Attachment A describes an area From Point Buchon to Point Arguello outside the 3-mile state waters limit line out to 60 fathoms. This area is historically fished for California halibut in muddy seafloor bottom habitat as the fish and weather allow.

3. We respectfully request that this area be kept open to trawl fishing, as currently regulated, in any final proposal to protect groundfish EFH.

Cumulative Socioeconomic Impacts

With the array of closures already implemented along the California coastline, a significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial "working" fishing ports and harbors along the 1,100 mile coastline of California. At what point do we see the regulation that becomes "the straw that broke the camel's back?" That is, which additional layer of no-fishing regulation will cross the threshold of cutbacks to the number of boats required to harvest a sustainable yield from California's ocean resources, the number of buying stations still left in Morro Bay, San Pedro or Santa Barbara Harbors, the number of fish processors and/or retailers that can keep their doors open in order to serve the remaining few fishing boats that still go out? The cultural value of working ports and harbors is measured in both cultural heritage and tourism value: it is common knowledge that what attracts tourist dollars to the Morro Bay or Santa Barbara Harbor is "the quaint fishing boats" that still number in the tens, at least, in each Harbor (actually, there are only 5 A-permit boats left in the combined ports of Morro Bay and Port San Luis, we learned at the May 1 meeting in Morro Bay). At some point, an additional regulation will be the last one necessary to remove the infrastructure, more or less permanently (due to the failure of the commercial fishing industry to recruit young people among its numbers), that supports this cultural heritage in California ports and harbors. It behooves the Council to carefully consider whether or not further draconian measures are actually required to effectively protect groundfish EFH, or whether these further measures are, in fact, "the last straw" for fisheries culture and infrastructure in these ports and harbors. Another way to phrase this question is to turn it on its head: "how much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?"

Fishing Grounds for Southern California Trawlers Association members

Attachment A lists the areas that our Association members use to harvest California halibut, ridgeback prawns, sea cucumbers and (formerly) spot prawns in the disjunct fishing grounds from Monterey Bay to San Diego. Figures 1 and 2 chart the areas closed to trawling due to a wide variety of management and regulatory actions. As you will see, due to recently implemented regulations, these areas are vanishingly small compared to "the Pacific Ocean," a common yardstick for conservationists to conclude "but we're only closing 1-4% of the ocean to trawling." They are vanishingly small compared to any EFH Alternative proposal currently in the DEIS. That 1-4% referenced, depending on how it overlaps with our trawl areas, might actually represent an additional erasure of 20, 30, 40, or even 50% of our remaining trawl grounds. Which percentage will be the final straw?

To conclude, we offer another alternative for the Southern California Bight that we respectfully request be analyzed concurrently with the other alternatives in the DEIS prior to the Council making a final decision regarding further protection for EFH from the impacts of trawling. We offer assistance to any proponent of any alternative in the form of consultation on detailed information regarding habitat types in our region. Please contact Mike McCorkle (805) 566-1400 to arrange such information sharing. Thank you for considering our request for analysis of our alternative to protect EFH while minimizing socioeconomic impacts to our Association members.

Sincerely,

Mike McCorkle

Mike McCorkle,
President

c: Mr. Don McIsaacs, PFMC
Ms. Rebecca Lent, NMFS
Mr. Steve Copps, NMFS
Mr. Steve Ralston, NMFS
Ms. Jan Mason, NMFS
Mr. Mark Helvey, NMFS
Mr. Lyle Enriquez, NMFS
Ms. Marija Vojkovich, CDFG
Ms. Susan Ashcroft, CDFG
Mr. Jim Ayers, Oceana
Mr. Chuck Cook, Nature Conservancy
Mr. Rod Fujita, Environmental Defense
Mr. Pete Leipzig, FMA
Mr. Zeke Grader, PCFFA
Congresswoman Lois Capps

Attachment A

Southern California Trawlers Association:
Southern California Trawl Grounds

The Southern California Trawlers Association is a group of small-boat artisanal trawl fishing vessels that use a small footrope (8" or less) to trawl sustainably for mainly fresh, local markets and buyer/processors. Our Association is composed of relatively few boats (variable from 13 to 20), but the age composition of our captains makes attrition a problem today that is accelerating (we held funeral services for Association Member, Captain Tony West, F/V Steel Fin II, in late April, 2005). Few younger fishermen are entering the trawl fishery due to the incessant clamor of some conservation organizations that "all trawling is bad," and due to the draconian measures taken by both State and Federal regulatory agencies in the last few years to rebuild several groundfish stocks. Due to horsepower and gear limitations, our boats do not fish on rocky substrate or in extremely deep water. Net damage from reefs has taught us the wisdom of avoiding these areas of rocks.

Our boats provide local live halibut, ridgeback prawns (and, formerly, spot prawns) and some sole to local markets. We also trawl for sea cucumbers, for human consumption, mostly in Asian ethnic markets in the San Francisco, Oakland, Los Angeles areas, and some dried sea cucumber is exported.

Areas our Association Members Fish

San Diego

From the 3 mile line out to about the 45 fathom depth. The seafloor from Pt. Loma down to the Mexican border is mostly relatively low gradient sand flats. We catch mainly halibut and sea cucumber in this area, but ridgeback shrimp are in the Navy dumping area but it is so full of debris we can't fish there.

Newport Beach

From the western edge of the Newport Canyon up to Pt. Fermin, off San Pedro, from the 3 mile line outward as far as (for ridgeback prawn) 100 fathom depth. We catch sea cucumbers, halibut and ridgeback prawns over mud seafloor in this area, but the halibut are mainly closer to the 3-mile state waters limit line.

Santa Monica Bank and Bay

Along the eastern edge of the Santa Monica Bank we fish for halibut, ridgeback prawn and sea cucumber, all on soft mud bottom from the Santa Monica Bay fishing closure line and/or the 3-mile state waters limit out to 100 fathoms for ridgebacks. Along the western edge of the Santa Monica Bank up to Malibu we fish along the closure line & outside 3 miles also. We do not fish any part of Redondo Canyon.

Pt. Mugu to Arguello

Along the mainland side of the Santa Barbara Channel from Point Mugu to Point Arguello. During the California Halibut Trawl season (June 16 to March 15) we fish from 1 mile offshore to 3 miles out and beyond. During the closed (for spawning) season in this area, we fish outside of state waters 3-mile limit line. As a result of discussions with conservation groups regarding the recently enacted California Halibut Trawl Permit legislation, we agreed not to fish in areas that may contain deepwater corals and/or sponges or other biogenic organisms such as sea fans. For this area specifically, we now do not fish in Mugu Canyon, Hueneme Canyon, or in the canyons off Point Arguello and Point Conception. We fish out to 150 fathoms from mainly Conception to Santa Barbara, and in the Ventura Flats from Hueneme Canyon west. We fish these areas for sea cucumbers, ridgeback prawn, and California halibut. We used to fish for spot prawns, but due to concerns over bycatch of bocaccio (principally in the area north of Point Arguello), we no longer are able to fish for spot prawns at this time. The bottom types we fish in this area are mostly mud and some sandy mud. There are a few well-known rock reef areas we all avoid so as not to damage our small trawl nets. Historically we also fished for ridgeback and spot prawns in China Bay, Santa Cruz Island, and in the Channel inside of the gap between Anacapa and Santa Cruz Islands, also over mud bottom. In 100-130 fathoms we also historically fished for Dover and English sole on soft bottom in that area, and along "the Finger" (100-fathom west-pointing bathymetric feature in mid-Channel) for rockfish. Sole were also caught along the lower (northeastern) edge of the Finger as it merges with the Ventura Flats (the "Dunes" area where Platform Gail is now located).

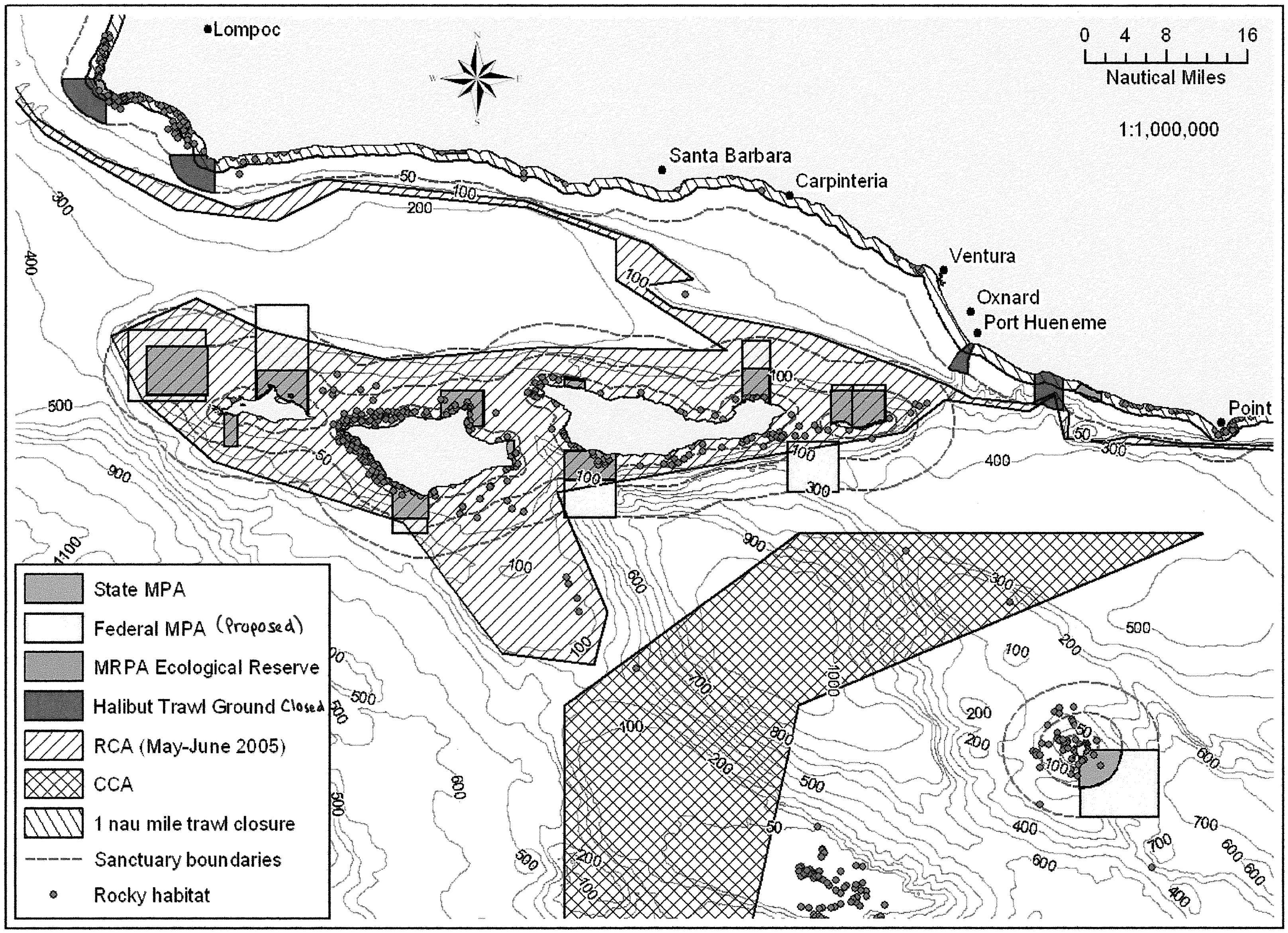
Avila Beach

From Point Buchon to Point Arguello outside the 3-mile state waters limit line. We catch principally California halibut in this sand and mud bottom area, but also catch some sole in quantities allowed by the Groundfish Management Plan.

Monterey

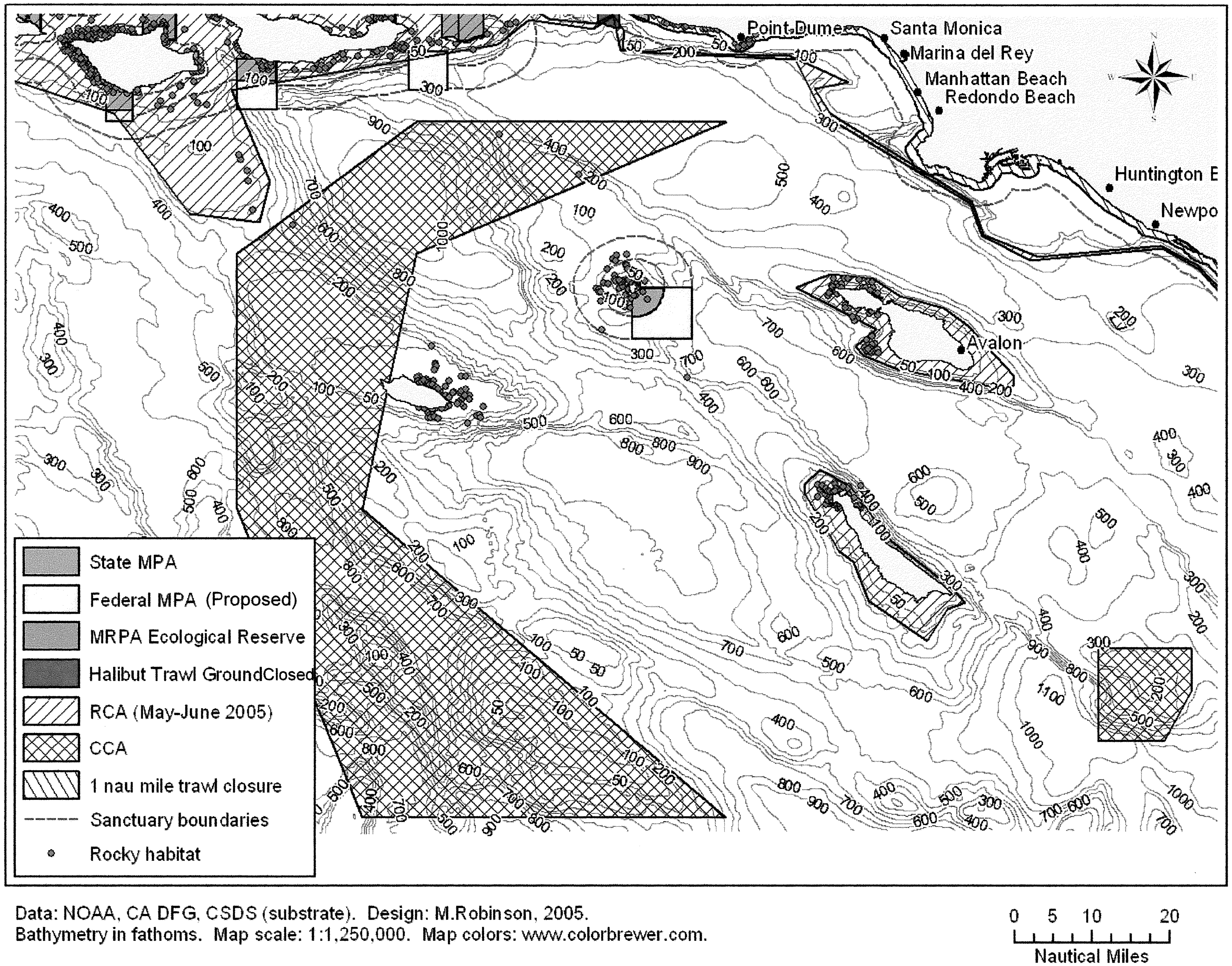
Outside the 3-mile line to the 60 fathom contour, from a point where these two lines intersect off Terrace Point (approximately 36° 53.61' x 122° 4.13') to a point where these two lines intersect again off the Pajaro River (approximately 36° 50.26' x 122° 52.37'). We catch halibut and sole, and the bottom is mostly sandy. Association members do not fish in the Monterey Canyon.

Figure 1.
Southern California Trawlers Association
Proposed Alternative to Mitigate Effects of Fishing on EFH



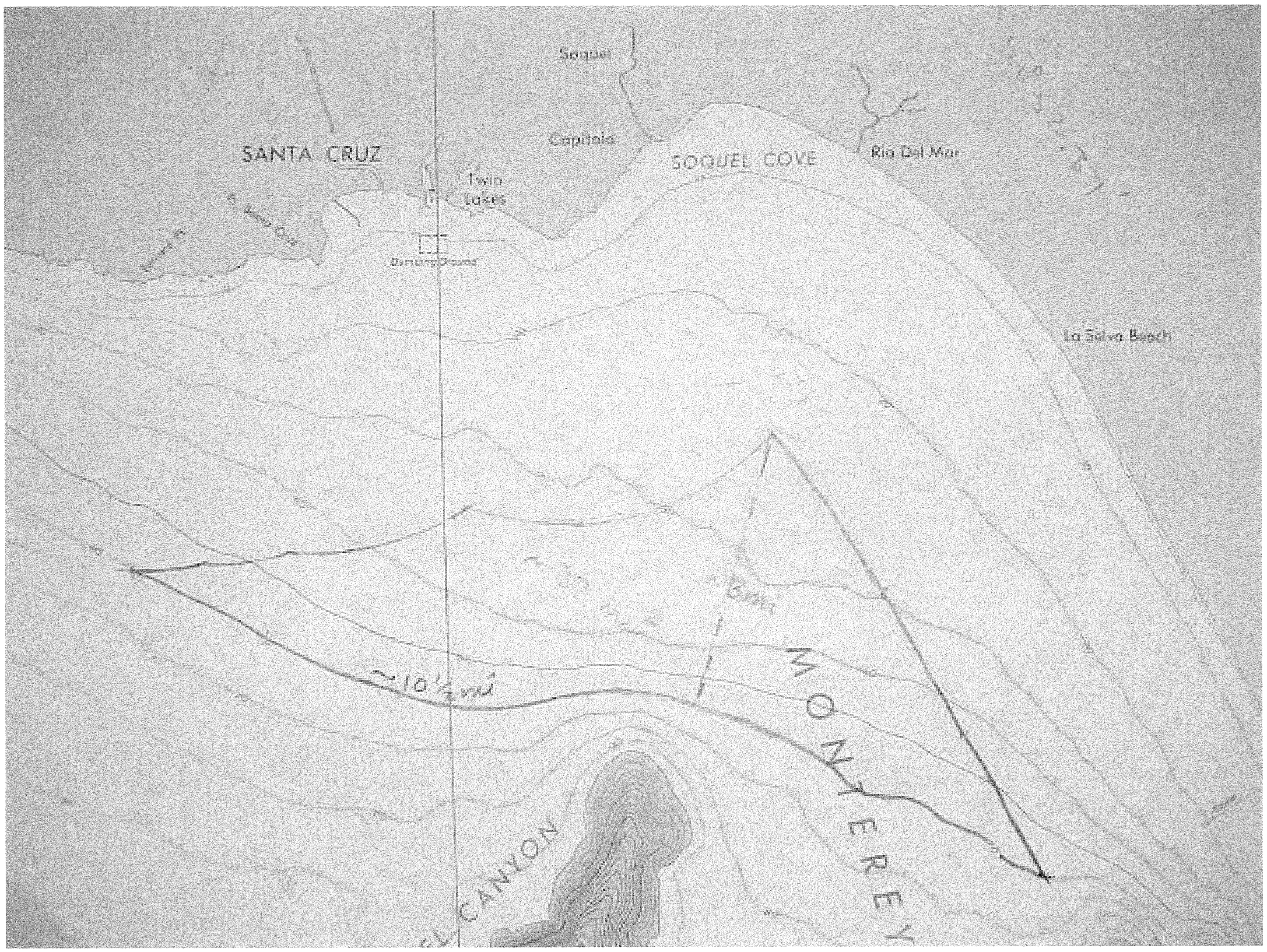
Data: NOAA, CA DFG, CSDS (substrate). Design: M.Robinson, 2005.
Bathymetry in fathoms. Map colors: www.colorbrewer.com.

Figure 2.
Southern California Trawlers Association
Proposed Alternative to Mitigate Effects of Fishing on EFH



Data: NOAA, CA DFG, CSDS (substrate). Design: M.Robinson, 2005.
Bathymetry in fathoms. Map scale: 1:1,250,000. Map colors: www.colorbrewer.com.

Figure 3.
Southern California Trawlers Association
Monterey Bay Halibut Trawling Area (Outside 3 miles)



FISHING VESSEL OWNERS' ASSOCIATION
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SINCE 1914

May 10, 2005

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 N.E. ambassador Place, Suite 200
Portland, OR 97220-1384

RECEIVED
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PFMC

Dear Chairman Hansen:

The following comments are on behalf of the members of the Fishing Vessel Owners' Association regarding the various alternatives for the fishing gear impact Minimization Alternatives that address Essential Fish Habitat and Habitat of Particular Concern. The Association represents 34 fixed-gear permit holders that operate off the Washington, Oregon, and California coast.

Alternative C.2 Depth based gear specific restrictions

This alternative has three options, C.2.1, C.2.2, and C.2.3, which close waters at specific depth contours to trawl and fixed gear. Options C.2.1 and C.2.2 propose to close fixed gear shoreward of 100 fathoms north of 40°10' N latitude and 150 fm south of 40°10' N latitude. Option C.2.3 proposes to close fixed gear shoreward of 60 fm.

The members oppose options C.2.1 and C.2.2 from a longline and pot gear perspective. These options mirror the current bi-annual restrictions on fixed gear operations. These restrictions were put into place largely due to the overfished status of yellow-eye rockfish and canary rockfish in the north and bocaccio in the south. The deeper restrictions in the south being an attempt for fixed gear to avoid bocaccio. These restrictions were based and continue to be justified with the information that is generated from the observer program. These proposed options, based on habitat protection and the resulting restrictions on fixed gear are not justified in the current analysis.

The only attempt to justify a restriction on fixed gear under this option is found on page 2-18. It states:

> **"Although the impacts of deploying fixed gear, such as longlines and traps, are considered less severe than that resulting from bottom trawling, these gear types can access the rocky habitat currently inaccessible to small footrope trawl gear. Therefore, this alternative closes shoreward areas to fixed gear."**

This statement suggests that, because one gear can access rocky habitat and the other cannot, they should both be banned. Tables 3 and 4 (Appendix 10, pages 14-19) show the sensitivity levels and recovery times for different habitat relative to the different gear types. These tables suggest that hook and line gear is shown to be 4 to 6 times less impacting than dredges or bottom trawls. Additionally, the analysis states relative to these tables, "moving across in the two tables, note that the ranges reflect the relative rankings of impact of gear in the following order: dredges > trawls > pots and traps > hook and line." Hook and line gear is listed as the least impacting type of gear yet this option treats fixed gear types equally with those gear-types that have greater impacts.

There is absolutely nothing in the analysis to justify including fixed gear in options C.2.1 and C.2.2.

Option C.2.3 Some form of this could be accommodated by hook and line and pot fishermen. We would repeat that the analysis indicates fixed gear has the least impact on habitat. Our permit holders traditionally fished sablefish off the North Coast into 75 fathoms off of Washington. Should yellow eye and canary rockfish be rebuilt, our permit holders would like to move back into 75 fathoms. Our CPUE levels for sablefish have dropped off in the late summer and fall due to the current rockfish 100 fm. conservation restriction for fixed gear. There are a few vessels that have fished for dog fish inside of 75 fm. We could support a 75 fm restriction for directed sablefish activities for future habitat protection. This restriction would affect 80 to 90% of the current fixed gear activity off of Washington and Oregon. We would support some limited activity on a case by case basis such as for dog fish inside of 80 fm.

C.4 Prohibit the Geographic Expansion of Fishing

This alternative has two options.

Option C.4.1 Trawl fishing would be prohibited from fishing in areas that were untrawled during 2000, 2002. No Comment.

Option C.4.2 – Apply the expansion limit to all bottom tending gear types. Closes area west of 2000 m. (deeper than 1094 fm). Our only comment is that our longline vessels have not operated seaward of this depth contour. The restrictions would have no affect on our fishing operations.

Alternative C.5 Prohibit a Krill fishery

Krill are an important prey for many fish species. They are important for juvenile species in particular and could be critical in the recovery of different salmon and rockfish species. Our members support this action; however, we are unsure which of the four implementation options is best for the Council.

C.6 Close hotspots.

This alternative prohibits trawling in habitat that has high probability of being EFH for a large number of groundfish. No Comment.

C.7 Close Areas of Interest.

This option is two complicated and subjective relative to areas of potential closure. There needs to be more detail on the impacts to the different user groups. The members of FVOA do not support this option.

C.8 Zoning Fishing Activities.

This option would potentially establish gear-specific closed zones. Though this option seems to recognize a difference between the impacts of fixed gear versus trawl and dredges, there is not enough description on what areas will ultimately be closed. It is therefore difficult to support or comment on.

Alternative C-9.

The Association will comment on options C.9.3 and C.9.4

C.9.3 **Limit the length of a single longline groundline to 3 NM**. Our vessel owners that hold coastal permits typically set close to 3-mile sets of hook and line gear. We could make this option work. However, the Council should be aware longline fishing is significantly a numbers game from the perspective of the vessel owner and crew in that it is CPUE driven. The lower the CPUE, the more times you throw the gear back into the water, which means more potential impacts on the sea floor. If the length of a set of gear is shortened, from what the current industry practice is, it means a vessel would set the same amount of hooks in more sets in order to catch a days worth of fish. With each new set of gear will be two more anchors and mid-gear weights creating impacts on the habitat.

Fishing Vessel Owners' Association can support the current proposal, but requests the Council be mindful that to require shorter sets may have the opposite impacts on the habitat than what is intended.

Alternative C.9.4. Employ Habitat-Friendly anchoring systems. FVOA members would support this option. Currently, our vessels use traditional 50 pound anchors on the end of our sets of gear. The anchor has a chain attached to the bottom of the fluke of the anchor and a gangion tied at the top of the anchor to the chain. If the anchor gets caught up, the gangion will break shifting the torque to the fluke and the lift is then from a different angle. We would like to help in any regulation of this type. A regulation that would adopt this safeguard, would be beneficial, lessening habitat impacts.

C.10 Central California No Trawl Zones

No Comment.

C.11 Relax Gear Endorsement Requirements.

Thee members of the Association could support this, however, it is unclear how this would work based on the analysis. There needs to be more detail provided. The following should be incorporated into the alternative.

(1) There needs to be a declaration prior to the fishing season on how a permit would be utilized, either with fixed gear or trawl.

(2) There should be a discussion on the duration of the declaration (i.e. bimonthly or yearly).

(3) Should fixed gear be used with a trawl permit, fixed gear should be able to take advantage of any gain due to having lesser bycatch mortality. As an example, if a trawl permit was used by an operation using fixed gear to target sablefish, the fixed gear operation should be able to have the addition of 30% more round pounds to target. This is currently the assessed discard mortality against trawl activity on sablefish. In this way there would be an economic incentive to use the gear that has the least discard and also has the least impact on the habitat. This consideration would convert current trawl discard mortality into landed mortality. If there are other species fixed gear could target with a trawl permit similar conversions would need to be provided for. The conversion rates are currently upgraded each year with the observer program so this should not be an undue complication

C-12 Close Ecologically Important Areas to Bottom Trawl.

No Comment.

C-13 Close Ecologically Important Areas to Bottom-Contacting Gear.

The Association opposes this option as proposed. The Association references the analysis tables 4 and 5 which suggest there is no rationale to treat all gear types similarly. These tables suggest fixed gear and hook and line in particular, is 4 to 6 times less impacting than trawls. To apply similar restrictions is unjustified.

Alternative D-2 Expanded Log Book Program

Option D.2.1 The Association supports this option for the longline sablefish fleet, particularly the tiered program. We also request that should this alternative be chosen, that the Pacific Council consider using the current longline log book used by NMFS for waters off of Alaska. This would minimize confusion and create a consistent information flow between the two Council jurisdictions.

Sincerely,

Robert D. Alverson
Manager

RDA:cb

Enclosures: support data

SE=0.0, n=3" for sensitivity and recovery. Although these means are based on three studies, they probably do not represent the situation for estuarine macrophytes generally. The three studies were all done on turtle grass (*Thalassia testudinum)* using a relatively light-weight (75 kg) trawl with the footrope rigged with rollers designed for catching shrimp in seagrasses. Turtle grass has leaves that range from several centimeters to a meter or so long and they are quite flexible, capable of lying nearly flush against the substrate in tidal currents. Hence, it may be expected that this type of gear could move above the turtle grass with minimal impact. The authors of these studies noted that certain gear specifications are needed to minimize damage to seagrasses. Hence, these studies should not be interpreted to represent the range of macrophyte and gear type combinations that may occur on the west coast.

The second gear by habitat combination that warrants comment is dredges in estuarine shellfish habitats, where sensitivity and recovery values were also quite low. All studies to date have been done on previously harvested oyster reefs where the natural vertical structure probably had already been greatly reduced. Oyster reefs that have not been harvested can have vertical relief ranging from < 1 m to several meters. Mechanical harvesting gears (whether hand-held or towed under power) typically used to harvest oysters are capable of greatly reducing this vertical structure because their effect is to destroy the natural aggregated nature of the reef, typically resulting in a reef that largely consists of individual oysters lying flat on the bottom. The studies summarized in Table 3 indicate that once the vertical structure of a reef is destroyed, further dredging apparently has only minimal impact on reef characteristics, including productivity. This is an important finding, but as in the case of the three trawl studies on one kind of seagrass, must not be pressed too far.

In conclusion, it should be emphasized that we only have a preliminary understanding of how fishing gear impacts biogenic habitats. Some trends are emerging, but further consideration of the two gear/habitat combinations that departed from general trends should be a warning that the relationships involved can be quite complex.

Table 3. Summary of mean sensitivity levels and recovery times for all combinations of five major gear types and bottom habitat types (i.e. three megahabitats, two induration types [hard and soft] and biogenic) for which empirical data were available.

Sensitivity Levels (range: 0 to 3)

Megahabitat, Induration, Meso/macrohabitat	**Habitat Code**	**Dredges**	**Bottom Trawls**	**Nets**	**Pots & Traps**	**Hook & Line**
Estuarine, Biogenic/Macrophytes		**2.9 (SE=0.07 , n=4)**	**0.0 (SE=0.00, n=3)**	(nd)	(nd)	(nd)
Estuarine, Biogenic/Shellfish		**0.9 (SE=0.93, n=3)**	(nd)	(nd)	(nd)	(nd)

Estuarine, Soft		1.3 (SE=0.34, n=9)	0.7 (SE=0.25, n=7)	(nd)	(nd)	(nd)
Shelf, Biogenic/Macrophytes		2.8 (SE= , n=1)	2.0 (SE= , n=1)	(nd)	(nd)	(nd)
Shelf, Biogenic/Shellfish		1.0 (SE= , n=1)	1.0 (SE= , n=1)	(nd)	0.8 (SE= , n=1)	(nd)
Shelf, Biogenic/Sponges		(nd)	2.2 (SE=0.15 , n=2)	(nd)	(nd)	(nd)
Shelf, Biogenic/Corals		(nd)	1.0 (SE= , n=1)	(nd)	(nd)	(nd)
Shelf, Hard, Exposure	She	1.7 (SE=0.40, n=3)	2.5 (SE=0.50, n=2)	(nd)	0.3 (SE=0.30, n=2)	(nd)
Shelf, Soft	Ss_u	1.0 (SE=0.10, n=22)	1.2 (SE=0.14, n=29)	(nd)	(nd)	(nd)
Slope, Biogenic, Sponges		(nd)	3.0 (SE=0.00 , n=2)	(nd)	(nd)	(nd)
Slope, Biogenic, Corals		(nd)	3.0 (SE=0.00 , n=2)	(nd)	(nd)	(nd)
Slope, Soft	Fs_u	(nd)	1.0 (SE= , n=1)	(nd)	(nd)	(nd)

Recovery Time (years)

Megahabitat, Induration, Meso/macrohabitat	Habitat Code	Dredges	Bottom Trawls	Nets	Pots & Traps	Hook & Line
Estuarine, Biogenic/Macrophytes		3.8 (SE=1.17, n=3)	0.0 (SE=0.00, n=3)	(nd)	(nd)	(nd)

Estuarine, Biogenic/Shellfish		**0.0 (SE=0.00, n=2)**	(nd)	(nd)	(nd)	(nd)
Estuarine, Soft		**0.4 (SE=0.17, n=8)**	**0.2 (SE=0.07, n=6)**	(nd)	(nd)	(nd)
Shelf, Biogenic/Macrophytes		**4.0+ (SE= , n=1)**	**3.0 (SE= , n=1)**	(nd)	(nd)	(nd)
Shelf, Biogenic/Shellfish		(nd)	(nd)	(nd)	**0.1 (SE= , n=1)**	(nd)
Shelf, Biogenic/Sponges		(nd)	**1.3 (SE=0.25 , n=2)**	(nd)	(nd)	(nd)
Shelf, Biogenic/Corals		(nd)	**1.0 (SE= , n=1)**	(nd)	(nd)	(nd)
Shelf, Hard, Exposure	She	(nd)	(nd)	(nd)	**0.0 (SE= , n=1)**	(nd)
Shelf, Soft	Ss_u	**0.5 (SE=0.17, n=9)**	**0.4 (SE=0.18, n=8)**	(nd)	(nd)	(nd)
Slope, Biogenic, Sponges		(nd)	(nd)	(nd)	(nd)	(nd)
Slope, Biogenic, Corals		(nd)	**7.0+ (SE= , n=1)**	(nd)	(nd)	(nd)
Slope, Soft	Fs_u	(nd)	(nd)	(nd)	(nd)	(nd)

Table 4 below is a first-draft "sensitivity matrix" and Table 5 is a first draft "recovery matrix." Each impact level is expressed as a range, which represents plus or minus one standard error around the mean for the values based on empirical data and plus or minus 50% of the mean for the derived values. The following 4-step protocol was used to derive the levels in both tables.

Table 4. Sensitivity level ranges for five major gear categories for all mapped habitat types. Sensitivity levels range from 0 to 3 (see Table 2 for descriptions). Values in green shaded cells are ranges from the literature, showing + or - one SE around the calculated means in Table 5. Others are derived values (see text for details).

MEGAHAB, SUBSTRATE, MESO/MACROHAB	Habitat Code	Dredges	Bottom Trawls	Nets	Pots & Traps	Hook & Line
Estuarine, Biogenic/Macrophytes		2.8-3.0 (n=4)	1.0-2.0 (n=3)	0.5-1.0	0.0-0.5	0.0-0.5
Estuarine, Biogenic/Shellfish		2.0-3.0 (n=3)	1.0-2.0	0.5-1.0	0.0-0.5	0.0-0.5
Estuarine, Hard		1.5-2.5	1.0-2.0	0.5-1.0	0.0-0.5	0.0-0.5
Estuarine, Soft		1.0-1.6 (n=9)	0.5-1.0 (n=7)	0.0-0.5	0.0-0.5	0.0-0.5
Shelf, Biogenic/Macrophytes		1.4-3.0 (n=1)	1.0-3.0 (n=1)	0.5-2.5	0.3-1.3	0.3-1.3
Shelf, Biogenic/Shellfish		1.4-3.0 (n=1)	1.4-2.2 (n=1)	0.9-1.8	0.4-1.2 (n=1)	0.2-1.0
Shelf, Biogenic/Sponges		2.0-3.0	2.0-2.4 (n=2)	0.9-1.8	0.4-1.2	0.2-1.0
Shelf, Biogenic/Corals		2.0-3.0	2.0-3.0 (n=1)	0.5-2.5	0.3-1.3	0.3-1.3
Shelf, Hard, Canyon Wall	Shc	1.3-2.1	2.0-3.0	0.8-1.6	0.0-0.6	0.0-0.6
Shelf, Hard, Exposure	She	1.3-2.1 (n=3)	2.0-3.0 (n=2)	0.8-1.6	0.0-0.6 (n=2)	0.0-0.6
Shelf, Hard, Ice-formed feature	Shi_b/p	1.3-2.1	2.0-3.0	0.8-1.6	0.0-0.6	0.0-0.6
Shelf, Soft	Ss_u	0.9-1.1 (n=22)	0.5-1.0 (n=29)	0.5-1.0	0.0-0.5	0.0-0.2
Shelf, Soft, Canyon Floor	Ssc/f_u	0.9-1.1	0.5-1.0	0.2-0.8	0.0-0.5	0.0-0.2
Shelf, Soft, Canyon Wall	Ssc_u	0.9-1.1	0.5-1.0	0.2-0.8	0.0-0.5	0.0-0.2
Shelf, Soft, Gully	Ssg	0.9-1.1	0.5-1.0	0.2-0.8	0.0-0.5	0.0-0.2
Shelf, Soft, Gully floor	Ssg/f	0.9-1.1	0.5-1.0	0.2-0.8	0.0-0.5	0.0-0.2
Shelf, Soft, Ice-formed feature	Ssi_o	0.9-1.1	0.5-1.0	0.2-0.8	0.0-0.5	0.0-0.2
Ridge, Biogenic		2.0-3.0	2.0-3.0	0.5-2.5	0.3-1.3	0.3-1.3
Ridge, Hard, Exposure	Rhe	1.3-2.1	2.0-3.0	0.8-1.6	0.0-0.6	0.0-0.6
Ridge, Soft	Rs_u	0.9-1.1	0.5-1.0	0.8-1.6	0.0-0.6	0.0-0.6
Slope, Biogenic/Sponges		2.5-3.0	2.5-3.0 (n=2)	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Biogenic/Corals		2.5-3.0	2.5-3.0 (n=2)	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Hard, Canyon Wall	Fhc	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0

Slope, Hard, Canyon Floor	Fhc/f	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Hard, Exposure	Fhe	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Hard, Gully	Fhg	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Hard, Landslide	Fhl	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Slope, Soft	Fs_u	1.0-2.0	0.5-1.5 (n=1)	0.5-1.0	0.2-0.6	0.2-0.6
Slope, Soft, Canyon Floor	Fsc/f_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Slope, Soft, Canyon Wall	Fsc_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Slope, Soft, Gully	Fsg	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Slope, Soft, Gully floor	Fsg/f	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Slope, Soft, Landslide	Fsl	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Biogenic		2.0-3.0	2.0-3.0	0.5-2.5	0.3-1.3	0.3-1.3
Basin, Hard, Exposure	Bhe	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Soft	Bs_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Soft, Canyon Floor	Bsc/f_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Soft, Canyon Wall	Bsc_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Soft, Gully	Bsg	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Basin, Soft, Gully floor	Bsg/f_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Continental Rise, Biogenic		2.0-3.0	2.0-3.0	0.5-2.5	0.3-1.3	0.3-1.3
Continental Rise, Hard, Canyon Wall	Ahc	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Continental Rise, Hard, Exposure	Ahe	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0
Continental Rise, Soft	As_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Continental Rise, Soft, Canyon Floor	Asc/f_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Continental Rise, Soft, Canyon	Asc_u	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Continental Rise, Soft, Gully	Asg	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3
Continental Rise, Soft, Landslide	Asl	1.0-2.0	0.5.1.5	0.3-1.0	0.2-0.6	0.1-0.3

Table 5. Recovery time (years) ranges for five major gear categories and all mapped habitat types. Values in green shaded cells are ranges from the literature, showing + or - one SE around the calculated means in Table 5. Others are derived values (see text for details).

MEGAHAB, SUBSTRATE, MESO/MACROHAB	Habitat Code	Dredges	Bottom Trawls	Nets	Pots & Traps	Hook & Line
Estuarine, Biogenic/Macrophytes		2.6-5.5 (n=3)	1.5-4.5	0.5-2.0	0.0-0.5	0.0-0.5
Estuarine, Biogenic/Shellfish		2.5-5.5	1.5-4.5	0.5-2.0	0.0-0.5	0.0-0.5
Estuarine, Hard		1.5-2.5	1.0-2.0	0.5-1.0	0.0-0.5	0.0-0.5
Estuarine, Soft		0.2-0.6 (n=8)	0.1-0.3 (n=6)	0.0-0.5	0.0-0.5	0.0-0.5
Shelf, Biogenic/Macrophytes		2.0-6.0 (n=1)	1.5-4.5 (n=1)	0.5-2.5	0.3-1.3	0.3-1.3
Shelf, Biogenic/Shellfish		2.0-6.0	1.0-3.0	0.5-1.5	0.0-0.2 (n=1)	0.0-0.2
Shelf, Biogenic/Sponges		2.0-3.0	1.0-1.6 (n=2)	0.5-1.5	0.4-1.2	0.2-1.0
Shelf, Biogenic/Corals		2.0-3.0	1.0-1.6	0.5-1.5	0.4-1.2	0.2-1.0
Shelf, Hard, Canyon Wall	Shc	1.0-3.0	1.0-2.0	0.5-1.5	0.0-0.5	0.0-0.5
Shelf, Hard, Exposure	She	1.0-3.0	1.0-2.0	0.5-1.5	0.0-0.1 (n=1)	0.0-0.5
Shelf, Hard, Ice-formed feature	Shi_b/p	1.0-3.0	1.0-2.0	0.5-1.5	0.0-0.5	0.0-0.5
Shelf, Soft	Ss_u	0.3-0.7 (n=9)	0.2-0.6 (n=8)	0.1-0.5	0.0-0.5	0.0-0.2
Shelf, Soft, Canyon Floor	Ssc/f_u	0.3-0.7	0.2-0.6	0.1-0.5	0.0-0.5	0.0-0.2
Shelf, Soft, Canyon Wall	Ssc_u	0.3-0.7	0.2-0.6	0.1-0.5	0.0-0.5	0.0-0.2
Shelf, Soft, Gully	Ssg	0.3-0.7	0.2-0.6	0.1-0.5	0.0-0.5	0.0-0.2
Shelf, Soft, Gully floor	Ssg/f	0.3-0.7	0.2-0.6	0.1-0.5	0.0-0.5	0.0-0.2
Shelf, Soft, Ice-formed feature	Ssi_o	0.3-0.7	0.2-0.6	0.1-0.5	0.0-0.5	0.0-0.2
Ridge, Biogenic		2.0-3.0	2.0-3.0	0.5-2.5	0.3-1.3	0.3-1.3
Ridge, Hard, Exposure	Rhe	1.3-2.1	2.0-3.0	0.8-1.6	0.0-0.6	0.0-0.6
Ridge, Soft	Rs_u	0.9-1.1	0.5-1.0	0.8-1.6	0.0-0.6	0.0-0.6
Slope, Biogenic/Sponges		3.5-10.5	3.5-10.5	2.0-8.0	0.0-3.0	0.0-3.0
Slope, Biogenic/Corals		3.5-10.5	3.5-10.5 (n=1)	2.0-8.0	0.0-3.0	0.0-3.0
Slope, Hard, Canyon Wall	Fhc	2.5-3.0	2.5-3.0	1.0-2.0	0.5-1.0	0.5-1.0

Slope, Hard, Canyon Floor	Fhc/f	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Slope, Hard, Exposure	Fhe	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Slope, Hard, Gully	Fhg	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Slope, Hard, Landslide	Fhl	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Slope, Soft	Fs_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Slope, Soft, Canyon Floor	Fsc/f_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Slope, Soft, Canyon Wall	Fsc_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Slope, Soft, Gully	Fsg	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Slope, Soft, Gully floor	Fsg/f	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Slope, Soft, Landslide	Fsl	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Basin, Biogenic		**3.5-10.5**	**3.5-10.5**	**2.0-8.0**	**0.0-3.0**	**0.0-3.0**
Basin, Hard, Exposure	Bhe	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Basin, Soft	Bs_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Basin, Soft, Canyon Floor	Bsc/f_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Basin, Soft, Canyon Wall	Bsc_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Basin, Soft, Gully	Bsg	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Basin, Soft, Gully floor	Bsg/f_u	**1.0-2.0**	**1.0-2.0**	**0.5-1.0**	**0.2-0.6**	**0.2-0.6**
Continental Rise, Biogenic		**3.5-10.5**	**3.5-10.5**	**2.0-8.0**	**0.0-3.0**	**0.0-3.0**
Continental Rise, Hard, Canyon Wall	Ahc	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Continental Rise, Hard, Exposure	Ahe	**2.5-3.0**	**2.5-3.0**	**1.0-2.0**	**0.5-1.0**	**0.5-1.0**
Continental Rise, Soft	As_u	**1.0-2.0**	**0.5.1.5**	**0.3-1.0**	**0.2-0.6**	**0.1-0.3**
Continental Rise, Soft, Canyon Floor	Asc/f_u	**1.0-2.0**	**0.5.1.5**	**0.3-1.0**	**0.2-0.6**	**0.1-0.3**
Continental Rise, Soft, Canyon	Asc_u	**1.0-2.0**	**0.5.1.5**	**0.3-1.0**	**0.2-0.6**	**0.1-0.3**
Continental Rise, Soft, Gully	Asg	**1.0-2.0**	**0.5.1.5**	**0.3-1.0**	**0.2-0.6**	**0.1-0.3**
Continental Rise, Soft, Landslide	Asl	**1.0-2.0**	**0.5.1.5**	**0.3-1.0**	**0.2-0.6**	**0.1-0.3**

Pacific Marine Conservation Council

May 10, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-007

Re: Comment on 2005 Pacific Coast Groundfish DEIS for Essential Fish Habitat

Dear Mr. Lohn,

Pacific Marine Conservation Council (PMCC) is pleased to take this opportunity to offer comments on the Draft Environmental Impact Statement (DEIS) on Essential Fish Habitat for Pacific Coast Groundfish. PMCC is a west coast regional non-profit organization that works with commercial and sport fishermen, marine scientists, environmentalists and others. We operate with a mission dedicated to sustaining healthy and diverse marine ecosystems and fishing communities. It is from this perspective that we offer these comments.

The Northwest Region of NOAA Fisheries and the Pacific Fishery Management Council (Council) are to be congratulated for the work that has been accomplished on the DEIS, given the limited resources available. While we will offer constructive criticism of aspects of this document and associated processes, we do so with accompanying respect for the efforts of your staff.

PMCC has long engaged in habitat issues regarding Pacific groundfish, including several years' service by Science Director Jennifer Bloeser on the Council's Habitat Advisory Committee. We have carefully monitored the development of the DEIS, and Senior Policy Director Peter Huhtala helped development draft alternatives on the Council's EIS Oversight Committee.

During this comment period PMCC has conducted extensive outreach to attempt to engage more members of the fishing industry and residents of coastal communities in this important process. We will describe some of this outreach in this comment letter, partly because we feel compelled to let you know that we believe that the limited outreach conducted by the federal government was inadequate. The decisions that will emerge from this DEIS will likely have significant short and long-term impacts on fisheries and coastal communities, and extraordinary efforts should have been

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made to communicate with this portion of the public as well as with all citizens interested in the future of marine habitat.

PMCC also facilitated the work of an Independent Scientific Review Panel. This group conducted their own examination of the DEIS and their conclusions and recommendations are submitted separately from these comments. Neither PMCC staff nor board members participated in the Panel's deliberations. PMCC was solely interested in bringing the additional, independent insight of well-respected scientists to this process.

PMCC Outreach: Essential Fish Habitat Draft Environmental Impact Statement

On February 23, 2005, PMCC distributed a letter stating the need for public comment on the DEIS to Pacific groundfish permit holders, fishing groups and associations, and others who we identified as being involved or interested in the fishery. We also contacted senior personnel with natural resource agencies, including Sea Grant, in Washington, Oregon and California; and all members of the Pacific Fishery Management Council and groundfish-related advisory bodies.

The response was significant. We received inquiries almost daily in the following weeks, and during March and April met with more than 40 sport and commercial fishermen in 24 Washington, Oregon and California coastal communities. Over 100 copies of the DEIS on CD, provided to PMCC by NOAA Fisheries, were handed out with written background materials on the DEIS process and how to comment. We also distributed these materials to interested National Marine Sanctuary managers and staff, and instructors and graduate students at the University of Washington and Oregon State University.

Many fishermen with whom we spoke did not know about or understand the DEIS nor know how to comment. Several raised concern over whether regulations that affect nearshore fishing efforts, particularly sport fisheries for salmon, rockfish and halibut, will result. PMCC's outreach efforts in Washington and California fueled those in Oregon, where town meetings were held by OSU Sea Grant Extension and the Oregon Department of Fish and Wildlife.

PMCC believes that NOAA Fisheries' outreach in coastal communities with regard to the DEIS should have been more extensive. Additional constructive input from people who make their living on and near the water would have resulted in a more comprehensive EFH EIS, and in superior protection of sensitive marine habitats with minimal impact on fishing communities.

PMCC Recommendations on the DEIS Alternatives:

EFH Designation

PMCC recommends adopting *Alternative A.3, Depths less than 3,500 m* as Essential Fish Habitat (EFH) for Pacific groundfish. This alternative encompasses all of the known Habitat Suitability Probability (HSP) information and adds a precautionary spatial extent by depth. This allows for species for which HSP is not known for all life stages and provides a buffer for uncertainty. A reasonably broad designation of EFH, but short of the entire EEZ, reduces potential conflicts with HAPC designation as well as defining an adequate area where actions by other federal agencies should be subject to EFH consultation with NOAA Fisheries.

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HAPC Designation

PMCC encourages the Council and NOAA Fisheries to designate Habitat Areas of Particular Concern (HAPC). The designation would, we believe, add a layer of focus that may inspire more attention to be paid to Conservation Recommendations made to other federal agencies during EFH consultation. This could have a positive impact on fisheries and coastal communities.

We understand the challenges in defining specific areas as HAPCs, but attention should be paid to the Areas of Interest in *Alternative B.7*. One challenge we foresee in geographically-defined HAPC designation based on "ecological function" is the lack of robust data regarding specific functions throughout the areas. This might be overcome by defining a process to modify the boundaries of the HAPCs as new data becomes available. PMCC supports *Alternative B.9 Process for New HAPC Designations*, and we suggest that procedures for modifying or removing HAPC designation might be implemented within a refined version of this alternative.

The Council's preliminary preferred alternatives, *B.2: Estuaries*, *B.3: Canopy Kelp*, *B.4: Seagrass*, and, *B.6: Rocky Reefs* all describe habitat types observed to serve important ecological functions. PMCC supports final adoption of these alternatives.

Minimize Adverse Fishing Impacts to EFH

This is the most challenging and controversial of the suites of alternatives. It is also where decisions can be made that result in real protection of the most sensitive or slow to recover marine habitats within EFH.

In general, PMCC supports use of fishing gear and techniques that are appropriate to the environment being fished. Incentives should be offered to encourage use of gear that least damages habitat. Considerable investment should be made in cooperative research that offers opportunity for fishermen to design and participate in studies to demonstrate the effective use of gear that minimizes damage to sensitive habitat.

PMCC acknowledges the limited amount of research that has been conducted on the West Coast to demonstrate specific impacts of a variety of gear on habitat. In addition, reliable fishing effort information relative to location is minimal, except in the case of the groundfish trawl fishery.

There has been a great deal of research conducted worldwide that documents the negative habitat impacts of mobile, bottom-contact gear. *Alternative C.12: Close Ecologically Important Areas to Bottom Trawl* focuses on this gear. PMCC generally supports the approach used in this alternative. The concept of using multiple data sources to define sensitive and slow to recover habitat in a precautionary manner, and then to close these areas to bottom trawling, while minimizing the economic impact makes a lot of sense. This should be the starting point in crafting a comprehensive alternative that works for both the marine environment and the fishery.

Alternative C.12 freezes the trawl footprint based on areas trawled 2000-2003, providing a reasonable basis for protecting potentially pristine habitat without affecting economic activity. *Alternative C.4: Prohibit the Geographic Expansion of Fishing* utilizes a similar approach with 2000-2002 as the qualifying years. This provides a measure of precaution but is not adequate in itself for minimizing adverse impacts of fishing gear on habitat.

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Alternative C.12 also identifies areas where trawling has occurred in recent years that would be off limits to the gears. The basis for closing these areas to trawling needs to be based on the best scientific information available, with a reasonable measure of precaution. In defining these areas, including buffers around the most sensitive habitat, consideration should be given to where any displaced fishing effort may move. Increased effort in nearby areas that remain open may have unintended consequences.

While the intent of *Alternative C.12* is to minimize gear impacts to the extent *practicable*, this requires some ground-truthing. PMCC has consistently testified to the Council that we believe that it is important to assess whether disparate adverse economic impacts may accrue to individual communities if important opportunities are lost due to restricted access. NOAA Fisheries can determine this to some degree using economic and spatial effort data regarding the trawl fishery, but it remains essential to engage fishermen in this process.

It is encouraging to hear that members of the trawl fishery have been working with *Alternative C.12* to reconfigure some of the closed areas so that the impact on the industry would be minimal even as important habitat is protected. There will probably be some give and take, but if NOAA Fisheries and the Council work closely with the fishermen and states to verify to the extent possible both biological and economic data, the outcome seems promising. Using trawl track data, logbooks and landings reports should help to refine the maps in order to minimize displacement of effort while still achieving significant habitat protection.

PMCC is supportive of *Alternative C.9: Gear Restrictions*, but only including those restrictions that very likely will protect habitat, such as *C.9.5: Prohibit dredge gear* and *C.9.6: Prohibit beam-trawl gear*. *C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls* might be considered if, in the total package of alternatives, roller gear larger than 8 inches is only prohibited on the shelf.

PMCC is also supportive of a modification of *Alternative C.11: Relax Gear Endorsement Requirements,* if trawl-endorsed permit holders are allowed to switch to longline or pot gear, but not vice versa.

Research and Monitoring

PMCC strongly recommends that the final Research and Monitoring EFH EIS Alternative combine elements of *Alternatives D.2, D.3, and D.4*. The management tools outlined in the Alternatives are complimentary to each other and would provide information critical to improving our understanding on the location and impacts on EFH. Selected individually, none of the proposed Alternatives is extensive enough to gather the information needed for adequate protection of EFH. An Alternative developed from elements of all of the proposed Alternatives would provide the balance of fishery dependent and fishery independent information sources we require in other areas of fishery management.

We recommend that the Council and NOAA Fisheries develop a research plan specific to the EFH research needs identified through the process of developing this EIS. While we recognize the need for improved information around groundfish habitat and strongly support the development of a research plan for this purpose, inaction (Alternative D.1) is not an acceptable response to lack of information. We recommend that the Council move forward with the identification and designation of sensitive habitat areas for protection and research purposes using the best available science.

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The National Research Council report on Improving the Use of the "Best Scientific Information Available" Standard in Fisheries Management makes the following recommendation in terms of developing plans to improve available science.

> *"NOAA Fisheries should develop and implement a plan to systematically improve the quality of the "best scientific information available" that includes regular assessments of the outcomes of management actions and evaluation of the predictive quality of the scientific information supporting those actions."*

To accomplish this we strongly recommend and support the development of a research program that uses local area knowledge and collaborative research with members of the fishing industry as information gathering mechanisms.

Our specific recommendations on the proposed Alternatives are outlined below.

Alternative D.2: Expanded Logbook Program
PMCC strongly supports the use of an expanded logbook program designed to gather information on habitat.   In recognition of the cost of such a program we would support Option D.2.2, where a random sample of fishing vessels is required to maintain logbooks as long as there is explicit buy-in at the onset of the program for adequate design, allowing for extrapolation of the information to the nonparticipating portion of the fleet.

Alternative D.3: Expanded Vessel Monitoring Program
PMCC supports the use of vessel monitoring programs for the purposes of increased safety and application of spatial management that allows for continued fishing opportunities while rebuilding overfished stocks. We encourage and support the use of technology in VMS systems that allows for the distinction between a vessel fishing and a vessel transiting. This would allow vessels to transit through closed areas for safety purposes. To the extent possible the cost of VMS units and associated transmission costs should be paid by the federal government.

Alternative D.4: Research Reserve System
PMCC strongly supports an Alternative that includes the development and use of a research reserve system. The EFH DEIS explicitly acknowledges the constraint placed on our knowledge of the effects of fishing on habitat resulting from the lack of unaffected control sites. The information gathered from control sites is a critical piece of the information puzzle and will not be accomplished through Alternatives D.2 or D.3. We recommend a collaborative process be developed with the fishing industry for the purposes of identification and design of this system.

Thank you for this opportunity to comment on the DEIS. We will be happy to discuss our recommendations

Sincerely

Jennifer Bloeser	Peter Huhtala
Science Director	Senior Policy Director

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NRDC
THE EARTH'S BEST DEFENSE

The Ocean Conservancy

May 11, 2005

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PFMC

D. Robert Lohn
NOAA Fisheries Regional Administrator
c/o Maryann Nickerson
7600 Sand Point Way, NE
BIN C15700, Bldg 1
Seattle, WA 98115-0070
GroundfishEFHDEIS.nwr@noaa.gov

Re: Comment on 2005 Pacific Coast Groundfish EFH DEIS

Dear Administrator Lohn:

This letter submits comments of the Natural Resources Defense Council and The Ocean Conservancy on the above referenced topic, supplementing the comments we sent jointly with Oceana under separate cover analyzing the legal and technical adequacy of the Essential Fish Habitat Draft Environmental Impact Statement (DEIS). The purpose of this letter is to express the support of our organizations and our more than 2 million members, volunteers and activists for specific alternatives analyzed in the DEIS. In summary, we support EFH Identification Alternative A.2 (depths less than 3,500m) plus seamounts and Impact Miminization Alternatives C.5 (prohibit a krill fishery) and C.12, revised version (close ecologically important areas to bottom trawl), combined with closures to bottom-contacting gear, per Alternative C. 13, at Cordell and Daisy Banks and seamounts. We also support Research and Monitoring Alternatives D.2.1, D.3 and D.4, combined with a systematic research and monitoring program aimed at providing relevant information on habitat quality and impacts to decision makers and the public, and fostering adaptive management of habitat measures (an alternative omitted from the DEIS). We urge you to remedy the deficiencies in the document, described in our joint comments with Oceana, and to take action as quickly as possible to implement the alternatives described herein.

Background and Principles

Fishery managers and scientists have called habitat damage the most significant long term threat to the health of fisheries. Extensive research, including a National Academy of Sciences (NAS) report,[1] documents the adverse impacts of bottom trawling on a variety of habitats. A number of studies identify bottom trawling as one of the most disruptive disturbances to seabed communities, decreasing habitat complexity and

[1] National Research Council, 2002. Effects of Trawling and Dredging on Seafloor Habitat, National Academy of Sciences.

potentially altering productivity. The NAS study emphasizes that lack of area-specific studies on trawling effects does not justify postponing action to address fishing effects on seafloor habitat.

Over the last two years, two national blue ribbon ocean commissions have made recommendations for improving fishery management and the health of the oceans. Those reports embrace a number of principles that are consistent with the NAS approach and that we believe should underlie the National Marine Fisheries Service's (NMFS's) decisions regarding protection of groundfish essential fish habitat (EFH). They include the precautionary approach, which errs on the side of conservation in the face of uncertainty and limited information; ecosystem-based management, which reflects the relationships between ecosystem components, including humans; adaptive management, in which management measures are designed to continually provide new information and improve the basis for future management decisions. The alternatives we support incorporate these principles. They take important steps to reduce the adverse effects of fishing on Pacific groundfish habitat, provide protection to diverse and vulnerable habitats, and proactively prevent new potential impacts in the future.

Rationale

Alternative A2: Depths less than 3,500 meters plus seamounts. Alternative A.2, selected by the Pacific Fishery Management Council (PFMC) as a preliminary preferred alternative, is the only EFH-identification alternative that utilizes both the habitat suitability probability (HSP) modeling outputs and other data sources, yet is not so broad as to be meaningless. This alternative addresses the uncertainties involved with the HSP modeling outputs by including other data sources plus a 100 meter-depth buffer. Alternatives A.3 through A.6 rely exclusively on the HSP model outputs and therefore fail in several ways to utilize the best scientific information available. First, the HSP modeling outputs are limited to depths less than 3000 meters. That limitation results in identification of EFH out to a maximum of 3000 meters despite information that groundfish occur at depths of 3400 meters. Second, the HSP modeling effort only produced EFH requirements for about half of the species by life stage. Thus, that modeling effort did not identify EFH for a number of life stages for key groundfish species. Alternative A.2 takes these uncertainties into account by incorporating other data sources and adding a 100-meter buffer to acknowledge our information is likely to be incomplete. Finally, the HSP modeling process excluded major prey species. Considering that the EFH rule requires that councils interpret information for designating EFH in a "risk averse fashion to ensure adequate areas are identified as EFH for managed species," Alternative A.2 is also the best choice because it provides a greater degree of certainty that the habitat needs of prey species are incorporated into EFH designation.

We support inclusion of seamounts for the following reasons. First, though seamounts may rise to a depth level above 3500 meters, the EFH identification methodology in the EIS utilizes the 3500-meter depth line on the continental slope to exclude areas beyond that line, including seamounts occurring outside it. Second, given what is known about the potential biological productivity, degree of endemism, occurrence of fragile habitats including coral and sponge, and other ecological functions of seamounts, the most prudent course of action would be to include seamounts in Alternative A.2 for EFH designation.

Alternative C.5: Prohibit a Krill Fishery. We support Alternative C.5 as a proactive measure to protect a crucial part of groundfish habitat: an abundant prey species at the base of the food web, nourishing groundfish directly and indirectly as food for other prey species. Food availability is a critical prerequisite for groundfish growth and recruitment. Protecting krill, currently an unfished species, as habitat is consistent with the EFH rule[2] and provides a zero-cost way to ensure that a major prey species remains available. Adopting Alternative C.5 is a smart step in a complex multi-species fishery with many uncertainties about how fishing is currently altering food-web relationships, productivity and rebuilding potential.

Revised Alternative C.12: Close Ecologically Important Areas to Bottom Trawl, combined with specified features of C. 13. The Council adopted the suite of C.12 through C.14 as preliminary preferred alternatives, and we support a combination of these options that provides higher levels of protection for habitats that are unique, particularly vulnerable, and/or important sources of productivity. Specifically we propose C.12 plus the greater protection level provided by C.13 (Close Bottom-Contacting Gear) for at least Cordell Bank, Daisy Bank (based on a proposal for a habitat area of particular concern submitted by Dr. Mark Hixon for consideration of the Pacific Fishery Management Council's EFH EIS Committee) and to all seamounts, as unique habitats with a high degree of endemism and vulnerability. We believe greater protection is warranted for these habitats because they are rich in fragile structure-forming invertebrates and likely to be slow to recover.

C.12 combines closure of identified areas to bottom trawling, freezing the trawl footprint, restricting catch, restricting gear, monitoring via observer data and expanded use of VMS, and benthic research and mapping. It thus incorporates the key measures recommended by the National Academy of Sciences to address the long-term adverse impacts of bottom trawling on fish habitat. The selection of these areas is based on the overlap of three or more habitat-related data sets, including the results of the risk assessment conducted by NMFS consultants to evaluate the sensitivity and recovery time of various habitats. This use of multiple data sets makes it the spatial alternative that most systematically uses available scientific information. As noted by the PFMC's Scientific and Statistical Committee, it is the only set of alternatives that deals explicitly with protection of habitat-forming invertebrates such as deep-water corals and sponges, in addition to encompassing a broad range of other groundfish habitat types.

Alternative C.12 has been revised recently, based on trawl track data, to reduce its potential economic displacement and increase protection in areas where displacement is unlikely to be a factor. The SSC found economic assessment methodology used by its proponents likely to be more accurate than that used in the DEIS.[3]

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[2] 50 C.F.R. 600.815 (a)(7).
[3] SSC Notes Nov. 1, 2, 2004

Alternatives D.2.1: Expanded Logbook; D.3: Expanded Vessel Monitoring System; and D.4: Research Reserve System. The DEIS identified a number of data needs that, if satisfied, can improve our knowledge about gear impacts (particularly those of the non-trawl groundfish fleet), assess habitat quality, minimize adverse impacts on groundfish habitat, mitigate economic displacement, and adaptively manage this fishery. We therefore support collection of data through expanded logbooks and VMS, the creation of research reserves that will facilitate studies of habitat impacts and better protection for essential groundfish habitat, and a research and monitoring program that utilizes this data to inform decision makers and the public and improve management.

Trawl logbook information has repeatedly proved useful for management purposes, from its supporting role in developing the first depth-based bycatch model to its use in revising the C.12-C.14 suite of alternatives to reduce economic displacement while maintaining protection for habitat. It makes sense to expand logbooks to other vessels in the groundfish fleet. Likewise, the kind of spatially specific information VMS provides is vital to improving habitat protection over time, managing adaptively, and mitigating economic impacts of management measures to fishing communities. Finally, we support creation of a research reserve system designed to improve our understanding of the impacts of fishing gear and for other management purposes. The DEIS finds that such a system may increase knowledge relating habitat to living marine resources, thereby resulting in improved stock status, higher fishery yields and improved education resources. To minimize economic displacement of such a system, we expect it could be designed within a subset of the areas identified in Alternatives C.12-C.14.

Summary

We believe NMFS and the Pacific Council have a historic opportunity to take a more ecosystem-based approach to managing the groundfish fishery by moving forward with a combination of Alternative C.12 and C.13, alternatives already designated as preliminary preferred by the Council. We appreciate the opportunity to comment, and urge you to take action now to address the flaws in the DEIS and provide the long-term habitat protection needed to sustain Pacific groundfish.

Sincerely,

Karen B Garrison

Karen Garrison
NRDC

Chris Dorsett

Chris Dorsett
The Ocean Conservancy

cc: Don Hansen, Chair, PFMC
Dr. Don McIsaac, Executive Director, PFMC
Susan A. Kennedy, NOAA Strategic Planning Office nepa.comments@noaa.gov

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May 10, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 - Bldg. 1
Seattle, WA 98115-0070

Subject: Comments on the "Pacific Coast Groundfish Fishery Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts" Draft EIS Support of Modified Alternatives of Collaborative Efforts between Environmental Non-Governmental Organizations and Fishermen and Protection and Consideration of Impacts to Coastal Communities

Dear Mr. Robert Lohn:

We appreciate this opportunity to comment on the "Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS)." We support the Pacific Fisheries Management Council and National Marine Fisheries Service's efforts to assess the environmental and socioeconomic effects of the alternatives presented in the Draft EIS. Our review of the Draft EIS document and discussions we have had with NMFS staff, including Dr. Rebecca Lent and Mr. Steve Copps, provided us with a good understanding of the intent and variables of the Essential Fish Habitat program. Our comments are broad with respect to the fisheries issues but are focused on the effects of the Essential Fish Habitat program on local coastal communities and fishing dependent harbors.

The Magnuson-Stevens Act and a 2000 court order require the preparation of this DEIS. The purpose of this DEIS is to evaluate the effects of fishing on essential fish habitat and to identify measures that will minimize those impacts to the extent practical. The project will also designate "Habitat Areas of Particular Concern" and identify other actions that encourage the conservation and enhancement of Essential Fish Habitat (source: DEIS). The Pacific Coast Groundfish Management Plan (FMP) will ultimately be amended to incorporate the alternatives selected by the Pacific Fisheries Management Council (PFMC) and as may be approved by the National Marine Fisheries Service (NMFS).

MOSS LANDING HARBOR DISTRICT

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May 5, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 Bldg. 1
Seattle, WA 98115-0070

Subject: Comments on the "2005 Pacific Coast Groundfish Fishery Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts" DEIS - Support of Modified Alternatives of Collaborative Efforts between Environmental Non-Governmental Organizations and Fishermen and Protection and Consideration of Impacts to Coastal Communities

Dear Mr. Lohn:

Thank you for this opportunity to comment on the "Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS)." We support the Pacific Fisheries Management Council (PFMC) and National Marine Fisheries Service (NMFS) efforts to assist the environmental and socioeconomic effects of the alternatives presented in the Draft EIS. Our comments are broad in scope on the fisheries issues but are focused on the effects of the Essential Fish Habitat program on local coastal communities and fishing dependent harbors.

The Magnuson-Stevens Act and a 2000 court order require the preparation of this DEIS. The purpose of this DEIS is to evaluate the effects of fishing on essential fish habitat and to identify measures that will minimize those impacts to the extent practical. The project will also designate "Habitat Areas of Particular Concern" and identify other actions that encourage the conservation and enhancement of Essential Fish Habitat (source: DEIS). The Pacific Coast Groundfish Management Plan (FMP) will ultimately be amended to incorporate the alternatives selected by the PFMC and as may be approved by the NMFS.

Current Joint Efforts

There are an estimated 23 permit holders that we believe regularly trawl in central California region, some of whom offload at the Moss Landing Harbor. We support the efforts of the environmental non-governmental organizations (NGO's) and these 23 commercial fishermen (and their associated representatives) to see if they can agree on designated zones in the study area (such as Alternatives C.10 and C.12 as may be modified) as no-bottom trawl zones. Of course, other areas would remain available for trawling and other types of fishing, for both sport and commercial take. It is my understanding that the NGO's, individuals and Fishing Associations (local Fishermen's Associations, FMA, PCFFA and others) are working to identify areas they think should be kept open to bottom trawl fishing and those remaining areas to be closed to bottom trawlers. We strongly support these efforts and recommend that whichever alternatives are eventually submitted to the PFMC be taken seriously and adopted by NMFS and the Commerce Department. We believe that the collaborative efforts of the NGO's and the Fishermen will ultimately result in the best alternative for the central California coast area for designation of the Essential Fish Habitat, meeting the requirements of the court order and the Magnuson-Stevens Act, et seq.

We request both the PFMC and NMFS allow the NGO's to continue working with the trawl fishermen (who will be most impacted) in order to prepare recommendations on open trawl areas and trawl closed zones within the central California coast study region. We expect these groups to provide a preliminary zoning plan for at the PFMC meeting in June 2005. We support any alternative submitted by a collaborative group effort of NGO's and commercial fishermen.

We respectfully request that both the PFMC and the NMFS accept and support any Alternative submitted by any joint effort of these groups as one of the preferred alternatives in the EFH EIS, and allow the fishermen and NGO's to continue their collaborative work with the commercial fishermen, that is, to identify essential fish habitat, to designate habitat areas of particular concern, to minimize, to the extent practical, the adverse effects of fishing on the essential fish habitat, and to identify other actions that will encourage the conservation and enhancement of the essential fish habitats within any modified Alternative for this region.

Potential Impacts on Ports, Harbors and Coastal Communities

There are many small ports and harbors that have mutually beneficial relationships with fisheries industries, both sport and commercial, within the study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine to keep the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic negative affect on the ability of the fishing fleets to continue making a profit, which has a direct effect on the coastal host community (harbors and marinas). The implementation of yet another regulatory action (closure) will have a great economically adverse effect on these local communities. Therefore, we ask that both the PFMC and the NMFS carefully consider the socioeconomic effects of any designation of essential fish habitat in the central California region.

We understand that it is very difficult to quantify the social and economic effects of such a project or plan and cannot offer specific verifiable evidence of those effects, other than our past experience and day-to-day observation of the fishing industry and the benefits it has on our communities. There is a synergy that occurs which is un-measurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. Please be careful in the implementation of the EFH and take these comments into consideration when doing so.

Again, we thank the Council and Fisheries Service for your consideration of this alternative. We are available for future discussions on this issue. Should you require additional information please contact me by email at mcintyre@mosslandingharbor.dst.ca.us or by telephone at (831) 633.5417.

Sincerely,
Moss Landing Harbor District

Linda G. McIntyre
General Manager/Harbormaster

LGM:mdm

C: MLHD Board of Harbor Commissioners
Dr. Rebecca Lent, Dept. Asst. Administrator – Regulatory Programs, NMFS
Mr. Steve Copps, Sr. Policy Analyst, NMFS
Mr. Don Hansen, Chair, PFMC
Moss Landing Harbor Commercial Fisherman's Association

Mendonoma Marine Life Conservancy
P.O. Box 217
Manchester, CA 95459
(707) 895-2584

May 9, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn,

I am writing on behalf of the Mendonoma Marine Life Conservancy to express our support for the effort to identify, restore, and protect ocean habitats that are essential to Pacific Coast groundfish.

We are a private group of sixteen educators, fishermen, environmentalists, divers, Native Americans, kelp harvesters, and other stakeholders focused on mapping offshore geography, ecology, fisheries, and recreational uses in California State waters from the Humboldt-Mendocino county line to the outflow of the Russian Gulch Watershed south of Fort Ross. MMLC's mailing list includes over 100 individuals and organizations, and our By-Laws authorize advocacy as an "interested party" as referenced in Section 2861(a) of the California Fish & Game Code.

Groundfish share a vulnerability to overfishing with open water, schooling fish. But because many groundfish species live in and around the same rocky reefs and other bottom features for most of their adult life, they are also vulnerable to destruction of their homes, feeding areas, and breeding grounds from certain kinds of fishing activity. These homes, feeding areas, and breeding grounds often include living seafloor animals as well as geologic terrain and vegetation.

MMLC supports efforts to (1) identify and protect habitat areas of concern essential to groundfish, and (2) protect some areas from further damage by prohibiting the use of fishing gear known to damage groundfish habitat and seafloor animals. We believe that the elimination of habitat-damaging fishing gear should be done in such a way as to minimize economic hardships on fishermen, as they are simply applying techniques and tools created before mankind realized their potential for damage.

MMLC would also like to point out that Figure 2-7 [B.2 HAPC Estuaries] omits the longest undeveloped estuary in California: Big River Estuary, where the upper extent of salt water intrusion can exceed eight miles. Bocaccio is among the species that were documented in the Big River Estuary and lower subbasin by Warrick & Wilcox in 1981, and several other groundfish species have been identified in the Estuary at some stage in their development. We feel Big River Estuary offers an excellent venue for estuarine research in general and studies of potential interaction between juvenile salmonids and juvenile rockfish in particular. Please include Big River Estuary in Alternative B.2.

Lastly, we would caution that precautionary management principles be used in all cases where information needed for decision making is unavailable. In the history of U.S. and Canadian management of North Atlantic fishing grounds many decisions placed socioeconomic interest over precautionary management principles, and eleven years after the fishery was finally closed Atlantic cod population levels were still among the lowest ever recorded.

We understand that application of precautionary management principles will skew decision making in favor of protecting essential habitat in those cases where definitive data is unavailable or inconclusive. Because of the degree of uncertainty surrounding much current data, precautionary management principles will need to be employed often early-on; thus we feel it is important that the final EIS include a definition of "precautionary management principles" in Chapter 9.

Thank you for the opportunity to comment.

Sincerely,

Rob Cozens

Rob Cozens
Staff Conservator

Pacific Marine Conservation Council

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-007

Re: Comment on 2005 Pacific Coast Groundfish DEIS for Essential Fish Habitat
Independent Scientific Review Panel

Dear Mr. Lohn,

Pacific Marine Conservation Council (PMCC) has facilitated the work of an Independent Scientific Review Panel (Panel) to review the Pacific Coast Groundfish DEIS for Essential Fish Habitat during the public comment period. We are pleased to provide you the report from this Panel.

It is PMCC’s belief that the thorough, scientific assessment of the DEIS "Purpose and Need" and proposed alternatives is a valuable contribution to this important process, and we encourage you to give the report careful consideration. We want to be clear that these comments are independent from PMCC, and wholly separate from the comments submitted by PMCC staff.

No staff or board members of PMCC served on the Panel. The Panel members were not offered or provided financial compensation.

Sincerely,

Peter Huhtala
Senior Policy Director

Pacific Marine Conservation Council

Independent Scientific Review Panel Evaluation of

Draft Environmental Impact Statement on Essential Fish Habitat for the U.S. West Coast

Dr. Selina Heppell, Chair

Dr. Peter Auster

Dr. Don Gunderson

Dr. Ralph Larson

Dr. Les Watling

Consensus Statement

The Draft Environmental Impact Statement (DEIS) on Essential Fish Habitat (EFH) for the U.S. West Coast represents an important opportunity for the Pacific Fisheries Management Council (PFMC) to take a major step toward ecosystem-based management. The document has a number of shortcomings, principally, a) lack of data on habitat impacts of various gear types, b) lack of ground-truthing for the GIS-based model that forms the foundation of several of the recommended management actions, c) lack of data to determine the functional relationship between habitat condition and fish population or community response, and d) repeated failure to identify appropriate response variables to assess the likely success or failure of a proposed action. Nevertheless, the DEIS does a reasonable job of acknowledging these shortcomings (many of which will require years of research to rectify) and providing alternatives with a wide range of precaution. The authors of the DEIS are to be congratulated on production of a comprehensive document in a very short time frame that provides paths for habitat definition and protection, while highlighting the paucity of information available on fish habitat off the west coast of the United States.

This review Panel's preferred alternatives for each DEIS objective reflect a general consensus of precaution, based on our understanding of the alternatives presented, data gaps (particularly on the distribution and intensity of non-trawl fisheries) and the our collective experience in marine ecology and fishery impacts. Because data on gear impacts, habitat sensitivity and recovery are not available for the West Coast, the data layers used to generate EFH and mitigation alternatives are not functionally connected. This is a major drawback, although the GIS-based model is an excellent tool for visualizing and evaluating the spatial extent of each alternative. We urge the PFMC to utilize this tool carefully and to acknowledge the uncertainty that accumulates with each data layer by avoiding decisions that require a high level of precision.

The impact of fishing on habitat can be reduced through one or more of the following actions:

a) gear modification,
b) gear restrictions in space – permanent (including closure to all gear types),
c) gear restrictions in space – rotating, and
d) effort reduction.

We anticipate that the PFMC will settle on a “package” of EFH protection that utilizes most or all of these actions. However, as marine ecologists, we are not well-qualified to judge the likely effectiveness of gear modifications and effort reduction. We also cannot evaluate the potential socioeconomic impacts of the alternatives, but support additional research to choose alternatives that minimize hardship while assuring adequate habitat protection. Progressive alternatives that include relief for fishermen, such as the Central California license buy-out, may be a viable solution for some areas. However, we have concerns about the potential redistribution of fishing effort if closures are enacted, and we urge the PFMC and its Habitat Committee to consider this possibility carefully for any management scenarios that involve closures.

We strongly recommend that the EIS be reviewed 5 years after implementation, to update the models with new information, ground-truthing, and assessment of the effects of the chosen alternatives. The research and monitoring necessary to improve the EIS will require a substantial commitment of funds from NMFS and state agencies. In order to estimate recovery times for damaged habitats, controlled experiments must be carried out over extensive time periods (decades in many cases). This research will be money well spent, however, if it is targeted at the major uncertainties of the model and effects of the mitigation actions. We anticipate that well-planned, cooperative research will decrease the amount of area designated as “essential” or “critical,” and permit a much more focused conservation effort that has less impact on fisheries and greater benefits to fish populations.

Preferred Alternatives – Summary

A. EFH designation

Alternative A.3, with some support for A.4.

B. HAPC designation

Alternative B.7 was strongly supported, along with designation for estuaries (B.2), kelp canopy (B.3), seagrass beds (B.4) and rocky shelf areas (B.6) that serve as juvenile rearing habitat.

Alternative B.5 is supported as a goal but some Panel members felt that Core Area designation is premature given the limited data available.

Alternative B.9 is supported with an emphasis on external review.

C. Alternatives to Minimize Impacts to EFH

Alternatives 3 or 12/13.

General goal: Reduce effort of most damaging gear on most sensitive habitat.

There is additional support for Alternatives 7 and 10.

D. Research recommendations

Alternatives D.2 and D.4 .

Preferred Alternatives – Justification and Discussion

EFH designation

All life stages and life processes require habitat, and these are not the same within a species. Identification of habitat necessary for growth, reproduction, and other life processes for all 80+ groundfish species and their life stages is an enormous undertaking, as evidenced by the large appendix listing these factors. It is not surprising that when presence/absence is used as a response variable to assess EFH, the entire EEZ becomes designated. No amount of probabilistic modeling is likely to change that conclusion, but placing EFH designation into a probability framework (Habitat Suitability Probability, or HSP) is a step in the right direction because it at least acknowledges uncertainty.

Able (1999, American Fisheries Society Symposium 22, *Fish Habitat: Essential Fish Habitat and Rehabilitation*) described a hierarchical scheme for EFH designation that could be integrated into PFMC's research and management goals:

- Tier 1: Presence/absence. This approach requires comprehensive sampling of all potential habitat with multiple gears, not just NMFS trawl survey data.
- Tier 2: Relative abundance. Better quality habitats should be able to sustain larger population sizes than lower quality habitats. This approach requires a repeated measures sampling scheme because population sizes fluctuate from year to year.
- Tier 3: Vital rates. Growth, frequency of reproduction, and other demographic rates should be greater in high quality habitat. This approach requires physiological sampling of multiple individuals from a variety of sites over time.
- Tier 4: Productivity. "Source" habitats contain healthy populations that consistently provide a net export of individuals through recruitment and spillover. The identification of "sources" is difficult and requires detailed sampling of many sites over long time periods.

The advantage of this hierarchical approach is that is can help us hone our designations substantially, from the entire EEZ to areas that truly are "essential" because they provide the food and shelter required to sustain healthy fish populations.

We are particularly concerned about the paucity of information on juvenile groundfish habitat because it is precisely those individuals that are most likely to be strongly tied to structure that may be damaged by fishing gear. Only the designation of estuaries, seagrass beds, kelp canopy areas and some "Areas of Interest" specifically address juvenile habitat. We believe that the PFMC should be most precautionary about potential impacts to juvenile habitat and be extremely wary of habitat status assessment that is based solely on the catch of adults.

Alternatives A.3 and A.4

Alternative A.1 (No action) keeps many options open, with less potential conflict when combined with HAPC designation and mitigation actions. It also identifies categories of habitat, although these should be expanded. However, designating the entire EEZ as EFH does not focus attention on any particular habitats, and shifts the entire direction of the exercise to designation of HAPC.

Alternative A.3 (100% HSP area) received the most support within the Panel, with additional consideration of alternatives that designate unknown deep water areas. However, this alternative is primarily based on HSP calculations from trawl survey records, which are insufficient measures of habitat use by all life stages. This option also makes everything "essential," hence nothing is essential, and makes actions targeted to conserve particular species difficult or impossible to implement using the EFH boundaries

We like the flexibility and added precaution of EFH based on management status (Alternative A.4), and 2 Panel members supported this option as preferred. Designation is weighted by management status of the exploited populations and protects “essential” habitats based on frequency-dependent distributions (Tier 2, above). Further, this alternative designates seamounts as EFH in a precautionary manner appropriate for the management regime and sensitivity of such habitats. However, this alternative is problematic because a) a population at low abundance may not occur regularly in areas that could be “essential”, and b) habitat needs of individuals do not change just because their management status changes.

The alternatives with lower HSP thresholds lack data to support the assumption that such designations truly contain essential habitats of managed species and that other areas do not have habitats that play an important role in mediating demographic processes.

Recommendations:

1) Retain the seven composite areas identified in the 1998 EFH designation, but consider other habitat designations based on structure, function and impacts. For example, splitting nearshore rocky shelf habitat (<100m depth) into a separate category is supported because of the importance of these shallow reef areas as juvenile fish habitat and increased impacts of recreational fishing gear.
2) Final designation of EFH should be based on maps that include the most recent information from multiple sampling sources. A research plan for ground-truthing those maps should be a top priority for the first 5 years. Refinements to the HSP model using a tiered assessment approach are encouraged.

HAPC designation

We strongly support the effort to designate Habitat Areas of Particular Concern, and the list of considerations is a good start. The use of habitat-specific knowledge regarding sensitivity to impacts and recovery times to designate specific sites as HAPCs allows implementation of precautionary approaches to mitigate the effects of fisheries activities in the context of ecosystem-based management. Unfortunately, the first consideration for HAPC designation, “the importance of the ecological function provided by the habitat”, is far too broad and vague, and “ecological function” has not really been measured for any of the habitats listed. Nevertheless, the areas listed in Alternatives B.2 – B.7 are based on ecological principles and observations of fishes and particular life stages in those habitats. Core areas for managed species as well as areas of interest, with area-specific knowledge of function or sensitivity, should be included in HAPC designation.

The Areas of Interest listed for Alternative B.7 include various canyons and banks that have unique combinations of structure and oceanographic characteristics that seem to correspond with high productivity, biodiversity, or both. Many of these areas also include biogenic structure, likely because of particular combinations of depth and current. The danger of a somewhat vague "Areas of Interest" HAPC designation is that decisions to include or not include an area will be highly subjective, at least until further study can identify features that make these areas unique or areas of high groundfish productivity. There may be more specific combinations of structure, depth, and currents that would be better to use for HAPC designation and identification of Areas of Interest.

Three Panel members strongly support designation of Core Areas (B.5). Use of core areas based on frequency-dependent distributions are supported by theoretical and empirical studies of demersal fishes. Core Habitat designation is a good goal, but may be premature without more "higher level" data (Tiers 2-3) than are currently available.

Specific HAPCs for areas known to serve important ecological functions are supported. Alternatives B.2 (Estuaries), B.3 (Kelp canopy), and B.4 (Sea grass) make sense, although the potential effects of non-fishing human activities on these habitats may exceed the effects of fishing activities, and there seems to be little power to limit these activities (such as development and filling of estuarine areas, or dredging and disposition of spoils). The kelp canopy designated for California (based on 1989) probably underestimates potential kelp coverage, although the map of kelp canopy in California looks reasonably complete at the scale shown. The area of kelp canopy habitat that does not coincide with area designated as essential under EFH alternative A.3 (Habitat Table 4-4) must be on sand bottom. If the inconsistency of the EFH alternative A.3 and the HAPC alternative B.3 is a problem, HAPC alternative B.6 would cover most of the important habitat included in alternative B.3.

Alternative B.6 (Rocky reefs) makes sense to the Panel, as the physical structure of the reef is essential for a number of species of fish, and can be subject to modification by some fishing activities. This alternative would include most kelp forests, so if alternative B.3 was not chosen, most of the same habitat would still be recognized as HAPC.

The Panel generally did not support the designation of oil platforms as HAPCs (Alternative B.8), despite the fact that they do serve as habitat.

All of these designations lack specific consideration of biogenic habitat other then kelp and sea grass, and all soft-bottom habitat. Much of biogenic habitat associated with hard substrates would be covered under Alternative B.6, and some in B.7, but none associated with soft bottom habitat would be included. Hard-substrate habitats are probably more sensitive to some effects of fishing, but focus on these areas may be at the expense of soft-bottom habitat.

The process for designating new HAPC areas (Alternative B.9) is supported, as it allows flexibility and response to new findings. Recommendations from the PFMC Habitat Committee should be reviewed by experts on benthic habitats, fish ecology and fish distribution. There should also be a mechanism for "delisting" HAPCs, as new information may actually reduce the perceived importance of specific areas.

Recommendations:

1) Combine Alternatives B.7, 2, 3, 4, and 6, with effort to identify quantifiable

characteristics for designation.

2) Strongly consider Alternative B.5, Core Area designation, if species-specific relative abundance data are available.
3) Support Alternative B.9, with emphasis on external review.

Alternatives to Minimize Impacts to EFH

General goal: reduce effort of most damaging gear on most sensitive habitat

We would encourage the use of more habitat-friendly gear, and the participation of the fishing community in the development of effective fisheries management systems. Therefore, to the extent that it is possible, we would like to see the use of the most destructive gear in the most sensitive habitats be restricted the most, and other gears restricted less (or encouraged). Given a wealth of experimental and observation data on the negative impacts of mobile, bottom-contacting gear in multiple habitats, we favor restrictions on dredging and trawling (especially on hard bottom). Restrictions on fixed gear are more problematic, because the effects of pots, nets and lines on habitat are poorly documented and probably less than mobile gear. Thus, precautionary restrictions on these gear types, in addition to trawl restrictions, may stifle a move toward more sustainable fishing practices. At present, we can only guess at habitat sensitivity to different gears, and it may be a long time before this lack of knowledge changes. Certainly, gear design and fishing tactics can minimize damage, so that this problem will be a constantly moving target.

Alternatives 3 and 12/13

The Panel favors impact reduction through protection of sensitive habitat. We favor options within Alternatives C.3 and C.12/13, although both of these approaches have flaws. These options provide a choice between a subjective set of "Ecologically Important Areas" identified by Oceana (C.12 and C.13) or, or an alternative set of areas chosen more objectively by the National Ocean Service (C.3) but using crude data inputs (trawl survey data) and admittedly questionable analytical techniques. Only option C.13 addresses invertebrate megafauna explicitly. Neither option seems to identify what will happen to the HAPC areas identified in Alternatives B.1 to B.8. Redistribution of fishing activities must be carefully considered, as "unsensitive habitat" may become heavily impacted, and more explicit justification for restricting the designation based on trawl effort is needed under Option C.3. However, either alternative offers a place to start, providing the areas involved can be added to or deleted as further information on HSP or sensitivity becomes available. Present information is crude at best, making it imperative that some flexibility be built into the selected alternative.

The amount of area closed to fishing under alternatives C.3.1 and C.3.3 is extensive, and would certainly play a role in limiting the effects of fishing on habitat. C.3.2 and C.3.4 apply more limited restrictions, focusing on the most highly-rated sensitive habitats, and might be more palatable from a socioeconomic perspective. The PFMC should consider the addition of Alternative C.7 (close Areas of Interest) if this alternative is adopted. Alternatives under C.3 may be particularly useful on an experimental basis as part of an adaptive management plan that includes intensive monitoring.

Alternatives C.12-14 are specific to habitat and the footprint of fishing and are most tightly linked to the distribution of managed species based on habitat selection theory, where areas of highest density, at particular life history stages, are generally an organism's preferred habitat. The description of these Alternatives is comprehensive and rather complex, requiring a) identification of ecologically important areas and b) an assumption that bottom trawling is the major impact on those areas. The latter is likely, but impact from other fisheries should not be ignored. The former requires a complex assessment and a number of assumptions, given the lack of data on relative abundance for many species and life stages. The Panel liked these alternatives from a biological standpoint, but data are lacking to provide a strong *empirical* justification for the large areas affected. From a precautionary standpoint, restriction of gear that is known to damage structure forming invertebrates in areas where those invertebrates are likely to occur is reasonable, but should be verified. This Alternative is strongly driven by protection of deep sea corals, which are poorly mapped on the west coast slope and may or may not provide critical habitat for groundfish.

Specific regulations that result from the adoption of this Alternative will require much discussion, compromise, and assessment monitoring. Efforts to "appease" fisheries by allowances for certain important fishing areas may be a successful compromising measure. Redistribution of effort must be modeled, at least qualitatively, and may be anticipated through analysis of logbook data following trawl footrope restrictions that occurred in 2000.

Alternatives C.13 and C.14 are more restrictive variations on C.12, and were generally viewed by Panel members as overly precautious. The exception to this is a recommendation for restriction of fixed gear in deepwater areas that are likely to house structure-forming invertebrates. There is a great advantage to having some areas closed to all fishing activities, but the large areas covered by these alternatives are likely excessive. Selective closures of Areas of Interest may be more palatable and avoid massive effort redistribution. One Panel member argued that the provision on footropes (none greater than eight inches in diameter) allowed in the open area should be removed from C.13 if this Alternative is adopted.

Alternative C.1 was deemed unacceptable because current regulations and closures are not based on habitat, which is the mandate of this EIS.

Alternative C.2, depth-based gear restrictions, could serve as a default option in light of poor information on impacts and recovery, but may be overly cautious. Restrictions on large-footrope trawl gear would seem to have positive effects, constraining trawling largely to non-rocky areas without having to specifically identify the rocky areas. Information on habitat recovery in areas currently closed or no longer trawled would be helpful to determine recovery times and relative impact functions. Without field data, it was difficult for the Panel to evaluate which depth zones would be best for this under the alternatives in C.2. However, we do not favor the restrictions on fixed gear in shallow water. Two important and well-managed fisheries, the Dungeness crab and California spiny lobster fisheries, would be particularly affected by the restrictions posed here, and it seems excessively punitive to destroy these fisheries after the members have helped to create reasonable systems of management.

Alternative C.4, prohibit geographic expansion of fishing, has some serious methodological flaws. Why would anyone assume that areas not fished between 2000 and 2002 are “potentially pristine”, given the long history of fishing on our coast? Nevertheless, the Panel agrees that preserving the current fingerprint of fishing seems like a good idea with few economic impacts right now. Alternative C.4.2 (all gear) would be preferable, as a way to encourage gear with smaller impacts (as covered under C.11). Fixed gear has a limited but measurable impact footprint, especially in deep waters during deployment and recovery. On hard substrates, gillnets and other fixed gear have been shown to impact emergent fauna like corals as well as fragile geologic structures. However, we note that these alternatives are not consistent with most of the EFH designation alternatives.

Alternative C.5. prohibit a krill fishery, is an interesting idea from an ecosystem-based management standpoint. It may also “set the stage” for setting limits to the expansion of fisheries for other low-trophic level species, such as northern anchovy, shortbelly rockfish, sardine and squid. However, this alternative seems outside of the scope of EFH, and it does not make sense from an ecological standpoint to equate prey availability with habitat.

Alternative C.6, close hotspots. This alternative focuses on biodiversity and needs further development. Hotspots do not directly address the sensitivity of habitats. For fisheries enhancement or biodiversity protection, hotspots can be stratified by depth, latitude and habitat type. They should also be based on data collected over a number of years. Identification and protection of hotspots of productivity or juvenile recruitment may meet sustainable fisheries goals more than biodiversity criteria.

Alternative C.7, close Areas of Interest. This may be a reasonable, precautionary alternative until data show “minimal impact” of each gear type on the Area of Interest identified in the HAPC Alternative B.7. However, as with Alternative C.3, redistribution of effort will be important to consider, and closing these areas is probably insufficient for EFH protection. This alternative could be added to Alternative C 3, and overlaps with areas identified in our current preferred alternative, C12.

Alternative C.8. Ocean zoning is a hotly debated option that we feel is politically unfeasible at this time. While the idea of zoning fishing activities and doing further research on ways to fish while reducing impact on the habitat may be useful, these concepts are better addressed in other alternatives. Also, zoning quickly turns the scientifically-based issue of habitat protection into a pure allocation issue.

Alternative C.9 covers a series of gear restrictions. Alternatives that involve the development of less harmful gear types, rather than fishing restrictions, are an effective management approach when there are data available to show that the gear modifications actually work (i.e., maintain catch and substantially reduce impact). This approach leads to cooperative research, which further enhances the relationship between fishermen, researchers and managers. Also, this alternative codifies many current practices. Gear restrictions are likely to be useful in some areas but are not precautionary by themselves. Some on the Panel felt that we should avoid support for gear-specific options, given our mandate and expertise. The measures described in this option are aimed only at a subset of the bottom-tending gears and are thus more allocative than biologically based, and may be more difficult to enforce than some other Alternatives.

Alternative C.10, no-trawl zones plus license buy-out in Central California, is the most progressive alternative and is likely to be useful in some areas, but may not be feasible where multiple gear impacts are common. It would also be important to know what the trawlers will do in response to the buy-out. C10 requires actions of private organizations after passage and is outside the purview of the Council and NMFS to require implementation of all of the provisions. In general, the Panel felt it was beyond our abilities to evaluate the socioeconomic trade-offs of acceptance or rejection of this alternative.

Alternative C.11 relaxes gear endorsement requirements. Adding flexibility to fishing strategies can ease the negative effects that area closures or gear restrictions may have on fishermen, promotes the use of more habitat-friendly gear, and may also help spread effort of individual fishermen across space, time and species. However, the biological impacts of this Alternative are unclear.

Recommendations:

1) Alternatives that consider the spatial distribution of habitat, impacts on habitat (fishing effort) and its sensitivity to those impacts should be adopted. Of the alternatives provided, C.3.4 and C.13 best meet those goals, and could be modified to reduce socioeconomic impacts.
2) Impacts of all gear types should be included in the assessment, and ground-truthing is needed.
3) Areas of Interest identified in the HAPC designation should also be protected (Alternative C.7).
4) Solutions that reduce economic hardship and encourage partnerships between conservation groups and industry should be supported (Alternative C.10).
5) Gear modifications to reduce impacts on habitat should be encouraged but require field testing (Alternative C.9).
6) Adoption of any Alternatives that include area closures should include an assessment of likely effort redistribution.

Research Recommendations

The Panel developed and ranked a series of general research needs that included our own judgments as well as specific alternatives from the DEIS:

1) Ground-truthing habitat suitability probability
2) Habitat recovery monitoring
3) Research reserves
4) Expanded logbook to include data from other fisheries
5) Gear impact experiments
6) Vessel Monitoring System effort distribution analysis
7) Alternative sampling methodologies

Recommendations 5, 6, and 7 received equivalent mean ranks from Panel members. Note that all of these research needs are important, but restricted funding will likely require some prioritization. We strongly recommend intensive pre- and post-closure monitoring of any closed areas that may result from adoption of the alternatives outlined in this DEIS.

Research reserves that are closed to all fishing activities are highly controversial, but provide the only tool to separate fisheries impacts from changes in habitats or fish abundance that are due to environmental change. Research reserves could also serve as locations for habitat sensitivity and recovery assessment. Two Panel members ranked establishment of reserves as their top research priority. We support cooperative efforts by coastal communities and scientists to design these reserves, as recommended by Oregon’s Ocean Policy Advisory Council.

We also make the following general recommendations for improvements to the HSP designations:

1) Trawl survey data needs to be supplemented with ROV or submersible observations.

2) The correct spatial scale (based on home range) for habitat analysis needs to be determined for each life stage of each species.

3) The analysis of habitat suitability currently should incorporate additional parameters and interactions of those parameters with the current ones (depth, latitude, and “substrate”).

4) Relative abundance (Tier 2 response) should be used instead of presence/absence whenever possible.

5) More habitat categories should be considered. Ten is overly crude, and misses important detail on features such as rugosity, biogenic cover, etc.

Comments on the DEIS process and document

The idea of "Essential Fish Habitat," as outlined in the SFA in 1996, was flawed at the outset, in that no guidance was provided to distinguish mere "habitat" from "essential habitat." The idea of habitat bottlenecks (habitats of limited size through which the population passes at some time in its life cycle, which are also vulnerable to the effects of fishing gear and other factors) is ecologically sound. However, the language of the law makes it difficult to account for the effects of density-dependent habitat selection (and therefore to distinguish the core areas of habitat that are most suitable for a population), the rarity of a habitat that might be used by a particular life stage, and the vulnerability of that habitat to human and natural disturbances. Thus, NMFS was probably correct in its first assessment, designating everything within the EEZ as "Essential Fish Habitat," even though that designation in the end meant nothing because it failed to allow focus on any particular portion of the habitat. As a result, the HAPC designation became the means of identifying "really, really Essential Fish Habitat."

Use of the HSP models for identifying habitat is a reasonable approach, but subject to limitations of the data used in the analysis. Because of the inherent problems in identifying "essential fish habitat" as it has been defined, perhaps the highest purpose of this section (EFH designation) should be to recognize the diversity of species and the habitats utilized, and allow for the broadest context for the identification of really, really essential (and vulnerable) habitat in the designation of HAPC and of measures to minimize adverse impacts to EFH.

It is critical, for the logic of this EIS, that any HAPC and actions for remediation are areas that have been designated as EFH. All of the alternatives to reduce impacts must interact with the designation of EFH that is ultimately chosen, and with the alternatives for HAPC. Ideally, mitigation efforts should be nested within EFH and HAPC designations to drive the alternatives to limit impacts, with explicit language linking mitigation issues to the attributes of concern. We recommend that the PFMC Habitat Committee develop a comprehensive framework for action that more logically follows the hierarchy necessary for non-conflicting action: a fairly broad EFH designation based on ground-truthed information on relative abundance of all life stages (which may not need to be species specific), HAPC designation for areas with unique functions, such as nursery grounds, areas with high biogenic habitat, high productivity, and/or high biodiversity, and impact reduction actions that target critical areas within these designations. The alternatives presented in the DEIS are disjoint, requiring an overwhelming appendix of tables and maps to show conflicts that will arise. This approach is inefficient and makes it extremely difficult to do more than simply choose a preferred action (or combination of actions) for each of the 3 sets of alternatives, based on ecological principles, conservation concerns, socioeconomic concerns, etc.

The apparent conflicts between EFH and HAPC designation shown in Appendix 4 are of particular concern and difficult to understand. For example, Habitat Table 4-4 shows that only EFH alternative A.6 would not include the areas identified in HAPC alternative B.6, but Figure 4-3 shows some areas (which seem mostly like deep-water areas) included in HAPC alternative B.6 are excluded in several of the EFH alternatives. Likewise, some of the areas included in HAPC alternative B.7 (Areas of Interest) are not included in some of the EFH alternatives because of a disconnect between methods to identify HSP (catch records) and in-water observations of these areas that identify them as Areas of Interest.

The “Purpose and Need” section does a good job describing the management framework for west coast groundfish but does a poor job linking the management framework to EFH designations, thus making it impossible to evaluate EFH alternatives against a set of explicit goals (e.g., minimally capture the top 50% of the population distribution of each managed species, capture 80% of spawning habitat, etc.). While there are targets set within alternatives (e.g., 70% HSP), these are thresholds for specific alternatives and not an overall goal for which various alternatives were proposed and can be compared. The four goals stated in section 1.4 are strawmen and the existing preferred alternatives discussed in chapter 2 clearly “consider” these in aggregate. Without explicit threshold values for particular metrics (e.g., what are thresholds for “practicable” alternatives?), it is impossible to develop a review criteria that does not explicitly include personal viewpoints related to balancing industry needs with conservation goals. This is not an unusual situation (in fact, a similar process and framework were recently evaluated for groundfish EFH in the New England Region) and is why reviews of the EFH and HAPC alternatives from other Councils preclude rigorous scientific review. While the underlying theory and methods used to develop alternatives is certainly open to scientific debate, the value-laden alternatives are really not. Thus, we believe that the approach used by the PFMC is generally robust and defensible, but science-driven vs. value-driven decisions should be distinguished whenever possible.

The Purpose and Need section is supposed to “set the stage” for what the EIS is and why it is important. Overall, the description of the EIS process is reasonable, but there are a few elements missing, such as the definition of EFH and habitat-related mandates of the Sustainable Fisheries Act. Some Panel members also found it confusing to have the EIS presented as a document describing “the effects of conservation actions [on habitat]” when the mandate is to determine the effects of fishing on habitat. This may be more than a simple semantics issue, as the “burden of proof” may rely on proper definition of the problem. Because the “action” in this case is implementation of conservation measures, rather than introduction of a new stressor, this apparent switch of focus may be intentional and necessary – but it should be better explained.

This section of the DEIS also includes a description of the current management framework for west coast groundfish, but does not really provide information about how habitat management would fit into that framework. Most importantly, state vs. federal regulations and their interactions should be addressed. Also, there is no description of the current regulations that are designed to reduce impacts on overfished stocks (these closures are described in the Alternatives chapter).

The current methods for determining HSP and habitat sensitivity are not up to the task at hand, primarily due to a lack of data. The Risk Assessment group developed a model that relies on a complex matrix of these interacting factors, which in turn is based on published studies that are mostly from other areas. The functional relationship between habitat sensitivity and impact is based on a sound premise, but one without any empirical support. There are no data on effort and local impacts of non-trawl fisheries. There is also a problem of spatial scale that was noted by the SSC - fishing effort blocks (large scale) vs. habitat patch (EFH polygons – small scale). The SSC’s conclusion was that fishing impacts model is inadequate and should not be used in its present form for risk assessment. Some Panel members were less certain of this conclusion, as long as the results of the model are used in a qualitative, rather than quantitative way. The level of apparent precision given by the models can be misleading, but only if you let it be. The DEIS authors acknowledge the uncertainty in the model and argue that the array of alternatives provides a range from extremely precautionary to risk-prone approaches. As a result of current uncertainty in key parameters, the PMCC Independent Scientific Review Panel believes that an adaptive approach is required whereby the EFH process allows for both closing and re-opening areas to fishing activity.

Pacific Marine Conservation Council
Independent Scientific Review Panel

DR. SELINA HEPPELL is an Assistant Professor in the Department of Fisheries and Wildlife at Oregon State University (OSU). She is also Adjunct Faculty in the OSU Marine Resource Management Program at the College of Oceanic and Atmospheric Science, as well as the Nicholas School of the Environment at Duke University. Selina is a member of the IUCN Marine Turtle Specialist Group (sea turtle conservation), the Willamette-Lower Columbia Technical Recovery Team (listed salmonid recovery planning), and the Environmental Quality Committee of the American Society of Ichthyologists and Herpetologists (fish conservation). Her expertise is population ecology, marine fisheries ecology, conservation biology, and life history evolution, and her research generally focuses on how populations respond to perturbations. Some current research projects include: comparative life-history analysis of Oregon groundfish, changes in habitat structure and fish communities in de facto marine reserves off the Oregon coast, grouper population dynamics and marine protected area design in Florida, maternal effects on offspring quality and changes in recruitment variability with age of maternal stock, and sea turtle population dynamics in response to management and longline bycatch.

DR. RALPH J. LARSON was born in 1946, and from the age of 4 grew up in southern California. He attended Occidental College, where he met Dr. John S. Stephens, Jr., and was introduced to marine ecology and the biology of fishes. He graduated with departmental honors in 1968. He then attended graduate school at the University of California, Santa Barbara, under the tutelage of Dr. Alfred W. Ebeling, earning his M.A. degree in Biology in 1972, and his Ph.D. degree in 1977. At UCSB, he studied the ecology of kelp-forest fishes, and interspecific competition between two species of kelp-forest rockfishes. He then taught for a year in the Department of Zoology, U. C. Berkeley, was a research Biologist for a year at the New York Ocean Sciences Laboratory, studying larval fish ecology, and then spent a year assessing the effects of the San Onofre nuclear power plant on fishes. He was appointed an Assistant Professor of Biology at San Francisco State University in 1980, and has spent the remainder of his career at that institution. He has taught courses in ecology, biology of fishes, fisheries biology, biological oceanography, biogeography, general zoology, and general biology, and has supervised the Master's thesis research of nearly 40 students. He also spent 2 ½ years working on leave with the National Marine Fisheries Service, studying the ecology of pelagic juvenile rockfishes. He and his students have studied life history of rockfishes, the ecology of juvenile rockfishes and other species, the genetics of the larval and juvenile stage of fishes, and the effects of climate change on fish communities. He is a Fellow of the California Academy of Sciences, was Chair of the Board of Governors for the Moss Landing Marine Laboratories, was a member of the Master Plan Team for the Marine Life Protection Act in California, and is the President-elect for the Western Society of Naturalists.

DR. LES WATLING received his Ph.D. in Marine Science from the University of Delaware in 1974. He is currently Professor of Oceanography at the University of Maine. He served on the U.S. National Research Council's Committee on Marine Biodiversity and he is a Past President of the Crustacean Society. He also serves on the International Council for the Exploration of the

Sea's Working Group on Benthic Ecology. His research interests have spanned two disparate topics, crustacean taxonomy and phylogeny on the one hand and benthic oceanography on the other. Watling's benthic interests are focused on impacts of humans on benthic environments, with an emphasis on organic enrichment and habitat disruption. Topics investigated in the last few years include the impact of salmon net-pen aquaculture on benthic environments, and the effects of fishing activities on benthic habitats and its consequences for benthic community structure. Most recently he has been the co-sponsor of two symposia dealing with impacts of mobile fishing gear on benthic communities and his research projects have focused on the potential loss of marine biodiversity associated with fishing activities. Much of the current work has been conducted using research submersibles as well as samples taken from surface ships.

DR. DONALD R. GUNDERSON is a Professor in the School of Aquatic and Fishery Science, University of Washington. His research has focused on the biology, population dynamics, and management of groundfish, with nearly 40 years of experience at the University of Washington, the Washington Dept. of Fish and Wildlife, and the National Marine Fisheries Service. Most of his current research is on spatial processes in population dynamics, and habitat utilization by groundfish.

DR. PETER J. AUSTER is the Science Director for the National Undersea Research Center and an Assistant Professor-in-Residence in the Department of Marine Sciences at the University of Connecticut. His research focuses on the ecology and conservation of fishes. He has participated as scientist or chief-scientist on 40 major research cruises and countless day trips in the northwest Atlantic, Gulf of Alaska, Bering Sea, Caribbean Sea, South China Sea, and equatorial Pacific. He also participated in research expeditions to Lake Baikal in Russia and Lakes Victoria and Malawi in the Rift Lake Valley of East Africa.

For the past 20 years, he has conducted studies to define how seafloor landscapes effect the distribution and abundance of fishes, understand the linkages between habitat level processes and population-community dynamics, and develop methods for monitoring habitat integrity. From an applied science perspective, he has focused his attention on the impacts of fishing gear on the environment and developing the scientific basis for using marine protected areas as a conservation tool in outer continental shelf regions.

His basic approach to fieldwork has been to use the same types of techniques underwater that wildlife biologists use on land. That is, making direct underwater observations to study how individual animals react to variations in nature. He has conducted over 1,400 scuba dives, 59 submersible dives (using the Johnson Sea-Link I and II, Delta, Mermaid IV, NR-l, Alvin, and Deepworker 2000), and 360 remotely operated vehicle dives (using Minirover, SeaRover, MaxRover, Phantom, Recon, and Ventana ROVs).

Peter serves on a number of panels and committees that are focused on marine resource management and conservation. He is involved in several outreach initiatives that are targeted at informing the public about marine conservation issues. Most recently, he was awarded a Pew Marine Conservation Fellowship in 1999, the NOAA Environmental Hero Award in 2000, and was named an Ocean Hero by the American Oceans Campaign in 2001.

Chris Miller, Vice President
California Lobster and Trap Fishermen's Association
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(805) 969-3594 cjmiller7@cox.net

May 9, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
C/o Maryann Nickerson
7600 Sand Point Way, NE, Bin C15700
Seattle, WA 98115-0070

RE: Comments on Pacific Coast Essential Fish Habitat Draft EIS

Dear Mr. Lohn,

Our Association represents a small boat fleet of trap fishermen in the California Bight that fish for Spiny Lobster, Crab, Spot Prawn and Nearshore Rock fish with traps. The area of the Santa Barbara Channel and Channel Islands are the focus of my comments.

California Bight Shellfish trap fisheries.
There are several factors that characterize our fisheries in general as being conducted with no detectable impact to the seabed.

1. We fish the perimeters of essential fishery habitat due too the crustaceans we targets foraging behavior we are fishing in sand gravel or mud bottom.
2. Our fisheries have limited entry programs and are conducted seasonally or in very discreet areas they are temporal or spatially limited
3. The traps themselves have evolved to be highly selective by design and placement. The majority of the trapping takes place within state waters with minimum bycatch. A high percentage of that incidental bycatch is released alive. It is composed of nearshore rockfish.
4. The exception is Spot prawn trapping which does take place in federal waters and has had an observer program for the last three years.
5. Our fish-trapping fishery has been restricted by the state based on a data low stock assessment to the point that it is not an economically viable fishery any more.
6. In the Northern Channel Islands where we have the highest diversity of groundfish. This is due to the transition of California and Oregonian biological provinces and the extensive reef systems. In this area we have an extensive MPA system designed as a precautionary buffer that covers well over 30% of the high quality reef inside 25 fathoms. This is really a small-scale EFH no-take MPA system complemented by the existing federal stock rebuilding programs.
7. In reality the extreme weather combined with the extreme and rapid harvest controls have made a large portion of the traditional groundfish fisheries economically unviable for the dominant sport charter fleet and small scale fixed gear rockfish fleet.

8. There has been a natural oceanographic regime shift that has triggered a trend in overall kelp canopy regrowth and successful rockfish recruitment as this is documented by our MPA monitoring program. These favorable conditions for recruitment are now supported by very strict harvest control in both catch limits and spatial management that restricts gear and harvest by area.

General Comments on Draft EIS.

We believe that the document needs to provide a better framework for regional assessment of fishery habitats in connection to the fishing ports as economic units that are characterized by diversity of fishing enterprise. The most significant omission is that there does not seem to be a human dimension to what is essential fishery habitat.
That would be the area that is essential to maintaining harvest and the working fishing port as a Cultural Resource for the Coastal Communities. There should be a defined alternative for insuring the fishing heritage of each port by adaptively managing the fisheries with experimental zonal harvest policies conducted with no-take representative habitat heritage reserves as monitoring control sites.

The key elements of this would be

1. Creating a policy for expanding the federal observer programs into fishing for data programs that develop a scientific protocol for incorporating research into traditional fishing practice.
2. Developing regional GIS support by expanding the NMFS port liaison program to directed fishery and habitat mapping
3. Regional development of joint fishery and scientists survey design forum supported by NOAA fisheries labs and the above geo-referenced mapping project.
4. Social and economic profiles of the ports and the spatial documentation of harvest control as baseline for EFH assessment.
5. A variety of monitoring programs by scale and region to calibrate monitoring of stock rebuilding objectives by area. Focusing the development of a representative sample of habitat and fishing as a bio-economic model for the various bioregions habitat types.
6. Achievable monitoring that has realistic goals so we will not be subject to more lawsuits.
7. Modeling of EFH experimental harvest policies with real stock data to quantify scenarios that would mitigate mandatory stock rebuilding timelines with an exponential level of precaution Harvest and habitat control.

Comments on California Bight Spatial Management.

As a commercial fisherman fishing in the California Bight we have witnessed the ad-hoc nature of spatial closures initiated in the California Bight. We recommend building adaptive management of the California Bight as a management unit for planning habitat quality based MPA systems. Restricting harvest by habitat is essentially creating a MPA.

We recommend an alternative reconfiguring the CINMS reserves taking into account the cumulative harvest control and fleet reduction in our region. That creates a monitoring reserve as a federal addition to CINMS through the council process adding slope fisheries.

This would be followed by adjusting the Existing Cow Cod Closure to open area for slope fisheries and creating a more scientifically based MPA network spatially designed by habitats that are high quality diversity areas.

This process would form the analytic basis for coordinating the federal and state MPA design to provide as a framework for adaptive harvest policy based in regulatory flexibility spatially utilizing the California Bight as an experimental regional management unit on a scale for habitat based community based spatial management systems.

We still do not have a definitive spatial baseline of cumulative spatial harvest control to address a monitoring plan design. The DEIS alternatives for monitoring cannot be adequately analyzed with out the definition of a baseline in habitat protection.

We provide attachments design examples in GIS image files.

1. Joint Scientist Fishery Straw-man designs for CINMS reconfiguration
2. Industry supported reconfigurations with state zoning changes for specific reserves from no-take to MPA status.
3. Ground fish Habitat maps and value distribution surveys from CINMS process

Habitats of particular concern.

The DEIS supports an alternative of Surf Grass habitat as essential fishery habitat. This habitat is protected by the California State Water Quality Control board under the Coastal management act. The primary threat to this habitat is from sedimentation of nearshore low relief reefs associated with dredging and the developing reliance of coastal property owners on opportunistic beech replenishment programs. We support the need for comprehensive mapping of surf grass habitats in regions where beech replenishment programs are being initiated by coastal city governments. It is critical to be able to assess cumulative impacts from coastal beech replenishment permits and a monitoring program to insure minimum impacts of these programs to surf grass.

Our organization is very willing to work with NMFS in the development of proposals to assist in funding habitat analysis and the development of infrastructure for a collaborative process with NMFS and the Pacific Fisheries Management Council. We recommend initiating a pilot regional strategic plan for habitat mapping in the California bight under a partnership with NMFS and Sea Grant Fisheries extension. This should be conducted in collaboration with support from local academic institutions such as the Bren School of Ecology and Management at UCSB Santa Barbara, the Channel Islands State College at Camarillo and the NOAA fisheries labs.

We request that the Northwest region designate a point person to serve as liaison to our organization and the NMFS Southwest region to insure we have the best level of communication possible on developing the EFH analysis for our area over the next year. We would like to maximize our ability to assist in this process

Sincerely

Chris Miller VP CLTFA

Southern California Trawlers Association

6 Harbor Way, Box 101, Santa Barbara, CA 93109

May 16, 2005

RECEIVED
MAY 20 2005
PFMC

RE: ERROR CORRECTION, COMMENT LETTER ON EFH DEIS

To whom it may concern:

On May 4, 2005, our Association sent a letter to Dr. Robert Lohn regarding our comments on the Draft EIS on Essential Fish Habitat currently under review. Unfortunately, due to the large volume of information we had to review in a very short time frame, we inaccurately described one of the alternatives to minimize fishing impacts on EFH.

Alternative C.10, described in Chapter 2 of the DEIS, involves the Nature Conservancy's alternative to work with fishermen to come up with areas closed to trawling in the central coast. Figure 2-27 illustrates an area from above Monterey Bay to Pt. Conception and out to at least 200 meter depth. The figure was captioned "no-trawl zones" and the text was not specific in detail other than to say that the Conservancy would work with fishermen to come up with no-trawl zones.

We erroneously concluded that the entire area, including all of Monterey Bay, was proposed to be closed to trawling, due to our reading of the text and figure. We understand now that that is not the stated intent of the Nature Conservancy proposal represented by Alternative C.10.

Please strike the words "...and the Nature Conservancy Alternative both..." from line 2 of the paragraph on page 4 of our letter that is headed "Monterey Bay." Thank you for making this correction to our comments on the EFH DEIS.

Sincerely,

Mike McCorkle

Mike McCorkle,
President

CARE

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Oceanic and Atmospheric Administration
7600 Sand Point Way, NE, Building 1
Seattle WA 98115-0700

Re: Comments on 2005 Draft EIS for Pacific Coast Groundfish Essential Fish Habitat

Dear Mr. Lohn:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Essential Fish Habitat Designation for the Pacific Coast Groundfish Fishery Management Plan. This letter contains comments on the DEIS from the California Artificial Reef Enhancement Program (CARE). CARE is a nonprofit organization which, through public education and scientific research, promotes awareness and understanding of the potential value to be derived from artificial reef ecosystems in offshore California, and supports the preservation and enhancement of artificial reefs when recognized as beneficial to the marine environment.

As stated in our comments submitted on October 5, 2004, CARE supports the designation of the oil and gas platforms offshore of southern California as “Habitat Areas of Particular Concern” (HAPC) under the Magnuson-Stevens Fishery Conservation and Management Act. For the reasons stated in our previous comments and in these comments, we believe that Alternative B.8 in the DEIS, which would designate the oil and gas platforms off of the California coast as Habitat Areas of Particular Concern (HAPC), should be adopted as part of the comprehensive strategy to conserve and enhance essential fish habitat for fish species managed under the Pacific Coast Groundfish Fishery Management Plan. With these comments, we are providing additional scientific information that should be included and evaluated in the Final EIS for the purpose of selecting the final preferred alternative. Please contact me at (805) 320-8456 if you have any questions or would like any further information that CARE may be able to provide.

Sincerely,

George Steinbach

George Steinbach
Executive Director

May 11, 2005

Comments of CARE on the February 2005
Draft EIS for Pacific Coast Groundfish EFH

General Comments:

General Comment 1:

CARE supports Alternative B.8 in the Draft Environmental Impact Statement ("DEIS"), the designation of oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" ("HAPC") under the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act"). The information submitted with these comments and with our comments dated October 5, 2004 strongly supports this designation.

General Comment 2:

In these comments, we use the term "platform reefs" to refer to the valuable groundfish habitat that oil and gas platforms provide. This term is meant to emphasize that scientific research demonstrates that the underwater portions of oil and gas platforms serve as de facto reef habitat. In addition, the term emphasizes that only the underwater portion of the platform is relevant to the discussion of groundfish Essential Fish Habitat ("EFH") and HAPC. We use "platform reefs" to emphasize the need for decision-makers to consider the habitat value of the underwater portion of the platform structure, and that both future groundfish fishery management and platform decommissioning decisions should consider their potential impact on the habitat that the platform reefs provide.

General Comment 3:

As the DEIS notes (p. 4-12), designation of HAPC "may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPCs." With respect to Alternative B.8, the DEIS (p. 4-13) acknowledges that: "Designation of the areas surrounding oil platforms would enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed" on decommissioning. For these reasons, a careful, thorough and balanced analysis of potential positive and negative consequences associated with this alternative is essential to enable decision-makers to make informed decisions among the alternatives. However, the DEIS does not contain such an analysis. The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8 based on the information discussed in these comments.

General Comment 4:

The discussion of environmental consequences for the proposed preferred alternative and other alternatives addresses the protection of habitat for groundfish species and includes conservative assumptions that habitat used by groundfish has positive value.[1] By contrast, the analysis of Alternative B.8 on p. 4-13 states only that: "One view holds that scientific research indicating an abundance of fish species located near oil rig platforms is a benefit to the ecosystem." No citations are given and the unidentified "scientific research" is not described at all beyond that single summary sentence. The remainder of the discussion consists of arguments against the designation of platform reefs as HAPC, based on one outdated citation and unsupported speculation cited as "personal communications" (as discussed in specific comments below). We are very disappointed with the lack of attention in the "Environmental Consequences" analysis to the scientific evidence supporting the important ecological role of platform reefs and the need for their protection. This one-sided presentation does not provide decision-makers or the public with the information necessary to make an informed comparison among alternatives. The Final EIS must be revised to take into account the information presented in our prior comments and in these comments in order to present an unbiased basis for decision-making.

General Comment 5:

Some information on groundfish populations at platform reefs is described under the heading of "Alternatives" (DEIS, p. 2-10) and "Affected Environment" (DEIS, pp. 3-8 – 3-10). However, this information is disregarded — and is not even cross-referenced — in the "Environmental Consequences" analysis (DEIS, p. 4-13). With all respect to those who read this large document and attempt to digest and utilize the massive amount of information it contains, inclusion of this material in the "Alternatives" and "Affected Environment" sections is not an adequate substitute for full and fair consideration of this information in the evaluation of environmental consequences as required by the National Environmental Policy Act ("NEPA").

General Comment 6:

EFH decisions must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). On that point, it is critical to note that ***the designation of platform reefs as HAPC will not have any adverse environmental consequences***. Rather, as the DEIS itself acknowledges, this designation would "enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed." (DEIS, p. 4-13) Whatever scientific uncertainties may yet remain can be considered when NMFS consults regarding decommissioning plans for particular platforms. CARE believes that the increasing accumulation of evidence clearly supports the benefits of platform reefs. Nevertheless, should substantive scientific evidence be presented to document the speculative suggestions raised in the DEIS (*id.*), that evidence can be taken into account in the EFH consultation process. The HAPC designation itself would not prevent NMFS from conducting a thorough evaluation of each decommissioning proposal in order to minimize any adverse consequences. On the other hand, once the structures are removed, NMFS will have no opportunity for further evaluation because the platform reef habitat and thriving ecological communities will be destroyed. Moreover, since the removal of oil and gas platforms is typically

[1] For example, see DEIS pp 4-3 ("Each alternative is analyzed for the extent to which it protects habitat for individual species/life stages of groundfish") and 4-4 ("in the absence of definitive research, the analysis concludes that it is beneficial to protect some portion of each habitat type. . .") .

carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000.) As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003.) Yet the DEIS entirely ignores this issue. The cursory analysis presented of environmental consequences on p. 4-13 is wholly inadequate in failing to take into account the "one-way" nature of those consequences: If HAPC designation indirectly leads to any adverse consequences from the presence of the platform reefs, those consequences can be addressed in future decisions. If lack of HAPC designation indirectly leads to adverse consequences from elimination of the platform reefs, they and their existing groundfish populations cannot be restored.

General Comment 7:

In addition, the information submitted with our prior comments and these comments supports the decision not to select Alternative A.6, the most geographically restricted EFH designation, as the final preferred alternative. Were Alternative A.6 to be adopted, some platform reefs would be excluded from the area designated as EFH. In that event, the substantial existing groundfish populations at those platform reefs would be deprived of the benefits of the overall EFH conservation strategy, as well as the protection of the EFH consultation process in future decisions regarding the decommissioning of the platforms. In addition, such exclusion would necessarily preclude designating excluded platform reefs as HAPC. The Final EIS should acknowledge and evaluate these environmental consequences of Alternative A.6. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain EFH status for platform reefs that are outside the current range of Alternative A.6.

Specific Comments

1. DEIS, pp. i, 1-3

The DEIS states that: "*The purpose of the proposed action* is: first, to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions; …" In order to fulfill this purpose, the DEIS must provide the Pacific Fisheries Management Council ("Council") and National Marine Fisheries Service ("NMFS") with all of the available scientific information regarding the habitat value of platform reefs. The duty to consider all available scientific information is enshrined in NEPA and in the Magnuson-Stevens Act. An EIS must "provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 CFR § 1502.1. Fishery Management Plans ("FMPs") must demonstrate that "the best available scientific information was used in the description and identification of EFH." 50 CFR § 600.815(a)(1)(ii). In addition, Fishery Management Councils are directed to "interpret this information in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." *Id.* at § 600.815(a)(1)(iv). The one-sided discussion on DEIS p. 4-13 fails to achieve this purpose.

2. DEIS, pp. i to ii, 1-3

The DEIS states that "the Council and NMFS have not had the tools to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decisionmaking. . . . *An overriding problem has been the challenge of managing fisheries with limited scientific data.* This increases the risk that decisions exacerbate the kinds of fishery- and stock-related problems just identified" (emphasis added). Thus, the DEIS recognizes the risk inherent in managing the Pacific groundfish fishery with limited data, and relies on conservative assumptions throughout the document to address this uncertainty. This approach is consistent with the requirement that identification of EFH must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and that this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). The document fails to take this approach in only one case – the analysis of alternative B.8. In that case alone, the "lack of conclusive research" is cited as an objection to HAPC designation (DEIS, p. 4-13). On the contrary, under the risk-averse analytical approach used in the rest of the document and required by EFH regulations, any scientific uncertainties should be a basis for conservative assumptions in favor of protecting platform reefs that provide existing habitat utilized by groundfish species.

3. DEIS, p. 2-1

The DEIS states that:

> In order to satisfy this requirement [to identify a preferred alternative or alternatives] in a way that fosters public input and informed decisionmaking, the Council chose preliminary preferred alternatives for EFH identification and description, HAPCs, and fishing impact minimization measures at their November 2004 meeting. They explicitly construed this choice as preliminary—they intend to revisit their decision at the June 2005 meeting, after the public comment on the DEIS has been received, to further refine their choice of a comprehensive preferred alternative. After the June 2005 Council meeting, NMFS will publish a final EIS (FEIS), which will identify these final preferred alternatives.

The DEIS does not explain why certain alternatives were designated as preferred. The Final EIS must describe the criteria used to identify preferred alternatives and must explain how the final preferred alternatives meet the criteria, as well as why rejected alternatives are rejected As noted above, one criterion that should be used to identify preferred alternatives is to interpret the best scientific available information "in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." 50 CFR § 600.815(a)(1)(iv).

4. DEIS, p. 2-1

During the November 2004 Council meeting, Council members raised some concerns which appeared to bear on the decision whether to designate Alternative B.8 as a preferred alternative. To the extent that those concerns may be considered in evaluating the alternative, they should be disclosed to the public readers of the EIS and addressed in its analysis. First, a concern was raised by one Council member about the "questionable motives" of those who advocate designating platform reefs as HAPC. It is unclear what motives the Council member was referring to. As a general matter, however, the Magnuson-Stevens Act balances a variety of interests, including commercial, recreational and environmental interests, in the management of U.S. fisheries. Commenters are entitled to present their views in order to inform fisheries management decisions and the analysis of environmental consequences. Moreover, under NEPA, the "motives" of any commenter on an EIS are irrelevant. The only relevant issue is whether a suggested course of action conserves and enhances EFH and assists in the recovery of fish populations.

5. DEIS, p. 2-1

Second, concerns were raised during the Council meeting that designating platform reefs as HAPC would set a precedent that would allow discarded articles, such as furniture, oil cans and sunken boats to be left in the ocean as artificial reefs. This is not the case. In the past, some artificial reef projects may have been used to justify solid waste disposal with harmful environmental consequences. However, such actions would not be permissible today under the extensive laws and regulations that govern the construction, siting and placement of artificial reefs. Congress passed the National Fishing Enhancement Act ("NFEA") (33 U.S.C. §§ 2101 *et seq.*) in 1984. The NFEA established national standards for artificial reef development, one of which is to "minimize environmental risks and risks to personal health and property." *Id.* at § 2102(4). The NFEA directed NOAA to create a National Artificial Reef Plan ("NARP") (*id.* at § 2103) and authorized the U.S. Army Corps of Engineers ("Corps") to issue permits for artificial reefs (*id*. at § 2104; *see also* 33 CFR § 322.5(b)). The NARP and the Corps' regulations establish guidelines for siting, materials, design, construction, management and liability, among others. In particular, the NARP provides that materials proposed for artificial reefs must be of proven stable design. Furthermore, the proposed revision of the NARP (Feb. 2002) states that secondary use materials that have generally been found to be unsuitable artificial reef materials include light vehicle bodies, fiberglass boats and boat molds and light gauge metal items such as refrigerators, washing machines, and clothes dryers. Both of these guidelines would prohibit designating discarded junk as artificial reefs. Moreover, state and federal natural resource agencies, the Council, NMFS, and the public all participate in the artificial reef permitting process, which ensures that only appropriate materials will be utilized. Finally, artificial reef permits issued by the Corps are subject to environmental review under NEPA, which further ensures that the concerns about the suitability of a particular material will be addressed.[2]

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[2] California also has an artificial reef program. Cal. Fish & Game Code §§ 6420-6425. Under California's program, the Department of Fish and Game has authority over the design, placement and monitoring of artificial reefs within state waters. Approximately 34 artificial reefs have been constructed along the California coast under

6. DEIS, p. 2-1

A third concern raised during the Council's consideration of Alternative B.8 was whether "man-made" habitat should be preferred over "natural" habitat in EFH and HAPC designations. The EFH regulations do not draw this distinction. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 50 CFR § 600.10. Substrate "includes sediment, hard bottom, **structures underlying the waters**, and associated biological communities." *Id.* (emphasis added). "Structures underlying the waters" means artificial (i.e., man-made) structures. NMFS added artificial structures to the definition of substrate in 1997. *See* Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 62 Fed. Reg. 66531 (Dec. 19, 1997) (interim final rule). In response to commenters that objected to the inclusion of artificial structures in the definition of substrate, NMFS stated that it:

> included "structures underlying the waters" in its interpretation of substrate to clarify that structures such as artificial reefs, jetties and shipwrecks may be considered EFH if they provide essential habitat for a managed species.

Id. at 66534. In 2002, when NMFS revised the EFH regulations, similar objections regarding the inclusion of artificial structures in the definition of EFH were raised, to which NMFS responded that it was "not modifying the interpretation of 'substrate' to exclude human made structures, because in some cases such structures can provide valuable habitat for managed species." Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 67 Fed. Reg. 2343, 2347 (Jan. 17, 2002) (preamble to final rule). Accordingly, NMFS has made it clear that artificial structures qualify as EFH. Nothing in the definition of HAPC is to the contrary. To the extent that the habitat characteristics of platform reefs qualify them as HAPC, the fact that they are artificial in origin must be considered irrelevant. Conversely, to reject platform reefs as HAPC for the reason that they are artificial would be inconsistent with the EFH regulations and the purposes of the Magnuson-Stevens Act. If the Council finds it necessary to prioritize, it should place the highest priority on those alternatives with the highest probability of achieving the fisheries management goals of the Act.

7. DEIS, p. iv, 2-6

It appears, based on Figure 2-6, that Alternative A.6, which would identify EFH as the upper 30 percent of the area where the Habitat Suitability Probability ("HSP") is greater than zero for all species, would exclude some of the 27 platform reefs off the California coast from the EFH area. However, there is not enough information in the text of the DEIS or in Figure 2-6 to determine whether or which platform reefs may be excluded from the area identified as EFH under Alternative A.6. In order to fully inform the decisionmakers and the public of the alternatives being considered, the DEIS should clearly state which platform reefs would be included in and excluded from the area identified as EFH under Alternative A.6. If the result of Alternative A.6 would be to eliminate some platform reefs from the EFH category – some of which support dense populations of groundfish as even the DEIS acknowledges (pp. 2-10, 3-8 to 3-10) – this

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the state program. Some of these artificial reefs were built before the NARP was adopted, however the recently constructed artificial reefs were built in accordance with NARP guidelines.

consequence should be recognized in the DEIS analysis as an adverse environmental consequence of Alternative A.6.

For this reason, as noted above, CARE urges that Alternative A.6 should not be adopted in its present form. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain platform reefs as EFH that are outside the current range of Alternative A.6.

8. DEIS, p. 2-10.

In the description of Alternative B.8, the DEIS notes that: “High concentrations of groundfish have been observed in association with many of the platforms off the California coast, including overfished species such as bocaccio and cowcod.” For this reason, and as discussed below, identifying platform reefs as EFH and designating them as HAPC should be part of the comprehensive strategy to conserve and enhance EFH.

9. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS states that: “In addition to providing suitable habitat, most of these structures are not fished and act as de facto reserves.” The scientific literature cited in Chapter 3 of the DEIS that supports this statement has been confirmed by more recent research. Love et al. (2003) (Exhibit 1) found that fishing pressure around most platforms has been minimal, in part due to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. The same fact is documented by the U.S. Environmental Protection Agency (“USEPA”) Essential Fish Habitat Assessment for NPDES Permit No. CA 2800000 (2000, pp. 5-2 to 5-3) (Exhibit 2). Further, the physical structure of oil platforms significantly restricts the use of both commercial and recreational gear to fish the resident fish populations.

10. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS briefly acknowledges that: “The platforms rise steeply from the bottom and provide unique high relief habitat.” The “uniqueness” of the platform reef habitat should be emphasized, given that “rarity of the habitat type” is one of the factors to be considered in designating HAPC. 50 CFR § 600.815(a)(8)(iv). As the DEIS acknowledges, the latticework of footers and crossbars that comprise the underwater features of platform reefs provide unique high relief habitat. Pinnacle reefs are the only natural formations that provide a similar type of high relief habitat. However, natural pinnacle reefs are very rare off of the California coast, with only one such reef located in the Santa Barbara Channel (Love, personal communication). The DEIS (p. 3-9) also notes that pinnacles are only found on the outer continental shelf, well away from the mainland. Consequently, the majority of this rare type of habitat is provided by platform reefs. In addition, as discussed in these comments, platform reefs provide hard bottom habitat that is rare in the areas in which the platform reefs are located. These facts must be considered in evaluating the environmental consequences of designating platform reefs as HAPC and provide support for the environmental benefits of Alternative B.8.

11. DEIS, p. 2-10

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(i), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(i) provides that one criterion for designating HAPC is the importance of the ecological function provided by the habitat. The DEIS correctly notes on page 2-10 that high concentrations of groundfish species, including overfished bocaccio and cowcod, have been observed associated with many platform reefs. However, this brief statement fails to adequately address and inform the reader of the variety and importance of the ecological functions that platform reefs provide. As discussed in section 3.2.2.2.4 of the DEIS (pp. 3-8 to 3-10) and in the additional scientific information discussed and cited in these comments:

- (i) platform reefs provide habitat for different life stages of rockfish (i.e., larvae, juveniles, adults) (Love 2000) (Exhibit 3), (Love 2001) (Exhibit 4), (Love 2003), (Love 2005) (Exhibit 5);
- (ii) different life stages of the same species inhabit different depths along the platform reef (i.e., adults inhabit the deep waters and juveniles inhabit the midwaters), thereby reducing predation by adults on juveniles (Love 2003);
- (iii) platform reefs create hard bottom habitat (via the lattice-work of legs and cross members) in areas that are primarily soft bottom habitat (Love 2003);
- (iv) each platform reef creates a variety of habitat (again, via the lattice-work of legs and cross members) (Love 2003);
- (v) because platform reefs have more adults in higher densities than natural reefs, they produce a disproportionate share of larvae in the region (Love 2003; Love 2005);
- (vi) platform reefs recruit larval fish, which grow into juveniles that live in the midwaters and are found in greater densities than at natural reefs (Love 2003; Love 2005);
- (vii) platform reefs recruit larval fish that would otherwise have perished in the absence of the platform reef (Love 2005);
- (viii) juveniles living at platform reefs may grow to adulthood and remain there throughout their lives (Love 2003); and
- (ix) a survey of six platform reefs revealed that approximately 20 percent of all bocaccio young-of-the-year in the Pacific Coast Groundfish fishery are found there (Love 2005).

Clearly, the platform reefs provide important ecological functions that must be addressed in the environmental consequences analysis of the Final EIS, and provide support for the environmental benefits of Alternative B.8.

12. DEIS, p. 2-10.

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(iii), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(iii) provides that another criterion for designating HAPC is whether and to what extent development activities are, or will be, stressing the habitat type. The brief discussion on page 2-10 of the DEIS does not mention the fact that the current platform decommissioning regulations require complete removal of the platforms. However, as the DEIS correctly notes in section 4.3.3 (p. 4-13), "Oil platforms are subject to removal from the ocean as they are decommissioned." In fact, Gebauer et al. (2004) (Exhibit 6) estimates that removal of the oil platforms located in federal waters along the California coast will begin in 2010 and be completed by 2025. Complete removal of the oil and gas platforms will eliminate the groundfish habitat that the underwater platform reef portions provide. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(iii).

13. DEIS, p. 2-10

The Final EIS should also explain that Alternative B.8 is consistent with the HAPC criterion in 50 CFR § 600.815(a)(8)(ii) ("The extent to which the habitat is sensitive to human-induced environmental degradation"). The habitat created by the platform reefs off of the coast of California is dependent on the platforms' presence and subject to elimination if they are removed under platform decommissioning regulations. As such, the platform reefs are sensitive to human-induced environmental degradation by removal of the structures. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(ii).

14. DEIS, p. 3-8

The DEIS states that: "Managed species known to use offshore artificial structures include black rockfish, black-and-yellow rockfish, blue rockfish, bocaccio, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, copper rockfish, cowcod, darkblotched rockfish, flag rockfish, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, kelp rockfish, leopard shark, Mexican rockfish, olive rockfish, quillback rockfish, rosy rockfish, sharpchin rockfish, starry rockfish, stripetail rockfish, treefish, vermilion rockfish, yelloweye rockfish, and yellowtail rockfish."

This list of 31 managed species understates the number of rockfish that use platform reefs as habitat. Based on annual surveys dating back to 1995, 42 species of rockfish have been identified as living around platform reefs. (Love et al. 2003; M. Love, personal communication.) The DEIS's understatement of the number of managed species that utilize platform reefs as habitat reflects the failure to rely on the best available scientific information on the habitat value of platform reefs.

15. DEIS, p. 3-8

The DEIS's discussion of the habitat value of platform reefs is based exclusively on *The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California* (OCS Study MMS 99-0015) ("1999 MMS Report").[3] Several important scientific studies of the habitat value provided by platform reefs located off of California have

[3] The 1999 MMS Report is not listed as a reference in Chapter 10, "Literature Cited." It should be added.

been published since the 1999 MMS Report, including: Love et al. (1999) (Exhibit 7); Love et al. (2000); Love et al. (2001); Love et al. (2003). In addition, Love (2005) summarizes several articles that are based on his latest research, which have been submitted for publication in scientific journals.

In particular, in September 2004, Love (2005) surveyed the largest number of platform reefs since 1999. Love conducted complete surveys of platforms Irene, Hidalgo, Harvest, Hermosa, Hondo (first time), Heritage (first time), Holly, Gail, Grace, and Gilda. In addition, Love conducted midwater surveys at platforms C, B, A, Hillhouse, Henry, and Habitat (complete surveys were hindered due to poor water visibility). Love also surveyed a number of natural reefs (some first mapped in spring 2004) in the Santa Barbara Channel and around the northern Channel Islands. Love's research confirms that many platform reefs harbor higher densities of both juvenile and adult fishes than do most natural reefs. Moreover, new seafloor maps produced in 2004 by the U.S. Geological Survey demonstrate that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. These studies corroborate the 1999 MMS Study and provide important additional evidence that platform reefs provide EFH for rockfish, and that platform reefs should be designated as HAPC. Love's research continues to demonstrate the importance of the Santa Barbara Channel platform reefs as providers of habitat for reef fishes. The DEIS again fails to present the best available scientific information on pp. 3-8 to 3-10, and disregards the breadth and depth of this research in concluding that there is a "lack of conclusive research regarding these issues specifically for the West Coast. . ." (p. 4-13).

16. DEIS, p. 4-13

The DEIS states that:

> One view holds that scientific research indicating an abundance of fish species located at oil rig platforms is a benefit to the ecosystem. Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications).

The citation of Holbrook et al. (2000) is out of date. More recent research has addressed a number of the uncertainties that existed at the time that the Holbrook paper was written. The Final EIS must present a more up-to-date and accurate picture of the available scientific evidence. Moreover, the manner in which the DEIS frames the issue — i.e., platform reefs either increase fish productivity **<u>or</u>** attract fish populations away from natural reef systems — misleads the public and decisionmakers. Current research (summarized in the following comment) demonstrates that platform reefs have both effects — i.e., that platform reefs are important habitat for rockfish and function just as natural reefs do, in that they both produce and attract fish depending on species, site, season and ocean conditions. The DEIS, relying on the outdated reference to Holbrook et al., wholly fails to take into account these crucial findings in discussing the environmental consequences of Alternative B.8.

17. DEIS, p. 4-13

The Final EIS must consider the following current research results:

17(a). Love et al. (2003) found young-of-the-year rockfishes around platform reefs and around natural outcrops. His research indicated that the recruitment of juvenile fishes to platform reefs that are far from shore or in deep waters, such as Platforms Gail and Grace, is from maternal sources rather than attraction from natural outcrops. Platform reefs located nearer to shore or in shallow waters may attract juveniles from natural habitats because these platform reefs are located in areas in which it is relatively easier for juveniles to move between habitats. However, the converse is also true: juveniles may be attracted from platform reefs to natural habitats. One important difference, however, is the higher densities of young-of-the-year rockfishes found at platform reefs. Love et al. (2003) concluded that platform reefs provide a more optimal habitat than found on natural outcrops, making platform reefs functionally more important as nurseries.

17(b). Love et al. (2003) also found adult rockfishes around platform reefs and around natural outcrops. As with juveniles, adult rockfish found at platform reefs located far offshore or in deep waters likely arrived through recruitment rather than attraction. This research suggests that rockfishes may live their entire benthic lives around a single platform reef. Thus, the adult rockfishes at platform reefs result from maturation of resident fish rather than through the attraction of adults from natural outcrops. One important difference, however, is the higher densities of adult rockfishes found at platform reefs. The difference is so pronounced that, in some locations, platform reefs provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production. (Love et al., 2003).

17(c). More recent research on the growth rate of young blue rockfish living around platform reefs demonstrates that they grow faster than fishes living around natural reefs in the same area (Love, 2005). Related research by Love (2005) indicates that platform reefs are more important producers of bocaccio and cowcod larva than natural habitat. Love's research demonstrates that mean densities for both species are higher at platform reefs than at natural reefs, and in some cases, the adult fishes at platform reefs are larger than those found at natural reefs. In particular, Platform Gail had the highest densities of mature bocaccio and cowcod of any natural or man-made habitat surveyed. Thus, the potential larval production at Platform Gail was much higher than any other site surveyed. Love estimated that for bocaccio one hectare of sea floor at that platform reef was equivalent to 68 hectares at an average natural reef, and for cowcod one platform reef hectare was equivalent to 26 hectares at an average natural reef.

17(d). Love (2005) also found that the number of juvenile bocaccio found around six platforms in the Santa Barbara Channel constituted 20 percent of the average number of juvenile bocaccio that survive in a year for the species' entire range. He determined that, when adults, these bocaccio will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. His research demonstrates that, although platform reefs provide a relatively small amount of habitat area, this habitat can be crucial for rebuilding an overfished species.

17(e). Furthermore, recent research by Love (2005) indicates that platform reefs recruit larva that would not have survived were the platform reefs not there. By simulating surface currents in 1999 and 2002 originating at Platform Irene to model juvenile bocaccio distribution patterns, Love estimated the proportion of fish recruited to a platform reef that would have arrived at natural juvenile fish habitat in the absence of the platform. Love's results indicated that that seven percent and 23 percent, respectively, of young bocaccio would have survived to reach natural nursery habitat. In other words, the vast majority of young bocaccio would not have survived if they had been unable to settle on the platform reef during the recruitment season.

17(f). The research discussed above demonstrates that platform reefs perform much like natural outcrops, in that both produce and attract rockfishes. However, there is a difference in scale favoring platform reefs, which indicates that some platform reefs are important to regional rockfish production. (Love et al., 2003; Love, 2005.) This ecological role is of significant value especially to the recovery of the many overfished rockfish species that populate the platform reefs, such as bocaccio and cowcod.

17(g) Removal of oil and gas platforms is typically carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000) (Exhibit 8). As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003; Love 2005.)

In sum, the uncertainty as to the habitat value of platform reefs discussed in Holbrook (2000) has been rebutted by more recent research. Given the directive by the EFH regulations to interpret the best available scientific information in a risk-averse manner (50 CFR § 600.815(a)(1)(i) & (iv)), the Final EIS should rely on the most up-to-date research in order to evaluate environmental consequences, and should consider each of the above findings.

18. DEIS, p. 4-13

The DEIS states that: "Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications)." The sources of these personal communications are identified in the "Literature Cited" section (DEIS p. 10-3) as Warner Chabot, affiliated with the Ocean Conservancy, and Richard Charter, affiliated with Environmental Defense. It appears that these personal communications relied solely on Holbrook (2000) which, as explained above, is out of date, to support their assertions. To the extent that the Final EIS relies on these personal communications, it should explain the qualifications of the persons cited and identify any supporting evidence for their statements.

19. DEIS, p. 4-13

The DEIS states that: "Other noted drawbacks to oil platforms HAPC designation include avoidance of returning the area under and around the platform to natural habitat that provide hiding places for rockfish, the potential for these sites to attract increased effort by fishermen and increased predators resulting in increased net mortality, and the potential for the oil platforms to be a hazard to navigation (Charter 2004, personal communication). No scientific evidence is cited as a basis for these assertions, which appear to be unsupported speculations. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement.

20. DEIS, p. 4-13

The speculation that HAPC designation would prevent the restoration of soft-bottom hiding places for rockfish is contradicted by the best available scientific evidence. The soft-bottom habitat under and around the platform reefs is virtually devoid of hiding places. (Love 2005.) The only hiding places that exist are provided by the latticework of beams and cross members that make up the platform reef structure. Moreover, returning the area under and around platform reefs to soft-bottom habitat will require the destruction of existing hiding places and thriving habitat and kill large numbers of the resident fish. (Gitschlag et al., 2000.) The alternative that would enhance hiding places for rockfish is designating platform reefs as HAPC.

21. DEIS, p. 4-13

Regarding the claim that platform reefs could "attract increased effort by fishermen. . . resulting in increased net mortality (DEIS, p. 4-13): As the DEIS acknowledges, and as corroborated by Love (2003) and USEPA (2000), platform reefs are not currently heavily fished and, in fact, act as de facto marine refuges. This is due in part to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. In addition, the physical structure significantly restricts the use of both commercial and recreational fishing gear to fish the resident species. Designation of platform reefs as HAPC will not change the Coast Guard's regulation of navigation near the platform reefs nor will the designation alter the physical structure of platform reefs (i.e., large fishing boats will still find it difficult to navigate near them). Accordingly, designation of platform reefs as HAPC will not result in increased effort by fishermen.

22. DEIS, p. 4-13

Regarding the claim that platform reefs could attract "increased predators resulting in increased net mortality" (DEIS, p. 4-13), available scientific evidence suggests that the predation of young fishes on platform reefs is probably lower than that on natural outcrops. This is due to the fact that platform reefs occupy the entire water column and that the fish assemblages are distributed differently than on most natural outcrops. Natural outcrops in the area of platform reefs are typically 5 to 15 feet in height, putting all fish, both young and adults in close proximity. Adults prey on young fish. On platform reefs, the adult fishes are found near the bottom while young fishes occupy the midwaters. This separation implies lower mortality rates for young fishes residing at platform reefs. (Love 2003.) Further, other natural predators, such as pinnipeds, do not appear to be attracted to platform reefs. (Love 2005, personal communication.) The DEIS identifies no evidence to the contradict these observations.

23. DEIS, p. 4-13

Finally, regarding the claim that platform reefs have "the potential to be a hazard to navigation" (DEIS, p. 4-13), the U.S. Coast Guard is responsible for maritime safety in the navigable waters of the U.S. where the platform reefs are located. It has established requirements for all oil and gas platforms regarding the operation and maintenance of aids to navigation and other measures to insure marine safety. No vessel operator has lodged a formal complaint that any oil and gas platforms off of California created a navigation hazard (Boyes, personal communication). Similarly, no hazard complaints have been lodged by vessel operators regarding oil and gas platforms or artificial reefs in the Gulf of Mexico, where many platforms have been turned into artificial reefs. (Kasprzak 2005, personal communication; Boyes 2005, personal communication.) Mr. Kasprzak (Artificial Reef Coordinator, Louisiana Department of Fish and Wildlife, Baton Rouge, Louisiana) and Mr. Boyes (Waterways Management Officer, U.S. Coast Guard, District Eleven) are well-qualified to attest to these facts. The U.S. Coast Guard's regulatory oversight will not be affected by the designation of these platform reefs as HAPC. Thus, there is no basis to the claim that HAPC designation will cause the platform reefs to become a hazard to navigation or adversely affect marine safety.

24. DEIS, p. 4-13

The DEIS states that:

> Another potential drawback that has been of particular concern in the Gulf of Mexico is the relatively high levels of mercury contamination around oil platforms. The disposal of drilling fluids containing mercury from operational oil rigs has resulted in concerns that mercury levels in fish caught near oil platforms, even years after the oil rig is no longer operational, are substantially higher than those caught elsewhere and could be a hazard to humans (Charter 2004, personal communication).

No scientific evidence is cited as a basis for these assertions. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement. The Department of the Interior, Minerals Management Service ("MMS"), has studied the issue of mercury contamination from drilling muds in the Gulf of Mexico and reached the opposite conclusion. As the MMS states on its website: "While the issue of mercury in seafood in the Gulf of Mexico is the subject of an increasing amount of research particularly because of global and regional inputs, the results of research to date generally supports the conclusion that oil and gas platforms do not play a significant role in elevating levels of mercury in fish and other seafood." (See:

http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html). The MMS bases its conclusion, in part, on the following studies:

> 24(a). In 1995, a study of three OCS oil and gas platforms included the analyses of over 700 sediment samples and over 800 tissue samples from shrimp, crabs, marine worms, clams, fish livers, and fish stomach contents. Results of the analyses documented that total mercury is not concentrated to any greater extent in organisms living near the oil and gas platforms (less than 100 meters away) when compared to those living far away from the oil and gas platforms (over 3000 meters). From these results the scientists concluded that oil and gas platforms do not contribute to higher mercury levels in marine organisms. (Kennicutt, 1996) (Exhibit 9).
>
> 24(b). In 2002, a total of 196 sediment samples were taken from six drilling sites in the Gulf of Mexico and analyzed to determine if methyl mercury (MeHg) was being produced in the sediment around drilling platforms. The results showed that concentrations of MeHg in sediments around drilling platforms do not vary significantly with concentrations found at sites that were far from drilling. The report concluded that elevated levels of MeHg around oil and gas platforms are not a widespread phenomenon in the Gulf of Mexico. (Trefry, 2002) (Exhibit 10).
>
> 24(c). The MMS Subcommittee on Mercury in the Gulf of Mexico ("MMS Subcommittee") corroborated these findings. (Creselius et al., 2002) (Exhibit 11). The MMS Subcommittee was established to independently evaluate existing scientific literature on whether OCS oil and gas activities were causing mercury pollution in the Gulf, and provide guidance as to what actions MMS should take. The MMS Subcommittee determined that high levels of total mercury around oil and gas drilling sites was directly correlated with the drilling mud weighting agent barite. However, the increase in sediment concentrations of MeHg at or adjacent to OCS oil and gas drilling sites is not directly attributable to mercury introduced with barite. Further, the MMS Subcommittee determined that the discharges at OCS oil and gas drilling sites do not create conditions that enhance the conversion of mercury to MeHg.
>
> 24(d). An additional study is currently being conducted by the Battelle Marine Sciences Laboratory to determine if barite (the source of mercury in drilling muds) is soluble in the stomach of marine animals and if trace metals are released. Preliminary results indicate that barite is only minimally soluble and that mercury is not bioavailable to marine animals. (Cimato 2005, personal communication.)

Accordingly, the available scientific evidence does not support a high level of concern regarding mercury levels. In order to provide complete and accurate information to the public and decision-makers, each of these studies should be considered in the discussion of mercury issue in the Final EIS.

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Exhibit 2

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Exhibit 3

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Exhibit 4

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Exhibit 5

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Exhibit 7

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Trawl Industry Proposal
For
Groundfish Bottom Trawl Closures
To
Protect Essential Fish Habitat in the Pacific Region

May 24, 2005

Process

In November of 2004, the PFMC selected preliminary preferred alternatives for the Draft EIS for Groundfish EFH. The spectrum of preferred alternatives was extremely broad, ranging from options that would effectively "freeze the footprint" of the trawl fishery to close large areas to trawling. Industry representatives discussed this range of alternatives with members of the Pacific Council, trying to gain insights into the thinking of the Council collectively and the possible final outcome of this process.

Several Council members strongly suggested that the trawl industry should engage in discussions which could lead to the development of an industry proposal that would include suggestions for areas to be closed to future bottom trawling for groundfish.

During March and April of 2005 a series of meetings occurred that involved approximately 50 individuals involved in groundfish trawling along the Pacific Coast. All of the meetings that occurred were open to all participants in the trawl fisheries. At these meetings, trawlers were given a presentation on the background of the EFH issue and a summary of the alternatives that have been developed. The PFMC preferred alternatives were highlighted and explained in greater detail.

The task of developing an industry proposal identifying areas to be closed to bottom trawl fishing was discussed and agreed to by those attending these meetings. It was suggested that a starting point for developing these area should be the areas that were identified in the Oceana proposal (Alternative 12). The coordinates for the Oceana proposal were entered into Nobeltec Visual Mariner, a widely used navigational charting program, and projected on a screen for fishermen to view.

Fishermen were told that they could either: 1) delete areas proposed by Oceana, 2) suggest modifications to the boundaries of the Oceana proposed areas, or 3) suggest entirely new areas that Oceana had not identified. The focus of these discussions was on the more near-shore areas that Oceana had proposed for closure. The trawl fleet had no concern for the off-shore areas around the seamounts. Trawlers examined each area very closely along the entire coast, from northern Washington to Point Conception. Since there has been no, or very little groundfish trawling south of Point Conception, no suggestion were made for that area of the coast. However, the Southern California Trawlers Association was contacted and made aware of the process that was underway. They were invited to provide suggestions for that area of the coast, since they were more familiar with the area. However, no suggestions were received from them.

The use of Nobeltec greatly added in this process. This program is quite flexible, allowing fishermen to zoom in and out of the scaleable charts, as well as to switch between bathometric charts and NOAA navigational charts which present loran-C lines. Thus fishermen were able to identify the exact location of where they would normally fish and see the impact that the proposed closed areas would have upon their fishing activities.

Through this process fishermen strived to minimize the impact upon fishing, while setting aside areas that could be protected from future fishing. Fishermen did not approach this task with the goal of setting aside any particular amount of area in total or an amount of any particular habitat.

Proposal

The industry proposal includes 25 locations from Cape Flattery to Point Conception. As well as the area west of 1000 fathoms (2000 meters) and the area shoreward of the three miles off Washington and California (Figure 1). Below is a listing of the areas and a brief description of the area contained within each. The names associated with each are reflect either a benthic feature such as a reef or some reference point onshore that helps locate the area offshore. The coordinates of the proposed closed areas are listed in Table 1.

In total the Industry proposal would close approximately 183,000 square nautical miles to trawling which would represent closing around 76% of the EEZ to the bottom trawling for groundfish (Table 2). Contained within the Industry proposal are a variety habitat types (Table 3), with a substantial amount of both hard and soft bottom area being set aside from bottom trawl fishing for groundfish, particularly north of Point Conception.

As stated above trawl fishermen were asked to propose areas to be closed based upon their knowledge and using Alternative 12 as a starting point for discussions. Figure 2a and Figure 2b show the location of the areas in the Industry proposal and compare these with the sites originally designated in Alternative 12. In some case the areas are identical while in others the boundaries have been shifted to minimize the impact upon prime fishing locations. This can be seen in Figure 3a and Figure 3b which shows the locations of both the Industry proposal and Alternative 12, with the location of tows that were made by Oregon trawlers. This data does not include those tows made by trawlers that made deliveries in Washington or in California. That data does exist, however, due to staffing and manpower constraints, that information was not available in a form that could be combined into one data set for charting. Given the desire to minimize the impact of closed areas upon the trawl fishery, it is anticipated that the data from the other two States would results in very similar displays of how the areas selected in the Industry proposal avoid areas of intense fishing.

The State of Oregon prepared an analysis across all of the alternatives found in the Draft EIS. Figure 4 presents a comparison of the Catch per Unit of Effort (CPUE) found within each of the areas. Clearly and not unexpectedly the CPUE in the areas of Industry proposal have the lowest rate. The overall economic impact from implementing each proposal the Industry proposal has one of the lowest negative economic impacts of all of the proposals in the Draft EIS (Figure 5).

Proposed closed areas

<u>Olympic:</u> Area of diverse topography containing submarine canyons up to 190 fm in depth, making up part of the larger Juan de Fuca Canyon. There is a large area of soft sediments that is home to juvenile flat fish as well as several large areas of both rough and smooth rock, gravels, and sands, approximately 60 to 90 fm in depth formed by glacial action. The area is surrounded by canyon walls of high relief containing many forests of hard corals as well as dispersed soft corals. Species of interest caught include wolf eels indicative of rocky crevasses

<u>Washington Deep:</u> Main feature is a large ridge of approximately 500 fm in depth at the top dropping off to 750 fm or more on the north and south sides. Additionally, the area substrate is composed of mud, silt, and hard areas of gravel and sand. Some areas contain high relief clay/mud banks. The area is strewn with granite boulders dropped by the Frazer River lobe of the continental glacier. Most interesting habitant is a unique glass coral which grows in a spiral column habit, clear in color except for a live exterior skin, stalk approx 3/4 inch in diameter, grows with a filtering top structure, several feet in length and attached to the bottom by a hold fast. The University of Oregon was sent a specimen 15 years ago since they did not have one. Species include deep water Tanner crab juveniles, red crab, shortspine thornyheads and longspine thornyheads, Dover, sable, and grenadiers,

<u>Willapa:</u> Submarine canyon with rocky shallow areas as well as clay and mud banks on walls of canyons. There are areas of high relief, and both jagged and smooth hard bottom.

<u>Columbia:</u> Deep water canyon between Grays Canyon and Astoria Canyon. The site consists of sedimentary slopes, canyon basins and deep sea rises. The sediment is primarily green mud and is rich in biota. Portions of Willapa Canyon

and Guide Canyon are in the site, as well the area in which they converge to create a larger sea canyon. The inner 1/3 of the area has been fished for Sablefish and Longspine thornyheads. Tanner Crab, Grenadier, Long nose cat shark, deepwater sole, Slick head and Pacific Flat nose are the primary by-catch by the trawl fishery as well as several species of starfish, corals and sponges. Annelid worms and Sea Anemones are also occasionally brought to the surface in this area

Cape Falcon: An offshore ridge comprised of three mountains the largest rising from a depth of around 900 fathoms to a height of 340 fathoms. The site has a rich diversity of bottom types. Rocky canyon-walls on offshore ridges are found in this site have some of the steepest ridge walls found on the west coast. Seabed depressions believed to be caused by methane gas escapement are found in this area, which may create unique aquatic communities. The lower portions of the Astoria Canyon contain a starfish not commonly found elsewhere. Alluvial mud is primary sediment on the seafloor, though the area is known to have glacial boulders as well as sand and gravel patches. A rich mixture of non-commercial species occur is this area.

Cascade Head: The area runs from the beach and out to 40 fathoms. The shape of the area is a large rectangle, although the maps show it as a triangle. The area is sandy bottom near shore and contains three major reefs. These are basalt pinnacles surrounded by sand. Known habitat for juvenile red rock.

Siletz Bay: An area containing a large bowl. The rim of the bowl is around 800 fathoms and the bottom drops to over 1000 fathoms.

Stonewall Banks: South End is jagged basalt, inshore is hard clay boulder patch. North end rough with a few sand slit in the middle.

Heceta Banks: Two major undersea mountains with very jagged rock formations. The area contains a large of amount of habitat for rockfish species.

Coos Bay: This is a large tract of continental slope which begins at around 700 fathoms.

Bandon: A nearshore area of continental shelf which begins on shore and ranges out to around 60 fathoms. The area is rocky nearshore and is sand, gravel, and hard mud offshore.

Rogue River: Depths ranging from 55 to 120 fathom deep. Bottom littered with pinnacles and large ridges that run east to west on the southern end of the area. It is excellent habitat for all of the shelf rockfish species and lingcod. Minimal amount of bottom trawl done in this area do to the high relief.

Rogue River Deep: A large area of continental slope beginning at around 700 fathoms.

Crescent City Deep: A large area of continental slope beginning at around 700 fathoms.

Eel River: This area contains the Eel River Canyon from depths from just over 100 fathoms at the canyon head along the canyon walls seaward to depths of around 1000 fathoms. The area fans out encompassing the alluvial plane. The area contain hard rock bottom through the canyon and soft sediments offshore at the canyon base.

Mendocino Ridge: This area begins with the nearshore rocky habitat roughly between Cape Mendocino and Punta Gorda. It contains two very large and significant marine canyons, Mendocino Canyon and Mattole Canyon. The area continues west bounding the Mendocino Escarpment and fracture zone.

Point Arena: Encompasses a shallow water area on the continental shelf with depths between 55 fathoms and 75 fathoms. The substrate is mixture of areas of clay and sandy bottom with little slope.

Fish Rocks: The area is ranges from continental shelf at 60 fathoms and over the edge on to the continental slope to depths around 300 fathoms. The nearshore substrate is mostly sandy bottom that transitions to rocky areas on the slope. There is a band of various corals running through this area from the northwest to southeast that follows the hard bottoms area.

Cordell Banks: This area surrounds the entire Cordell Bank and includes a large area of continental slope south of the banks, as well as a large area reaching shoreward to 40 fathoms. The bottom type ranges from sandy areas nearshore to the rocky banks. The area includes areas with “glass coral” and “bamboo coral” on the southern part of the area.

Farallon Islands: This area contains the Farallon Island and the area surrounding them. The area is identical to that proposed by Oceana and found in Alternative 12.

Halfmoon Bay: This is a shallow continental shelf area with depths that range from 25 to 50 fathoms. The bottom is composed of areas with sand, gravel, mud, and rocks.

Monterey Bay: The Monterey Bay area contains the very large Monterey Bay Canyon along with the smaller Sequel Canyon and Carmel Canyon. The area contains the canyon heads, rocky shores, particularly from Monterey to south of Carmel, and through the canyon to very deep offshore waters.

Point Sur: Contained within this area is a deepwater nearshore ridge. The western side of the area is around 800 fathoms that rises to around 450 fathoms at the top of the ridge. Move further east the ridge drops back to depths of 600 fathoms before moving into the onshore shallow water. On top of this ridge is found “glass coral” and “bamboo coral”.

Piedras Blancas: This is a very large offshore basin that ranges in depth from 500 fathoms to 700 fathoms.

Point Conception: This is the largest of the onshore tracts. It ranges in depth from 30 to 40 fathoms nearshore and continues offshore to depths over 1000 fathoms. The more onshore area contains numbers small canyons that continue offshore. The area is also the dividing point between the Northern California coast and the Southern California bight.

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Table 1. Location of proposed closed areas in the Trawl Industry proposal in Latitude and Longitude

Area Name	Coordinate Number	Latitude	Longitude
Olympic	1	48.389	-125.000
Olympic	2	48.387	-124.900
Olympic	3	48.102	-125.001
Olympic	4	48.089	-125.032
Olympic	5	48.139	-125.251
Washington Deep	1	47.173	-125.268
Washington Deep	2	47.174	-125.747
Washington Deep	3	47.634	-125.773
Washington Deep	4	47.604	-125.492
Washington Deep	5	47.626	-125.346
Washington Deep	6	47.544	-125.325
Willapa	1	46.843	-125.458
Willapa	2	46.826	-125.319
Willapa	3	46.692	-125.283
Willapa	4	46.664	-125.492
Columbia	1	46.462	-124.750
Columbia	2	46.407	-124.713
Columbia	3	46.378	-124.752
Columbia	4	46.356	-125.300
Columbia	5	46.584	-125.185
Cape Falcon	1	46.061	-125.133
Cape Falcon	2	46.032	-125.041
Cape Falcon	3	45.768	-124.923
Cape Falcon	4	45.584	-124.980
Cape Falcon	5	45.474	-124.995
Cape Falcon	6	45.434	-125.175
Cape Falcon	7	45.552	-125.271
Cape Falcon	8	45.672	-125.286
Cape Falcon	9	46.050	-125.249
Cascade Head	1	44.821	-124.073
Cascade Head	2	44.820	-124.184
Cascade Head	3	44.945	-124.125
Cascade Head	4	45.051	-124.101
Cascade Head	5	45.050	-124.015
Siletz Bay	1	44.939	-125.152
Siletz Bay	2	44.832	-125.025
Siletz Bay	3	44.782	-125.047
Siletz Bay	4	44.699	-125.177
Siletz Bay	5	44.556	-125.147
Siletz Bay	6	44.556	-125.285
Siletz Bay	7	44.712	-125.308
Siletz Bay	8	44.938	-125.210
Stonewall Banks	1	44.636	-124.419
Stonewall Banks	2	44.577	-124.447
Stonewall Banks	3	44.460	-124.449
Stonewall Banks	4	44.419	-124.345

Stonewall Banks	5	44.480	-124.313
Stonewall Banks	6	44.630	-124.384
Heceta Banks	1	44.224	-124.901
Heceta Banks	2	44.338	-124.645
Heceta Banks	3	44.225	-124.674
Heceta Banks	4	44.150	-124.755
Heceta Banks	5	44.058	-124.762
Heceta Banks	6	44.054	-124.824
Heceta Banks	7	43.977	-124.831
Heceta Banks	8	43.961	-124.925
Heceta Banks	9	44.002	-124.921
Heceta Banks	10	44.048	-124.899
Coos Bay Deep	1	43.489	-125.335
Coos Bay Deep	2	43.649	-125.313
Coos Bay Deep	3	43.631	-125.138
Coos Bay Deep	4	43.610	-125.109
Coos Bay Deep	5	43.551	-125.140
Coos Bay Deep	6	43.462	-125.121
Coos Bay Deep	7	43.266	-125.131
Coos Bay Deep	8	43.256	-125.174
Coos Bay Deep	9	43.429	-125.323
Bandon	1	43.304	-124.564
Bandon	2	43.306	-124.511
Bandon	3	43.285	-124.482
Bandon	4	43.288	-124.427
Bandon	5	43.150	-124.458
Bandon	6	43.151	-124.418
Bandon	7	43.092	-124.435
Bandon	8	43.105	-124.535
Bandon	9	43.148	-124.578
Bandon	10	43.223	-124.609
Rogue River	1	42.458	-124.759
Rogue River	2	42.410	-124.723
Rogue River	3	42.372	-124.705
Rogue River	4	42.379	-124.671
Rogue River	5	42.388	-124.613
Rogue River	6	42.426	-124.636
Rogue River	7	42.449	-124.650
Rogue River Deep	1	42.689	-125.277
Rogue River Deep	2	42.693	-125.051
Rogue River Deep	3	42.588	-125.037
Rogue River Deep	4	42.568	-124.927
Rogue River Deep	5	42.510	-124.916
Rogue River Deep	6	42.397	-124.881
Rogue River Deep	7	42.299	-125.170
Crescent City Deep	1	41.625	-125.127
Crescent City Deep	2	41.845	-125.137
Crescent City Deep	3	41.778	-125.050
Crescent City Deep	4	41.652	-125.046
Eel River	1	40.606	-124.512
Eel River	2	40.639	-124.541
Eel River	3	40.644	-124.603

Eel River	4	40.634	-124.664
Eel River	5	40.591	-124.716
Eel River	6	40.546	-124.747
Eel River	7	40.405	-124.666
Eel River	8	40.388	-124.707
Eel River	9	40.456	-124.853
Eel River	10	40.545	-125.094
Eel River	11	40.819	-124.790
Eel River	12	40.739	-124.775
Eel River	13	40.679	-124.792
Eel River	14	40.670	-124.721
Eel River	15	40.659	-124.567
Eel River	16	40.644	-124.494
Mendocino Ridge	1	40.395	-125.948
Mendocino Ridge	2	40.399	-125.947
Mendocino Ridge	3	40.401	-125.947
Mendocino Ridge	4	40.428	-125.163
Mendocino Ridge	5	40.351	-124.566
Mendocino Ridge	6	40.429	-124.402
Mendocino Ridge	7	40.208	-124.376
Mendocino Ridge	8	40.240	-124.597
Mendocino Ridge	9	40.269	-124.650
Mendocino Ridge	10	40.291	-124.680
Mendocino Ridge	11	40.321	-124.799
Mendocino Ridge	12	40.333	-124.879
Mendocino Ridge	13	40.334	-125.036
Mendocino Ridge	14	40.196	-125.123
Mendocino Ridge	15	40.345	-125.955
Point Arena	1	39.055	-123.852
Point Arena	2	38.942	-123.830
Point Arena	3	38.902	-123.878
Point Arena	4	38.994	-123.917
Point Arena	5	39.047	-123.920
Fish Rocks	1	38.790	-123.853
Fish Rocks	2	38.732	-123.820
Fish Rocks	3	38.713	-123.802
Fish Rocks	4	38.594	-123.730
Fish Rocks	5	38.582	-123.711
Fish Rocks	6	38.546	-123.683
Fish Rocks	7	38.592	-123.580
Fish Rocks	8	38.619	-123.611
Fish Rocks	9	38.687	-123.696
Fish Rocks	10	38.825	-123.763
Cordell Banks	1	38.067	-123.513
Cordell Banks	2	38.081	-123.506
Cordell Banks	3	38.081	-123.464
Cordell Banks	4	38.074	-123.407
Cordell Banks	5	38.051	-123.356
Cordell Banks	6	38.096	-123.114
Cordell Banks	7	38.068	-123.121
Cordell Banks	8	38.047	-123.123
Cordell Banks	9	38.018	-123.118

Cordell Banks	10	38.017	-123.368
Cordell Banks	11	37.913	-123.394
Cordell Banks	12	37.767	-123.427
Cordell Banks	13	37.778	-123.451
Cordell Banks	14	37.794	-123.470
Cordell Banks	15	37.838	-123.516
Cordell Banks	16	37.907	-123.545
Cordell Banks	17	37.949	-123.548
Cordell Banks	18	37.952	-123.417
Cordell Banks	19	37.991	-123.455
Cordell Banks	20	38.014	-123.494
Cordell Banks	21	38.038	-123.515
Farallon Islands	1	37.742	-123.029
Farallon Islands	2	37.688	-122.966
Farallon Islands	3	37.665	-122.994
Farallon Islands	4	37.701	-123.062
Farallon Islands	5	37.739	-123.056
Halfmoon Bay	1	37.388	-122.512
Halfmoon Bay	2	37.302	-122.519
Halfmoon Bay	3	37.330	-122.578
Halfmoon Bay	4	37.321	-122.646
Halfmoon Bay	5	37.392	-122.679
Halfmoon Bay	6	37.424	-122.553
Monterey Bay	1	36.918	-122.557
Monterey Bay	2	36.839	-122.354
Monterey Bay	3	36.880	-122.319
Monterey Bay	4	36.857	-122.236
Monterey Bay	5	36.823	-122.253
Monterey Bay	6	36.805	-122.310
Monterey Bay	7	36.759	-122.315
Monterey Bay	8	36.679	-122.288
Monterey Bay	9	36.665	-122.162
Monterey Bay	10	36.749	-122.141
Monterey Bay	11	36.790	-122.053
Monterey Bay	12	36.848	-121.967
Monterey Bay	13	36.790	-121.969
Monterey Bay	14	36.806	-121.849
Monterey Bay	15	36.760	-121.903
Monterey Bay	16	36.761	-121.961
Monterey Bay	17	36.646	-122.009
Monterey Bay	18	36.581	-121.979
Monterey Bay	19	36.569	-121.971
Monterey Bay	20	36.560	-121.954
Monterey Bay	21	36.560	-121.934
Monterey Bay	22	36.518	-121.950
Monterey Bay	23	36.503	-122.620
Monterey Bay	24	36.918	-122.608
Point Sur	1	36.429	-122.295
Point Sur	2	36.420	-122.193
Point Sur	3	36.361	-122.217
Point Sur	4	36.268	-122.239
Point Sur	5	36.275	-122.374

Point Sur	6	36.375	-122.378
Point Sur	7	36.433	-122.349
Piedras Blancas	1	36.152	-122.055
Piedras Blancas	2	36.131	-122.451
Piedras Blancas	3	35.688	-122.238
Piedras Blancas	4	35.200	-121.669
Piedras Blancas	5	35.448	-121.507
Piedras Blancas	6	35.535	-121.853
Piedras Blancas	7	36.021	-121.894
Point Conception	1	34.557	-120.709
Point Conception	2	34.529	-121.582
Point Conception	3	33.883	-121.083
Point Conception	4	34.438	-120.530
Point Conception	5	34.489	-120.559
Point Conception	6	34.522	-120.674

Table 2. EFH EIS Spatial Analysis Tables for Trawl Industry's Proposed Alternative
May 2005

	sq. meters	hectares	sq nm	% EEZ
Total Area of Alternative	627,268,679,177	62,726,867.92	182,882.28	76.23%
SubAreas:				
Bandon	256,477,844	25,647.78	74.78	0.03%
Cape Falcon	1,488,161,902	148,816.19	433.88	0.18%
Cascade Head	98,299,994	9,830.00	28.66	0.01%
Columbia	694,412,086	69,441.21	202.46	0.08%
Coos Bay Deep	564,510,202	56,451.02	164.58	0.07%
Cordell Banks	453,415,404	45,341.54	132.19	0.06%
Crescent City Deep	133,418,731	13,341.87	38.90	0.02%
Eel River	822,911,053	82,291.11	239.92	0.10%
Farallon Islands	39,309,132	3,930.91	11.46	0.00%
Fish Rocks	259,114,850	25,911.48	75.55	0.03%
Halfmoon Bay	128,408,461	12,840.85	37.44	0.02%
Heceta Banks	422,837,182	42,283.72	123.28	0.05%
Mendocino Ridge	1,863,635,142	186,363.51	543.35	0.23%
Monterey Bay	1,933,817,970	193,381.80	563.81	0.24%
Olympic	434,735,299	43,473.53	126.75	0.05%
Piedras Blancas	3,305,341,034	330,534.10	963.68	0.40%
Point Arena	88,048,387	8,804.84	25.67	0.01%
Point Conception	3,801,078,526	380,107.85	1,108.22	0.46%
Point Sur	239,732,085	23,973.21	69.89	0.03%
Rogue River	66,824,156	6,682.42	19.48	0.01%
Rogue River Deep	885,087,519	88,508.75	258.05	0.11%
Siletz Bay	537,728,950	53,772.89	156.78	0.07%
Stonewall Banks	171,592,098	17,159.21	50.03	0.02%
Washington Deep	1,700,161,198	170,016.12	495.69	0.21%
Willapa	230,796,696	23,079.67	67.29	0.03%
west of 2000m cntour	606,641,162,587	60,664,116.26	176,868.26	73.73%
Total Area of EEZ:		82,281,490.50		

Table 3. Inventory of habitat type contained within the Industry proposal for both north and south of Pt. Conception.

Biogeographic Zone	Habitat Description	Megahabitat	Induration	Meso/Macro Habitat	Total Habitat Area (ha)	% Hab area in Alt.
north of Pt Conception	Rocky Apron Canyon Wall	Continental Rise	hard	canyon wall	1,562	100
	Rocky Apron	Continental Rise	hard	exposure	135	100
	Sedimentary Apron	Continental Rise	soft		734,150	100
	Sedimentary Apron Canyon Floor	Continental Rise	soft	canyon floor	33,833	92
	Sedimentary Apron Canyon Wall	Continental Rise	soft	canyon	90,400	100
	Sedimentary Apron Gully	Continental Rise	soft	gully	222	100
	Sedimentary Apron Landslide	Continental Rise	soft	landslide	38,949	100
	Rocky Basin	Basin	hard	exposure	2,494	22
	Sedimentary Basin	Basin	soft		623,187	41
	Rocky Slope Canyon Wall	Slope	hard	canyon wall	33,967	51
	Rocky Slope Canyon Floor	Slope	hard	canyon floor	9,759	38
	Rocky Slope	Slope	hard	exposure	44,571	7
	Rocky Slope Gully	Slope	hard	gully	188	0
	Rocky Slope Landslide	Slope	hard	landslide	138,297	66
	Sedimentary Slope	Slope	soft		5,313,660	23
	Sedimentary Slope Canyon Floor	Slope	soft	canyon floor	500,542	47

Biogeographic Zone	Habitat Description	Megahabitat	Induration	Meso/Macro Habitat	Total Habitat Area (ha)	% Hab area in Alt.
	Sedimentary Slope Canyon Wall	Slope	soft	canyon wall	701,031	27
	Sedimentary Slope Gully	Slope	soft	gully	467,840	48
	Sedimentary Slope Gully Floor	Slope	soft	gully floor	33,514	56
	Sedimentary Slope Landslide	Slope	soft	landslide	582,831	39
	Rocky Ridge	Ridge	hard	exposure	764,402	69
	Sedimentary Ridge	Ridge	soft		1,067,912	38
	Rocky Shelf Canyon Wall	Shelf	hard	canyon wall	5,271	97
	Rocky Shelf	Shelf	hard	exposure	255,112	31
	Rocky Glacial Shelf Deposit	Shelf	hard	ice-formed feature	406	0
	Sedimentary Shelf	Shelf	soft		4,598,606	3
	Sedimentary Shelf Canyon Floor	Shelf	soft	canyon floor	7,215	0
	Sedimentary Shelf Canyon Wall	Shelf	soft	canyon wall	41,095	15
	Sedimentary Shelf Gully	Shelf	soft	gully	36,610	47
	Sedimentary Glacial Shelf Deposit	Shelf	soft	ice-formed feature	101,690	26

Biogeographic Zone	Habitat Description	Megahabitat	Induration	Meso/Macro Habitat	Total Habitat Area (ha)	% Hab area in Alt.
south of Pt Conception	Sedimentary Apron	Continental Rise	soft		959,070	0
	Rocky Basin	Basin	hard	exposure	2,492	1
	Sedimentary Basin	Basin	soft		2,110,038	0
	Sedimentary Basin Canyon Floor	Basin	soft	canyon floor	580	0
	Sedimentary Basin Canyon Wall	Basin	soft	canyon wall	1,881	0
	Sedimentary Basin Gully	Basin	soft	gully	813	0
	Sedimentary Basin Gully Floor	Basin	soft	gully floor	495	0
	Rocky Slope Canyon Wall	Slope	hard	canyon wall	6,579	0
	Rocky Slope Canyon Floor	Slope	hard	canyon floor	642	0
	Rocky Slope	Slope	hard	exposure	85,212	0
	Rocky Slope Gully	Slope	hard	gully	2,654	30
	Sedimentary Slope	Slope	soft		1,276,598	30
	Sedimentary Slope Canyon Floor	Slope	soft	canyon floor	64,784	11
	Sedimentary Slope Canyon Wall	Slope	soft	canyon wall	26,425	1
	Sedimentary Slope Gully	Slope	soft	gully	39,358	0

Biogeographic Zone	Habitat Description	Megahabitat	Induration	Meso/Macro Habitat	Total Habitat Area (ha)	% Hab area in Alt.
	Sedimentary Slope Gully Floor	Slope	soft	gully floor	3,794	2
	Sedimentary Slope Landslide	Slope	soft	landslide	39,335	64
	Rocky Ridge	Ridge	hard	exposure	778,813	9
	Sedimentary Ridge	Ridge	soft		2,098,580	0
	Rocky Shelf Canyon Wall	Shelf	hard	canyon wall	728	0
	Rocky Shelf	Shelf	hard	exposure	60,921	1
	Sedimentary Shelf	Shelf	soft		632,017	0
	Sedimentary Shelf Canyon Floor	Shelf	soft	canyon floor	765	0
	Sedimentary Shelf Canyon Wall	Shelf	soft	canyon wall	1,561	0
	Sedimentary Shelf Gully	Shelf	soft	gully	734	0
	Sedimentary Shelf Gully Floor	Shelf	soft	gully floor	1,954	0

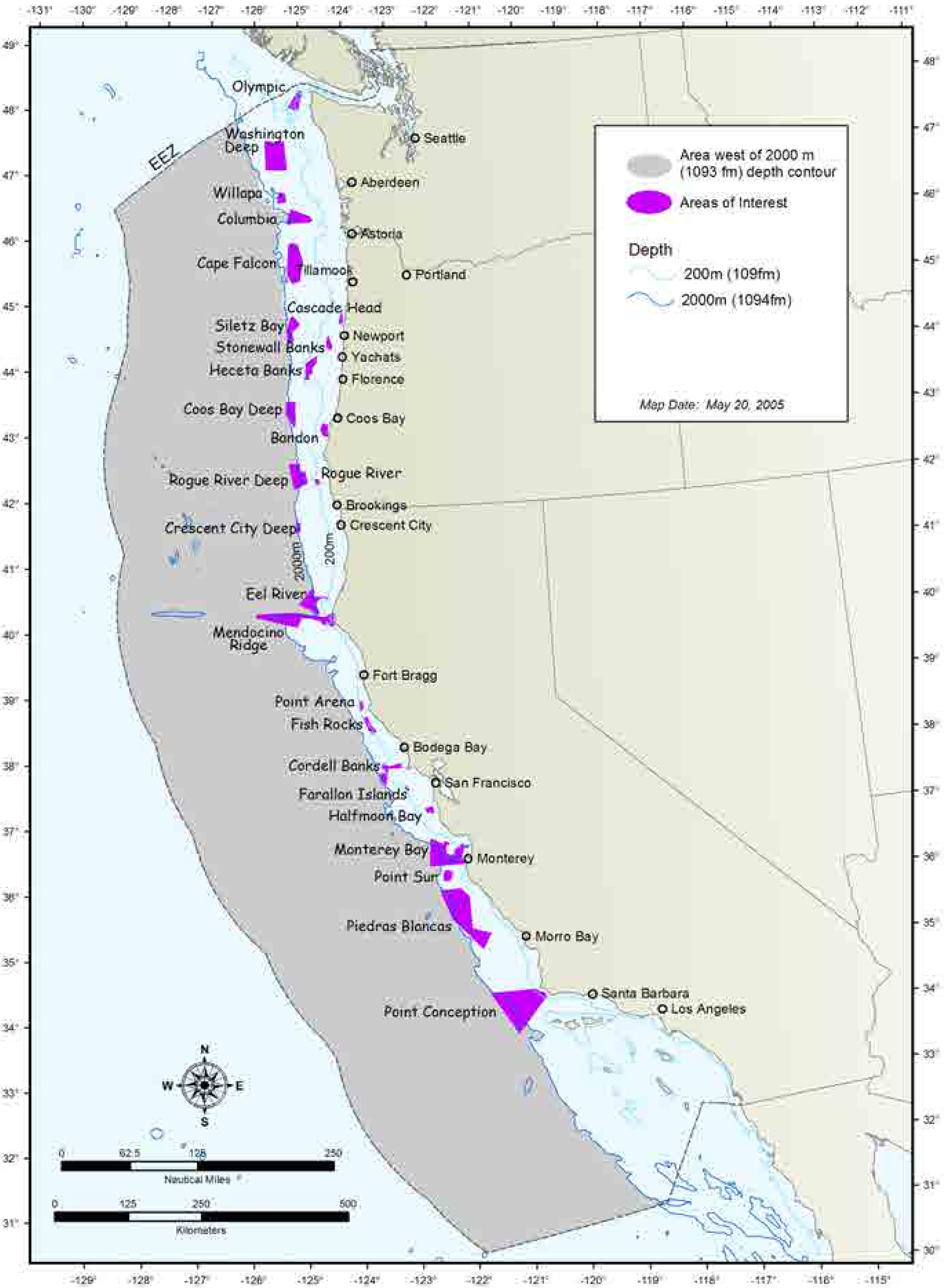


Figure 1. Map of areas in the Industry proposal.

Figure 2a. Comparison of the locations of the Industry prposal and Alternative 12.

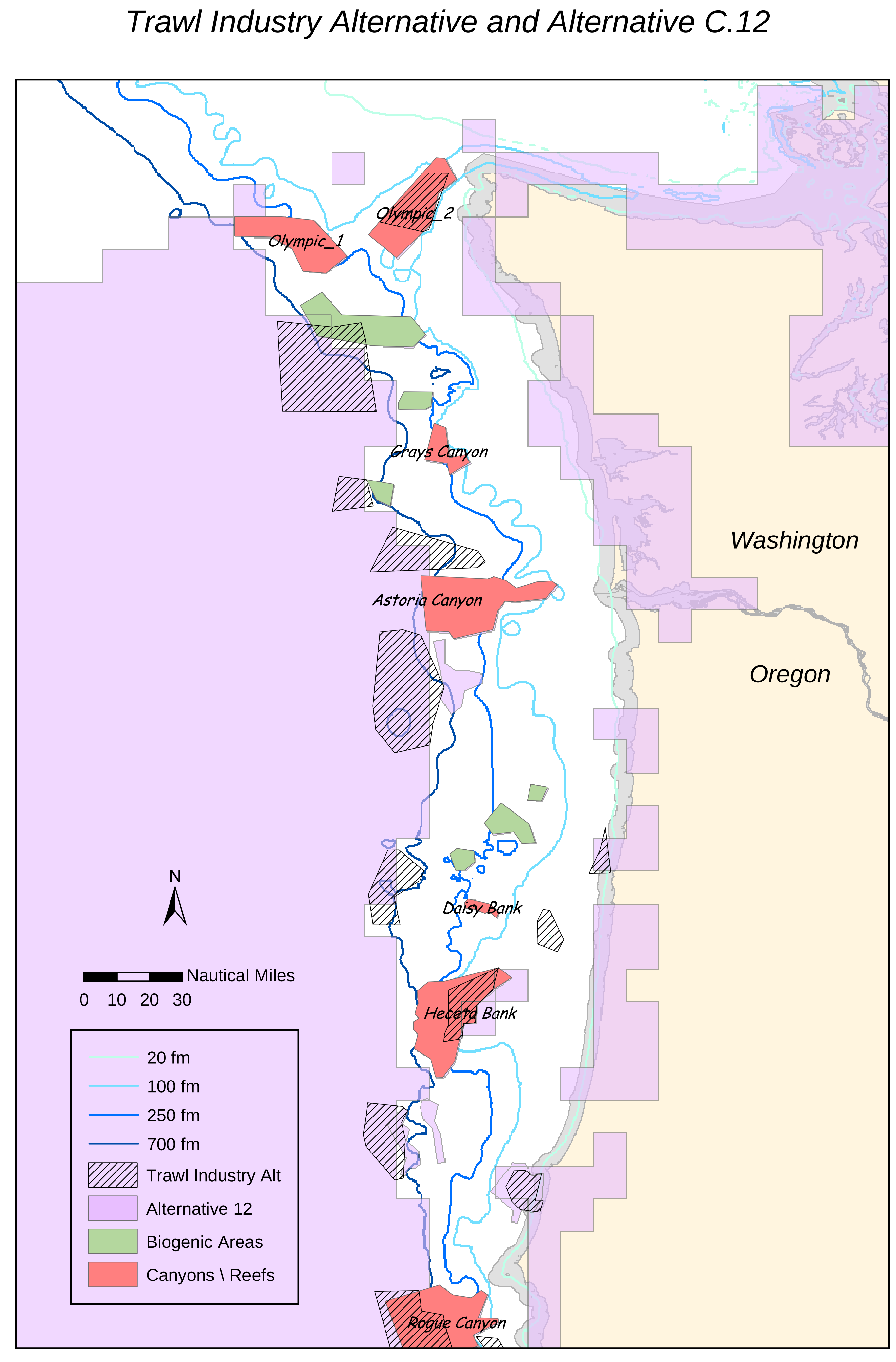


Figure 2b. Comparison of the locations of the Industry proposal and Alternative 12.

Trawl Industry Alternative and Alternative C.12

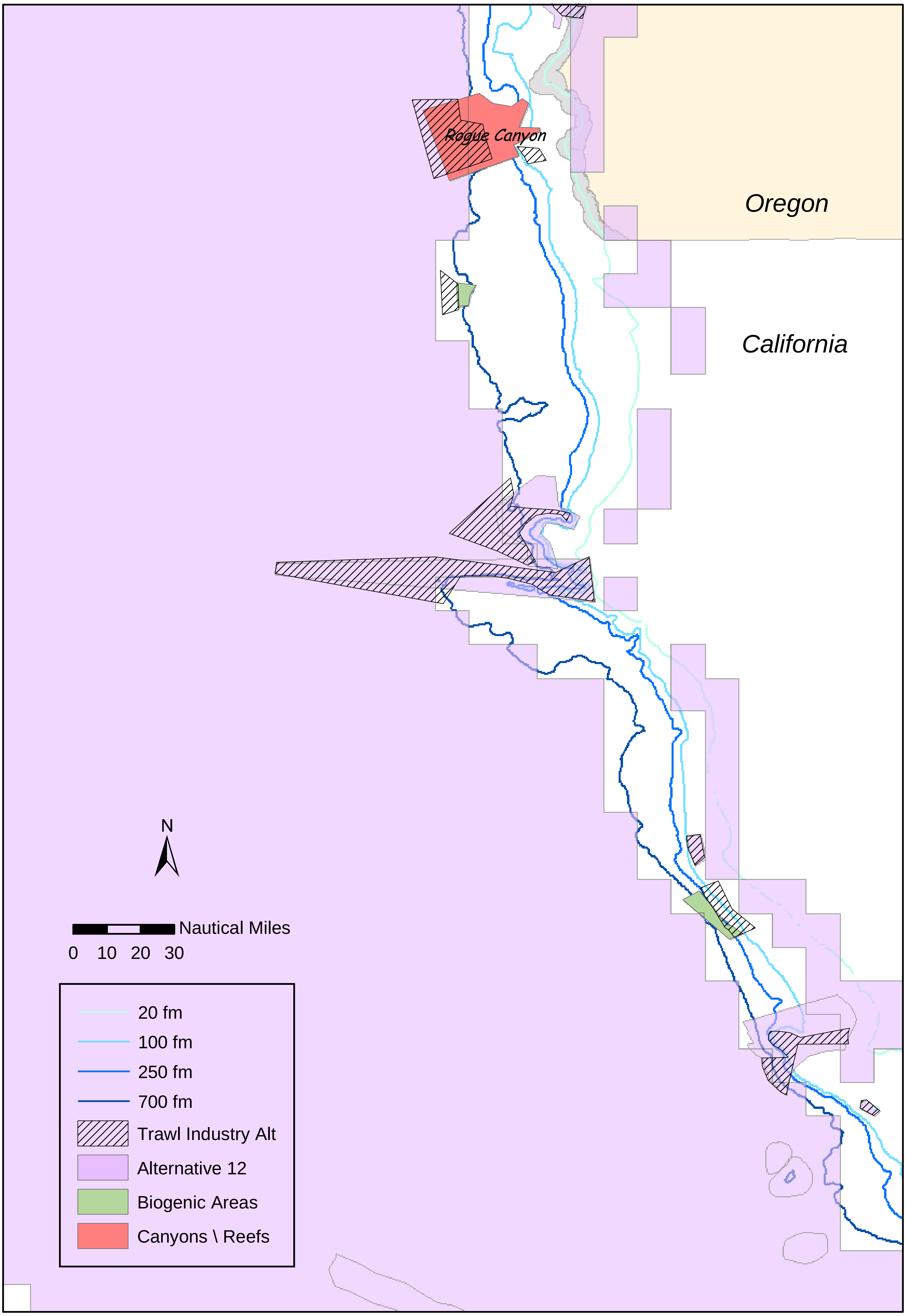
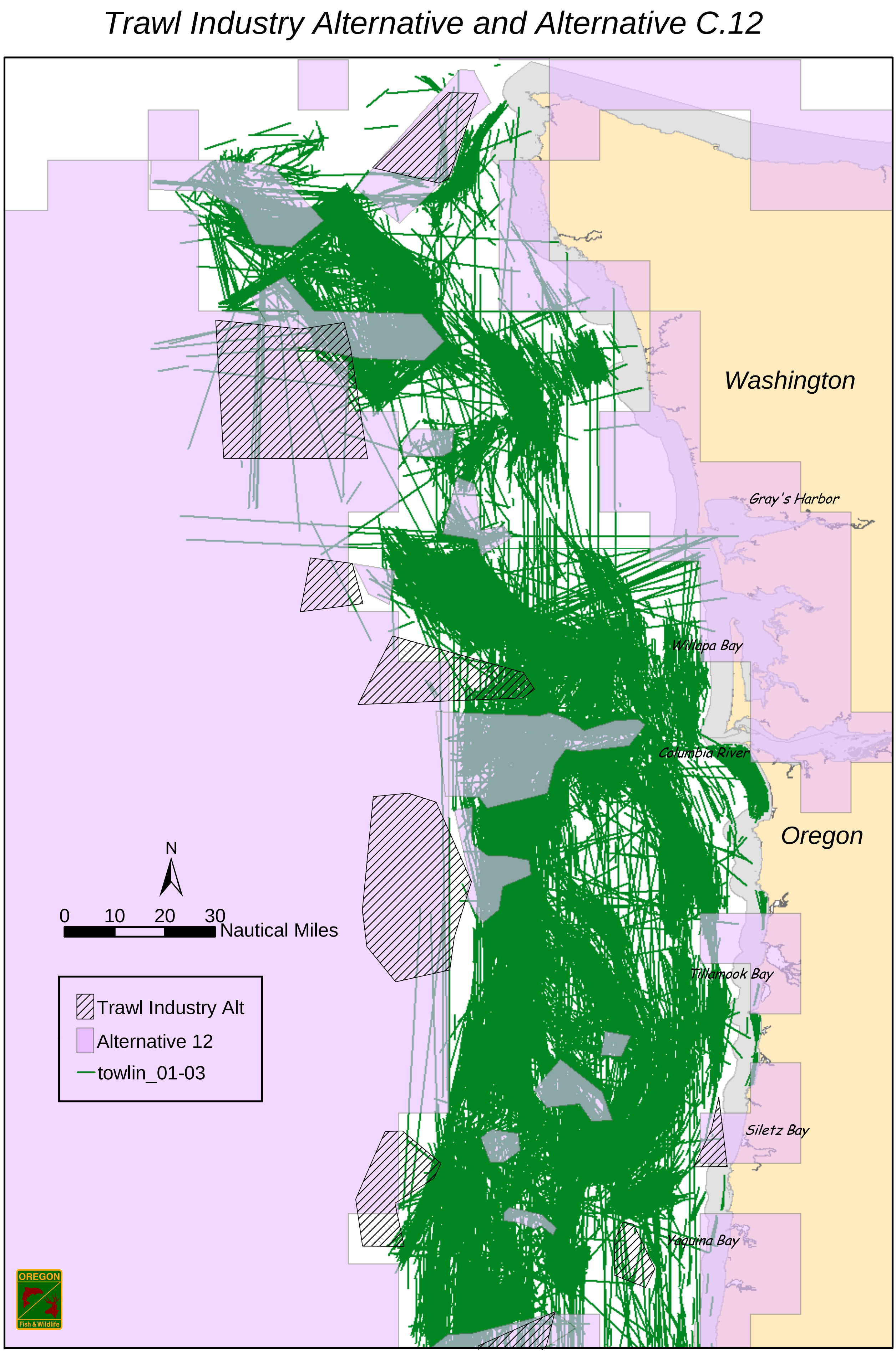


Figure 3a. Northern map showing location of trawl tow locations.

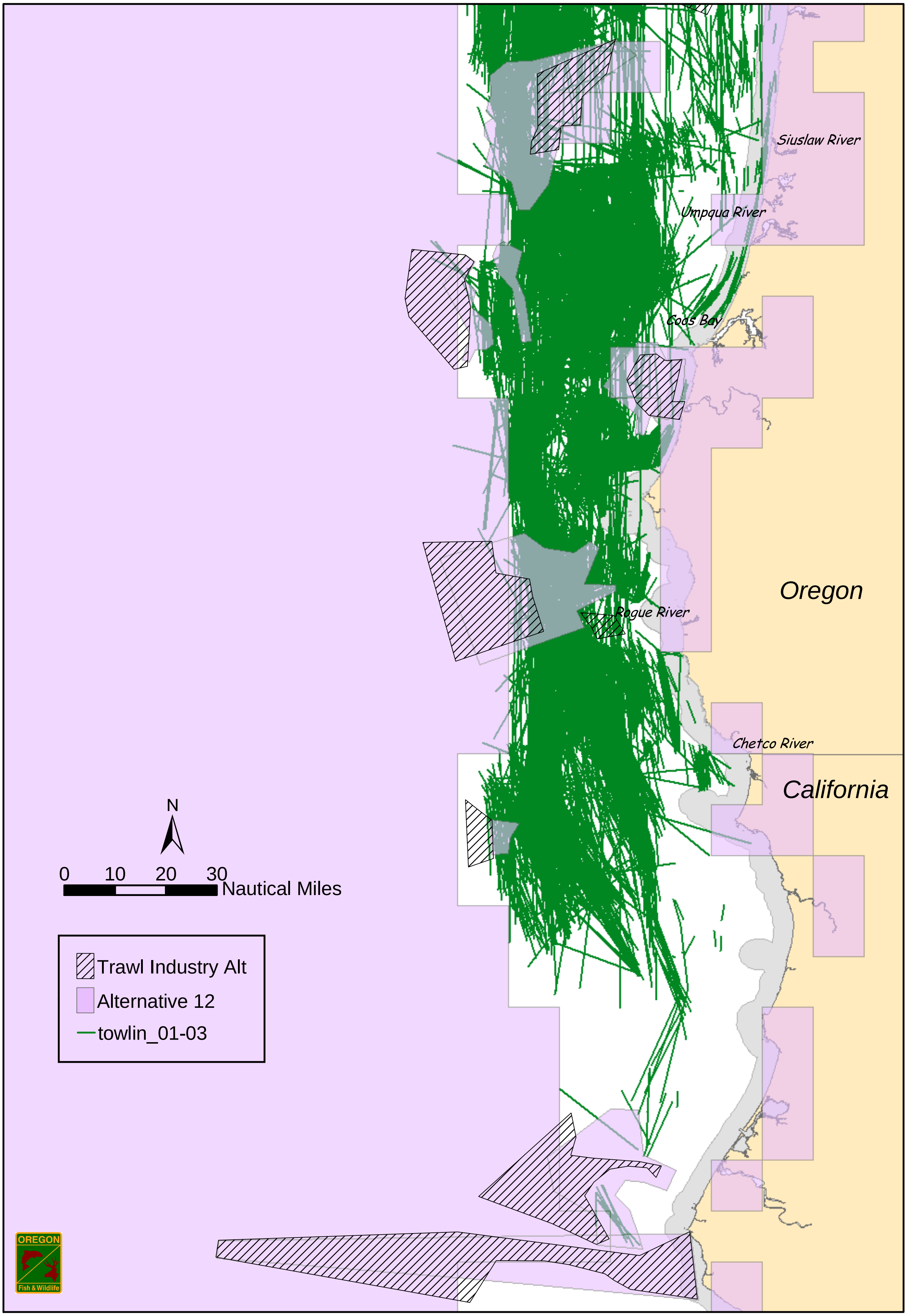


Oregon Department of Fish and Wildlife, Marine Resources Program

Towline data courtesy of Marlene Bellman and Scott Heppell, OSU

Figure 3b. Southern map showing trawl tow locations.

Trawl Industry Alternative and Alternative C.12



Oregon Department of Fish and Wildlife, Marine Resources Program

Towline data courtesy of Marlene Bellman and Scott Heppell, OSU

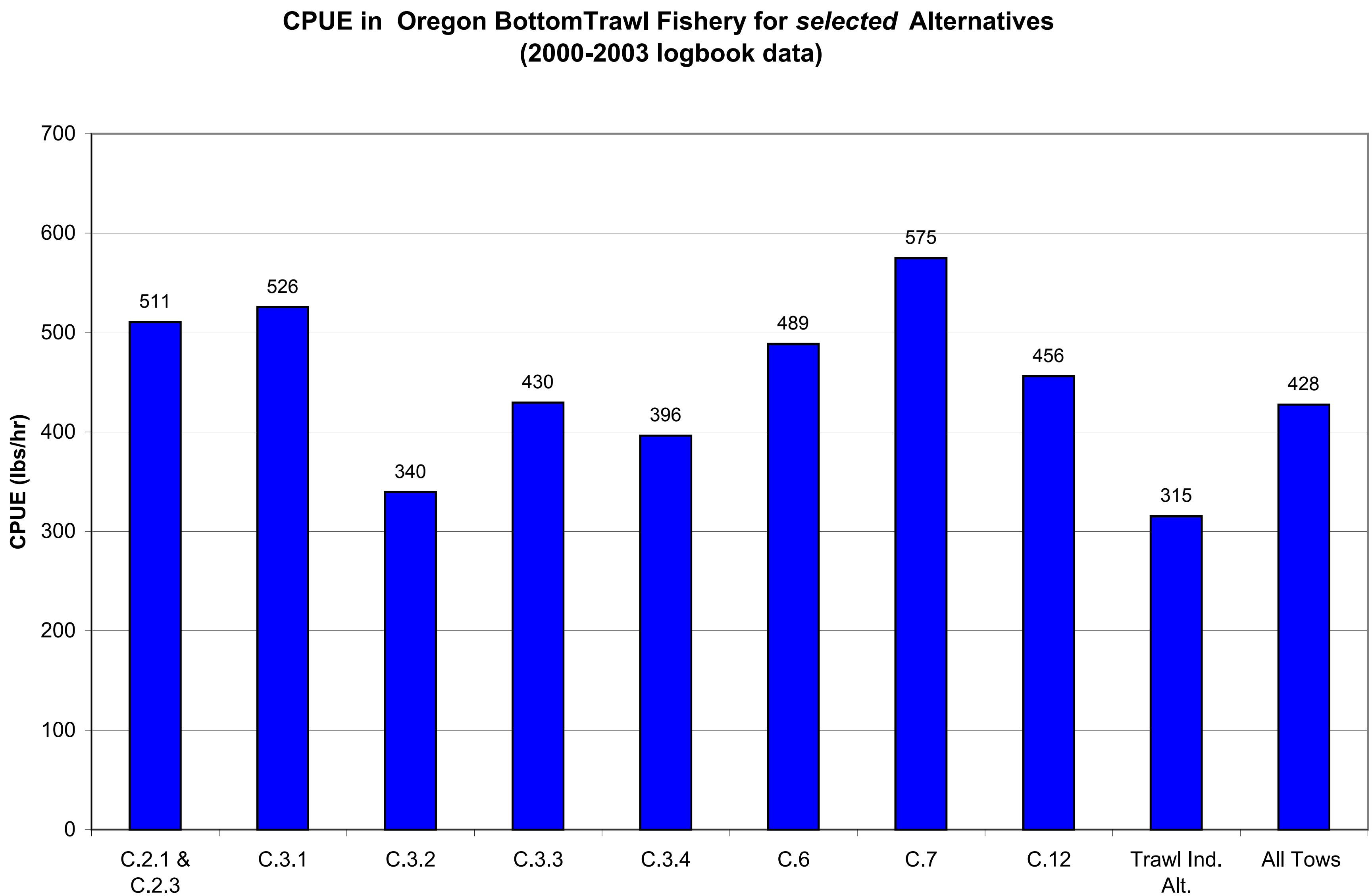


Figure 4. CPUE for Oregon landings for selected alternatives, including the Industry Proposal.

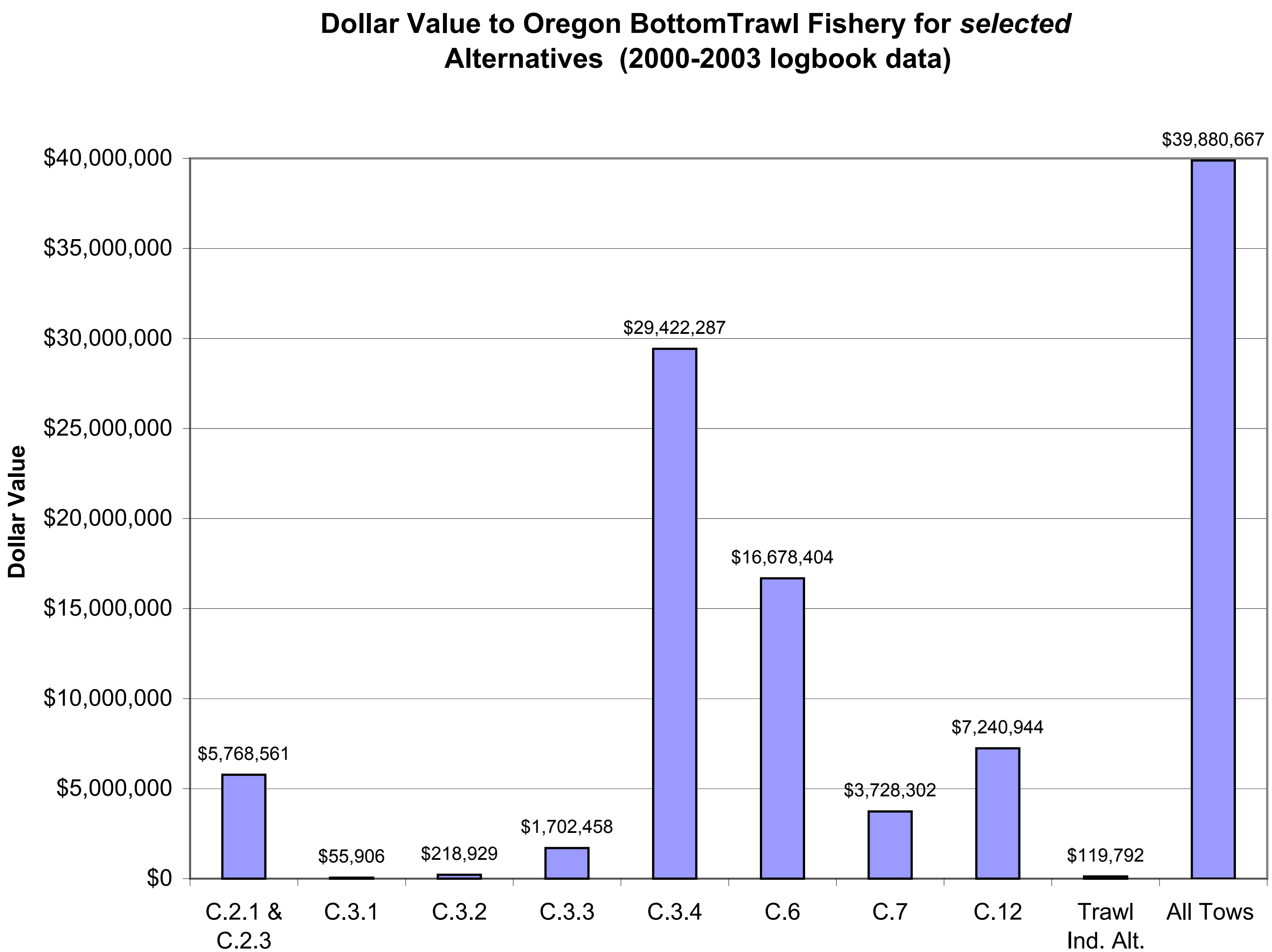


Figure 5 Dollar value of trawl catch landed in Oregon for selected alternatives, including the Industry proposal.

May 25, 2005

Mr. Donald K. Hansen
Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Re: June 15, 2005 Meeting Agenda Item C.3: Adoption of a Final Preferred Alternative for the 2005 EIS for Pacific Coast Groundfish Essential Fish Habitat

Dear Chairman Hansen:

Thank you for the opportunity to comment on the adoption of a final preferred alternative for the Environmental Impact Statement (EIS) for Essential Fish Habitat Designation for the Pacific Coast Groundfish Fishery Management Plan, at the June 15, 2005 meeting of the Pacific Fishery Management Council (Council). This letter contains comments of the California Artificial Reef Enhancement Program (CARE). CARE is a nonprofit organization which, through public education and scientific research, promotes awareness and understanding of the potential value to be derived from artificial reef ecosystems in offshore California, and supports the preservation and enhancement of artificial reefs when recognized as beneficial to the marine environment.

CARE urges the Council to adopt Alternative B.8, the designation of the oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" (HAPC) under the Magnuson-Stevens Fishery Conservation and Management Act, as the final preferred alternative for purposes of the Final EIS. For the reasons stated in our previous comments regarding the scope and content of the Draft EIS, submitted to NOAA Fisheries on October 5, 2004 and May 11, 2005, we believe that the Final EIS should include and evaluate additional scientific information that strongly supports the designation of the platforms as HAPC, as part of the comprehensive strategy to conserve and enhance essential fish habitat for fish species managed under the Pacific Coast Groundfish Fishery Management Plan. For the benefit of Council members now considering the preferred alternative, we are providing these comments and supporting scientific literature. Please contact me at (805) 320-8456 if you have any questions or would like any further information that CARE may be able to provide.

Sincerely,

George Steinbach

George Steinbach
Executive Director

May 25, 2005

Comments of CARE on the Selection of a Preferred Alternative for the Pacific Coast Groundfish EFH EIS

Comment 1:

CARE urges the Pacific Fishery Management Council ("Council") to select Alternative B.8, the designation of oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" ("HAPC"), as the Final Preferred Alternative for the Pacific Coast Groundfish Environmental Impact Statement ("EIS"). The information submitted with these comments and with our comments dated October 5, 2004 (Exhibit 1) strongly supports this designation.

Comment 2:

The Draft EIS ("DEIS"), p. 2-10, states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(i), which is one of four distinct criteria on which HAPC designation may be based. Under Section 600.815(a)(8)(i), one of the criteria for HAPC designation is the "importance of the ecological function provided by the habitat." The DEIS notes on page 2-10 that high concentrations of groundfish species, including overfished bocaccio and cowcod, have been observed associated with many platforms. In fact, considerable additional scientific information is now available which demonstrates that the platform reefs[1] provide important ecological functions, supporting the environmental benefits of Alternative B.8:

(i) Platform reefs provide habitat for different life stages of rockfish (i.e., larvae, juveniles, adults) (Love et al., 2000) (Exhibit 2), (Love et al., 2001) (Exhibit 3), (Love et al. 2003) (Exhibit 4), (Love 2005) (Exhibit 5).

(ii) Platform reefs create hard bottom habitat (via the lattice-work of legs and cross members) in areas that are primarily soft bottom habitat (Love et al., 2003). Each platform reef creates a variety of habitat (again, via the lattice-work of legs and cross members) (Love et al., 2003).

(iii) Love (2005) found that the number of juvenile bocaccio found around six platforms in the Santa Barbara Channel constituted 20 percent of the average number of juvenile bocaccio that survive in a year for the species' entire range. He determined that, when adults, these bocaccio will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. His research demonstrates that, although platform reefs provide a relatively small

[1] In these comments, we use the term "platform reefs" to refer to the valuable groundfish habitat that oil and gas platforms provide. This term is meant to emphasize that scientific research demonstrates that the underwater portions of oil and gas platforms serve as de facto reef habitat. In addition, the term emphasizes that only the underwater portion of the platform is relevant to the discussion of groundfish Essential Fish Habitat ("EFH") and HAPC.

amount of habitat area, this habitat can be crucial for rebuilding an overfished species.

(iv) The higher densities of adult rockfishes found at platform reefs are so pronounced that, in some locations, platform reefs provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production. (Love et al., 2003.)

(v) Platform reefs recruit larval fish, which grow into juveniles that live in the midwaters and are found in greater densities than at natural reefs (Love et al., 2003; Love 2005). Platform reefs recruit larval fish that would otherwise have perished in the absence of the platform reef (Love 2005). Love et al. (2003) concluded that the recruitment of juvenile fishes to platform reefs that are far from shore or in deep waters is from maternal sources, rather than attraction from natural outcrops. Platform reefs located nearer to shore or in shallow waters may attract juveniles from natural habitats because these platform reefs are located in areas in which it is relatively easier for juveniles to move between habitats. The converse is also true: juveniles may be attracted from platform reefs to natural habitats. However, because higher densities of young-of-the-year rockfishes are found at platform reefs, Love et al. (2003) concluded that platform reefs are functionally more important as groundfish nurseries.

(vi) Because platform reefs have more adults in higher densities than natural reefs, they produce a disproportionate share of larvae in the region (Love et al., 2003; Love 2005). Love (2005) compared the density and size of bocaccio and cowcod found on platform reefs to those found on natural outcrops. The results indicate that platform reefs are more important producers of bocaccio and cowcod larva than natural habitat. At Platform Gail in particular, which had the highest densities of mature bocaccio and cowcod of any natural or man-made habitat surveyed, Love estimated that for bocaccio one hectare of sea floor at that platform reef was equivalent to 68 hectares at an average natural reef, and for cowcod one platform reef hectare was equivalent to 26 hectares at an average natural reef.

(vii) Furthermore, recent research by Love (2005) indicates that platform reefs recruit larva that would not have survived were the platform reefs not there. By simulating surface currents in 1999 and 2002 originating at Platform Irene to model juvenile bocaccio distribution patterns, Love estimated that only seven percent and 23 percent, respectively, of young bocaccio that recruited to Platform Irene would have survived to reach natural nursery habitat.

(viii) Different life stages of the same species inhabit different depths along the platform reef (i.e., adults inhabit the deep waters and juveniles inhabit the midwaters), thereby reducing predation by adults on juveniles (Love et al., 2003).

(ix) Juveniles living at platform reefs may grow to adulthood and remain there throughout their lives (Love 2003). Research on the growth rate of young blue rockfish living around platform reefs demonstrates that they grow faster than fishes living around natural reefs in the same area (Love 2005).

The research discussed above demonstrates that platform reefs perform much like natural outcrops, in that both produce and attract rockfishes. However, there is a difference in scale favoring platform reefs, which indicates that some platform reefs are important to regional rockfish production. (Love et al., 2003; Love 2005.) This ecological role is of significant value especially to the recovery of the many overfished rockfish species that populate the platform reefs, such as bocaccio and cowcod.

Comment 3:

The second criterion for designation of HAPC, 50 CFR § 600.815(a)(8)(ii), is the "extent to which the habitat is sensitive to human-induced environmental degradation." As the DEIS notes in section 4.3.3 (p. 4-13), "Oil platforms are subject to removal from the ocean as they are decommissioned." In fact, Gebauer et al. (2004) (Exhibit 6) estimates that removal of the oil platforms located in federal waters along the California coast will begin in 2010 and be completed by 2025. The habitat created by the platform reefs off of the coast of California is dependent on the platforms' presence and subject to elimination if they are removed under platform decommissioning regulations. As such, the platform reefs are sensitive to human-induced environmental degradation by removal of the structures.

Comment 4:

The third criterion for designation of HAPC, 50 CFR § 600.815(a)(8)(iii), is "whether, and to what extent, development activities are, or will be, stressing the habitat type." Again, complete removal of the oil and gas platforms will eliminate the type of groundfish habitat that the underwater platform reef portions provide.

Comment 5:

The fourth criterion for designation of HAPC, 50 CFR § 600.815(a)(8)(iv), is the "rarity of the habitat type." As the DEIS explains (p. 2-10): "The platforms rise steeply from the bottom and provide unique high relief habitat." The "uniqueness" of the platform reef habitat should be emphasized, given that "rarity of the habitat type" is one of the factors to be considered in designating HAPC. As the DEIS acknowledges, the latticework of footers and crossbars that comprise the underwater features of platform reefs provide unique high relief habitat. Pinnacle reefs are the only natural formations that provide a similar type of high relief habitat. However, natural pinnacle reefs are very rare off of the California coast, with only one such reef located in the Santa Barbara Channel (Love 2005, personal communication; DEIS p. 3-9). Consequently, the majority of this rare type of habitat is provided by platform reefs. In addition, as discussed in these comments, platform reefs provide hard bottom habitat that is rare in the areas in which the platform reefs are located.

Comment 6:

EFH decisions must be based on "the best scientific information available" (50 CFR § 600.815(a)(1)(ii)(B)), and this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)(A)). On that point, it is critical to note that ***the designation of platform reefs as HAPC will not have any adverse environmental consequences***. Rather, as the DEIS acknowledges, this designation would "enhance NMFS' [National Marine Fisheries Service] opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed." (DEIS, p. 4-13.) Whatever scientific uncertainties may yet remain can be considered when NMFS consults regarding decommissioning plans for particular platforms. On the other hand, once the structures are removed, NMFS will have no opportunity for further evaluation because the platform reef habitat and thriving ecological communities will be destroyed. Moreover, since the removal of oil and gas platforms is typically carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000) (Exhibit 7). This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love et al., 2003).

Comment 7:

During the November 2004 Council meeting, a concern was raised by one Council member about the "questionable motives" of those who advocate designating oil and gas structures as HAPC. It is unclear what motives the Council member was referring to. As a general matter, however, the Magnuson-Stevens Fishery Conservation and Management Act balances a variety of interests, including commercial, recreational and environmental interests, in the management of U.S. fisheries. The only relevant issue is whether a suggested course of action conserves and enhances EFH and assists in the recovery of fish populations.

Comment 8:

Second, concerns were raised during the Council meeting that designating platform reefs as HAPC would set a precedent that would allow discarded articles, such as furniture, oil cans and sunken boats to be left in the ocean as artificial reefs. Such actions would not be allowed under the extensive laws and regulations that govern the construction, siting and placement of artificial reefs. The National Fishing Enhancement Act of 1984 (33 U.S.C. §§ 2101 *et seq.*) established national standards for artificial reef development, (*id.* at § 2102), directed the National Oceanic and Atmospheric Administration to create a National Artificial Reef Plan ("NARP") (*id.* at § 2103), and authorized the U.S. Army Corps of Engineers ("Corps") to issue permits for artificial reefs (*id*. at § 2104; *see also* 33 CFR § 322.5(b)). The NARP and the Corps' regulations establish guidelines for siting, materials, design, construction, management and liability, among others. In particular, the NARP provides that materials proposed for artificial reefs must be of proven stable design, which would prohibit designating discarded junk as artificial reefs. Moreover, state and federal natural resource agencies, the Council, NMFS and the public all participate in the artificial reef permitting process, which ensures that only appropriate materials will be utilized. Finally, artificial reef permits issued by the Corps are subject to environmental review under the National Environmental Policy Act (42 U.S.C. §§

4321 *et seq.*), which further ensures that the concerns about the suitability of a particular material will be addressed.

California also has an artificial reef program. Cal. Fish & Game Code §§ 6420-6425. Under California's program, the Department of Fish and Game has authority over the design, placement and monitoring of artificial reefs within state waters. Approximately 34 artificial reefs have been constructed along the California coast under the state program. Some of these artificial reefs were built before the NARP was adopted, however the recently constructed artificial reefs were built in accordance with NARP guidelines.

Comment 9:

A third concern raised during the Council's consideration of Alternative B.8 was whether "man-made" habitat should be preferred over "natural" habitat in EFH and HAPC designations. The EFH regulations do not draw this distinction. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 50 CFR § 600.10. Substrate "includes sediment, hard bottom, **structures underlying the waters**, and associated biological communities." *Id.* (emphasis added). "Structures underlying the waters" means artificial (i.e., man-made) structures. NMFS has made it clear that artificial structures qualify as EFH because "such structures can provide valuable habitat for managed species." *Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH)*, 67 Fed. Reg. 2343, 2347 (Jan. 17, 2002) (preamble to final rule). Nothing in the definition of HAPC is to the contrary. To the extent that the habitat characteristics of platform reefs qualify them as HAPC, the fact that they are artificial in origin must be considered irrelevant.

Comment 10:

The DEIS's discussion of the habitat value of platform reefs on pages 3-8 to 3-10 is based exclusively on *The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California* (OCS Study MMS 99-0015) ("1999 MMS Report"). Several important scientific studies of the habitat value provided by platform reefs located off of California have been published since the 1999 MMS Report, including: Love et al. (1999) (Exhibit 8); Love et al. (2000); Love et al. (2001); Love et al. (2003). In addition, Love (2005) summarizes several articles that are based on his latest research, which have been submitted for publication in scientific journals.

The research by Love (2005) confirms that many platform reefs harbor higher densities of both juvenile and adult fishes than do most natural reefs. Moreover, new seafloor maps produced in 2004 by the U.S. Geological Survey demonstrate that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. These studies corroborate the 1999 MMS Study and provide important additional evidence that platform reefs provide EFH for rockfish, and that platform reefs should be designated as HAPC.

Comment 11:

The DEIS (p. 4-13) states that:

> One view holds that scientific research indicating an abundance of fish species located at oil rig platforms is a benefit to the ecosystem. Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications).

The citation of Holbrook et al. (2000) is out of date. More recent research (presented in the attached Exhibits and summarized in comment 2, above) has addressed a number of the uncertainties that existed at the time that the Holbrook paper was written. Moreover, the manner in which the DEIS frames the issue — that platform reefs either increase fish productivity **or** attract fish populations away from natural reef systems — misleads the public and decisionmakers. Current research demonstrates that platform reefs have both effects: platform reefs are important habitat for rockfish and function just as natural reefs do, in that they both produce **and** attract fish depending on species, site, season and ocean conditions. The DEIS, relying on the outdated reference to Holbrook et al. (2000), wholly fails to take into account these crucial findings in discussing the environmental consequences of Alternative B.8. In selecting a final preferred alternative, the Council should consider the more up-to-date scientific evidence that is now available.

Comment 12:

Based on comments from others, the DEIS (p. 4-13) lists a number of concerns regarding designation of platforms as HAPC. However, no scientific evidence is cited as a basis for these assertions. On the contrary, the scientific evidence contradicts the drawbacks suggested:

- Regarding the speculation that HAPC designation would prevent the restoration of soft-bottom hiding places for rockfish: The soft-bottom habitat under and around the platform reefs is virtually devoid of hiding places. (Love 2005.) The only hiding places that exist are provided by the latticework of beams and cross members that make up the platform reef structure. Moreover, returning the area under and around platform reefs to soft-bottom habitat will require the destruction of existing hiding places and thriving habitat and kill large numbers of the resident fish. (Gitschlag et al., 2000.) The alternative that would enhance hiding places for rockfish is designating platform reefs as HAPC.

- Regarding the claim that platform reefs could "attract increased effort by fishermen … resulting in increased net mortality": As the DEIS acknowledges, and as corroborated by Love et al. (2003) and USEPA (2000) (Exhibit 9), platform reefs are not currently heavily fished and, in fact, act as de facto marine refuges. This is due in part to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. In addition, the physical structure significantly restricts the use of both commercial and recreational fishing gear to fish the resident species. Designation of platform reefs as HAPC will not change the Coast Guard's regulation of navigation near the platform reefs nor will the designation alter the physical structure of platform reefs. Accordingly, designation of platform reefs as HAPC will not result in increased effort by fishermen.

- Regarding the claim that platform reefs could attract "increased predators resulting in increased net mortality": Available scientific evidence suggests that the predation by adult fishes on young fishes on platform reefs is probably lower than that on natural outcrops. This is due to the fact that platform reefs occupy the entire water column and that the fish assemblages are distributed differently than on most natural outcrops. Natural outcrops in the area of platform reefs are typically 5 to 15 feet in height, putting all fish, both young and adults in close proximity. On platform reefs, the adult fishes are found near the bottom while young fishes occupy the midwaters. This separation implies lower mortality rates for young fishes residing at platform reefs. (Love et al., 2003.) Further, other natural predators, such as pinnipeds, do not appear to be attracted to platform reefs. (Love 2005, personal communication.)

- Regarding the claim that platform reefs have "the potential to be a hazard to navigation": The U.S. Coast Guard is responsible for maritime safety in the navigable waters of the U.S. where the platform reefs are located. It has established requirements for all oil and gas platforms regarding the operation and maintenance of aids to navigation and other measures to insure marine safety. According to M. Boyes, Waterways Management Officer, U.S. Coast Guard, District Eleven (2005 personal communication), no vessel operator has lodged a formal complaint that any oil and gas platforms off of California created a navigation hazard. Similarly, according to G. Kasprzak, Artificial Reef Coordinator, Louisiana Department of Fish and Wildlife (2005 personal communication), no hazard complaints have been lodged by vessel operators regarding oil and gas platforms or artificial reefs in the Gulf of Mexico, where many platforms have been turned into artificial reefs. The U.S. Coast Guard's regulatory oversight will not be affected by the designation of these platform reefs as HAPC.

Comment 13:

In addition, based on comments of others, the DEIS (p. 4-13) raises a concern regarding levels of mercury in fish caught near oil platforms. Again, no scientific evidence is cited as a basis for this assertion. On the contrary, the Department of the Interior, Minerals Management Service ("MMS"), has studied the issue of mercury contamination from drilling muds in the Gulf of Mexico and reached the opposite conclusion. As the MMS states on its website: "While the issue of mercury in seafood in the Gulf of Mexico is the subject of an increasing amount of research particularly because of global and regional inputs, the results of research to date generally supports the conclusion that oil and gas platforms do not play a significant role in elevating levels of mercury in fish and other seafood." (*See*: http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html). The MMS bases its conclusion, in part, on the following studies:

- Kennicutt et al. (1996) (Exhibit 10) found that total mercury is not concentrated to any greater extent in organisms living near the oil and gas platforms (less than 100 meters away) when compared to those living far away from the oil and gas platforms (over 3000 meters). From these results the scientists concluded that oil and gas platforms do not contribute to higher mercury levels in marine organisms.

- Trefry et al. (2002) (Exhibit 11) determined that concentrations of methyl mercury ("MeHg") in sediments around drilling platforms do not vary significantly with concentrations found at sites that were far from drilling. He concluded that elevated levels of MeHg around oil and gas platforms are not widespread in the Gulf of Mexico.

- The MMS Subcommittee on Mercury in the Gulf of Mexico ("MMS Subcommittee"), which was established to independently evaluate existing scientific literature on whether OCS oil and gas activities were causing mercury pollution, corroborated these findings (Creselius et al., 2002) (Exhibit 12). The MMS Subcommittee determined that high levels of total mercury around oil and gas drilling sites is directly correlated with the drilling mud weighting agent barite. However, the increase in sediment concentrations of MeHg at or adjacent to OCS oil and gas drilling sites is not directly attributable to mercury introduced with barite, and discharges at OCS oil and gas drilling sites do not create conditions that enhance the conversion of mercury to MeHg.

- Preliminary results from a study currently being conducted by the Battelle Marine Sciences Laboratory indicate that barite is only minimally soluble and that the mercury in barite is not bioavailable to marine animals. (Cimato 2005, personal communication.)

Accordingly, the available scientific evidence does not support a high level of concern regarding mercury levels.

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HABITAT AREAS OF PARTICULAR CONCERN (HAPC) DESIGNATIONS FOR OFFSHORE OIL & GAS PLATFORMS IN SOUTHERN CALIFORNIA

October 5, 2004

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This paper is submitted by the California Artificial Reef Enhancement Program (CARE) in connection with the Environmental Impact Statement (EIS) being prepared by NOAA Fisheries for the designation of Essential Fish Habitat (EFH) for Pacific coast groundfish, which will be used by the Pacific Fisheries Management Council to update the EFH provisions in its Pacific Coast Groundfish Fishery Management Plan. We understand that NOAA Fisheries will be considering a number of alternatives for the designation of EFH and Habitat Areas of Particular Concern (HAPC) for inclusion in the EIS, including an alternative that would designate certain existing oil and gas production platforms as HAPC. CARE strongly supports the full evaluation of this alternative in the EIS. CARE also believes that the HAPC designations are appropriate based on the considerable evidence of habitat value, which is summarized in this report.

Background on the Existing Platforms off California:

The oil and gas industry began installing steel platforms for the development of offshore oil fields in Southern California in the late 1950's. Today, 27 platforms remain out of the original number of 34 constructed. The seven platforms no longer in service were completely removed from the seabed and disposed of onshore.

Of the remaining 27 platforms, 23 are in Federal Outer Continental Shelf (OCS) waters under leases from the U.S. Department of the Interior Minerals Management Service (MMS) and 4 are in State waters under leases from the California State Lands Commission.

The platforms are located between 1.2 and 10.5 miles from shore and in water depths from 35 to 1198 feet. The platforms are made almost entirely of structural steel tubular beams of up to 6 feet in diameter. The structures weigh from 1,000 to 70,000 tons, depending on water depth, and are very stable and long-lived.

Many of the platforms offshore California are in locations suitable as habitat for certain rockfish species, including overfished species such as bocaccio and cowcod. In addition to providing suitable habitat, most of these structures are not fished and act as de facto reserves.

The average age of the California platforms is approximately 25 years, with the last installation occurring in 1989. Although the operator determines the economic life of these platforms, the MMS estimates that all of the remaining OCS platforms will be decommissioned during the 2010 to 2025 timeframe. With a 3 to 5 year permitting process, it is possible that decommissioning planning and permitting will start within the next few years.

Current MMS regulations that govern decommissioning of offshore platforms require that the platforms be completely removed. The process of removal will completely destroy the habit that exists around these structures and kill most or all of the fishes that live there.

Criteria for Habitat Areas of Particular Concern:

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," and such "substrate" can include artificial structures underlying the water, such as oil and gas platforms. 50 C.F.R. § 600.10. Accordingly, under existing regulations it is appropriate for the EIS to include an alternative that explicitly recognizes the EFH value of the platforms by designating them as HAPC, if the structures satisfy the relevant criteria. As indicated in CARE's letter dated August 23, 2004, we believe that the HAPC designation is highly appropriate for the platforms in waters off California, based on the HAPC criteria stated in 50 C.F.R. § 600.815(a)(8):

(i) **importance of the ecological function provided by the habitat;**
The importance of the platforms to regional rockfish production is described in Love, M. S., Schroeder, D. M. & Nishimoto, M. M. (2003) *The ecological role of oil and gas production platforms and natural outcrops on fishes in southern and central California: a synthesis of information* (Minerals Management Service OCS Study MMS 2003-032) and other studies cited below. This research is ongoing, and recent findings indicate that the scope of impact of the platform habitat is greater than previously thought.

(ii) **the extent to which the habitat is sensitive to human-induced environmental degradation;**
The platform habitats are at risk for elimination due to the expected obsolescence and subsequent decommissioning of the platforms as required by current regulations. These regulations require the complete removal of the platforms, thereby destroying the habitats and killing all or most of the fish that live there.

(iii) **whether and to what extent development activities are, or will be, stressing the habitat type; and**
See (ii) above.

(iv) **the rarity of the habitat type.**
The platform habitats are unique in their size and proportions and in the fact that they provide relief through the entire water column. They also provide hard substrate that is limited in the vicinity of the platforms.

EFH determinations should be based on the best scientific information available. 50 C.F.R. § 600.815(a)(1)(ii)(B). If quantitative density or relative abundance data is available for the habitats occupied by the species at various life stages, the degree of habitat utilization can be assumed to be indicative of habitat value. Id. at § 600.815(a)(1)(iii)(B). If data regarding habitat-related growth, reproduction and/or survival by life stage are available, then habitat value should be assigned according to which habitat types support the highest growth rate, reproduction and survival. Id. at § 600.815(a)(1)(iii)(C). As indicated below, current research demonstrates the high habitat value of the oil and gas platforms for rockfish species based on these considerations.

Research on the Utilization of California Platforms by Rockfish:

Soon after the platforms were installed, it became obvious that marine life, both fishes and invertebrates, began to accumulate on and around the platforms. Operators began to periodically remove marine growth to insure platform stability. This removal process eventually became a commercial shellfish harvesting business. Recreational divers, underwater photographers, and marine scientists were drawn to the platforms by the extensive and diverse marine life.

Marine biologists began to examine the marine life in more detail starting in the 1980's, but it was not until 1995 when scientists at the Marine Science Institute (MSI) at University of California at Santa Barbara began to systematically survey the platforms. These surveys have been conducted annually with funding from United States Geological Survey (USGS), MMS and CARE (Love et al. 1999, Love et al. 2000, Love et al. 2001, and Love et al. 2003). Data on the densities of specific rockfish species (including overfished species) at specific platforms, compared to densities at natural reefs, are presented in Love et al. 2003.

MSI scientists have directly surveyed eighteen platforms and have reviewed ROV inspection tapes for five additional platforms. The overall results indicate that most of the platforms are important to rockfish species. Using both direct evidence and analogy, it is probable that a total of 23 platforms (listed in Appendix A) are important to rockfish species. The remaining four platforms (listed in Appendix B), while harboring numerous other fish species, are probably less important to rockfish. Key findings from this research which relate to the group of 23 platforms is summarized below:

1. Although generalizations about the platforms are possible, each platform habitat has unique features due to location, water depth, water temperature, ocean currents, platform configuration and other variables.
2. A total of 42 species of rockfish have been identified as living around the platforms. Rockfish species dominate platforms and platform habitats.
3. Platforms provide habitat for most rockfish species that is better than or equal to natural reefs.
   - Some platforms harbor higher densities of young rockfishes than do many natural reefs.
   - Some platforms harbor higher densities of some species of adult rockfishes than do most natural reefs.
   - In general, compared to platforms, natural reefs harbor higher densities of primarily dwarf rockfish species.
4. Platforms provide habitat for several critically depleted rockfishes and lingcod:
   - Platform Gail has the highest densities of adult bocaccio and cowcod of any location surveyed in Central or Southern California.
   - Some platforms have higher densities of young bocaccio, cowcod, and lingcod than do most natural reefs.

5. Platforms act as nursery grounds for rockfishes:
   - It is probable that platforms provide habitat for recruiting pelagic stages of some rockfishes that would otherwise have perished. Some rockfishes that are recruited to the platforms appear to stay there until they reach maturity. Some rockfishes may stay for life.

This research is ongoing and continues to generate new findings. Recently the 2003 platform survey results for young-of-the-year (YOY) bocaccio were incorporated into the STATC model for fish stock assessments. It was found that, in some years, a significant number of all YOY bocaccio on the entire Pacific Coast live around the platforms. This is a surprising finding given the small scale of the platforms relative to the entire Pacific Coast. The study has been submitted for publication in a scientific journal, and details will be available for discussion once it is published. We will provide copies when available for consideration by NOAA Fisheries in preparing the EIS.

Uniqueness of Habitat:

As documented by Love et al. 1999, Love et al. 2000, Love et al. 2001, and Love et al. 2003, offshore platforms provide unique structural features that make them particularly suited for rockfish habitat. Perhaps the most obvious of these is the fact that the platforms provide relief through the entire water column. Most natural reefs in the vicinity of the platforms consist of rock features of no more than 30 feet above the sea floor. Thus, platforms are easier for larval fish to find and recruit to. Platforms also provide a variation of depths for different life stages of rockfish. Juveniles are found in the mid-waters and adults dominate the bottom. This separation may lead to lower predation rates for juveniles than on natural reefs where the different ages are in closer proximity.

Another feature of many platforms is that they provide sheltered hiding places where platform legs and cross-members near the seafloor leave small openings and crevices that suit rockfish behavior patterns. Adults are found taking advantage of this shelter where the cross-members are close to the bottom and are generally absent where there are no cross-members.

The location of the platforms in the Southern California Current put them in the path of a substantial supply of plankton. The combination of shelter and a plentiful food supply, make them well suited for rockfish habitat.

Finally, the platforms provide hard substrate in some areas where this habitat type is limited. The platform substrate has had, on average, 25 years to develop relatively undisturbed into mature, diverse and thriving reef communities that include substantial rockfish populations.

Benefits of HAPC Designation:

As the oil and gas platforms off California become obsolete, platform operators will propose decommissioning projects to meet applicable regulatory requirements. Since full removal is currently required, operators will be forced to seek permits that will result in the permanent destruction of this habitat. HAPC designation for this habitat will highlight the habitat value to the agencies leading the permitting process. A full and complete evaluation of this habitat weighed against all other factors in the decommissioning process will result in the best project decisions with a minimum of adverse impacts.

Recommendation

Based upon the best available scientific information, CARE recommends that the EIS being prepared by NOAA Fisheries for Pacific groundfish EFH include full evaluation of an alternative for the designation of the 23 platforms listed in Appendix A as Habitat Areas of Particular Concern for rockfish species. As new information becomes available through ongoing studies, our recommendation may be revised to add or delete individual platforms.

The four existing platforms off California that are excluded from this recommendation all have extensive marine life and provide habitat to many fish species. However, at this time, they are not known to be important to rockfish. See Appendix B.

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Appendix A

Platforms recommended for HAPC designation for rockfish:

Platform	Lat/Long	Water Depth
Platform A	34º19’N, 119º36’W	188
Platform B	34º19’N, 119º37’W	190
Platform C	34º19’N, 119º37’W	192
Hogan	34º20’N, 119º32’W	154
Edith	33º35’N, 118º08’W	161
Houchin	34º20’N, 119º33’W	163
Henry	34º19’N, 119º33’W	173
Hillhouse	34º19’N, 119º36’W	190
Gilda	34º10’N, 119º25’W	205
Holly*	34º22’N, 119º52’W	211
Irene	34º36’N, 120º43’W	242
Elly	33º35’N, 118º07’W	255
Ellen	33º34’N, 118º07’W	265
Habitat	34º17’N, 119º35’W	290
Grace	34º10’N, 119º28’W	318
Hildago	34º29’N, 120º42’W	430
Hermosa	34º27’N, 120º38’W	603
Harvest	34º28’N, 120º40’W	675
Eureka	33º33’N, 118º06’W	700
Gail	34º07’N, 119º24’W	739
Hondo	34º23’N, 120º07’W	842
Heritage	34º21’N, 120º16’W	1075
Harmony	34º22’N, 120º10’W	1198

*Platform in State waters

Appendix B

Platforms not recommended for HAPC for rockfish:

Platform	Lat/Long	Water Depth
Ester*	33º19'N, 118º77'W	35
Emmy*	33º39'N, 118º02'W	47
Eva*	33º39'N, 118º03'W	57
Gina	34º07'N, 119º16'W	95

*Platforms in State waters

Fish assemblages around seven oil platforms in the Santa Barbara Channel area

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Abstract.—In 1996 we surveyed the fishes living on and around seven offshore oil platforms in the Santa Barbara Channel area. We conducted belt transects at various depths in the midwater and around the bottoms of each platform using the research submersible *Delta*. The bottom depths of these platforms ranged from 49 to 224 m and the midwater beams ranged from 21 to 196 m. We found that there were several distinct differences in the fish assemblages living in the midwater and bottom habitats around all of the platforms. Both midwater and bottom assemblages were dominated by rockfishes. Platform midwaters were dominated by young-of-the-year (YOY) or juveniles up to two years old. Rockfishes larger than about 18 cm total length were rarely seen in the midwater. The fish assemblages around the bottoms of the platforms were dominated by larger individuals, primarily subadults or adults. Density of all fishes was similar between the bottoms and midwater of any given platform. However, the total biomass was much greater on the bottoms, owing to larger fish living there. There was a consistently greater number of species on the bottom than in the midwater of each platform, likely because of a larger variety of habitat types on the bottom. The fish assemblages also differed among platforms. We found significantly higher densities of young-of-the-year rockfishes around platforms north of Pt. Conception compared with those in the Santa Barbara Channel, probably because the more northerly platforms are located in the more productive waters of the California Current.

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Petroleum production has been a part of the southern California economy since the nineteenth century. The earliest drilling took place on land, but by the early twentieth century a large number of piers lined the coast, tapping into offshore oil deposits. Hazel, the first offshore oil platform, was constructed off Summerland in 1958 (Carlisle et al., 1964). At the peak of oil drilling in the early 1980s, there were 30 platforms operating in southern and central California. Currently, there are 19 platforms in operation in the Santa Barbara Channel and off Point Conception (Fig. 1).

Oil platforms provide considerable habitat for marine organisms. The earliest structures were relatively small (23 m long at the surface), newer platforms, however, are over 100 m long (MBC[1]). Sessile invertebrates (primarily mussels, barnacles and anemones) encrust the pilings and well pipes and cover the bottom to form additional habitat.

Oil platforms have a finite economic lifespan and a number of them are becoming uneconomical to operate. In 1996, four platforms were removed from the Santa Barbara Channel, although not without controversy. There is considerable debate regarding the fate of these structures. Some interest groups would like to leave part or all of them in place, claiming protection of fish habitat; others favor complete removal. Understanding the biological communities on the platforms is crucial to making rational decisions regarding the fates of these structures. In addition, research on these platforms could also address questions regarding the role that artificial reefs might play in coastal fish communities. Ultimately, this research will allow us to contrast the fish assemblages on platforms with those of nearby reefs.

Currently, very little is known about the fish fauna around these platforms. One relatively comprehensive SCUBA survey examined fish populations around two shallow inshore platforms, Hazel and Hilda, during Hazel's first three years and Hilda's first year of operation (Carlisle et al., 1964). Additional cursory surveys were conducted around these two platforms in 1970 and 1975; Bascom et al., 1976; Allen and Moore[2]). With the exception of a short-term study of fishes around platform Hidalgo using a remotely operated vehicle (ROV) (Love et al., 1994) and a survey of recreational fishing around Santa Bar-

[1] MBC (Marine Biology Consultants). 1987. Ecology of oil/gas platforms offshore California. Outer Continental Shelf (OCS) Study Minerals Management Service (MMS) 86-0094.

[2] Allen, M. J., and M. D. Moore. 1976. Fauna of offshore structures. South. Calif. Coast. Water. Res. Proj. Annu. Rep., Long Beach, CA, p. 179–186.

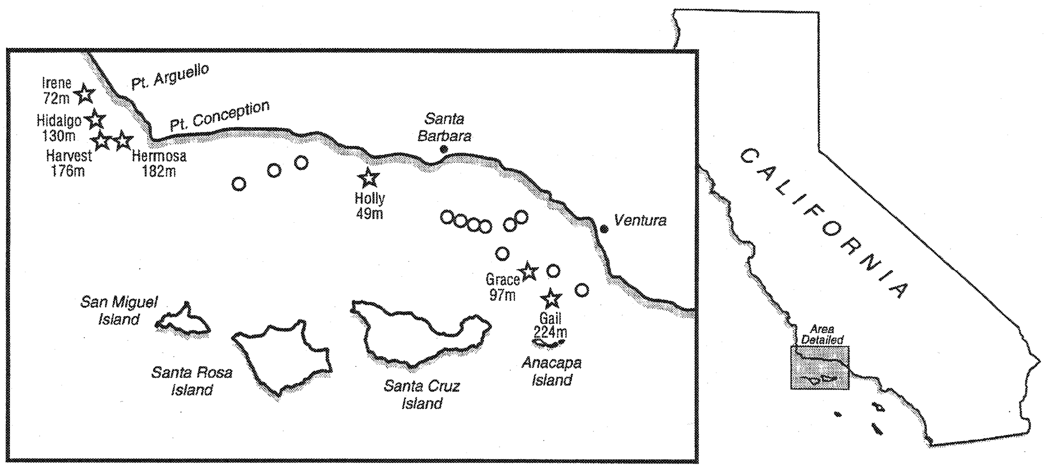

Figure 1
Locations of 19 oil platforms in the Santa Barbara Channel and off Pt. Conception. The seven platforms surveyed in this paper are denoted with stars and labeled.

bara Channel platforms (Love and Westphal, 1990), no other research has been published on the fishes of any California oil platform.

In 1995, we began a survey of the fishes living on and around several platforms in the Santa Barbara Channel area. The surveys were of two types: a scuba-based study in the surface waters (to 30 m) of the platforms and a submersible survey that examined the deeper sections of these structures. However, in 1995, we could not survey any platform bottoms because of inclement weather. This paper discusses the results of the 1996 deep survey.

Materials and methods

Study sites

We surveyed fish assemblages around oil platforms situated in and just northwest of the Santa Barbara Channel. Surveys were conducted around the bottom of six platforms and in the midwater of seven platforms in 1996 (Fig. 1; Table 1). The bottom depth of these platforms ranged from 49 to 224 m. The midwater depths ranged from 21 to 196 m.

The platforms are situated in an area with a complex oceanographic regime. The Santa Barbara Channel is semi-enclosed, faces east-west, and is bordered by the Northern Channel Islands on the south and the mainland on the west. It is embedded within the much larger California-Baja California coastal current regime (Brink and Muench, 1986; Hickey, 1992). Surface waters to the north and west of the Channel are typically cool because the California Current flows equatorward from high latitudes yearround and upwells in the Point Conception and Point Arguello areas during spring and summer. At the same time, the cyclonic circulation pattern in the southern California bight brings warm water flowing poleward along the coast from the east and south of the Santa Barbara Channel. In general, water is cooler and more productive in the area of Points Arguello and Conception than in the Santa Barbara Channel, particularly compared with the more eastern end of the channel.

Surveys

Using the submersible *Delta*, we conducted belt transects around each platform. The submersible maintained a speed of approximately 0.5 knots and stayed approximately 2 m from the structure. Transects were made around the bottom of the platform (from the substrata to approximately 2 m above the substrata) and around each set of cross beams to a minimum depth of about 20 m below the surface. Dives were conducted during daylight hours, between one hour after sunrise and two hours before sunset.

During the transects, researchers made their observations from the central starboard-side viewing port. An externally mounted Hi 8-mm video camera with associated lights filmed the same viewing field as seen by the observers. Observers identified and counted all fishes and verbally recorded those data on the video. All fishes within 2 m of the submarine were counted. Fish lengths were estimated by using

Table 1

Latitude, longitude, bottom and midwater depths, and date of sampling of the seven oil platforms. Platforms listed from northwest to southeast.

Platform	Location	Bottom depth (m)	Midwater depths (m)	Date surveyed
Irene	34°36.62'N, 120°43.77'W	72	29, 50	2 Nov 1996
Hidalgo	34°29.70'N, 120°42.13'W	130	36, 59, 83, 107	28 Oct 1996
Harvest[1]	34°28.15'N, 120°40.85'W	176	38, 61, 84, 113, 141	28 Oct 1996
Hermosa	34°27.33'N, 120°38.78'W	182	63, 84, 106, 131, 156	28 Oct 1996
Holly	34°23.38'N, 120°54.33'W	49	21, 35, 50	29 Oct 1996
Grace	34°10.77'N, 120°28.12'W	97	45, 69, 82	30 Oct 1996
Gail	34°07.50'N, 120°24.02'W	224	71, 95, 115, 141, 166, 196	30 Oct 1996

[1] Midwater survey only.

a pair of lasers mounted on either side of the external video camera. The projected reference spots were 20 cm apart and were visible to the observer. An environmental monitoring system aboard the submarine continuously recorded date and time, depth, and altitude of the vessel above the sea floor. After the dive, these data were overlaid on the original videotape.

Transect videos were reviewed either aboard the research vessel or in the laboratory. For each fish, we recorded 1) its species, to lowest identifiable taxa; 2) its estimated total length to the nearest cm; and 3) the microhabitat it occupied (e.g. pipe, sand, mussel shell mounds, mud). We defined young-of-year fishes (YOYs) from published estimates of size at age. Subadults are defined as juveniles in their second year up to, but not including, maturity.

During the survey at platform Gail, all greenspotted (*Sebastes chlorostictus*) and greenblotched rockfishes (*S. rosenblatti*) were inadvertently identified as greenspotted rockfish. In reviewing the videotape, it was clear that some of the individuals that were recorded as greenspotted rockfish were in fact greenblotched rockfish. In order to correct for this potential misidentification, the total number of both species was adjusted by using the proportion of greenblotched to greenspotted rockfishes (ratio=2.2) observed at platform Gail during the following year's survey (Love, unpub. data). Similar numbers of the two species combined were observed during the two years (1996: n=186,1997: n=209).

Analyses

We estimated length of those transects conducted on the bottom by first determining the submersible speed. This was done by evaluating a ten-second segment for every one minute of transect. The video was manually forwarded frame by frame and the number of 20-cm segments passing the lasers in a ten-second section was counted. The number of 20 cm segments per 10 seconds was divided by 2 to obtain speed in centimeters per second. All subsamples were then averaged to obtain mean transect speed (cm/s). The mean speed was then multiplied by the number of seconds in the transect and divided by 100 to obtain transect length in meters. The length was then multiplied by 2 m (the transect width) to obtain transect area, allowing us to present both densities (fish/m^2) and biomass (kg/m^2). Biomass was estimated for all species by using length-weight relationships derived empirically or obtained from the literature. No biomass estimates were made for species that could not be identified to the family level.

In the midwater, we could not see the lasers pass before fixed points; therefore, we could not directly measure the length of the midwater transects. Without knowledge of the length of the midwater transects, we could not calculate density or biomass per unit area as done on the bottom transects. However, we were able to estimate the length of midwater transects for use in estimating both fish density and biomass. We did this by converting density and biomass on the midwater transects from number and kilogram per minute to number and kilogram per m^2, respectively. This conversion was accomplished by calculating the equation for the regression of density in terms of number per m^2 on density in terms of number per minute for the bottom transects where both values were known (Fig. 2A). The same relationship was calculated for biomass (Fig. 2B). Given the regression equations, density per m^2 and biomass per m^2 could be calculated from number per minute and kilograms per minute. We called these calculations "estimated density" (number/m^2) and "estimated biomass "(kg/m^2).

This method of estimating transect length and hence fish density and biomass relies on the assumption that the submersible travels at the same speed in both habitats. Although we did not have data on submersible speed, every attempt was made to maintain the submersible at the same speed on all transects during the survey. However, because of debris on the bottom and water currents in the midwater, if there were differences in speed, the submersible was likely to travel slightly faster in the midwater habitats than on the bottoms. In this case, the submersible would cover more area per unit time and the true fish density in the midwater may actually be slightly lower than our estimated density. We consider the potential bias introduced by differences in submersible speed to be minor in relation to the magnitude of the observed differences in fish densities between the midwater and bottom transects (see "Results" section).

We calculated both species richness (number of species) and species diversity. We used the Shannon-Weiner diversity index (H') for all species diversity comparisons (Shannon and Weaver, 1949). We also calculated a percent similarity index (PSI) that quantifies how similar two assemblages are in terms of their species composition (i.e. the relative abundance of those species). The index ranges from 0 (no species shared) to 100% (identical composition and relative abundances). The formula for PSI is

$$PSI = \left\{\sum \min(p_{xi}, p_{yi})\right\} \times 100,$$

where, p_{xi} and p_{yi} are the proportion of the ith species in habitat x and habitat y. PSI was calculated for each pair of platform bottom assemblages.

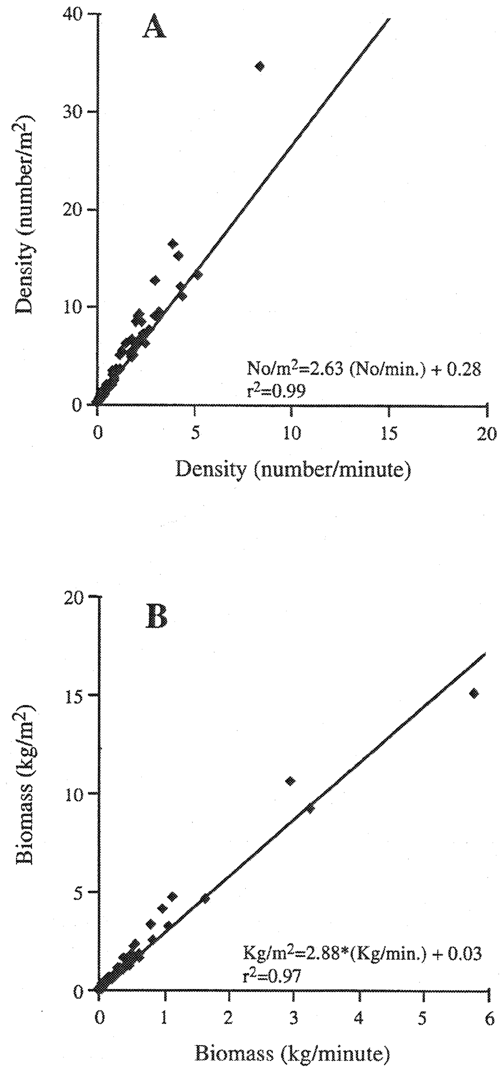

Figure 2
Regressions of (**A**) density in terms of number per minute on density in terms of number per m^2 and (**B**) biomass in terms of kilograms per minute on biomass in terms of kilogram per m^2 for bottom transects on all platforms. The regression equations were used to calculate density and biomass from number and kilogram per minute into number and kilogram per m^2 on the midwater transects. See "Methods" section for explanation of the conversion.

Results

Bottom versus midwater transects

We found that there were several distinct differences in the fish assemblages living in the midwater and bottom habitats around all of the platforms. We calculated percent similarity indices (PSI) between the bottom and midwater assemblages for each platform. These PSIs ranged from 1% to 34% (mean 13.3%). Although both midwater and bottom assemblages were dominated by rockfishes, platform midwaters were dominated by young-of-the-year (YOY) or slightly older juveniles (<10 cm). Rockfishes larger than about 20 cm were rarely seen in the midwater (Fig. 3). The fish assemblages around the bottoms of the platforms were dominated by subadults or adults (11–20 cm) and occasionally harbored very large individuals (up to 48 cm) (Fig. 3).

Average density per platform of all fishes combined was not significantly different on the bottom versus the midwater transects (bottom mean density

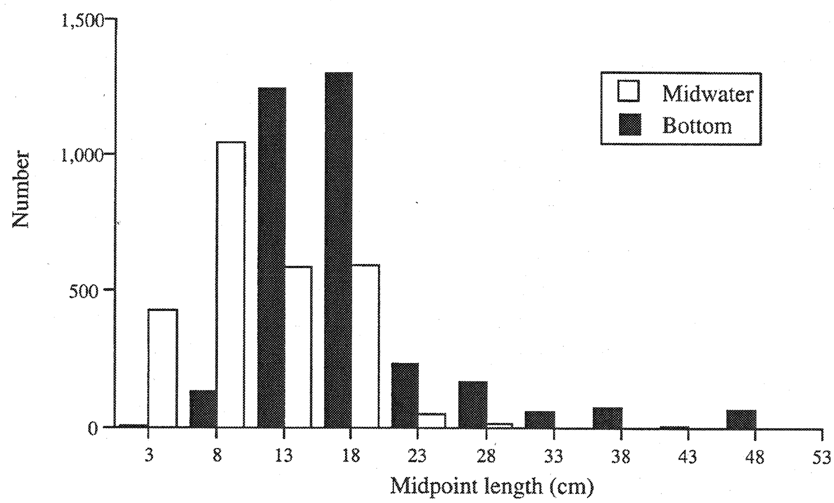

Figure 3
Length-frequency distribution for all rockfish species and all platforms combined. Midpoint length is the midpoint of 5-cm length bins.

(SE)=141.4 fish/100m^2 (49.0), n=6 platforms; midwater mean density (SE)=115.8 fish/100m^2 (32.2), n=7 platforms; t-test, t=0.44, P=0.66). On three platforms, density was higher on the bottom than in midwater and on three other platforms the reverse was true. However, there was a much larger and consistent difference in biomass between bottom and midwater transects. For most families and all platforms, total biomass was higher on bottom than midwater transects (Table 2). Average biomass per platform (SE) for all species combined was 19.06 kg/m^2 (2.5) on the bottom and 6.47 kg/m^2 (2.3) in the midwater (t-test, t=3.75, P=0.003). This consistent difference was due to the lack of adult fishes in the midwater.

Fewer species lived on the midwater structures than on the bottom. Species richness for all rigs combined was 24 in the midwater versus 40 on the bottom. Average species richness per platform was significantly higher on the bottom than in the midwater (bottom mean richness (SE)=14.7 species (1.5); midwater mean richness (SE)=8.2 species (1.4); t-test, t=3.26, P=0.008). Average species diversity (H′) across platforms was identical between bottoms and midwaters (bottom mean H′ (SE)=1.2 (0.2); midwater mean H′ (SE)=1.2 (0.2); t-test, t=0.09, P=0.99). We present the remaining results for bottom and midwater habitats separately.

Bottom habitat

All platforms We identified at least 40 fish species around the platform bottoms (Table 2). Twenty-seven species were rockfishes; they were by far the most speciose group. Rockfishes made up 92.7% of all fishes on the bottom (Table 3) and represented 96.7% of the biomass (Table 2).

Halfbanded, greenspotted, copper, vermilion, widow, and flag rockfishes, and bocaccio were among the most commonly observed rockfishes (Table 3). Our observations indicated that vermilion rockfish, flag rockfish, and bocaccio of all sizes were always closely associated with the platform structure (Fig. 4A). Larger copper and greenspotted rockfishes also were more likely to be very close to the platform. In particular, flag rockfish were most often seen tucked well into the space formed by the bottom of the lowest crossbeam and the bottom (Fig. 4B). Flag and greenspotted rockfishes were almost always seen on or very close to the bottom. Halfbanded rockfish, as well as smaller greenspotted and copper rockfishes, were less bound to the platform and were often seen well away from the structure. Juvenile greenspotted and copper rockfishes were usually nestled within or just above the mussel, shell-covered substrata. Vermilion rockfish, and to a certain extent copper rockfish and bocaccio, would occasionally ascend up platform legs as much as 5 m.

Flag rockfish, as well as larger bocaccio and vermilion rockfish, often were solitary or found in small groups. The exception occurred at platform Gail, where one school of bocaccio comprised at least 100 individuals. Smaller adult or subadult vermilion and copper rockfishes tended to aggregate, often in mixed groups containing 50 or more individuals. The few

Table 2

Biomasses of fishes observed, by species, around all platforms in October–November of 1996. Biomasses are given for bottoms of platforms and midwater, with percent of totals for those parts of the platforms. Biomass is kilograms/m^2. Family totals are given in boldface. YOY means "young-of-year."

			Bottom		Midwater	
Family	Common name	Scientific name	Biomass	% Total	Biomass	% Total
Scorpaenidae	Rockfishes		**96.83**	**84.66**	**38.81**	**85.90**
	Kelp rockfish	*Sebastes atrovirens*	0	0	0.34	0.75
	Brown rockfish	*S. auriculatus*	0.82	0.71	0	0
	Gopher rockfish	*S. carnatus*	0.01	<0.1	0.23	0.51
	Copper rockfish	*S. caurinus*	12.12	10.59	0.47	1.04
	Greenspotted rockfish	*S. chlorostictus*	8.80	10.94	0.56	1.23
	Starry rockfish	*S. constellatus*	0.02	<0.1	0	0
	Darkblotched rockfish	*S. crameri*	0.07	<0.1	0	0
	Calico rockfish	*S. dalli*	1.40	1.22	0.08	0.18
	Greenstriped rockfish	*S. elongatus*	0.32	0.28	0	0
	Swordspine rockfish	*S. ensifer*	0.03	<0.1	0.08	0.17
	Widow rockfish	*S. entomelas*	1.86	1.62	24.08	53.15
	Yellowtail rockfish	*S. flavidus*	0.08	<0.1	0	0
	Chilipepper	*S. goodei*	0	0	0.82	1.82
	Squarespot rockfish	*S. hopkinsi*	0.46	0.40	0.51	1.12
	Vermilion rockfish	*S. miniatus*	20.84	18.22	0	0
	Blue rockfish	*S. mystinus*	0.74	0.65	0.29	0.64
	Bocaccio rockfish	*S. paucispinis*	14.35	12.55	3.68	8.12
	Canary rockfish	*S. pinniger*	1.18	1.03	0	0
	Rosy rockfish	*S. rosaceus*	0.46	0.40	0.07	0.15
	Greenblotched rockfish	*S. rosenblatti*	3.89	0.15	0	0
	Yelloweye rockfish	*S. ruberrimus*	0.06	<0.1	0	0
	Flag rockfish	*S. rubrivinctus*	1.44	1.26	0.55	1.21
	Bank rockfish	*S. rufus*	0.29	0.25	0	0
	Halfbanded rockfish	*S. semicinctus*	26.21	22.91	0.04	<0.1
	Olive rockfish	*S. serranoides*	0.03	<0.1	0	0
	Treefish	*S. serriceps*	0.19	0.17	0.04	<0.1
	Pygmy rockfish	*S. wilsoni*	0.04	<0.1	0	0
	Sharpchin rockfish	*S. zacentrus*	0.10	<0.1	0.04	<0.1
	Shortspine thornyhead	*Sebastolobus alascanus*	<0.1	<0.1	0	0
	Sebastomus group[1]		0.31	0.27	0.37	0.82
	Rockfish YOY	*Sebastes* spp.	0.72	0.63	6.56	14.47
Hexagrammidae	Greenlings		**12.88**	**11.25**	**2.72**	**6.01**
	Kelp greenling	*Hexagrammos decagrammus*	0	0	<0.1	<0.1
	Lingcod	*Ophiodon elongatus*	12.35	10.80	0	0
	Painted greenling	*Oxylebius pictus*	0.51	0.44	2.72	6.01
	Shortspine combfish	*Zaniolepis frenata*	0.01	<0.1	0	0
	Combfish sp.	*Zaniolepis* sp.	0.01	<0.1	0	0
Pomacentridae	Damselfishes		**0**	**0**	**0.54**	**1.20**
	Blacksmith	*Chromis punctipinnis*	0	0	0.54	1.20
Embiotocidae	Seaperches		**4.57**	**3.99**	**3.02**	**6.65**
	Pile perch	*Damalichthys vacca*	3.71	3.24	1.18	2.60
	Sharpnose surfperch	*Phanerodon atripes*	0.49	0.43	1.84	4.05
	Unident. sea perches		0.20	0.17	0	0
	Pink surfperch	*Zalembius rosaceus*	0.17	0.15	0	0
Gadidae	Cods		**0**	**0**	**0.20**	**0.44**
	Pacific hake	*Merluccius productus*	0	0	0.20	0.44

continued

Table 2 (continued)

Family	Common name	Scientific name	Bottom Biomass	Bottom % Total	Midwater Biomass	Midwater % Total
Cottidae	Sculpins		**0**	**0**	**0.03**	**0.07**
	Unidentifed sculpin		0	0	0.03	0.07
Bathymasteridae	Ronquils		**0.03**	**0.03**	**0**	**0**
	Unidentified ronquil		0.03	0.03	0	0
Agonidae	Poachers		**0.01**	**0.01**	**0**	**0**
	Unidentified poacher		0.01	0.01	0	0
Flatfish	Flatfish		**0.06**	**0.06**	**0**	**0**
	Sanddabs	*Citharichthys* sp.	0.01	0.01	0	0
	Unident. flatfish		0.05	0.05	0	0

[1] *Sebastomus* group may include greenblotched, greenspotted, pinkrose, rosethorn, rosy, starry, or swordspine rockfishes.

canary rockfish we noted tended to associate with vermilion rockfish. Halfbanded rockfish were almost always seen in schools, sometimes containing hundreds of individuals (Fig. 4C).

In the greenling family, Hexagrammidae, both lingcod and painted greenling, were common; together they represented about 5.3% of all fishes seen. Larger lingcod were solitary and tended to remain near the bottom of the platform (Fig. 4D). They were usually seen sitting motionless on the bottom or slowly swimming just above it. Juvenile lingcod rarely came within a meter of the platform, they were usually seen lying among the mussel shells away from the structure (Fig. 4E). Painted greenling sat on the crossbeams, along the pilings and on the mussel shells, always found as solitary individuals.

Among platform comparisons The bottom fish assemblages around each platform were all different (Tables 4 and 5). Pairwise percent similarity indices (PSI) for each combination of platforms ranged from 0% (platforms Gail and Holly) to 70.1% (platforms Grace and Hidalgo) (Table 4). The average percent similarity was 20.0%. Despite a low average similarity value, rockfishes, as measured by number, density and biomass, dominated the bottom assemblages around all of the platforms (Table 5). Lingcod were the only nonrockfish species among the top four most common species at any platform.

Around platform Irene, subadult and adult copper and vermilion rockfishes were most abundant. Irene also was unique among the platforms in having large numbers of juvenile lingcod. Halfbanded rockfish, painted greenling, and pile perch were also commonly seen. Halfbanded and greenspotted rockfish were most common at platform Hidalgo, along with flag rockfish, lingcod, bocaccio, and vermilion rockfish. Similar to that around Hidalgo (PSI=60%), the bottom fish assemblage around platform Hermosa was characterized by greenspotted and halfbanded rockfish, with lesser numbers of flag rockfish and lingcod (Table 4). Vermilion, calico, widow, copper, and squarespot rockfishes were most often seen at Holly, along with lesser numbers of halfbanded rockfish, pile perch, rosy rockfish, and painted greenling. Very large schools of halfbanded rockfish were observed at Grace, along with some flag, greenspotted, and vermilion rockfishes. The dominance of halfbanded rockfish at Hidalgo and Grace resulted in the highest PSI among platform pairs (70.1%). Members of the rockfish subgenus *Sebastomus*, primarily greenblotched and greenspotted rockfishes and bocaccio were most abundant at platform Gail. Gail had by far the highest number and density of bocaccio of any of the platforms.

We observed between 8 and 21 species around the bottom of the platforms (Fig. 5A). We found no significant relationship between species number or diversity (H′) and platform bottom depth (linear regression: species richness vs. depth, r^2=0.58, P=0.07, diversity (H′) vs. depth, r^2=0.19, P=0.37, Fig. 5A). Although neither relationship was significant, there was a tendency for platforms in shallower water to have both higher species richness and species diversity. Location of the platforms within the Santa Barbara Channel and Santa Maria Basin also did not explain the differences among platforms. There was no correlation between northwest to southeast orientation and either species richness or diversity (Spearman rank correlation: species richness vs. orientation, r_s=–0.26, P=0.6, diversity (H′) vs. orientation, r_s=–0.6, P=0.2). In fact, the two most

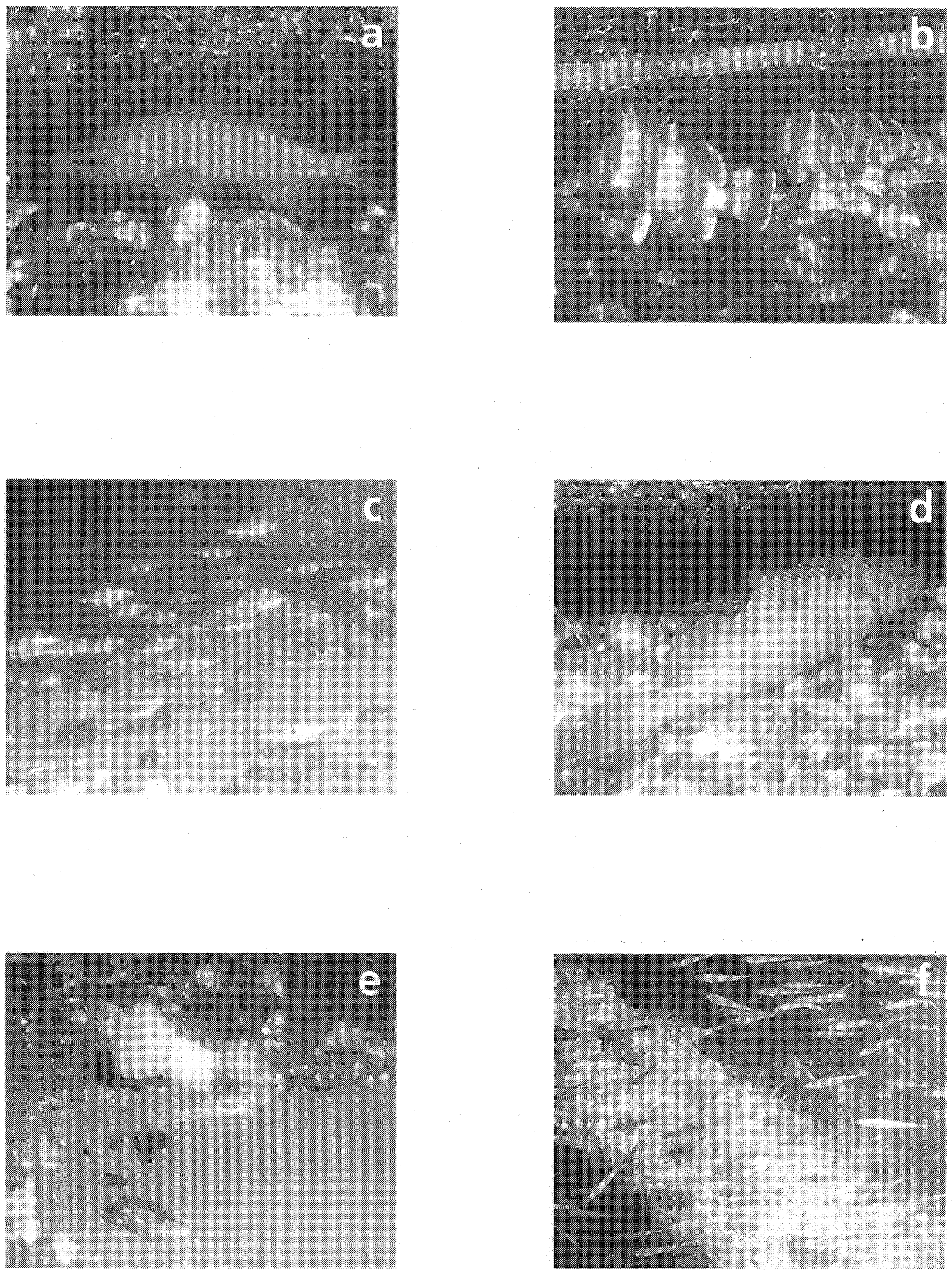

Figure 4
Fishes typical of offshore oil platforms in the Santa Barbara Channel and Santa Maria Basin: (**A**) bocaccio, *Sebastes paucispinis*, (**B**) flag rockfish, *S. rubrivinctus*, (**C**) halfbanded rockfish, *S. semicinctus*, (**D**) adult lingcod, *Ophiodon elongatus*, (**E**) juvenile lingcod, A–E all on bottom transects, and (**F**) young-of-the-year rockfish, *Sebastes* spp,. on midwater crossbeam.

Table 3

Numbers of fishes observed, by species, around all platforms in October–November of 1996. Numbers are given for bottoms of platforms and midwater, with percent of totals for those parts of the platforms. Family totals are given in boldface. YOY means "young-of-year."

			Bottom		Midwater	
Family	Common name	Scientific name	Biomass	% Total	Biomass	% Total
Scorpaenidae	Rockfishes		**4212**	**92.7**	**2753**	**91.4**
	Kelp rockfish	*Sebastes atrovirens*	0	0	1	<0.1
	Brown rockfish	*S. auriculatus*	7	0.2	0	0
	Gopher rockfish	*S. carnatus*	2	<0.1	4	0.1
	Copper rockfish	*S. caurinus*	347	7.6	11	0.4
	Greenspotted rockfish	*S. chlorostictus*	365	8.0	18	0.6
	Starry rockfish	*S. constellatus*	1	<0.1	0	0
	Darkblotched rockfish	*S. crameri*	1	<0.1	0	0
	Calico rockfish	*S. dalli*	68	1.5	2	<0.1
	Greenstriped rockfish	*S. elongatus*	12	0.3	0	0
	Swordspine rockfish	*S. ensifer*	2	<0.1	2	<0.1
	Widow rockfish	*S. entomelas*	115	2.5	1054	35.0
	Yellowtail rockfish	*S. flavidus*	1	<0.1	0	0
	Chilipepper	*S. goodei*	0	0.00	68	2.3
	Squarespot rockfish	*S. hopkinsi*	47	1.0	22	0.7
	Vermilion rockfish	*S. miniatus*	307	6.8	0	0
	Blue rockfish	*S. mystinus*	7	0.2	6	0.2
	Bocaccio rockfish	*S. paucispinis*	85	1.9	264	8.8
	Canary rockfish	*S. pinniger*	10	0.2	0	0
	Rosy rockfish	*S. rosaceus*	31	0.7	1	<0.1
	Greenblotched rockfish	*S. rosenblatti*	129	2.8	0	0
	Yelloweye rockfish	*S. ruberrimus*	2	<0.1	0	0
	Flag rockfish	*S. rubrivinctus*	113	2.5	15	0.5
	Bank rockfish	*S. rufus*	2	<0.1	0	0
	Halfbanded rockfish	*S. semicinctus*	2491	54.8	1	<0.1
	Olive rockfish	*S. serranoides*	1	<0.1	0	0
	Treefish	*S. serriceps*	5	0.1	1	<0.1
	Pygmy rockfish	*S. wilsoni*	4	<0.1	0	0
	Sharpchin rockfish	*S. zacentrus*	11	0.2	1	<0.1
	Shortspine thornyhead	*Sebastolobus alascanus*	1	<0.1	0	0
	Sebastomus group[1]		19	0.4	13	0.4
	Rockfish YOY	*Sebastes* spp.	26	0.6	1269	42.1
Hexagrammidae	Greenlings		**244**	**5.4**	**187**	**6.2**
	Kelp greenling	*Hexagrammos decagrammus*	0	0	1	<0.1
	Lingcod	*Ophiodon elongatus*	193	4.3	0	0
	Painted greenling	*Oxylebius pictus*	46	1.0	186	6.2
	Shortspine combfish	*Zaniolepis frenata*	2	<0.1	0	0
	Combfish sp.	*Zaniolepis* sp.	3	<0.1	0	0
Pomacentridae	Damselfishes		**0**	**0**	**12**	**0.4**
	Blacksmith	*Chromis punctipinnis*	0	0	12	0.4
Embiotocidae	Seaperches		**65**	**1.4**	**20**	**0.7**
	Pile perch	*Damalichthys vacca*	46	1.0	6	0.2
	Sharpnose surfperch	*Phanerodon atripes*	9	0.2	14	0.5
	Unident. sea perches		1	<0.1	0	0
	Pink surfperch	*Zalembius rosaceus*	9	0.2	0	0
Gadidae	Cods		**2**	**<0.1**	**18**	**0.6**
	Pacific hake	*Merluccius productus*	2	<0.1	18	0.6

continued

Table 3 (continued)

Family	Common name	Scientific name	Bottom Biomass	Bottom % Total	Midwater Biomass	Midwater % Total
Cottidae	Sculpins		**0**	**0**	**1**	**<0.1**
	Unidentifed sculpin		0	0	1	<0.1
Bathymasteridae	Ronquils		**2**	**<0.1**	**0**	**0**
	Unidentified ronquil		2	<0.1	0	0
Agonidae	Poachers		**2**	**<0.1**	**0**	**0**
	Unidentified poacher		2	<0.1	0	0
Flatfish	Flatfish		**13**	**0.3**	**0**	**0**
	Sanddabs	*Citharichthys* sp.	1	<0.1	0	0
	Unident. flatfish		12	0.3	0	0

[1] *Sebastomus* group may include greenblotched, greenspotted, pinkrose, rosethorn, rosy, starry, or swordspine rockfishes.

similar assemblages were on platforms near the geographic extremes (Hidalgo and Grace).

Density and biomass of all species combined also varied among rigs but in a pattern different from species richness and diversity (Fig. 5B). However, similar to richness and diversity, density and biomass differences could not be explained by bottom depth or by geography (linear regression: density vs. depth, r^2=0.22, P=0.35, biomass vs. depth, r^2=0.06, P=0.64; Spearman rank correlation: density vs. orientation, r_s=-0.31, P=0.54, biomass vs. orientation, r_s=-0.37, P=0.46).

Although bottom depth did not explain the patterns of abundance of all species combined, the abundance patterns of individual species did relate more strongly to bottom depth. Among the more commonly observed species, eight showed depth-related patterns of abundance (Fig. 6). Copper and vermilion rockfishes, lingcod, and painted greenling were most dense around the bottoms of some of the shallower platforms (especially platform Irene). Halfbanded and flag rockfishes were most dense on the bottoms of the middepth structures and bocaccio and greenspotted rockfish were most common at the bottom of the deeper platforms.

Table 4

Percent similarity indices for each pair of platforms for the bottom only in 1996. No bottom surveys were done on platform Harvest.

Platform	Gail	Grace	Holly	Hermosa	Hidalgo
Grace	2.3				
Holly	0	8.5			
Hermosa	24.7	34.5	8.5		
Hidalgo	17.9	70.1	11.8	60.0	
Irene	1.4	4.7	41.5	3.8	10.0

Midwater habitat

All platforms Rockfishes also dominated the midwater portions of the platforms, but were primarily YOYs and slightly older juveniles. Rockfishes represented 91.4% of the individuals (Table 3) and 85.9% of the biomass (Table 2) in the midwater. Although it was difficult to identify many of the smaller individuals, widow rockfish were by far the most common species, representing 35.0% of all fishes seen. It is likely that many of the small, unidentifiable YOYs also were widow rockfish. YOY bocaccio also were fairly abundant around some of the platforms and occasionally schooled with widow rockfish. Both species formed relatively tight, polarized schools, loosely associated with the pilings and crossbeams (Fig. 4F). When disturbed, the schools immediately swam inward underneath the platform structure. We also saw small numbers of what we tentatively identified as YOYs of the complex of kelp, copper, gopher and black-and-yellow rockfishes (*S. chrysomelas*). These were found in smaller, much less coherent aggregations and were more likely to move in closer to the substrata when disturbed.

Painted greenling, primarily small individuals, were the most commonly seen nonrockfish species. We often saw solitary individuals resting on the crossbeams. Other species occasionally seen near or

Table 5

Number, densities, and biomasses of fishes observed around the bottoms of six oil platforms off central and southern California. Platforms are listed geographically, from northwest to southeast. Species are ranked by number observed. YOY means "young-of-year." We computed minimum number of species by assuming that each unidentified taxa (flatfish, poacher, ronquil and seaperch) represented one species.

Platform	Species	Number	Density (fish/100m^2)	Biomass (kg/m^2)
Irene	Copper rockfish	297	55.99	10.01
	Vermilion rockfish	198	37.33	11.81
	Lingcod	152	28.65	1.23
	Halfbanded rockfish	25	4.71	0.16
	Painted greenling	20	3.77	0.24
	Pile perch	20	3.77	0.83
	Rosy rockfish	4	0.75	0.02
	Sebastomus group[1]	2	0.38	0.01
	Brown rockfish	2	0.38	0.05
	Bocaccio	1	0.19	0.24
	Flag rockfish	1	0.19	0.01
	Gopher rockfish	1	0.19	0.00
	Rockfish YOY	1	0.19	0.01
	Widow rockfish	1	0.19	0.02
	Yellowtail rockfish	1	0.19	0.08
	Total	**726**	**136.86**	**24.73**
	Minimum number of species	13		
Hidalgo	Halfbanded rockfish	552	94.62	9.35
	Greenspotted rockfish	109	18.68	3.48
	Flag rockfish	58	9.94	1.00
	Lingcod	29	4.97	6.52
	Bocaccio	17	2.91	2.10
	Vermilion rockfish	13	2.23	2.83
	Rosy rockfish	10	1.71	0.27
	Sharpchin rockfish	10	1.71	0.09
	Canary rockfish	7	1.20	1.03
	Greenstriped rockfish	7	1.20	0.11
	Painted greenling	5	0.86	0.07
	Pygmy rockfish	4	0.69	0.04
	Widow rockfish	4	0.69	0.64
	Squarespot rockfish	3	0.51	0.03
	Rockfish YOY	2	0.34	0.06
	Shortspine combfish	2	0.34	0.01
	Yelloweye rockfish	2	0.34	0.06
	Sebastomus group [1]	1	0.17	0.01
	Bank rockfish	1	0.17	0.02
	Unidentified poacher	1	0.17	0.01
	Total	**837**	**143.47**	**27.73**
	Minimum number of species	18		
Hermosa	Greenspotted rockfish	179	25.72	3.24
	Halfbanded rockfish	98	14.08	0.71
	Flag rockfish	16	2.30	0.20
	Lingcod	7	1.01	2.60
	Rockfish YOY	5	0.72	0.10
	Copper rockfish	4	0.57	0.03
	Pacific hake	2	0.29	0.00
	Sebastomus group[1]	1	0.14	0.04
	Greenblotched rockfish	1	0.14	0.15

continued

Table 5 (continued)

Platform	Species	Number	Density (fish/100m²)	Biomass (kg/m²)
Hermosa continued	Greenstriped rockfish	1	0.14	0.01
	Unidentified poacher	1	0.14	0.00
	Sharpchin rockfish	1	0.14	0.01
	Starry rockfish	1	0.14	0.02
	Widow rockfish	1	0.14	0.02
	Total	**318**	**45.70**	**7.13**
	Minimum number of species	12		
Holly	Vermilion rockfish	87	21.98	5.87
	Calico rockfish	68	17.18	1.40
	Widow rockfish	47	11.88	1.14
	Copper rockfish	45	11.37	2.05
	Squarespot rockfish	43	10.87	0.41
	Halfbanded rockfish	29	7.33	0.12
	Pile perch	26	6.57	2.88
	Rosy rockfish	16	4.04	0.11
	Painted greenling	15	3.79	0.17
	Sharpnose surfperch	9	2.27	0.49
	Blue rockfish	7	1.77	0.74
	Pink surfperch	7	1.77	0.15
	Unident. flatfish	6	1.52	0.02
	Brown rockfish	5	1.26	0.77
	Sebastomus group [1]	4	1.01	0.08
	Canary rockfish	3	0.76	0.15
	Rockfish YOY	3	0.76	0.15
	Treefish	2	0.51	0.10
	Ronquils	1	0.25	0.00
	Unident. sea perches	1	0.25	0.20
	Combfish sp.	1	0.25	0.00
	Gopher rockfish	1	0.25	0.01
	Olive rockfish	1	0.25	0.03
	Shortspine thornyhead	1	0.25	0.00
	Unidentified fish	1	0.25	•
	Total	**429**	**108.40**	**17.04**
	Minimum number of species	21		
Grace	Halfbanded rockfish	1787	351.16	15.87
	Flag rockfish	30	5.90	0.18
	Greenspotted rockfish	18	3.54	0.38
	Vermilion rockfish	9	1.77	0.33
	Rockfish YOY	7	1.38	0.05
	Unident. flatfish	6	1.18	0.03
	Painted greenling	6	1.18	0.03
	Widow rockfish	5	0.98	0.05
	Treefish	3	0.59	0.09
	Combfish sp.	2	0.39	0.01
	Lingcod	2	0.39	0.03
	Pink surfperch	2	0.39	0.01
	Ronquils	1	0.20	0.03
	Copper rockfish	1	0.20	0.03
	Greenblotched rockfish	1	0.20	0.02
	Rosy rockfish	1	0.20	0.06
	Sanddabs	1	0.20	0.01
	Squarespot rockfish	1	0.20	0.01

continued

Table 5 (continued)

Platform	Species	Number	Density (fish/100m²)	Biomass (kg/m²)
Grace	Unidentified fish	1	0.20	•
continued	Total	**1884**	**370.22**	**17.21**
	Minimum number of species	16		
Gail	Greenblotched rockfish	127	19.8	3.71
	Bocaccio	67	10.46	12.01
	Greenspotted rockfish	59	9.2	1.70
	Sebastomus group †	10	1.9	0.18
	Rockfish YOY	5	0.78	0.35
	Greenstriped rockfish	4	0.62	0.20
	Lingcod	3	0.47	1.96
	Flag rockfish	2	0.31	0.03
	Swordspine rockfish	2	0.31	0.03
	Bank rockfish	1	0.16	0.27
	Darkblotched rockfish	1	0.16	0.07
	Total	**281**	**44.17**	**20.51**
	Minimum number of species	9		

[1] *Sebastomus* group may include greenblotched, greenspotted, pinkrose, rosethorn, rosy, starry, or swordspine rockfishes.

on midwater structure included juvenile greenspotted and flag rockfishes, as well as sharpnose seaperch, pile perch, and blacksmith.

Among platform comparisons The midwater assemblages also differed among rigs, although the variability was less than among the bottom assemblages. Species richness ranged from 6 to 11 species per platform (Fig. 7A). Species diversity also showed less variability among platform midwaters than platform bottoms (midwater H' range: 0.7 to 1.8, Fig. 7A).

The midwater around platform Irene was dominated by widow rockfishes (primarily YOYs, but also one-year-old fishes), unidentified YOY rockfishes (probably primarily widow rockfish) and YOY bocaccio. Almost no other fishes were noted (Table 6). The species composition at platforms Hidalgo and Harvest was similar to that at platfrom Irene, although painted greenling were also occasionally seen. Far fewer fishes were noted at platform Hermosa, although the species composition was similar, with the addition of small numbers of Pacific hake. Fewer fishes were seen at platform Holly. Here, YOY rockfish (probably widow rockfish), painted greenling, sharpnose seaperch and squarespot rockfish were the most common species. Smaller numbers of juvenile widow rockfish, YOY rockfish, and juvenile chilipepper characterized platform Grace. We saw fewest fishes in the midwaters around platform Gail where YOY rockfish (again probably widow rockfish) were the most common.

In general, the platforms at the western end of the Santa Barbara Channel harbored a higher density of fishes in the midwater than did those towards the east (Fig. 7B). There was a significant relationship between density and northwest-southeast rank (Spearmans r_s=0.89, P=0.006). This pattern was due to higher density of YOY rockfishes, especially widow rockfish and bocaccio, at platforms Irene and Hidalgo. YOY rockfishes were abundant only at Irene and Hidalgo, they were much less common at the platforms farther east. There was not a significant relationship between biomass and northwest-southeast rank (Spearmans r_s=0.64, P=0.11).

Length-frequency comparisons

Relatively few species were abundant in both the midwater and bottom assemblages. For those species that were found in both environments, such as copper, flag, and greenspotted rockfishes, there was a tendency for juveniles to be found in the midwater and older individuals on the bottom. Bocaccio were the extreme example, with smaller juveniles occurring only in midwater and larger individuals only on the bottom (Fig. 8). The painted greenling was one of the few species that occurred in virtually all size classes in both the midwater and on the bottom (Fig. 8).

There were considerable differences in the size frequencies of the major species around the platforms (Fig. 8). Some species, such as copper rockfish and vermilion rockfish, were found primarily as juveniles and subadults. At the extreme, we did not identify any mature widow rockfish. Numerous other species (i.e. painted greenling, bocaccio, greenspotted rockfish,

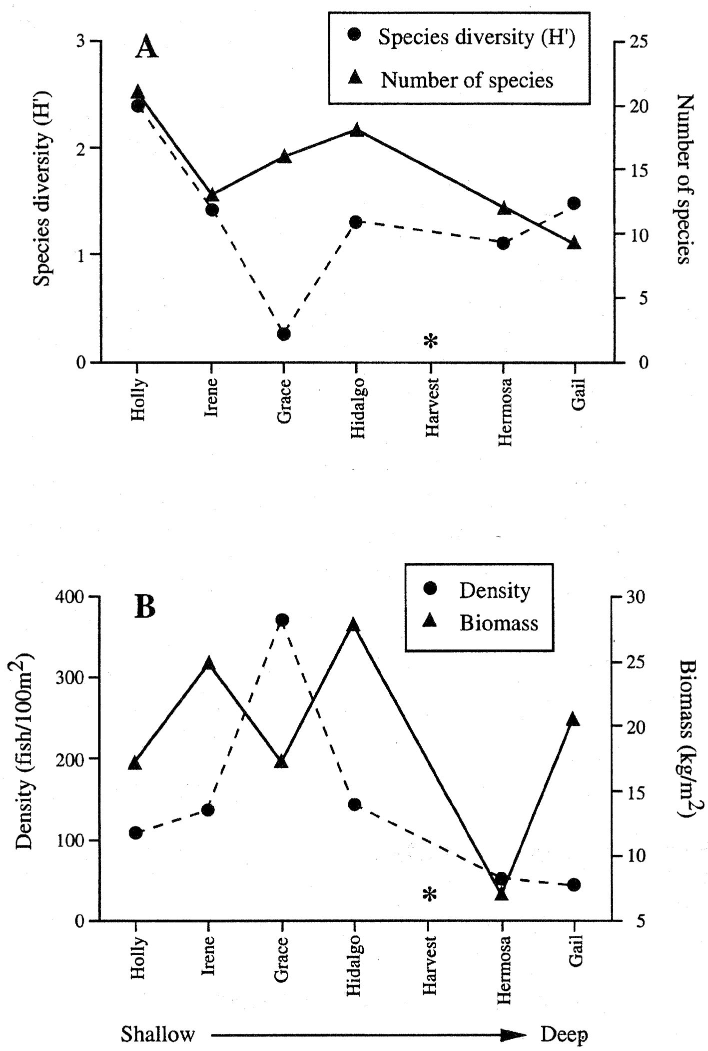

Figure 5

(**A**) Species richness (number of species) and species diversity (Shannon-Weaver diversity index, H') and (**B**) density (fish/100 m^2) and biomass (kilograms/m^2) on the bottoms of seven platforms in the Santa Barbara Channel area. Platforms are ordered by bottom depth from shallow (Holly) to deep (Gail). * = no bottom transects done.

flag rockfish, and halfbanded rockfish) were found over a wide size range, encompassing most life stages. Although a wide size range of lingcod was observed, it is noteworthy that most of the small fish were found around platform Irene; relatively few of these young individuals inhabited the other platforms.

Discussion

Although we found large variability in many of the attributes of the fish assemblages living around these seven oil platforms, several consistent patterns were evident. Around all of these structures, the midwater fish assemblage was quite different from that inhabiting the platform bottoms. Juvenile rockfishes were by far the dominant group occupying the midwater. Although the density of all species combined was similar between the bottom and midwater of any given platform, the biomass was much greater on the bottom, owing to larger fish living around the bottom. In addition, there was a consistently greater number of species on the bottom than in the midwater around each platform. The bottom of the

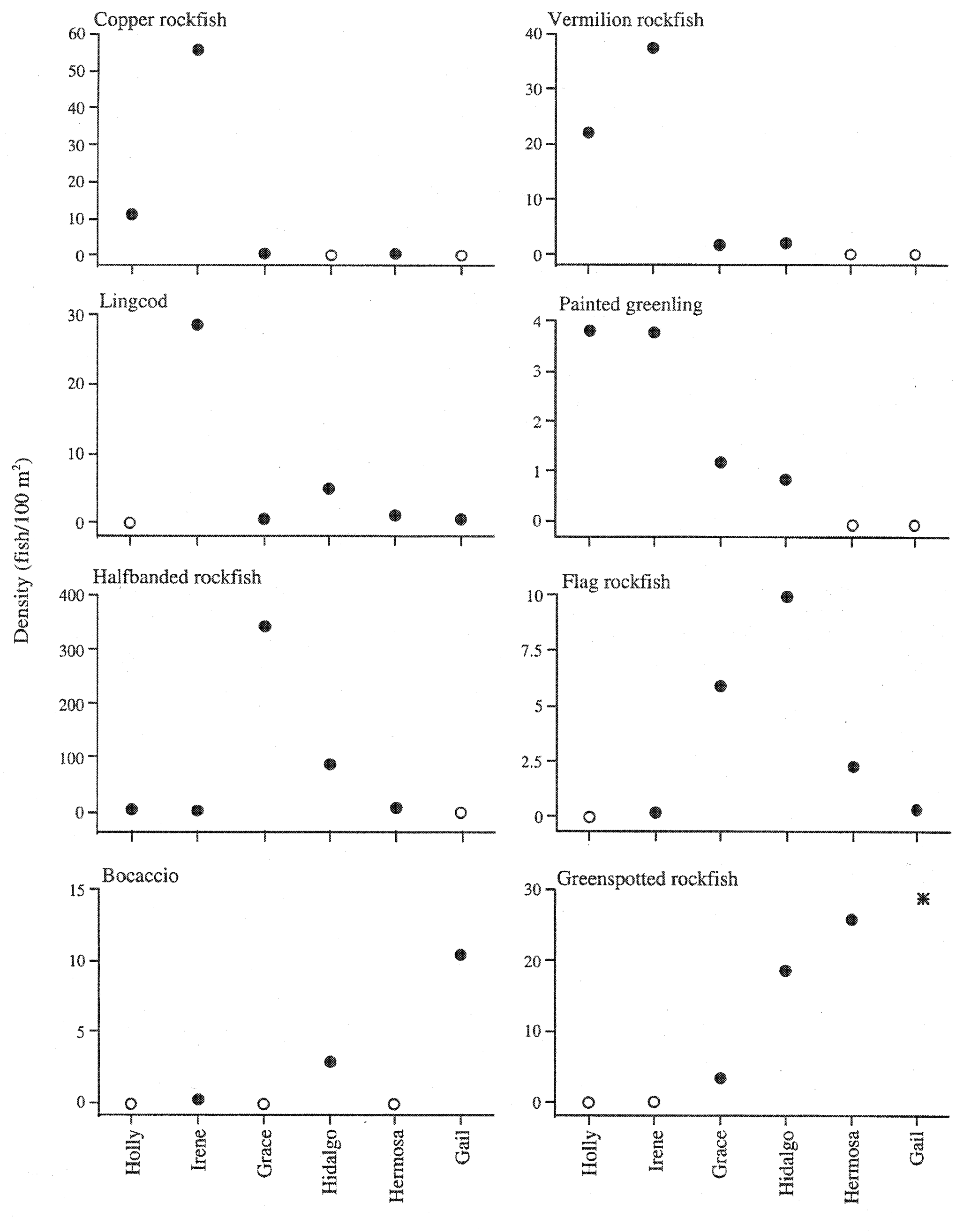

Figure 6

Densities (fish/100m^2) of eight common species on the bottoms of seven platforms in the Santa Barbara Channel area. Platforms are ordered by bottom depth from shallow (Holly) to deep (Gail). Data for greenspotted rockfish around platform Gail (noted by *), may include observation of greenblotched rockfish. Empty symbols represent zero values.

platforms provided a larger variety of habitat types than did the midwater. Bottoms are often largely composed of shell mounds that have fallen from the upper parts of the platforms. These mounds, in com-

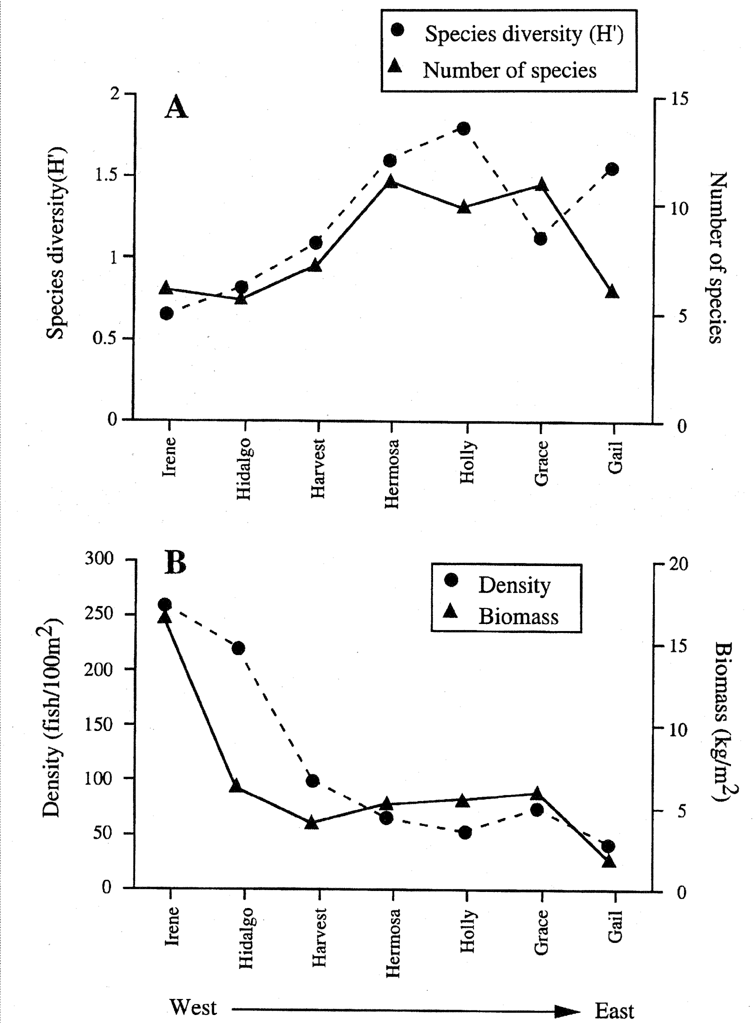

Figure 7

(**A**) Species richness (number of species) and species diversity (Shannon-Weaver diversity index, H') and (**B**) density (fish/100 m^2) and biomass (kilograms/m^2) on the midwater transects of seven platforms in the Santa Barbara Channel area. Platforms are ordered by geography from northwest (Irene) to southeast (Gail).

bination with the wells, crossbeams, and pilings provide a greater degree of habitat complexity and thus, may allow a greater number of species to coexist.

Platforms north of Pt. Conception in the Santa Maria Basin contain far more YOY rockfishes than those in the Santa Barbara Channel to the south. This geographic difference is almost certainly due to the difference in water masses of the two areas. Platforms north of Pt. Conception are more exposed to the California Current; those south of the Point are more influenced by Southern California Bight water (Brink and Muench, 1986; Hickey, 1992). There is considerable evidence that, within much of the Southern California Bight, juvenile rockfish recruitment has been poor for a number of years (Stephens et al., 1984, 1994; Love et al., 1998), probably due to decadal-long changes in oceanographic conditions. Since the late 1970s, waters off Southern California have warmed significantly and upwelling has declined. This situation has led to reduced zooplankton production (Roemmich and McGowan, 1995) and a reduction in the survival of many marine fish species in early life stages (Holbrook and Schmitt, 1996). The present regime is probably part of a long-term

Table 6

Number, densities, and biomasses of fishes observed on the midwater transects of seven oil platforms off central and southern California. Platforms are listed geographically, from northwest to southeast. YOY means "young-of-year." We computed minimum number of species by assuming that each unidentified taxa (flatfish, poacher, ronquil, and seaperch) represented one species. Both density and biomass on midwater transects are estimates calculated from transect minutes (see text for explanation of the conversion).

Platform	Species	Number	Estimated density (fish/100m^2)	Estimated biomass (kg/m^2)
Irene	Widow rockfish	447	127.25	12.47
	Rockfish YOY	271	78.22	1.36
	Bocaccio	162	46.56	2.73
	Blue rockfish	2	0.85	0.07
	Copper rockfish	2	0.85	0.11
	Pile perch	2	1.14	0.19
	Painted greenling	1	0.57	0.04
	Total	**887**	**255.44**	**16.97**
	Minimum number of species	6		
Hidalgo	Rockfish YOY	647	137.88	1.80
	Widow rockfish	286	50.57	3.62
	Bocaccio	78	19.70	0.29
	Painted greenling	29	8.60	0.28
	Greenspotted rockfish	2	0.71	0.04
	Unident. sculpin	1	0.53	0.03
	Flag rockfish	1	0.46	0.04
	Total	**1044**	**218.46**	**6.10**
	Minimum number of species	6		
Harvest	Widow rockfish	171	39.45	2.51
	Rockfish YOY	102	24.80	0.42
	Bocaccio	43	11.53	0.18
	Painted greenling	36	11.78	0.51
	Unidentified fish	17	5.09	•
	Blacksmith	8	2.27	0.05
	Greenspotted rockfish	5	1.80	0.11
	Calico rockfish	1	0.55	0.05
	Flag rockfish	1	0.45	0.03
	Total	**384**	**97.72**	**3.87**
	Minimum number of species	7		
Hermosa	Painted greenling	77	21.24	1.06
	Rockfish YOY	63	17.70	1.41
	Widow rockfish	36	11.01	0.99
	Pacific hake	18	3.76	0.20
	Bocaccio	16	4.60	0.38
	Greenspotted rockfish	6	1.94	0.17
	Squarespot rockfish	6	2.67	0.20
	Sebastomus group [1]	4	1.56	0.12
	Blue rockfish	3	1.46	0.16
	Unidentified fish	3	1.45	•
	Copper rockfish	1	0.46	0.08
	Flag rockfish	1	0.46	0.04
	Halfbanded rockfish	1	0.45	0.04
	Sharpchin rockfish	1	0.46	0.04
	Total	**236**	**69.20**	**4.90**
	Minimum number of species	11		
Holly	Rockfish YOY	62	20.22	0.54
	Painted greenling	33	13.75	0.53

continued

Table 6 (continued)

Platform	Species	Number	Estimated density (fish/100m²)	Estimated biomass (kg/m²)
Holly continued	Sharpnose seaperch	14	6.22	1.84
	Squarespot rockfish	11	4.02	0.12
	Copper rockfish	8	3.77	0.28
	Blacksmith	4	1.82	0.49
	Gopher rockfish	4	2.13	0.23
	Pile perch	4	2.23	0.99
	Widow rockfish	3	1.80	0.31
	Bocaccio	1	0.57	0.04
	Kelp rockfish	1	0.67	0.34
	Total	**145**	**57.21**	**5.70**
	Minimum number of species	10		
Grace	Widow rockfish	103	28.92	3.90
	Rockfish YOY	76	25.18	0.32
	Chilipepper	25	6.73	0.64
	Sebastomus group[1]	9	4.67	0.25
	Painted greenling	8	3.37	0.16
	Squarespot rockfish	5	1.58	0.18
	Flag rockfish	2	0.88	0.03
	Greenspotted rockfish	2	0.80	0.06
	Swordspine rockfish	2	1.09	0.08
	Calico rockfish	1	0.62	0.04
	Kelp greenling	1	0.54	0.05
	Rosy rockfish	1	0.54	0.07
	Treefish	1	0.54	0.04
	Total	**236**	**75.47**	**5.76**
	Minimum number of species	11		
Gail	Rockfish YOY	48	21.49	0.72
	Flag rockfish	10	4.92	0.40
	Widow rockfish	8	3.77	0.27
	Bocaccio	7	3.07	0.25
	Greenspotted rockfish	3	1.42	0.18
	Painted greenling	2	1.29	0.14
	Unidentified fish	2	1.10	•
	Blue rockfish	1	0.63	0.06
	Total	**81**	**37.69**	**2.00**
	Minimum number of species	6		

[1] *Sebastomus* group may include greenblotched, greenspotted, pinkrose, rosethorn, rosy, starry, or swordspine rockfishes.

alternation of warm- and cold-water conditions that have occurred over millennia (MacCall, 1996).

Previous surveys of rockfishes at the two most inshore platforms of the Santa Barbara Channel, Hilda and Hazel, provide some evidence for the plasticity of rockfish populations in the Santa Barbara Channel. In the late 1950s, Carlisle et al. (1964) found large numbers of bocaccio and olive, copper, and brown rockfishes. Most of these fishes were either YOYs or older juveniles. By 1975, olive and brown rockfishes were still abundant, but bocaccio and copper rockfishes were uncommon (Bascom et al., 1976). In this latter survey, blue rockfish, not reported by Carlisle et al. (1964), were abundant.

Thus, we believe that the relative dearth of juvenile rockfishes around Southern California Bight platforms is not a permanent condition but represents a fluctuating system. It is likely that as oceanographic conditions in the Southern California Bight become more favorable to rockfish recruitment, offshore platforms in the Santa Barbara Channel may well harbor far greater numbers of juvenile rockfishes than at present. In fact, indirect evidence implies that juvenile rockfishes were at one time far more abundant around southern California platforms. This conclusion comes from observations we made in the mid-1970s, a period of relatively strong juvenile rockfish recruitment off California (Love and Westphal, 1990). During that period, we observed a significant recreational fishery directed at juvenile widow rockfish and bocaccio (and to a certain extent olive and blue rockfishes) at platform Holly, as well as at a number of other Santa Barbara Channel platforms. We estimate that tens of thousands of these YOY and 1- and 2-yr-old fishes were caught over the course of about three years.

The absence or relative rarity of such common nearshore species as kelp bass (*Paralabrax clathratus*), opaleye (*Girella nigricans*), black seaperch (*Embiotoca jacksoni*), and white seaperch (*Phanerodon furcatus*) from the upper waters was particularly striking. This is in contrast to the inshore platforms and reefs of this area that harbor many of these species (Carlisle et al., 1964; Ebeling et al., 1980; Schroeder[3]). A most important cause for the absence of nearshore species is the isolation of these offshore structures; relatively deep water separates them from the mainland. This distance may effectively cut these species off from source populations of many shallow-water species. Thus, it may be difficult for the young of many species to either reach these platforms or become established there. Seaperches are viviparous and produce fully developed

[3] Schroeder, D. 1997. Marine Science Institute, University of California, Santa Barbara, CA 93106. Personal commun.

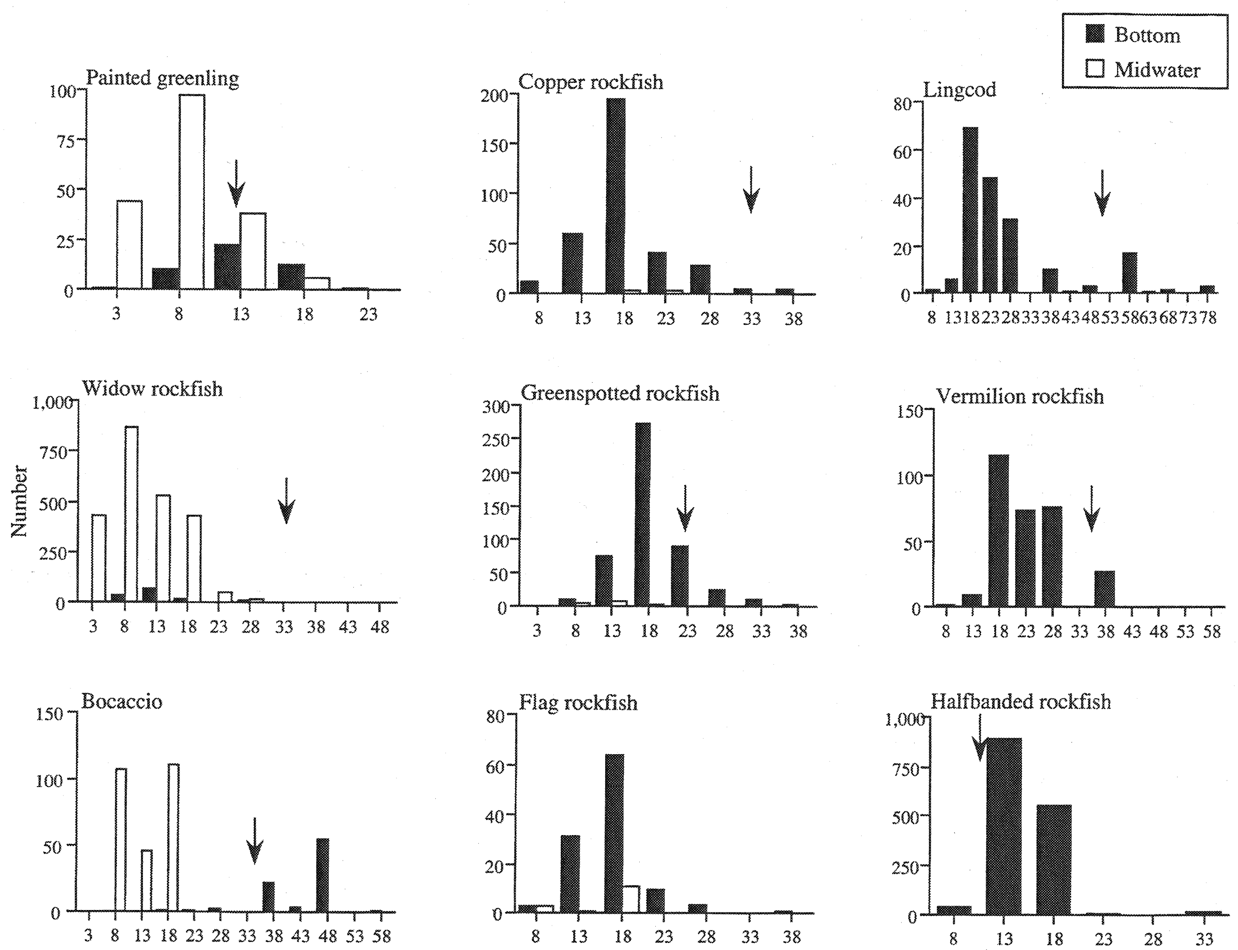

Figure 8

Length-frequency distributions of nine common species on midwater and bottom transects on all platforms combined. Midpoint length is the midpoint of 5-cm length bins.

young that do not disperse widely, making it unlikely that they commonly find their way to platforms. Kelp bass and opaleye produce pelagic larvae and although it is likely that some may settle to the platforms, conditions at these structures may preclude their survival after settlement. Young opaleye seem to require quiet intertidal waters and kelp bass YOY may need algae or thick benthic turf to avoid predation (Carr, 1994; Stephens[4]). Both of these conditions are lacking at platforms. Moreover, in the study area kelp bass recruitment is only sporadic and may not have occurred in the recent past. Thus, strong currents and lack of suitable habitat around platforms may reduce the amount of successful recruitment of these and other nearshore species.

A few species, notably painted greenling, do seem to be well adapted to a substrate-associated life in the midwaters. Judging from the very small individuals we observed, it is likely that larvae of this species recruit directly to the platform and settle out in the shallower portions. We saw a wide range of sizes, from newly settled individuals to adults, sitting on the crossbeams and hanging vertically on the pilings. Other than painted greenling, only a few juvenile flag, greenspotted, copper, swordspine, gopher, and rosy rockfishes were seen sitting on the platform in midwater.

Although juvenile rockfishes dominated the platform midwater, for some species platform bottoms tended to harbor a wider range of life stages. For some rockfishes (such as copper and greenspotted rockfishes), the entire range of stages from YOY to adults were present. In these species, the smaller individuals tended to live somewhat away from the legs and crossbeams and more among those parts of the mussel shell mounds a few meters from the platform. Although juvenile vermilion rockfish were common on several of the shallower platforms, we saw no YOYs around any of these structures. Vermilion rockfish tend to settle out in the nearshore, relatively shallow waters, and it is likely that even the shallowest of the surveyed platforms were situated in waters too deep for successful recruitment. This supposition was born out in our SCUBA diver surveys of platform Gina, located off Port Hueneme, southern California. Platform Gina is located in waters about 33 m deep. Divers have surveyed the entire structure and on several occasions have noted YOY vermilion rockfish at the bottom of the platform.

The situation with lingcod is particularly interesting. Including observations from all platforms, we observed all life stages from YOYs to large adults. However, almost all the young fish lived around platform Irene, in relatively high densities. From the lengths of these animals (Miller and Geibel, 1973), we determined that these fish were either YOYs or one-year-olds. We noted that most were sitting in the mussel shells on the bottom slightly away from the structure. In an underwater survey that encompasses seven platforms and 61 natural reefs in central and southern California, we have never encountered juvenile lingcod densities approaching the levels noted around platform Irene. Similar submersible research farther north, off Big Sur-Monterey (Yoklavich[5]) and Alaska (O'Connell[6]) also implies that such aggregations are very rare. The aggregation around Irene may also be relatively stable because we saw similar high densities in the subsequent 1997 survey. It is unclear what attracts young lingcod to this location. A large juvenile aggregation was noted off Big Sur on a sandy bottom covered with ripple marks (Yoklavich[4]). Perhaps young lingcod seek out substrate with at least some vertical relief and, at Irene, mussel shell mounds provide this type of relief.

Many bottom fishes tended to be patchily distributed around individual platforms. This is particularly true of the aggregating species, such as bocaccio and vermilion and halfbanded rockfishes. Whether this is in response to current pattern, variations in platform structure, or to other parameters is not clear at this point. We have also observed a tendency for small individuals, such as halfbanded rockfish or juvenile greenspotted rockfish, to be found away from larger, presumably predacious, individuals. Smaller fishes also tend to be found farther away from the platform, again probably to avoid the larger fishes nestled in the structure.

Fishing pressure is intense over most of the natural reefs in southern California and platforms may act as refuges for rockfishes and lingcod. An example is the relatively high numbers of bocaccio living around platform Gail. Historically, bocaccio were very important recreational and commercial fish along all of California and owing to a combination of over-fishing and poor juvenile recruitment, their populations have drastically decreased (Ralston et al., 1996). Our survey of the fish assemblages of 61 natural reefs off southern and central California shows that platform Gail has by far the highest density of adult bocaccio of all of these sites (10.5 fish/100 m^2 on platform Gail

[4] Stephens, J. 1997. Department of Biology, Occidental College, 1600 Campus Rd., Los Angeles, CA 90041. Personal commun.

[5] Yoklavich, M. 1997. Pacific Fisheries Environmental Laboratory, National Marine Fisheries Service, 1352 Lighthouse Ave., Pacific Grove, CA, 93950. Personal commun.

[6] O'Connell, T. 1998. Alaska Department of Fish and Game, 304 Lake St., Rm. 103, Sitka, AK, 99835. Personal commun.

compared with 4.4 fish/100 m^2 on the highest density natural reef). The reef was located on the northern side of the passage between San Miguel and Santa Rosa islands. The average density of bocaccio across all natural reefs surveyed in 1996 was only 1.26 fish/ 100 m^2. The large numbers of bocaccio around Gail may reflect the minimal fishing pressure around this platform. Fishing by recreational or commercial vessels near platforms is generally discouraged by platform operators. In addition, because larger fishes tend to live close to or inside the platforms, they are difficult to catch because the habitat close to or inside the platforms eludes most fishing gear.

We realize that the data presented in this paper represent a "snapshot" in time and thus issues of seasonality or interannual variation in assemblage structure remain to be addressed. Longer-term surveys of the fish fauna on two platforms in the Gulf of Mexico as well as one in the Santa Barbara Channel showed considerable diel and seasonal variation in the number of species present (Carlisle et. al 1964; Hastings et. al. 1975). In addition, monthly SCUBA observations on one shallow-water platform indicate that there may be large temporal changes in assemblage structure (Schroeder[2]). Despite this, the differences we observed in fish assemblages among and within platforms suggest that each platform may have unique characteristics.

There has been considerable discussion regarding the role of artificial structures in aggregation or enhanced production of marine species (or both) (Carr and Hixon, 1997). Based on this study, it appears that oil platforms may serve to do both. First, large adult fishes of several species were present on several platforms where no juveniles of those species had previously been observed, e.g. vermilion rockfish. It appears that those adults may have settled away from the platforms and migrated to them at some life stage. On the other hand, several platforms had very large numbers of very young fish that presumably settled to the platforms directly from the plankton, e.g. widow rockfish. If we assume that some of these young fishes would not have found appropriate settling habitat, then platforms, at least in the short term, do play some role in enhancing production. To ultimately assess the role of platforms in production of reef fishes, it will be necessary to understand the fate of the young fish settling to them.

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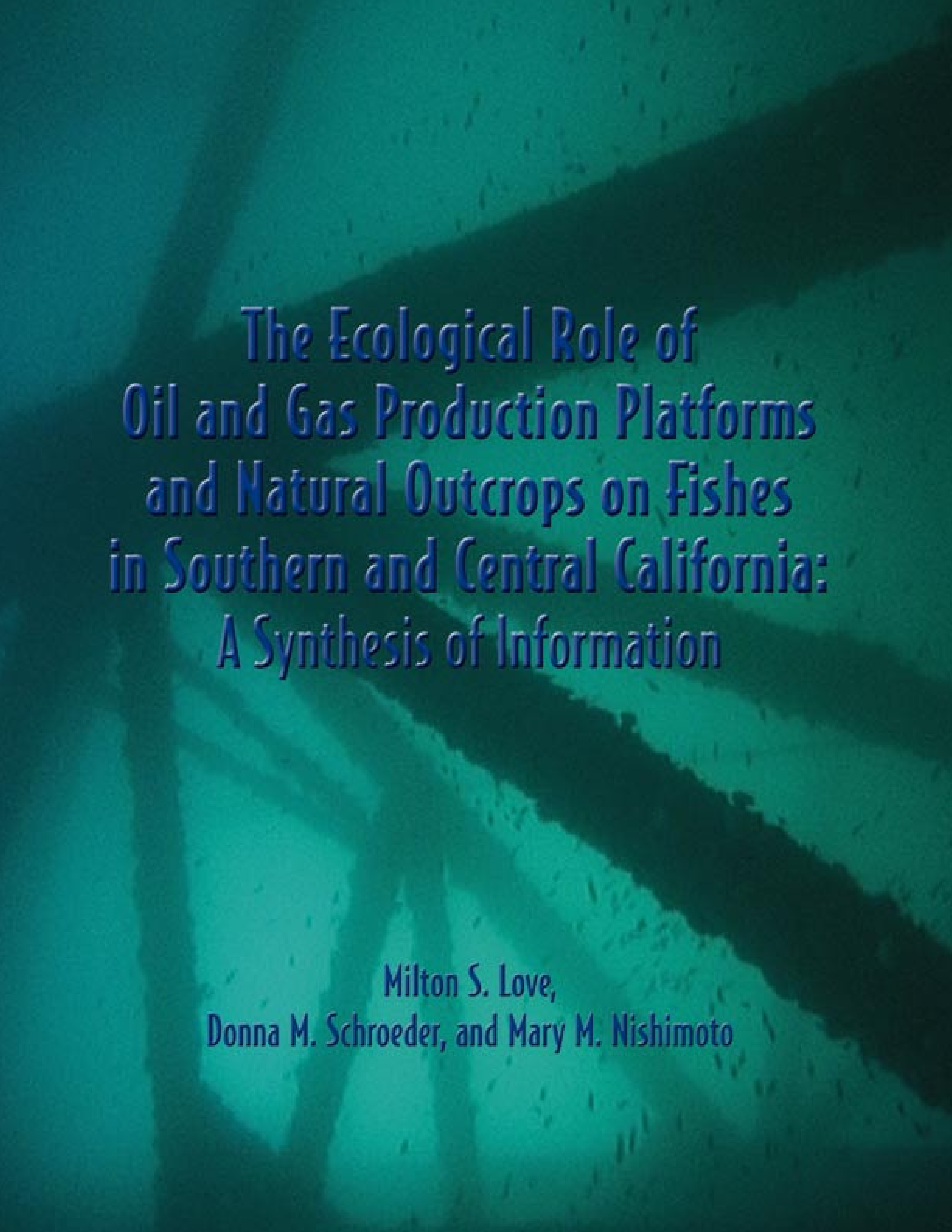

The Ecological Role of Oil and Gas Production Platforms and Natural Outcrops on Fishes in Southern and Central California: A Synthesis of Information

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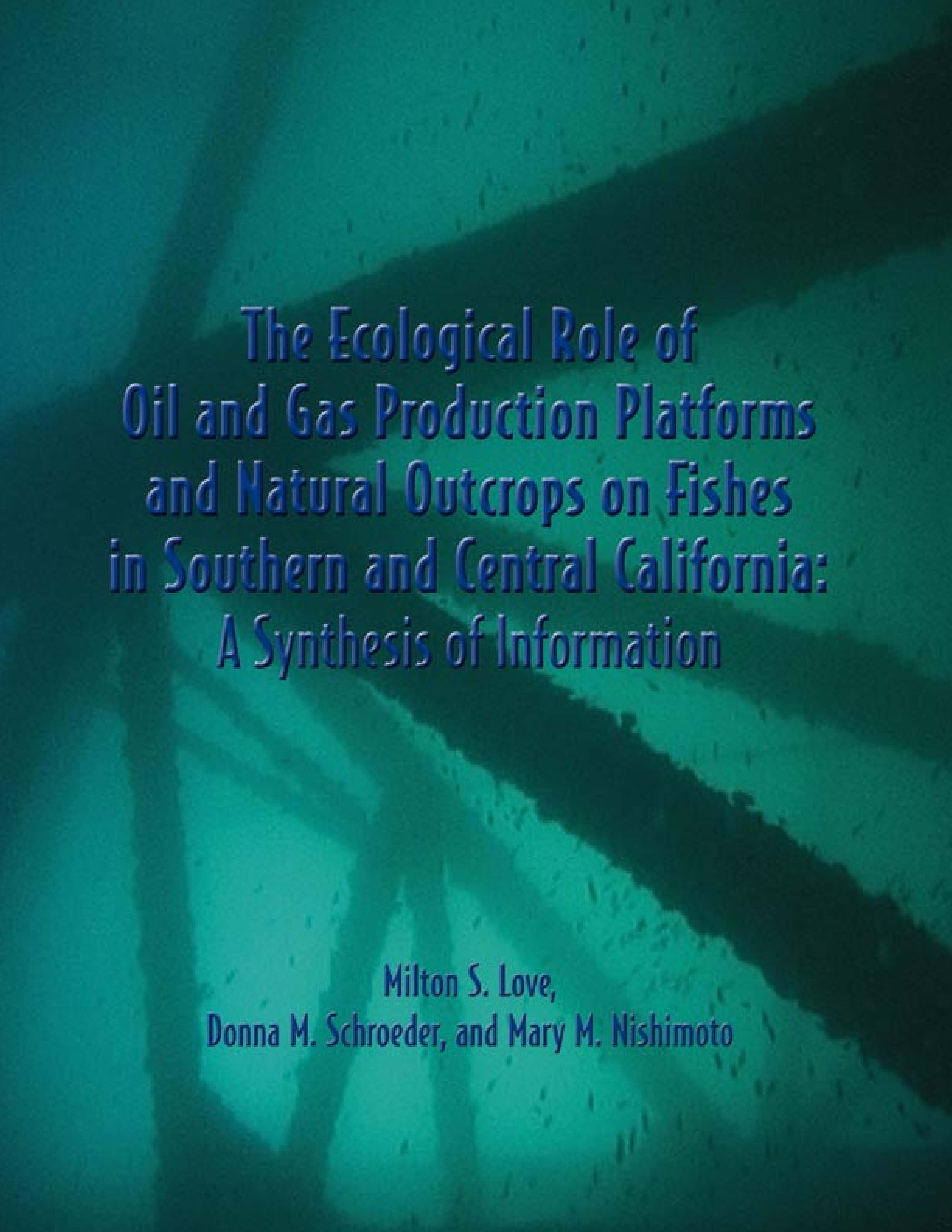

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OCS Study MMS 2003-032

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Front Cover: Background, young-of-the-year rockfishes, Platform Grace (Mary Nishimoto). From upper left: Seastars and mussels, midwater, Platform Holly (Dan Dugan); Platform Irene (Linda Snook); juvenile bocaccio, midwater, Platform Gilda (Donna Schroeder); young-of-the-year yellowtail rockfish, Platform Irene (Rick Starr); flag rockfish, Platform Grace (Donna Schroeder); young-of-the-year cowcod, shell mound, Platform Gail (Milton Love); juvenile vermilion rockfish, bottom, Platform Grace (Donna Schroeder).

Back Cover: Kelp rockfish and club anemones, midwater, Platform Holly (Dan Dugan).

Project Cooperation
This research addressed an information need identified by the U. S. Department of the Interior's Minerals Management Service, Pacific OCS Region, Camarillo, California.

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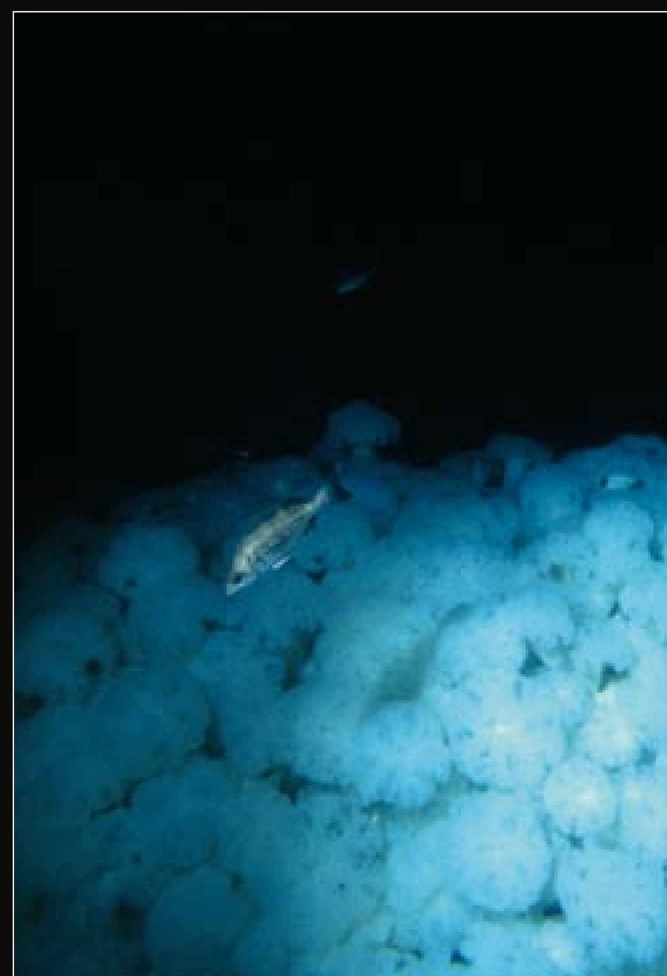
CONTENTS

LINDA SNOOK

Mexican rockfish at bottom of Platform Gail.



EXECUTIVE SUMMARY

Information Needed

Production of oil and gas from offshore platforms has been a continual activity along the California coast since 1958. There are 26 oil and gas platforms off California, 23 in federal waters (greater than 3 miles from shore) and 3 in state waters. The platforms are located between 1.2 to 10.5 miles from shore and at depths ranging from 11 to 363 m (35–1,198 ft.). Crossbeams and diagonal beams occur about every 30 m (100 ft.), from near the surface to the seafloor. The beams extend both around the perimeter of the jacket and reach inside and across the platform. The beams and vertical pilings (forming the jacket) and the conductors on all platforms are very heavily encrusted with invertebrates and provide important habitat for fishes. The seafloor surrounding a platform is littered with mussel shells. This "shell mound" (also called "mussel mound" or "shell hash") is created when living mussels, and other invertebrates, are dislodged and fall to the seafloor during platform cleaning or storms.

Once an industrial decision is made to cease oil and gas production, managers must decide what to do with the structure, a process known as *decommissioning*. Platform decommissioning can take a number of forms, from leaving much, or all, of the structure in place to complete removal. Along with the platform operator, many federal and state agencies are involved in the decommissioning process. All oil and gas platforms have finite economic lives and by the beginning of the twenty-first century, seven platforms in southern California had been decommissioned and a number of others appeared to be nearing the end of their economic lives.

Management decisions regarding the decommissioning of an oil and gas platform are based on both biological and socioeconomic information. This study addressed the need for resource information and better understanding of how offshore oil/gas platforms contributed to the fish populations and fishery productivity in the Santa Maria Basin and Santa Barbara Channel. Prior to our studies, there was almost no biological information on Pacific Coast platform fish assemblages. This necessary research involved broad scale sampling at numerous oil/gas platforms and natural reefs. Research objectives included 1) characterizing the fish assemblages around platforms and natural reefs, 2) examining how oceanography affects patterns of recruitment and community structure of reef fishes, and 3) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types (e. g., platforms and natural outcrops).

Research Summary

Between 1995 and 2001, we studied oil and gas platforms sited over a wide range of bottom depths, ranging between 29 and 224 m (95 and 739 ft.) and sited from north of Point Arguello, central California to off Long Beach, southern California. However, most of the platform research occurred in the Santa Barbara Channel and Santa Maria Basin. The Santa Barbara Channel and Santa Maria Basin are situated in a dynamic marine transition zone between the regional flow patterns of central and southern California. The Santa Barbara Channel is about 100 km long by about 50 km wide (60 x 20 miles) and is bordered on the south by the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). This area is bathed in a complex hydrographic system of currents and water masses. Generally, cool coastal waters from the California Current enter the Santa Barbara Channel through its west entrance at Point Conception. Warm waters from the Southern California Bight flow in the opposite direction into the channel through its eastern entrance. Surface waters are substantially warmer in the Bight than north of Point Conception due to less wind-induced vertical mixing, the solar heating of surface waters, and currents of subtropical waters entering from the south. The convergence of different water masses in the Santa Barbara Channel results in relatively large scale differences in physical parameters (e.g., temperature, salinity, oxygen, and nutrient concentrations) and biotic assemblages (e. g., flora and fauna).

Scuba surveys were conducted at shallow depths and submersible surveys, using the research submarine *Delta*, at greater depths. We also surveyed shallow-water and deeper-water rock outcrops, many in the vicinity of platforms. Nine nearshore, shallow-water rock outcrops, seven on the mainland and two at Anacapa Island, were monitored annually from 1995 to 2000. These natural outcrops are geographically distributed across the Santa Barbara Channel providing opportunities for spatial comparisons. In addition, we surveyed over 80 deeper-water outcrops, in waters between 30 and 360 m (100

Opposite: Juvenile widow rockfish in platform midwater. (Photograph by Lovelab, UC Santa Barbara) and 1,180 ft.) deep, located throughout the Southern California Bight and off Points Conception and Arguello. These sites included a wide range of such habitats as banks, ridges, and carbonate reefs, ranging in size from a few kilometers in length to less than a hectare in area. On these features, we focussed on hard bottom macrohabitats, including kelp beds, boulder and cobble fields, and bedrock outcrops. Most of these deeper-water sites were visited once, a few were surveyed during as many as four years and one outcrop, North Reef, near Platform Hidalgo, was sampled annually.

Most of our oil and gas platform surveys were conducted at nine structures (Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Gilda, Grace, Gina, and Gail) located in the Santa Barbara Channel and Santa Maria Basin. Between 1995 and 2000, we conducted annual surveys on the shallow portions of these nine platforms. The shallowest of the nine platforms, Gina, was surveyed from surface to bottom depths using scuba techniques. Deep-water surveys conducted between 1995 and 2001, using the research submersible, *Delta*, studied the same platforms excluding the bottom of Gilda and all of Gina. In 1998, one submersible survey was conducted around Platform Edith, located off Long Beach. In 2000 partial submersible surveys were completed around Platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat.

Patterns in Shallow-Water Habitats

Regional and local processes influenced patterns of outcrop fish assemblages in shallow waters. At regional spatial scales, outcrop fish abundance patterns often shifted abruptly as oceanographic patterns changed, roughly defining a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. This distinctive spatial pattern was observed in both oil and gas platform and natural outcrop habitats. In shallow waters, there was greater variability in platform species assemblages and population dynamics compared to natural outcrop assemblages, and this was most likely caused by the greater sensitivity of platform habitats to changing oceanographic conditions. Local processes that affected fish distribution and abundance were related to habitat features, where depth, relief height, and presence of giant kelp all played important roles. On platform habitat, we found that the majority of newly settled rockfish juveniles resided at depths greater than 26 m (86 ft.), although there were differences among species.

Characterization of the Deepwater Platform Fish Assemblages

With the exception of the shallow-water Platform Gina, all of the platforms we surveyed were characterized by three distinct fish assemblages: midwater, bottom, and shell mound. Rockfishes, totaling 42 species, dominated these habitats. Fish densities at most platforms were highest in the midwater habitat reflecting the depth preferences of young-of-the-year rockfishes. Young-of-the-year rockfishes represented the most abundant size classes in platform midwaters. Platform midwaters were nursery grounds for rockfishes as well as for a few other species, including cabezon and painted greenling. The young-of-the-year of at least 16 rockfish species inhabited these waters. Settlement success was affected by oceanographic conditions. Densities of young-of-the-year varied greatly between years and platforms. Young-of-the-year rockfish densities often varied by an order of magnitude or greater among survey years and platforms. From 1996 through 1998, rockfish settlement was generally higher around the platforms north of Point Conception as compared to platforms in the Santa Barbara Channel. This finding is reflective of the generally colder, more biologically productive waters in central California during the 1980s and much of the 1990s. Colder waters in 1999 were associated with relatively high levels of rockfish recruitment at all platforms surveyed. In 2000 and 2001, juvenile rockfish recruitment at platforms in the Santa Barbara Channel remained higher than pre-1999 levels, possibly reflecting the oceanographic regime shift to cooler temperatures that may be occurring in southern California.

Subadult and adult rockfishes and several other species dominated the bottom habitats of platforms. The bottom habitat of some platforms is also important nursery habitat as, in some instances, young-of-the-year rockfishes were observed in very large numbers. In general, more than 90% of all the fishes around platform bottoms were rockfishes. Bottom depth strongly influenced the number of species, species diversity, and density of fishes living around platform bases. This is distinctly different than the pattern observed in platform midwaters. The platform base provides habitat for not only fishes but also their prey and predators.

Shell mounds supported a rich and diverse fish assemblage. As at other platform habitats, rockfishes comprised the vast majority of the fishes. The many small sheltering sites created by mussels, anemones, and other invertebrates on the shell mounds created a habitat occupied by small fishes. Many of these fishes were the young-of-the-year and older juveniles of such species as lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod. The adults of these species also inhabited the platform bottom.

Platform versus Reef Fish Assemblages

We compared the species composition of the fish assemblages at Platform Hidalgo and at North Reef, an outcrop located about 1,000 m (3,300 ft.) from the platform. The assemblages were quite similar, both were dominated by rockfishes. In general, the distinctions between the platform and outcrop assemblages were based on differences in species densities, rather than species' presence or absence. Most species were more abundant at Platform Hidalgo. Halfbanded, greenspotted, flag, greenstriped, and canary rockfishes, and all three life stages of lingcod (young-of-the-year, immature, adult) and painted greenling had higher densities around the platform. Five species (pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the outcrop. Young-of-the-year rockfishes were found at both Platform Hidalgo (primarily in the midwaters) and at North Reef. Young-of-the-year rockfish densities were higher at the platform than at the outcrop in each of the five years studied. In several years, their densities were more than 100 times greater at Platform Hidalgo compared to North Reef.

Rockfishes numerically dominated the fish assemblages at almost all of the platform and hard seafloor habitats in our study. Overall species richness was greater at the natural outcrops (94) than at the platforms (85). There was a high degree of overlap in species between platforms and outcrops and differences were primarily due to generally higher densities, of more species, at platforms. In general, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, vermilion rockfishes, bocaccio, cowcod, and widow rockfish young-of-the-year, painted greenling and all life history stages of lingcod were more abundant at platforms than at all or most of the outcrops studied. Yellowtail rockfish and the dwarf species pygmy, squarespot, and swordspine rockfishes were more abundant on natural outcrops.

Findings

Our research demonstrates that some platforms may be important to regional fish production. The higher densities of rockfishes and lingcod at platforms compared to natural outcrops, particularly of larger fishes, support the hypothesis that platforms act as de facto marine refuges. High fishing pressure on most rocky outcrops in central and southern California has led to many habitats almost devoid of large fishes. Fishing pressure around most platforms has been minimal. In some locations, platforms may provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production.

Platforms usually harbored higher densities of young-of-the-year rockfishes than natural outcrops and thus may be functionally more important as nurseries. Platforms may be more optimal habitat for juvenile fishes for several reasons. First, because as structure they physically occupy more of the water column than do most natural outcrops; presettlement juvenile or larval fishes, transported in the midwater, are more likely to encounter these tall structures than the relatively low-lying natural rock outcrops. Second, because there are few large fishes in the midwater habitat, predation on young fishes is probably lower. Third, the offshore position and extreme height of platforms may provide greater delivery rates of planktonic food for young fishes. Most of the natural outcrops we found that had high densities of young-of-the-year rockfishes were similar to platforms as they were very high relief structures that thrust their way well into the water column.

Our research, and reviews of existing literature, strongly implies that platforms, like natural outcrops, both produce and attract fishes, depending on species, site, season, and ocean conditions. Platform fish assemblages around many of the deeper and more offshore platforms probably reflect recruitment of larval and pelagic juvenile fishes from both near and distant maternal sources, not from attraction of juvenile or adult fishes from natural outcrops. Annual tracking observations of strong year classes of both flag rockfish and bocaccio imply that fishes may live their entire benthic lives around a single platform. A pilot study showed that young-of-the-year blue rockfish grew faster at a platform than at a natural outcrop indicating that juvenile fishes at platforms are at least as healthy as those around natural outcrops.

Management Applications

In this report, we discuss the ecological and political issues that surround platform decommissioning in California, including the ecological consequences of the four platform decommissioning alternatives: (1) Complete Removal, (2) Partial Removal and Toppling, and (3) Leave-in-Place.

Complete Removal: In complete removal, operators may haul the platform to shore (for recycling, reuse, or disposal) or it can be towed to another site and reefed.

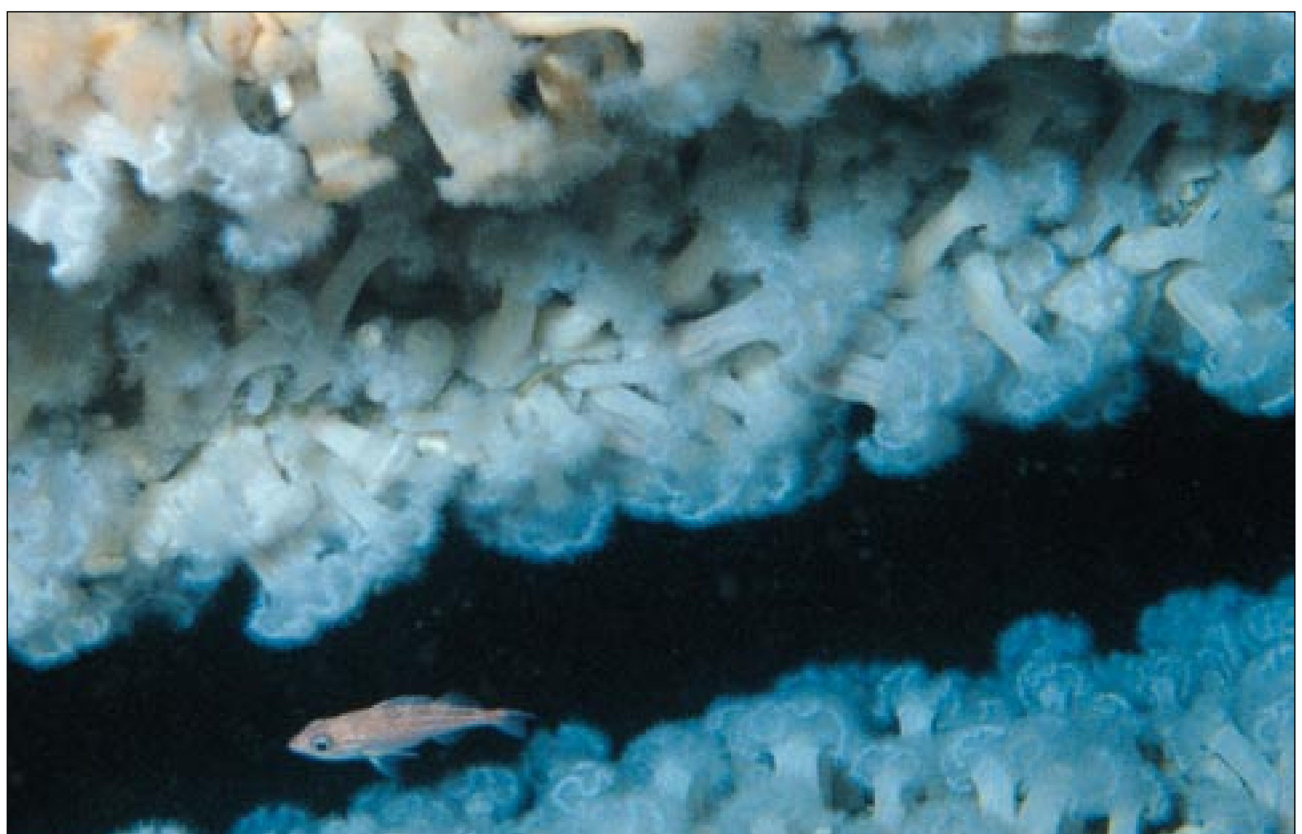
A typical full-removal project begins with well abandonment in which the well bores are filled with cement. The topsides, which contain the crew quarters and the oil and gas processing equipment, are cut from the jacket and removed and the conductors are removed with explosives. Finally, the piles that hold the jacket to the seabed are severed with explosives and the jacket is removed.

Completely removing a platform for disposal on land will kill all attached invertebrates. If some of the platform structure is hauled to a reef area and replaced in the water, some of these animals may survive, depending on water depth and the length of time the structure is exposed to the air. The explosives used to separate the conductor and jacket from the seafloor kill large numbers of fishes. In a study in the Gulf of Mexico, explosives were placed 5 m (15 ft.) below the seafloor to sever the well conductors, platform anchor pilings and support legs, of a platform in about 30 m (100 ft.) of water. All of the fishes on or near the bottom and most of the adult fishes around the entire platform suffered lethal concussions. Marine mammals and sea turtles may also be indirectly killed by damage to the auditory system.

The use of explosives to remove or topple a platform may also complicate fishery-rebuilding programs. Cowcod, a species declared overfished by NOAA Fisheries, provides an example. This species is the subject of a federal rebuilding plan that severely limits catches. In 2001, this was 2.4 metric tons or about 600 fish. Based on our research, there are at least 75 adult cowcod on Platform Gail. If explosives are used to remove Gail, all of these fish will be killed. The loss of at least 75 adult cowcod may be sufficiently large to complicate the rebuilding plan.

Partial Removal and Toppling: Under both partial removal and toppling the topsides are removed. In partial removal, the jacket is severed to a predetermined depth below the surface and the remaining subsurface structure is left standing. In toppling, the conductors and piles are severed with explosives and the jacket is pulled over and allowed to settle to the seafloor. In both partial removal and toppling, conductors need not be completely removed. Retaining conductors would add habitat complexity to a reefed platform.

While the immediate mortality impact to attached invertebrates of partial removal is greater than leaving the platform structure in place, mortality risks to both fishes and invertebrates are much lower than in both toppling and total removal. Partial removal causes fewer deaths than does toppling for two reasons. First, because partial removal does not require explosives (as does toppling), there is relatively little fish, marine mammal, sea turtle, and motile invertebrate (such as crab) mortality. In addition, when a platform is partially removed, vertebrate and invertebrate assemblages associated with the remaining structure are likely to be minimally affected. In contrast, when a platform is toppled, the jacket falls to the seafloor, and, depending on bottom depth, many, if not most of the attached invertebrates die.



*Whitespeckled rockfish and white anemones (*Metridium *sp.).*

Both partial removal and toppling would produce reefs with somewhat different fish assemblages than those around intact platforms. With the shallower parts of the platform gone, it is likely that partial removal would result in fewer nearshore reef fishes, such as seaperches, basses, and damselfishes. However, young-of-the-year rockfishes of many species recruit in large numbers to natural outcrops that have crests in about 30 m (100 ft.) of water or deeper. Thus, it is possible that partial removal would result in little or no reduction in young-of-the-year recruitment for many rockfish species. The pelagic stage of some rockfish species, particularly copper, gopher, black-and-yellow and kelp, may recruit only to the shallowest portions of the platform. For these species, both partial removal and toppling would probably decrease juvenile recruitment, depending on the uppermost depth of the remaining structure. Young-of-the-year rockfishes, which make up the bulk of the fish populations in the platform midwater habitat, would probably be less abundant around a toppled platform compared to a partially removed one. Because most California platforms reside in fairly deep water, toppled platforms might reside at depths below much rockfish juvenile settlement. Thus, toppling might result in lowered species composition and fish density. However, depending on the characteristics of the platform, a toppled structure, with twisted and deformed pilings and beams, might have more benthic complexity than one that is partially removed. This might increase the number of such crevice dwelling fishes as pygmy rockfishes.

It is difficult to catch fishes that live inside the vertically standing platform jacket. Our observations demonstrate that many of the rockfishes living at the platform bottom, such as cowcod, bocaccio, flag, greenspotted, and greenblotched rockfishes, dwell in the crevices formed by the bottom-most crossbeam and the seafloor. To a certain extent, these fishes are protected from fishing gear by the vertical mass of the platform, a safeguard that would persist if the platform were partially removed, particularly if the conductors remained in place. It would be much easier to fish over a toppled platform, as more of the substrate would be exposed to fishing gear.

Coast Guard regulations do not require a minimum depth below the ocean surface to which a decommissioned platform must be reduced. The decision on how much of the jacket and conductors is left in place is based on both a Coast Guard assessment and the willingness of the liability holder to pay for the navigational aids required by the Coast Guard. As mussels become rare below about 30 m (100 ft.) on most platforms, the mistaken assumption that all partially removed platforms must be cut to 24–30 m (80–100 ft.) below the surface has led some to conclude that this will inevitably lead to a severe reduction in the amount of mussels that fall to the bottom and, thus, to a change in or end to, the shell mound community. This is not necessarily the case.

Leave-in-Place: A platform could be left in its original location at the time of decommissioning. The topsides would be stripped of oil and gas processing equipment, cleaned, and navigational aids installed. If a platform were left in place, the effect on platform sea life would be minimal.

Pacific Coast Platforms

In this report we have also included a brief summary of information on all of the Pacific Coast platforms (Appendix 1), densities of all fishes observed at each platform during scuba and submersible surveys (Appendix 2 and Appendix 3, respectively), and a list of the 20 most important sites, both platforms and natural outcrops, for the most abundant species in our deepwater study (Appendix 4).

Research Needs

Our research demonstrates that additional biological information is needed in the decommissioning process. These information needs fall into three categories: (1) A comparison of the ecological performance of fishes living at oil platforms and on natural outcrops, (2) A definition of the spatial distribution of economically important species (of all life history stages) within the region of interest and a definition of the connectivity of habitats within this region, and (3) An understanding of how habitat modification of the platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

Major questions remaining to be addressed include:

What Fishes Live Around Platforms and Nearby Natural Reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been surveyed.

How Does Fish Production around Platforms Compare to that at Natural Outcrops?

It is possible to compare fish production between habitats by examining (1) fish growth rates, (2) mortality rates, and (3) reproductive output. A pilot study compared the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef and another examining young-of-the-year mortality rates is planned. Additional work is needed to determine larval dispersal patterns and differences in densities at various study sites. For example, we now have enough data to study the relative larval production per hectare of cowcod and bocaccio at Platform Gail versus that on natural outcrops.

What Is the Relative Contribution of Platforms in Supplying Hard Substrate and Fishes to the Region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires knowledge of the rocky outcrops in the vicinity of each platform; this is derived from seafloor mapping. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How Long Do Fishes Reside at Oil/Gas Offshore Platforms?

It is unclear how long fishes are resident to platforms. For instance, does the large number of fishes, particularly such species as the overfished bocaccio and cowcod, remain around the platforms for extended periods? Knowledge of the residence time of these species would allow us to more accurately determine if platforms form optimal habitat for these species.

What are the Effects of Platform Retention or Removal on Fish Populations within a Region?

As an example, what effect would platform retention or removal have on young-of-the-year fish recruitment? Would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle to platforms in substantial numbers. If that platform did not exist, would these young fishes have been transported to natural outcrops? Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground.

Similarly, using a synthesis of oceanographic information, it is possible to model the fate of larvae produced by fishes living at a platform.

How Does Habitat Modification of the Platform Environment (e.g., Removal of Upper Portion or Addition of Bottom Structure) Change Associated Assemblages of Marine Life?

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the seafloor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

Chapter 1

INTRODUCTION

Milton S. Love, Donna M. Schroeder, and Mary M. Nishimoto

Goals and Objectives

Production of oil and gas from offshore platforms has been a continual activity along the California coast since 1958. All oil and gas platforms have finite economic lives and at the beginning of the twenty-first century, seven platforms in southern California have been decommissioned and a number of others appear to be nearing the end of their economic lives.

Once an industrial decision is made to cease oil and gas production, managers must decide what to do with the structure, a process known as *decommissioning*. Platform decommissioning can take a number of forms, from leaving much, or all, of the structure in place to complete removal (see Chapter 4, page 4-1). Along with the corporation that owns the platform, federal agencies that are involved in the decommissioning process include the Minerals Management Service (for Outer Continental Shelf platforms), U. S. Coast Guard, U. S. Army Corps of Engineers, National Marine Fisheries Service, U. S. Environmental Protection Agency, U. S. Occupational Safety & Health Administration. California State agencies include the California State Lands Commission (for platforms in State waters), California Regional Water Quality Control Districts (for platforms in State waters), California Coastal Commission, and California Fish and Game Commission. At the local level the County Air Pollution Control Districts and agencies such as the County Energy Division would also play a role.

Off California, three platforms, Harry (in 1974), Helen (in 1978), and Herman (in 1978) were decommissioned through complete removal without a great deal of controversy. Public debate arose over decommissioning of platforms Hilda, Hazel, Hope, and Heidi when a recreational angler's group, desiring to continue fishing on these structures, began to lobby for their retention. Ultimately, the four platforms were removed in 1996. It appears certain that future decommissioning of California platforms will be controversial because of conflicting desires regarding the fate of platforms on the part of various marine stakeholders (see Chapter 4, page 4-1).

Since 1995, our group, first funded by the Biological Resources Division of the U. S. Geological Survey, the Minerals Management Service and most recently by the California Artificial Reef Enhancement Program, has conducted research on the fishes that live around the platforms and on natural rock outcrops. Our goals have been to determine the patterns of fish assemblages around both platforms and outcrops and to identify the processes that may have generated these patterns. In addition, we are attempting to understand the linkages between habitats among different fish life history stages.

Previous Research

Decommissioning decisions in California will have a biological as well as socioeconomic and cultural component. Therefore, it is timely to summarize what is known about the biology and ecology of the fauna of these structures. Our emphasis has been on the fish assemblages.

Our research on platforms and outcrops occurred between 1995 and 2001. Before our research began, only a few fish surveys had been conducted around California platforms. Most of this work was conducted around platforms Hilda and Hazel, two shallow-water platforms off Summerland, just below Santa Barbara (Carlisle et al. 1964; Allen and Moore 1976; Bascom et al. 1976). Both of these structures were removed in 1996. Carlisle et al. (1964) found an average of about 6,000 fish under each platform. Allen and Moore (1976) estimated an average of about 20,000 fishes, occasionally reaching at least 30,000. Rockfishes, particularly young-of-the-year fishes, and sea perches dominated the assemblages, kelp and barred sand bass were also abundant. Large numbers of young bocaccio and widow rockfish living around platforms A, B, and C in the Santa Barbara Channel were tagged by the California Department of Fish and Game (Hartmann 1987). Six bocaccio were recovered as adults. All had traveled to natural outcrops, one 148 km (94 miles) away from the platforms. Love and Westphal (1990) compared fishes captured around oil platforms and at two nearby natural outcrops in the Santa Barbara Channel. Rockfishes were the most commonly taken species. Young rockfishes were most abundant at the platforms, rockfishes on natural outcrops tended to be older. A pilot survey of fishes, using a remotely operated vehicle at Platform Hidalgo and nearby natural outcrops (Love et al. 1994), identified large numbers of young rockfishes at the platform and few at natural outcrops. Benthic rockfishes were more abundant at natural outcrops.

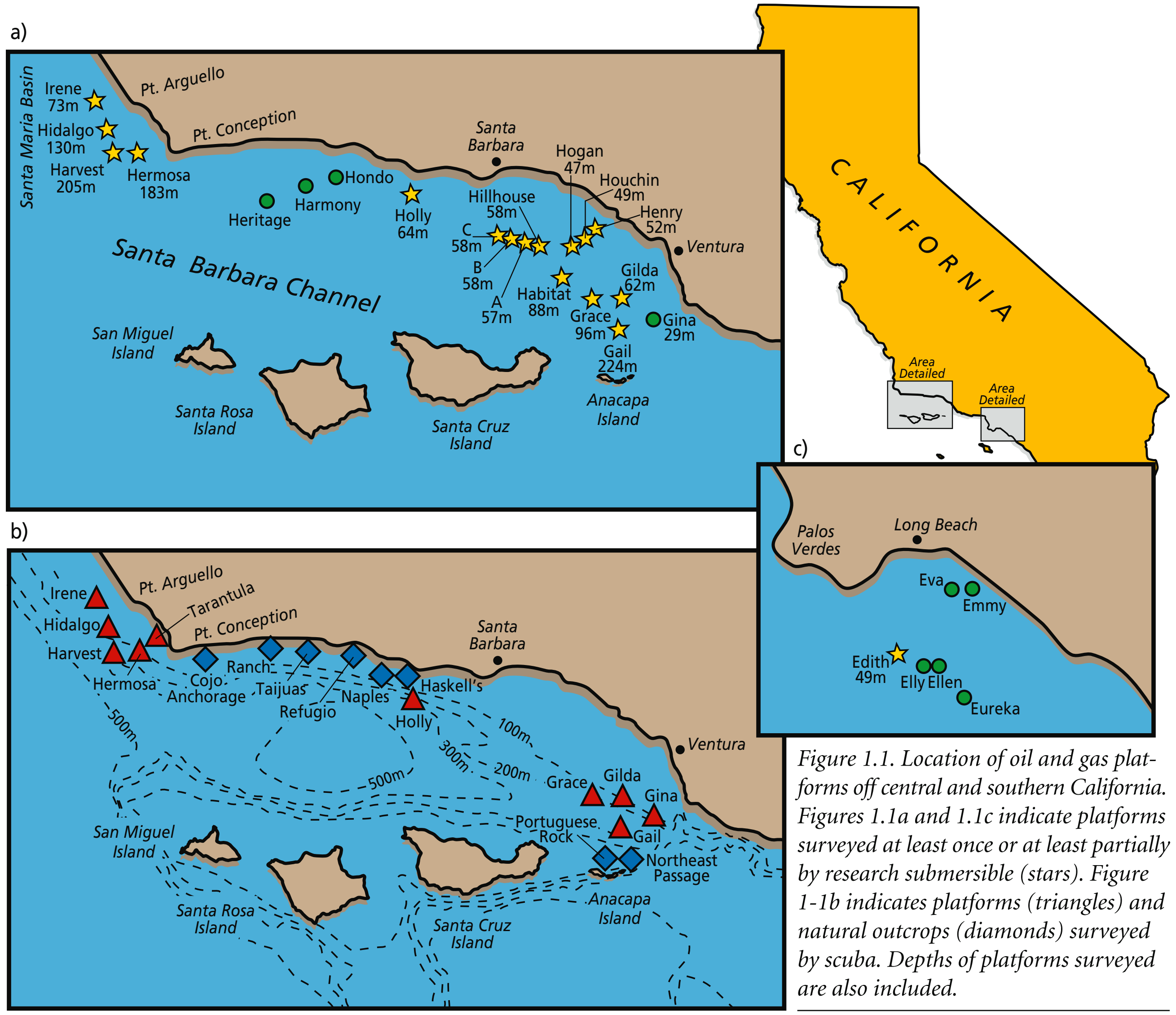


Figure 1.1. Location of oil and gas platforms off central and southern California. Figures 1.1a and 1.1c indicate platforms surveyed at least once or at least partially by research submersible (stars). Figure 1-1b indicates platforms (triangles) and natural outcrops (diamonds) surveyed by scuba. Depths of platforms surveyed are also included.

Our current research began in 1995, preliminary data is found in Love et al. (1999, 2000, 2001) and Schroeder et al. (1999) and we have incorporated that information into this report.

Study Area

Platforms

There are 26 oil and gas platforms off California, 23 in federal waters (greater than 3 miles from shore) and 3 in state waters (Figures 1.1a, b, and c). The platforms are located between 1.2 to 10.5 miles from shore and at depths ranging from 11 to 363 m (35–1,198 ft.). Information regarding location, depth, and other physical features of California's offshore platforms are described in Appendix 1.

All California platforms are similar in design (Figure 1.2); they primarily vary in size. The above-water structures, including oil and gas processing equipment and crew living and working quarters are termed the *topside* (also *topside facilities* and *deck*). The vertical pipes that carry the oil and gas are the *conductors.* The parts of the structure that are embedded in the bottom and protrude through the surface to support the topside structural components form the *jacket* that includes the crossbeams, legs, and the piles inside the legs. In general, the jackets of California platforms are made of carbon steel and the topsides are composed of steel plate and other structural steel components. Platforms also contain a relatively small amount of cement.

Crossbeams and diagonal beams occur about every 30 m (100 ft.), from near the surface to the seafloor. The beams extend both around the perimeter of the jacket and reach inside and across the platform. This web work of cross beams provides a great deal of habitat for both invertebrates

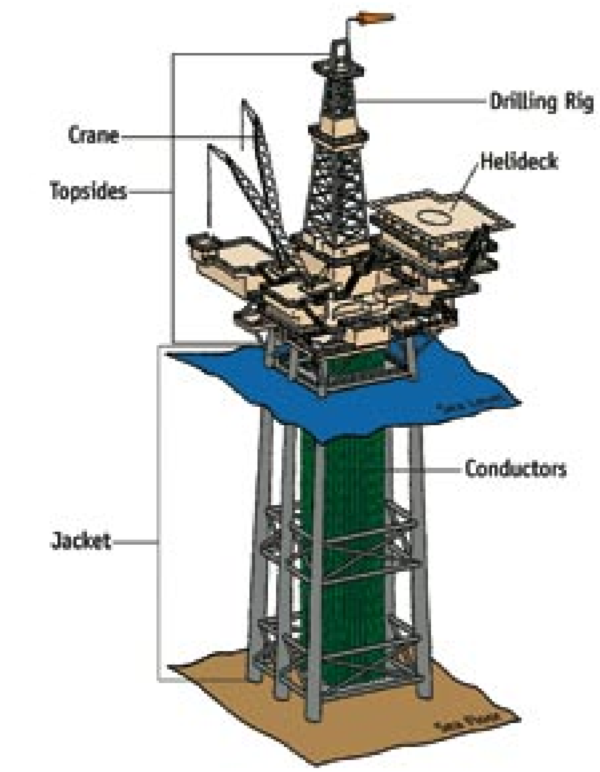


Figure 1.2. A typical oil/gas platform off southern California. Adapted from Manago and Williamson (1998).

and fishes. All of the platforms we studied have a crossbeam on the seafloor, although portions of the beam may be either buried in sediment or undercut by currents.

The seafloor surrounding a platform is littered with mussel shells. This "shell mound" (also called "mussel mound" or "shell hash") is created when living mussels, and other invertebrates, are dislodged during platform cleaning or storms. We observed shell mounds under and around all of the platforms we surveyed. Only a few of the more shallow shell mounds (around platforms Gina, Grace, Henry, and Houchin) have been accurately mapped (Sea Surveyor Inc. 2003). These mounds ranged from 4–6 m (13–19 ft.) high and were either oval or round in shape. Dimensions of these four mounds were: Gina, oval, 45 x 64 m (150 x 210 ft.); Grace, oval, 61 x 118 m (200 x 390 ft.); Henry, round, 76 m (250 ft.) in diameter; Houchin, round, 85 m (280 ft.) in diameter. Current patterns, rate of shell deposition, and age of platform all play a role in the size of shell mounds.

Rock Outcrops

An objective of our research was to compare fish assemblages and fish productivity at platforms and natural outcrops in central and southern California. Understanding spatial variability and trends in fish populations at these sites is important as it aids in understanding the regional importance of platforms as fish habitat. These sites included a wide range of such mesohabitats as banks, ridges, and carbonate buildups, ranging in size from a few kilometers in length to less than a hectare in area. On these features, we focussed on hard bottom macrohabitats, including kelp beds, boulder and cobble fields, and bedrock outcrops following standard, statistically based sampling methods and techniques.

Physical Oceanography and Biogeography of the Platform Study Area

General Description

The study area includes the Santa Barbara Channel and Santa Maria Basin (Figure 1.1). These oceanographic bodies are situated in a dynamic marine transition zone between the regional flow patterns of central and southern California. The Santa Barbara Channel is about 100 km long by about 50 km wide (60 x 20 miles) and is bordered on the south by the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). Within the Santa

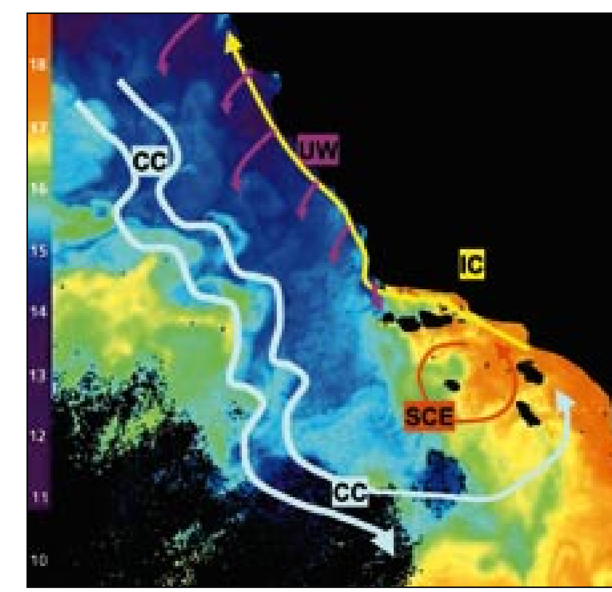


Figure 1.3. Satellite image of sea surface temperature (SST) and a diagram of the large-scale current patterns off the central and southern California coast. This image shows the predominant, large-scale SST pattern along with smaller scale features such as eddies and fronts (temperature scale, degrees Celsius). The generalized flow of the California Current (CC), the Inshore Countercurrent (IC), and Southern California Eddy (SCE) overlay the SST image. Plumes of cold, nutrient-rich, upwelled water (represented by dark blue and purple) originate near the coast and are directed offshore (magenta arrows).

The invertebrate communities of the jacket, conductors and shell mounds

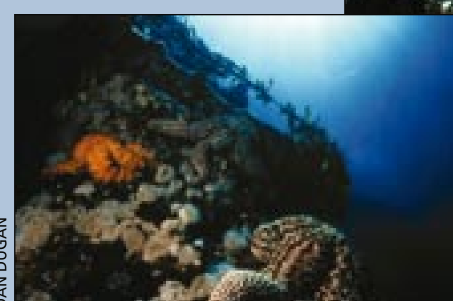

DAN DUGAN

Rock crab

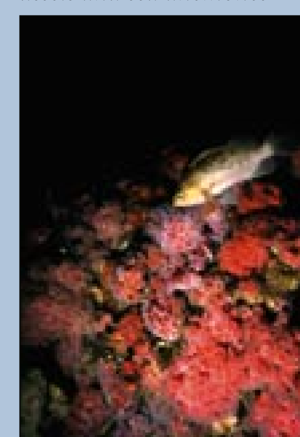
The jackets and conductors of all platforms are very heavily encrusted with invertebrates. Depth zonation of the invertebrate community is evident. An extremely thick layer of mussels extends from the intertidal zone to depths of at least 30 m (100 ft) (and to at least 44 m, 145 ft., on some platforms). Both *Mytilus galloprovincialis* and *M. californianus* occur in these upper depths, although *M. galloprovincialis* is more common in the shallower portions of this zone (J. Dugan, personal communication). Although mussels dominate this habitat, other invertebrate taxa are abundant in this upper layer. Common inhabitants include barnacles, seastars (primarily *Pisaster giganteus*), rock scallops (*Crassadoma gigantea*), rock oysters and jingle shells (*Chama arcana* and *Pododesmus cepio*), sea anemones (*Anthopleura xanthogrammica*, *Metridium* sp.), caprellid amphipods, rock crabs (*Cancer antennarius*), limpets (including *Lottia gigantea*, *Lottia* sp., *Tectura* spp., and *Acmaea mitra*), gooseneck barnacles (*Pollicipes polymerus*), and sessile tunicates. With greater depth, the diverse mussel community wanes and tends to be replaced by a blanket of club anemones (*Corynactis californicus*). At greater depths yet, white anemones (*Metridium* sp.) and sponges begin to dominate these platform structures. These organisms, along with crabs (*Munida* sp.) and sea stars, characterize the deepest parts of the deepwater platforms we surveyed (J. Dugan, personal communication; M. Love, unpublished observations).


DAN DUGAN

Mussels and sea anemones


DAN DUGAN

Mussels and sea stars


DAN DUGAN

Club anemone and kelp rockfish

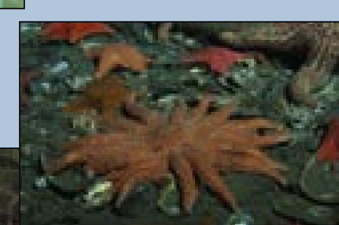

LOVELAB

Metridium *sp. and galatheid crab*

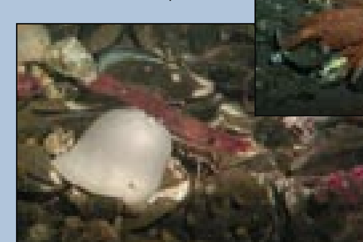

MILTON LOVE

Metridium *sp.*

Our observations indicate that, depending on bottom depth, a number of invertebrate species are abundant on the shell mounds. Common mound species include three species of seastars (*Pisaster brevispinus, P. giganteus,* and *P. ochraceus*), sunstars (*Pycnopodia helianthoides, Rathbunaster* sp.), bat stars (*Asterina miniata*), brittle stars, rock crabs (*Cancer anthonyi, C. antennarius,* and *C. productus*), king crabs (*Paralithodes rathbuni*), opisthobranchs (*Pleurobranchaea californica*), spot prawns (*Pandalus platyceros*), octopi (*Octopus* spp.), and sea anemones (*Metridium* sp.) (M. Love, unpublished observations).


DONNA SCHROEDER

Rathbunaster *sp.*


LOVELAB

Spot prawn

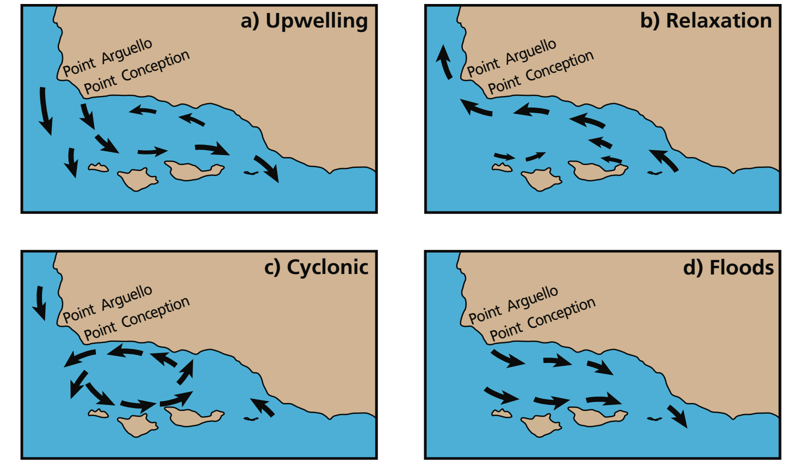


Figure 1.4. Generalized circulation patterns in the Santa Barbara Channel. (a) Upwelling; (b) Relaxation; (c) Cyclonic; (d) Flood east (shown) or west. Westward propagating train of cyclonic and anticyclonic eddies have also been observed (not shown). Adapted from Harms and Winant (1998).

Barbara Channel is a basin that is about 500 m (1,650 ft.) deep. The predominant large-scale patterns of sea surface temperature distributions off California and smaller scale, but persistent, features such as eddies, fronts (strong temperature gradients), and plumes of cold, upwelled water that extend offshore from coastal headlands are depicted in Figure 1.3. The coastal current patterns are embedded in the complex California Current System (CCS) that extends from the Strait of Juan de Fuca at the Canada-US border to the tip of Baja California, Mexico (Hickey 1998). A generalized scheme of the CCS is presented in Figure 1.3. Waters off northern and central California are typically cool because of the southerly flowing California Current offshore the continental shelf and upwelling events generated over the shelf. Upwelling, which is most intense during the spring and summer, is generated by winds that blow toward the south along the coast. Cool coastal waters enter the Santa Barbara Channel through its west entrance at Point Conception. Warm waters from the Southern California Bight flow in the opposite direction into the channel through its eastern entrance. The geographic orientation of the Southern California Bight shelters it from the winds that generate upwelling. Surface waters are substantially warmer in the Bight than north of Point Conception due to less wind-induced vertical mixing, the solar heating of surface waters, and currents of subtropical waters entering from the south (Lynn and Simpson 1987). The convergence of different water masses in the Santa Barbara Channel results in relatively large scale differences in physical parameters (e.g., temperature, salinity, oxygen, and nutrient concentrations) and biotic assemblages (e. g., flora and fauna).

Circulation in the Santa Barbara Channel is complex and highly variable (Hendershott and Winant 1996; Harms and Winant 1998; Winant et al. 1999). Santa Barbara Channel circulation typically is characterized by westward flow along the northern boundary of the Channel and eastward flow along its southern boundary (Figure 1.4). The relative strength of these opposing flows varies on scales of days to weeks and seasonally. Two opposing forces drive channel circulation: a wind gradient that is strongest in the west and a pressure gradient that is caused by higher water temperatures in the east. When these forces are balanced, a singular cyclonic (counter-clockwise rotating) eddy forms in the western channel over its central basin. Cyclonic circulation is observed to be the strongest in the summer and weakest in the winter. Unidirectional currents toward the east or west throughout the Santa Barbara Channel occur predominantly in the winter and tend to be short in duration. Throughout the year, smaller cyclonic and anticyclonic eddies, fronts, and jets are common in the Santa Barbara Channel and may be ephemeral or persistent for days to weeks. Circulation within this channel at any particular time is affected by a tendency for cyclonic flow and by the variability in the alongshelf currents that are of a scale larger than the channel.

The complex flow patterns and ocean conditions within the Santa Barbara Channel are affected by larger-scale oceanographic and atmospheric processes associated with intra-annual (e.g., storms and seasonal patterns) and inter-annual (e.g., El Niño and La Niña events) variability and interdecadal climate regime shifts. These events are teleconnected to tropical Pacific and Pacific basin-wide atmospheric phenomena. Oceanographic conditions within the Santa Barbara Channel and along the California coast at-large changed dramatically between 1997 and 1999. Strong, warm-water El Niño conditions began late in the summer of 1997 and continued into the summer of 1998. Cool-water La Niña conditions manifested in early 1999 (Lynn et al. 1998; Hayward et al. 1999). El Niño events are linked to delayed and reduced phytoplankton productivity, reduced zooplankton biomass, reduced growth and reproduction of coastal fishes, and increased mortality during their planktonic larval phase (Lenarz et al. 1995; McGowan et al. 1998; Kahru and Mitchell 2000). Our findings indicate that fish populations responded rapidly to the shift from El Niño to La Niña conditions along the coast.

Superimposed on the inter-annual variability, which include the El Niño and La Niña anomalies, are climate-ocean changes that occur throughout the entire North Pacific Basin on decadal scales. A well documented climatic shift occurred rapidly during 1976 to 1977. It was marked by abrupt changes in sea surface temperature patterns and the circulation of a predominant atmospheric feature of the northeast Pacific known as the Aleutian Low. Since that time in the northeast Pacific, macrozooplankton biomass and a number of nearshore fish stocks in the California Current system have declined (Roemmich and McGowan 1995). In 1999, a number of physical and biological changes in the northeast Pacific indicated another shift from a warm to cool regime (Bograd et al. 2000). Recruitment of young-of-the-year rockfishes to platforms in the Santa Barbara Channel was exceptionally high in 1999. The permanence of this shift to cool conditions is uncertain.

Small-Scale Oceanographic Variability within the Santa Barbara Channel

Interesting patterns of fish abundance are related to the complexity and dynamics of the hydrography and circulation within the Santa Barbara Channel. Certain aspects of our research are focussed on the biological significance of fronts and eddies to the transport and survival of early juvenile stages of marine fishes. Typically, these features are generated by local-scale interactions of wind, opposing water mass currents, and tides. This is especially true where the coastline is characterized by irregular topography and bathymetry, as is the case in the Santa Barbara Channel and the Southern California Bight (Owens 1980) (Figure 1.1). As mentioned, fronts and eddies affect how fishes are pelagically distributed in the region and may ultimately affect the timing and location of young-of-the-year settlement. For example, we sampled high densities of pelagic juvenile fishes within an eddy in the Santa Barbara Channel. The location of the eddy was determined by analysis of surface current maps generated from remote-sensing radar (Nishimoto and Washburn 2002). Furthermore, we have discovered that sea surface temperature fronts can be used to identify boundaries that separate reef habitat with high and low levels of juvenile rockfish settlement (Love, Nishimoto, Schroeder, and Caselle 1999). Mesoscale features that are visible in sea surface temperature images and surface current maps potentially can be used along with other oceanographic data to identify areas where benthic recruitment is likely.

The Santa Barbara Channel as a biological transition zone

Marine organisms from distinctively different northern and southern biogeographic communities occur in the Santa Barbara Channel as resident populations or as seasonal or occasional visitors making this a rich, biological transition zone (Horn and Allen 1978). A few examples of warm-temperate and subtropical fishes that are more common in southern California (defined as south of Point Conception) than in central California and that we have observed at platforms in the Santa Barbara Channel are Mexican rockfish, kelp bass, yellowtail, and Pacific barracuda. Examples of cool-temperate fishes that have distributions centered from central California to the Pacific Northwest and may occur at platforms include cabezon, kelp greenling, lingcod, and many rockfishes (e.g., blue, canary, widow, and yelloweye).

Methods

A major research objective of this project was to describe and compare the spatial and temporal patterns of fish assemblages around platforms and natural rock outcrops. Between 1995 and 2001, we surveyed platforms sited over a wide range of bottom depths, ranging between 29 and 224 m (95 and 739 ft.) and sited from north of Point Arguello to off Long Beach. We also surveyed shallow-water and deep-water rock outcrops, many in the vicinity of platforms. Scuba surveys were conducted at shallow depths (< 36 m, 119 ft.), and submersible surveys at deeper depths.

Most of our platform surveys were conducted at nine structures (Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Gilda, Grace, Gina, and Gail) located in the Santa Barbara Channel and Santa Maria Basin (Figure 1.1). Between 1995 and 2000, we conducted scuba surveys on the shallow portions of these nine platforms (Figure 1.1b). The shallowest of the nine platforms, Gina, was surveyed from top to bottom using scuba. Deeper-water surveys between 1995 and 2001, using a research submersible, surveyed the same platforms excluding the bottom of Gilda and all of Gina (Figure 1.1a). In 1998, we made one submersible survey around Platform Edith, located off Long Beach (Figure 1.1c) and in 2000 we made partial submersible surveys around platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat (Figure 1.1a). Poor

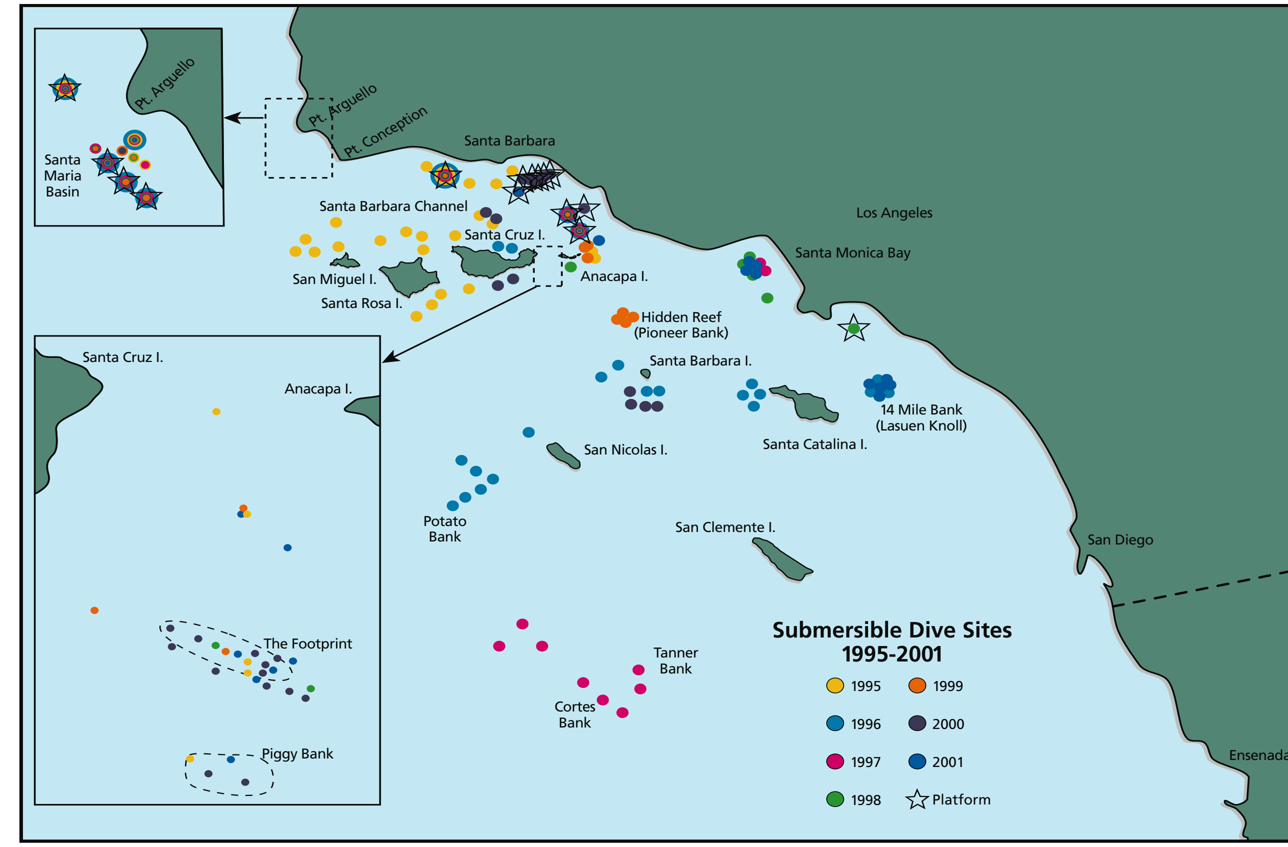


Figure 1.5. Platform and natural outcrops surveyed by Delta submersible, 1995–2001. Concentric rings denote sites surveyed in more than one year. Stars indicate platforms. See Figure 1.1 for names of platforms.

water visibility prevented us from completing the surveys around the latter eight structures. Appendix 1 lists all of the platforms and includes their dimensions, depths, locations, and the years these structures were surveyed.

Nine nearshore, shallow-water rock outcrops, seven on the mainland and two at Anacapa Island were surveyed from 1995 to 2000 by scuba (Figure 1.1b). These surveyed natural outcrops are distributed across the Santa Barbara Channel region and are exposed to water masses similar to that of the surveyed oil platforms. In addition, we surveyed over 80 deeper-water outcrops, in waters between 30 and 360 m (100 and 1,180 ft.) deep (Figure 1.5). Most of these deeper-water sites were visited once, a few were surveyed during as many as four years and one outcrop, North Reef near Platform Hidalgo, was sampled annually.

Shallow Portions of Platforms and Nearshore Natural Outcrops

Scuba surveys estimated density (individuals per hectare), mean size (total length), and species composition of reef fishes in shallow portions of platforms (0–36 m, 0–119 ft. depth) and natural outcrops (6–20 m, 20–66 ft.) (Figure 1.6). Typically, we performed three surveys from July to November of each year during 1995 to 2000, although some platforms were sampled less frequently. Fish enumeration methods consisted of fish counts and fish size estimates using both visual and underwater videography methods. Visual surveys recorded fish density and size (total lengths) using underwater plastic sheets and slates. All divers performing visual counts had received training in size estimation. Additional size estimates were obtained using a Hi-8 mm video camera and laser calibration system. The visual estimates of size and relative abundance were used first in data analyses and video size data were occasionally used to supplement visual estimates.

In each platform survey, scuba divers recorded observations while swimming a pattern which incorporated all four corner legs and the major horizontal crossbeams and portions underneath the platform jacket at three different depths (Level 1 range 6–10 m, 20–33 ft.; Level 2 range 12–21m, 40–70 ft.; Level 3 range 25–36 m, 83–119 ft.) (Figure 1.7). Natural reef surveys consisted of diver observations

Figure 1.6. A scuba diver surveys fishes around Platform Gina.

collected along four haphazardly placed 30 m length x 2 m width x 2 m (100 x 7 x 7 ft.) height belt transects, two transects each at approximately 7 m (23 ft.) and 14 m (46 ft.) bottom depths corresponding to the inshore and offshore portions of the reef. Each transect included sampling of three strata: surface, midwater, and bottom portions of the water column, one above the other. Habitat measures using a random point count method (2 points/m) were taken along the same transects for characterization of physical and biological attributes. Quantified habitat features included relief height (0 to 0.1 m, 0.1 to 1 m, 1 to 2 m, and > 2 m), substrate type (sand/mud, cobble, and rock), and percent cover of sessile invertebrates and fleshy algae. We also measured the percent cover of surface canopy of giant kelp, *Macrocystis pyrifera*, and stipe density of large kelps, especially *M. pyrifera*, *Pterygophora californica*, and *Eisenia arborea*, along the transects.

Deeper Portions of Platforms and Deeper Natural Outcrops

Below scuba depths, we surveyed fish assemblages using the *Delta* submersible, a 4.6 m, 2-person vessel, operated by Delta Oceanographics of Oxnard, California (Figure 1.8). Aboard the *Delta,* we conducted belt transects about two meters from the substrata, while the submarine maintained a speed of about 0.5 knots. At the platforms, transects were made around the bottom of the platform and around each set of cross beams to a minimum depth of 20–30 m (66–100 ft.) below the surface (e. g., midwater habitat). The belt transect was also used to sample the shell mounds and natural rock outcrops. The shell mounds and outcrops were sample in consistently the same fashion as the platform method described above.

Submersible surveys were conducted during daylight hours between one hour after sunrise and two hours before sunset. During each transect, observations were taken from one viewing port on the starboard side of the submersible. An externally mounted Hi-8 mm video camera with associated lights filmed the same viewing fields as seen by the observer. The observer identified, counted, and estimated the lengths of all fishes and verbally recorded those data on the video. All fishes within 2 m (7 ft.) of the submarine were counted. Densities were calculated as fish per 100 m^2. Fish lengths were estimated using a pair of parallel lasers mounted on either side of the external video camera. The projected reference points were 20 cm (8 in.) apart and were visible both to the observer and the video camera. An environmental monitoring system aboard the submarine continuously recorded date, time, depth, and altitude of the vessel above the seafloor. The environmental data was overlaid on the original videotape upon completion of each survey.

Transect videos were reviewed aboard the research vessel or in the laboratory. Field observations were transcribed into a database. For each fish, we recorded the following

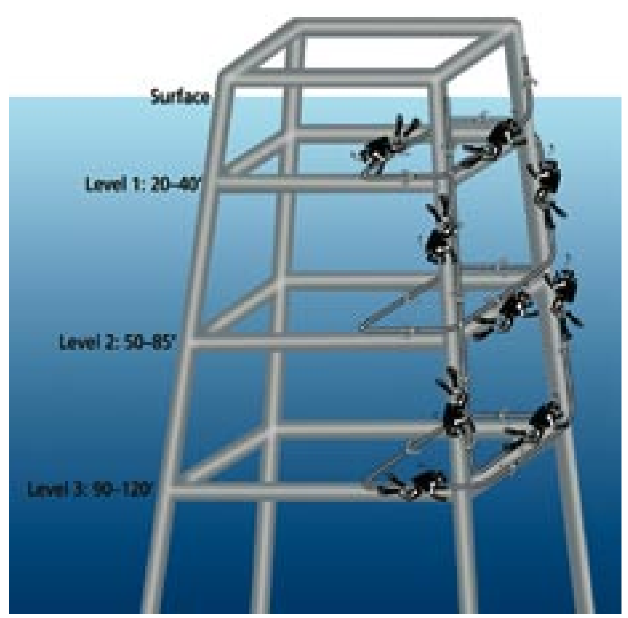


Figure 1.7. A schematic illustration of the diver platform surveys.

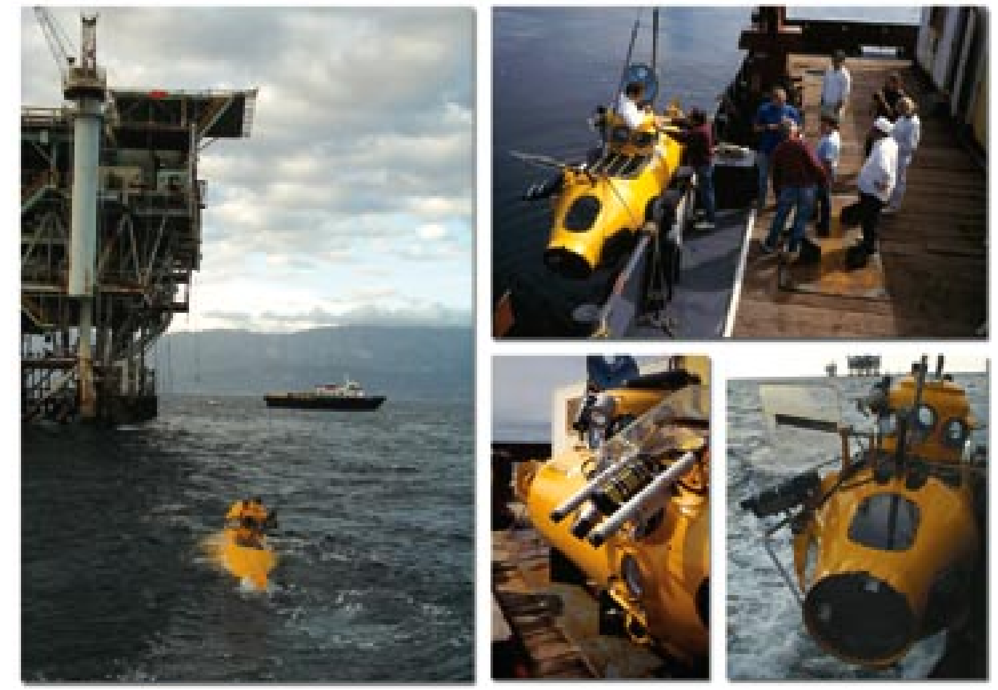


Figure 1.8. The research submersible Delta. Delta *is a 2-person untethered vehicle.*

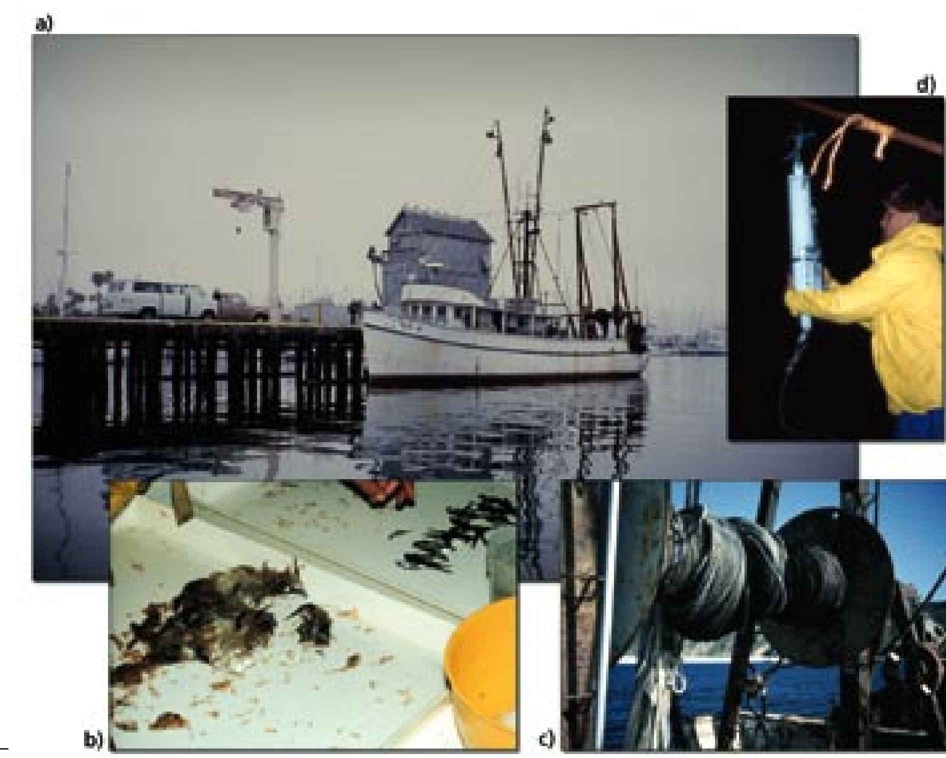


Figure 1.9. Annual midwater trawling and oceanographic surveys, 1995–2000. (a) F/V Gus-D *was chartered for research; (b) pelagic juvenile rockfish and other small fishes were sorted from the catch that included euphausiids and various jellies; (c) modified Cobb trawl rolled around spool; (d) deployment of conductivity-temperature-depth profiler.*

information: (1) species (if known); (2) estimated total length; (3) the habitat it occupied (e.g., rock, sand, mud, cobble, boulder); (4) its position relative to the substrate (e. g., in crevice, on reef crest, on slope, above structure); and (5) the distance of the fish from that substrate.

Midwater Trawling and Oceanographic Surveys

Recruitment, the settlement to a benthic habitat of pelagic juveniles or larvae, is an important process influencing the fish assemblages found on platforms and natural outcrops. To better understand spatial and temporal patterns of recruitment and sources of recruitment variability, we conducted annual midwater trawling and oceanographic surveys in the vicinity of the Santa Barbara Channel and Santa Maria Basin. Our goal was to describe how regional patterns of circulation and distribution of hydrographic features (such as fronts and eddies) influenced the distribution and relative abundance of pelagic juvenile fishes. Our focus on this life stage would allow emphasis on settlement and delineation of nursery habitats, including both platforms and natural outcrops.

Annual midwater trawling and oceanographic surveys were conducted from 1995 through 2000. Sampling was conducted during June to coincide with the time when the most juveniles of the early spring spawning rockfishes would be present in the water column. A modified anchovy trawl with a codend of 9 mm mesh was used to collect samples at depths between 20 m and 55 m (66–182 ft.) below the surface (Figure 1.9). Towing speed was about 2 knots, and trawling time was 15 minutes at the targeted depth. All fishing was conducted at night to minimize net avoidance. Fishes were identified to species if possible and measured in the laboratory. The shipboard surveys included vertical profiling of water properties at all trawling stations so that we could associate patterns of fish abundance with local hydrographic conditions. Salinity, potential temperature, and potential density anomaly, and dynamic height were derived from the data collected using a conductivity-temperature-depth (CTD) profiler (SBE-19, SeaBird Electronics). The CTD was lowered to 200 m (660 ft.) or to about 10 m (33 ft.) above the bottom at shallower stations. Daily satellite imagery, hourly sea surface current maps, and underway sea surface temperature observations were used to direct sampling when it was based on the location of surface circulation features such as fronts and eddies. The specific objective of each survey differed from year to year, see Love et al. (1997, 1999, 2001), Nishimoto (2000), and Nishimoto and Washburn (2002) for details. Surveys were conducted throughout the Santa Barbara Channel, in adjacent waters outside of the channel, and around the Northern Channel Islands (Figure 1.10).


DAN DUGAN

Black-and-Yellow rockfish at Platform Holly.

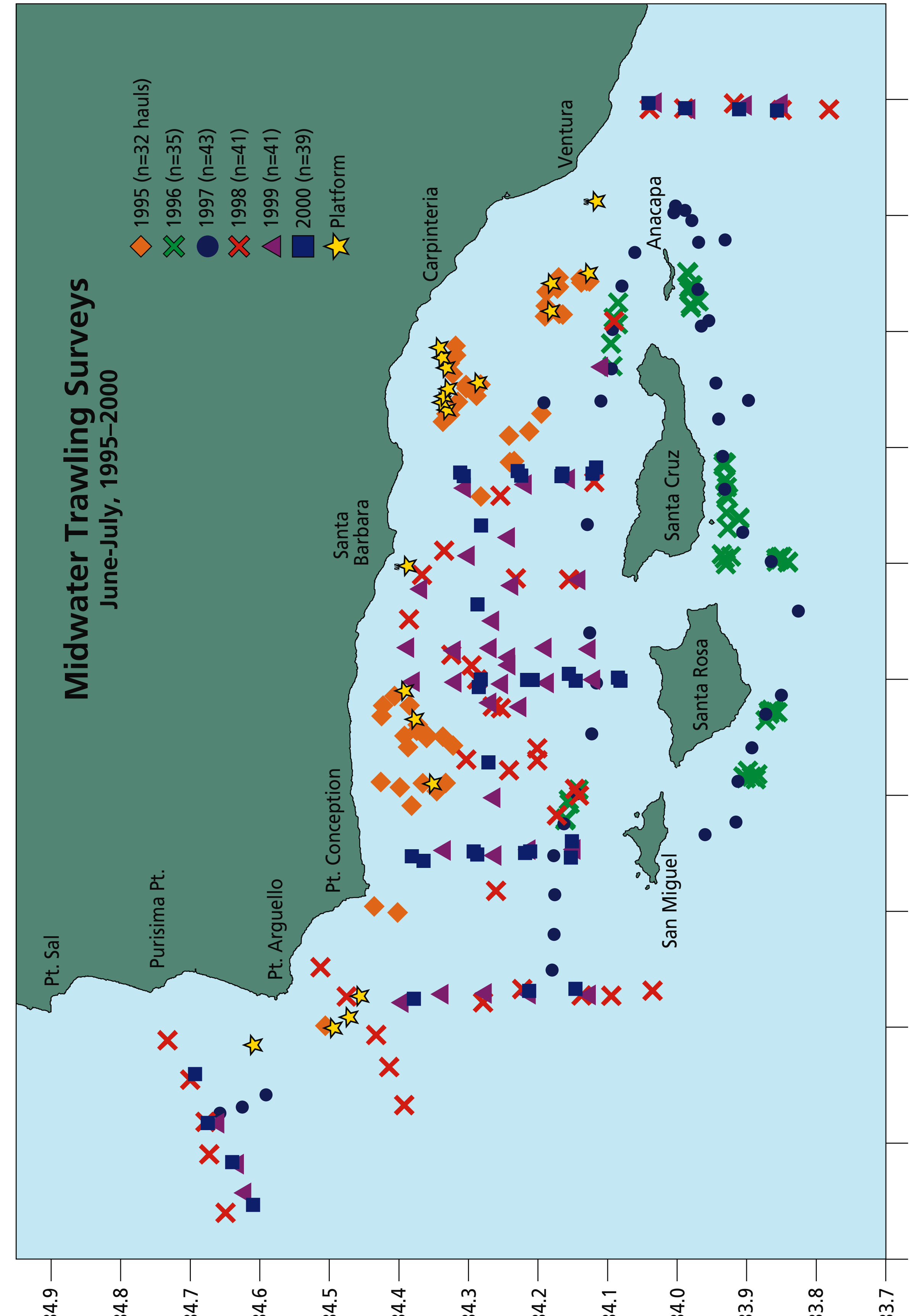
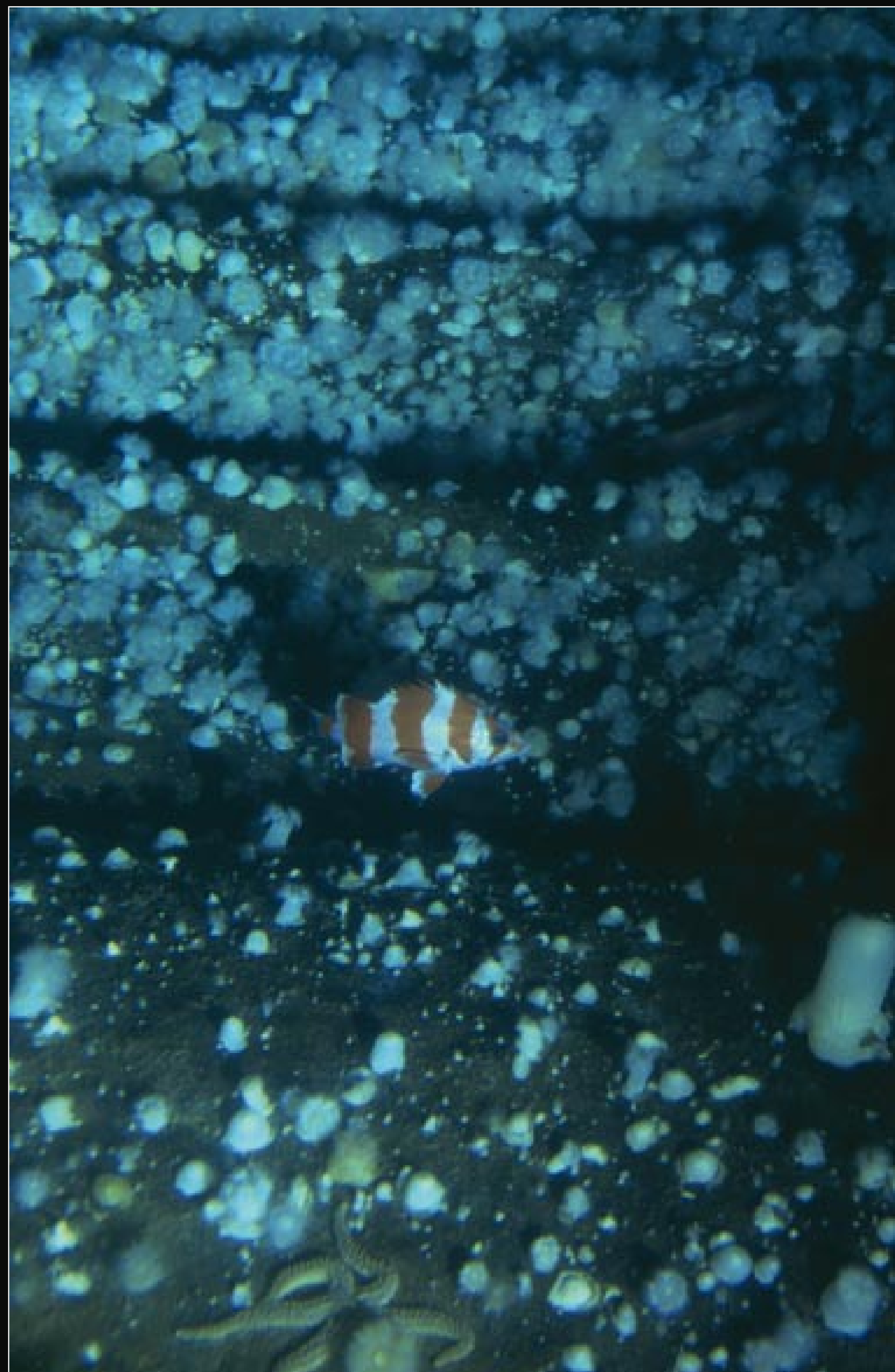


Figure 1.10. Annual midwater trawling surveys, 1995–2000. Map of stations where trawl samples were collected. Surveys typically were conducted in June and included 10 nights of sampling.



Opposite: Flag rockfish at Platform Harvest. (Photograph by Donna Schroeder)

Chapter 2

A BRIEF HISTORY OF OIL DEVELOPMENT IN SOUTHERN CALIFORNIA

Milton S. Love

Oil and gas seeps, often the result of geological deformation of the oil-saturated strata, are a common global occurrence. The famous La Brea tarpits, found near downtown Los Angeles, is just one of many seeps found in California. Offshore, seeps are visible on the ocean surface as oil slicks or gas bubbles. As noted by California Resources Agency (1971), "Some [seeps] remain dormant for extended periods of time and then become reactivated, probably by pressure buildup or earth movement. Because of the transient nature of many seeps, an accurate count is difficult to obtain; however, it appears that there are probably 50 to 60 seeps and seep areas on the ocean floor between Point Conception in Santa Barbara County and Huntington Beach in Orange County."

Native Americans in many parts of California, but particularly along the southern California coast, mined those land seeps that contained hard, high-grade asphaltum. The soft tar derived from offshore seeps and diverted to beaches was rarely, if ever, used. California Native Americans used asphaltum in a variety of ways. Baskets and water bottles were made watertight, arrowpoints and hook barbs attached to shafts, broken stone vessels repaired, canoes caulked and sealed and shell decorations were inlaid on various objects. The Chumash of coastal southern California melted asphaltum and mixed it with pine resin to create an effective adhesive for many of these uses.

Early European explorers noted the presence of these seeps. "The Spanish explorer Fages, in 1775, said that 'At a distance of two leagues from this mission [San Luis Obispo] there are as many as eight springs of a bitumen or thick black resin…' Fr. Pedro Font, in 1776, while near Goleta in Santa Barbara County wrote '…much tar which the sea throws up is found on the shores, sticking to the stones and dry. Little balls of fresh tar are also found. Perhaps there are springs of it which flow out into the sea, because yesterday on the way the odor of it was perceptible, and today…the scent was as strong as that perceived in a ship or in a store of tarred ship tackle and rope" (Heizer 1943).

While European settlers in California also utilized asphalt from terrestrial seeps in limited ways, primarily for water proofing and lubrication, there was relatively little interest in oil seeps until about 1850, when it became more widely known that kerosene, an excellent substitute for whale oil in lamps, could be distilled from crude oil. While Dr. Abraham Gesner, a Canadian geologist, is officially credited with inventing this process in 1849, others may also have stumbled onto this idea. In California, the first person known to use partially refined oil for illumination was General Andreas Pico, the brother of Pio Pico, the last Mexican governor of California. In 1850, General Pico distilled kerosene from oil taken from hand dug pits in Pico Canyon (near Newhall, southern California) and used it for lighting a home. By 1854, miners had excavated into Sulphur Mountain in Ventura County (southern California), were hauling out the oil that seeped into their tunnels and had set up stills to produce kerosene. Throughout the 1850 and 1860s, various companies mined seeps for petroleum and produced kerosene or kerosene-like products.

In California, the first well (as opposed to hand-dug pit) that was designed to produce oil was a failure. It was drilled in Humboldt County in 1861 and it, along with others in the same county between 1861 and 1864, came up dry. However, the first productive well, drilled in 1865, came in from this county. This was quickly followed up by successful wells in Ventura and other localities. It was not until 1876 that the first truly commercial well was developed in Pico Canyon, the site of General Pico's first pit mine. The next 20 years saw production rapidly escalate, with new fields explored and developed in a number of locations in central and southern California.

The first oil production from submarine strata in California occurred in Summerland, a sleepy village south of Santa Barbara formally founded in 1889 as a spiritualist colony. For years, Summerland residents had noted both the heavy scent of oil that frequently hung over the community and the numerous seeps that dotted their coastline. In fact, natural gas was so plentiful that when boys wanted to play baseball at night "…they would drive short pieces of pipe into the ground about four or five inches, and would light them, and there would be a gas flame at least a foot high from the top of the pipe. Fifteen or twenty of these pipes along the edge of the road gave plenty of light for them to play after dark. When they got called in to go to bed, each had a flat board, and they would whack the board down over the flame, and out it would go." (Lambert 1975).

In the late 1880s and early 1890s, several Summer-

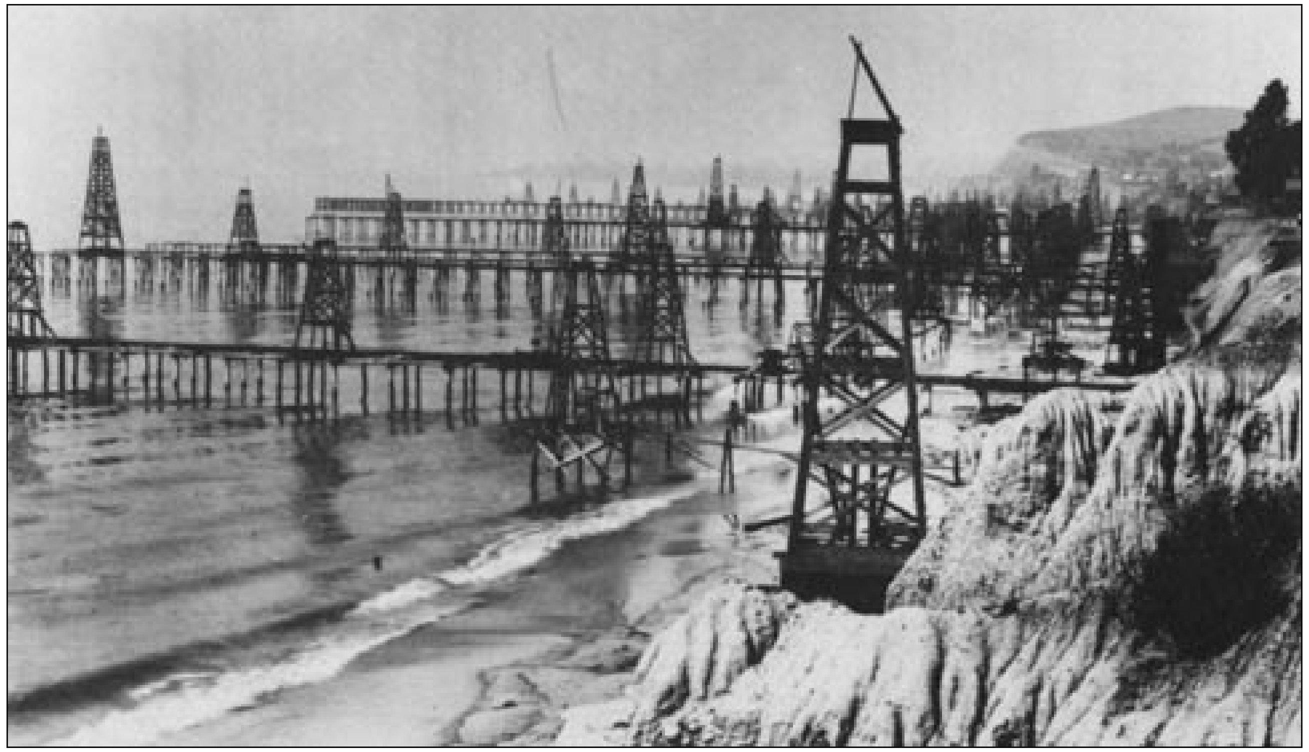


Figure 2.1. Oil piers off Summerland, California, about 1904 (from Rintoul 1990).

land residents had struck oil while digging water wells and at least one would fill barrels from a bucket, haul them by buckboard to Santa Barbara, and sell the oil to laundries. Drilling for oil just back from the ocean commenced shortly after and by 1897 both the beaches and short stretch between ocean and coastal hills were blanketed with drilling rigs. In 1896, W. L. Watts of the California State Mining Bureau reported that "It is also evident that the oil yielding formations extend south into the ocean…At low tide, springs of oil and gas are uncovered on the seashore." (Rintoul 1990).

True to the prediction, the first pier holding a well was built in 1897. This was perhaps the world's first well brought in over water, a record also reportedly claimed for the Baki (formerly Baku) (Republic of Azerbaijan) oil fields in the Caspian Sea and by Pennsylvania for drilling into Lake Erie. Within a few years there were 11 piers (harboring over 200 wells), one of them stretching 1,230 feet offshore (Figure 2.1). The Summerland piers continued to produce oil until 1939, when the last well was destroyed by high tides and high surf.

In the 1920s, a series of discoveries along the Santa Barbara Channel, particularly at Rincon (northwest of Ventura) and Ellwood and Capitan (west of Santa Barbara) led to additional offshore drilling. While all of these discoveries were made on land, development quickly extended onto piers. However, rather than being built of wood, these piers were more heavily constructed of steel pilings and reinforced concrete caissons.

The year 1932 saw the erection of the first oil platform off California and perhaps in the world. In that Depression year, the Indian Petroleum Company was faced with a dilemma. Geological evidence implied that productive oil-bearing strata lay offshore of Rincon (just northwest of Ventura). However, the costs of building a pier out to that formation were prohibitive. The company solved the problem by building part of a pier, located about 1,200 feet beyond the end of the nearest pier. Constructed of steel in 38 feet of water, the aptly named "Steel Island" was eventually home to three wells (Figure 2.2). It lasted until 1 January 1940, when "…mountainous waves battered the platform. The structure went down. There was no loss of life, but equipment was destroyed and wells damaged. Rohl-Connolly Company, marine contractors, removed equipment, derrick and steel pilings from the ocean floor; cut off casing at the floor of the ocean; and placed 6-foot cement plugs in the tops of the water strings" (Rintoul 1990).

Later oil and gas discoveries that were of importance to offshore development included those at Huntington Beach, Wilmington and Seal Beach. However, it was not until 1954, that the next step in offshore production oc-

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Figure 2.2. Built off Rincon, southern California, in 1932, the "Steel Island" was one of the first oil platforms in the world.

curred with the creation of the first man-made drilling island, "Monterey", situated 1.5 miles offshore of Seal Beach in 42 feet of water. Construction on the island commenced in 1952, but a lawsuit by the city of Seal Beach prevented drilling until 1954. The circular island "…75 feet in diameter, had an outer rim formed of interlocking sheet-steel piling driven into the ocean floor to depths of 15 to 20 feet. The interior was filled with rock and sand barged in from Catalina Island" (Rintoul 1990). In succeeding years five other oil islands (Grissom, White, Freeman, Chaffee, and Esther) were built.

Oil islands were only practical in relatively shallow waters and when industry-led seismic surveys and bottom coring discovered potential fields in deeper offshore waters, the stage was set for the development of oil platforms. In June 1958, the California State Lands Commission held its first sale of tidelands leases, ending a freeze that had held up offshore drilling on new sites. The first platform constructed was Platform Hazel, located about two miles offshore of Summerland in 100 feet of water. As noted in Rintoul (1990) regarding Hazel's construction, "In that same month, Standard [Oil] towed an imposing tower a distance of 210 miles… to the Summerland tract. The tower was 75 feet square and 170 feet high. It was a major component of Platform Hazel and was to serve as the foundation on which the 110-foot square deck would be mounted…The tower was floated to the job site on the four big caissons that formed the bottom portion of the tower's legs, each 40 feet high and 27 feet in diameter. Each caisson was pressurized to prevent leakage and also ballasted with 90 tons of sand for stability…Once on bottom, the caissons were sunk 22 feet into the ocean floor by means of high pressure water and air jets that literally hosed away the bottom sands, allowing the caissons to rest on hard ground. The final anchoring was accomplished by filling the caissons with 6,000 tons of sand

and concrete…The cost of building and installing the platform was $4 million." In September 1958, Standard Oil began drilling from the newly constructed platform and within one month the first well, bottoming out at 7,531 feet began producing 865 barrels per day. This was followed two years later by the construction of nearby Platform Hilda.

In subsequent years, a number of platforms were installed in both state and (beginning in 1967 with Platform Hogan) federal waters in southern California. However, expansion of offshore oil drilling came to an abrupt halt in 1969, with the disastrous blowout and subsequent oil spill at Platform A (installed in 1968) in the Santa Barbara Channel. And while discussion of both opposition and support for oil development are beyond the scope of this report (see Beamish et al. 1998, Nevarez et al. 1998, and Paulsen et al. 1998 for more information), it is safe to say that the subsequent environmental concerns about the safety of offshore oil exploration, development, and production delayed further drilling for a number of years. It was not until the late 1970s that installation of new platforms resumed. No new platforms have been erected since 1989 (Nevarez et al. 1998).

How do platforms get their names?

On the Pacific Coast, platform names have to conform to a set of rules promulgated by the U. S. Coast Guard. The Coast Guard created a series of zones ("15-minute quadrangles") along the Pacific Coast beginning at the U. S. – Mexican border. The names of all platforms in a zone must begin with the same letter. Platforms in the first zone, off San Diego, would begin with "A". The southern-most platforms (Emmy, Edith etc.) lie off Long Beach, in the "E" zone.

Industry personnel imply that the choice of names have often been made in a disarmingly casual way. For instance, the project engineer for Hermosa apparently named that structure after the elementary school attended by his daughter. Ellen and Elly are said to honor the wives of the engineers in charge of those platforms' construction. Hondo, meaning "big" in Spanish, was so christened because at the time it was the tallest (measured from the seafloor) of the California platforms. One story has it that, because a nearby platform was later installed to tap the same reservoir as Hondo, it was named Harmony. Hogan and Houchin were the surnames of two presidents of Phillips Petroleum.

Why do Platforms A, B and C, despite their locations in the H zone, not have "H" names? These were installed in the days before the Coast Guard regulations were mandatory.

LINDA SNOOK

Stripetail rockfish on shell mound of Platform Gail.

CHAPTER 3

A REVIEW OF BIOLOGICAL AND OCEANOGRAPHIC SURVEYS: RESULTS AND ANALYSES

Milton S. Love, Donna M. Schroeder, and Mary M. Nishimoto

There was no single characteristic fish assemblage that could be described for the oil platforms and natural outcrops of central and southern California. However, we identified a number of patterns in fish diversity and abundance that corresponded to bottom depth, geographic area, and year. Depth played an important role because, in general, rockfishes numerically dominated fish assemblages around platforms and deep natural reefs, and rockfish species segregate themselves according to habitat depth. We also observed biogeographic partitioning in species composition, where northerly platforms show the influence of the Oregonian province and southerly platforms show the influence of the San Diegan province. These zoogeographic patterns were more conspicuous in shallow water fish assemblages. The large inter-annual fluctuations in juvenile fish recruitment observed during the studies may have been generated by the large inter-annual variability in oceanographic conditions (e.g., upwelling, El Niño-Southern Oscillation events). Since juveniles of many species inhabited shallow and midwater portions of oil platforms, the greatest temporal variability in fish abundance occurred at these depths.

We present more detailed summaries of fish assemblages identified by the two different survey methods (scuba and submersible) in the sections below. The common and scientific names of fishes observed in these studies are listed in Table 1.

1. Shallow Water Fish Assemblages: 0–36 m (119 ft.)

Findings at a Glance

A combination of regional and local processes influenced patterns of reef fish assemblages in shallow water. At regional scales, composition and relative abundance of reef fishes often shifted abruptly as oceanography changed. This shift delineated a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. This distinct spatial pattern was reflected in both platform and natural reef habitats. There was greater variability in platform species assemblages and population dynamics compared to natural outcrop assemblages and dynamics, and this was most likely caused by the offshore position and greater sensitivity of platform habitats to changing oceanographic conditions. Local processes which affected fish distribution and abundance were related to habitat features, where depth, relief height, and presence of giant kelp all played important roles. We found that the majority of juvenile rockfish recruits resided at depths greater than 26 m (86 ft.), although there were differences among species.

Except where noted, the following synopsis encompasses platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace, Gilda, Gail, and Gina and are based on diver surveys conducted between 1995 and 2000.

1a. General Patterns

The two primary research objectives were to (1) describe the spatial and temporal variability of shallow water (less than 36 m, 119 ft.) fish assemblages residing on oil/gas production platforms and natural outcrops, and (2) describe the relative importance of regional processes (e.g., oceanographic patterns) compared to local processes (e.g., habitat features) in generating observed patterns of reef fish assemblages. An understanding of mechanisms which structure marine populations is necessary to predict the outcome of resource management decisions related to marine fisheries, platform decommissioning, and marine protected areas on fish assemblages within the Santa Barbara Channel region (including the Santa Maria Basin). A list of species observed at each platform is given in Appendix 2.

We find that a combination of regional and local processes influenced patterns of reef fish assemblages in shallow water. At regional scales, composition and relative abundance of reef fishes often shifted abruptly as oceanography changed. This shift delineated a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. Rockfishes and surfperches dominated the cool-temperate assemblage, and damselfishes, wrasses, and sea chubs dominated the warm-temperate assemblage. This distinct spatial pattern was reflected in both platform and natural outcrop habitats.

Within each of the cool- and warm-temperate assemblages, local habitat features modified patterns of species abundance and distribution. For example, kelp surfperch and giant kelpfish were only observed on rocky outcrops that possessed stands of giant kelp, *Macrocystis pyrifera*. Other factors likely to have been important were outcrop or platform depth and relief height. These local scale features sufficiently decoupled sites within an oceanographic region (cool- or warm-temperate) to make broad generalizations about fish assemblages difficult, especially within platform habitats.

Temporal dynamics of reef fish assemblages also resulted from a complex, dynamic interaction between regional oceanography and local habitat features. The diverse array of oceanographic conditions that occurred during the six-year survey period appeared to strongly influence regional dynamics of fish assemblages. The 1997–1998 El Niño event corresponded to a large increase in juvenile recruitment of species which dominated the warm-temperate fish assemblage (e.g., blacksmith), while the 1999 La Niña event corresponded to a large increase of juvenile recruitment of species which dominated the cool-temperate fish assemblage (e.g., rockfishes). Severe winter storms that accompany El Niño events propagated into small-scale variability at some sites. For example, the scouring effect of severe storm waves depleted red algal turf (a forage base for small crustaceans and fish) on two shallow natural outcrops. This forage base reduction may have been the primary cause of the observed synchronous decline in surfperch abundance at the same outcrops.

1b. Shallow Water Fish Assemblages Surrounding Oil/Gas Production Platforms

As observed on natural outcrops (see Section 1d), shallow water fish assemblages surrounding oil/gas production platforms show distinct spatial patterns which correspond to oceanographic patterns in the Santa Barbara Channel. Rockfishes are numerically dominant in west channel platform fish communities, although 1999 was a strong recruitment year for juvenile rockfish at all platforms. Blacksmith and halfmoon are numerically dominant in east channel platform assemblages. Platform fish assemblages appeared to respond faster and more dramatically to changing oceanographic conditions than natural reef assemblages, perhaps due to their offshore position and higher proportion of juvenile fishes.

There were notable differences among platforms within an oceanographic region. These differences may be due to water depth in which the platform is positioned, where deeper water can inhibit species such as surfperches from migrating onto platform habitat. Among-platform differences may also be influenced by food availability or other factors. During the 1997–1998 El Niño event, juvenile blacksmith recruited onto all platforms, but did not recruit onto Tarantula Reef, the closest natural reef to west channel platforms surveyed in this study. This observation suggests that platforms may "capture" pelagic stages of some reef fish species that might have otherwise perished.

The fish assemblage observed at Platform Gina (depth 29 m, 95 ft.) is noteworthy because of its very high density of kelp bass and because of the large diversity of rockfishes that recruit to its shell mound habitat. Anecdotal observations at a nearby shipwreck did not record either of these characteristics in its local fish assemblage. High turnover of fish species diversity has also been noted at Platform Gina (Love, Nishimoto, Schroeder, and Caselle 1999).

JAMES FORTE

Kelp bass at a nearshore platform.

1c. Depth Distribution of Juvenile Fish Recruitment on Oil Platforms

For all fishes observed at all Southern California Bight platforms surveyed at shallow depths, approximately 27% were observed in the shallowest portions of platform habitat (6–12 m, 20–40 ft.). Most of these were pelagic fishes, such as anchovy and barracuda. Twenty-seven percent of all fishes were observed at intermediate depths (15–26 m, 50–86 ft.), and 46% were observed at deeper depths (27–36 m, 89–119 ft.). We observed that the majority of juvenile rockfish recruits resided at depths greater than 26 m (96 ft.) (Figure 3.1), although there were differences among species. The olive-yellowtail group and copper-complex species group (black-and-yellow, copper, gopher, and kelp rockfishes) had the largest percentages residing at shallower depths. Our observations on copper-complex rockfishes represent a somewhat different vertical distribution than that described by Holbrook et al. (2000). This disparity may be due to differences in surveyed platforms and program duration (6 platforms within one biogeographic area during 1995–7 versus 9 platforms in 3 biogeographic areas during 1995–2000). This difference underscores the importance of evaluating platforms on a case-by-case basis and in developing monitoring programs over multiple years.

Our results correspond with Holbrook et al. (2000) regarding vertical distribution of midwater juvenile rockfishes (e.g., bocaccio, blue, and widow) where the vast majority of individuals recruited to depths greater than 26 m (86 ft.). The majority of individuals of other rockfish species such as squarespot, treefish, and the *Sebastomus* subgenus (e.g., rosy, greenspotted, starry rockfishes, and others) are also found below 26 m (86 ft.). Kelp and painted greenling recruits, two species associated with the cool-temperate fish fauna, mimic the vertical distribution of rockfish recruits, preferring deeper portions. In contrast, garibaldi and blacksmith recruits, two species associated with the warm-temperate fish fauna, favor upper portions of platforms, suggesting temperature may play a role in determining depth distribution of juvenile fishes at platforms.

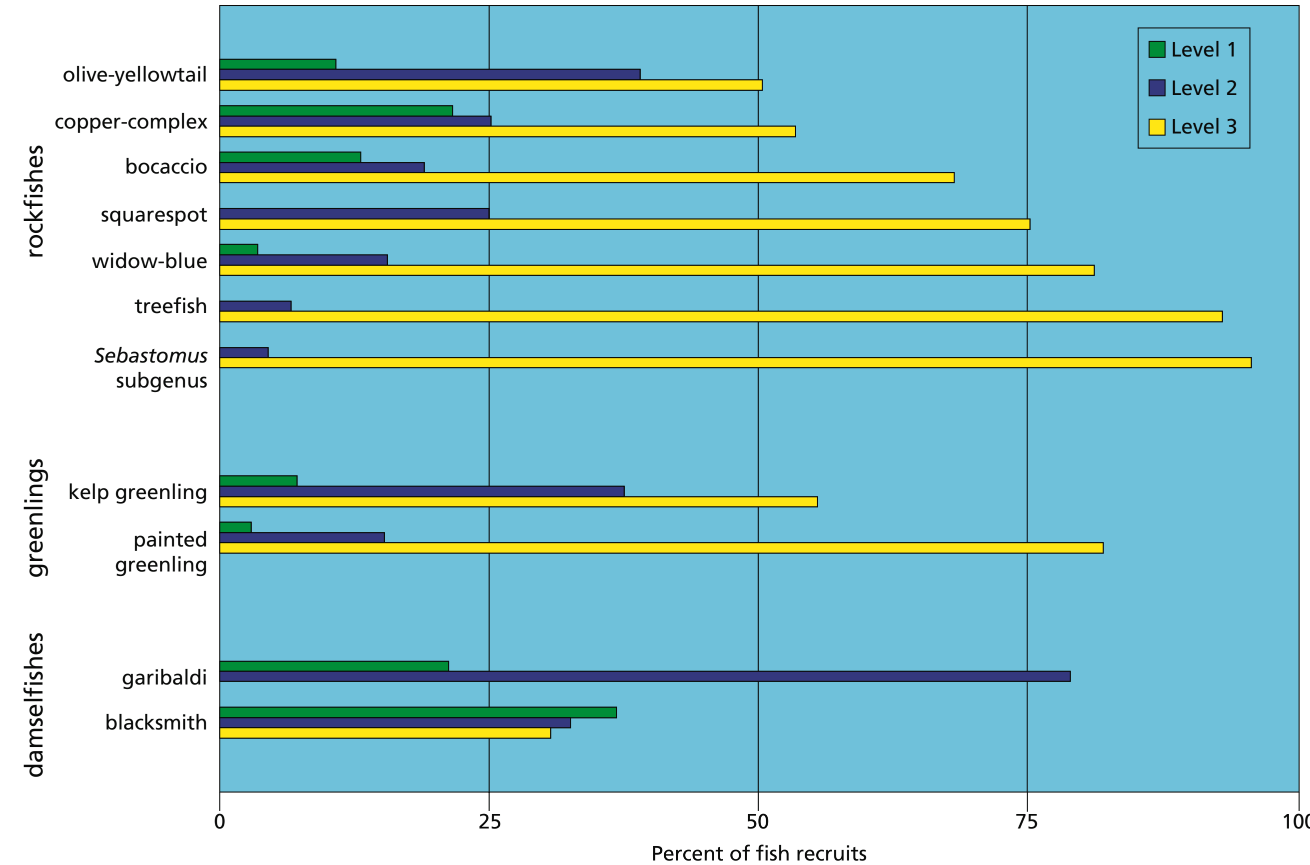
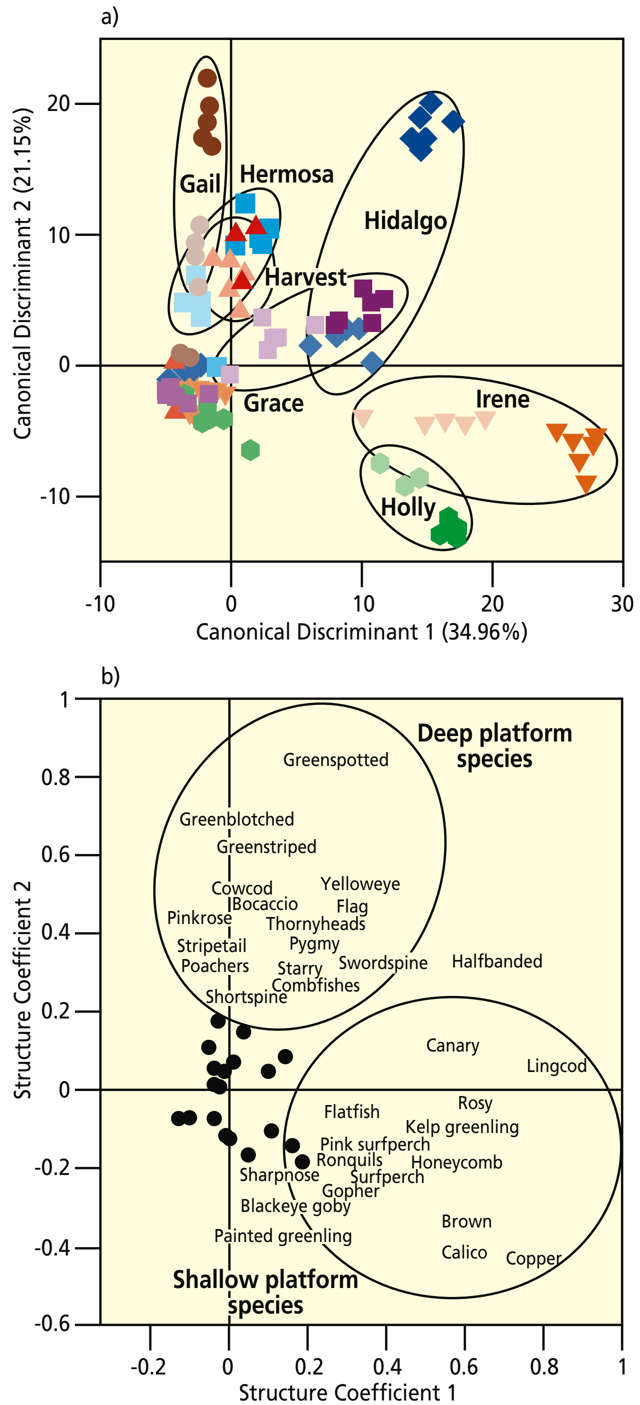


Figure 3.1. Percent of juvenile fish density observed during scuba surveys at different depths on offshore platforms during 1995–2000. Depth ranges for each strata: level 1 (6–12 m), level 2 (15–26 m), level 3 (27–36 m).

1d. Fish Assemblages on Nearshore Natural Outcrops

The relative importance of spatial versus temporal variability in structuring fish assemblages on shallow natural outcrops differed among sites. Ordination analysis revealed that natural outcrops in the west channel tended to be more sensitive to temporal variability than those outcrops positioned in the east channel. This seems intuitive since west channel outcrops are closer to areas of intense and temporally variable upwelling processes which affect mean water temperature, primary production, and dispersal processes of larvae.



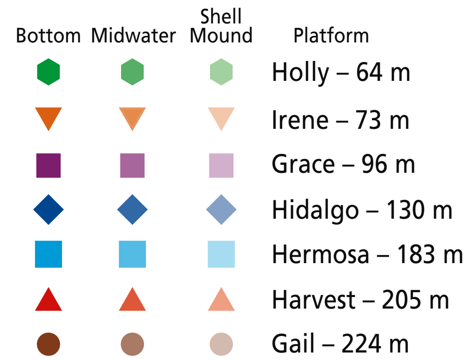


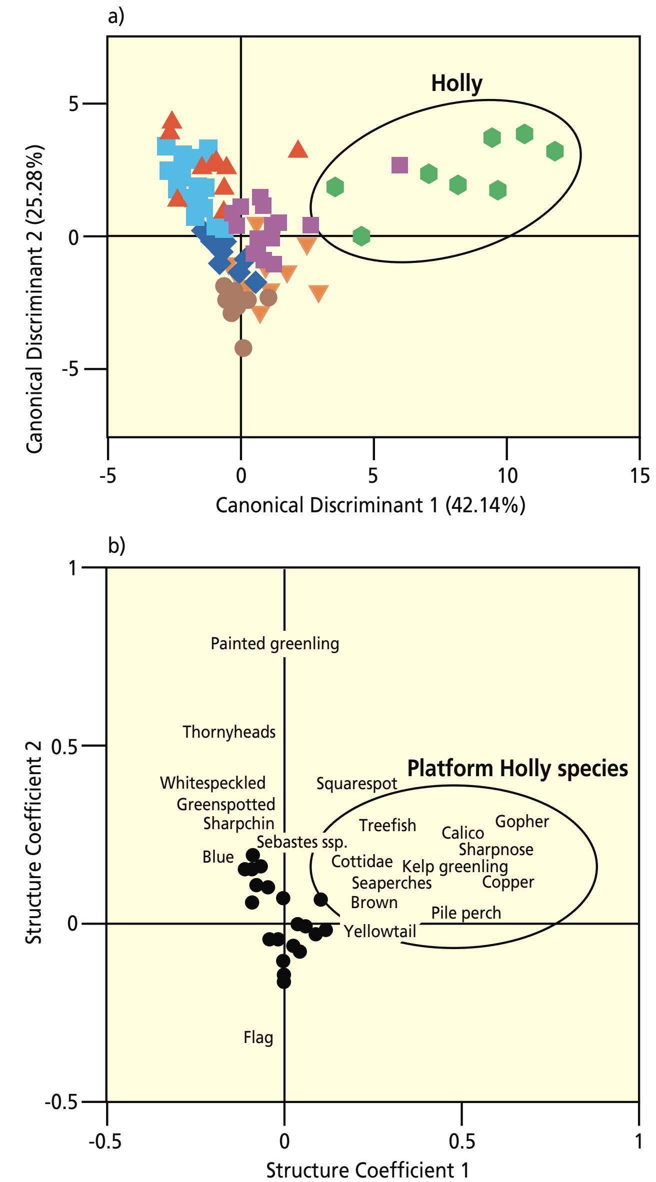
Figure 3.2. 3.2a. Canonical Discriminant Analysis of the bottom and shell mound fish assemblages at seven platforms, 1996–2001. 3.2b. Canonical Discriminant Analysis of the bottom and shell mound species found around seven platforms, 1996–2001. Two groups, one characteristic of shallow platforms, the other of deeper structures are apparent. Black dots represent species that were not strongly associated with either axis.

Similar to platform habitats, the fish assemblages on natural outcrops showed distinct spatial patterns that seemed to correspond to regional oceanographic patterns in the Santa Barbara Channel. Rockfishes and surfperches were important species in west channel fish communities, although 1999 was a strong recruitment year for juvenile rockfishes at most natural outcrops. Blacksmith, garibaldi, sheephead, opaleye, and rock wrasse were important species in east channel fish communities. Kelp bass, black surfperch, and senorita were abundant at all sites. Because we observed abrupt spatial changes in abundance for many species in the Santa Barbara Channel, it is tempting to attribute these patterns solely to oceanographic processes. However, habitat features may covary with oceanography, and we are currently unable to distinguish between these processes.

Dispersal of pelagic stages does not appear to be the primary factor in structuring fish assemblages. For the eight common species in the warm-temperate assemblage that have pelagic larvae, six species exhibited very low or no juvenile recruitment onto shallow rocky outcrops in the Santa Barbara Channel. This suggests that dispersal of benthic stages plays a critical role in the dynamics of reef fish communities and local temperature may be an important criterion in habitat selection. Some species important in the warm-temperate fish assemblage (e.g., kelp bass and opaleye) declined in abundance during the cold La Niña year of 1999. The response of reef fish communities to oceanographic regime shifts may be faster and less persistent than previously thought.

2. Deeper-water Platform Fish Assemblages: 31–224 m (103–739 ft.)

Except where noted, the following synopsis encompasses platforms Irene, Hidalgo, Harvest, Hermosa, Holly,



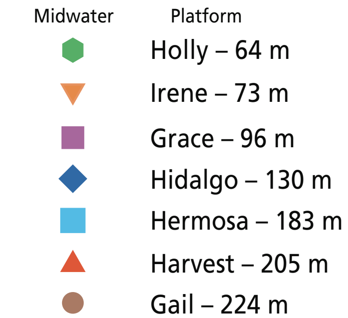


Figure 3.3. 3.3a. Canonical Discriminant Analysis of midwater fish assemblages at seven platforms, 1996–2001. Note that the Platform Holly fish assemblage is distinct from the others. 3.3b. Canonical Discriminant Analysis of the midwater species found around seven platforms, 1996–2001. Note that a group of species tends to be more characteristic of Platform Holly than other platforms. Dots represent species that were not strongly associated with either axis.

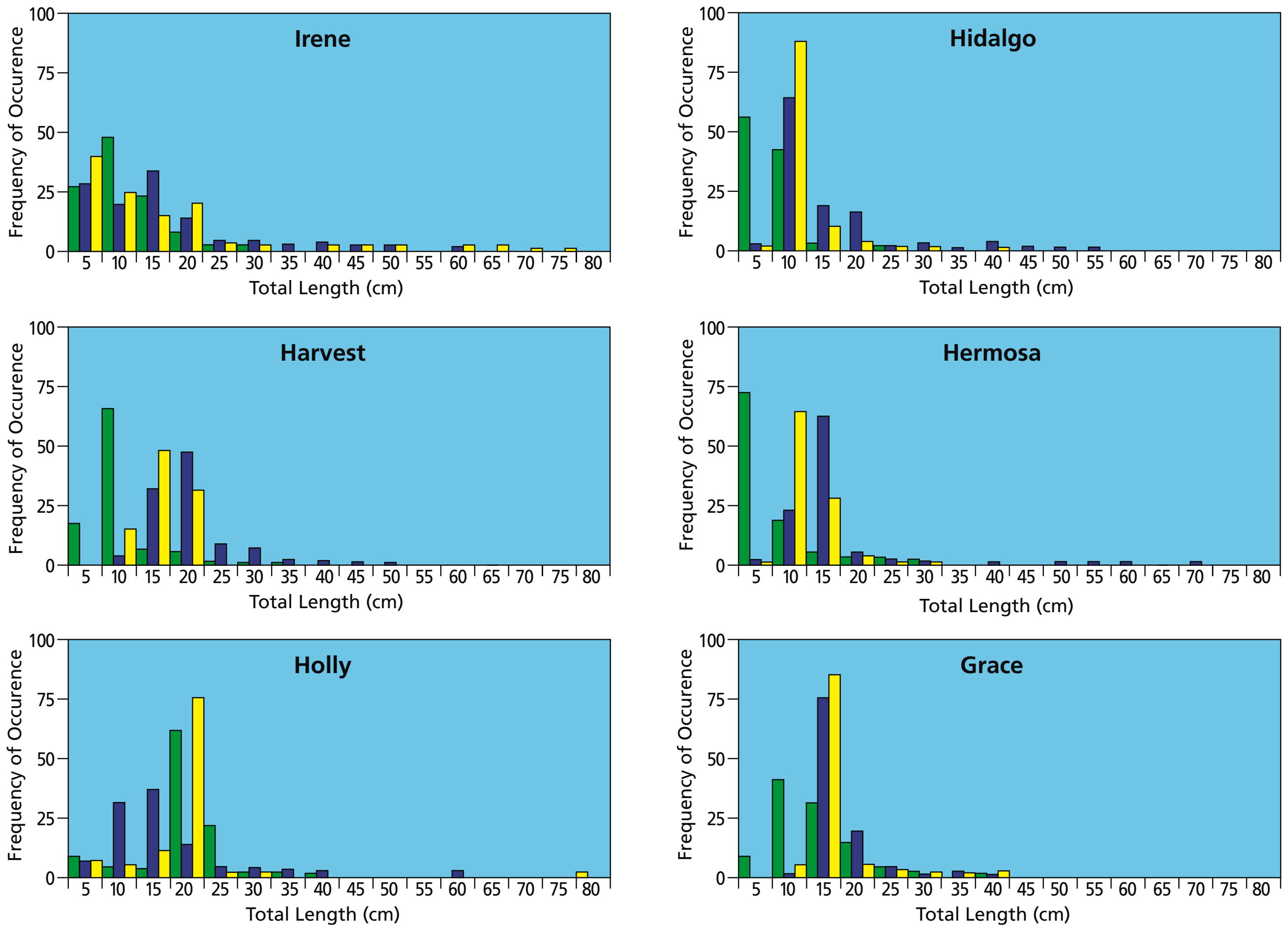
Grace, and Gail, based on surveys conducted between 1995 and 2001 from the research submersible *Delta*.

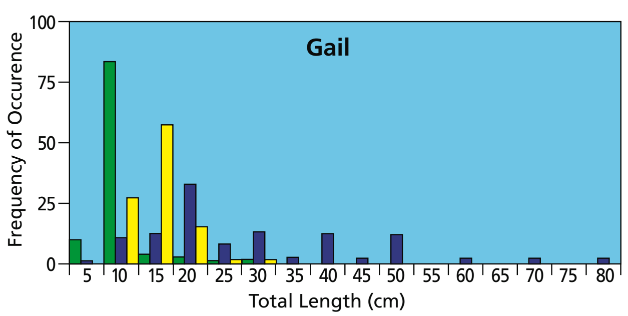
2a. General Patterns

All of the platforms studied by submersible had three distinct fish assemblages, midwater, bottom, and shell mound (Figure 3.2a). Rockfishes, totaling about 35 species, dominated all three fish assemblages. Fish densities at most platforms tended to be highest in the midwater reflecting the depth preferences of young-of-the-year rockfishes that represented the most abundant size class of fishes.

Midwater assemblages were more similar to each other regardless of platform location and bottom depth. The assemblage at Platform Holly had the only distinct midwater assemblage (Figure 3.3a). A suite of species (e.g., calico, copper, and gopher rockfishes, pile, and sharpnose seaperches) characterized this particular assemblage (Figure 3.3b). Holly has the shallowest bottom depth (standing in 64 m, 211 ft.), and it might be that these shallow demersal species were able to occupy these shallow midwater crossbeams. The midwater fish assemblages around the other platforms showed no systematic depth or geographic relationships.

The composition of platform bottom and shell mound fish assemblages was dependent on the bottom depth of the platform (Figure 3.2a) and certain species are characteristic of either shallow or deep benthic habitats (Figure 3.2b). Platforms Holly and Irene (64 m and 73 m; 211 and 241 ft., respectively) were dominated by brown, calico, copper, and vermilion rockfishes and lingcod. In deeper waters, Platforms Hermosa, Harvest, and Gail (183 m, 205 m, and 224 m; 604, 677, and 739 ft., respectively) were dominated by greenblotched, greenspotted, and greenstriped rockfishes. Platform Hidalgo, and to a certain extent Platform Grace, both at intermediate depths (130 m and 96 m, 429 and 317 ft., respectively), were inhabited by species common to both the shallower and deeper platforms. In general, our data suggests that shell mound fish assemblages most closely resemble the fish assemblages of their adjacent platform bottoms (Figure 3.2a). Fishes living on the shell mounds are generally smaller, and presumably younger, than the same species living around the platform bottom.





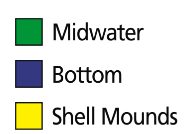


Figure 3.4. Frequency of occurrence of fishes in 5 cm size classes in midwater, bottom and shell mounds at seven platforms, 1996–2001.

The size distribution of fishes differed by habitat type. The midwater assemblages harbored few fishes over 20 cm (8 in.) long (Figure 3.4). Immature, mostly young-of-the-year rockfishes and young painted greenling dominated midwater depths. In addition, seaperches, blacksmith, and several less abundant species inhabited this zone. In contrast, older and larger rockfishes, lingcod, and several other benthic species, occupied the platform bottom habitat. Rockfishes also dominated the shell mounds. The size frequency of shell mound fishes tended to be intermediate between the two other habitats (Figure 3.4). This apparent partitioning of different size modes was most evident in the deepest platforms. Around shallow platforms, there was significant settlement of young-of-the-year rockfishes both in the midwater and at the bottom. This common feature blurred the distinctions between these two habitats.

Young-of-the-year rockfishes showed strong depth preferences around platforms (Figure 3.5). Young-of-the-year were often very abundant in the shallowest portions (above 30 m, 100 ft., depths) of the platform but were also abundant between 31 and 120 m depths (102–396 ft.). They were most abundant at depths between 61 and 90 m (201–297 ft.).

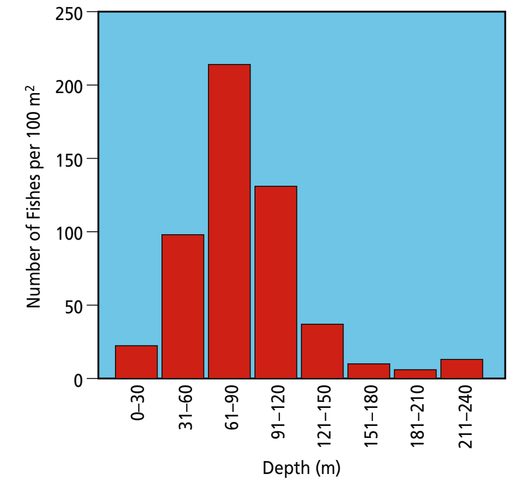


Figure 3.5. Density of young-of-the-year rockfishes observed from the Delta *submersible, by depth, at all platforms surveyed, 1995–2001. Note that large numbers of these fishes were also observed by scuba divers in the shallower sections of the platforms.*

Among platforms, total fish densities typically fell within a relatively small range (Figure 3.6). In general, platforms furthest offshore and in deepest waters had somewhat lower fish densities than did those closer to shore in shallower waters. However, the absolute number of fishes around deeper water platforms may be greater than those in shallower waters, as deeper platforms are much larger than shallower water structures.

2b. Midwater Assemblages

Findings at a Glance

Platform midwaters are nursery grounds for rockfishes as well as for other marine fish species such as cabezon and painted greenling. The young-of-the-year of at least 15 rockfish species inhabit these midwater habitats.

Benthic settlement success is greatly influenced by oceanographic conditions. During our study, densities of young fishes varied greatly between years and platforms. Young-of-the-year rockfish densities often varied

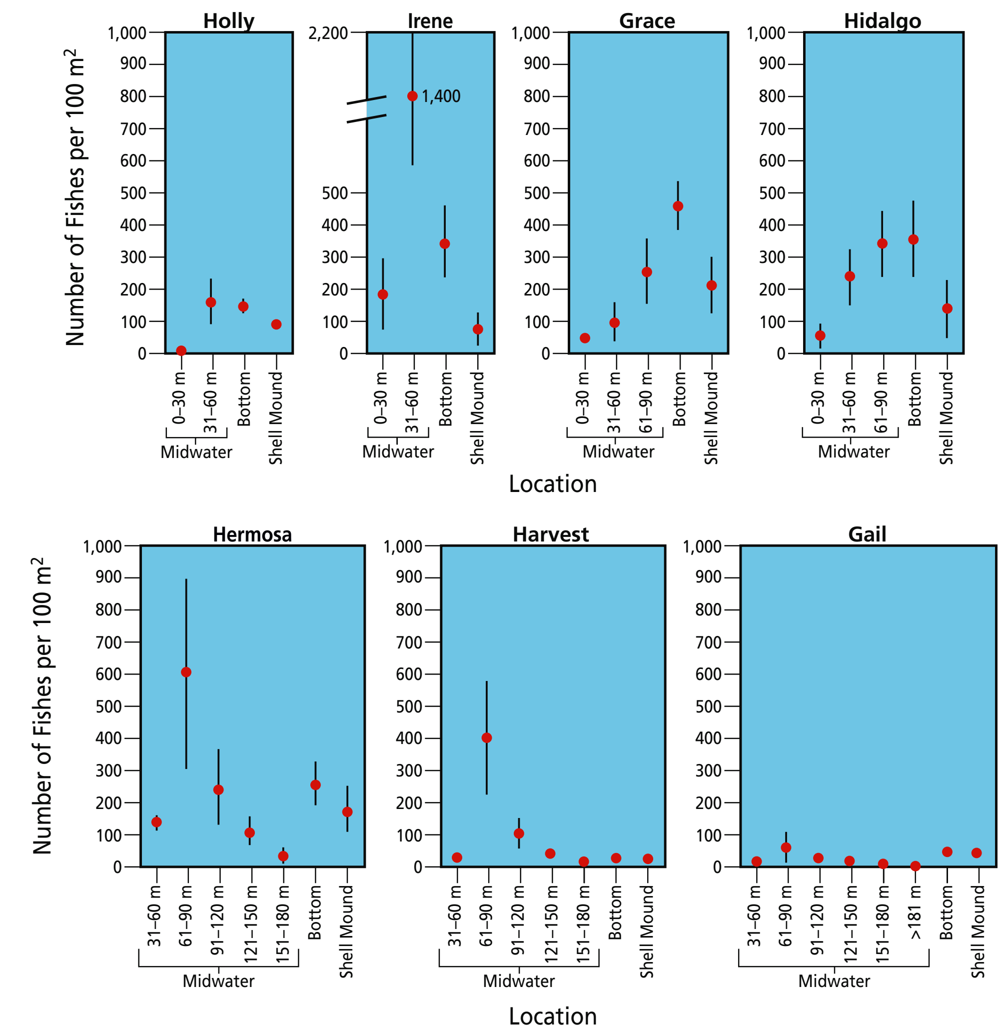


Figure 3.6. Density, with standard error bars, of all fishes in midwater (by 30 m depth zones), bottom and shell mounds, at seven platforms, 1996–2001.

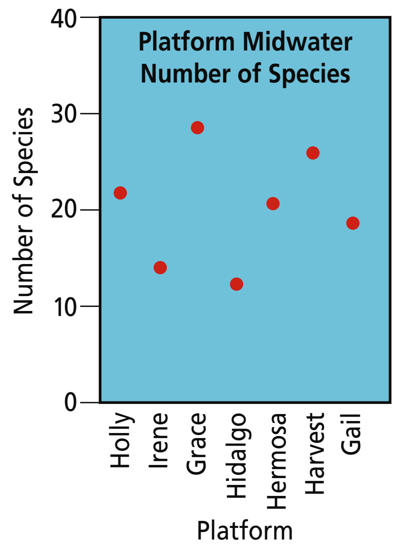


Figure 3.7. Number of species observed in the midwaters of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

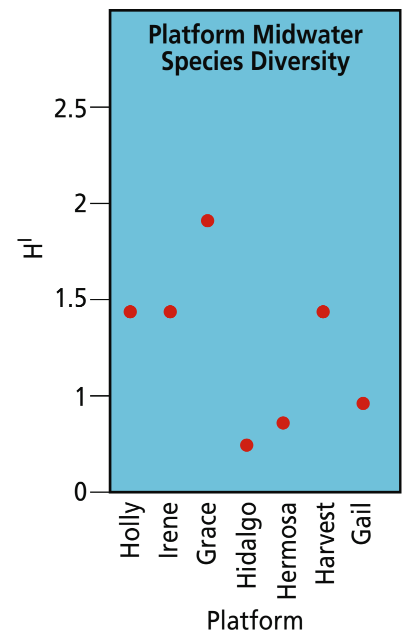


Figure 3.8. Species diversity of fishes in the midwaters of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

by a factor of 10 or even 100 among survey years at some platforms. From 1996 through 1998, rockfish settlement was generally higher around the platforms north of Point Conception compared to those structures in the Santa Barbara Channel, reflective of generally colder, more productive waters in central California. Colder waters in 1999 were associated with relatively high densities of young-of-the-year rockfish recruitment at all of the platforms surveyed. In 2000 and 2001, rockfish recruitment at platforms in the Santa Barbara Channel remained higher than pre-1999 levels. We hypothesize that this was related to the oceanographic regime shift to cooler temperatures that may be occurring in southern California.

Depending on platform location, we observed between 13 and 29 fish species in the midwater habitats below 31 m (102 ft.) depths (Appendix 3). There was no relationship between platform bottom depth and either the number of species or species diversity in the midwater habitat (Figures 3.7 and 3.8). Relatively abundant non-rockfish species included blacksmith, sharpnose seaperch, and juvenile painted greenling. Occasionally, we observed influxes of migratory species such as Pacific sardine, jack mackerel, and Pacific mackerel. However, because our surveys are snapshots in time, they do not adequately capture the importance of platform habitats to these and other pelagic species. The most abundant fishes were young-of-the-year and older juvenile rockfishes and blacksmith. These are planktivorous and thus are not dependent on the platform for food. They utilize these structures for orientation in the water column and as refuge from predation. Less common species, such as seaperches, painted greenling, opaleye, and cabezon do feed on animals or algae living on the platform jacket or conductors.

Our research shows that oil and gas platforms off California provide important nursery grounds for many species of rockfishes. The most conspicuous faunal characteristic of the platform midwaters below scuba depth is the dominance of young rockfishes. Over the course of the study, young-of-the-year and older juvenile rockfishes almost always comprised more than 90% of all fishes observed in this habitat (Appendix 3). In some years, young-of-the-year rockfishes were virtually the only fishes present at some platform midwaters (Appendix 3).

The young-of-the-year of at least 16 rockfish species (bank, blue, copper, darkblotched, flag, gopher, kelp, olive, pygmy, shortbelly, squarespot, widow, yellowtail rockfishes, bocaccio, cowcod, and one or more members of the subgenus *Sebastomus*) recruited to the midwater habitat. Many of the species that were most abundant (e.g., blue, olive, pygmy, squarespot, widow, and yellowtail rockfishes and bocaccio) are those that are epibenthic or semipelagic as adults. Of these diverse young rockfishes, widow rockfishes were consistently the most abundant species at platforms. Among adult rockfishes, kelp and whitespeckled rockfishes were commonly observed.

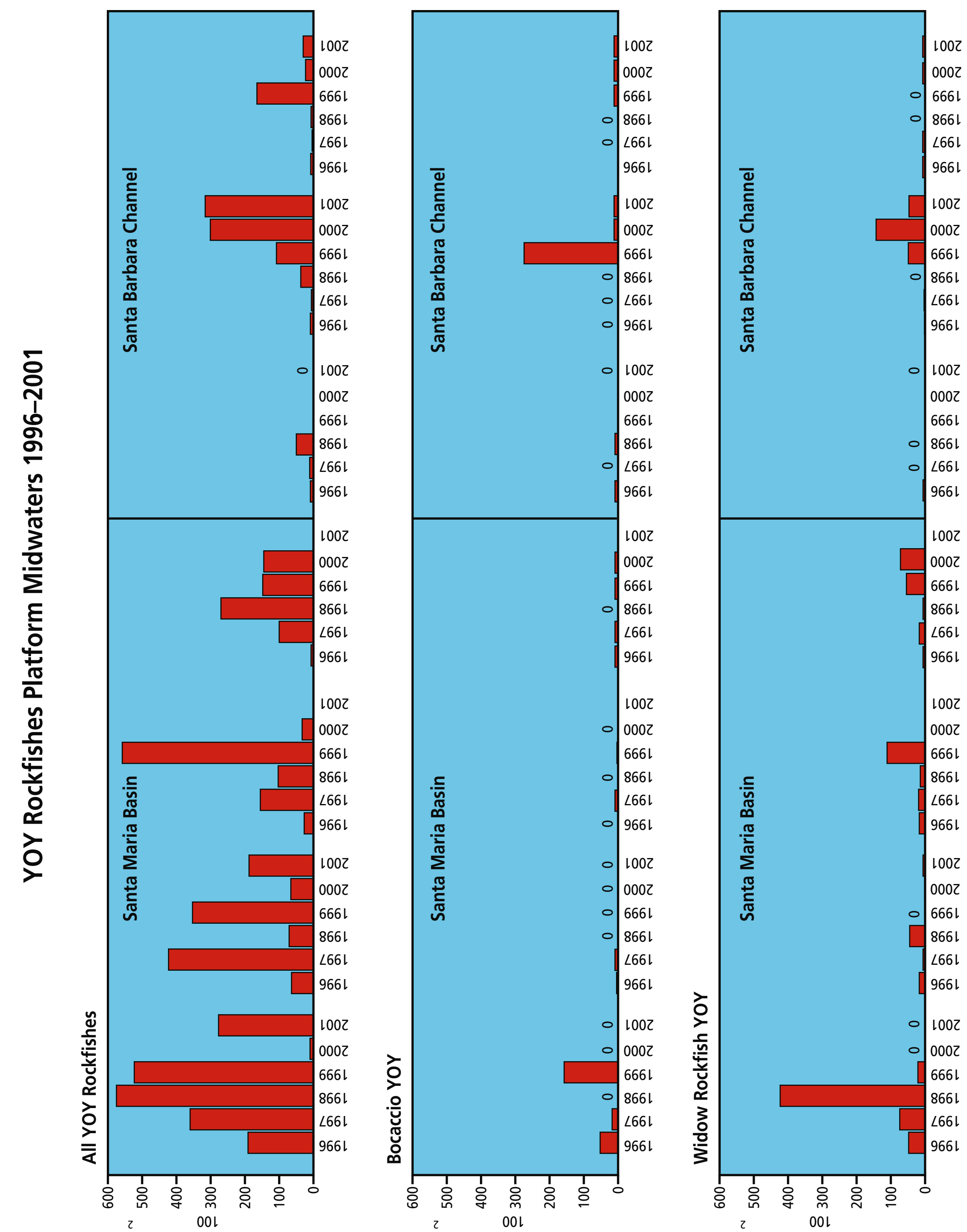


Figure 3.9. Density of all young-of-the-year bocaccio and widow rockfish and all YOY rockfishes combined in platform midwaters, by year and platform, 1996–2001.

DAN DUGAN

Pacific sardines, midwaters of Plaform Holly.

RICK STARR

Young-of-the-year yellowtail rockfish, midwaters of Platform Irene.

MARY NISHIMOTO

Juvenile bocaccio and widow rockfish, midwaters of Platform Grace.

Young-of-the-year and 1-yr old rockfishes of many species (e.g., bank, blue, olive, pygmy, shortbelly, squarespot, widow, and yellowtail rockfishes, and bocaccio) often formed highly mobile schools in the midwater habitat. During years of high abundance, these schools contained many thousands of individuals. Our experience suggests that these schools remained either inside the platform or ventured only a few meters outside it. Schools of young rockfishes tended to more closely associate with the jacket substrate during years of low recruitment or when water visibility was poor. However, when their numbers were high or water clarity was good, young rockfishes, while still living within the platform structure, only loosely associated with the crossbeams and vertical structure. In general, the schools occurred throughout 50 to 100 m or more (150–300 ft.) of the water column. Young copper, gopher, kelp, and flag rockfishes, treefish, and cowcod, as well as cabezon and painted greenling were generally observed either as solitary individuals or in small groups, usually intimately associated with the platform jacket.

Young-of-the-year rockfish settlement (recruitment) to midwater habitats is also strongly influenced by oceanographic conditions. The density of these fishes varied greatly inter-annually by location and among platforms (Figure 3.9). Spatial and temporal differences in young-of-the-year rockfish densities often varied by a factor of 10 or even 100. In several instances, a species that was entirely absent from a platform midwater in one year would recruit in great numbers in the following year. Between 1996 and 1998, young-of-the-year rockfish recruitment was generally higher around the platforms north of Point Conception in the Santa Maria Basin (Irene, Hidalgo, Harvest, and Hermosa) than at the structures in the Santa Barbara Channel (Holly, Grace, and Gail) (Figure 3.9). In contrast, these three years were a period of low rockfish recruitment for many species south of Point Conception both at platforms (Holly, Grace, and Gail) and natural outcrops. The colder water conditions of 1999 brought with it widespread recruitment for a number of rockfish species in California compared to the previous decades. This was reflected at all of the platforms surveyed (Figure 3.9). We should note that the 2000 data at Platforms A, B, C, Hillhouse, Hogan, Houchin, and Henry (see sidebar) strongly suggest that recruitment for some rockfish species, particularly blue and widow rockfishes, had been very successful in 1999. In 2000 and 2001, recruitment of some rockfish at Platforms Gail and Grace remained higher than pre-1999 levels (Figure 3.9). We hypothesize that this represents a successful response to the oceanographic regime shift to cooler temperatures that may be occurring in southern California and the greater northeast Pacific.

The population dynamics of bocaccio exemplifies the annual and geographic variability that occurs in rockfish recruitment at both platforms (Figure 3.9) and natural

Figure 3.10. Patterns of young-of-the-year (YOY) bocaccio settlement in 1999, as observed from the Delta *submersible surveys.*

outcrops (Figure 3.10). Prior to 1999, young-of-the-year bocaccio were absent at the platforms we surveyed (except Irene in 1996 and 1997). During 1999, large densities of young-of-the-year bocaccio were observed at Platforms Irene and Grace; small numbers of at least a few individuals were observed at most other platforms. Platform Grace provided the most striking example of inter-annual variability. Almost no young-of-the-year bocaccio were observed at Platform Grace prior to 1999. In contrast, during 1999, the platform harbored the third highest densities (after 1996 and 1999 at Platform Irene) of young bocaccio we observed around either platforms or natural outcrops during the six years of research. It is important to realize that even in years of relatively high rockfish recruitment, the actual process of settlement may result in a patchy distribution of young-of-the-year benthic recruits. Such patchiness was observed in the bocaccio recruitment pattern in 1999 at Platforms Grace and Gail, which are located only 8 km (5 miles) apart. While Platform Grace harbored large numbers of young bocaccio, they were much less abundant at nearby Platform Gail. Furthermore, our research has shown that successful rockfish recruitment at platforms does not always translate to similar high densities of these species at nearby natural outcrops. Using the *Delta*, in 1999 we also surveyed 12 natural outcrops located in depths suitable for bocaccio recruitment and found little evidence of bocaccio recruitment over any of these structures (Figure 3.10).

In 2000, we studied the midwater habitats of Platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat. These platforms, located off Summerland east of Santa Barbara (Figure 1.1), were home to many typical midwater reef fishes, including juvenile blue, olive, and widow rockfishes (of the 1999 year class), blacksmith, kelp rockfish, kelp bass, painted greenling, halfmoon, and sharpnose seaperch. Unlike the species assemblage of the further offshore and the more northerly platforms, both garibaldi and California sheephead were common. In 1998, we surveyed Platform Edith and again found a typical mix of reef fishes, including blacksmith, halfmoon, opaleye, sheephead, and garibaldi. Complete species assemblages for all of these platforms are found in Appendix 3.

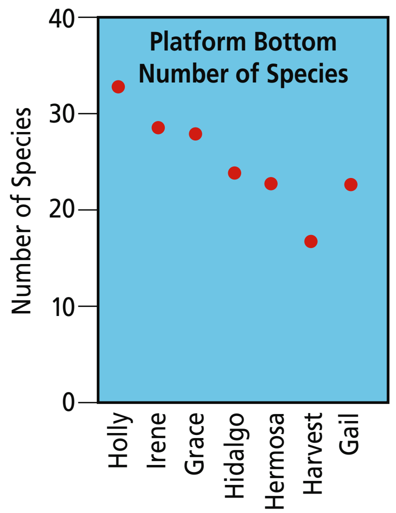


Figure 3.11. Number of species observed at the bottom of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

2c. Bottom Assemblages

Findings at a Glance

The bottom habitat of platforms is dominated by subadult and adult rockfishes. Young-of-the-year rockfishes were also abundant around some platform bottoms, occasionally in large numbers. In general, more than 90% of all the fishes found around platform bottoms were rockfishes. The numbers and estimated densities of all fishes in the bottom habitats are shown by platform in Appendix 3. Bottom depth strongly influenced the number of species, species diversity, and density of fishes living around platform bases. This is in direct contrast to the midwater habitat. The presence of young-of-the-year and older aged juveniles indicates that the bottom habitat of some platforms may be important nursery habitat for some species. The platform base appears to be important to many marine species, as it provides both refuge and prey.

Depth strongly influences fish assemblages in platform bottom habitat. Species richness varied widely from about 33 species at Platform Holly to 17 species at Platform Harvest. Generally, the shallower-water platforms harbored more species than platforms in deeper depths although this trend may have begun to reverse at Gail, the deepest platform (Figure 3.11). Species diversity was high at the shallowest and deepest platforms and lowest among the mid-depth structures (Figure 3.12). Conversely, overall fish densities were much higher at the mid-depth platforms than at the deepest platforms (Figure 3.13).

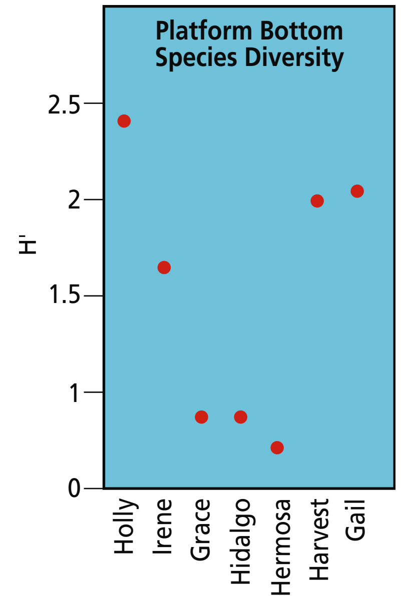


Figure 3.12. Diversity of fishes at the bottom of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

Diversity and abundance patterns were driven by the depth preferences of a suite of rockfishes that dominate the bottom habitats. For instance, brown, calico, copper, and vermilion rockfishes were most abundant around the shallower structures but were absent from the deepest platforms (Figure 3.13). Pile perch, painted greenling, and young-of-the-year lingcod displayed the same pattern. Juvenile lingcod were also abundant at the shallowest platforms, particularly at Platform Irene, but these were also occasional around even the deepest structures surveyed. Halfbanded rockfish and flag rockfish were typically found at the intermediate-depth platforms. Greenblotched, greenspotted, greenstriped, pinkrose, and stripetail rockfishes were most abundant around the deeper structures (Figure 3.13). The juveniles of many of these species were found in shallower water or on the shell mounds.

Platform structure in the bottom habitats may influence the distribution of fishes. This habitat encompasses that area where the platform jacket and conductors physically meet the seafloor. At all of the platforms surveyed, there is a crossbeam that rests on, or is close to, the bottom. Some portions of this crossbeam may be completely buried by sediment or undercut by currents. The platform jacket and, in particular, the undercut crossbeam, appears to provide many of the attributes of a natural outcrop, providing high relief and large crevices. Many species, such as canary, flag, vermilion, and widow rock-

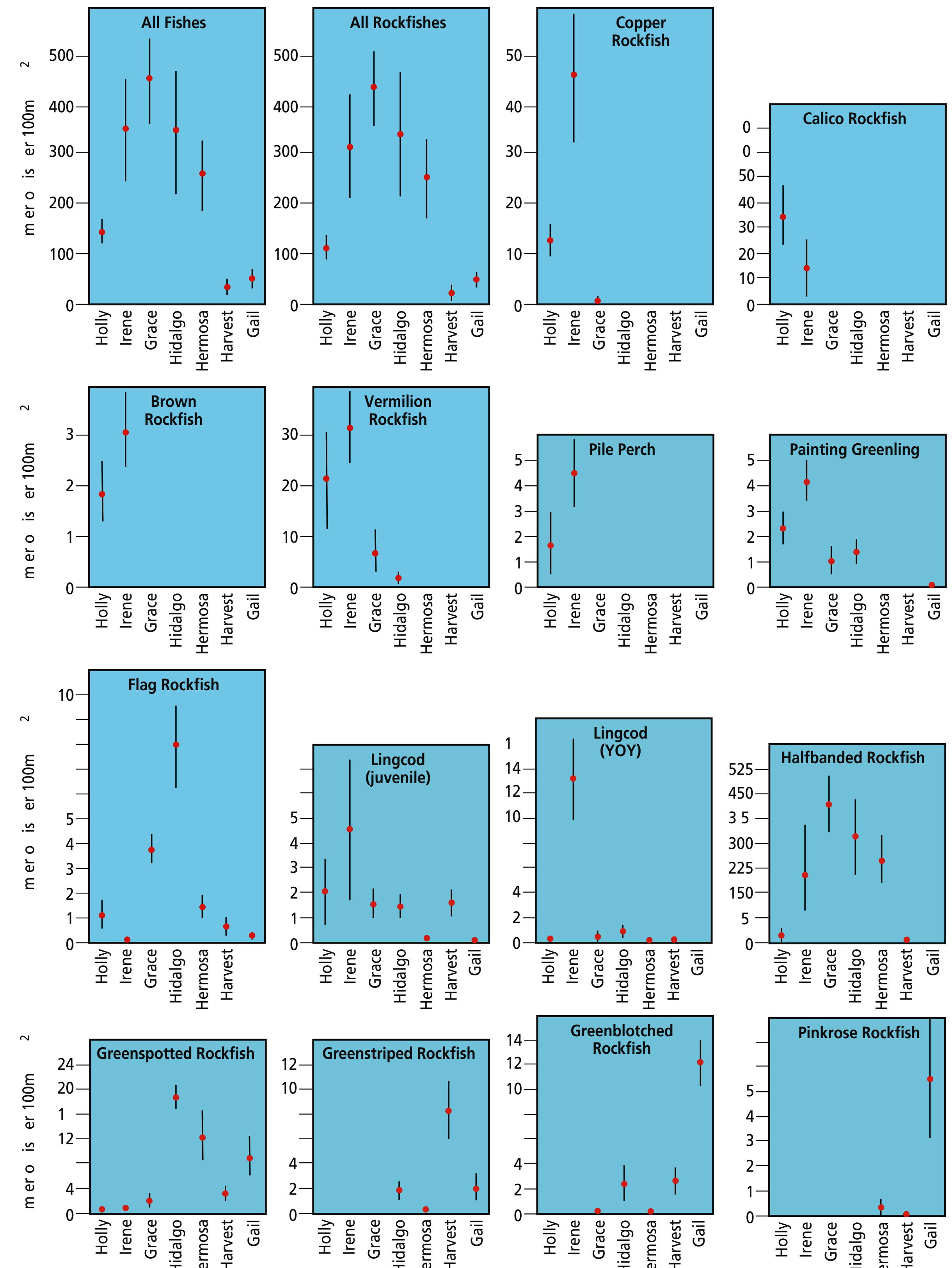


Figure 3.13. Densities (with standard error bars) of all fishes, all rockfishes and the most important species at the bottom of seven platforms, years combined, 1996–2001.

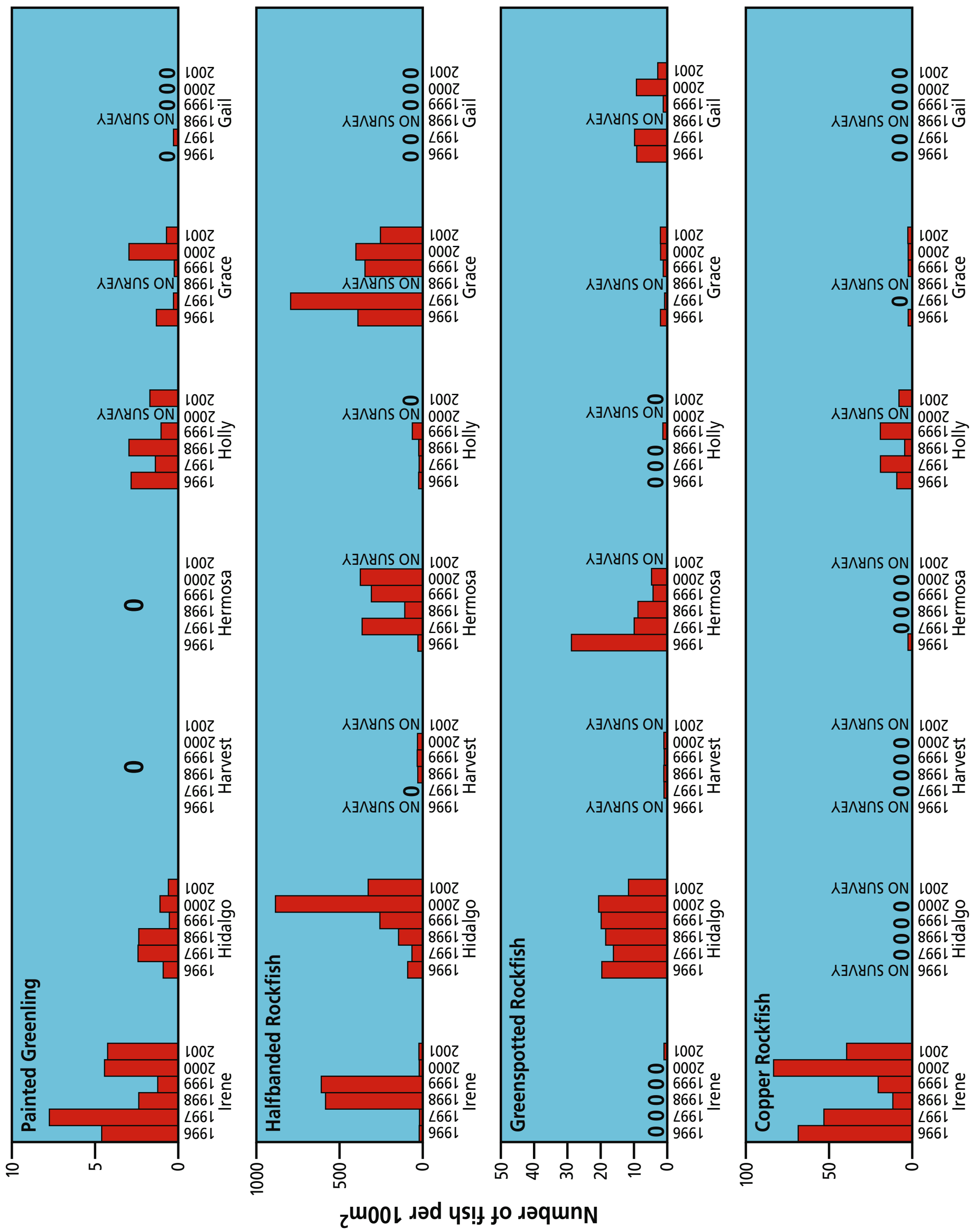


Figure 3.14a. Densities of selected species at the bottom of seven platforms, by platform, by year, 1996–2001.

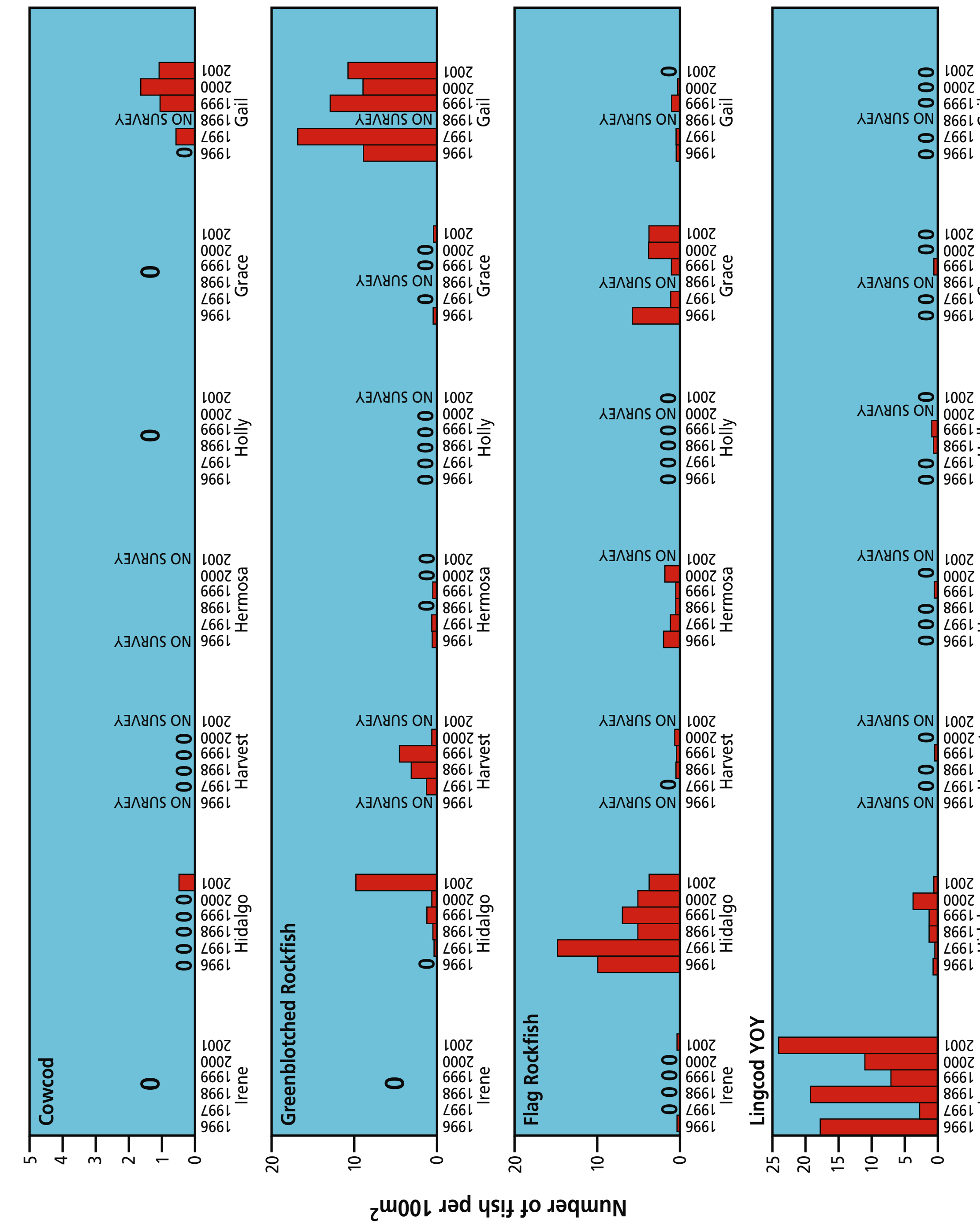


Figure 3.14b. Densities of selected species at the bottom of seven platforms, by platform, by year, 1996–2001.


MILTON LOVE

Bocaccio, bottom of Platform Gail.


DONNA SCHROEDER

Subadult vermilion rockfish, bottom of Platform Grace.


LINDA SNOOK

Cowcod, bottom of Platform Gail.


MILTON LOVE

Lingcod, bottom of Platform Gail.


LINDA SNOOK

Mexican and greenspotted rockfishes, bottom of Platform Gail.

fishes, bocaccio, pile perch, and painted greenling closely associate themselves with the platform jacket, particularly with the crossbeam. Similarly, larger copper, greenspotted, greenblotched, and pinkrose rockfishes and cowcod tend to shelter inside or immediately next to the platform. These fishes were particularly abundant where a space formed between the lowest crossbeam and the seafloor. Calico and greenstriped rockfishes and various life stages of lingcod were less closely associated with the structure. While most species rarely ascend more than a meter or two above the seafloor, bocaccio and halfbanded rockfish often rose as much as 5 m (17 ft.) above the bottom.

Most platform bottom species are either solitary or shelter in small groups. The exceptions are young-of-the-year rockfishes, juvenile and subadult brown, copper, halfbanded, and vermilion rockfishes, and bocaccio. On a number of occasions, we observed aggregations of tens and hundreds of brown, copper, and vermilion rockfishes and bocaccio and large schools of halfbanded rockfish comprised of thousands of individuals.

Compared to midwater habitats, the fish species compositions at platform bottoms were relatively stable over time (Figures 3.14a, b). The dominant species varied little between years at any platform. Thus a platform, such as Gail, that was dominated by adult greenspotted and greenblotched rockfishes, bocaccio, and cowcod in one year tended to be inhabited by these same species in all years in about the same abundances. Similar patterns were observed for such common species as painted greenling (Platforms Irene and Holly), greenspotted rockfish (Platforms Hidalgo and Hermosa), copper rockfish (Platforms Irene and Holly), and flag rockfish (Platform Hidalgo). It is likely that we were observing some of the same individuals each year. This constancy would be expected as these assemblages are at least partially composed of subadult and adult stages of relatively sedentary and long-lived rockfishes. Thus, the composition of the bottom assemblages is not determined by the year-to-year fluctuations in year-class success that is characteristic of the platform midwaters. However, the densities of a few important species, particularly halfbanded rockfish, varied annually. In some years halfbanded rockfish were essentially absent from a platform bottom, only to be extremely abundant the following year. Schools of this species are highly mobile and may have been present but not in the vicinity of the submersible when the survey was made.

Our observations indicate that the bottom habitat of some platforms may be particularly important for certain species. For example, young-of-the-year lingcod densities were much higher at Platform Irene and Hidalgo than at any natural outcrop during any year of the survey (Appendix 4).

Unlike most of the fishes living in the platform midwater, it is likely that the majority of the platform bottom-dwelling species feed on platform-associated prey. Many of these species, such as brown, copper, and flag rockfishes, eat a variety of crustaceans, molluscs, and small fishes, many of which live in and around the jacket, conductors, and shell mound. Other species, such as lingcod, cowcod, and bocaccio are opportunistic feeders, preying on a very wide range of organisms, including benthic and water column fishes, molluscs, and crustaceans (Love et al. 2002). Thus, for many benthic fishes, the platform base provides not only shelter but also an abundant source of food.

We conducted one survey, in 1998, around the base of Platform Edith. We found that California scorpionfish, sharpnose seaperch, blacksmith, and blackeye goby were the most abundant species. See Appendix 3 for a complete species list.

2d. Shell Mound Assemblages

Findings at a Glance

Shell mounds support a rich and diverse fish assemblage. As at other platform habitats, rockfishes comprise the vast majority of the fishes. The many small sheltering sites created by mussels, anemones, and other invertebrates on the shell mounds provided structure in a habitat dominated by small fishes. Many of these fishes are the young-of-the-year and older-aged juveniles of lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod. The adults of these species inhabit the platform bottom.

Depending on platform, we observed between 17 and 30 species living on this habitat. In the shell mound habitat, the patterns of species numbers, diversity, and fish densities were similar to those observed around the platform bottoms. Species numbers generally decreased with increasing depth (Figure 3.15) although it increased sharply at the Platform Gail, the deepest structure. This increase was due to the occurrence of a number of deeper water species (e. g., rex sole, blackgill rockfish, and California smoothtongue) that were absent from other platforms. As in the platform bottom habitat, species diversity was highest at the shallowest and deepest platforms compared to shell mounds in intermediate depths (Figure 3.16).

The shell mounds surrounding all platforms provided habitat and refuge for a diverse assemblage of fishes. Fish densities were highest on the intermediate-depth platform shell mounds (Figure 3.17). However, as in the platform midwater and bottom, a majority of these fishes are rockfishes; between 53% and 98% of all fishes living on the shell mounds are rockfishes (Appendix 3). Furthermore, when highly migratory and non-resident species, such as Pacific hake and Pacific sardine, are eliminated from the analysis, rockfishes comprise more than 80% of the shell mound fauna at each of the seven platforms surveyed. Those species most characteristic of the shell mounds exhibited distinct depth preferences (Figure 3.17) and the abundance of some of these fishes was responsible for the higher densities in the intermediate bottom depths. The dominant species of the shallow water shell mounds were vermilion, copper, and calico rockfishes, young-of-the-year and immature lingcod, and painted greenling. A few species, such as greenspotted and halfbanded rockfishes, were most common in the intermediate bottom depths. It was primarily the very high densities of halfbanded rockfish that were responsible for the overall high densities at intermediate-depth shell mounds. Greenstriped, pinkrose, and stripetail rockfishes

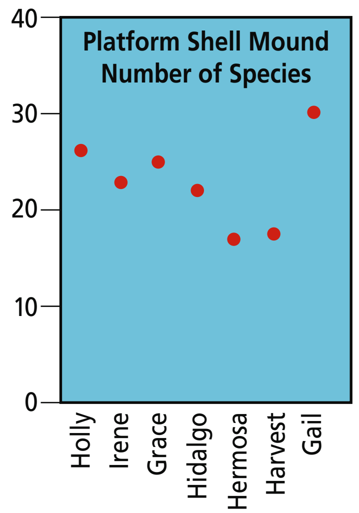


Figure 3.15. Number of fish species observed on the shell mounds of seven platforms, 1996–2001. Platforms listed left to right from shallowest to deepest.

were most abundant at the deepest platforms surveyed.

The mosaic of small refuge sites created by mussels, anemones, and other invertebrates are occupied by small fishes. Many of these fishes are the juveniles of such species as lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod, whose adults inhabit the adjacent platform bottom. Small sheltering sites are rarely found at the platform bottom. In part, this explains why fishes tend to be smaller on a shell mound than on the associated platform bottom (Table 2). This also explains why the shell mound assemblage so closely resembles its counterpart around the adjacent platform bottom. Painted greenling, calico, and halfbanded rockfishes, shortspine combfish, blackeye goby, and the poachers are among the dwarf species occupying the shell mound. Juveniles of the species characteristic of platform midwaters, such as blue and widow rockfishes, are rare over the shell mounds.

Most shell mound species are solitary fishes, living just above the seafloor or nestled among the shell debris or around anemones, seastars, and other large invertebrates. The only schooling species is the halfbanded rockfish that often forms highly mobile schools of 100 to 1,000 or more individuals.

It is likely that many of the fishes, including most of the rockfishes, combfishes, painted greenling, and other benthic species are resident to the shell mound habitat. Highly mobile and migratory species, such as northern anchovy, Pacific sardine, and juvenile Pacific hake, that were observed over the shell mounds probably spend only a relatively short period associated with this habitat.

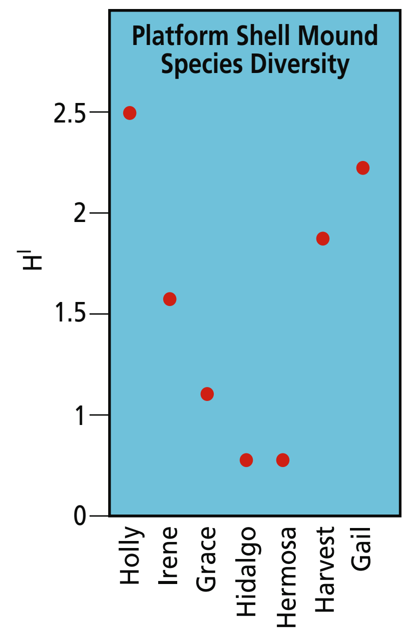


Figure 3.16. Diversity of all fishes observed on the shell mounds of seven platforms, 1996–2001. Platforms are listed left to right from shallowest to deepest.

Shell mound surveys were conducted around Platform Edith in 1998 and around Platform C in 2000. Young vermilion rockfish, as well as halfbanded and calico rockfish, were the most abundant species around Platform C. These species were also characteristic of the shell mound at Platform Holly, which lies in a similar depth. California scorpionfish and blackeye goby dominated the shell mound around platform Edith. Edith lies a few miles southeast of Long Beach and near a known California scorpionfish spawning grounds (Love et al. 1987). California scorpionfish are relatively uncommon in the Santa Barbara Channel and are rare north of Point Conception. This distribution explains the near absence of this species from other shell mounds we surveyed.

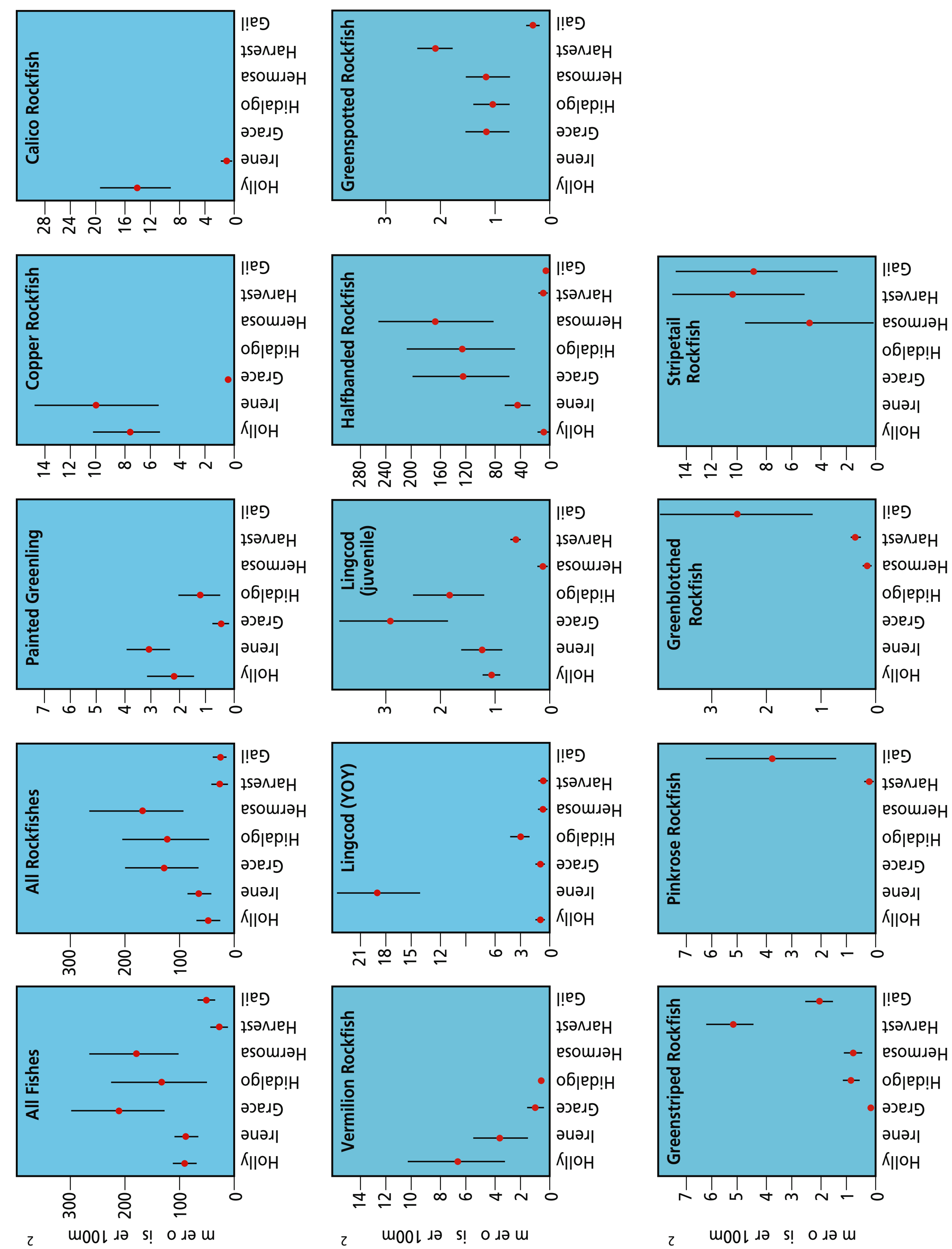


Figure 3.17. Density (with standard error bars) of all fishes, all rockfishes, and the most abundant shell mound fish species found around seven platforms, 1996–2001. Platforms are listed left to right from shallowest to deepest.

MILTON LOVE

Pinkrose rockfish, shell mound of Platform Gail.

MILTON LOVE

Greenspotted and flag rockfishes, shell mound of Platform Gail.

LOVELAB, UC SANTA BARBARA

Young-of-the-year cowcod on shell mound of Platform Gail.

MILTON LOVE

Halfbanded rockfish, shell mound of Platform Hidalgo.

3. A Comparison of Fish Assemblages at a Deeper Platform and a Nearby Natural Outcrop: Hidalgo and North Reef

Findings at a Glance

The species composition at Platform Hidalgo and North Reef are quite similar as both structures are dominated by rockfishes. In general, the distinctions between the platform and reef assemblages were based on differences in species densities (rather than species presence or absence). Most species were more abundant at Platform Hidalgo than at North Reef. Halfbanded, greenspotted, flag, greenstriped, and canary rockfishes, all three life stages of lingcod (young-of-the-year, immature, adult), and painted greenling all had higher densities around the platform. Five species (i. e., pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the reef. The dominance of small fishes at North Reef probably reflects fishing pressure that has cropped larger individuals. Young-of-the-year rockfishes were found at both Platform Hidalgo (primarily in the midwaters) and at North Reef. In each of five years, young-of-the-year rockfish density was higher at the platform than at the reef. In several years, densities of these young fishes were more than 100 times greater at Platform Hidalgo than at North Reef.

We surveyed the fish assemblages at Platform Hidalgo and a nearby natural outcrop, North Reef, for the period 1996–2001. North Reef was compared with Platform Hidalgo because it is close to the platform (about 1,000 m, 3,300 ft., north of the platform) (Figure 3.18), and its depth (112 m, 370 ft.) is comparable to the platform's 130 m (430 ft.). North Reef is a hard carbonate scarp, which is 1–4 m (3–13 ft.) high, 3,353 m^2 in area and contains numerous boulders, caves, and crevices.

The species composition at Platform Hidalgo and North Reef are very similar (Table 3). Both habitats are dominated by rockfishes; they comprised 98.3% and

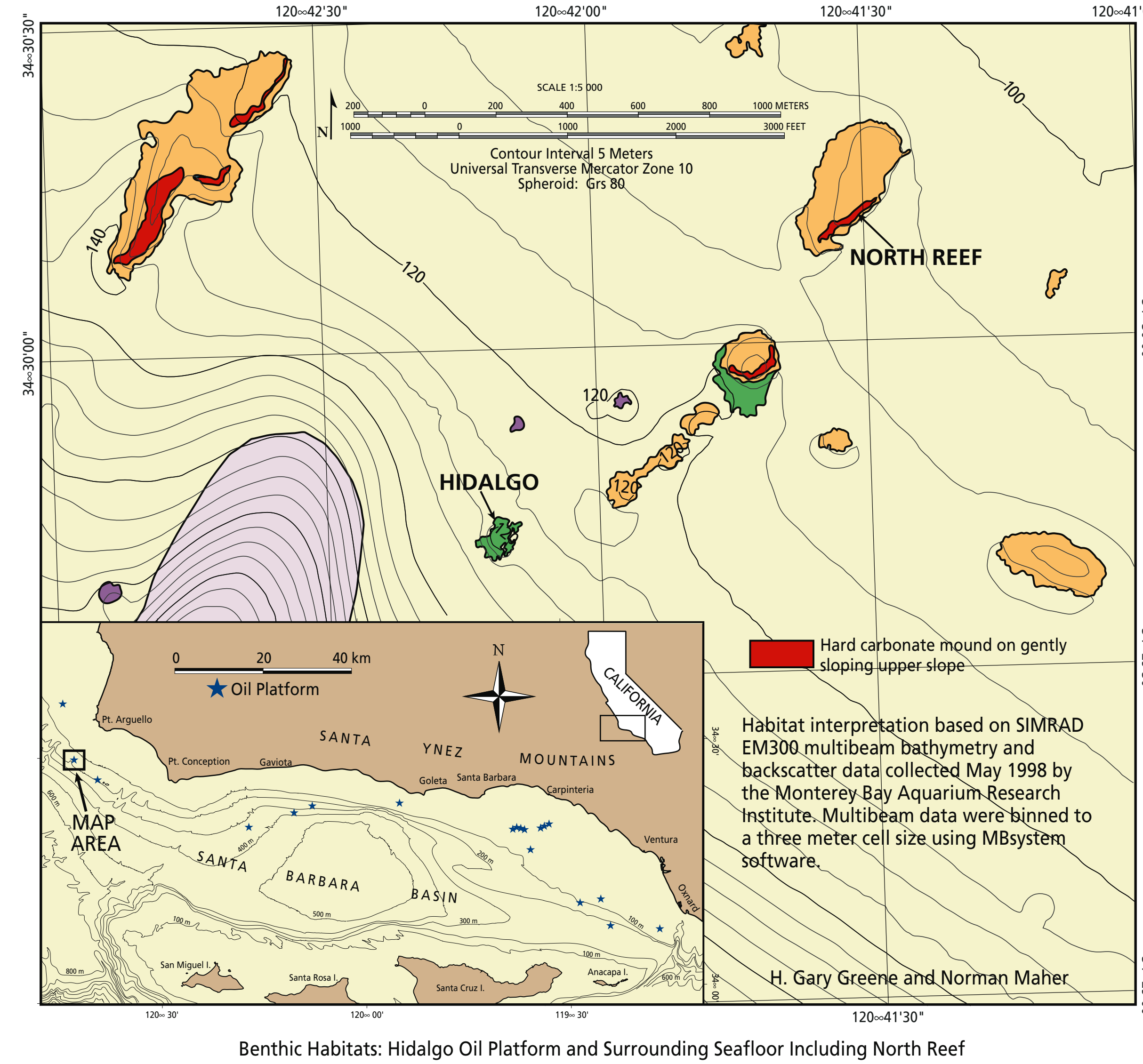


Figure 3.18. Locations of Platform Hidalgo and North Reef. Seafloor characterization by Gary Greene, Moss Landing Marine Laboratory.

96.6% of all fishes at Platform Hidalgo and North Reef, respectively. We observed a minimum of 34 fish species at each location. A few species were unique to each structure. Copper and stripetail rockfishes and California scorpionfish were found only at Platform Hidalgo, while blackeye goby, bluebarred prickleback, Pacific argentine, speckled sanddab, and an unidentified cuskeel were present only at North Reef. None of these species were major constituents of their respective fish communities.

However, when taking into consideration the fish assemblages of the three habitats (midwater, bottom, and shell mounds) at Platform Hidalgo, each was somewhat distinct from that of North Reef (Figure 3.19). To characterize and distinguish between the species assemblages at Platform Hidalgo and North Reef, we compared only the benthic assemblages of the platform bottom and shell mound and North Reef. Canonical discriminant analysis showed that species assemblages at the bottom of Platform Hidalgo and its shell mound were somewhat different from each other and from the North Reef assemblages (Figure 3.20a). The platform bottom assemblage was characterized by a suite of rockfishes, including bocaccio and cowcod, flag, vermilion, and widow rockfishes and lingcod. The shell mound assemblage was similar to and overlapped with the platform bottom, but was characterized by smaller fishes, such as swordspine,

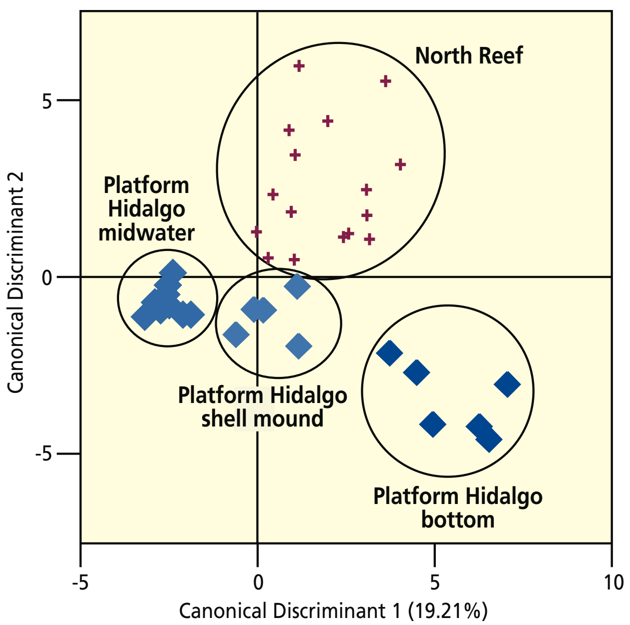


Figure 3.19. Canonical Discriminant Analysis of fish assemblages at Platform Hidalgo, midwater, bottom, and shell mound habitats and North Reef, 1996–2001.

greenstriped and halfbanded rockfishes, painted greenling, and juvenile lingcod (Figure 3.20b).

In general, the distinctions between the platform and reef assemblages were based on differences in species densities rather than species presence and absence. The densities of a range of species varied between the two sites (Figure 3.21) and most exhibited higher densities at Platform Hidalgo than at North Reef (Figure 3.21). Halfbanded, greenspotted, flag, greenstriped, canary rockfishes, all three life stages of lingcod (young-of-the-year, immature, adult), and painted greenling were among the species that were more abundant around the platform. Five species (pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the reef.

Young-of-the-year rockfishes were common at both Platform Hidalgo (primarily in the midwaters) and at North Reef, although species differences were observed. From our submersible surveys, we identified at least seven species of young-of-the-year rockfishes at Hidalgo (e.g., blue, bocaccio, olive, pygmy, squarespot, widow, and yellowtail). Our scuba surveys around that platform also noted young-of-the-year of the "copper complex," composed of black-and-yellow, copper, gopher, and kelp rockfishes. Most of the young-of-the-year rockfishes at North Reef appeared to be pygmy, squarespot, and widow rockfishes.

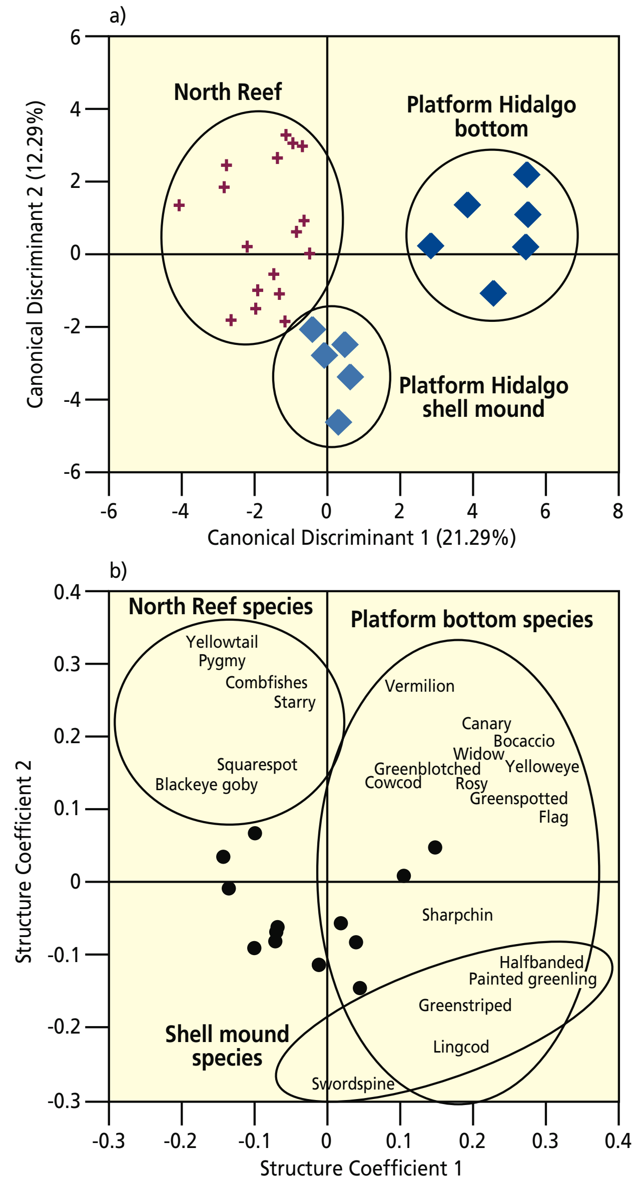
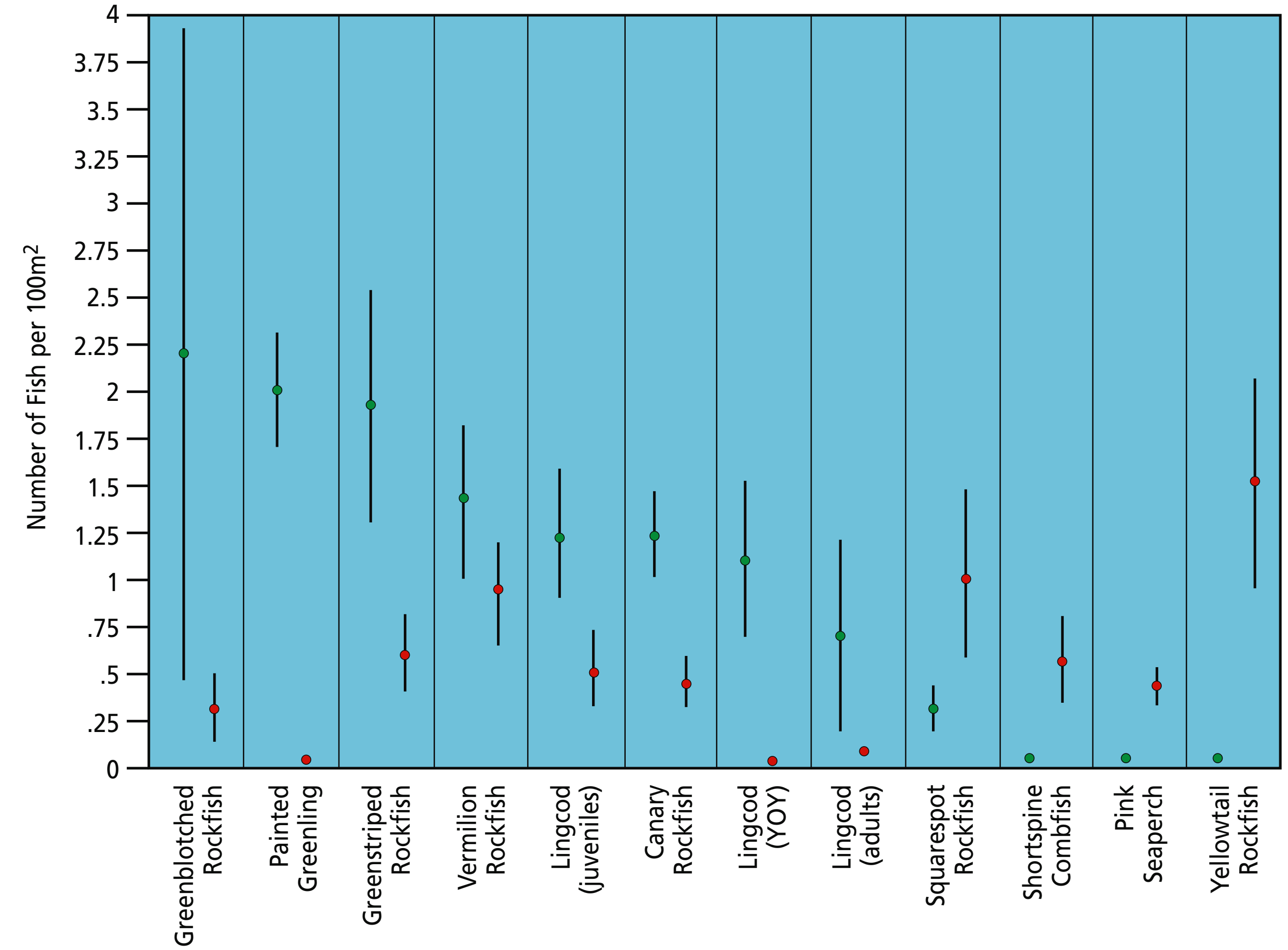
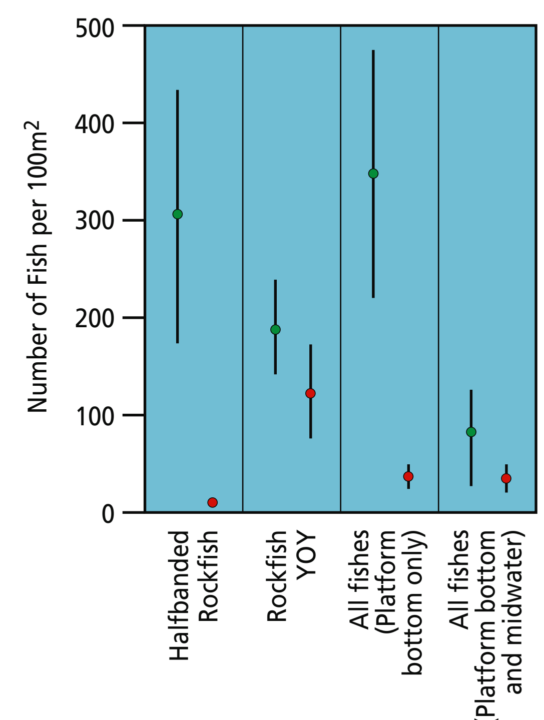


Figure 3.20. 3.20a. Canonical Discriminant Analysis of fish assemblages at Platform Hidalgo bottom and shell mound habitats and North Reef, 1996–2001. Each yearly survey at North Reef was comprised of 2–3 transects and thus each year's survey is represented by more than one cross. 3.20b. Canonical Discriminant Analysis of the species found around Platform Hidalgo, bottom and shell mound and North Reef, 1996–2001. Dots represent species that were not strongly associated with either axis.

The mean density of young-of-the-year rockfishes in the midwater habitat of Platform Hidalgo was higher than at North Reef (Figure 3.21). This probably reflects greater rockfish recruitment to the platform. This has important implications with respect to platform habitat values regarding settlement and fish production around





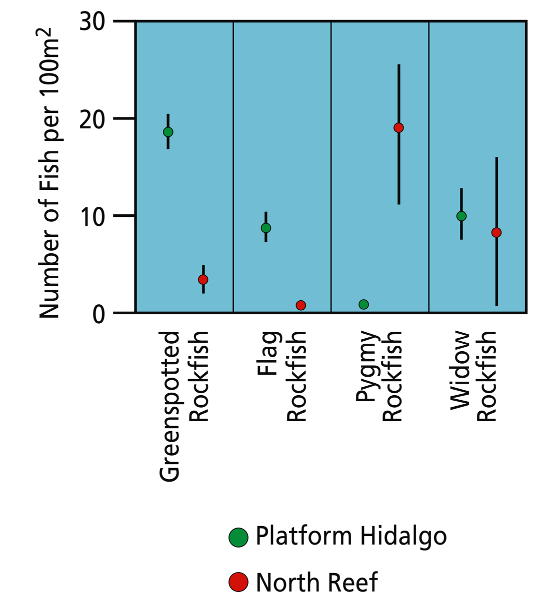


Figure 3.21. Mean densities (with standard error bars) of the common species or species assemblages at Platform Hidalgo and North Reef, 1996–2001. Species or species assemblages are grouped by abundance.

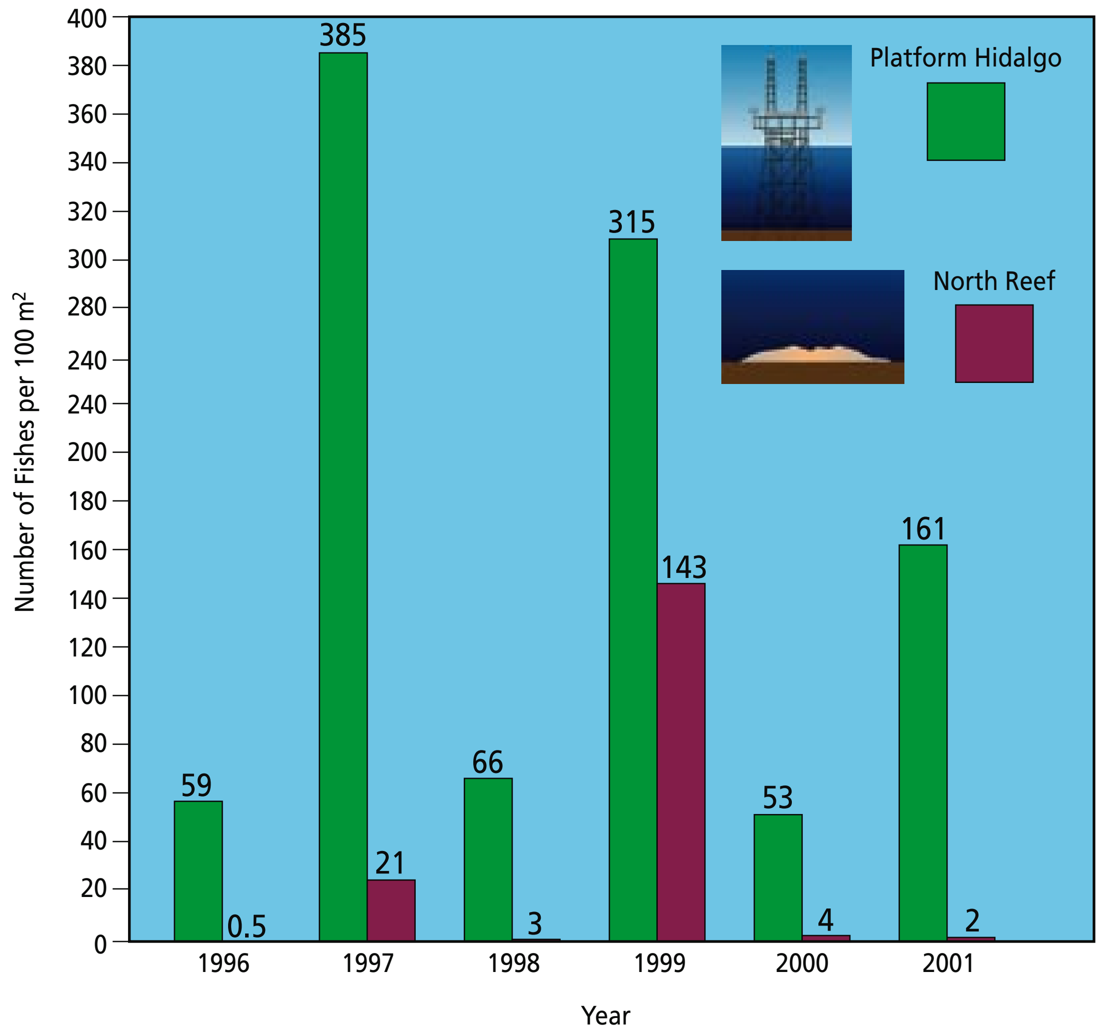


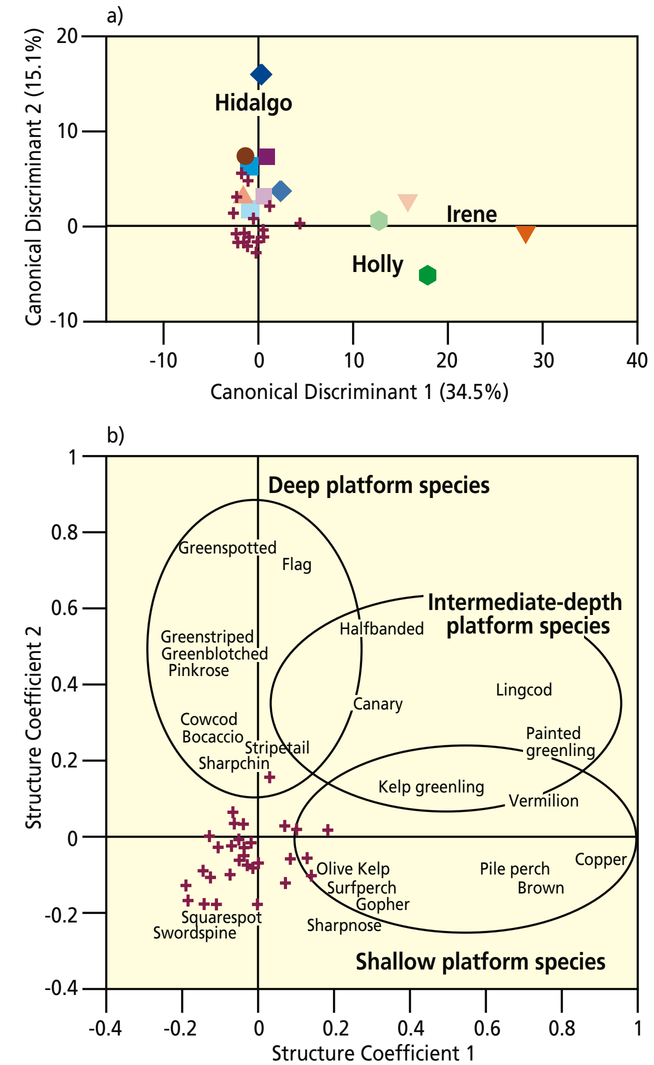
Figure 3.22. Mean densities of young-of-the-year rockfishes, all species combined, at Platform Hidalgo midwater and North Reef, 1996–2001.

these structures. This recruitment pattern was repeated in each year of our surveys as young-of-the-year rockfish densities were always greater at the platform than at the outcrop (Figure 3.22). In some years, densities were more than 100 times greater at the platform.

4. A Comparison of Fish Assemblages of Platforms and Natural Outcrops off Central and Southern California

Findings at a Glance

Based on surveys of seven platforms and over 80 natural outcrops, rockfishes dominate almost all of the platform and hard seafloor habitats. A greater number of species was observed at the natural outcrops (94) than at the platforms (85). There is a high degree of overlap in species composition and differences are primarily due to generally higher densities for more species at platforms. In particular, widow rockfish young-of-the-year, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, and vermilion rockfishes, bocaccio, painted greenling and all life history stages of lingcod were more abundant at platforms. Yellowtail rockfish and the dwarf species pygmy, squarespot, and swordspine rockfishes were more abundant on natural outcrops. Some of these differences can be explained by recruitment (settlement) processes and the greater chance for survival at the platform habitats. We believe that as fish size increases with age the platforms act as de facto marine reserves because fishing pressure is light or nonexistent. Platforms can be characterized as having higher densities of young-of-the-year rockfishes than natural outcrops.



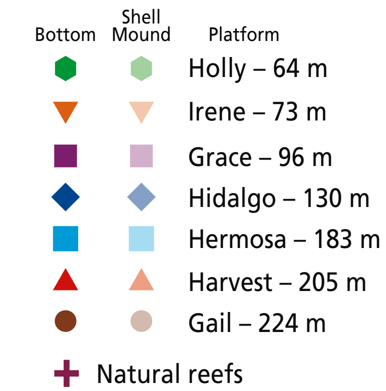


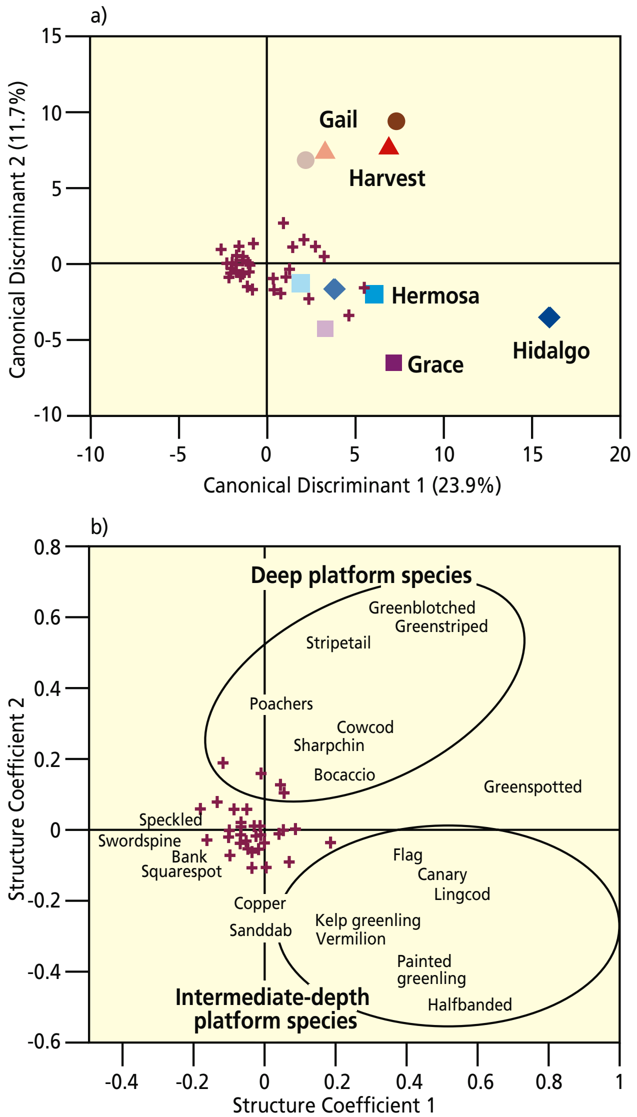
Figure 3.23. 3.23a. Canonical Discriminant Analysis of fish assemblages at seven platforms, bottom and shell mound, and all natural outcrops, 1996–2001. Each cross represents more than one natural outcrop. 3.23b. Canonical Discriminant Analysis of the species found at seven platforms, bottom and shell mounds, and all natural reefs, 1996–2001. Crosses represent species that were not strongly associated with either axis.

We compared the fish assemblages from the deeper parts of seven platforms (below about 30 m, 100 ft.) with those of similar depth natural outcrops. Analyses were based on platform surveys and on 133 dives at over 80 natural outcrops throughout southern California and off Point Conception and Point Arguello (Figure 1.5).

We observed at least 85 species at platforms and 94 species at outcrops (Table 4). Rockfishes dominated both habitats, comprising 89.7% of all fishes at platforms and 92.5% at outcrops. Platform fish assemblages were somewhat different from those of natural outcrops (Figures 3.23a, b). However, these differences were due almost entirely to the generally greater numbers, of more species, of fishes around platforms, rather than differences in species composition between platforms and outcrops.

There was a distinct assemblage of fishes at the two shallow platforms, Holly and Irene, and another composed of species occupying the deeper platforms. Differences among platform bottom assemblages were more extreme than differences among shell mounds. This, too, was largely a function of greater fish abundance around platform bottoms than over the shell mounds. Intermediate-depth and deepest platforms were less distinct from each other than from shallow platforms. With or without the two shallow platforms (Holly and Irene) in our comparative analysis, the fish assemblages at the platforms still tended to be different from those at the natural outcrops (Figures 3.24a, b). These differences were primarily due to most fish species being more abundant at platforms than at outcrops (Figure 3.25). Widow rockfish young-of-the-year, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, and vermilion rockfishes, bocaccio, painted greenling, and all life history stages of lingcod were more abundant at platforms. Species that were more abundant at natural outcrops than platforms included pygmy, squarespot, swordspine, and yellowtail rockfishes.

Platforms tended to harbor higher densities of young-of-the-year rockfishes than did natural outcrops. Young-of-the-year rockfishes primarily occurred in the platform midwaters. Thirteen of the 20 highest young-of-the-year rockfish densities were observed at Platforms Grace, Harvest, Hermosa, Hidalgo, Holly, and Irene (Table 5). The highest young-of-the-year rockfish densities over natural outcrops were usually at high relief sites well away from the mainland. The California Current, which is centered



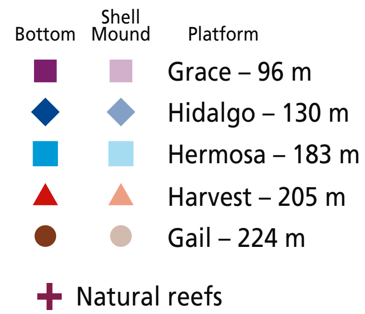


Figure 3.24. 3.24a. Canonical Discriminant Analysis of fish assemblages at five platforms (shallower platforms Holly and Irene deleted), bottom and shell mound, and all natural outcrops, 1996–2001. Each cross represents more than one natural outcrop. 3.24b. Canonical Discriminant Analysis of the species found at five platforms (shallower platforms Holly and Irene deleted), bottom and shell mound, and all natural outcrops, 1996–2001. Crosses represent species that were not strongly associated with either axis.

offshore of the coastal shelf, influences these locations (e.g., San Nicolas and San Miguel islands) more than the mainland sites we surveyed. Furthermore, our observations strongly imply that the midwaters of many platforms bear a striking resemblance to some of the relatively shallow and steep-sided outcrops (such as those on Hidden Reef) that dot the outer continental shelf of southern California. In both cases, the assemblages are dominated by young rockfishes and larger fish predators are relatively uncommon. Thus, survivorship of young fishes may be higher in both habitats due to lowered predation rates.

The role that some platforms play as defacto marine refuges is supported by evidence of greater densities of rockfishes, particularly the larger size classes, at platforms compared to natural outcrops. As an example, densities tended to be higher at some platforms than at natural outcrops for: (1) all rockfishes regardless of size, (2) all rockfishes greater than or equal to 30 cm (12 in.), (3) adult bocaccio, and (4) adult cowcod (Figures 3.26–3.29). Our experience is that rockfishes are most susceptible to being caught by both recreational and commercial gear when they reach about 30 cm (12 in.); thus, densities of fishes of this or larger sizes would be an indication of fishing pressure. Adult bocaccio and cowcod are overfished species with population sizes at levels less than 10% of unfished stock. These fishes at one time were abundant in southern California.

Rockfishes were observed at all of the platforms and outcrops we surveyed, with the exception of two sites on Piggy Bank (Figure 3.26). The highest rockfish densities (500 rockfishes or more per 100 m^2) occurred at four platforms and at five natural outcrops; all of these structures were nursery grounds for young-of-the-year rockfishes. The assemblages of most of the other platforms and outcrops that harbored relatively high rockfish densities also were primarily composed of small rockfishes, both immature individuals and dwarf species. This can be clearly seen when we focussed on rockfishes 30 cm (12 in.) or larger (Figure 3.27). The paucity of rockfishes 30 cm (12 in.) or larger is evident even at the most productive sites (Figure 3.27). Highest densities of large rockfishes (10 rockfishes or more per 100 m^2) occurred at three platforms and two natural outcrops. Many sites harbored no or only a few larger rockfishes.

Almost all of the natural outcrops we studied should have harbored large numbers of larger rockfishes. Their absence or rarity is almost certainly attributable at least

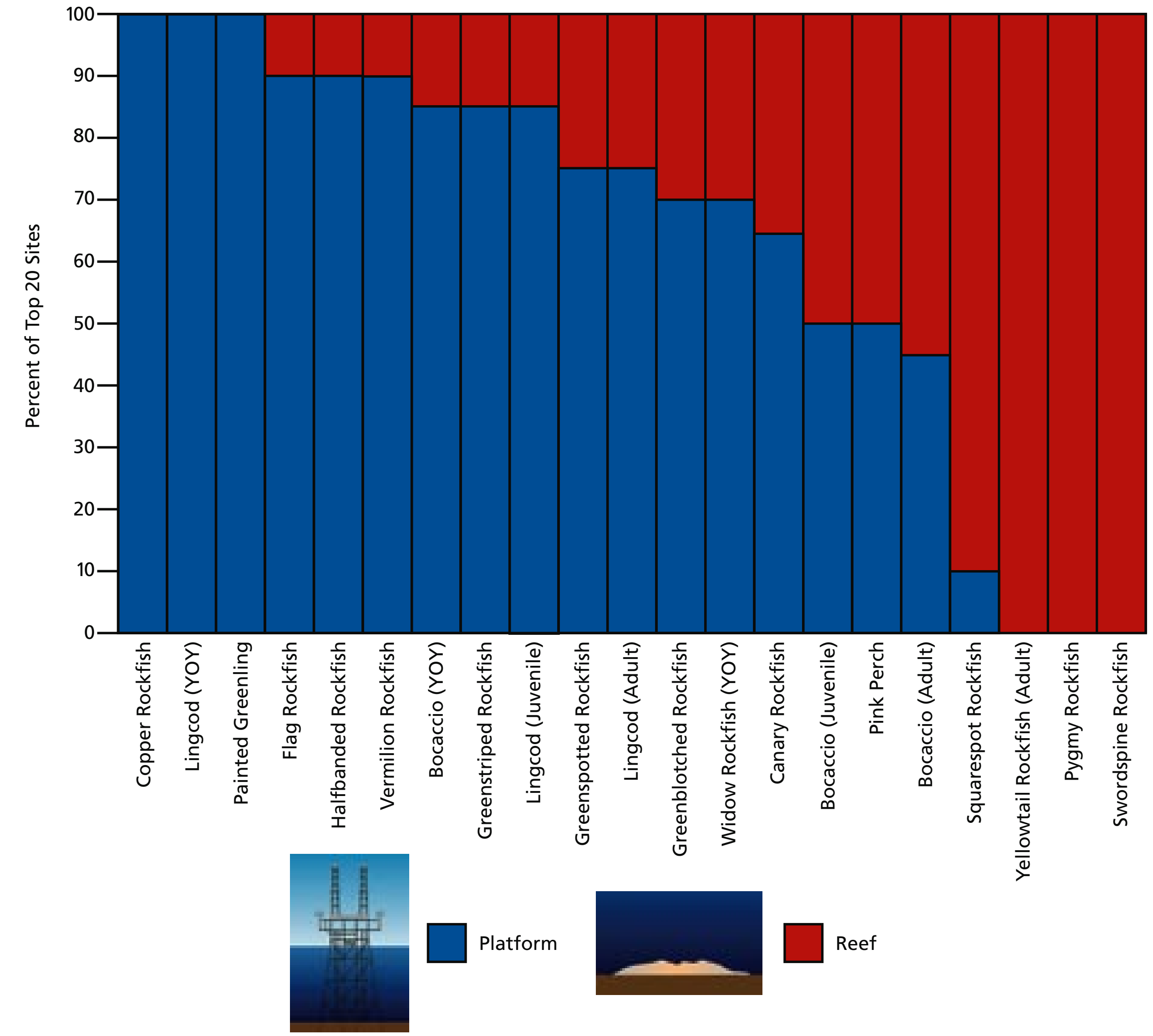


Figure 3.25. The relative importance of seven platforms (Irene, Hidalgo, Harvest, Hermosa, Holly, Grace, and Gail) and about 80 natural outcrops off central and southern California as habitat for common reef fish species. Densities of these species were computed for each year, at each location (platform midwater, bottom and shell mound, and natural outcrops) and ranked from highest to lowest. This figure displays the percentage that platforms or natural outcrops comprised of the top 20 densities for each species (or species' life history stage). For example, of all sites where copper rockfish were observed, the highest 20 densities were at various platforms, in a number of years. Similarly, the highest 20 densities of swordspine rockfish were all at natural outcrops. See Appendix 4 for underlying data.

in part to fishing pressure. These sites were comprised of boulders or other structures that were suitable shelter sites for larger sized rockfishes. A few outcrops, such as sites near the Potato and Osborn Banks, were composed of cobble, a habitat that is less likely to harbor large rockfishes. Adult bocaccio were only abundant around Platform Gail and were relatively common at Platform Hidalgo, Reef "D" near that platform and a few sites around the northern Channel Islands (Figure 3.28). Even at these natural outcrops, many shelter structures contained no or few adult bocaccio. Cowcod densities were also depressed (Figure 3.29). Relatively few rock outcrops surveyed contained adults, and platform Gail harbored the highest densities, although even here numbers were low. In general, the highest densities of adult bocaccio and cowcod occurred at platforms or at those outcrops that were protected from harvest by distance from ports or by being situated in areas susceptible to poor weather conditions.

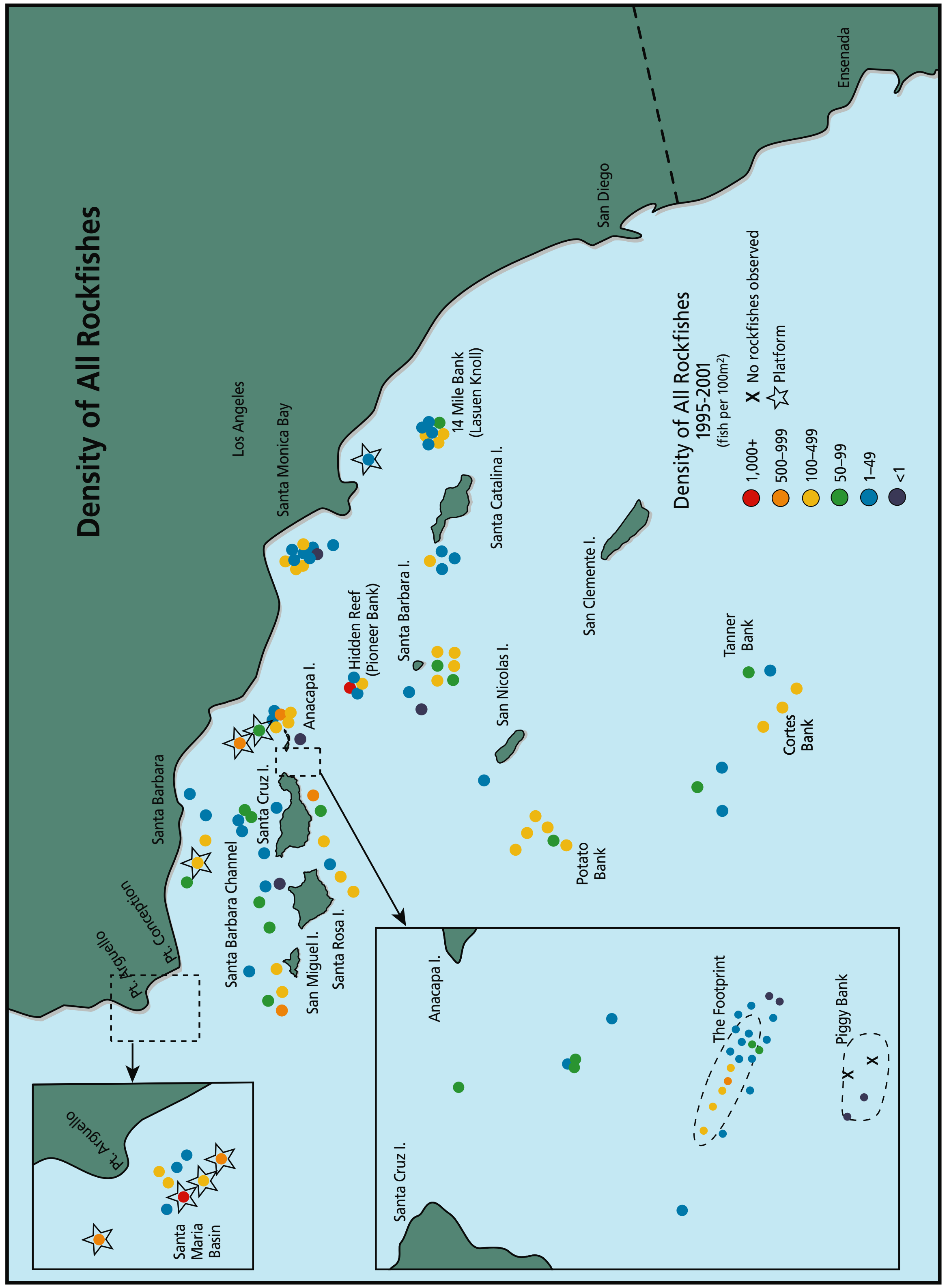


Figure 3.26. Density of all rockfishes, regardless of size, as observed from the Delta submersible on platforms and natural outcrops, 1995–2001. Fish densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail, North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years.

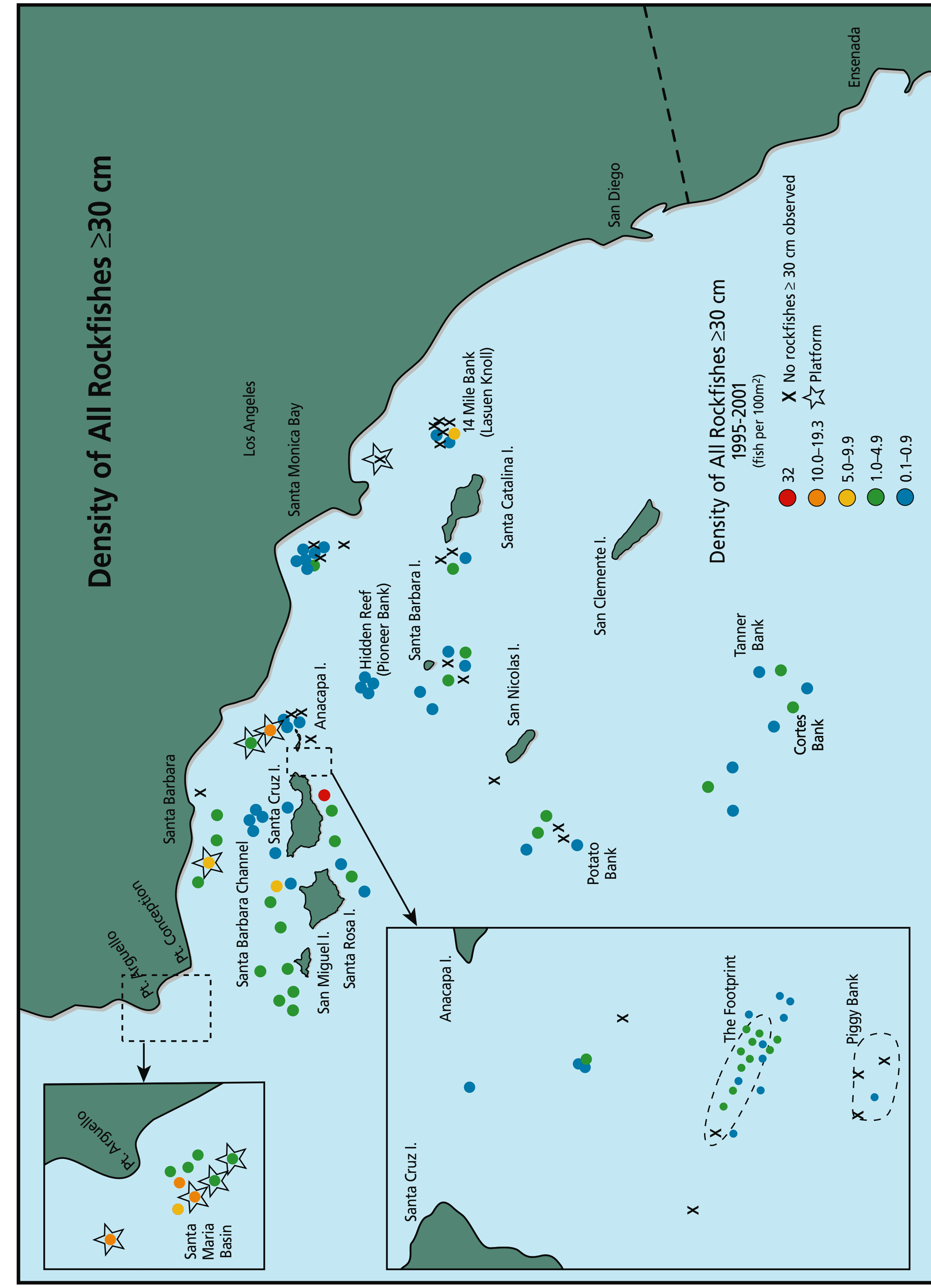


Figure 3.27. Density of all rockfishes larger than or equal to 30 cm as observed from the Delta submersible on platforms and natural outcrops, 1995–2001. Fish densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hillhouse, Hogan, Houchin, and Henry were not included because they were not completely surveyed.

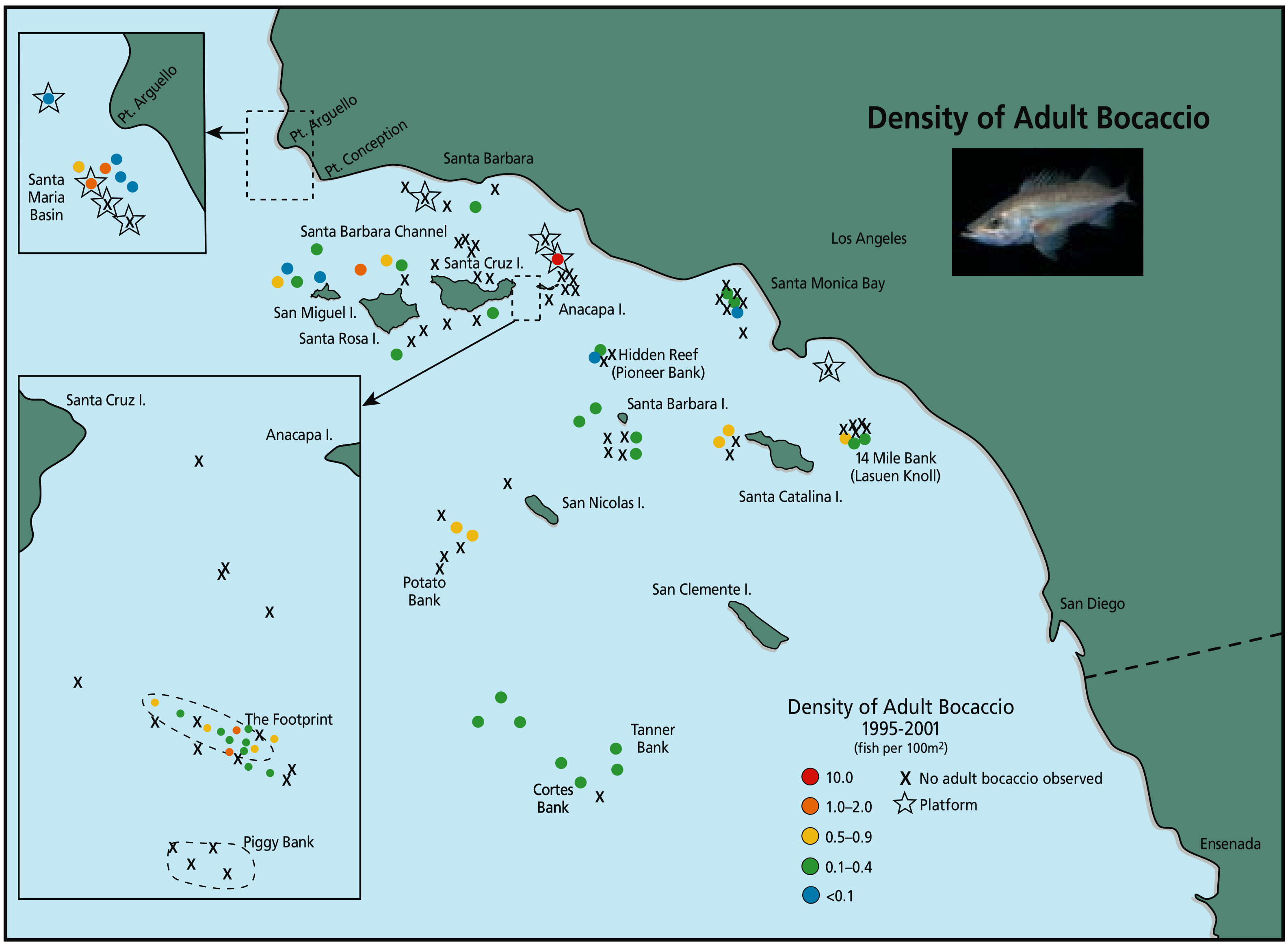


Figure 3.28. Density of adult bocaccio (defined as fish larger than 35 cm total length) as observed from the Delta submersible on platforms and natural outcrops, 1995–2001. Bocaccio densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hillhouse, Hogan, Houchin, and Henry were not included because they were not completely surveyed.

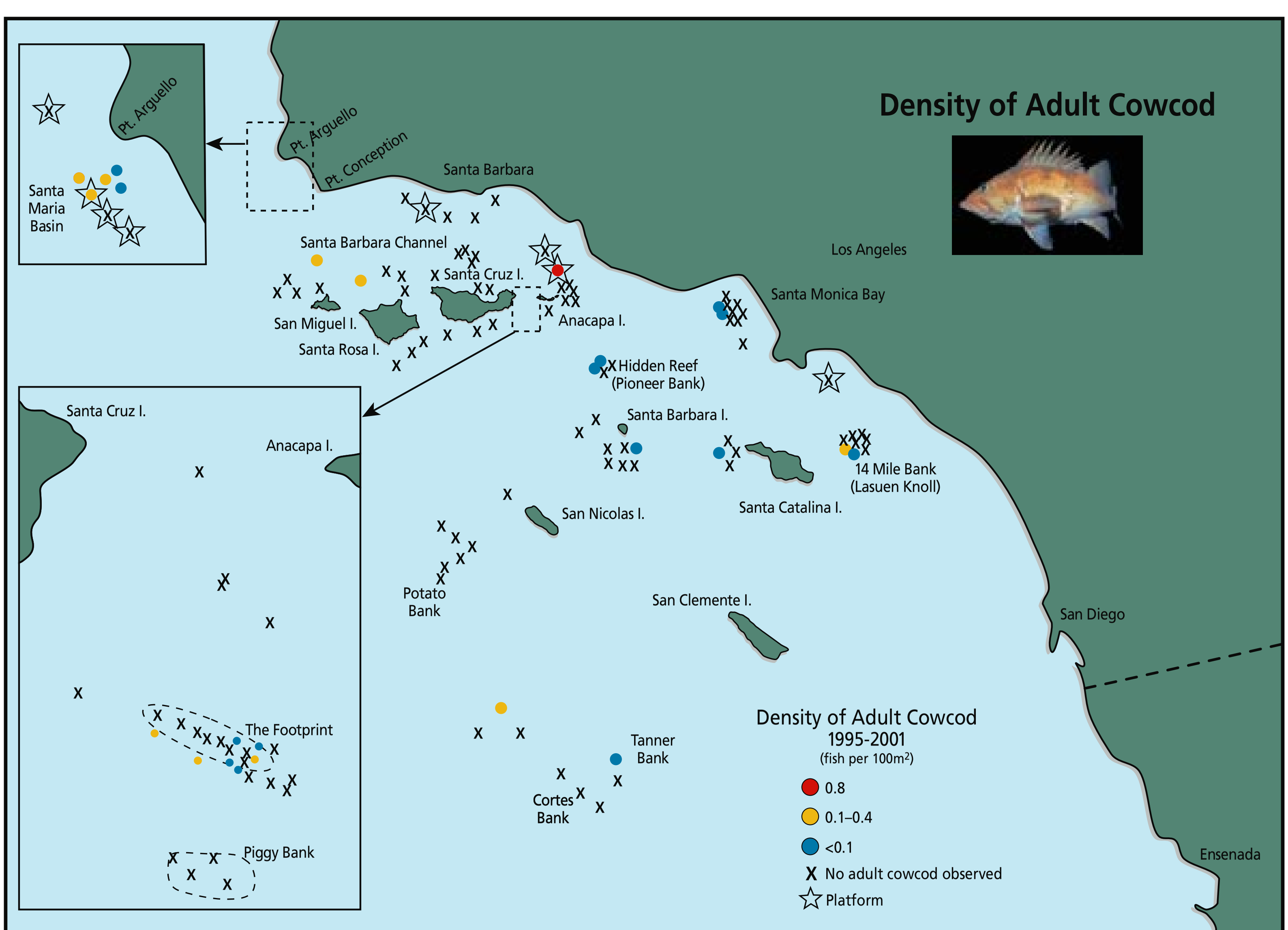


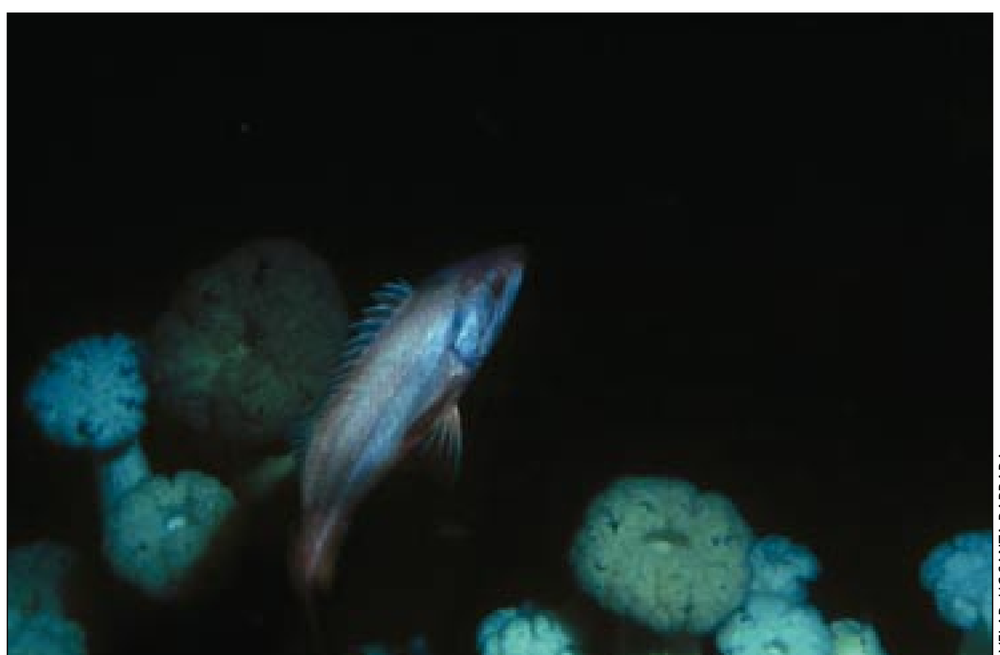
Figure 3.29. Density of adult cowcod (defined as fish larger than 45 cm TL) as observed from the Delta *submersible on platforms and natural outcrops, 1995–2001. Cowcod densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gai are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hill-house, Hogan, Houchin, and Henry were not included because they were not completely surveyed.*

Why platforms support higher densities of young rockfishes than do nearby natural outcrops.

Platforms are important nursery habitat for many species of rockfishes. This research demonstrates that, in general, platforms may be more important nursery habitats than nearby natural outcrops or, indeed, most other outcrops surveyed in central and southern California. Why is this? First, platforms occupy more of the water column than do most natural outcrops. Presettlement juvenile rockfishes, swimming in the midwater, are much more likely to encounter these tall structures than the relatively low-lying natural rock outcrops. It is interesting to note that most of the natural outcrops we found that had high densities of young-of-the-year rockfishes (e.g., Hidden Reef and outcrops around islands) were very high relief features that thrust their way well into the water column.

In addition, there are also relatively fewer large predators in the platform midwaters. By comparison, even on heavily fished outcrops there tend to be at least a few larger fishes. Many of the major predators of young rockfishes are species that live close to the bottom, such as lingcod, copper and vermilion rockfishes, cowcod and large bocaccio. In general, these species do not ascend the platform jacket. Thus, even when they are abundant at the bottom of a platform, they are absent from the platform midwaters. In this respect, platforms are similar to some of the offshore pinnacles on the southern California continental shelf. Predatory species, such as cowcod, lingcod, and greenblotched rockfishes are also not abundant around the steep, smooth sides of offshore outcrops.

At most of the platforms, we observed both harbor seals and California sea lions, both resting on the platforms and swimming in the water column among the jackets and conductors. Based on the known food habits of these animals, it is likely that they feed on platform fishes, but their low numbers probably have little effect on the abundance of young rockfishes. We also observed both harbor seals and California sea lions swimming over natural outcrops and it likely that here, too, predation on young rockfishes occurs.



LOVELAB, UC SANTA BARBARA

Bocaccio.

Platforms as defacto marine refuges

The role that some platforms play as defacto marine refuges is supported by evidence of greater densities of rockfishes, particularly the larger size classes, at platforms than at natural outcrops. The role that platforms may play as de facto reserves should not be underestimated at a time when many fish populations are in decline on natural outcrops. A number of benthic fishes, including such economically important species as bocaccio, cowcod, copper, and vermilion rockfishes and lingcod find refuge within the platforms and this is probably a factor in their relatively high densities compared to most natural outcrops. Schroeder and Love (2002) compared the rockfish assemblages at three deeper-water areas subjected to variable fishing pressures. Two were natural outcrops, one outcrop open to all fishing and one open only to recreational fishing, and the third was Platform Gail, acting as a de facto marine refuge. The outcrop allowing open fishing had the highest densities of rockfishes (7,212 fish/ha); however, the assemblage was dominated by dwarf species. The recreational fishing area had the lowest rockfish density (423 fish/ha) and this assemblage was also dominated by small fishes. Platform Gail possessed a relatively high density (5,635 fish/ha), and the fishes tended to be larger than individuals at either of the fished sites. Two federally listed overfished species, cowcod and bocaccio, had 32- and 408-fold higher densities, respectively, at Platform Gail than the recreational site, and 8- and 18-fold higher densities, respectively, than the all-fishing area.

There is some fishing effort around most platforms in the Southern California Bight and Santa Maria Basin. The relative amount of fish pressure among platforms is dependent on ease of access and local ocean conditions. Platforms in the Santa Maria Basin are located in an area that is far from ports, usually windy, and unprotected from weather. It is difficult to fish around the bottom of platforms, especially the deeper ones, because of the threat to gear imposed by the large number of crossbeams, other platform structural elements, conductors, and strong currents. Many anglers also believe that operators do not welcome fishing near their platforms.

Some platforms are important fishing areas for recreational anglers. Historically, commercial passenger fishing vessels and small private vessels fished around some of the shallower platforms in the Santa Barbara Channel (Love and Westphal 1990). Platforms Hilda and Hazel were targeted for kelp bass. During years with strong rockfish recruitment, large numbers of juvenile bocaccio, blue, olive, and widow rockfishes were caught at Platforms Holly, A, B, C and Hillhouse. In all of these instances, fishing effort was directed at surface or midwaters, rather than at the platform bottom. The removal of Hilda and Hazel and the poor rockfish recruitment of the 1980s and much of the 1990s reduced the overall fishing effort at oil/gas platforms. Some recreational fishing continues around Platform Gina, and there is minimal effort around a few other structures in the Santa Barbara Channel.

Overfishing has drastically altered the species composition of many outcrops off central and southern California (Yoklavich et al. 2000; M. Love, unpublished data). Over most moderate-depth and deep outcrops in central and southern California, many, or sometimes all, of the larger predatory fishes, such as lingcod, cowcod, bocaccio, yelloweye, and canary rockfishes are gone. In contrast, surveys made over an unfished outcrop in central California showed very high densities of large predatory fishes, including lingcod, cowcod, bocaccio, and yelloweye rockfish (Yoklavich et al. 2000). At many natural outcrops, these larger individuals have been replaced by very large numbers of dwarf species, particularly pygmy, swordspine, and squarespot rockfishes. Fish assemblages at platforms, such as Gail, Hidalgo, and Irene, with relatively high densities of many economically important species and low numbers of dwarf species, may more closely resemble unfished assemblages than those at many natural outcrops.

5. The Origins of Platform Fishes: Production and Attraction

Finding at a Glance

Our research suggests that platforms, like natural outcrops, both produce and attract fishes, depending on species and location. Platform fish assemblages around the deeper and further offshore platforms may be generated primarily from the recruitment of larval and pelagic juvenile fishes, not from attraction of fishes from natural outcrops. Some fishes may live their entire lives around a single platform but their movement patterns are poorly known. A pilot study comparing growth rates showed that young-of-the-year blue rockfish grew faster at a platform than at a natural outcrop.

In recent years, public attention has been drawn to artificial reefs and their function in the marine environment. While a variety of issues have been raised, much of the discussion has centered around the question of whether artificial reefs are producers or attractors of marine life (Carr and Hixon 1997; Lindberg 1997). Some researchers suggest this question is biologically simplistic, because it "imposes an unrealistic either-or-dichotomy…" (Lindberg 1997). Nevertheless, this issue continues to arise in the context of the importance of platforms as fish habitat off California (Carr and Stephens 1998; Krop 1998).

Attraction suggests the net movement of juvenile and adult fishes away from natural outcrops to platforms. While there is not complete agreement on the definition of production, most researchers agree that it involves larval or pelagic juvenile settlement at a structure and the survival and growth of these organisms in this habitat (Carr and Hixon 1997).The attraction/production debate is framed around three questions (Carr and Stephens 1998; Krop 1998): (1) Do larval and juvenile fishes settle onto platforms from the plankton, or do fishes move from other structures to platforms as older juveniles or adults? (2) If a species does settle onto a platform, are growth and survivorship at least as good as on a natural outcrop? (3) If a species does grow and survive well around a platform, did the structure take away larvae or pelagic juveniles that would have settled onto natural outcrops?

5a. Do Fishes Settle from the Plankton onto Platforms or Do They Swim There from Other Structures as Juveniles or Adults?

A large number of fish species settled out of the plankton and took up residence around platforms. We observed young-of-the-year of about 46 fish species at these structures (Table 6) and, including species observed by other researchers (Carlisle et al. 1964), at least 50 fish settle on to platforms from the plankton. During some years, the midwaters of many platforms had very high densities of juvenile rockfishes. Young-of-the-year blacksmith, kelp and painted greenlings, and cabezon also were abundant in this habitat at times. Young-of-the-year rockfishes, lingcod, and other species were abundant around platform bottoms and shell mounds. With a few exceptions, species that settled on the bottom and shell mound were different from those found in the midwaters.

Juveniles of some species were rarely or never observed around platforms. For instance, young-of-the-year kelp bass were rarely seen around any platform, although adults were very abundant at one platform. Young seaperches also were rare or absent. In these cases, older juveniles or adults immigrated to the platforms or juveniles settled there at times other than our surveys.

5b. The Biological Influence of Oceanographic Conditions on Recruitment Success at Platforms and Natural Outcrops in the Santa Barbara Channel and Santa Maria Basin

Most coastal fishes and invertebrates, including those inhabiting platforms, are planktonic during early stages of their life histories. These life stages, which may last from weeks to months, can begin as fertilized eggs (e.g., lingcod, cabezon, and garibaldi) or larvae (e.g., rockfishes). Some fishes, including rockfishes, continue to develop in the pelagic environment until they transform to the juvenile stage (Figure 3.30).

Pelagic life stages are at risk from starvation and predation and transport away from the specific habitats required for their growth and survival. Therefore, the type of water mass an animal finds itself may have a profound effect on its survival. There are a number of water masses in our study area, including waters from the Southern California Bight, the central California coast, upwelling from Point Conception, and from more distant places such as Baja California. How these waters enter, circulate and mix in the Santa Barbara Channel and Santa Maria Basin affects marine populations and community diversity on both platforms and natural habitats.

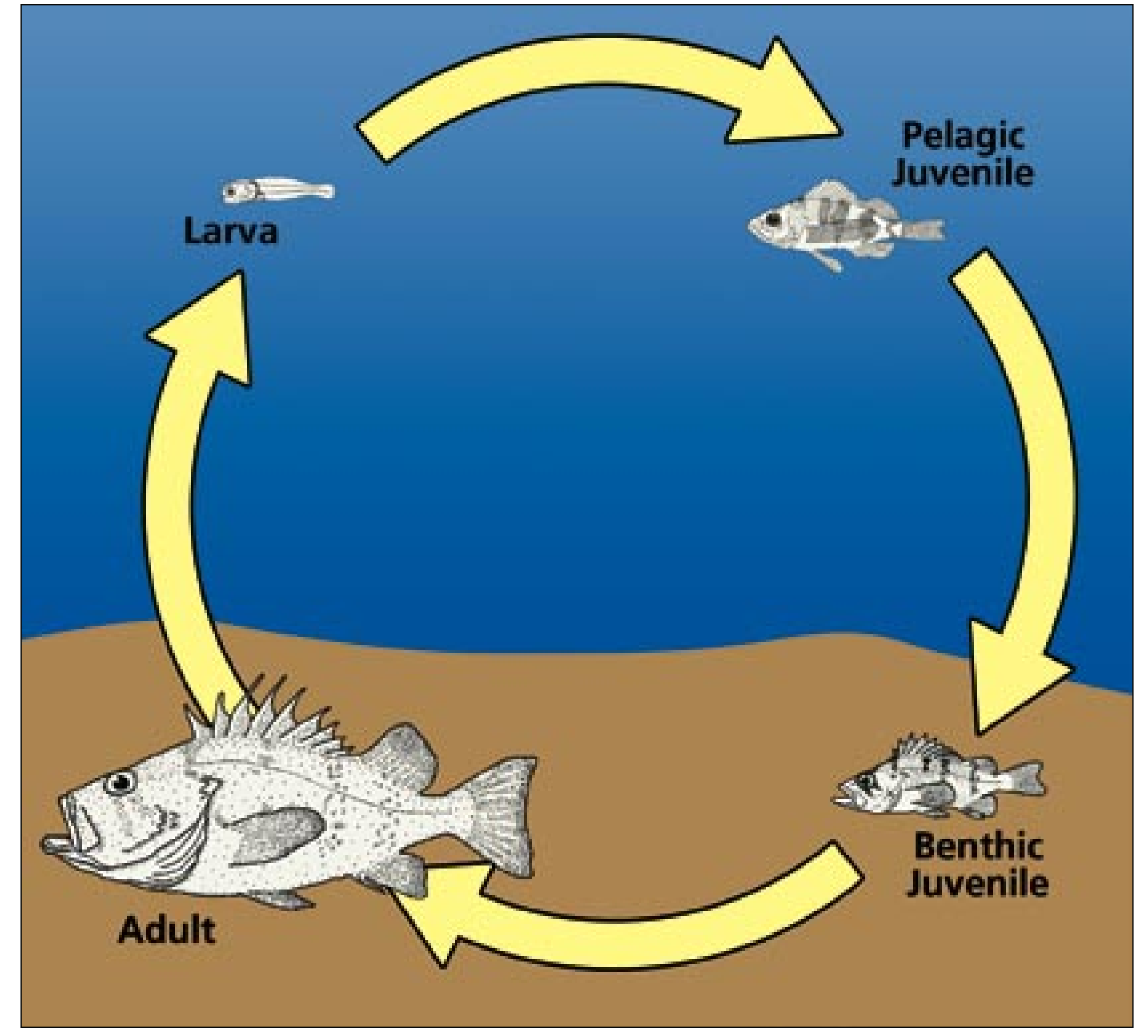


Figure 3.30. A typical rockfish life history cycle using the cowcod as an example.

Upwelling processes, the wind-induced pulling of deeper, colder water to the surface and displacement of warmer waters offshore, is a major factor in larval and pelagic juvenile survival. During years when upwelling coincides with larval fish production, fish survival may be enhanced. Because deep waters are nutrient-rich, upwelling increases reproduction of phytoplankton and encourages the growth of zooplankton, providing food for larval and pelagic juvenile fishes. Upwelling may also increase survivorship of some species by moving larvae and pelagic juveniles somewhat offshore, away from high densities of nearshore predators. Conversely, the offshore transport that accompanies upwelling can be detrimental to the survival of larvae and pelagic juveniles. Wind-induced turbulence in surface waters can make it difficult for larvae to come into contact with prey. Larvae risk being swept well offshore by strong upwelling and far removed from suitable habitat. Spatial and temporal variability in circulation, however, can provide some larvae and pelagic juveniles with conditions that enhance survivorship including delivery to optimum settlement.

The timing, location, intensity, and duration of upwelling events may have a large effect on rockfish settlement. For instance, recruitment may be hampered at sites constantly exposed to newly upwelled water. Through much of the late-spring and summer when presettlement-stage rockfishes are in the pelagic environment, upwelling from the mainland at Point Conception impacts the west channel. Our summer oceanographic data confirm that the upwelling plume can extend across the western portion of the Northern Channel Islands (Love et al. 1999). We found that pelagic juvenile rockfishes were relatively rare in this newly upwelled water (Figure 3.31) (Nishimoto 2000). As an example, when cool upwelled waters moved into an area off the south side

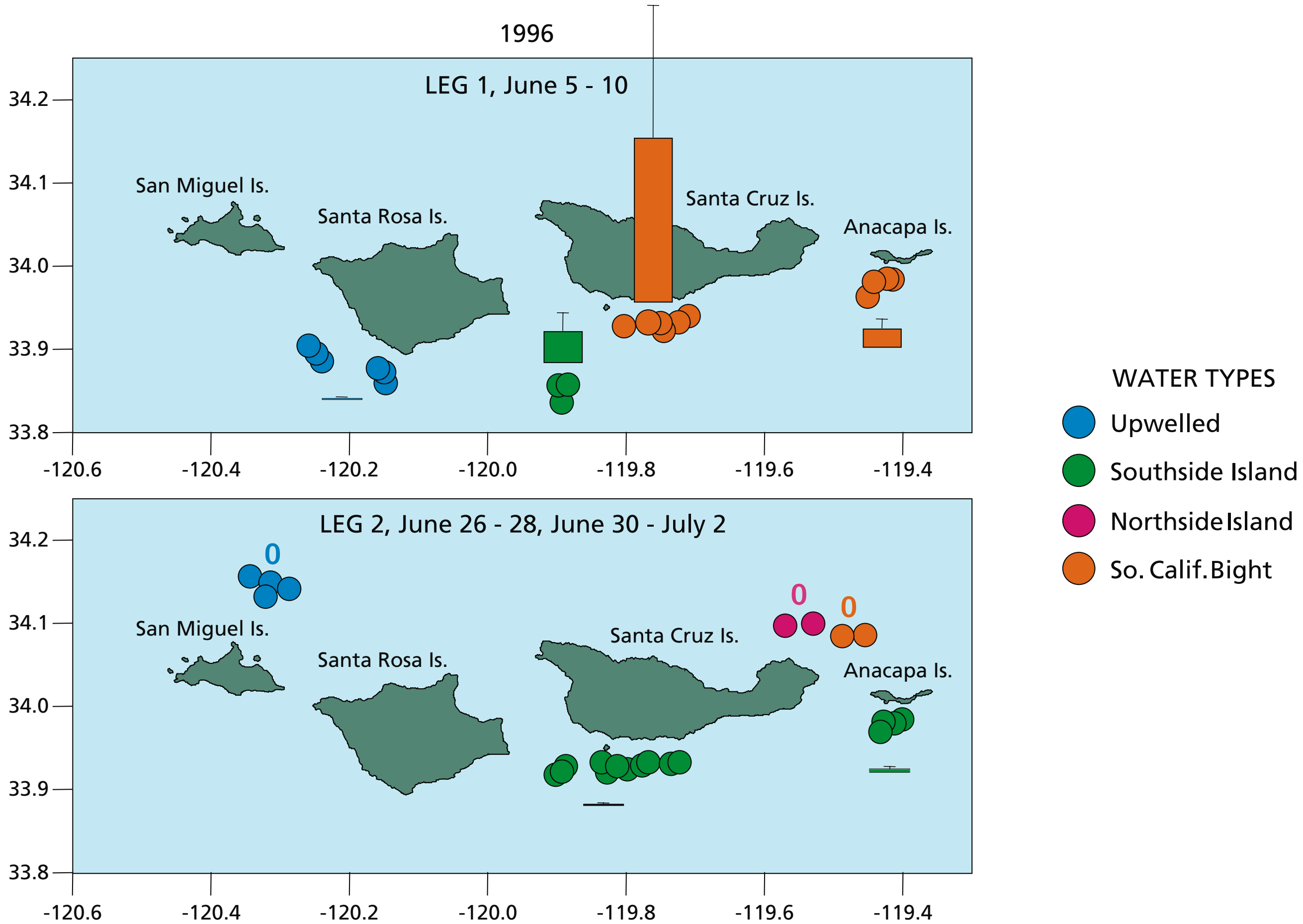


Figure 3.31. The abundance of late-larval stage and pelagic juvenile rockfishes decreases off the south side of Santa Cruz Island when one water mass replaced another between two sampling periods, June–July 1996. Temperature and salinity properties were used to identify four water masses: Upwelled water, Southside Island water, Northside Island water, and Southern California Bight water. Hauls are represented by colored circles. Fish abundance was estimated using the mean collected in midwater trawl hauls within a water mass. Bars illustrate the relative abundances among the water masses. Zeros indicate that no rockfishes were collected in the hauls within a water mass.

of Santa Cruz Island, the fish assemblage changed from one with relatively abundant pelagic juvenile rockfishes to one where these fishes were almost absent. We suspect that the upwelled water, the coldest and most saline water mass that we identified, was recently brought to the surface from depths where few larval and juvenile rockfishes reside**.**

Inter-annual oceanographic conditions, including the intensity of seasonal, coastal upwelling, are highly variable and this affects year class success and population variability. A shift from El Niño to La Niña conditions between 1998 and 1999 was marked by abrupt changes in the marine ecosystem off southern and central California. Our survey data of young-of-the-year rockfishes in 1999 indicates an increase in rockfish recruitment. The number of several juvenile rockfishes and other fish species observed on oil/gas production platforms and rocky outcrops in 1999 far exceeded those of 1998 and previous years. This increased recruitment coincided with intense coastal upwelling off Central California (among the strongest events in 50 years) in spring 1999 followed by high phyto- and zooplankton production (Lynn et al. 1998; Hayward et al. 1999). High productivity in the region likely contributed to the increased survivorship of the fishes including those that recruited to the platforms and natural outcrops.

Relatively transitory phenomena, such as fronts and eddies, may also play an important role in fish settlement and year-class success. Fronts, the zones where different water masses collide and mix, may prevent weak-swimming

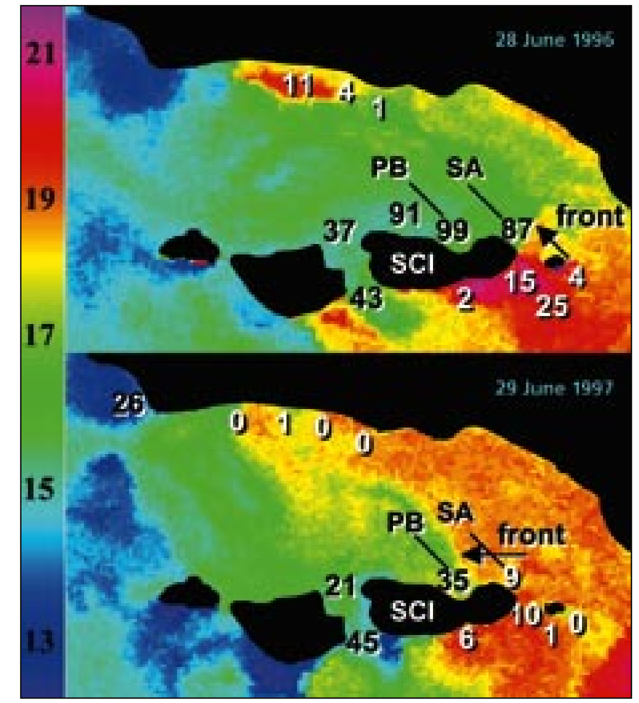


Figure 3.32. The strong correspondence between exposure to cool water and young-of-the-year rockfish density. A shift in position of the thermal front on the north shore of Santa Cruz Island (SCI) in 1996 and 1997 corresponded with a striking spatial shift in juvenile rockfish densities (see sampling sites, Pelican Bay (PB) and Scorpion Anchorage (SA)). Numbers overlaid on images represent mean densities of juvenile rockfishes (number/60 m²) that recruited to giant kelp canopy at sites within the survey area.

planktonic animals from swimming between these masses (Moser and Smith 1993; Wing et al. 1998). The strength of recruitment to a platform or outcrop may be determined in part by the habitat's exposure to those fronts carrying ready-to-settle fish larvae and juveniles. Our research at Santa Cruz and Anacapa islands indicates that the recruitment of nearshore rockfishes was sparse on outcrops separated from cool, fish-rich waters by a frontal boundary (Figure 3.32) (Love, Nishimoto, Schroeder, and Caselle 1999).

Eddies, cyclonic currents that can concentrate and retain plankton, may retain fishes and affect the dispersal of larval and juvenile fishes to outcrops and platforms. For instance, in summer 1998 we sampled a stationary and persistent cold-core cyclonic eddy in the western Santa Barbara Channel. In this feature, we found very high concentrations of small fishes, including late-stage larval and pelagic juvenile rockfishes (Figure 3.33). Eddies may also be very transitory. During the summer of 1999, we observed a much different circulation pattern of shorter-lived, propagating eddies and collected few young rockfishes.

We suspect that the high levels of recruitment of young-of-the-year rockfishes at some platforms were associated, in part, with eddies and fronts retaining larvae that had been locally produced at either platforms or natural outcrops. For instance, Platform Irene is located to the north of the frontal boundary of the upwelling plume that extends off Point Conception. The platform is also situated in an area where a semi-persistent eddy is frequently observed during spring and summer (L.Washburn, personal communication). Similarly, both fronts and eddies were observed at Platforms Gail and Grace in the eastern channel north of Anacapa. As noted previously, Platform Gail harbors important habitat for adult bocaccio in the Santa Barbara Channel. Local retention of bocaccio larvae produced at Platform Gail would explain the high levels of bocaccio settlement at nearby platform Grace and Gilda.

The variability of oceanographic conditions in the Santa Barbara Channel between 1995 and 2001 appears to have strongly influenced settlement as young-of-the-year recruitment to platforms and natural outcrops was highly variable both temporally and spatially. For instance, while the 1997–1998 El Niño corresponded with a large increase in juvenile recruitment of species that dominate the warm-temperate fish assemblage (such as blacksmith), the 1999 La Niña corresponded to a strong settlement of cool-temperate species, such as rockfishes. While settlement of many rockfish species to platforms was generally higher north of Point Conception than in

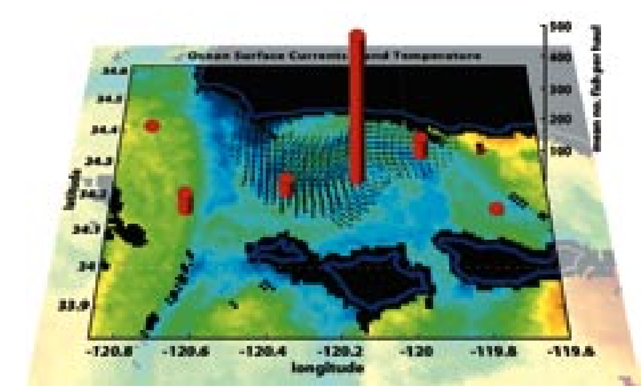


Figure 3.33. The strong link between eddy circulation and the distribution of pelagic young-of-year rockfishes. A persistent eddy about 30 km (19 mi.) wide was evident in satellite sea surface temperature imagery and in surface current mapping generated from coastal-based high frequency radar observations. The abundance of fishes were extraordinarily high in the center of the eddy (red bars represent the mean number of late-stage larval and pelagic juvenile rockfishes in midwater trawl samples from different areas).

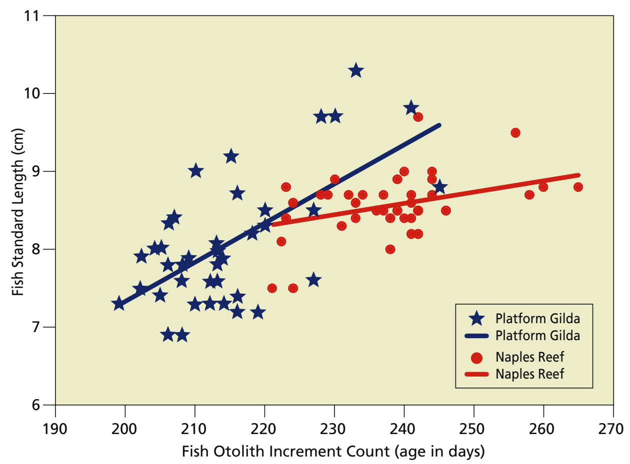


Figure 3.34. A comparison of daily growth rates of young-of-the-year blue rockfish collected at Platform Gilda and Naples Reef in 1999. Fish from Platform Gilda grew at a statistically faster rate than did those from the natural outcrop.

the Santa Barbara Channel during 1996 through 1998, the cooler waters of 1999 brought with it a relatively good year for cool-temperate rockfish recruitment throughout the channel.

The timing of this upsurge in young-of-the-year rockfish settlement in the Santa Barbara Channel also coincided with what may have been a Northeast Pacific oceanographic regime shift from warm to cool waters that overlaid the El Niño and La Niña events. This may have been reflected in the 2000 and 2001 rockfish recruitment at platforms in the eastern channel, which remained higher than pre-1999 levels. We should note that the last cold water regime off southern California occurred in the 1970s, a period that saw heavy settlement of young-of-the-year blue, olive, and widow rockfishes and bocaccio to some of the platforms near Santa Barbara (Love and Westphal 1990).

5c. If a Species Does Settle around a Platform, How Well Does It Grow and Survive, Particularly Compared to the Same Species on a Natural Outcrop?

While our studies in this area are preliminary, they are sufficiently compelling that we can begin to draw some conclusion regarding production of fishes at platforms. On many platforms, we believe that larval and pelagic juvenile recruitment is a major force in shaping platform fish assemblages. We have observed young-of-the-year of about 46 species at the platforms. Of these species, at least 35 were observed as adults at the same structures (Table 7). Adults of some species, such as pygmy, widow, and yellowtail rockfishes, are relatively uncommon around platforms suggesting different habitat requirements. Conversely, adults of many more species, including blacksmith, bocaccio, cabezon, cowcod, lingcod, painted greenling, shortspine and longspine combfishes, and calico, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, kelp, and pinkrose rockfishes are abundant at the platforms.

Pilot research suggests that at least some juvenile fishes may be growing as well or better at the platforms than at natural outcrops. In 1999, we collected young-of-the-year blue rockfish from Platform Gilda and from Naples Reef (Figure 1.1). Daily growth rates derived from these fishes from otoliths (ear bones) indicated that the platform fish grew at a statistically faster rate than did those from the natural outcrop (F-test, $F = 2.96$, $p = 0.0006$) (Figure 3.34).

Recruitment patterns of flag rockfish at Platform Grace and bocaccio at Platform Gail in 1999 and subsequent annual monitoring of year classes at these sites is providing important new information about the production value of platform habitats. In 2000, and again in 2001, we observed the 1999 year classes of these species at the bottoms of the platforms (Figures 3.35 and 3.36). Length-frequency data indicate substantial survival of the 1999 year classes at the platforms (Figure 3.36). Flag rockfish mature at about six years of age (M. Love and M. Yoklavich, unpublished data) and bocaccio at four or five years (A. MacCall, personal communication). Thus,

DONNA SCHROEDER

Figure 3.35. Flag rockfish at the bottom of Platform Grace, 2001. These fish recruited to the platform as pelagic juveniles in 1999 and moved to the bottom in 2000.

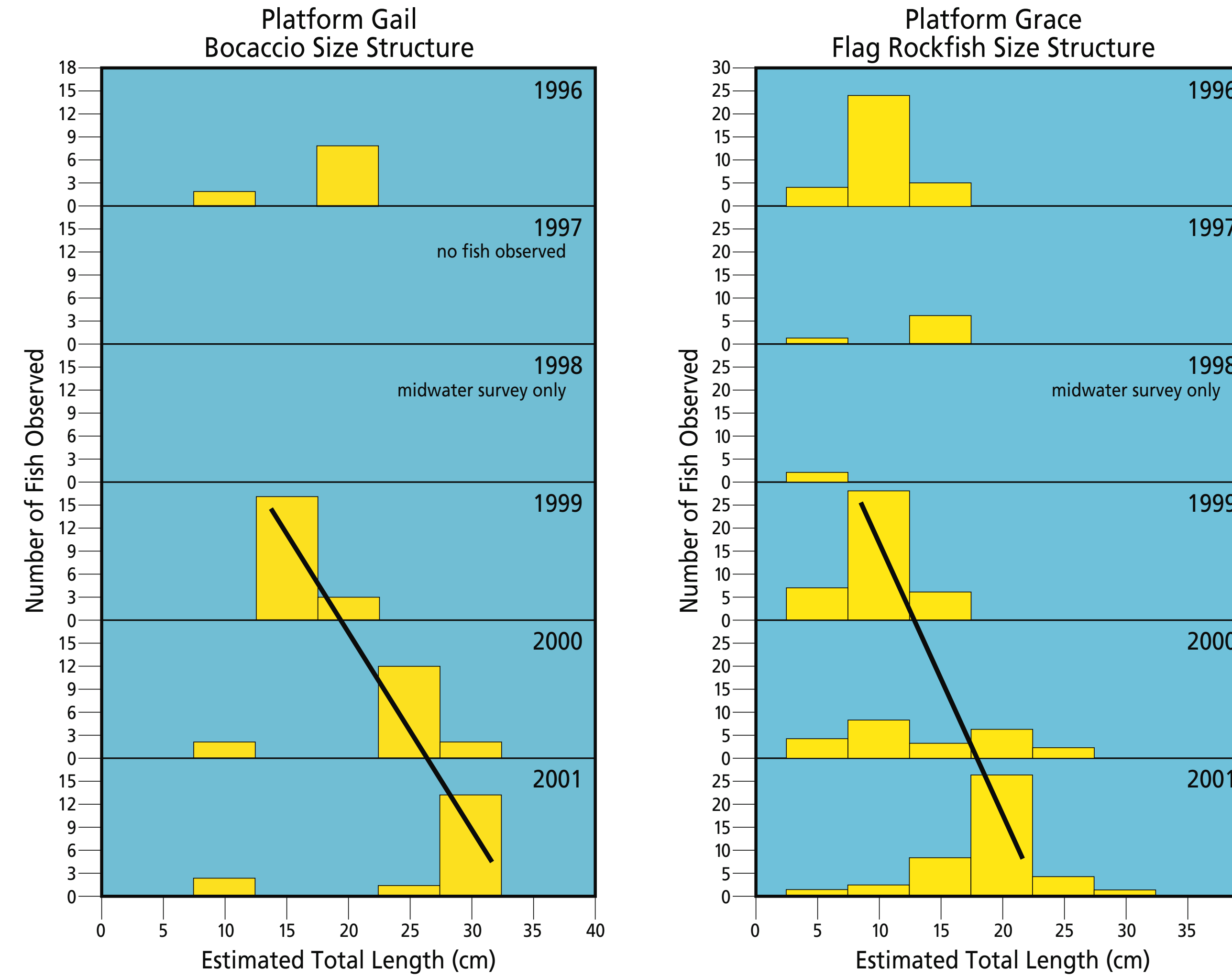


Figure 3.36. Size structure of young bocaccio observed at Platform Gail and flag rockfish observed at Platform Grace, 1996 to 2001. Black line denotes persistence of the successful 1999 year class.

it is conceivable that these fishes will mature at the platforms. This would be strong evidence of production at these structures. [Added in proof: We again observed these fishes during our 2002 surveys of Platforms Gail and Grace.]

5d. Both Attraction and Production Play Important Roles in Shaping Fish Assemblages at Platforms

Our research suggests that populations of fishes at platforms far removed from natural outcrops, as is true for Platforms Gail and Grace, are most likely dependent on larval and juvenile recruitment from the plankton. Our research is developing information about recruitment and residence of fishes at platforms and we have provided evidence of fishes not only settling out at platforms but also maturing there. Recruitment process is highly variable at all habitats from year to year. Adult abundance, at least for some species, is dependent on the strength of recruitment in previous years. Furthermore, recruitment variability may contribute to the year class success (i.e., demographics) of platform and outcrop species such as flag rockfish and bocaccio.

While the movement patterns of some deeper-water rockfishes are unknown, it is likely that many benthic species, such as greenspotted, greenblotched, pinkrose, and cowcod are residential (Starr et al. 2001; Love et al. 2002). Certainly many are restricted to hard substrata seafloors and probably rarely traverse large expanses of soft sediment (Love et al. 2002). Thus, it is likely that the high densities of many platform rockfishes, as well as such species as combfishes, painted greenling, and perhaps lingcod, are due to successful settlement from the plankton and subsequent survival.

The shallow-water species that do inhabit offshore platforms are further evidence that larval and juvenile recruitment play a dominant role in these structures' assemblages. Shallow species that do occur on Gail and/or Grace include kelp bass, garibaldi, and grass and kelp rockfishes. All of these fishes have pelagic larvae. Pile perch and rubberlip seaperch, species without a pelagic life stage, while found on the shallower platforms, are not present on Gail and Grace. This reflects the difficulty these species have in crossing deep waters along the seafloor.

Thus, there is growing evidence that individuals of a number of species, particularly those that are relatively resident and benthic, not only settle out at platforms but also mature there. Such species include, but are not limited to, blacksmith, bocaccio, cowcod, flag, grass, greenblotched, greenspotted, kelp, pinkrose rockfishes, painted greenling, and combfishes.

A dependence on pelagic juvenile recruitment, rather than attraction of older fishes from other structures, explains some of the differences in species composition we observed among the platforms. For instance, until 1999, we observed high densities of adult flag rockfish only at Platform Hidalgo. These densities were far higher than at other platforms or natural outcrops. In 1999, there was a strong recruitment of pelagic juvenile flag rockfish to Platform Grace, and as noted above, these fish remained there at least through 2001. [Added in proof: We observed these fish in 2002.] Annual recruitment of rockfish is highly variable. Thus, the large numbers of flag rockfish observed at Platform Hidalgo are almost certainly the result of a previous successful recruitment, similar to that at Platform Grace. Spatial variability is indicated by the paucity of this species at the other platforms. Similarly, the high densities of adult bocaccio at Platform Gail, and their absence at Platform Harvest (which is located in about the same depth), also suggests spatial variability in the recruitment process.

In contrast, the fish assemblages at platforms that are closer to shore, and in shallow waters, are probably derived both from larval/pelagic juvenile settlement and movements of juveniles and adults from other structures. Carlisle et al. (1964) clearly demonstrated that inshore reef species, such as kelp bass and sheephead, are very mobile and able to traverse shallow, soft seafloors from outcrop to artificial reef. Platform Gina, for instance, is a shallow water platform that seasonally harbors very large numbers of kelp bass, halfmoon, opaleye, pile perch, and other reef species. Fishes are abundant around that platform during summer and fall, but move elsewhere in late winter and spring.

MARY NISHIMOTO

Adult canary rockfish at bottom of Platform Hidalgo.

CHAPTER 4

A GUIDE TO ECOLOGICAL AND POLITICAL ISSUES SURROUNDING OIL PLATFORM DECOMMISSIONING IN CALIFORNIA

Donna M. Schroeder and Milton S. Love

Decommissioning Alternatives

Within one year of an OCS lease termination, the Minerals Management Service (MMS) requires that the lessee remove the oil platform structure to a depth of fifteen feet below the mud line, and the leased area must be cleared of obstructions (*see generally*, 30 C.F.R. Part 250, subpart Q, § 250.1700 *et seq.*). However, the MMS may waive these requirements to accommodate conversion of a platform structure to an artificial reef provided that (1) the remaining structure does not inhibit future oil or other mineral development, (2) the resulting artificial reef complies with the Army Corps of Engineers permit requirements and procedures outlined in the National Artificial Reef Plan, and (3) a state fishing management agency accepts liability for the remaining structure (30 C.F.R. §§ 250.1703, 250.1730). In addition, the National Fishing Enhancement Act of 1984 (NFEA), which authorizes the Corps of Engineers' permit program and the National Artificial Reef Plan (33 U.S.C. § 2101 *et seq.*), allows other organizations or agencies (such as the operator) to assume liability for the artificial reef, although MMS policy to date has required a state agency to accept liability.

The timing of future decommissioning activities is not fixed. It depends on the length of the lease, the rate of reservoir depletion, the market value of oil or gas, and whether the platform might serve an extended use for the operator, such as a gathering system for the production of other platforms. There are three stages in the decommissioning process: planning, permitting, and implementation. Platform decommissioning alternatives fall into four general categories: complete removal (the default option), partial removal, toppling, and leave-in-place (Figure 4.1). The suite of decommissioning alternatives that proposes to leave part or all of the abandoned platform structure in the marine environment is often collectively referred to as "rigs-to-reefs".

Alternative 1: COMPLETE REMOVAL

A typical full-removal project begins with well abandonment in which the well bores are filled with cement. The conductors are then separated from below the seafloor by being pulled, cut-off, or removed using explosives. Next the topsides, which contain the crew quarters and the oil and gas processing equipment, are cut from the jacket and removed. Finally, the piles that hold the jacket to the seabed are severed with explosives and the jacket is removed. Other typical decommissioning requirements include the removal or abandonment of pipelines and electrical cables and the removal of any debris from the seafloor.

After deciding to totally remove a platform from the seafloor, operators have several options (O'Connor 1999; van Voorst 1999; Gibbs 2000; Terdre 2000). (1) The platform can be taken to shore, where it is disassembled and the components either recycled, sold as scrap, or discarded in landfills or other depositories. To date, managers have selected this option for most decommissioned platforms. (2) The structure can be reconditioned and reused. As an example, in 1997 a platform was removed from the North Sea, taken to shore and cleaned, refurbished, shortened by 10 m (33 ft.), and installed in another North Sea location. A few small platforms have also been reused in the Gulf of Mexico. (3) A platform can be towed to another site and reefed. This has occurred a number of times in the Gulf of Mexico, with the most zealous example towing structures of two Tenneco platforms over 1480 km (920 mi) from offshore Louisiana to a site 1.5 miles off Dade County, Florida (Wilson et al. 1987).

Alternative 2: PARTIAL REMOVAL

In this scenario, the wells are abandoned, the topsides are removed, and the remaining jacket and possibly the shell mound are left in place to continue to function as an artificial reef. Navigation aids are added.

Despite what has been implied in other reports, conductors need not be completely removed. Dauterive (2000) notes "Recognizing the preservation of environmental values associated with the method of partial removal of the platform, the MMS in 1997 established a policy to allow the industry the option to partially remove

DECOMMISSIONING OPTIONS AND ISSUES

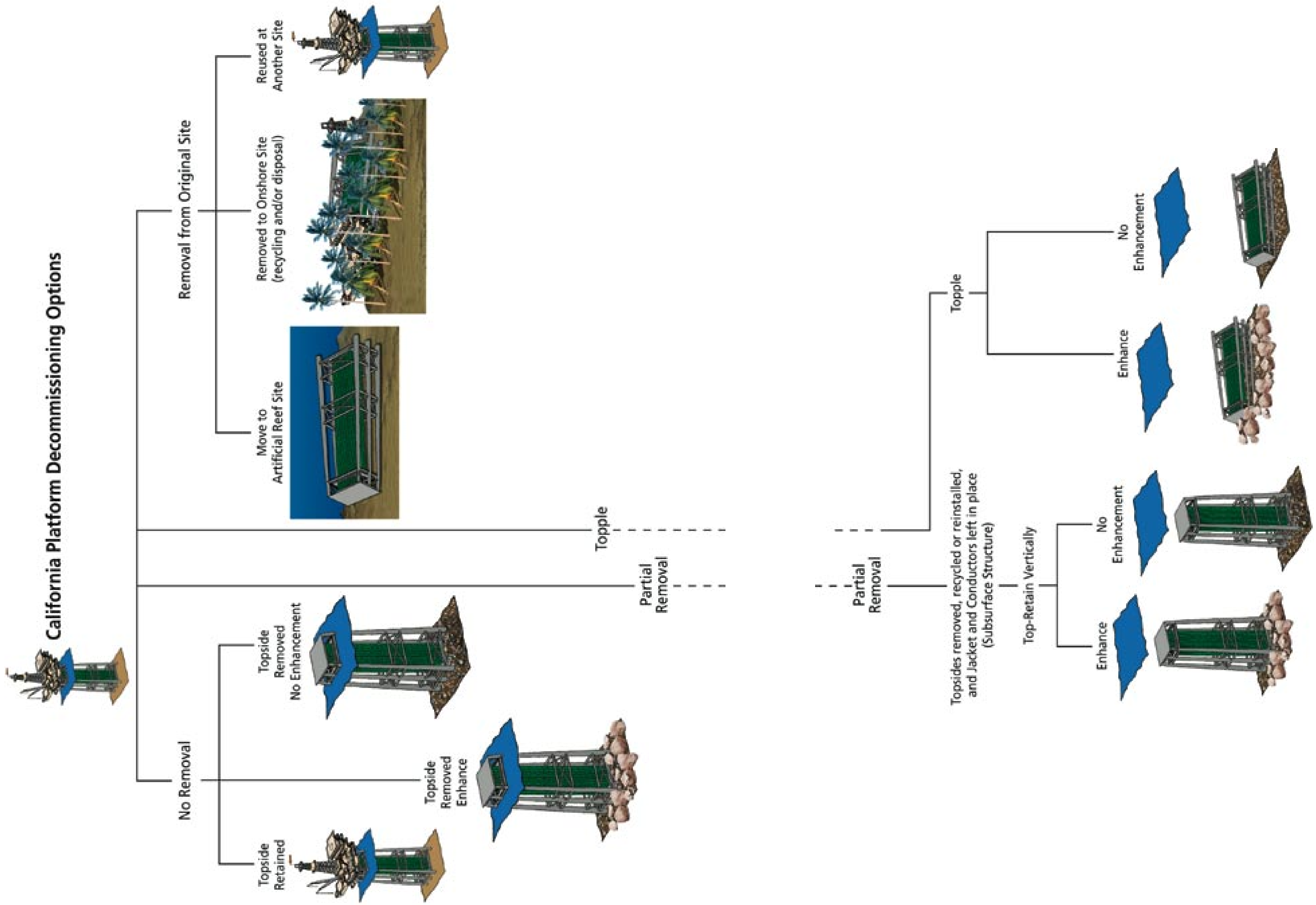


Figure 4.1. Platform decommissioning options.

the well conductors at the same depth below the water line (WL) at which the industry had proposed to remove the platform jacket." Retaining platform conductors has two consequences. First, it adds additional complexity to remaining structure. Second, explosives are usually used to remove the conductors and retaining these pipes eliminates the need for explosives (Dauterive 2000).

After cleaning, disposition of topsides may be handled in a couple of ways. It can be moved to a new platform and reinstalled, or it can be taken onshore, where the steel and other valuable components are recycled and other material sent to landfills. Certain parts of the topsides, such as the cleaned deck, have occasionally be used in forming artificial reefs.

Alternative 3: TOPPLING

As in partial removal, the wells are abandoned and the topsides are removed. The shell mounds may be either removed or left in place. The primary difference between partial removal and toppling is that, in toppling, explosives are used to sever the jacket from the seabed and then a derrick barge or pull barge drags the jacket over and it is allowed to settle to the seafloor (Twachtman 1997). Navigational aids, if necessary, are then put in place.

Alternative 4: NO REMOVAL (LEAVE-IN-PLACE)

A platform and its surrounding shell mound could be left in its original location at the time of decommissioning. The topside would be stripped and cleaned and navigational aids installed.

In the Gulf of Mexico this scenario has been discussed on a number of occasions, although it has not been attempted. For instance, a platform in the Flower Garden Banks National Marine Sanctuary was studied as a possible research laboratory. However, the cost of maintaining cathodic protection and navigational aids (together running to $300,000 per year) proved too high (L. Dauterive, personal communication). Other creative suggestions offered by stakeholders for decommissioned, left-in-place platforms include wind and aquaculture farms, meteorological stations, hospitals, hotels, gambling casinos, and penal institutions.

Agencies Responsible for the Decommissioning Process

By law, various coastal states and the federal government share the administration of submerged lands, subsoils and seabeds off the United States. Thus, depending on where platforms are positioned, responsibility for mineral extraction, including oil and gas development, is either under state or federal jurisdiction. Similarly, decisions regarding the decommissioning of platforms fall under either state or federal control, although the final decisions are based on consultation and mutual agreements among a number of agencies.

Responsibility for the fate of platforms in federal waters rests with the MMS (33 U.S.C. § 1331 *et seq.*) Federal agencies that are consulted in the decommissioning process include the Environmental Protection Agency (33 U.S.C. §§ 1311(a), 1342), Army Corps of Engineers (33 U.S.C. §§ 403,1344), National Oceanic and Atmospheric Administration (NOAA) Fisheries (16 U.S.C. § 1801 *et seq.*), and Coast Guard (14 U.S.C. § 85: 43 U.S.C. § 1333(d)). State agencies, such as the California Department of Fish and Game do not have jurisdiction in federal waters but may comment in the decision making process. Under the federal Coastal Zone Management Act (16 U.S.C. § 1451 *et seq.*), MMS decisions on platform decommissioning that will affect coastal resources are also reviewed by the appropriate state agency for consistency with the state's coastal zone management program. In California, the California Coastal Commission conducts review for consistency with the state program. In turn, state agency consistency decisions can be appealed to the U. S. Department of Commerce (16 U.S.C. § 1456(c)(3)(A), (c)(3)(B)(iii); 15 C.F.R. Part 930, subpart H).

Decisions regarding the decommissioning of platforms in California state waters are the province of the State Lands Commission (Cal. Pub. Res. Code § 6216), along with such agencies as the California Coastal Commission (Cal. Pub. Res. Code § 30330), Department of Fish and Game (Cal. Fish & Game Code § 1602), local Air Pollution Control Districts (Cal. Health & Safety Code 40000), U. S. Army Corps of Engineers (33 U.S.C. §§ 403, 1344), and the U. S. Coast Guard (14 U.S.C. § 85).

Jacket and conductor removal: the role of the U. S. Coast Guard in decommissioning

Local United States Coast Guard districts are responsible for the safety of vessel traffic in their respective geographic areas and have the authority to dictate aids to navigation for obstacles in the water (14 U.S.C. §85; 43 U.S.C. § 1333(d); 33 C.F.R. Part 67). Therefore, in instances where some part or all of a platform is to be reefed, the Coast Guard will specify the necessary navigational aids. Discussions regarding decommissioning of platforms off California have often erroneously assumed that the Coast Guard will require that the jacket be removed to about 26 m (85 ft.) below the surface. However, decommissioning experience in the Gulf of Mexico demonstrates that there is no set removal depth. Indeed, the Coast Guard decision-making process appears to be quite flexible; it reviews each decommissioning on a case-by-case basis. For instance, in the decommissioning of the mile-long Freeport-McMoRan sulfur mine platform and bridge off Louisiana, the Coast Guard required piles to be cut 9 m (30 ft.) beneath the surface (Kasprzak 1999).

Generally, the requirements for aids to navigation become more restrictive (and therefore more expensive) the closer to the surface the obstacle lies. As an example, here is a generic set of conditions for decommissioned platforms in the Gulf of Mexico based on recent Coast Guard decisions (G. Steinbach, personal communication):

- If the obstacle is greater than 61 m (200 ft.) in depth: no requirement for aids to navigation
- If the obstacle is from 61 m to 26 m (200 ft. to 85 ft.) in depth: unlighted buoys are required
- If the obstacle is 26 m to 11 m (85 ft. to 35 ft.) in depth: lighted buoys are required
- If the obstacle is from 11 m (35 ft.) to protruding through the surface: lights or lighted buoys and foghorns are required.

In the rigs-to-reefs programs in the Gulf of Mexico, the states are responsible for aids to navigation on reefed platforms. The costs of these aids are paid for from the funds created by the industry's donations. As a cost savings measure, these states generally have selected greater water clearances. The requirements for California waters may be different from those in the Gulf of Mexico. The local Coast Guard District will determine these requirements based on vessel traffic and other local conditions.

The question of liability for a reefed platform off California

Liability, who retains responsibility for a reefed platform, is a major issue in the decommissioning process. MMS policy states the "The MMS supports and encourages the reuse of obsolete offshore petroleum structures as artificial reefs in U. S. Waters." Current MMS regulations provide that a platform operator may be released from removal obligations in the federal lease instrument if a state agency responsible for managing fisheries resources will accept liability (30 C.F.R. § 250.1730). However, in situations where reefs are not managed by a state agency, another organization or agency must assume liability, as provided in the National Fishing Enhancement Act of 1984 (Stone 1985). In such cases, liability could possibly be retained by the oil company, transferred to a private entity, or handled in some other manner as long as MMS approval is received (G. Steinbach, personal communication).

An extensive body of policy and research outlines proper procedures for siting and deploying artificial reefs, and this information bears upon liability of such structures. The National Artificial Reef Plan (NARP) states "When a reef has been properly located, marked on navigation charts if necessary, and any required surface markers affixed, there should be very little potential for liability" (Stone 1985). Regarding accidents, which may occur during recreational activities near artificial reefs, the NARP further declares, "Diving accidents may occur with use by recreational divers. In this respect, an artificial reef is like a public park — there are dangers in those parks, guardrails and fences cannot be placed everywhere, and everyone who visits the park assumes some risk of injury. A warning could be placed on nautical charts and posted in local dive shops to warn of these dangers. However, each case would probably involve determination of comparative negligence" (Stone 1985). Parker (1999) notes that no lawsuits have ever been filed against the California Department of Fish and Game with respect to their artificial reef program.

Regardless of which decommissioning alternative is selected, the federal government cannot be held liable. Regarding State liability, the NARP notes, "If the permit holder is a State government, it may have sovereign immunity from liability. It is unclear whether the National Fishing Enhancement Act affects any State's claim of sovereign immunity." (Stone 1985)

National Artificial Reef Plan

Decommissioning options other than complete removal must be consistent with the National Artificial Reef Plan (33 U.S.C. § 2104(a)(4)). The National Fishing Enhancement Act of 1984 directed the development of a long-term National Artificial Reef Plan (NARP) to provide guidance and criteria on planning, construction, and evaluating artificial reef use, as well as introducing liability and mitigation issues (33 U.S.C. § 2103). Goals of the NARP seek to enhance fishing and fishery resources and minimize user conflicts and environmental risks without creating unreasonable obstruction to navigation (33 U.S.C. § 2102). In 1998, the NARP was supplemented by the Coastal Artificial Reef Planning Guide, which incorporates new language from relevant federal and state agencies, fishing interests, and the general public.

California Department of Fish and Game Rigs-to-Reef Guidelines

"These guidelines stipulate that the project must benefit living marine resources, habitat, and user groups; that disposal or use of contaminated materials is not permitted; that wherever possible the subsurface structure of the platform should remain in place; that where possible subsurface structure that must be removed could be relocated to the base of the rig or other appropriate sites; and that the remaining structure be augmented by rocks or other materials to assure that the site functions as a diverse and productive reef habitat. To replace the biotic productivity from that part of the platform removed for navigational purposes, rock or concrete reefs should be placed in nearshore locations. A rigs-to-reef project sponsor must provide sufficient funds to the Department to evaluate the benefits to biotic productivity, user groups, and the overall management of fishery resources." (Holbrook et al. 2000)

Social Values in Platform Decommissioning

Defining the social and ecological goals of decommissioned platforms as artificial reefs will be critical in evaluating the efficacy of any potential rigs-to-reef program and the current and future performance of any artificial reef. Therefore, it is likely that various stakeholder groups will vie in defining the goals (and therefore the usefulness) of decommissioned platforms as artificial reefs. In this report, we sort the multitude of stakeholder viewpoints regarding a rigs-to-reef program into three groups, each of which is primarily defined by one concern: community membership, resource accessibility and environmental (marine life) issues. Of course, an individual may be influenced by more than one social value, and others may use arguments from multiple categories to promote a desired decommissioning outcome.

The first group consists of stakeholders who are concerned about community membership, and either oppose or support local presence of the oil industry. Those that wish to promote a community without the oil industry often view reefing alternatives as bundled together with all oil industry activities (e.g., continued exploration and production), the whole of which should be locally opposed (although they may not be opposed to oil industry activities in the Gulf of Mexico). For example, Camozzi (1998a) states that complete removal should be the preferred alternative in decommissioning because, after decades of fighting oil development on the California Coast, it acts as a "catharsis" for the local community. Camozzi (1998b) reiterates this point by stating that, in regard to mussel mound removal, "Sending a message to oil companies that they must clean up our coast when they are done extracting their profits is the most vital issue in this case." Individuals who wish to encourage or maintain the presence of the oil industry in the local community, presumably for economic reasons, favor some sort of reefing option because reefing is less expensive than complete removal (Pulsipher et al. 2000). Further information regarding local community views on the oil industry in California can be found in Lima (1994) and Smith and Garcia (1995).

The second group of stakeholders is primarily concerned with resource accessibility. A heterogeneous group, these citizens will either favor or oppose decommissioning alternatives depending on how these alternatives aid or inhibit their ability to access a particular resource. For example, commercial trawlers in the Southern California Bight favor complete removal because fishing gear may snag on platform structure or shell mounds (Southern California Trawlers Association 1998; McCorkle 1999). Other commercial fishers benefit from oil industry activities. Shrimp trawlers in the Gulf of Mexico drag within 0.4 km (0.25 mi) of platform structures, reporting that these fishing grounds tend to be more productive (Wilson et al. 1987). The rocky habitat associated with Rincon Oil Island in California provides excellent lobster fishing grounds and trap fishers would oppose seeing this habitat removed (Miller 1999). Recreational fishers often dominate the debate surrounding platform decommissioning, and they have driven the formation of artificial reef policy at both state and federal levels (Stone 1985; Wilson et al. 1987). Many recreational fishers favor a reefing alternative in decommissioning because catch per unit effort is often high at offshore platforms for targeted fish species such as kelp bass (Love and Westphal 1990; McCrea 1998). In the Gulf of Mexico, Reggio (1987) estimates that 70% of fishing excursions target oil platform habitats. Citizens participating in non-consumptive activities also possess a variety of viewpoints regarding decommissioning alternatives. Many scuba divers find that underwater portions of oil platforms provide outstanding diving and underwater photographic opportunities, and favor decommissioning alternatives that preserve such opportunities, (Vallette 1999). Other members of the public may view the topside structure of platforms as denying them access to unobstructed, scenic ocean views, and consequently they oppose the leave-in-place decommissioning option (Wiseman 1999).

The third stakeholder group makes decisions regarding decommissioning based on their perception of how certain marine populations or environmental ideals fare under the various decommissioning alternatives. It is this last group that is most likely to use ecological information in making decisions regarding platform decommissioning. A decommissioning option that involves reefing may be supported if a substantial net benefit to the marine environment can be demonstrated (Chabot 1999). Others support complete removal because this option is the only one which promotes a wilderness ideal, that is, a marine environment which fails to retain a visible mark of human activities. If there is a lack of scientific evidence regarding ecological consequences, or if they are unaware of such consequences, these stakeholders may use another social value, such as community membership, in choosing a preferred decommissioning alternative (Chabot 1999).

Economic incentives interact and overlap with social values. In past rigs-to-reefs activities, industry and state entities have equally shared the cost-savings resulting from partial removal or toppling alternatives. Partial removal of deep water platforms will generate estimated savings of one to two orders of magnitude greater than the amount saved in decommissioning smaller platforms. The cost of maintaining navigational equipment (if any is needed) at these reefed platforms will not increase in the same proportion as the increase in cost-savings, and may actually decrease. These additional financial resources may be used to develop or enhance projects of interest to stakeholders, and may be a sufficient incentive to alter the preferred decommissioning option for some groups.

The Interaction of Science, Scale, and Social Values

State and federal regulatory agencies involved in the decommissioning process are required to protect the public interest when managing natural resources. In the face of strongly conflicting viewpoints among stakeholder groups, resource managers may try to convert a controversial issue into a technical one. For instance, they may give preference to the protection of marine life resources, thereby avoiding the appearance of favoring one group's economic concerns over another's. Additionally, legislation such as the Endangered Species Act and the Marine Mammal Protection Act, among others, often give environmental concerns priority over social and economic concerns. In combination, these issues give ecological information a prominent role in the decommissioning process.

Impacts to the environment may be measured at short or long time scales, or within a local or regional context. As time and space scales increase, so does scientific uncertainty about predicting consequences of various management alternatives (due to an increasing number of unknown variables and propagation of error associated with imprecise assumptions or model parameters). When there is greater scientific uncertainty, social values and political or economic factors often become more important in the decision-making process. This phenomenon may result in stakeholders advocating that ecological performance of reefed platforms be evaluated at scales which enhance the possibility of their preferred decommissioning alternative, even if ecological data are irrelevant to their concerns.

For example, proponents of regional ecological assessment at long time intervals may be individuals who oppose the local presence of the oil industry. Since regional assessment is difficult and expensive to accomplish, social values (e.g., antagonistic views of oil industry) will increase in importance. Significantly, these same individuals have not stipulated that other artificial reefs which are similar to reefed platforms, such as steel hulled ships, undergo the same rigorous ecological assessment. Further, the assured instantaneous and lethal effects of explosives are not considered in arguments about marine life effects.

Proponents of small scale ecological assessment tend to be recreational anglers, who often state their support for rigs-to-reef programs in terms of benefits to the environment. They maintain that the local presence of abundant marine life at a platform is sufficient evidence of satisfactory ecological performance. But this support for a rigs-to-reef alternative often evaporates if artificial reefs are designated no-take areas.

Ecological information greatly aids the decision-making process if explicit management goals are specified. The rebuilding of depleted fish stocks might be one goal, the preservation and expansion of marine wilderness might be another. Determination and ranking of ecological goals reflects cultural values. Thus, controversies surrounding platform decommissioning cannot easily be translated into technical issues by giving priority to ecological goals because we lack agreement on the space and time scales in which ecological impacts should be measured. Therefore, the scale at which ecological impacts are measured (local or regional) and considered (short or long term) becomes paramount in the decommissioning process. To date, such specific space and time scales have not been designated by any state or federal government agency.

MILTON LOVE

Juvenile cowcod on pipeline.

Decommissioning Activities in the Gulf of Mexico

To date, almost all platform decommissioning and reefing in the world has occurred in the Gulf of Mexico. Because large-scale offshore drilling first took place in the Gulf of Mexico, it was in this region that the issue of what to do with unwanted platforms first arose. Below, we give a brief summary of the history of decommissioning in the Gulf of Mexico; additional details are found in Lukens (1997), Kasprzak (1998), and Dauterive (2000).

Kerr-McGee erected the first offshore oil and gas platform in the Gulf of Mexico off Louisiana in 1947. Despite its primitive structure and placement in waters only 6 m (18 ft.) deep, oil was struck 22 days after drilling began, presaging a veritable tidal wave of offshore drilling. In 2001, there were over 4,000 platforms in the Gulf of Mexico, the vast majority occurring off Louisiana, followed by Texas, Mississippi and Alabama (Lukens 1997; Moritis 1997; Kasprzak 1998, 1999; Dauterive 2000). Platforms provide a considerable amount of the hard substrate in the north-central Gulf of Mexico, and surveys indicate that 20%–50% more fish live around platforms than on surrounding soft seafloors (Gallaway and Lewbel 1982; Driesen 1985). Because recreational and commercial fishers target fish residing near these structures, they are of considerable economic value (Dimitroff 1982; Reggio 1987; Kasprzak 1998).

By the late 1970s, it was apparent that the economic life span of many of these structures was nearing an end. During that decade, about 150 platforms were removed to shore and scrapped. The first reefing of an oil and gas structure occurred in 1979 when a subsea production system was towed from Louisiana to an artificial reef site off the Panhandle of Florida. In 1982, an obsolete platform jacket was moved from Louisiana to a Dade County, Florida site and over the next few years several additional structures were moved to various artificial reef sites.

Responding to this new activity, Congress passed the National Fishing Enhancement Act (NFEA) in 1984 (33 U.S.C. § 2101 *et seq.*). The NFEA mandated the creation of a "long-term plan for siting, constructing, permitting, installing, monitoring, managing, and maintaining artificial reefs within and seaward of state jurisdictions" (Kasprzak 1998). This document, later called the National Artificial Reef Plan, was published in 1985. In response to NFEA, several Gulf of Mexico states have now passed laws to take advantage of platform decommissioning to help preserve complex habitat in the northern Gulf of Mexico, for example, the Louisiana Fishing Enhancement Act of 1986 (La. Rev. Stat. § 56:639.1 *et seq.*) [Act 100] and the Texas Artificial Reef Act of 1989 (Tex. Parks & Wildlife Code § 89.001 *et seq.*). As an example, Act 100 created a process by which ownership of and liability for uneconomical platforms could be transferred from operators to the state of Louisiana. As noted by Kasprzak (1998), "Act 100 established the State of Louisiana as the permittee for artificial reefs developed under the program's jurisdiction and appointed the Department of Wildlife and Fisheries as agent for the state. The state assumes responsibility for the reefs upon placement within the established reef permit area…Act 100 does not authorize state general funds for the artificial reef program but does establish the Louisiana Artificial Reef Trust Fund. Oil and gas companies that donate structures to the program are asked to contribute half of the disposal savings realized through program participation to the trust fund." A similar program exists in Texas (Texas Parks and Recreation 1999).

A significant amount of money has been collected in rigs-to-reef programs in both Louisiana and Texas. As of 2001, there was about $15 million in the Louisiana fund and at least $4 million in Texas. Contrary to what has been reported (McGinnis et al. 2001), major artificial reef programs of several states, including Louisiana and Texas, receive neither state nor federal funding, they are fully underwritten by the interest paid on their respective rigs-to-reef accounts (J. Culbertson, personal communication; R. Kasprzak, personal communication). The Louisiana Department of Wildlife and Fisheries and Texas Parks and Wildlife Department describe their rigs-to-reefs programs at http://www.wlf.state.la.us (under "Marine Fisheries") and http://www.tpwd.state.tx.us/fish/reef/artreef.htm, respectively.

Since 1942, over 188 Gulf of Mexico platforms have been reefed, primarily off Louisiana and Texas. This represents about 8.4% of all decommissioned platforms (L. Dauterive, personal communication). The reasons for this early low reefing rate were economic. Most of the platforms thus far decommissioned were in shallow water, and it was more cost effective to haul them onshore for salvage or reuse rather then tow them to reefing sites. In the future, it is likely that a higher proportion of platforms will be reefed as more offshore structures become obsolete. Of the platforms that have been reefed, about 60% have been removed from a site and towed to a new location. Contrary to what was stated by Krop (1998), some decommissioned platform structures have been left in place. Thus far, 30% have been toppled in place and the remainder have been partially removed and left standing (Dauterive 2000). As larger platforms in deeper waters are decommissioned, L. Dauterive (personal communication) has noted a trend towards partial removal, rather than towing or toppling. In all but a few instances, only the platform jacket has been used as reef material.

The Future: Ecological Consequences of Offshore Platform Decommissioning in California

Complete Removal (Total Removal) of Platform

The immediate impact of removing and hauling an entire platform to shore is that all attached animals die. If some of the platform structure is hauled to a reef area and replaced in the water, some of these animals may survive, depending on water depth and the length of time the structure is exposed to the air.

Using explosives to separate the jacket from the seafloor kills large numbers of fishes, although limited research makes it difficult to predict how many deaths will occur. Marine mammals and sea turtles may also be indirectly killed by damage to the auditory system. In a study in the Gulf of Mexico (Bull and Kendall 1994), explosives were placed 5 m (15 ft.) below the seafloor to sever the well conductors, platform anchor pilings and support legs, of a platform in about 30 m (100 ft.) of water. All of the fishes on or near the bottom and most of the adult fishes around the entire platform suffered lethal concussion.

Some shallow-water platforms can be removed without explosives. However, "The oil and gas industry has attempted to find alternatives to the use of explosives, such as cryogenic cutting, hydraulic abrasive cutting, mechanical cutting, and torch cutting. Most of these techniques either have proven to be ineffective or are successful only in limited situations. At present, the industry maintains that the use of explosives is by far the safest, most reliable, and most cost-effective method of platform removal" (Kasprzak 1998). A recent assessment of techniques for removing platforms (NRC 1996) found that it is unlikely that any techniques or devices now known will significantly reduce fish kills during removal operations that use explosives.

Shell Mounds at the Base of Platform

The jackets and conductors of all platforms off southern and central California are heavily encrusted with invertebrates, including mussels, barnacles, seastars, rock scallops, rock oysters and jingle shells, sea anemones, caprellid amphipods, rock crabs, limpets, gooseneck barnacles, and sessile tunicates. An extremely thick layer of mussels extends from the intertidal zone to depths of at least 30 m (100 ft.) (and deeper on some platforms). The seafloor surrounding the platforms is covered with mussel shells. This "shell mound" or "mussel mound" is created when mussels, and other invertebrates, are dislodged during platform cleaning or heavy swells. Our observations show that, depending on bottom depth, a number of species of invertebrates, including many species of seastars, brittle stars, and rock crabs, as well as king crabs, opisthobranchs, shrimps, octopi, and sea anemones are abundant on the shell mounds. Substantial number of fishes, primarily the juvenile stages of various rockfishes, adult stages of dwarf rockfish species, as well as lingcod, poachers, painted greenling, and other benthic species also inhabit shell mounds.

Around four platforms in shallow water locations (+/- about 33 m, 109 ft., water depth), the shell mounds were found to be many meters thick, and were found to cover accumulations of drilling muds and cuttings. Investigations of the shell mounds around deep-water platforms have not been completed. Nevertheless, because of the potential for environmental harm, this issue must be addressed for all platforms regardless of the decommissioning option pursued. The level of contamination, while localized, has been shown to vary from platform to platform. Therefore, any remedial actions taken during the decommissioning process will likely be determined on a case-by-case basis. Although the regulatory requirements are still evolving, the alternatives being discussed include leaving the shell mounds undisturbed, smoothing and shaping them to allow for trawling, capping the shell mounds with an impervious material, adding material to the mounds for enhancement, or completely removing the shell mounds.

The removal of shell mounds may have a number of consequences to marine life by (1) removing habitat and (2) the potential for releasing toxins into the water column during the removal process. The biological consequences of either removing, altering, or leaving the shell mounds in-place must be given appropriate attention in the decommissioning process.

Partial Removal of Platform

Since partial removal reduces or eliminates shallow water habitat from the platform structure, this alternative would likely result in lower species composition and diversity than at the start of decommissioning process. Response of biotic communities will depend upon how much of the upper portion is removed. Depending on the platform, fewer nearshore reef fishes, such as surfperches, basses, and damselfishes may occur. Invertebrates that only reside or recruit to shallow water habitat would also be absent. Since the majority of mussels are located at shallow depths, shell mound replenishment will be reduced or absent, and affect the persistence of that community.

Since partial removal does not require the use of explosives, there is relatively little marine mammal, sea turtle, fish and invertebrate mortality compared to complete removal. Vertebrate and invertebrate assemblages associated with the remaining platform structure are assumed to be minimally affected.

A number of misunderstandings surround predictions regarding the potential ecological consequences of partial removal.

(1) Some stakeholders and policy analysts have erroneously assumed that Coast Guard regulations require a minimum depth below the ocean surface to which a reefed platform must be reduced. However, as noted earlier, the decision on how much of the jacket and conductors is left in place is based on both a Coast Guard assessment and the willingness of the liability holder to pay for the requisite navigational aids. As mussels become rare below 30 m (100 ft.) on most platforms, the mistaken assumption that all topped platforms must be cut to 24–30 m (80–100 ft.) below the surface has led some to conclude that partial removal will inevitably lead to a severe reduction in the amount of mussels that fall to the bottom and, thus, to a change in or end to the shell mound community. This is not necessarily the case.

(2) Some reports suggest that partial removal will lead to a large decrease in juvenile rockfish densities; our research does not support this supposition. On the offshore platforms in the Santa Barbara Channel region, the juveniles of most rockfish species (particularly blue, bocaccio, halfbanded, olive, pygmy, squarespot, starry, widow, and yellowtail) are uncommon in waters shallower than 26 m (85 ft.). Partial removal could reduce fish densities if pelagic juvenile stages of these rockfishes first encounter a platform in shallow surface waters, then swim downwards below the 26 m range, causing pelagic juveniles to "miss" a platform. However, young-of-the-year rockfishes of many of these species recruit from the plankton in large numbers both to natural outcrops in nearshore waters and to those coming out of deeper waters that have crests in about 30 m (100 ft.) of water. This indicates that emergent structure is not necessary for these juveniles to locate suitable habitat.

On the other hand, the pelagic stage of a few rockfish species, particularly copper, gopher, black-and-yellow, and kelp may prefer to recruit shallower portions of the platform than other rockfish species (Holbrook et al. 2000; this report). These species recruit to nearshore rocky outcrops and kelp beds and do not appear to settle in deeper waters (Larson 2002a,b). For these species, partial removal of a platform would probably decrease juvenile recruitment, depending on the uppermost depth of the remaining structure.

(3) Errors regarding factors affecting juvenile fish mortality have also lead to confusion. McGinnis et al. (2001), in describing the history of artificial reef research in California, states that "Research has shown that high relief, open structures serve best to attract fish, and better enable fishery exploitation, while low relief, complex structured reefs provide better nurseries and afford more diverse assemblages of fish and other organisms". McGinnis et al. (2001) also cite an anonymous California Department of Fish and Game biologist who notes that "a drawback to rigs as reefs is that they are high relief, which works against survival of young-of-the-year fish, suggesting they may not be a source of production but rather simply an attraction site."

We know of no research that can support the above claims, and the authors do not cite any specific studies. Predators are the main source of juvenile fish mortality in marine systems; death due to starvation or exposure is rare. Thus, variation in habitat structure would modify juvenile fish survivorship by modifying the success rate of predators. Presently, no studies have assessed comparative performance in survivorship rates between platforms and natural habitats. Alternatively, we may begin to infer potential predator vulnerability between habitats by examining the ratio of juvenile fishes to piscivorous fishes. In the shallow portion of Platform Irene, the ratio of juvenile rockfishes to piscivorous fish is about 25:1 and at nearby Tarantula Reef it is 3:1 (Appendix 2; Schroeder, unpublished data). Conversely, in the east Santa Barbara Channel, at Platform Gina the ratio is 1:5, and at Portuguese Rock, Anacapa Island it is 1:1.4.

Toppling of Platform

Toppling would produce reefs with somewhat different fish assemblages than what has been observed around intact platforms. Consequences of removal of shallow water habitat would be similar to that of partial removal. In California, because most platforms reside in fairly deep water, toppled platforms would also harbor fewer young-of-the-year rockfishes, just as the reefs adjacent to Platform Hidalgo harbor fewer of these animals. Depending on the characteristics of the platform, a toppled structure, with twisted and deformed pilings and beams, might have more complexity than an upright one. This might increase the number of such crevice dwelling fishes as pygmy rockfishes.

No Removal (Leave-in-Place) of Platform

The no-removal option would allow the platform and shell mound to continue to function as they had when the structure was occupied. Decommissioning activities would result in small mortality impacts to resident marine populations.

What is the Life Span of a Reefed Platform?

How long can a decommissioned steel platform survive in the marine environment before rusting away? Operating steel platforms are protected by sacrificial anodes, often made of aluminum or zinc, which preferentially corrode before steel, thus preserving the jackets' integrity. This cathodic protection lasts as long as the anodes are intact, usually for a number of decades. It is assumed that, once a platform is reefed, there will be no additional replacement of the sacrificial anodes, although the issue has yet to be addressed for platforms off California. While corrosion rates vary in seawater, depending on water temperature, biofouling and other factors, it is estimated that the life span of a cathodically unprotected platform will range from a minimum of 100 to more than 300 years (Quigle and Thorton 1989; Mishael 1997; Voskanian and Byrd 1998).

Pipelines Associated with Platforms

Pipelines run from all platforms either to shore or to other platforms that collect the oil or gas and then ship it to shore. McGinnis et al. (2001), note that "Both Federal and California regulations allow decommissioned OCS pipelines to be abandoned in place so long as they do not constitute a hazard to navigation, commercial fishing or unduly interfere with other uses of the OCS." (See also 30 C.F.R. § 250.1750; Ca. Pub. Res. Code § 6873.) In the Gulf of Mexico, few pipelines have been completely removed in the course of decommissioning (Breaux et al. 1997).

In 2001, using the research submersible *Delta*, we conducted pilot surveys of a pipeline between Platforms Gail and Grace. We found this pipe to be heavily encrusted with such invertebrates as anemones, crinoids, basket stars, and seastars. We also noted relatively large numbers of fishes, particularly juvenile or dwarf fishes, including cowcod, flag, blackgill, striped, and vermilion rockfishes, along with poachers and flatfishes. Both fish and invertebrate densities were much higher than found on the surrounding mud bottom.

Resource Management Issues Associated with Decommissioning

Habitat Enhancement of Reefed Platform Structure

The California Department of Fish and Game has issued guidelines for rigs-to-reef projects that call for enhancing the remaining structure using quarry rocks or other material (Parker 1998). Adding such material would increase the number of crevices and hiding places suitable for smaller sized fish. Thus, species which are rare or absent from observed platform fish assemblages, such as pygmy rockfish, may then occur. The ecological community response may depend on the type of habitat enhancement and has not been examined.

Marine Protected Areas

To a certain extent, the platforms in the Santa Barbara Channel and Santa Maria Basin currently act as de facto marine protected areas (Schroeder and Love 2002). Fishing pressure around many of these platforms is relatively low because (1) some platforms are relatively far from harbors and thus from fishing vessels, (2) four platforms (Irene, Hidalgo, Harvest, and Hermosa) are located near Point Conception in waters that are extremely rough for much of the year, and (3) it is difficult to fish close to operating platforms because tying up to these structures is discouraged by platform operators.

Clearly, many reefed platforms would be a target for recreational anglers or commercial fishermen because platforms often host sizable local populations of sought-after fish species. Off Florida, Shinn and Wicklund (1989) suggest that patterns of large fish at Tenneco platforms may be in part determined by fishing activities. Thus, in California, it has been proposed that reefed structures be designated as no-take areas (California senate bill introduced by D. Alpert). In addition, it may be possible to modify the architecture of reefed platforms to make them difficult to fish. For instance, because most of the target species are found inside the bottom of platform any structure above the bottom would prevent gear from reaching the seafloor, thus inhibiting the capture of many fishes.

Decommissioning Alternatives in Relation to National Marine Fishery Service's Fishery Rebuilding Plans

The use of explosives to remove or topple a platform may compromise fishery-rebuilding programs. Cowcod provide one example. This species has been declared overfished by NOAA Fisheries (formerly known as the National Marine Fisheries Service) and is the subject of a federal rebuilding plan. The Pacific Fisheries Management Council has approved a cowcod rebuilding plan that limits fishery impacts to 1% per year (about 2.4 metric tons for 2001), as part of a 95-year rebuilding period, and the use of spatial closures south of Point Conception to reduce bycatch mortality. As noted earlier, our observations around Platform Gail indicate it has the highest density of adult cowcod and bocaccio of any natural or artificial structure surveyed. We can make an estimate of the number of cowcod at the bottom of Gail by multiplying the density of cowcod observed by the area of the platform's footprint (the area underneath the platform). For instance, in the last two years of the survey, 1999 and 2000, observed cowcod densities were 0.015 and 0.0183 fish per m^2, respectively. As Gail's footprint is 5,327 m^2 (Holbrook et al. 2000), extrapolation for 1999 and 2000 gives estimates of 79 and 97 individuals respectively. This conservative estimate does not include juveniles we have observed living on the shell mound or on the adjacent pipeline. The current rebuilding plan calls for both a quota on commercial and recreational fisheries combined of 2.4 metric tons, equal to about 600 fish (T. Barnes, personal communication). Assuming that Platform Gail has 75 or more cowcod living under it, and if, as seems likely from all known research, explosives used to remove or topple a platform will kill all of them, that loss may be sufficiently large to complicate the rebuilding plan (T. Barnes, personal communication).

LOVELAB, UC SANTA BARBARA

Spotted ratfish on shell mound at Platform Gail.

CHAPTER 5
RESEARCH AND MONITORING RECOMMENDATIONS

When Governor Davis vetoed SB 1, a bill that would have allotted some of the savings derived from reefing platforms to California, he wrote, " There is no conclusive evidence that converted platforms enhance marine species or produce net benefits to the environment…it is premature to establish this program until the environmental benefits of such conversions are widely accepted by the scientific and environmental communities." And, with respect to assessing the effect of different decommissioning options on marine populations, Holbrook et al. (2000) state that the key marine ecological question is, "What is the effect of each decommissioning alternative on regional stocks of reef-associated species in general, or of particular targeted species?" Clearly, in the decommissioning process, there is a need for additional information.

Below we list examples of research that would be useful in addressing these issues. Many of these examples have been suggested by various resource managers. The first two tasks are necessary to resolve issues regarding attraction or production of platform and natural habitats as well as helping to define essential fish habitat. In addition to aiding in the platform decommissioning process, these three tasks will also aid in future coastal zoning and mapping that would occur in any future boundary expansion of the Channel Islands Marine Sanctuary.

Compare ecological performance between oil platforms and natural outcrops and determine if any oil platforms serve as Essential Fish Habitat for focal species.

What fishes live around platforms and nearby natural reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been well surveyed or have not been surveyed at all. Both scuba and submersible surveys must be conducted.

How does fish production around platforms compare to that at natural outcrops?

Fish production can be assessed and compared between habitats by examining a number of ecological yardsticks. These include (1) fish growth rates, (2) mortality rates, and (3) reproductive output. As an example, we conducted a pilot study comparing the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef. More research needs to be conducted in all of these areas. For instance, mortality rates can be estimated by sequential surveys of the densities of young fishes at a specific platform or natural outcrop. Reproductive output (larval production in the case of rockfishes) can be quantified by first estimating the size frequency and density of a species at a platform or natural outcrop. Then, using size-fecundity relationships from the literature, the potential annual larval production for that species can be calculated.

How does trophic structure around platforms compare to that at natural outcrops?

How do platforms and natural outcrops compare in terms of habitat value?

A relatively new measure called Habitat Value (HV) allows comparisons between habitats, incorporating fish density, fish length, and fish regularity of occurrence. In Stephens et al. (1999), we presented a preliminary analysis of nine platforms and found that platform HVs tended to be much higher than those for open coastal soft substrate, higher than low relief deep rock outcrop and in the same range as wetlands and kelp/rock natural outcrops. An analysis of all of the platforms and as many outcrops as possible should be conducted.

Can we identify areas that are Essential Fish Habitat?

All of the above studies contribute to answering this question.

Define the spatial distribution of economically important species (all life history stages) within the region of interest and define connectivity of habitats within this region.

What is the relative contribution of platforms in supplying hard substrate and fishes to the region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires an assessment of the rocky outcrops in the vicinity of each platform; this is derived from seafloor mapping. Much of the seafloor in the vicinity of platforms remains to be characterized. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How long do fishes reside at platforms?

It remains unclear how long fishes are resident around a platform. For instance, do the large numbers of fishes, such as the overfished bocaccio and cowcod, remain around the platforms for extended periods? One settled on a platform, how long do young-of-the-year fishes remain there? A knowledge of the residence time of these species would allow for a more accurate determination if platforms form optimal habitat for these species and if they are indeed acting as long-term marine reserves. Residence time can be determined through the use of both tagging studies and observations of a year class through time.

Acoustic tags are one way to determine fish residency. In a pilot study, Dr. Christopher Lowe, at California State University, Long Beach, captured and acoustically tagged rockfishes at Platform Gail and, after one year has determined that all have remained around the platform. Broader studies, covering additional platforms, outcrops, and species are needed.

What are the effects of platform retention or removal on fish populations within a region?

As an example, what effect would platform retention or removal have on fish recruitment? For instance, would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle out of the plankton to a platform in substantial numbers. If that platform did not exist, would these young fishes have found, and settled upon, natural outcrops? In a pilot project, we are using radar-derived (CODAR) current data to estimate where the young rockfishes that settled at Platform Irene would have gone if Irene had not existed. We identify the direction and distance of pathways from the platform to natural outcrops. A directional histogram of radar-derived trajectories will show the degree to which surface currents potentially carry larvae in any given direction from the platform site. Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground. Similarly, using a synthesis of oceanographic information, it is possible to model the drift direction of larvae produced by fishes living at a platform.

It would be useful to understand the natal origins of fishes residing at platforms and natural outcrops. Both genetic and otolith microchemistry techniques might aid in determining the degree of dispersal of fishes produced at platforms and natural outcrops.

Understand how habitat modification of platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the seafloor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

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Opposite: Tons o'invertebrates on the Gail-Grace pipeline. (Photograph by Milton Love)

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TABLES

TABLE 1. Common and scientific names of fishes observed in these studies.

Common Name	Scientific Name
Bank rockfish	*Sebastes rufus*
Barred sand bass	*Paralabrax nebulifer*
Barred surfperch	*Amphistichus argenteus*
Bat ray	*Myliobatis californica*
Bearded eelpout	*Lyconema barbatum*
Big skate	*Raja binoculata*
Black-and-yellow rockfish	*Sebastes chrysomelas*
Blackeye goby	*Rhinogobius nicholsi*
Blackgill rockfish	*Sebastes melanostomus*
Black rockfish	*Sebastes melanops*
Blacksmith	*Chromis punctipinnis*
Black perch	*Embiotoca jacksoni*
Bluebanded goby	*Lythrypnus dalli*
Bluebarred prickleback	*Plectobranchus evides*
Blue rockfish	*Sebastes mystinus*
Bluntnose sixgill shark	*Hexanchus griseus*
Bocaccio	*Sebastes paucispinis*
Brown rockfish	*Sebastes auriculatus*
Bull sculpin	*Enophrys taurina*
Cabezon	*Scorpaenichthys marmoratus*
Calico rockfish	*Sebastes dalli*
California halibut	*Paralichthys californicus*
California lizardfish	*Synodus lucioceps*
California scorpionfish	*Scorpaena guttata*
California sheephead	*Semicossyphus pulcher*
California smoothtongue	*Leuroglossus stilbius*
California tonguefish	*Symphurus atricauda*
Canary rockfish	*Sebastes pinniger*
Chilipepper	*Sebastes goodei*
C-O turbot	*Pleuronichthys coenosus*
Copper rockfish	*Sebastes caurinus*
Cowcod	*Sebastes levis*
Darkblotched rockfish	*Sebastes crameri*
Dover sole	*Microstomus pacificus*
Dwarf perch	*Micrometrus minimus*
Embiotoca sp.	Black perch, *Embiotoca jacksoni* or striped perch, *E. lateralis*
Fantail sole	*Xystreurys liolepis*
Flag rockfish	*Sebastes rubrivinctus*
Freckled rockfish	*Sebastes lentiginosus*
Garibaldi	*Hypsypops rubicunda*
Giant kelpfish	*Heterostichus rostratus*
Gopher rockfish	*Sebastes carnatus*
Grass rockfish	*Sebastes rastrelliger*
Gray smoothhound	*Mustelus californicus*
Greenblotched rockfish	*Sebastes rosenblatti*
Greenspotted rockfish	*Sebastes chlorostictus*
Greenstriped rockfish	*Sebastes elongatus*
Halfbanded rockfish	*Sebastes semicinctus*
Halfblind goby	*Lethops connectens*
Halfmoon	*Medialuna californiensis*
Honeycomb rockfish	*Sebastes umbrosus*
Hornshark	*Heterodontus francisci*
Hornyhead turbot	*Pleuronicthys verticalis*
Island kelpfish	*Alloclinus holderi*
Jack mackerel	*Trachurus symmetricus*
Kelp bass	*Paralabrax clathratus*
Kelp goby	*Lethops connectens*
Kelp greenling	*Hexagrammos decagrammus*
Kelp gunnel	*Ulvicola sanctaerosae*
Kelp rockfish	*Sebastes atrovirens*
Kelp perch	*Brachyistius frenatus*
Lavender sculpin	*Leiocottus hirundo*
Leopard shark	*Triakis semifasciata*
Lingcod	*Ophiodon elongatus*
Longnose skate	*Raja rhina*
Mexican rockfish	*Sebastes macdonaldi*
Mola	*Mola mola*
Mussel blenny	*Hypsoblennius jenkinsi*
Northern anchovy	*Engraulis mordax*
Ocean sunfish	*Mola mola*
Ocean whitefish	*Caulolatilus princeps*
Olive rockfish	*Sebastes serranoides*
Opaleye	*Girella nigricans*
Pacific argentine	*Argentina sialis*
Pacific barracuda	*Sphyraena argentea*
Pacific electric ray	*Torpedo californica*
Pacific hagfish	*Eptatretus stouti*
Pacific hake	*Merluccius productus*
Pacific mackerel	*Scomber japonicus*
Pacific pompano	*Peprilus simillimus*
Pacific sanddab	*Citharichthys pacificus*
Pacific sardine	*Sardinops sagax*
Painted greenling	*Oxylebius pictus*
Phanerodon sp.	White seaperch, *Phanerodon furcatus* or sharpnose seaperch, *P. atripes*
Pile perch	*Rhacochilus vaca*
Pink rockfish	*Sebastes eos*
Pink seaperch	*Zalembius rosaceus*
Pinkrose rockfish	*Sebastes simulator*
Plainfin midshipman	*Porichthys notatus*
Pygmy rockfish	*Sebastes wilsoni*

TABLE 1. (cont.) Common and scientific names of fishes observed in these studies.

Common Name	Scientific Name
Rainbow surfperch	*Hypsurus caryi*
Rathbunella sp.	Unidentified ronquil
Redbanded rockfish	*Sebastes babcocki*
Rex sole	*Glyptocephalus zachirus*
Rock wrasse	*Halichoeres semicinctus*
Rosy rockfish	*Sebastes rosaceus*
Roughback sculpin	*Chitonotus pugetensis*
Rubberlip seaperch	*Rhacochilus toxotes*
Sarcastic fringehead	*Neoclinus blanchardi*
Sargo	*Anisotremus davidsoni*
Sebastomus sp.	Unidentified member of rockfish subgenus *Sebastomus*
Senorita	*Oxyjulis californica*
Sharpchin rockfish	*Sebastes zacentrus*
Sharpnose seaperch	*Phanerodon atripes*
Shiner perch	*Cymatogaster aggregata*
Shortbelly rockfish	*Sebastes jordani*
Shortspine combfish	*Zaniolepis frenata*
Shortspine thornyhead	*Sebastolobus alascanus*
Silver surfperch	*Hyperprosopon ellipticum*
Slender sole	*Eopsetta exilis*
Speckled sanddab	*Citharichthys stigmaeus*
Spotted cuskeel	*Chilara taylori*
Spotted ratfish	*Hydrolagus colliei*
Spotted sand bass	*Paralabrax maculatofasciatus*
Squarespot rockfish	*Sebastes hopkinsi*
Starry rockfish	*Sebastes constellatus*
Striped seaperch	*Embiotoca lateralis*
Stripetail rockfish	*Sebastes saxicola*
Swell shark	*Cephaloscyllium ventriosum*
Swordspine rockfish	*Sebastes ensifer*
Thornback	*Platyrhinoidis triseriata*
Threadfin bass	*Pronotogrammus multifasciatus*
Treefish	*Sebastes serriceps*
Tube-snout	*Aulorhynchus flavidus*
Vermilion rockfish	*Sebastes miniatus*
Walleye surfperch	*Hyperprosopon argenteum*
White seabass	*Atractoscion nobilis*
White surfperch	*Phanerodon furcatus*
Whitespeckled rockfish	*Sebastes moseri*
Widow rockfish	*Sebastes entomelas*
Wolf-eel	*Anarrhichthys ocellatus*
Yelloweye rockfish	*Sebastes ruberrimus*
Yellowtail	*Seriola lalandi*
Yellowtail rockfish	*Sebastes flavidus*
Zebra goby	*Lythrypnus zebra*
Zebraperch	*Hermosilla azurea*
Unidentified blennies	Family Blenniidae
Unidentified gunnel	Family Pholidae
Unidentified kelpfishes	Family Clinidae
Unidentified pipefishes	*Syngnathus* spp.
Unidentified poachers	Family Agonidae
Unidentified rockfish juveniles	*Sebastes* spp.
Unidentified ronquils	Family Bathymasteridae
Unidentified sanddabs	*Citharichthys* spp.
Unidentified sculpins	Family Cottidae
Unidentified silversides	Family Atherinidae
Unidentified fish species	

TABLE 2. Mean length of selected species at platform bottoms and shell mounds, 1996–2001.

Species	Location	Holly	Irene	Grace	Hidalgo	Hermosa	Harvest	Gail
LINGCOD	bottom	—	22.6	30.4	34.7	—	32.7	—
	shell mound	—	19.1	30.2	22.2	—	28.8	—
	t	—	7.04	0.15	7.57	—	2.24	—
	d.f.	—	869	124	222	—	49	—
	significant@α=.05	—	*	—	*	—	*	—
PAINTED GREENLING	bottom	—	15.6	—	12.7	—	—	—
	shell mound	—	13.5	—	11.9	—	—	—
	t	—	3.35	—	0.93	—	—	—
	d.f.	—	175	—	80	—	—	—
	significant@α=.05	—	*	—	—	—	—	—
STRIPED ROCKFISH	bottom	—	—	—	17.8	—	22.1	21.3
	shell mound	—	—	—	14.4	—	21.3	17.4
	t	—	—	—	3.11	—	1.75	5.08
	d.f.	—	—	—	82	—	341	119
	significant@α=.05	—	—	—	*	—	—	*
COPPER ROCKFISH	bottom	22.2	20.7	—	—	—	—	—
	shell mound	20	18.4	—	—	—	—	—
	t	22.23	5.95	—	—	—	—	—
	d.f.	327	1,400	—	—	—	—	—
	significant@α=.05	*	*	—	—	—	—	—
PINKROSE ROCKFISH	bottom	—	—	—	—	—	—	20.2
	shell mound	—	—	—	—	—	—	14.2
	t	—	—	—	—	—	—	141.2
	d.f.	—	—	—	—	—	—	278
	significant@α=.05	—	—	—	—	—	—	*
GREENBLOTCHED ROCKFISH	bottom	—	—	—	—	—	—	26.0
	shell mound	—	—	—	—	—	—	17.5
	t	—	—	—	—	—	—	8.86
	d.f.	—	—	—	—	—	—	432
	significant@α=.05	—	—	—	—	—	—	*
FLAG ROCKFISH	bottom	—	—	17.4	—	—	—	—
	shell mound	—	—	13.7	—	—	—	—
	t	—	—	3.23	—	—	—	—
	d.f.	—	—	136	—	—	—	—
	significant@α=.05	—	—	*	—	—	—	—
HALFBANDED ROCKFISH	bottom	12.5	11.6	16.2	12.3	13.5	—	—
	shell mound	7.0	7.0	14.9	10.4	11.7	—	—
	t	7.23	35.6	32.8	32.33	31.37	—	—
	d.f.	438	6,356	15,230	13,158	10,288	—	—
	significant@α=.05	*	*	*	*	*	*	*

TABLE 3. Total numbers and densities (fishes per 100m²) of all fishes observed at Platform Hidalgo and North Reef, 1996–2001.

PLATFORM HIDALGO

Species	Total	Density
Unidentified rockfish YOY	13,462	103
Halfbanded rockfish	13,194	101
Widow rockfish YOY	828	6
Greenspotted rockfish	617	5
Flag rockfish	266	2
Lingcod	224	2
Painted greenling	218	2
Widow rockfish	95	<1
Bocaccio YOY	91	<1
Greenstriped rockfish	84	<1
Greenblotched rockfish	69	<1
Bocaccio	56	<1
Rosy rockfish	56	<1
Vermilion rockfish	44	<1
Canary rockfish	41	<1
Squarespot rockfish	33	<1
Swordspine rockfish	27	<1
Sebastomus sp.	27	<1
Pacific sanddab	17	<1
Pygmy rockfish	16	<1
Sharpchin rockfish	16	<1
Unidentified combfish	14	<1
Cowcod	12	<1
Yelloweye rockfish	12	<1
Kelp greenling	10	<1
Unidentified rockfish	9	<1
Unidentified sanddab	7	<1
Starry rockfish	7	<1
Shortspine combfish	6	<1
Unidentified poacher	5	<1
Yellowtail rockfish	5	<1
Unidentified fishes	5	<1
Pink surfperch	4	<1
Bank rockfish	2	<1
Unidentified ronquil	2	<1
Unidentified sculpin	1	<1
Ratfish	1	<1
Copper rockfish	1	<1
Stripetail rockfish	1	<1
California scorpionfish	1	<1
Longspine combfish	1	<1
TOTAL	29,587	226
Minimum number of species	34	
Total rockfish YOY	14,381	109
Total rockfishes	29,071	217

Rockfish YOY comprised 48.6% of all fishes surveyed.
All rockfishes comprised 98.3% of all fishes surveyed.

NORTH REEF

Species	Total	Density
Unidentified rockfish YOY	4,786	54
Pygmy rockfish	1,684	19
Widow rockfish YOY	886	10
Halfbanded rockfish	575	7
Greenspotted rockfish	370	4
Sebastomus group	187	2
Yellowtail rockfish	118	1
Vermilion rockfish	100	1
Squarespot rockfish	72	<1
Shortspine combfish	69	<1
Greenstriped rockfish	61	<1
Unidentified rockfish	52	<1
Lingcod	49	<1
Blackeye goby	43	<1
Unidentified fish	40	<1
Pink surfperch	39	<1
Starry rockfish	38	<1
Canary rockfish	38	<1
Greenblotched rockfish	38	<1
Rosy rockfish	34	<1
Unidentified combfish	27	<1
Pacific argentine	23	<1
Swordspine rockfish	19	<1
Flag rockfish	18	<1
Bocaccio	16	<1
Cowcod	12	<1
Widow rockfish	10	<1
Unidentified flatfishes	10	<1
Unidentified ronquils	5	<1
Speckled rockfish	4	<1
Yelloweye rockfish	4	<1
Unidentified sanddab	3	<1
Bank rockfish	3	<1
Unidentified poacher	2	<1
Ratfish	2	<1
Olive rockfish	2	<1
Unidentified Cusk-eel	1	<1
Kelp greenling	1	<1
Painted greenling	1	<1
Bluebarred prickleback	1	<1
Sharpchin rockfish	1	<1
Longspine combfish	1	<1
TOTAL	9,445	108
Minimum number of species	34	
Total rockfish YOY	5,672	65
Total rockfishes	9,128	99

Rockfish YOY comprised 60% of all fishes surveyed.
All rockfishes comprised 96.6% of all fishes surveyed.

Species observed only at Platform Hidalgo: California scorpionfish, copper and stripetail rockfishes.
Species observed only at North Reef: Blackeye goby, bluebarred prickleback Pacific argentine, speckled sanddab.

TABLE 4. Total numbers of all fishes observed at the deeper, below 30 m, depths at seven platforms and 80 natural outcrops, 1996–2001.

ALL PLATFORMS

Species	Total	Species	Total	Species	Total
Unident. rockfish YOY	47,973	Pile perch	235	Splitnose rockfish	22
Halfbanded rockfish	46,831	Blackeye goby	222	Gopher rockfish	19
Widow rockfish YOY	10,902	Pacific sanddab	215	Pygmy rockfish	17
Shortbelly rockfish	7,443	Unidentified combfish	210	Yelloweye rockfish	16
Squarespot rockfish	3,834	Yellowtail rockfish	198	C-O turbot	15
Pacific sardine	3,308	Whitespeckled rockfish	196	Senorita	14
Blacksmith	2,796	Halfmoon	189	Darkblotched rockfish	14
Widow rockfish	2,540	Unidentified rockfish	184	Unidentified *Rathbunella*	12
Vermilion rockfish	2,288	Kelp rockfish	171	Cabezon	12
Blue rockfish	2,063	Rosy rockfish	167	California smoothtongue	11
Stripetail rockfish	2,037	Northern anchovy	159	Starry rockfish	11
Bocaccio YOY	1,910	Brown rockfish	142	Bank rockfish	11
Copper rockfish	1,836	Unidentified fishes	131	Speckled rockfish	7
Painted greenling	1,738	Chilipepper	122	Spotted ratfish	6
Greenspotted rockfish	1,595	Canary rockfish	113	Hornyhead turbot	5
Widow/squarespot rockfish	1,575	Unidentified flatfish	103	Unidentified cuskeel	4
Lingcod	1,486	Cowcod	98	*Phanerodon* sp.	4
Calico rockfish	1,311	Unidentified seaperch	95	Unidentified skate	4
Shiner perch	1,161	Swordspine rockfish	73	Wolf-eel	3
Bocaccio	742	Kelp greenling	66	Unidentied eelpout	3
Flag rockfish	735	Kelp bass	55	Rex sole	2
Sharpnose seaperch	621	California sheephead	53	Bluebanded goby	2
Greenblotched rockfish	600	Longspine combfish	43	California halibut	2
Unidentified sanddab	576	Dover sole	41	Redbanded rockfish	2
Greenstriped rockfish	572	Opaleye	38	Pink rockfish	2
California scorpionfish	560	Garibaldi	36	Pacific electric ray	2
Pacific hake	531	Honeycomb rockfish	35	Mola	1
Sebastomus sp.	371	Spotted cuskeel	33	White seaperch	1
Jack mackerel	348	Treefish	33	Whitespeckled rockfish/	
Sharpchin rockfish	346	Unidentified ronquil	30	Chilipepper	1
Pinkrose rockfish	331	Rubberlip seaperch	30	Bocaccio/chilipepper	1
Olive rockfish	312	Pacific mackerel	30	Shortspine thornyhead	1
Pink seaperch	308	Blackgill rockfish	28	California tonguefish	1
Unidentified poacher	296	Unidentified sculpin	26		
Shortspine combfish	245	Mexican rockfish	25		
TOTAL	155,973				
Minimum number of species	85				
Total rockfishes	139,855				

All rockfishes comprised 89.7% of all fishes surveyed.

TABLE 4. (cont.) Total numbers of all fishes observed at the deeper, below 30 m, depths at seven platforms and 80 natural outcrops, 1996–2001.

ALL NATURAL OUTCROPS

Species	Total	Species	Total	Species	Total
Widow rockfish YOY	87,238	Splitnose rockfish	214	Black perch	12
Squarespot rockfish	41,344	Pile perch	202	Calico rockfish	12
Pygmy rockfish	36,036	Greenblotched rockfish	167	Pacific hake	9
Shortbelly rockfish	35,439	Cowcod	146	Rubberlip seaperch	9
Halfbanded rockfish	26,169	Bocaccio YOY	146	Kelp rockfish	9
Swordspine rockfish	11,733	White seaperch	137	California halibut	7
Sebastomus spp.	7,648	*Rathbunella* sp	128	Unidentified prickleback	6
Widow rockfish YOY	6,635	Canary rockfish	127	Spotted cuskeel	4
Widow rockfish	6,245	Painted greenling	125	Dover sole	4
Blacksmith	4,744	Unidentified flatfish	123	Redbanded rockfish	4
Pink seaperch	4,495	Honeycomb rockfish	118	California lizardfish	4
Senorita	3,831	Copper rockfish	112	Jack mackerel	4
Rosy rockfish	2,459	Unidentified seaperch	111	Wolf-eel	3
Blue rockfish	2,274	Stripetail rockfish	106	Slender sole	3
Blackeye goby	2,123	Unidentified poacher	104	Bluntnose sixgill shark	3
Pacific sardine	2,070	Pacific argentine	104	Hornyhead turbot	3
Bank rockfish	1,781	Unidentified sanddab	104	Longnose skate	3
Pinkrose rockfish	1,433	Unidentified ronquil	85	White seabass	2
Speckled rockfish	1,285	Olive rockfish	85	Roughback sculpin	2
Greenspotted rockfish	1,094	Unidentified sculpin	73	Northern anchovy	2
Vermilion rockfish	945	Freckled rockfish	65	Rex sole	2
Unidentified rockfish	863	Yelloweye rockfish	65	Kelp greenling	2
Bocaccio	861	Treefish	64	Halfmoon	2
Unidentified combfish	728	Sharpchin rockfish	59	Unidentified pholid	2
Shortspine combfish	663	Shortspine thornyhead	49	English sole	2
Pinkrose rockfish	585	Swell shark	48	Unidentified turbot	2
Lingcod	580	Brown rockfish	40	Unidentified skate	2
Yellowtail rockfish	494	Darkblotched rockfish	38	Pacific electric ray	2
Greenspotted rockfish	462	Unidentified eelpout	36	Pacific sanddab	1
Starry rockfish	440	Gopher rockfish	35	Rainbow surfperch	1
Unidentified fish	381	Longspine combfish	31	California smoothtongue	1
Chilipepper	373	Island kelpfish	27	Bearded eelpout	1
Sharpnose seaperch	325	Blackgill rockfish	26	Unidentified cuskeel	1
Flag rockfish	309	Ocean whitefish	23	*Phanerodon* sp	1
Spotted ratfish	296	Threadfin bass	21	Bluebarred prickleback	1
California sheephead	237	Pink rockfish	17	C-O turbot	1
California scorpionfish	222	Pacific hagfish	14	Big skate	1
Whitespeckled rockfish	221	Bronzespotted rockfish	13		

GRAND TOTAL 298,379
Minimum number of species 94
Total rockfishes 276,034
All rockfishes comprised 92.5% of all fishes surveyed.

TABLE 5. Twenty highest densities of rockfish young-of-the-year juveniles, 1996–2001 as observed from the *Delta* submersible. Platforms are listed in blue, natural outcrops in red.

Site	Year	Habitat Type	Density of Rockfish YOY (fish per 100m^2)
Hidden Reef	1999	Natural	1249.2
Platform Hermosa	1999	Midwater	993. 6
Platform Irene	1998	Midwater	935.4
Platform Harvest	1999	Midwater	555.1
Platform Irene	1999	Midwater	524.3
San Miguel Island	1995	Natural	520.5
Platform Grace	2001	Midwater	486.5
Platform Hidalgo	1997	Midwater	385.2
Potato Bank	1996	Natural	367.7
Platform Irene	1997	Bottom	363.8
Platform Grace	2000	Midwater	346.2
Platform Irene	1997	Midwater	344.1
North Reef	1995	Natural	338.7
Platform Holly	1999	Bottom	326.1
Platform Hidalgo	1999	Midwater	314.6
Platform Irene	2001	Midwater	306.2
San Nicolas Island	1996	Natural	302.9
San Miguel Island	1995	Natural	262.1
Santa Rosa Island	1995	Natural	227.1
Platform Harvest	1997	Midwater	225.6

TABLE 6. Fish species observed as young-of-the-year juveniles at California oil/gas platforms.

Common Name	Common Name
Bank rockfish	Kelp bass*
Black rockfish	Kelp greenling*
Blackeye goby*	Kelp rockfish*
Blackgill rockfish	Lingcod*
Blacksmith*	Olive rockfish
Blue rockfish*	Pacific hake
Bluebanded goby*	Painted greenling*
Bocaccio*	Pinkrose rockfish*
Brown rockfish*	Pygmy rockfish*
Cabezon*	Rosy rockfish*
Calico rockfish*	Sharpchin rockfish
Canary rockfish*	Shortbelly rockfish*
Copper rockfish*	Splitnose rockfish
Cowcod*	Squarespot rockfish*
Flag rockfish*	Starry rockfish*
Garibaldi*	Stripetail rockfish*
Gopher/Black-and-Yellow rockfish*	Treefish
Greenblotched rockfish*	Vermilion rockfish*
Greenspotted rockfish*	Widow rockfish*
Greenstriped rockfish*	Yelloweye rockfish*
Halfbanded rockfish*	Yellowtail rockfish
Halfmoon*	Unidentified combfishes (*Zaniolepis* spp.)*

We also observed adult sarcastic fringehead, as well as unidentified blennies (*Hypsoblennius* spp.) and sculpins. Given the cryptic and sedentary nature of these species, we believe they arrived at platforms via larval recruitment.

In addition, Carlisle et al. (1964) observed young-of-the-year black perch, pile perch, rubberlip seaperch, and white surfperch at Platform Hazel (removed in 1996).

*These species were observed as both newly settled juveniles and adults at platforms.

APPENDICES

APPENDIX 1. Platform Synopses

In this section, we give a brief summary of each of the California platforms. The platforms are listed from the most northwest, Irene, off Point Arguello, to Emmy in the southeast off Long Beach.

Wherever possible, we have included the following information on each platform: (1) the original operator; (2) the current operator of record; (3) the date the platform was installed; (4) the first production date; (5) the platform's distance from shore (including whether it is in state or outer continental shelf [OCS] waters); (6) the bottom depth of the platform; (7) the number of wells; (8) what the platform produces (oil and/or gas); (9) the platform jacket dimensions (generally at the seafloor [bottom]); (10) the size of the shell mound surrounding the platform; (11) the size of the platform's footprint. This data was taken from California Resources Agency (1971), Manago and Williamson (1998), Holbrook et al. (2000), and Sea Surveyor Inc. (2001). We have also included a photograph of most of the platforms and their locations including latitude and longitude.

We follow this with a synopsis of the fish assemblages around each platform. When these summaries are based on our scuba and submersible surveys we include the years these surveys were conducted. Scuba surveys are midwater surveys except at the shallow water Platform Gina. Because of funding limitations, a number of platforms were surveyed only once and in a number of instances poor water visibility prevented complete coverage. Neither ExxonMobil nor Aera gave us permission to survey their platforms. In some instances, we were able to review videos that were taken during mandatory platform inspections. From these, we made a qualitative estimate of platform bottom fish assemblages for those platforms we were unable to survey.

IRENE

Original operator: Union; current operator of record: Nuevo Energy; date installed: 1985; first production: 1987; distance from shore (miles): 4.7 (OCS); water depth: 73 m (242 ft.); number of well slots 72; produces: oil and gas; platform jacket dimensions: 47 x 56 m (155 x 185 ft.) (bottom); platform footprint (m²): 2,633; location: 120°43.45'N, 34°36.37'W.

Dates and types of surveys:

Scuba: 1995–2000

Submersible:

	Midwater	Bottom	Shell Mound
1995	x		
1996	x	x	x
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001	x	x	x

Platform Irene's midwaters consistently harbored large numbers of YOY (young-of-the-year) and older juvenile rockfishes. Bocaccio, blue, shortbelly, squarespot, treefish, and widow rockfishes, and the complex comprised of young black-and-yellow, copper, gopher, and kelp rockfishes, were abundant. Densities of these fishes were usually among the highest we observed around either platforms or natural outcrops. Young painted greenling, living on the jacket, were also quite abundant. During the 1998 El Niño, YOY blacksmith settled on the platform in large numbers. However, they were gone by the following year. Kelp greenling recruited as young-of-the-year in 1999; they swam to the platform bottom during the next year and were there through 2001. Two pelagic species, jack mackerel and Pacific sardine, were also occasionally seen in high numbers. The platform bottom had particularly high densities of halfbanded rockfish and YOY rockfishes, as well as subadult and adult copper, vermilion, calico, and brown rockfishes. Juvenile lingcod, pile perch and painted greenling were also very abundant and Pacific sanddab, canary and yellowtail rockfishes were frequently seen. On the shell mound, halfbanded and copper rockfish, as well as young lingcod were very common. Platform Irene is particularly noteworthy as it harbored far higher densities of young lingcod than did any other site (platform or natural outcrop) that we surveyed.

Opposite: Vermilion rockfish and assorted invertebrates at the bottom of Platform Grace. (Photograph by Donna Schroeder)

HIDALGO

Original operator: Chevron; current operator of record: Arguello Inc.; date installed: 1986; first production: 1991; distance from shore (miles): 5.9 (OCS); water depth: 130 m (430 ft.); number of well slots: 56; produces: oil and gas; platform jacket dimensions: 78 x 53 m (257 x 176 ft.) (bottom); platform footprint (m^2): 4,154; location: 34°29'N, 120°42'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	x
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001	x	x	x

We observed high densities of YOY and older juvenile rockfishes in the midwaters of Platform Hidalgo. A number of rockfishes, including blue, copper, gopher, kelp, olive, rosy, squarespot, and widow rockfishes and bocaccio were abundant. Halfmoon and young painted greenling were also common. Large numbers of YOY blacksmith recruited to the platform during 1998 and remained there through 2001. Similarly, kelp greenling young settled during 1999, and some remained through 2001. Jack mackerel and northern anchovy were occasional visitors. The bottom of this platform was dominated by halfbanded, greenspotted, and flag rockfishes, YOY rockfishes, and lingcod. Flag rockfish density was higher than at any natural outcrop or other platform. Other important species included canary, greenstriped, vermilion, and widow rockfishes and painted greenling. On the shell mounds, we noted extremely large numbers of halfbanded rockfish. Both juvenile and adult lingcod were also abundant.

HARVEST

Original operator: Texaco; current operator of record: Arguello Inc.; date installed: 1985; first production: 1991; distance from shore (miles): 6.7 (OCS); water depth: 205 m (675 ft.); number of well slots: 50; produces: oil and gas; platform jacket dimensions: 61 x 97 m (200 x 319 ft.) (bottom); platform footprint (m^2): 5,859; location: 34°28'N, 120°40'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x		
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001			

As on most of the other platforms we surveyed, YOY and somewhat older rockfishes characterized the midwaters of Platform Harvest. Of these, bocaccio, as well as blue, olive, squarespot, and widow rockfishes were most abundant. Young painted greenling , as well as halfmoon, also were seen frequently. Blacksmith were abundant, they had recruited in 1998 as YOY and remained at the platform through 2001. Large numbers of kelp greenling settled from the plankton in 1999. Pelagic species, such as northern anchovy and Pacific sardine, were occasional visitors. In the deeper midwaters, we saw many sharpchin and whitespeckled rockfishes. Stripetail, greenstriped, greenspotted, and greenblotched rockfishes and lingcod were commonly seen on the bottom. Stripetail, greenstriped and sharpchin rockfishes were most abundant on the shell mounds.

HERMOSA

Original operator: Chevron; current operator of record: Arguello Inc.; date installed: 1985; first production: 1991; distance from shore (miles): 6.8 (OCS); water depth: 183 m (603 ft.); number of well slots: 48; produces: oil and gas; platform jacket dimensions: 61 x 85 m (200 x 280 ft.) (bottom); platform footprint (m^2): 5,142; location: 34°27'N, 120°38'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001			

Platform Hermosa's midwaters are noteworthy as rockfish nursery grounds. They harbored the second highest densities of YOY rockfishes of any site we surveyed (second only to Hidden Reef) (Table 5). Bocaccio, blue, olive, squarespot, widow, and whitespeckled rockfishes, as well as painted greenling were very abundant. Blacksmith and halfmoon were also typical species. As at many other platforms, in 1999 kelp greenling settled out of the plankton at Platform Hermosa. Jack mackerel and northern anchovy were also common. While halfbanded rockfish dominated the bottom assemblage, greenspotted rockfish were also abundant. Halfbanded rockfish also were the most abundant species on the shell mound.

HONDO

Original operator: Exxon; current operator of record: ExxonMobil; date installed: 1976; first production: 1981; distance from shore (miles): 5.1 (OCS); water depth: 255 m (842 ft.); number of well slots: 28; produces: oil and gas; platform jacket dimensions: 68 x 68 m (225 x 225 ft.) (bottom); platform footprint (m^2): 4,649; location: 34°23'N, 120°07'W.

Exxon and ExxonMobil did not allow us to survey this platform. However, we were able to review part of an inspection tape made at and near the bottom of Platform Hondo (Divecon International, 3 August 2002). Based on this, a number of rockfishes, including bank, darkblotched, pinkrose, widow and probably blackgill, live around the bottom of Platform Hondo. Darkblotched rockfish appeared to be particularly abundant.

HARMONY

Original operator: Exxon; current operator of record: ExxonMobil; date installed: 1989; first production: 1993; distance from shore (miles): 6.4 (OCS); water depth: 363 m (1,198 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 91 x 117 m (300 x 385 ft.) (bottom); platform footprint (m^2): 10,606; location: 34°22'N, 120°10'W.

Exxon and ExxonMobil did not allow us to survey this platform.

HERITAGE

Original operator: Exxon; current operator of record: ExxonMobil; distance from shore (miles): 8.2 (OCS); water depth: 326 m (1,075 ft.); number of well slots: 60; produces: oil and gas; location: 34°21'N, 120°16'W.

Exxon and ExxonMobil did not allow us to survey this platform. We reviewed part of an ROV inspection of this platform (Divecon International, 2 August 2002) and noted blackgill, darkblotch, pinkrose, and widow rockfish at or near the bottom.

HOLLY

Original operator: Atlantic Richfield, current operator of record: Venoco, date installed: 1966; first production: 1966; distance from shore (miles): 1.8 (state); water depth: 64 m (211 ft.); number of well slots: 30; produces: oil and gas; platform jacket dimensions: 18 x 30 m (60 by 100 ft.) (surface), 36 x 48 m (119 by 158 ft.) (bottom); location: 34°22'N, 119° 52'W.

Dates and types of surveys:
Scuba: 1995–2000
Submersible:

	Midwater	Bottom	Shell Mound
1995	x		
1996	x	x	
1997	x	x	x
1998	x	x	x
1999		x	
2000			
2001	x	x	x

The midwaters around Platform Holly were populated by large numbers of blue, copper, kelp, olive, squarespot, and widow rockfishes and bocaccio. With the exception of kelp rockfishes, most of these fishes were juveniles. Blacksmith, halfmoon, kelp bass, painted greenling, pile perch, and sharpnose seaperch were also abundant. Schools of jack mackerel and Pacific sardines were also noted. The platform bottom fish assemblage was characterized by YOY widow rockfish, calico, vermilion, halfbanded, and copper rockfishes, sharpnose seaperch and blackeye goby. Most of the vermilion and copper rockfishes were juveniles and subadults. Calico, vermilion, and copper rockfishes were the most abundant species on the shell mound.

C

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1977; first production: 1977; distance from shore (miles): 5.7 (OCS); water depth: 58 m (192 ft); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°37'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x (partial)		x

Only part of the platform midwater was surveyed and olive rockfish were most abundant. On the shell mound, vermilion, halfbanded, and calico rockfishes were most common, and blackeye goby, copper rockfish and painted greenling were also frequently encountered. A platform inspection video made on 23 September 1999 (Stolt Comex Seaway) around the platform bottom showed large numbers of juvenile blue, brown, copper, olive, vermilion, and widow rockfishes and lingcod. Both juvenile and adult calico, gopher, halfbanded and kelp rockfishes and painted greenling were also present.

B

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1968; first production: 1969; distance from shore (miles): 5.7 (OCS); water depth: 58 m (190 ft.); number of well slots: 63; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°37'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Juvenile widow rockfish, which had probably settled from the plankton in 1999, were abundant in the platform midwaters in 2000. Blacksmith, young blue, olive and kelp rockfishes, senorita and painted greenling were also common. We reviewed a video of a platform inspection (Stolt Comex Seaway, 21 September 1999) and noted large numbers of juvenile lingcod, blue, flag, and vermilion rockfishes as well as many juvenile and adult calico, gopher, halfbanded, kelp and rosy rockfishes and painted greenling.

A

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1968; first production: 1969; distance from shore (miles): 5.8 (OCS); water depth: 57 m (188 ft.); number of well slots: 57; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°36'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith, blue and olive rockfishes were most abundant in the platform midwaters during 2000. Halfmoon, kelp bass and painted greenling were also common. Due to poor visibility, we were unable to survey the bottom and shell mound of Platform A during 2000. However, we reviewed a 2001 platform inspection video tape (Divecon International 2001) conducted with a remotely operated vehicle. That tape showed that there were large numbers of fishes, primarily rockfishes, around the platform bottom. These included many subadult vermilion and copper rockfishes, as well as blue, calico, gopher, kelp, and juvenile widow rockfishes, lingcod and painted greenling.

HILLHOUSE

Original operator: Sun Oil; current operator of record: Nuevo Energy; date installed: 1969; first production: 1970; distance from shore (miles): 5.5 (OCS); water depth: 58 m (190 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 49 x 40 m (163 x 133 ft.) (bottom); location: 34°19'N, 119°36'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith and painted greenling were the most abundant species in the platform midwaters. Poor water visibility prevented us from surveying the platform bottom and shell mound. We reviewed a videotape made during an ROV platform inspection survey (Divecon International, 26 August 2001) and, although this too was conducted during poor visibility, noted juvenile copper, flag, and vermilion rockfishes, as well as painted greenling and pile perch.

HENRY

Current operator of record: Nuevo Energy; date installed: 1979; first production: 1980; distance from shore (miles): 4.3 (OCS); water depth: 52 m (173 ft.); number of well slots: 24; produces: oil and gas; platform jacket dimensions: 45 x 33 m (149 x 110 ft.) (bottom); size of shell mound: 9 m (19 ft) high, circular and 76 m (250 ft.) in diameter; platform footprint (m^2): 1,505; location: 34°19'N, 119°33'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Halfmoon, blacksmith and kelp bass were common in the midwaters of Platform Henry.

HOUCHIN

Original operator: Phillips Petroleum/Continental Oil/Cities Services Oil; current operator of record: Pacific Operators Offshore; date installed: 1968; first production: 1969; distance from shore (miles): 4.1 (OCS); water depth: 49 m (163 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 38 x 38 m (125 x 125 ft.) (bottom); size of shell mound: 6 m (21 ft.) high, circular and 85 m (280 ft.) in diameter; 1,435; location: 34°20'N, 119°33'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Painted greenling and halfmoon were the most abundant species in the platform midwaters.

HOGAN

Original operator: Phillips Petroleum/Continental Oil/Cities Services Oil; current operator of record: Pacific Operators Offshore; date installed: 1967; first production: 1968; distance from shore (miles): 3.7 (OCS); water depth: 47 m (154 ft.); number of well slots: 66; produces: oil and gas; platform jacket dimensions: 38 x 38 m (125 x 125 ft.) (bottom); platform footprint (m^2): 1,435; location: 34°20'N, 119°32'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

The midwaters around Platform Hogan were important habitat for a diverse fish assemblage. Blacksmith, blue and olive rockfishes, painted greenling, sharpnose seaperch, pile perch and California sheephead were all common species.

HABITAT

Original operator: Texaco; current operator of record: Nuevo Energy; date installed: 1981; first production: 1993; distance from shore (miles): 7.8 (OCS); water depth: 88 m (290 ft.); number of well slots: 24; produces: gas; platform jacket dimensions: 60 x 38 m (199 x 125 ft.) (bottom); platform footprint (m^2): 2,284; location: 34°17'N, 119°35'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
1995	x (partial)		
2000	x		

YOY widow rockfish, blacksmith, and one-year-old widow rockfish dominated the midwater at Platform Habitat. Blue and kelp rockfishes and painted greenling were also common species.

GRACE

Original operator: Standard Oil; current operator of record: Venoco; date installed: 1979; first production: 1980; distance from shore (miles): 10.5 (OCS); water depth: 96 m (318 ft.); number of well slots: 48; produces: Grace is a non-producing platform; platform jacket dimensions (at surface and at bottom): 27 x 44 m (90 by 145 ft.) (surface), 48 x 65 m (158 x 213 ft.) (bottom); size of shell mound: 4 m (13 ft.) high, oval, 61 x 118 m (200 x 390 ft.), oriented in a northwest-southeast direction; platform footprint (m^2): 3,090; location: 34°10'N, 119°28'W.

Dates and types of surveys:

Scuba: 1996–2000

Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x		x
1999	x	x	x
2000	x	x	x
2001	x	x	x

The midwaters around Platform Grace contained very large numbers of young rockfishes. Most of these rockfishes recruited between 1999 and 2001. YOY widow rockfish and bocaccio, juvenile squarespot, blue and widow rockfishes, bocaccio and juvenile and adult blacksmith were very common. Painted greenling, sharpnose seaperch, jack mackerel and young flag rockfish were also frequently encountered. Halfbanded rockfish were the most abundant species around the platform bottom. Juvenile widow, vermilion, and flag rockfishes and bocaccio were also abundant. Many of these individuals had settled out of the plankton at the platform in 1999 and had remained there. Squarespot and greenspotted rockfishes, young lingcod, and sanddabs were also common. Over the shell mounds, halfbanded rockfish and shiner perch were the most abundant species. Pink seaperch, sanddabs, YOY bocaccio, young lingcod, juvenile greenspotted, flag and vermilion rockfishes were also characteristic species.

GILDA

Original operator: Union Oil; Current operator of record: Nuevo Energy; date installed: 1981; first production: 1981; distance from shore (miles): 8.8 (OCS); water depth: 62 m (205 ft.); number of well slots: 96; produces: oil and gas; platform jacket dimensions: 45 x 52 m (150 x 170 ft.) (bottom); platform footprint (m²): 2,342.location: 34°10'N, 119°25'W.

Dates and types of surveys:
Scuba: 1995–2000
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith, halfmoon, kelp bass, opaleye, senorita, as well as YOY and juvenile blue, olive, squarespot and widow rockfishes and bocaccio were abundant in the midwater of this platform. Many of these rockfishes recruited from the plankton as YOYs during 1999. Due to poor visibility, we were unable to survey the bottom and shell mound of Platform Gilda during 2000. However, we reviewed a 2001 platform inspection video tape (Divecon International 2001) conducted with a remotely operated vehicle. That tape showed high densities of calico and juvenile vermilion rockfishes, as well as blue, brown, copper, halfbanded, olive, and widow rockfishes. Kelp greenling, lingcod, Pacific sanddab, and painted greenling were also noted.

GAIL

Original operator: Standard Oil; current operator of record: Venoco; date installed: 1987; first production: 1988; distance from shore (miles): 9.9 (OCS); water depth: 224 m (739 ft.); number of well slots: 36; produces: oil and gas; platform jacket dimensions: 21 x 52 m (70 x 170 ft.) (surface), 60 x 90 m (197 x 297 ft.) (bottom); platform footprint (m²): 5,327; location: 34°07'N, 119°24'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x		
1999	x	x	x
2000	x	x	x
2001	x	x	x

Blacksmith, halfmoon, kelp bass and a variety of young rockfishes, including bocaccio, blue, flag, olive, and widow, characterized the midwaters of this platform. Most of the young rockfishes settled from the plankton in 1999. The platform bottom fish assemblage was dominated by adult bocaccio, greenblotched, greenspotted, stripetail and pinkrose rockfishes. Of particular interest, we observed higher densities of both adult cowcod and bocaccio at the bottom of Platform Gail than at any natural outcrop or other platform. The shell mound at Platform Gail was characterized by stripetail, pinkrose, greenblotched and greenstriped rockfishes. On one occasion, large numbers of juvenile hake were observed, on another northern anchovies were abundant.

GINA

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed:1980; first production: 1982; distance from shore (miles): 3.7 (OCS); water depth: 29 m (95 ft.); number of well slots: 15; produces: oil and gas; platform jacket dimensions: 28 x 20 m (94 x 65 ft.) (bottom); shell mound: 4 m (13 ft.) high, oval, 45 x 64 m (150 x 210 ft.), oriented in a northwest-southeast direction; platform footprint (m²): 561; location: 34°07'N, 119°16'W.

Dates and types of surveys:
Scuba: 1995–2000

Platform Gina had the highest species richness (47) of any platform surveyed using scuba. Blacksmith dominated the assemblage, comprising 38% of all fishes observed. A close second was kelp bass, which counted for 31% of all fishes observed. Platform Gina had the highest number and density of surfperches of any platform, and was the only site where rubberlip surfperch formed part of the assemblage. The shell mound habitat at this platform provided excellent habitat for many species of recruiting rockfishes, where 13 species were observed. However, despite being present at every other surveyed platform, no widow or bocaccio juveniles were observed at Platform Gina. Pelagic species that characterized this assemblage include yellowtail, barracuda, and jackmackerel.

EDITH

Original operator: Standard Oil; current operator of record: Nuevo Energy; date installed: 1983; first production: 1984; distance from shore (miles): 8.5 (OCS); water depth: 49 m (161 ft.); number of well slots: 72; produces: oil and gas; platform jacket dimensions: 58 x 50 m (190 x 165 ft.) (bottom); platform footprint (m²): 2,879; location: 33°35'N, 118°08'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
1998	x	x	x

Blacksmith, halfmoon, opaleye, sheephead and garibaldi characterized the midwater fish assemblage at Platform Edith. Very high densities of California scorpionfish, along with sharpnose seaperch, blacksmith and blackeye goby were found at the platform bottom. California scorpionfish were also extremely abundant on the shell mound.

ELLEN

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1980; first production: 1981; distance from shore (miles): 8.6 (OCS); water depth: 80 m (265 ft.); number of well slots: 80; produces: oil and gas; platform jacket dimensions: 45 x 56 m (147 x 186 ft.) (bottom); platform footprint (m²): 2,511; location: 33°34'N, 118°07'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 7 September 2001) and observed very high densities of flag, halfbanded, squarespot and honeycomb rockfishes. We also saw a number of young vermilion rockfish. In the platform midwater, from about 61 m (200 ft) and deeper, there were very large numbers of young rockfishes, including both squarespots and widows.

ELLY

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1980; first production: n/a; distance from shore (miles): 8.6 (OCS); water depth: 77 m (255 ft.); number of well slots: n/a; produces: Elly is a processing facility for Ellen and Eureka; platform jacket dimensions: 48 x 61 m (159 x 202 ft.) (bottom); platform footprint (m^2): 2,949; location: 33°35'N, 118°07'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 9 September 2001) and observed high densities of young vermilion and young widow rockfishes, as well as many flag, honeycomb, olive, and squarespot rockfishes, and lingcod.

EUREKA

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1984; first production: 1985; distance from shore (miles): 9.0 (OCS); water depth: 212 m (700 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 54 x 85 m (179 x 282 ft.) (bottom); platform footprint (m^2): 4,635; location: 33°33'N, 118°06'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 5 September 2001) and observed large numbers of pinkrose and juvenile darkblotched rockfishes, as well as juvenile and subadult bocaccio and widow rockfish. Also present were flag, greenblotched and greenspotted, and perhaps speckled, rockfishes and lingcod.

EVA

Original operator: Union Oil Company; current operator of record: Nuevo Energy; date installed: 1964; first production: 1966; distance from shore (miles): 1.8 (state); water depth: 17 m (57 ft.); number of well slots: 39; produces: oil and gas; location: 33°39'N, 118°03'W.

EMMY

Original operator: Signal Oil and Gas Company; current operator of record: Aera Energy; date installed: 1963; first production: 1963; distance from shore (miles): 1.2 (state); water depth: 14 m (47 ft.); number of well slots: 53; produces: oil and gas; location: 33°39N, 118°02'W.

Aera did not allow us to survey this platform.

APPENDIX 2

Density of fishes observed during the oil/gas platform scuba surveys off central and southern California. Platforms are listed from northwest to southeast. Density is in fish per 100 m^2, "<" means "less than."

Common name	Irene	Hidalgo	Harvest	Hermosa	Holly	Grace	Gilda	Gail	Gina
Barred sand bass					0.8				
Black rockfish		<0.1		<0.1		<0.1			<0.1
Black-and-yellow rockfish			<0.1	<0.1		<0.1			
Blackeye goby		<0.1	<0.1			<0.1		0.2	4.0
Blacksmith	1.6	16.2	20.0	8.5	20.9	71.3	57.4	77.4	51.3
Blue rockfish	32.3	3.8	18.9	7.5	36.3	5.3	9.8	3.9	1.3
Bluebanded goby									<0.1
Bocaccio	9.5	0.1	3.7	0.8	36.6	2.7	5.0	5.9	
Brown rockfish		<0.1			<0.1		<0.1		<0.1
Bull sculpin							<0.1		
Cabezon	0.1	0.1	0.2	0.2	0.1	<0.1	0.1	<0.1	1.1
Calico rockfish							<0.1		0.6
California barracuda						0.4	<0.1		0.8
California scorpionfish	<0.1				<0.1				0.1
California sheephead			<0.1			<0.1	0.1	<0.1	0.3
C-O turbot									<0.1
Copper rockfish	0.2	0.2	0.1	0.1	0.8	0.1	<0.1	<0.1	<0.1
Copper -complex juv. rockfishes	6.1	4.7	3.1	1.5	0.7	0.8	0.4	0.1	0.2
Garibaldi						<0.1	0.1	<0.1	0.1
Giant kelpfish					<0.1				
Gopher rockfish	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Grass rockfish					<0.1	<0.1	<0.1	0.2	<0.1
Halfbanded rockfish									0.6
Halfmoon	<0.1	1.3	0.3	0.9	3.1	2.2	16.7	13.7	2.4
Jackmackerel	69.3	22.1		8.0	34.5	6.1	6.3	0.2	9.6
Kelp bass					<0.1	0.5	6.1	1.8	42.9
Kelp greenling	0.1	0.4	0.6	0.4	0.1	0.1	0.1	0.1	<0.1
Kelp rockfish	<0.1	0.7	0.2	0.1	3.7	1.5	0.6	0.4	0.4
Lingcod	<0.1				0.1		<0.1		0.2
Mussel blenny							<0.1		
Northern anchovy		6.3	7.4	7.4					
Ocean sunfish	<0.1								
Ocean whitefish				0.0					0.8
Olive rockfish	0.6	0.7	4.5	3.8	2.5	0.3	1.6	0.9	0.2
Opaleye						<0.1	2.4	0.1	2.5
Pacific butterfish	<0.1								
Pacific mackerel						<0.1			
Painted greenling	3.4	1.6	1.5	2.9	1.9	1.0	0.5		1.7
Pile perch	0.1				0.7		0.2		3.4
Rock wrasse							0.1		0.1
Rosy rockfish	<0.1	0.5	<0.1		<0.1			<0.1	0.1
Rubberlip seaperch									0.6
Sarcastic fringehead						<0.1			
Sardine	7.1		0.2		169.3	36.4	1.2	6.8	
Senorita							3.6	0.2	
Sharpnose seaperch					1.9		0.7		2.3

Common name	Irene	Hidalgo	Harvest	Hermosa	Holly	Grace	Gilda	Gail	Gina
Shortbelly rockfish	57.0								
Spotted sand bass									<0.1
Squarespot rockfish	4.7	8.4	3.3		49.0	5.4	13.3	0.2	4.2
Starry rockfish									<0.1
Stripetail rockfish									1.2
Treefish	0.4	0.1	0.2	<0.1	0.1	0.2	0.1	0.1	0.1
Unidentified Atherinidae					12.3				
Unidentified Blenniidae					<0.1	<0.1		<0.1	
Unidentified Bothidae									<0.1
Unidentified Clinidae					<0.1				
Unidentified Cottidae	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Unidentified fish species	<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1
Unidentified rockfish juveniles	4.9	8.6	1.2	0.1	1.6	0.5	0.2	0.1	0.6
Vermilion rockfish									0.1
White seaperch	<0.1				<0.1		<0.1		1.5
Widow rockfish	141.4	10.8	46.9	15.5	54.9	2.7	1.5	<0.1	
Wolf eel	<0.1								<0.1
Yellowtail									0.1


DAN DUGAN

Cabezon in the midwater of Platform Holly.

APPENDIX 3

Number and density of fishes observed in the midwaters, bottoms and shell mounds of oil/gas platforms off central and southern California. Platforms are listed geographically, from northwest to southeast. Species are ranked by number observed. YOY means "young-of-the-year", those are fish that are less than one year old. Density is in fish per 100 m^2, "<" means "less than".

PLATFORM MIDWATERS

Because we could not estimate the lengths of the transects around Platforms Habitat and Gilda, no fish densities are presented.

PLATFORM IRENE (Surveyed 1995–2001)

Species	Number	Density
Shortbelly rockfish YOY	7,300	378
Unidentified rockfish YOY	4,133	214
Widow rockfish YOY	2,310	120
Pacific sardine	1,600	83
Bocaccio YOY	989	51
Widow rockfish	372	19
Yellowtail rockfish	133	7
Blacksmith	120	6
Painted greenling	26	1
Copper rockfish	24	1
Pile surfperch	11	<1
Blue rockfish	5	<1
Unidentified rockfish	2	<1
Kelp greenling	1	<1
Lingcod	1	<1
Olive rockfish	1	<1
TOTAL	**17,028**	**880**
Minimum number of species	14	
Total rockfish YOY	14,732	763
Total rockfishes	15,269	790

Rockfish YOY comprised 86.5% of all fishes surveyed.
All rockfishes comprised 89.7% of all fishes surveyed.

PLATFORM HIDALGO (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	13,134	186
Widow rockfish YOY	794	11
Painted greenling	136	2
Bocaccio YOY	87	1
Halfbanded rockfish	34	<1
Widow rockfish	26	<1
Flag rockfish	6	<1
Kelp greenling	5	<1
Yellowtail rockfish	5	<1
Squarespot rockfish	5	<1
Pygmy rockfish	3	<1
Unidentified fish	3	<1
Greenspotted rockfish	2	<1
Unidentified sculpin	1	<1
Copper rockfish	1	<1
Cabezon	1	<1
TOTAL	**14,243**	**200**
Minimum number of species	13	
Total rockfish YOY	14,015	198
Total rockfishes	14, 097	198

Rockfish YOY comprised 98.3% of all fishes surveyed.
All rockfishes comprised 98.9% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HARVEST (Surveyed 1996–2000)

Species	Number	Density
Unidentified rockfish YOY	5,000	54
Widow rockfish YOY	1,474	16
Squarespot rockfish	1,246	14
Painted greenling	289	3
Sharpchin rockfish	171	2
Whitespeckled rockfish	134	1
Widow rockfish	113	1
Chilipepper	50	<1
Sebastomus sp.	47	<1
Bocaccio YOY	43	<1
Flag rockfish	26	<1
Unidentified rockfish	23	<1
Unidentified fish	22	<1
Greenspotted rockfish	21	<1
Blue rockfish	18	<1
Blacksmith	13	<1
Kelp rockfish	5	<1
Cabezon	2	<1
Kelp greenling	2	<1
Pacific sardine	2	<1
Rosy rockfish	2	<1
Shortbelly rockfish	2	<1
Blackeye goby	1	<1
Bocaccio	1	<1
Calico rockfish	1	<1
Halfbanded rockfish	1	<1
Pygmy rockfish	1	<1
Shortspine combfish	1	<1
Starry rockfish	1	<1
Treefish	1	<1
Wolf-eel	1	<1
Yellowtail rockfish	1	<1
TOTAL	**8,715**	**91**
Minimum number of species	26	
Total rockfish YOY	6,517	70
Total rockfishes	8,382	88

Rockfish YOY comprised 74.8% of all fishes surveyed.
All rockfishes comprised 96.2% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1996–2000)

Species	Number	Density
Unidentified rockfish YOY	17,242	199
Widow rockfish YOY	1,140	16
Painted greenling	480	7
Blue rockfish	436	5
Widow rockfish	256	3
Squarespot rockfish	148	2
Whitespeckled rockfish	47	<1
Sebastomus sp.	42	<1
Blacksmith	30	<1
Bocaccio YOY	29	<1
Unidentified rockfish	22	<1
Pacific hake	19	<1
Greenspotted rockfish	12	<1
Halfbanded rockfish	10	<1
Flag rockfish	8	<1
Copper rockfish	5	<1
Cowcod	5	<1
Unidentified fish	4	<1
Unidentified sculpin	3	<1
Cabezon	3	<1
Lingcod	3	<1
Sharpchin rockfish	3	<1
Chilipepper	2	<1
Stripetail rockfish	2	<1
Treefish	2	<1
Yelloweye rockfish	2	<1
TOTAL	**19,955**	**232**
Minimum number of species	21	
Total rockfish YOY	18,411	215
Total rockfishes	19,413	225

Rockfish YOY comprised 92.2% of all fishes surveyed.
All rockfishes comprised 97.3% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HOLLY (Surveyed 1995–1998, 2001)

Species	Number	Density
Pacific sardine	1,506	78
Squarespot rockfish	315	16
Jack mackerel	287	15
Unidentified rockfish YOY	129	6
Painted greenling	120	6
Kelp rockfish	43	2
Copper rockfish	31	2
Sharpnose seaperch	31	1
Yellowtail rockfish	22	1
Blacksmith	8	<1
Pile perch	7	<1
Brown rockfish	7	<1
Calico rockfish	6	<1
Gopher rockfish	6	<1
Unidentified rockfish	6	<1
Sebastomus sp.	4	<1
Treefish	3	<1
Unidentified sculpin	2	<1
Widow rockfish	2	<1
Blue rockfish	2	<1
Bocaccio YOY	2	<1
Unidentified fish	2	<1
Lingcod	1	<1
Olive rockfish	1	<1
Rubberlip seaperch	1	<1
Widow rockfish YOY	1	<1
Unidentified seaperch	1	<1
TOTAL	**2,546**	**127**
Minimum number of species	22	
Total rockfish YOY	122	6
Total rockfishes	580	27

Including the one time occurrence of Pacific sardine, YOY rockfishes comprised 4.8%, and all rockfishes comprised 22.8% of all fishes surveyed.

Excluding Pacific sardines, YOY rockfishes comprised 11.7%, and all rockfishes comprised 55.8% of all fishes surveyed.

PLATFORM A (Surveyed 2000)

Species	Number	Density
Blacksmith	421	28
Blue rockfish	336	22
Olive rockfish	126	8
Halfmoon	25	2
Kelp bass	17	1
Painted greenling	11	<1
Unidentified seaperch	9	<1
Sharpnose seaperch	9	<1
Kelp rockfish	8	<1
Garibaldi	7	<1
Unidentified rockfish YOY	6	<1
Pile perch	5	<1
California sheephead	4	<1
Blackeye goby	3	<1
Unidentified fish	1	<1
Unidentified rockfish	1	<1
TOTAL	**989**	**61**
Minimum number of species	13	
Total rockfish YOY	6	<1
Total rockfishes.	477	30

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 48.2% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM B (Surveyed 2000)

Species	Number	Density
Widow rockfish	180	12
Blacksmith	124	8
Blue rockfish	44	3
Olive rockfish	26	2
Kelp rockfish	16	1
Senorita	13	<1
Painted greenling	13	<1
California sheephead	9	<1
Kelp bass	6	<1
Sharpnose seaperch	6	<1
Halfmoon	5	<1
Pile perch	4	<1
Bluebanded goby	2	<1
Cabezon	1	<1
Copper rockfish	1	<1
Gopher rockfish	1	<1
Lingcod	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**453**	**26**
Minimum number of species	17	
Total rockfish YOY	1	<1
Total rockfishes	269	18

Rockfish YOY comprised <1.0% of all fishes surveyed.
All rockfishes comprised 59.4% of all fishes surveyed.

PLATFORM C (Partially Surveyed 2000)

Species	Number	Density
Olive rockfish	13	3
Kelp rockfish	7	2
Pile perch	4	<1
Blue rockfish	4	<1
Phanerodon sp.	3	<1
Vermilion rockfish	2	<1
Unidentified rockfish	2	<1
Lingcod	1	<1
Unidentified fish	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**38**	**5**
Minimum number of species	7	
Total rockfish YOY	1	<1
Total rockfishes	27	5

All rockfishes comprised 71.1% of all fishes surveyed.

PLATFORM HILLHOUSE (Surveyed 2000)

Species	Number	Density
Blacksmith	23	2
Painted greenling	22	2
Kelp bass	7	<1
Olive rockfish	7	<1
Pile perch	3	<1
Kelp rockfish	1	<1
Lingcod	1	<1
Phanerodon sp.	1	<1
Unidentified rockfish	1	<1
TOTAL	**66**	**4**
Minimum number of species	8	
Total rockfishes	9	<1

PLATFORM HENRY (Surveyed 2000)

Species	Number	Density
Halfmoon	57	6
Blacksmith	20	2
Kelp bass	12	1
Painted greenling	8	<1
Kelp rockfish	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**99**	**9**
Minimum number of species	5	
Total rockfish YOY	1	<1
Total rockfishes	2	<1

Rockfish YOY comprised 1% of all fishes surveyed.
All rockfishes comprised 2% of all fishes surveyed.
All rockfishes comprised 13.6% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HOUCHIN (Surveyed 2000)

Species	Number	Density
Painted greenling	41	4
Halfmoon	12	1
Kelp rockfish	9	<1
Blacksmith	4	<1
Unidentified rockfish YOY	4	<1
Garibaldi	3	<1
Pile perch	2	<1
California sheephead	1	<1
Olive rockfish	1	<1
Sharpnose seaperch	1	<1
Unidentified sculpin	1	<1
TOTAL	**99**	**6**
Minimum number of species	10	
Total rockfish YOY	4	<1
Total rockfishes	14	<1

Rockfish YOY comprised 4% of all fishes surveyed.
All rockfishes comprised 14% of all fishes surveyed.

PLATFORM HOGAN (Surveyed 2000)

Species	Number	Density
Blacksmith	75	7
Blue rockfish	72	6
Olive rockfish	41	3
Painted greenling	28	3
Sharpnose seaperch	26	2
Pile perch	16	1
California sheephead	15	1
Kelp rockfish	4	<1
Unidentified rockfish YOY	4	<1
Garibaldi	1	<1
Kelp bass	1	<1
Rubberlip seaperch	1	<1
TOTAL	**293**	**23**
Minimum number of species	11	
Total rockfish YOY	4	<1
Total rockfishes	121	9

Rockfish YOY comprised 1.4% of all fishes surveyede
All rockfishes comprised 41.3% of all fishes surveyed.

PLATFORM HABITAT (Partially Surveyed 1995, Surveyed 2000)

Species	Number	Density
Widow rockfish YOY	470	
Blacksmith	122	
Widow rockfish	111	
Unidentified rockfish YOY	41	
Blue rockfish	25	
Painted greenling	14	
Kelp rockfish	14	
Bocaccio YOY	12	
Flag rockfish	7	
Halfmoon	5	
Olive rockfish	5	
Copper rockfish	4	
Garibaldi	4	
Kelp bass	1	
Sebastomus sp.	1	
TOTAL	**836**	
Minimum number of species	13	
Total rockfish YOY	523	
Total rockfishes	690	

Rockfish YOY comprised 62.6% of all fishes surveyed.
All rockfishes comprised 82.5% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM GRACE (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	5,454	79
Widow rockfish YOY	2,768	40
Squarespot rockfish	1,554	22
Blue rockfish	1,029	15
Widow rockfish	633	9
Bocaccio YOY	396	6
Blacksmith	313	4
Bocaccio	142	2
Painted greenling	86	1
Sharpnose seaperch	54	<1
Jack mackerel	54	<1
Flag rockfish	46	<1
Kelp rockfish	35	<1
Olive rockfish	30	<1
Pacific mackerel	30	<1
Unidentified rockfish	28	<1
Halfmoon	26	<1
Chilipepper	25	<1
Sebastomus sp.	15	<1
Brown rockfish	10	<1
Copper rockfish	10	<1
Lingcod	7	<1
Whitespeckled rockfish	5	<1
Unknown fish	4	<1
Unknown sculpin	3	<1
Greenspotted rockfish	3	<1
Rosy rockfish	2	<1
Swordspine rockfish	2	<1
Treefish	2	<1
Calico rockfish	1	<1
Cowcod	1	<1
Kelp greenling	1	<1
Pink seaperch	1	<1
Vermilion rockfish	1	<1
White seaperch	1	<1
Unidentified seaperch	1	<1
TOTAL	**12,773**	**178**
Minimum number of species	29	
Total rockfish YOY	8,618	125
Total rockfishes	12,192	173

Rockfish YOY comprised 67.5% of all fishes surveyed.
All rockfishes comprised 95.5% of all fishes surveyed.

PLATFORM GILDA (Surveyed 2000)

Species	Number	Density
Widow rockfish	650	
Blue rockfish	23	
Olive rockfish	15	
Kelp bass	6	
Kelp rockfish	6	
Painted greenling	5	
Squarespot rockfish	3	
Blacksmith	2	
Bocaccio	2	
Lingcod	1	
Mola	1	
Opaleye	1	
Pile perch	1	
Senorita	1	
Sharpnose seaperch	1	
TOTAL	**718**	
Minimum number of species	15	
Total rockfishes	699	

All rockfishes comprised 97.4% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM GAIL (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	2,371	24
Blacksmith	241	2
Flag rockfish YOY	102	1
Widow rockfish YOY	93	<1
Painted greenling	46	<1
Bocaccio YOY	28	<1
Unidentified fish	23	<1
Pinkrose rockfish	12	<1
Widow rockfish	8	<1
Squarespot rockfish	7	<1
Whitespeckled rockfish	6	<1
Bank rockfish	4	<1
Unidentified rockfish	4	<1
Greenblotched rockfish	3	<1
Blue rockfish	2	<1
Cabezon	2	<1
Greenspotted rockfish	2	<1
Olive rockfish	2	<1
Bocaccio	1	<1
Chilipepper	1	<1
Kelp greenling	1	<1
Pacific hake	1	<1
Sebastomus sp.	1	<1
Swordspine rockfish	1	<1
TOTAL	**2,962**	**26**
Minimum number of species	19	
Total rockfish YOY	2,593	25
Total rockfishes	2,648	25

Rockfish YOY comprised 87.5% of all fishes surveyed.
All rockfishes comprised 89.4% of all fishes surveyed.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
Blacksmith	1,241	265
Halfmoon	59	13
Opaleye	37	8
Sheephead	23	5
Garibaldi	20	4
Sharpnose seaperch	8	1
Kelp bass	5	1
Painted greenling	4	1
TOTAL	**1,397**	**298**
Minimum number of species	8	

No rockfishes observed.

PLATFORM BOTTOMS

PLATFORM IRENE (Surveyed 1996–2001)

Species	Number	Density
Halfbanded rockfish	5,393	217
Unidentified rockfish YOY	1,411	57
Copper rockfish	1,187	47
Vermilion rockfish	799	40
Lingcod	468	19
Calico rockfish	381	15
Widow rockfish YOY	335	13
Pile perch	115	5
Painted greenling	105	4
Pacific sanddab	96	4
Brown rockfish	78	3
Yellowtail rockfish	30	1
Canary rockfish	28	1
Blue rockfish	25	1
Rosy rockfish	21	<1
Kelp greenling	20	<1
Rubberlip seaperch	19	<1
Bocaccio YOY	17	<1
Sebastomus sp.	12	<1
Olive rockfish	8	<1
Unidentified seaperch	5	<1
Gopher rockfish	5	<1
Sharpnose seaperch	4	<1
Squarespot rockfish	4	<1
Widow rockfish	4	<1
Unidentified fish	4	<1
Greenspotted rockfish	3	<1
Unidentified rockfish	3	<1
Bocaccio	2	<1
Flag rockfish	2	<1
Kelp rockfish	2	<1
Honeycomb rockfish	1	<1
Yelloweye rockfish	1	<1
Unidentified ronquil	1	<1
Unidentified sanddab	1	<1
Unidentified flatfish	1	<1
TOTAL	**10,591**	**427**
Minimum number of species	29	
Total rockfish YOY	1,766	70
Total rockfishes	9,748	395

Rockfish YOY comprised 16.7% of all fishes surveyed.
All rockfishes comprised 92% of all fishes surveyed.

PLATFORM HIDALGO (Surveyed 1996–2001)

Species	Number	Density
Halfbanded rockfish	9,664	305
Greenspotted rockfish	587	19
Unidentified rockfish YOY	307	10
Flag rockfish	256	8
Lingcod	97	3
Greenblotched rockfish	69	2
Widow rockfish	69	2
Greenstriped rockfish	60	2
Bocaccio	56	2
Painted greenling	47	1
Vermilion rockfish	43	1
Canary rockfish	39	1
Rosy rockfish	36	1
Widow rockfish YOY	34	1
Squarespot rockfish	28	<1
Sebastomus sp.	26	<1
Sharpchin rockfish	15	<1
Pygmy rockfish	12	<1
Yelloweye rockfish	12	<1
Swordspine rockfish	10	<1
Cowcod	8	<1
Unidentified rockfish	8	<1
Starry rockfish	6	<1
Unidentified combfish	6	<1
Kelp greenling	5	<1
Bocaccio YOY	4	<1
Shortspine combfish	2	<1
Bank rockfish	1	<1
Stripetail rockfish	1	<1
Unidentified poacher	1	<1
TOTAL	**11,509**	**358**
Minimum number of species	24	
Total rockfish YOY	345	11
Total rockfishes	11, 351	354

Rockfish YOY comprised 3.0% of all fishes surveyed.
All rockfishes comprised 98.6% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM HARVEST (Surveyed 1997–2000)

Species	Number	Density
Stripetail rockfish	250	10
Greenstriped rockfish	207	8
Greenspotted rockfish	78	3
Greenblotched rockfish	67	3
Sharpchin rockfish	44	2
Lingcod	35	1
Sebastomus sp.	24	<1
Flag rockfish	17	<1
Unidentified rockfish	12	<1
Unidentified combfish	10	<1
Unidentified rockfish YOY	6	<1
Chilipepper	5	<1
Halfbanded rockfish	4	<1
Shortspine combfish	4	<1
Unidentified flatfish	3	<1
Cowcod	2	<1
Pinkrose rockfish	2	<1
Unidentified poacher	2	<1
Bank rockfish	1	<1
Bocaccio	1	<1
Swordspine rockfish	1	<1
TOTAL	**775**	**27**
Minimum number of species	17	
Total rockfish YOY	6	<1
Total rockfishes	721	26

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 93.0% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1996–2000)

Species	Number	Density
Halfbanded rockfish	6,718	262
Greenspotted rockfish	321	13
Flag rockfish	42	2
Sebastomus sp.	26	1
Lingcod	24	1
Unidentified rockfish YOY	9	<1
Pinkrose rockfish	7	<1
Shortspine combfish	7	<1
Cowcod	6	<1
Greenstriped rockfish	6	<1
Greenblotched rockfish	5	<1
Shortbelly rockfish	4	<1
Unidentified rockfish YOY	4	<1
Pacific hake	2	<1
Ratfish	2	<1
Swordspine rockfish	2	<1
Unidentified rockfish	2	<1
Bocaccio YOY	1	<1
Canary rockfish	1	<1
Darkblotched rockfish	1	<1
Pink seaperch	1	<1
Sharpchin rockfish	1	<1
Starry rockfish	1	<1
Whitespeckled rockfish	1	<1
Widow rockfish	1	<1
Unidentified combfish	1	<1
Unidentified fish	1	<1
Unidentified flatfish	1	<1
Unidentified poacher	1	<1
TOTAL	**7,195**	**279**
Minimum number of species	23	
Total rockfish YOY	14	<1
Total rockfishes	7,159	278

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 99.5% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM HOLLY (Surveyed 1996–1999, 2001)

Species	Number	Density
Widow rockfish YOY	1,028	49
Calico rockfish	726	35
Vermilion rockfish	444	21
Sharpnose seaperch	407	19
Halfbanded rockfish	405	19
Copper rockfish	285	13
Squarespot rockfish	221	10
Blackeye goby	67	3
Unidentified seaperch	66	3
Unidentified rockfish YOY	54	3
Pink seaperch	53	3
Painted greenling	51	2
Rosy rockfish	43	2
Brown rockfish	38	2
Pile perch	37	2
Lingcod	36	2
Widow rockfish	29	1
Flag rockfish	24	1
Sebastomus sp.	24	1
Unidentified flatfish	20	<1
Honeycomb rockfish	19	<1
Canary rockfish	18	<1
Unidentified rockfish	13	<1
Blue rockfish	12	<1
Unidentified ronquil	10	<1
Rubberlip seaperch	9	<1
Treefish	9	<1
Kelp rockfish	8	<1
Olive rockfish	8	<1
Gopher rockfish	7	<1
Kelp greenling	5	<1
Unidentified fish	4	<1
California scorpionfish	3	<1
Bocaccio YOY	2	<1
Rathbunella sp.	2	<1
Yellowtail rockfish	2	<1
Unidentified combfish	2	<1
Cowcod	1	<1
Greenspotted rockfish	1	<1
Shortspine combfish	1	<1
Shortspine thornyhead	1	<1
TOTAL	**4,195**	**191**
Minimum number of species	33	
Total rockfish YOY	1,084	52
Total rockfishes	3,421	157

PLATFORM GRACE (Surveyed 1996, 1997, 1999–2001)

Species	Number	Density
Halfbanded rockfish	11,078	408
Widow rockfish	413	15
Squarespot rockfish	220	8
Vermilion rockfish	205	8
Bocaccio YOY	203	7
Bocaccio	183	7
Shiner perch	130	5
Flag rockfish	103	4
Unidentified sanddab	79	3
Greenspotted rockfish	66	2
Lingcod	41	2
Painted greenling	29	1
Unidentified rockfish YOY	28	1
Chilipepper	26	<1
Sebastomus sp.	24	<1
Rosy rockfish	21	<1
Pink seaperch	19	<1
Unidentified flatfish	12	<1
Blue rockfish	9	<1
Kelp greenling	9	<1
Copper rockfish	8	<1
Unidentified rockfish	8	<1
Canary rockfish	7	<1
Unidentified fish	6	<1
Treefish	5	<1
Greenblotched rockfish	4	<1
Unidentified combfish	4	<1
Whitespeckled rockfish	3	<1
Widow rockfish	3	<1
Shortspine combfish	3	<1
Yellowtail rockfish	2	<1
Pink rockfish	1	<1
Rathbunella sp.	1	<1
Yelloweye rockfish	1	<1
Unidentified sculpin	1	<1
TOTAL	**12,955**	**471**
Minimum number of species	28	
Total rockfish YOY	231	8
Total rockfishes	12,621	460

Rockfish YOY comprised 1.8% of all fishes surveyed.
All rockfishes comprised 97.4% of all fishes surveyed.

Rockfish YOY comprised 25.8% of all fishes surveyed.
All rockfishes comprised 81.5% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM GAIL (Surveyed 1996, 1997, 1999–2001)

Species	Number	Density
Greenblotched rockfish	369	12
Bocaccio	328	11
Greenspotted rockfish	278	9
Stripetail rockfish	200	7
Pinkrose rockfish	168	6
Sebastomus sp.	63	2
Greenstriped rockfish	61	2
Cowcod	34	1
Mexican rockfish	22	<1
Lingcod	17	<1
Unidentified rockfish	14	<1
Flag rockfish	11	<1
Chilipepper	7	<1
Unidentified rockfish YOY	5	<1
Unidentified poachers	4	<1
Swordspine rockfish	3	<1
Dover sole	2	<1
Unidentified fish	2	<1
Unidentified flatfish	2	<1
Bank rockfish	1	<1
Bocaccio YOY	1	<1
Darkblotched rockfish	1	<1
surveyed.		
Northern anchovy	1	<1
Painted greenling	1	<1
Pink rockfish	1	<1
Redbanded rockfish	1	<1
Sharpchin rockfish	1	<1
Widow rockfish	1	<1
Unidentified combfish	1	<1
TOTAL	**1,600**	**50**
Minimum number of species	23	
Total rockfish YOY	5	<1
Total rockfishes	1,570	50

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 98.2% of all fishes surveyed.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
California scorpionfish	274	63
Sharpnose seaperch	71	16
Blacksmith	35	8
Blackeye goby	22	5
Treefish	9	2
Unidentified seaperch	8	2
Painted greenling	6	1
Unidentified rockfish YOY	5	1
Pile perch	3	<1
Cabezon	3	<1
Unidentified fish	3	<1
Honeycomb rockfish	2	<1
Squarespot rockfish	1	<1
Sebastomus sp.	1	<1
California sheephead	1	<1
Unidentified rockfish	1	<1
TOTAL	**445**	**98**
Minimum number of species	12	
Total rockfish YOY	5	<1
Total rockfishes	19	

Rockfish YOY comprised 1.1% of all fishes

All rockfishes comprised 1% of all fishes surveyed.

PLATFORM SHELL MOUNDS

PLATFORM IRENE (SURVEYED 1996–2001)

Species	Number	Density
Halfbanded rockfish	965	45
Lingcod	404	19
Copper rockfish	215	10
Pacific sanddab	92	4
Vermilion rockfish	76	4
Painted greenling	72	3
Calico rockfish	32	2
Pile perch	18	<1
Rosy rockfish	9	<1
Kelp greenling	8	<1
Unidentified rockfish YOY	8	<1
Olive rockfish	5	<1
Unidentified fish	5	<1
Canary rockfish	3	<1
Unidentified flatfish	3	<1
Unidentified sanddab	3	<1
Bocaccio YOY	2	<1
Brown rockfish	2	<1
Sebastomus sp.	2	<1
Widow rockfish	2	<1
Wolf-eel	2	<1
Yellowtail rockfish	2	<1
Unidentified ronquil	2	<1
Flag rockfish	1	<1
Pink seaperch	1	<1
Unidentified rockfish	1	<1
Unidentified sculpin	1	<1
TOTAL	**1,936**	**87**
Minimum number of species	23	
Total rockfish YOY	8	<1
Total rockfishes	1,341	61

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 69.3% of all fishes surveyed.

PLATFORM HIDALGO (SURVEYED 1996–2001)

Species	Number	Density
Halfbanded rockfish	3,496	124
Lingcod	127	4
Painted greenling	35	1
Greenspotted rockfish	28	<1
Greenstriped rockfish	24	<1
Unidentified rockfish YOY	21	<1
Rosy rockfish	20	<1
Pacific sanddab	17	<1
Swordspine rockfish	17	<1
Unidentified combfish	8	<1
Unidentified sanddab	7	<1
Cowcod	4	<1
Flag rockfish	4	<1
Pink seaperch	4	<1
Shortspine combfish	4	<1
Unidentified poacher	4	<1
Canary rockfish	2	<1
Unidentified fish	2	<1
Bank rockfish	1	<1
Longspine combfish	1	<1
Pygmy rockfish	1	<1
Ratfish	1	<1
Rathbunella sp.	1	<1
Sebastomus sp.	1	<1
Sharpchin rockfish	1	<1
Starry rockfish	1	<1
Vermilion rockfish	1	<1
Unidentified rockfish	1	<1
Unidentified ronquil	1	<1
TOTAL	**3,835**	**129**
Minimum number of species	22	
Total rockfish YOY	21	<1
Total rockfishes	3,623	124

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 94.5% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM HARVEST (Surveyed 1997–2000)

Species	Number	Density
Stripetail rockfish	373	14
Greenstriped rockfish	136	5
Sharpchin rockfish	91	3
Greenspotted rockfish	41	2
Unidentified poacher	18	<1
Sebastomus sp.	17	<1
Lingcod	16	<1
Greenblotched rockfish	9	<1
Unidentified rockfish	8	<1
Unidentified flatfish	7	<1
Shortspine combfish	7	<1
Unidentified combfish	6	<1
Pinkrose rockfish	5	<1
Unidentified rockfish YOY	5	<1
Halfbanded rockfish	4	<1
Unidentified fish	3	<1
Chilipepper	2	<1
Bank rockfish	1	<1
Cowcod	1	<1
Flag rockfish	1	<1
Pacific hake	1	<1
Ratfish	1	<1
Rathbunella sp.	1	<1
Swordspine rockfish	1	<1
Unidentified sanddab	1	<1
TOTAL	**756**	**24**
Minimum number of species	18	
Total rockfish YOY	5	<1
Total rockfishes	695	24

surveyed.
Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 91.9% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1997–2000)

Species	Number	Density
Halfbanded rockfish	3,572	188
Shortbelly rockfish	114	6
Stripetail rockfish	64	3
Shortspine combfish	38	2
Greenspotted rockfish	27	1
Greenstriped rockfish	14	<1
Unidentified sanddab	11	<1
Lingcod	9	<1
Unidentified combfish	9	<1
Flag rockfish	6	<1
Sebastomus sp.	6	<1
Cowcod	4	<1
Unidentified poacher	3	<1
Greenblotched rockfish	3	<1
Unidentified fish	3	<1
Longspine combfish	2	<1
Pink seaperch	2	<1
Rosy rockfish	2	<1
Unidentified rockfish YOY	2	<1
Blackeye goby	1	<1
Ratfish	1	<1
Widow rockfish	1	<1
Unidentified rockfish	1	<1
TOTAL	**3,895**	**200**
Minimum number of species	17	
Total rockfish YOY	2	<1
Total rockfishes	3,814	

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 97.9% of all fishes

PLATFORM SHELL MOUNDS, cont.

PLATFORM HOLLY (Surveyed 1997, 1998, 2001)

Species	Number	Density
Pacific sardine	200	25
Calico rockfish	129	16
Vermilion rockfish	64	8
Copper rockfish	44	5
Halfbanded rockfish	35	4
Blackeye goby	31	4
Squarespot rockfish	21	3
Pink seaperch	18	2
Lingcod	14	2
Honeycomb rockfish	13	2
Painted greenling	13	2
Flag rockfish	11	1
Rosy rockfish	9	1
Canary rockfish	8	<1
Brown rockfish	6	<1
Kelp greenling	6	<1
Pile perch	6	<1
Unidentified fish	6	<1
Rathbunella sp.	5	<1
Sebastomus sp.	5	<1
Unidentified flatfish	4	<1
Unidentified ronquil	4	<1
Olive rockfish	3	<1
Pacific hake	3	<1
Unidentified combfish	3	<1
Unidentified rockfish	2	<1
California halibut	1	<1
California scorpionfish	1	<1
Sharpnose seaperch	1	<1
Treefish	1	<1
Widow rockfish	1	<1
Sebastomus sp.	1	<1
Unidentified seaperch	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**670**	**75**
Minimum number of species	26	
Total rockfish YOY	1	<1
Total rockfishes	354	40

Including the one-time observation of Pacific sardine, YOY rockfishes comprised <1%, and all rockfishes comprised 52.8% of all fishes surveyed.
Excluding sardines, YOY rockfishes comprised <1%, and all rockfish comprised 75.3% of all fishes.

PLATFORM C (Surveyed 2000)

Species	Number	Density
Vermilion rockfish	153	74
Halfbanded rockfish	59	29
Calico rockfish	33	16
Olive rockfish	19	9
Blackeye goby	16	8
Copper rockfish	15	7
Painted greenling	10	5
Kelp rockfish	9	4
Lingcod	8	4
Brown rockfish	1	<1
Canary rockfish	1	<1
Widow rockfish	1	<1
Yellowtail rockfish	1	<1
TOTAL	**326**	**156**
Minimum number of species	13	
Total rockfishes	292	139

All rockfishes comprised 89.5% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM GRACE (Surveyed 1997–2001)

Species	Number	Density
Halfbanded rockfish	4,154	144
Shiner perch	1,031	36
Pink seaperch	171	6
Unidentified sanddab	148	5
Bocaccio YOY	91	3
Lingcod	88	3
Unidentified rockfish YOY	80	3
Greenspotted rockfish	38	1
Flag rockfish	35	1
Vermilion rockfish	34	1
Shortspine combfish	27	<1
Unidentified combfish	26	<1
Hornyhead turbot	15	<1
Painted greenling	10	<1
Blue rockfish	8	<1
Sebastomus sp.	5	<1
Bocaccio	4	<1
Canary rockfish	4	<1
Swordspine rockfish	4	<1
California scorpionfish	2	<1
Copper rockfish	2	<1
Kelp greenling	2	<1
Rathbunella sp.	2	<1
Rosy rockfish	2	<1
Unidentified flatfish	2	<1
Greenstriped rockfish	1	<1
Hornyhead turbot	1	<1
Squarespot rockfish	1	<1
Treefish	1	<1
Unidentified fish	1	<1
Unidentified rockfish	1	<1
Unidentified seaperch	1	<1
TOTAL	**5,992**	**203**
Minimum number of species	25	
Total rockfish YOY	171	6
Total rockfishes	4,464	153

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 74.5% of all fishes surveyed.

PLATFORM GAIL (Surveyed 1997, 1999–2001)

Species	Number	Density
Pacific hake	470	15
Stripetail rockfish	242	8
Northern anchovy	158	5
Pinkrose rockfish	112	4
Greenblotched rockfish	65	2
Greenstriped rockfish	60	2
Unidentified poacher	46	2
Unidentified combfish	29	<1
Swordspine rockfish	25	<1
Shortbelly rockfish	23	<1
Sharpchin rockfish	18	<1
Darkblotched rockfish	12	<1
Dover sole	11	<1
Unidentified fish	11	<1
Sebastomus sp.	9	<1
Unidentified rockfish	9	<1
Pacific sanddab	8	<1
Unidentified rockfish YOY	8	<1
Unidentified sculpin	8	<1
Greenspotted rockfish	8	<1
Jack mackerel	7	<1
Blackgill rockfish	5	<1
Chilipepper	4	<1
Unidentified flatfish	4	<1
Cowcod	3	<1
Flag rockfish	3	<1
Mexican rockfish	3	<1
Pacific electric ray	2	<1
Unidentified ronquil	2	<1
Bocaccio	1	<1
California smoothtongue	1	<1
California tonguefish	1	<1
Halfbanded rockfish	1	<1
Redbanded rockfish	1	<1
Rex sole	1	<1
TOTAL	**1,371**	**38**
Minimum number of species	30	
Total rockfish YOY	8	<1
Total rockfishes	603	16

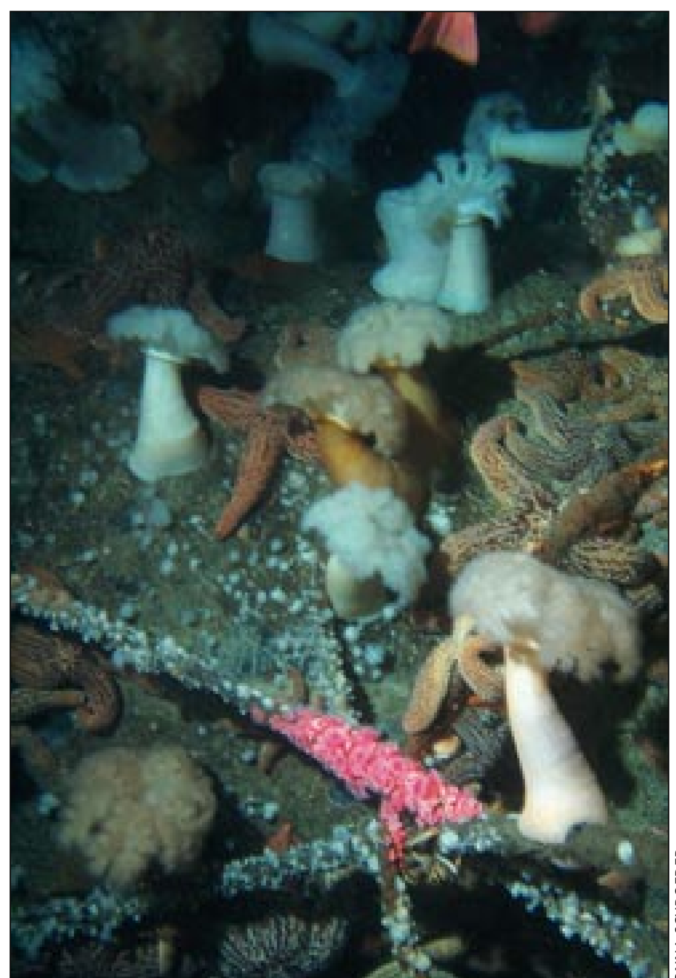
Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 44.0% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
California scorpionfish	280	67
Blackeye goby	81	19
Unidentified fish	3	<1
Unidentified rockfish YOY	3	<1
Unidentified seaperch	3	<1
Calico rockfish	2	<1
Sharpnose seaperch	2	<1
Painted greenling	1	<1
Pile seaperch	1	<1
Unidentified flatfish	1	<1
TOTAL	377	**0.86**
Minimum number of species	8	
Total rockfish YOY	3	<1
Total rockfishes	5	<1

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised <1% of all fishes surveyed.



DONNA SCHROEDER

An invertebrate tossed salad at the bottom of Platform Grace.

APPENDIX 4

Densities, at the top 20 sites, of some of the most abundant species in our deepwater surveys. Platforms are listed in blue, natural outcrops in red.

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Lingcod (adult)	Hidalgo	1996	Bottom	3.2
	Irene	1997	Bottom	1.7
	Irene	1997	Shell Mound	1.5
	Hermosa	1996	Bottom	1.0
	Footprint	2001	Natural	1.0
	Hermosa	1997	Bottom	0.9
	Reef "A"	1997	Natural	0.8
	Reef "A"	1998	Natural	0.7
	Hermosa	1999	Bottom	0.7
	Gail	2001	Bottom	0.7
	Santa Monica Bay	2001	Natural	0.7
	Santa Cruz I.	2000	Natural	0.6
	Santa Monica Bay	2001	Natural	0.5
	Hermosa	2000	Bottom	0.5
	Gail	1996	Bottom	0.5
	Gail	1997	Bottom	0.5
	Gail	1999	Bottom	0.5
	GAIL	2000	Bottom	0.5
	Irene	1998	Bottom	0.5
	Irene	2000	Bottom	0.5
	Irene	2001	Bottom	0.5
Lingcod (juvenile)	Irene	1996	Bottom	18.8
	Holly	1999	Bottom	6.1
	Grace	2000	Shell Mound	5.4
	Grace	2001	Platform pipe	4.6
	14 Mile Bank	2001	Natural	4.5
	Grace	2000	Bottom	3.8
	Hidalgo	1999	Shell mound	3.6
	Platform "C"	2000	Shell mound	3.4
	Grace	2001	Shell mound	3.2
	Irene	2001	Bottom	2.7
	Hidalgo	1997	Bottom	2.7
	Grace	1999	Shell Mound	2.3
	Harvest	2000	Bottom	2.2
	Grace	2001	Bottom	2.2
	Irene	1999	Bottom	2.2
	Hidalgo	2000	Bottom	2.1
	Harvest	1999	Bottom	1.9
	More Mesa	1995	Natural	1.9
	Irene	1997	Shell Mound	1.9
	12 Mile Reef	2000	Natural	1.8
Lingcod YOY	Irene	1998	Shell Mound	31.5
	Irene	2001	Shell Mound	29.2
	Irene	2001	Bottom	24.1
	Irene	1998	Bottom	19.6
	Irene	1996	Bottom	17.9
	Irene	2000	Shell Mound	12.0
	Irene	1997	Shell Mound	10.9
	Irene	2000	Bottom	10.6

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Lingcod YOY (cont.)	Irene	1999	Shell Mound	9.7
	Irene	1999	Bottom	7.5
	Hidalgo	1999	Shell Mound	4.6
	Hidalgo	2000	Shell Mound	4.3
	Hidalgo	2000	Bottom	3.0
	Irene	1997	Bottom	2.9
	Hidalgo	2001	Shell Mound	2.6
	Hidalgo	1998	Shell Mound	1.9
	Hidalgo	1997	Shell Mound	1.8
	Grace	1999	Shell Mound	1.2
	Hidalgo	1998	Bottom	1.1
	Hidalgo	1999	Bottom	1.1
Painted greenling	Holly	1998	Midwater	18.0
	Harvest	1999	Midwater	9.9
	Harvest	1997	Midwater	9.9
	Holly	2001	Midwater	8.2
	Hermosa	1997	Midwater	8.1
	Irene	1997	Bottom	8.0
	Hermosa	1998	Midwater	6.9
	Hermosa	1999	Midwater	5.5
	Houchin	2000	Midwater	5.3
	Irene	1997	Shell Mound	5.3
	Irene	2000	Shell Mound	5.1
	Irene	1996	Bottom	4.8
	Harvest	1999	Midwater	4.7
	Holly	1998	Shell Mound	4.6
	Irene	2000	Bottom	4.6
	Irene	2000	Midwater	4.5
	Platform "C"	2000	Shell Mound	4.4
	Hermosa	2000	Midwater	4.4
	Irene	2001	Bottom	4.4
	Hidalgo	2000	Midwater	4.2
Greenspotted rockfish	Hermosa	1996	Bottom	30.3
	Hidalgo	2000	Bottom	21.8
	Gail	1996	Bottom	21.3
	Hidalgo	1996	Bottom	20.6
	Hidalgo	1999	Bottom	19.9
	Hidalgo	1998	Bottom	19.1
	Hidalgo	1997	Bottom	17.6
	Hidalgo	2001	Bottom	12.1
	Gail	1997	Bottom	10.8
	Hermosa	1997	Bottom	10.6
	North Reef	1997	Natural	9.8
	Gail	2000	Bottom	9.3
	Hermosa	1998	Bottom	9.1
	Hermosa	2000	Bottom	5.8
	Reef "A"	1997	Natural	5.0
	North Reef	1998	Natural	5.0
	Reef "C"	1999	Natural	4.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Greenspotted rockfish (cont.)	Reef "A"	2000	Natural	4.8
	Hermosa	1999	Bottom	4.3
	Grace	1996	Bottom	4.0
Copper rockfish	Irene	2000	Bottom	88.5
	Irene	1996	Bottom	71.6
	Irene	1997	Bottom	53.6
	Irene	2001	Bottom	40.8
	Irene	2000	Shell Mound	27.1
	Holly	1997	Bottom	21.8
	Holly	1999	Bottom	21.5
	Irene	1999	Bottom	21.5
	Holly	1998	Shell Mound	12.0
	Holly	1996	Bottom	11.4
	Irene	2001	Shell Mound	10.4
	Irene	1998	Bottom	10.4
	Holly	1997	Shell Mound	9.3
	Holly	2001	Bottom	8.4
	Platform "C"	2000	Shell Mound	7.3
	Irene	1997	Shell Mound	5.2
	Irene	1999	Shell Mound	4.5
	Holly	1998	Bottom	4.4
	Irene	2001	Midwater	3.9
	Irene	2000	Midwater	3.7
Swordspine rockfish	14 Mile Bank	1996	Natural	94.4
	14 Mile Bank	1996	Natural	47.4
	14 Mile Bank	2001	Natural	45.8
	Footprint	2000	Natural	41.0
	Footprint	2000	Natural	39.6
	Footprint	1999	Natural	29.7
	Osborn Bank	2000	Natural	27.5
	Footprint	2001	Natural	24.9
	Catalina I.	1996	Natural	22.4
	Santa Monica Bay	2001	Natural	21.9
	Tanner Bank	1997	Natural	20.1
	Footprint	2000	Natural	20.1
	Santa Barbara I.	2000	Natural	18.3
	Footprint	2001	Natural	15.3
	Footprint	2000	Natural	14.2
	Cortes Bank	1997	Natural	12.8
	Santa Monica Bay	1998	Natural	10.6
	Footprint	2001	Natural	9.9
	Footprint	2000	Natural	8.3
	Footprint	1999	Natural	8.2
Greenstriped rockfish	Harvest	2000	Bottom	14.7
	Harvest	1999	Bottom	9.2
	Gail	2000	Bottom	7.5
	Harvest	1997	Shell Mound	7.1
	Harvest	1997	Shell Mound	6.1
	Harvest	2000	Shell Mound	5.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Greenstriped rockfish (cont.)	Harvest	1998	Bottom	5.2
	Harvest	1999	Shell Mound	4.3
	Harvest	1997	Bottom	3.6
	Harvest	1998	Shell Mound	3.5
	Hidalgo	1998	Bottom	3.4
	Hidalgo	2000	Bottom	3.4
	Reef "A"	2000	Natural	3.3
	Gail	1997	Shell Mound	2.6
	Reef "A"	1997	Natural	2.5
	Gail	1999	Shell Mound	2.4
	Hidalgo	2001	Bottom	2.3
	Gail	2000	Shell Mound	2.2
	Santa Rosa Passage	1995	Natural	2.2
	Hidalgo	1998	Shell Mound	2.1
Widow rockfish (YOY)	Irene	1998	Midwater	344.0
	Irene	1996	Midwater	253.3
	Holly	1999	Bottom	252.9
	Harvest	1999	Midwater	188.9
	Grace	2000	Midwater	175.7
	Irene	1997	Midwater	173.6
	San Nicholas I.	1996	Natural	173.5
	Catalina I.	1996	Natural	116.8
	Irene	1998	Bottom	79.1
	Grace	2001	Midwater	73.8
	San Nicolas I.	1996	Natural	68.1
	Grace	1997	Bottom	66.3
	Cortes Bank	1997	Natural	66.0
	Santa Cruz I.	2000	Natural	65.4
	North Reef	1999	Natural	63.6
	Hidalgo	1998	Midwater	52.9
	Footprint	1995	Natural	45.9
	Hermosa	2000	Midwater	44.4
	Footprint	2001	Natural	40.3
	Grace	1999	Midwater	39.6
Squarespot rockfish	Santa Cruz I.	2000	Natural	282.5
	Santa Barbara I.	2000	Natural	263.0
	Santa Monica Bay	1998	Natural	196.4
	Harvest	1999	Midwater	180.0
	Cortes Bank	1997	Natural	149.6
	Grace	2001	Midwater	130.6
	San Miguel I.	1995	Natural	122.1
	Footprint	1998	Natural	94.6
	San Nicolas I.	1996	Natural	93.9
	Anacapa Passage	1999	Natural	88.8
	Santa Monica Bay	1998	Natural	85.0
	Hidden Reef	1999	Natural	72.6
	San Nicolas I.	1996	Natural	69.7
	Guano Bank	1995	Natural	69.6
	Footprint	2000	Natural	61.8

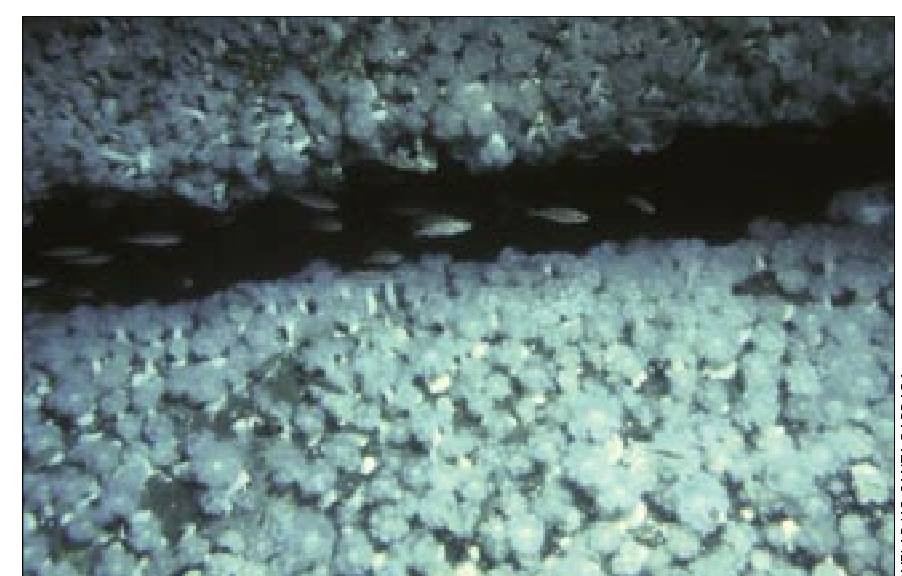
Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Squarespot rockfish (cont.)	Osborn Bank	2000	Natural	54.9
	Osborn Bank	2000	Natural	51.9
	Anacapa Passage	1995	Natural	50.5
	Santa Monica Bay	2001	Natural	44.3
	Santa Rosa I.	1995	Natural	43.4
Vermilion rockfish	Platform "C"	2000	Shell Mound	74.5
	Holly	2001	Bottom	58.1
	Irene	2000	Bottom	55.2
	Irene	1996	Bottom	47.8
	Irene	1997	Bottom	32.8
	Grace	2001	Platform pipe	30.8
	Irene	1999	Bottom	30.4
	Anacapa Passage	1995	Natural	30.1
	Grace	2001	Bottom	29.9
	Holly	1999	Bottom	23.8
	Holly	1996	Bottom	22.0
	Irene	2001	Bottom	14.0
	Irene	1998	Bottom	12.5
	Holly	2001	Shell Mound	11.9
	Irene	2000	Shell Mound	10.6
	Grace	2001	Bottom	8.8
	Holly	1998	Shell Mound	8.3
	Irene	2001	Shell Mound	6.1
	Santa Cruz I.	2000	Natural	5.2
	Holly	1997	Bottom	4.5
Bocaccio (adult)	Gail	1997	Bottom	18.2
	Gail	1999	Bottom	11.0
	Gail	1996	Bottom	10.8
	Gail	2000	Bottom	6.2
	Gail	2001	Bottom	3.5
	Hidalgo	2001	Bottom	3.0
	Hidalgo	1996	Bottom	2.7
	Reef "A"	1997	Natural	1.9
	Reef "D"	1999	Natural	1.6
	Hidalgo	1997	Bottom	1.3
	Santa Rosa Passage	1995	Natural	1.2
	Footprint	1995	Natural	1.1
	Hidalgo	1998	Bottom	0.9
	Footprint	2001	Natural	0.9
	Footprint	2001	Natural	0.9
	Footprint	2000	Natural	0.8
	Footprint	2000	Natural	0.7
	Catalina I.	1996	Natural	0.6
	Footprint	1999	Natural	0.6
	San Nicolas I.	1996	Natural	0.6
Bocaccio (juvenile)	Grace	2000	Bottom	39.6
	Grace	2000	Midwater	13.0
	Santa Cruz I.	2000	Natural	5.6
	14 Mile Bank	2001	Natural	5.1

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Bocaccio (juvenile) (cont.)	Santa Barbara I.	2000	Natural	2.5
	Santa Monica Bay	2001	Natural	2.4
	Gail	2001	Bottom	2.3
	Osborn Bank	2000	Natural	2.3
	12 Mile Reef	2000	Natural	2.0
	Gail	2000	Bottom	1.8
	Footprint	2000	Natural	1.2
	Grace	2001	Platform pipe	0.9
	Reef“A”	1997	Natural	0.9
	Footprint	2000	Natural	0.8
	Hidalgo	2000	Bottom	0.8
	Gail	1997	Bottom	0.7
	Footprint	2000	Natural	0.6
	Grace	2000	Shell Mound	0.6
	Hidalgo	1996	Bottom	0.6
	Hidalgo	2001	Bottom	0.6
Bocaccio (YOY)	Irene	1999	Midwater	166.4
	Irene	1996	Midwater	91.8
	Grace	1999	Bottom	44.9
	Grace	1999	Midwater	24.1
	Irene	1997	Midwater	17.2
	Grace	1999	Shell Mound	15.9
	Hidalgo	1996	Midwater	5.6
	Harvest	1999	Midwater	4.0
	Grace	2001	Midwater	3.0
	Hidden Reef	1999	Natural	2.3
	Irene	1999	Bottom	2.2
	Grace	2001	Midwater	1.5
	Harvest	1999	Midwater	1.3
	Santa Barbara I.	1996	Natural	1.3
	Irene	1997	Bottom	1.2
	Harvest	1997	Midwater	1.1
	Grace	2000	Midwater	1.0
	Hidalgo	1997	Midwater	0.9
	Santa Monica Bay	2001	Natural	0.9
	Hidalgo	2000	Bottom	0.8
Canary rockfish	Irene	2001	Bottom	5.5
	Holly	2001	Bottom	3.4
	Hidalgo	1999	Bottom	1.9
	Holly	2001	Shell Mound	1.7
	Hidalgo	1998	Bottom	1.7
	North Reef	1999	Natural	1.7
	Reef “D”	1999	Natural	1.6
	Hidalgo	1996	Bottom	1.3
	Reef “A”	1999	Natural	1.2
	Irene	1997	Bottom	1.2
	Reef “B”	1997	Natural	1.1
	Hidalgo	1997	Bottom	0.9
	Hidalgo	2001	Bottom	0.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
	Grace	2000	Bottom	0.9
	Holly	1996	Bottom	0.8
	North Reef	2000	Natural	0.7
	Reef “C”	1998	Natural	0.7
	Irene	2001	Shell Mound	0.7
	Reef “A”	1998	Natural	0.5
	Grace	1998	Shell Mound	0.5
Greenblotched rockfish	Gail	1997	Bottom	17.7
	Gail	1999	Bottom	13.7
	Gail	2001	Bottom	11.3
	Hidalgo	2001	Bottom	10.6
	Gail	1996	Bottom	9.7
	Gail	2000	Bottom	9.2
	Gail	1997	Shell Mound	5.9
	Harvest	1999	Bottom	4.6
	Harvest	1998	Bottom	3.8
	Gail	1999	Shell Mound	3.3
	Harvest	1997	Bottom	1.6
	San Miguel I.	1995	Natural	1.4
	Hidalgo	1999	Bottom	1.3
	North Reef	1997	Natural	1.0
	Footprint	2001	Natural	1.0
	Reef “A”	1999	Natural	0.9
	Reef “B”	1997	Natural	0.8
	Hidalgo	2000	Bottom	0.8
	North Reef	2001	Natural	0.7
	Gail	2001	Shell Mound	0.7
Flag rockfish	Hidalgo	1997	Bottom	15.5
	Hidalgo	1996	Bottom	11.0
	Hidalgo	1999	Bottom	7.2
	Grace	1996	Bottom	6.6
	Grace	2001	Bottom	5.7
	Hidalgo	1998	Bottom	5.5
	Hidalgo	2000	Bottom	5.1
	Grace	2000	Bottom	4.4
	Hidalgo	2001	Bottom	3.8
	Holly	2001	Bottom	3.1
	Grace	2001	Bottom	3.1
	Santa Barbara Point	1995	Natural	3.0
	Hermosa	1996	Bottom	2.7
	Grace	1999	Midwater	2.6
	Gail	1999	Midwater	2.5
	Hermosa	2000	Bottom	2.2
	Grace	2001	Shell Mound	2.2
	Santa Rosa Passage	1995	Natural	2.0
	Holly	1998	Shell Mound	1.8
	Holly	2001	Shell Mound	1.7

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Halfbanded rockfish	Hidalgo	2000	Bottom	907.1
	Grace	1997	Bottom	800.5
	Anacapa I.	1999	Natural	703.1
	Irene	1999	Bottom	621.2
	Irene	1998	Bottom	595.9
	Hidalgo	2000	Shell Mound	461.0
	Grace	1999	Shell Mound	415.1
	Hermosa	2000	Shell Mound	406.9
	Grace	2000	Bottom	405.2
	Hermosa	2000	Bottom	398.1
	Grace	1996	Bottom	395.1
	Hermosa	1997	Bottom	381.4
	Grace	1999	Bottom	344.2
	Hidalgo	2001	Bottom	318.4
	Hermosa	1999	Bottom	313.2
	E. End Anacapa I.	1995	Natural	284.9
	Hidalgo	1999	Bottom	275.8
	Grace	2001	Bottom	266.4
	Grace	2001	Shell Mound	259.1
	Grace	2001	Bottom	237.7
Pygmy rockfish	Hidden Reef	1999	Natural	263.7
	San Nicolas I.	1996	Natural	236.9
	Footprint	2001	Natural	125.7
	Cortes Bank	1997	Natural	119.7
	North Reef	2000	Natural	93.8
	Santa Monica Bay	1998	Natural	93.7
	San Miguel I.	1995	Natural	87.3
	Santa Monica Bay	2001	Natural	84.1
	Cortes Bank	1997	Natural	76.7
	Footprint	2000	Natural	72.2
	Santa Cruz I.	2000	Natural	71.9
	Osborn Bank	2000	Natural	71.2
	San Nicolas I.	1996	Natural	64.6
	14 Mile Bank	2001	Natural	64.5
	San Nicolas I.	1996	Natural	64.2
	Santa Rosa I.	1995	Natural	60.6
	Footprint	2000	Natural	54.6
	Reef "D"	1999	Natural	47.0
	Footprint	1999	Natural	42.3
	Santa Monica Bay	2001	Natural	38.3
Pink seaperch	Santa Monica Bay	1998	Natural	304.5
	Grace	1998	Shell Mound	39.2
	Holly	1998	Shell Mound	11.1
	Holly	1999	Bottom	9.1
	Catalina I.	1996	Natural	4.0
	Grace	1997	Shell Mound	2.9
	Grace	1997	Bottom	2.7
	Holly	1996	Bottom	1.8

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Pink seaperch (cont.	Reef "D"	1999	Natural	1.7
	Santa Monica Bay	1997	Natural	1.3
	Holly	1997	Bottom	1.3
	Catalina I.	1996	Natural	1.2
	Holly	1997	Shell Mound	1.2
	Santa Monica Bay	1997	Natural	1.2
	Santa Rosa I.	1995	Natural	1.2
	Grace	2000	Bottom	1.1
	Grace	2001	Platform pipe	1.0
	Reef"A"	1997	Natural	0.9
	Santa Cruz I.	1996	Natural	0.8
	North Reef	1998	Natural	0.8
Yellowtail rockfish (adult)	Reef "B"	1995	Natural	3.9
	San Miguel I.	1995	Natural	3.5
	North Reef	1996	Natural	2.8
	North Reef	1995	Natural	2.1
	Santa Rosa I.	1995	Natural	2.1
	San Miguel I.	1995	Natural	1.9
	San Miguel I.	1995	Natural	1.7
	Reef "D"	1999	Natural	1.6
	North Reef	2000	Natural	1.5
	Reef "A"	2000	Natural	1.0
	San Miguel I.	1995	Natural	0.7
	Reef "A"	1998	Natural	0.7
	Reef "B"	1997	Natural	0.5
	North Reef	1999	Natural	0.5
	Santa Rosa I.	1995	Natural	0.4
	Reef "A"	1997	Natural	0.3
	North Reef	1997	Natural	0.3
	Santa Rosa I.	1995	Natural	0.2
	North Reef	1998	Natural	0.2


LOVELAB UC, SANTA BARBARA

Young-of-the-year rockfish in the platform midwater.

The Ecological Role of Oil and Gas Production Platforms and Natural Outcrops on Fishes in Southern and Central California: A Synthesis of Information

OCS Study MMS 2003-032

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Front Cover: Background, young-of-the-year rockfishes, Platform Grace (Mary Nishimoto). From upper left: Seastars and mussels, midwater, Platform Holly (Dan Dugan); Platform Irene (Linda Snook); juvenile bocaccio, midwater, Platform Gilda (Donna Schroeder); young-of-the-year yellowtail rockfish, Platform Irene (Rick Starr); flag rockfish, Platform Grace (Donna Schroeder); young-of-the-year cowcod, shell mound, Platform Gail (Milton Love); juvenile vermilion rockfish, bottom, Platform Grace (Donna Schroeder).

Back Cover: Kelp rockfish and club anemones, midwater, Platform Holly (Dan Dugan).

Project Cooperation
This research addressed an information need identified by the U. S. Department of the Interior's Minerals Management Service, Pacific OCS Region, Camarillo, California.

Report Availability
Available for viewing and in PDF at:
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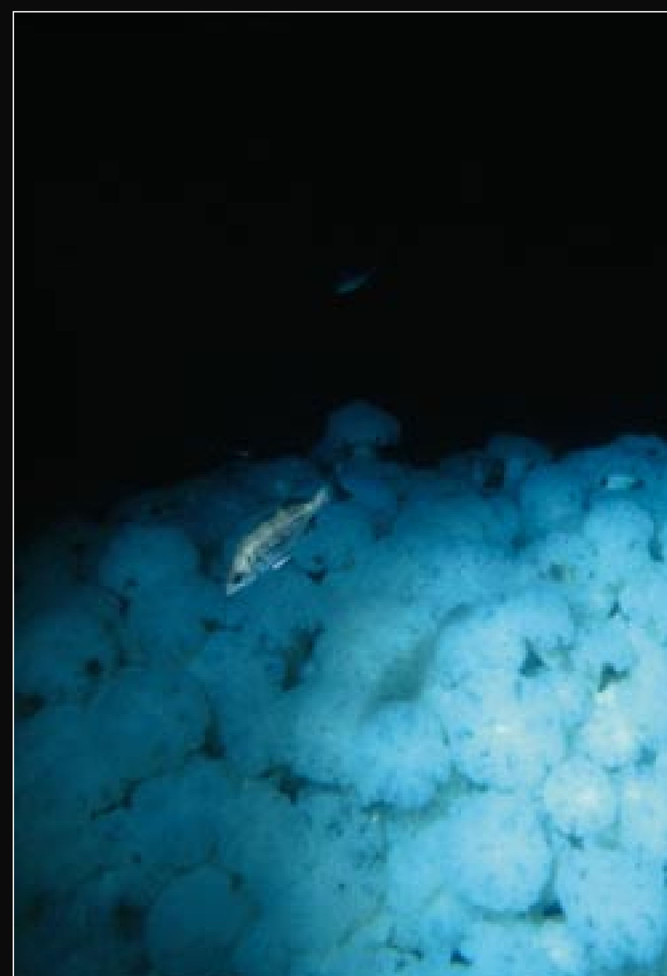
CONTENTS

LINDA SNOOK

Mexican rockfish at bottom of Platform Gail.



EXECUTIVE SUMMARY

Information Needed

Production of oil and gas from offshore platforms has been a continual activity along the California coast since 1958. There are 26 oil and gas platforms off California, 23 in federal waters (greater than 3 miles from shore) and 3 in state waters. The platforms are located between 1.2 to 10.5 miles from shore and at depths ranging from 11 to 363 m (35–1,198 ft.). Crossbeams and diagonal beams occur about every 30 m (100 ft.), from near the surface to the seafloor. The beams extend both around the perimeter of the jacket and reach inside and across the platform. The beams and vertical pilings (forming the jacket) and the conductors on all platforms are very heavily encrusted with invertebrates and provide important habitat for fishes. The seafloor surrounding a platform is littered with mussel shells. This "shell mound" (also called "mussel mound" or "shell hash") is created when living mussels, and other invertebrates, are dislodged and fall to the seafloor during platform cleaning or storms.

Once an industrial decision is made to cease oil and gas production, managers must decide what to do with the structure, a process known as *decommissioning*. Platform decommissioning can take a number of forms, from leaving much, or all, of the structure in place to complete removal. Along with the platform operator, many federal and state agencies are involved in the decommissioning process. All oil and gas platforms have finite economic lives and by the beginning of the twenty-first century, seven platforms in southern California had been decommissioned and a number of others appeared to be nearing the end of their economic lives.

Management decisions regarding the decommissioning of an oil and gas platform are based on both biological and socioeconomic information. This study addressed the need for resource information and better understanding of how offshore oil/gas platforms contributed to the fish populations and fishery productivity in the Santa Maria Basin and Santa Barbara Channel. Prior to our studies, there was almost no biological information on Pacific Coast platform fish assemblages. This necessary research involved broad scale sampling at numerous oil/gas platforms and natural reefs. Research objectives included 1) characterizing the fish assemblages around platforms and natural reefs, 2) examining how oceanography affects patterns of recruitment and community structure of reef fishes, and 3) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types (e. g., platforms and natural outcrops).

Research Summary

Between 1995 and 2001, we studied oil and gas platforms sited over a wide range of bottom depths, ranging between 29 and 224 m (95 and 739 ft.) and sited from north of Point Arguello, central California to off Long Beach, southern California. However, most of the platform research occurred in the Santa Barbara Channel and Santa Maria Basin. The Santa Barbara Channel and Santa Maria Basin are situated in a dynamic marine transition zone between the regional flow patterns of central and southern California. The Santa Barbara Channel is about 100 km long by about 50 km wide (60 x 20 miles) and is bordered on the south by the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). This area is bathed in a complex hydrographic system of currents and water masses. Generally, cool coastal waters from the California Current enter the Santa Barbara Channel through its west entrance at Point Conception. Warm waters from the Southern California Bight flow in the opposite direction into the channel through its eastern entrance. Surface waters are substantially warmer in the Bight than north of Point Conception due to less wind-induced vertical mixing, the solar heating of surface waters, and currents of subtropical waters entering from the south. The convergence of different water masses in the Santa Barbara Channel results in relatively large scale differences in physical parameters (e.g., temperature, salinity, oxygen, and nutrient concentrations) and biotic assemblages (e. g., flora and fauna).

Scuba surveys were conducted at shallow depths and submersible surveys, using the research submarine *Delta*, at greater depths. We also surveyed shallow-water and deeper-water rock outcrops, many in the vicinity of platforms. Nine nearshore, shallow-water rock outcrops, seven on the mainland and two at Anacapa Island, were monitored annually from 1995 to 2000. These natural outcrops are geographically distributed across the Santa Barbara Channel providing opportunities for spatial comparisons. In addition, we surveyed over 80 deeper-water outcrops, in waters between 30 and 360 m (100

Opposite: Juvenile widow rockfish in platform midwater. (Photograph by Lovelab, UC Santa Barbara) and 1,180 ft.) deep, located throughout the Southern California Bight and off Points Conception and Arguello. These sites included a wide range of such habitats as banks, ridges, and carbonate reefs, ranging in size from a few kilometers in length to less than a hectare in area. On these features, we focussed on hard bottom macrohabitats, including kelp beds, boulder and cobble fields, and bedrock outcrops. Most of these deeper-water sites were visited once, a few were surveyed during as many as four years and one outcrop, North Reef, near Platform Hidalgo, was sampled annually.

Most of our oil and gas platform surveys were conducted at nine structures (Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Gilda, Grace, Gina, and Gail) located in the Santa Barbara Channel and Santa Maria Basin. Between 1995 and 2000, we conducted annual surveys on the shallow portions of these nine platforms. The shallowest of the nine platforms, Gina, was surveyed from surface to bottom depths using scuba techniques. Deep-water surveys conducted between 1995 and 2001, using the research submersible, *Delta*, studied the same platforms excluding the bottom of Gilda and all of Gina. In 1998, one submersible survey was conducted around Platform Edith, located off Long Beach. In 2000 partial submersible surveys were completed around Platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat.

Patterns in Shallow-Water Habitats

Regional and local processes influenced patterns of outcrop fish assemblages in shallow waters. At regional spatial scales, outcrop fish abundance patterns often shifted abruptly as oceanographic patterns changed, roughly defining a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. This distinctive spatial pattern was observed in both oil and gas platform and natural outcrop habitats. In shallow waters, there was greater variability in platform species assemblages and population dynamics compared to natural outcrop assemblages, and this was most likely caused by the greater sensitivity of platform habitats to changing oceanographic conditions. Local processes that affected fish distribution and abundance were related to habitat features, where depth, relief height, and presence of giant kelp all played important roles. On platform habitat, we found that the majority of newly settled rockfish juveniles resided at depths greater than 26 m (86 ft.), although there were differences among species.

Characterization of the Deepwater Platform Fish Assemblages

With the exception of the shallow-water Platform Gina, all of the platforms we surveyed were characterized by three distinct fish assemblages: midwater, bottom, and shell mound. Rockfishes, totaling 42 species, dominated these habitats. Fish densities at most platforms were highest in the midwater habitat reflecting the depth preferences of young-of-the-year rockfishes. Young-of-the-year rockfishes represented the most abundant size classes in platform midwaters. Platform midwaters were nursery grounds for rockfishes as well as for a few other species, including cabezon and painted greenling. The young-of-the-year of at least 16 rockfish species inhabited these waters. Settlement success was affected by oceanographic conditions. Densities of young-of-the-year varied greatly between years and platforms. Young-of-the-year rockfish densities often varied by an order of magnitude or greater among survey years and platforms. From 1996 through 1998, rockfish settlement was generally higher around the platforms north of Point Conception as compared to platforms in the Santa Barbara Channel. This finding is reflective of the generally colder, more biologically productive waters in central California during the 1980s and much of the 1990s. Colder waters in 1999 were associated with relatively high levels of rockfish recruitment at all platforms surveyed. In 2000 and 2001, juvenile rockfish recruitment at platforms in the Santa Barbara Channel remained higher than pre-1999 levels, possibly reflecting the oceanographic regime shift to cooler temperatures that may be occurring in southern California.

Subadult and adult rockfishes and several other species dominated the bottom habitats of platforms. The bottom habitat of some platforms is also important nursery habitat as, in some instances, young-of-the-year rockfishes were observed in very large numbers. In general, more than 90% of all the fishes around platform bottoms were rockfishes. Bottom depth strongly influenced the number of species, species diversity, and density of fishes living around platform bases. This is distinctly different than the pattern observed in platform midwaters. The platform base provides habitat for not only fishes but also their prey and predators.

Shell mounds supported a rich and diverse fish assemblage. As at other platform habitats, rockfishes comprised the vast majority of the fishes. The many small sheltering sites created by mussels, anemones, and other invertebrates on the shell mounds created a habitat occupied by small fishes. Many of these fishes were the young-of-the-year and older juveniles of such species as lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod. The adults of these species also inhabited the platform bottom.

Platform versus Reef Fish Assemblages

We compared the species composition of the fish assemblages at Platform Hidalgo and at North Reef, an outcrop located about 1,000 m (3,300 ft.) from the platform. The assemblages were quite similar, both were dominated by rockfishes. In general, the distinctions between the platform and outcrop assemblages were based on differences in species densities, rather than species' presence or absence. Most species were more abundant at Platform Hidalgo. Halfbanded, greenspotted, flag, greenstriped, and canary rockfishes, and all three life stages of lingcod (young-of-the-year, immature, adult) and painted greenling had higher densities around the platform. Five species (pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the outcrop. Young-of-the-year rockfishes were found at both Platform Hidalgo (primarily in the midwaters) and at North Reef. Young-of-the-year rockfish densities were higher at the platform than at the outcrop in each of the five years studied. In several years, their densities were more than 100 times greater at Platform Hidalgo compared to North Reef.

Rockfishes numerically dominated the fish assemblages at almost all of the platform and hard seafloor habitats in our study. Overall species richness was greater at the natural outcrops (94) than at the platforms (85). There was a high degree of overlap in species between platforms and outcrops and differences were primarily due to generally higher densities, of more species, at platforms. In general, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, vermilion rockfishes, bocaccio, cowcod, and widow rockfish young-of-the-year, painted greenling and all life history stages of lingcod were more abundant at platforms than at all or most of the outcrops studied. Yellowtail rockfish and the dwarf species pygmy, squarespot, and swordspine rockfishes were more abundant on natural outcrops.

Findings

Our research demonstrates that some platforms may be important to regional fish production. The higher densities of rockfishes and lingcod at platforms compared to natural outcrops, particularly of larger fishes, support the hypothesis that platforms act as de facto marine refuges. High fishing pressure on most rocky outcrops in central and southern California has led to many habitats almost devoid of large fishes. Fishing pressure around most platforms has been minimal. In some locations, platforms may provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production.

Platforms usually harbored higher densities of young-of-the-year rockfishes than natural outcrops and thus may be functionally more important as nurseries. Platforms may be more optimal habitat for juvenile fishes for several reasons. First, because as structure they physically occupy more of the water column than do most natural outcrops; presettlement juvenile or larval fishes, transported in the midwater, are more likely to encounter these tall structures than the relatively low-lying natural rock outcrops. Second, because there are few large fishes in the midwater habitat, predation on young fishes is probably lower. Third, the offshore position and extreme height of platforms may provide greater delivery rates of planktonic food for young fishes. Most of the natural outcrops we found that had high densities of young-of-the-year rockfishes were similar to platforms as they were very high relief structures that thrust their way well into the water column.

Our research, and reviews of existing literature, strongly implies that platforms, like natural outcrops, both produce and attract fishes, depending on species, site, season, and ocean conditions. Platform fish assemblages around many of the deeper and more offshore platforms probably reflect recruitment of larval and pelagic juvenile fishes from both near and distant maternal sources, not from attraction of juvenile or adult fishes from natural outcrops. Annual tracking observations of strong year classes of both flag rockfish and bocaccio imply that fishes may live their entire benthic lives around a single platform. A pilot study showed that young-of-the-year blue rockfish grew faster at a platform than at a natural outcrop indicating that juvenile fishes at platforms are at least as healthy as those around natural outcrops.

Management Applications

In this report, we discuss the ecological and political issues that surround platform decommissioning in California, including the ecological consequences of the four platform decommissioning alternatives: (1) Complete Removal, (2) Partial Removal and Toppling, and (3) Leave-in-Place.

Complete Removal: In complete removal, operators may haul the platform to shore (for recycling, reuse, or disposal) or it can be towed to another site and reefed.

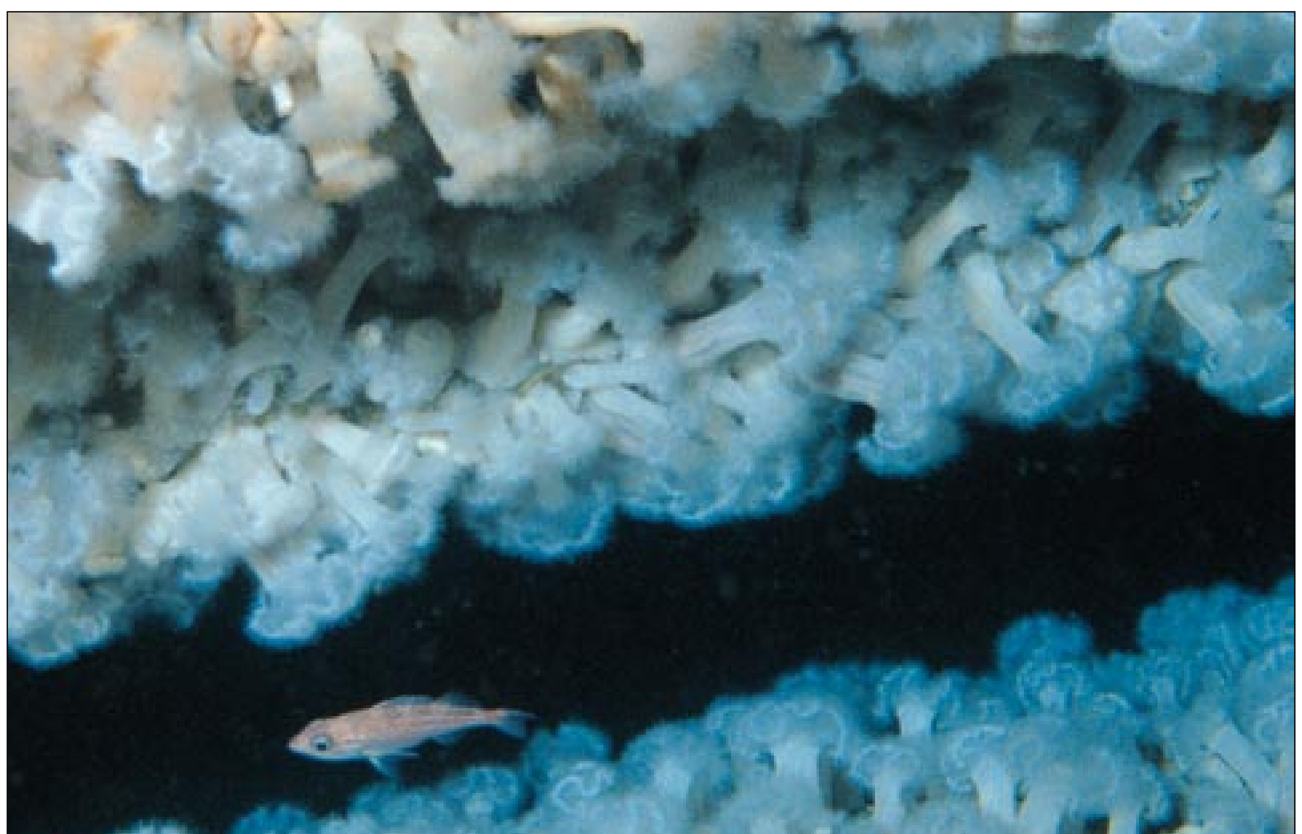
A typical full-removal project begins with well abandonment in which the well bores are filled with cement. The topsides, which contain the crew quarters and the oil and gas processing equipment, are cut from the jacket and removed and the conductors are removed with explosives. Finally, the piles that hold the jacket to the seabed are severed with explosives and the jacket is removed.

Completely removing a platform for disposal on land will kill all attached invertebrates. If some of the platform structure is hauled to a reef area and replaced in the water, some of these animals may survive, depending on water depth and the length of time the structure is exposed to the air. The explosives used to separate the conductor and jacket from the seafloor kill large numbers of fishes. In a study in the Gulf of Mexico, explosives were placed 5 m (15 ft.) below the seafloor to sever the well conductors, platform anchor pilings and support legs, of a platform in about 30 m (100 ft.) of water. All of the fishes on or near the bottom and most of the adult fishes around the entire platform suffered lethal concussions. Marine mammals and sea turtles may also be indirectly killed by damage to the auditory system.

The use of explosives to remove or topple a platform may also complicate fishery-rebuilding programs. Cowcod, a species declared overfished by NOAA Fisheries, provides an example. This species is the subject of a federal rebuilding plan that severely limits catches. In 2001, this was 2.4 metric tons or about 600 fish. Based on our research, there are at least 75 adult cowcod on Platform Gail. If explosives are used to remove Gail, all of these fish will be killed. The loss of at least 75 adult cowcod may be sufficiently large to complicate the rebuilding plan.

Partial Removal and Toppling: Under both partial removal and toppling the topsides are removed. In partial removal, the jacket is severed to a predetermined depth below the surface and the remaining subsurface structure is left standing. In toppling, the conductors and piles are severed with explosives and the jacket is pulled over and allowed to settle to the seafloor. In both partial removal and toppling, conductors need not be completely removed. Retaining conductors would add habitat complexity to a reefed platform.

While the immediate mortality impact to attached invertebrates of partial removal is greater than leaving the platform structure in place, mortality risks to both fishes and invertebrates are much lower than in both toppling and total removal. Partial removal causes fewer deaths than does toppling for two reasons. First, because partial removal does not require explosives (as does toppling), there is relatively little fish, marine mammal, sea turtle, and motile invertebrate (such as crab) mortality. In addition, when a platform is partially removed, vertebrate and invertebrate assemblages associated with the remaining structure are likely to be minimally affected. In contrast, when a platform is toppled, the jacket falls to the seafloor, and, depending on bottom depth, many, if not most of the attached invertebrates die.



MARY NISHIMOTO

*Whitespeckled rockfish and white anemones (*Metridium *sp.).*

Both partial removal and toppling would produce reefs with somewhat different fish assemblages than those around intact platforms. With the shallower parts of the platform gone, it is likely that partial removal would result in fewer nearshore reef fishes, such as seaperches, basses, and damselfishes. However, young-of-the-year rockfishes of many species recruit in large numbers to natural outcrops that have crests in about 30 m (100 ft.) of water or deeper. Thus, it is possible that partial removal would result in little or no reduction in young-of-the-year recruitment for many rockfish species. The pelagic stage of some rockfish species, particularly copper, gopher, black-and-yellow and kelp, may recruit only to the shallowest portions of the platform. For these species, both partial removal and toppling would probably decrease juvenile recruitment, depending on the uppermost depth of the remaining structure. Young-of-the-year rockfishes, which make up the bulk of the fish populations in the platform midwater habitat, would probably be less abundant around a toppled platform compared to a partially removed one. Because most California platforms reside in fairly deep water, toppled platforms might reside at depths below much rockfish juvenile settlement. Thus, toppling might result in lowered species composition and fish density. However, depending on the characteristics of the platform, a toppled structure, with twisted and deformed pilings and beams, might have more benthic complexity than one that is partially removed. This might increase the number of such crevice dwelling fishes as pygmy rockfishes.

It is difficult to catch fishes that live inside the vertically standing platform jacket. Our observations demonstrate that many of the rockfishes living at the platform bottom, such as cowcod, bocaccio, flag, greenspotted, and greenblotched rockfishes, dwell in the crevices formed by the bottom-most crossbeam and the seafloor. To a certain extent, these fishes are protected from fishing gear by the vertical mass of the platform, a safeguard that would persist if the platform were partially removed, particularly if the conductors remained in place. It would be much easier to fish over a toppled platform, as more of the substrate would be exposed to fishing gear.

Coast Guard regulations do not require a minimum depth below the ocean surface to which a decommissioned platform must be reduced. The decision on how much of the jacket and conductors is left in place is based on both a Coast Guard assessment and the willingness of the liability holder to pay for the navigational aids required by the Coast Guard. As mussels become rare below about 30 m (100 ft.) on most platforms, the mistaken assumption that all partially removed platforms must be cut to 24–30 m (80–100 ft.) below the surface has led some to conclude that this will inevitably lead to a severe reduction in the amount of mussels that fall to the bottom and, thus, to a change in or end to, the shell mound community. This is not necessarily the case.

Leave-in-Place: A platform could be left in its original location at the time of decommissioning. The topsides would be stripped of oil and gas processing equipment, cleaned, and navigational aids installed. If a platform were left in place, the effect on platform sea life would be minimal.

Pacific Coast Platforms

In this report we have also included a brief summary of information on all of the Pacific Coast platforms (Appendix 1), densities of all fishes observed at each platform during scuba and submersible surveys (Appendix 2 and Appendix 3, respectively), and a list of the 20 most important sites, both platforms and natural outcrops, for the most abundant species in our deepwater study (Appendix 4).

Research Needs

Our research demonstrates that additional biological information is needed in the decommissioning process. These information needs fall into three categories: (1) A comparison of the ecological performance of fishes living at oil platforms and on natural outcrops, (2) A definition of the spatial distribution of economically important species (of all life history stages) within the region of interest and a definition of the connectivity of habitats within this region, and (3) An understanding of how habitat modification of the platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

Major questions remaining to be addressed include:

What Fishes Live Around Platforms and Nearby Natural Reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been surveyed.

How Does Fish Production around Platforms Compare to that at Natural Outcrops?

It is possible to compare fish production between habitats by examining (1) fish growth rates, (2) mortality rates, and (3) reproductive output. A pilot study compared the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef and another examining young-of-the-year mortality rates is planned. Additional work is needed to determine larval dispersal patterns and differences in densities at various study sites. For example, we now have enough data to study the relative larval production per hectare of cowcod and bocaccio at Platform Gail versus that on natural outcrops.

What Is the Relative Contribution of Platforms in Supplying Hard Substrate and Fishes to the Region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires knowledge of the rocky outcrops in the vicinity of each platform; this is derived from seafloor mapping. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How Long Do Fishes Reside at Oil/Gas Offshore Platforms?

It is unclear how long fishes are resident to platforms. For instance, does the large number of fishes, particularly such species as the overfished bocaccio and cowcod, remain around the platforms for extended periods? Knowledge of the residence time of these species would allow us to more accurately determine if platforms form optimal habitat for these species.

What are the Effects of Platform Retention or Removal on Fish Populations within a Region?

As an example, what effect would platform retention or removal have on young-of-the-year fish recruitment? Would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle to platforms in substantial numbers. If that platform did not exist, would these young fishes have been transported to natural outcrops? Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground.

Similarly, using a synthesis of oceanographic information, it is possible to model the fate of larvae produced by fishes living at a platform.

How Does Habitat Modification of the Platform Environment (e.g., Removal of Upper Portion or Addition of Bottom Structure) Change Associated Assemblages of Marine Life?

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the seafloor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

Chapter 1

INTRODUCTION

Milton S. Love, Donna M. Schroeder, and Mary M. Nishimoto

Goals and Objectives

Production of oil and gas from offshore platforms has been a continual activity along the California coast since 1958. All oil and gas platforms have finite economic lives and at the beginning of the twenty-first century, seven platforms in southern California have been decommissioned and a number of others appear to be nearing the end of their economic lives.

Once an industrial decision is made to cease oil and gas production, managers must decide what to do with the structure, a process known as *decommissioning*. Platform decommissioning can take a number of forms, from leaving much, or all, of the structure in place to complete removal (see Chapter 4, page 4-1). Along with the corporation that owns the platform, federal agencies that are involved in the decommissioning process include the Minerals Management Service (for Outer Continental Shelf platforms), U. S. Coast Guard, U. S. Army Corps of Engineers, National Marine Fisheries Service, U. S. Environmental Protection Agency, U. S. Occupational Safety & Health Administration. California State agencies include the California State Lands Commission (for platforms in State waters), California Regional Water Quality Control Districts (for platforms in State waters), California Coastal Commission, and California Fish and Game Commission. At the local level the County Air Pollution Control Districts and agencies such as the County Energy Division would also play a role.

Off California, three platforms, Harry (in 1974), Helen (in 1978), and Herman (in 1978) were decommissioned through complete removal without a great deal of controversy. Public debate arose over decommissioning of platforms Hilda, Hazel, Hope, and Heidi when a recreational angler's group, desiring to continue fishing on these structures, began to lobby for their retention. Ultimately, the four platforms were removed in 1996. It appears certain that future decommissioning of California platforms will be controversial because of conflicting desires regarding the fate of platforms on the part of various marine stakeholders (see Chapter 4, page 4-1).

Since 1995, our group, first funded by the Biological Resources Division of the U. S. Geological Survey, the Minerals Management Service and most recently by the California Artificial Reef Enhancement Program, has conducted research on the fishes that live around the platforms and on natural rock outcrops. Our goals have been to determine the patterns of fish assemblages around both platforms and outcrops and to identify the processes that may have generated these patterns. In addition, we are attempting to understand the linkages between habitats among different fish life history stages.

Previous Research

Decommissioning decisions in California will have a biological as well as socioeconomic and cultural component. Therefore, it is timely to summarize what is known about the biology and ecology of the fauna of these structures. Our emphasis has been on the fish assemblages.

Our research on platforms and outcrops occurred between 1995 and 2001. Before our research began, only a few fish surveys had been conducted around California platforms. Most of this work was conducted around platforms Hilda and Hazel, two shallow-water platforms off Summerland, just below Santa Barbara (Carlisle et al. 1964; Allen and Moore 1976; Bascom et al. 1976). Both of these structures were removed in 1996. Carlisle et al. (1964) found an average of about 6,000 fish under each platform. Allen and Moore (1976) estimated an average of about 20,000 fishes, occasionally reaching at least 30,000. Rockfishes, particularly young-of-the-year fishes, and sea perches dominated the assemblages, kelp and barred sand bass were also abundant. Large numbers of young bocaccio and widow rockfish living around platforms A, B, and C in the Santa Barbara Channel were tagged by the California Department of Fish and Game (Hartmann 1987). Six bocaccio were recovered as adults. All had traveled to natural outcrops, one 148 km (94 miles) away from the platforms. Love and Westphal (1990) compared fishes captured around oil platforms and at two nearby natural outcrops in the Santa Barbara Channel. Rockfishes were the most commonly taken species. Young rockfishes were most abundant at the platforms, rockfishes on natural outcrops tended to be older. A pilot survey of fishes, using a remotely operated vehicle at Platform Hidalgo and nearby natural outcrops (Love et al. 1994), identified large numbers of young rockfishes at the platform and few at natural outcrops. Benthic rockfishes were more abundant at natural outcrops.

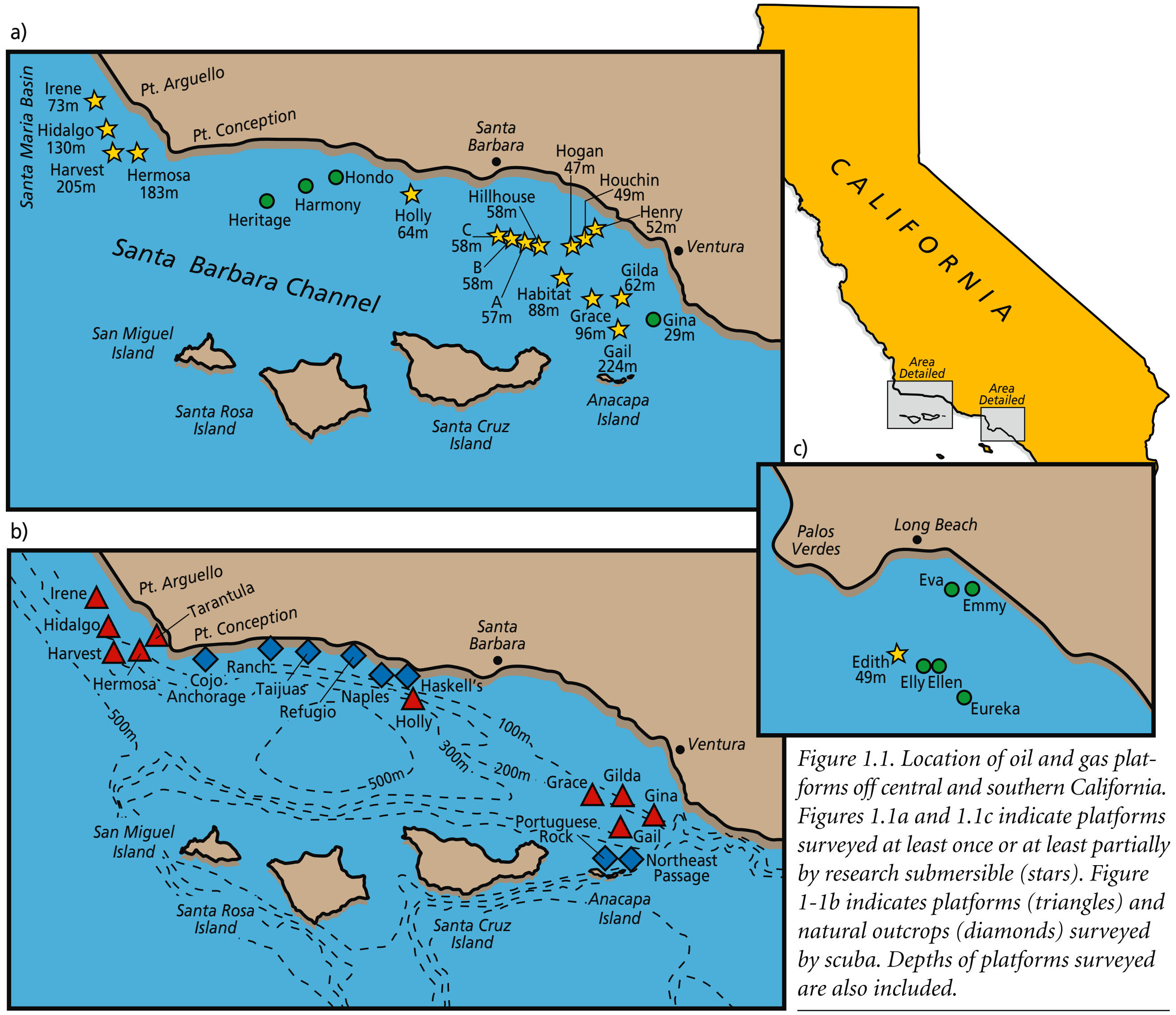


Figure 1.1. Location of oil and gas platforms off central and southern California. Figures 1.1a and 1.1c indicate platforms surveyed at least once or at least partially by research submersible (stars). Figure 1-1b indicates platforms (triangles) and natural outcrops (diamonds) surveyed by scuba. Depths of platforms surveyed are also included.

Our current research began in 1995, preliminary data is found in Love et al. (1999, 2000, 2001) and Schroeder et al. (1999) and we have incorporated that information into this report.

Study Area

Platforms

There are 26 oil and gas platforms off California, 23 in federal waters (greater than 3 miles from shore) and 3 in state waters (Figures 1.1a, b, and c). The platforms are located between 1.2 to 10.5 miles from shore and at depths ranging from 11 to 363 m (35–1,198 ft.). Information regarding location, depth, and other physical features of California's offshore platforms are described in Appendix 1.

All California platforms are similar in design (Figure 1.2); they primarily vary in size. The above-water structures, including oil and gas processing equipment and crew living and working quarters are termed the *topside* (also *topside facilities* and *deck*). The vertical pipes that carry the oil and gas are the *conductors*. The parts of the structure that are embedded in the bottom and protrude through the surface to support the topside structural components form the *jacket* that includes the crossbeams, legs, and the piles inside the legs. In general, the jackets of California platforms are made of carbon steel and the topsides are composed of steel plate and other structural steel components. Platforms also contain a relatively small amount of cement.

Crossbeams and diagonal beams occur about every 30 m (100 ft.), from near the surface to the seafloor. The beams extend both around the perimeter of the jacket and reach inside and across the platform. This web work of cross beams provides a great deal of habitat for both invertebrates

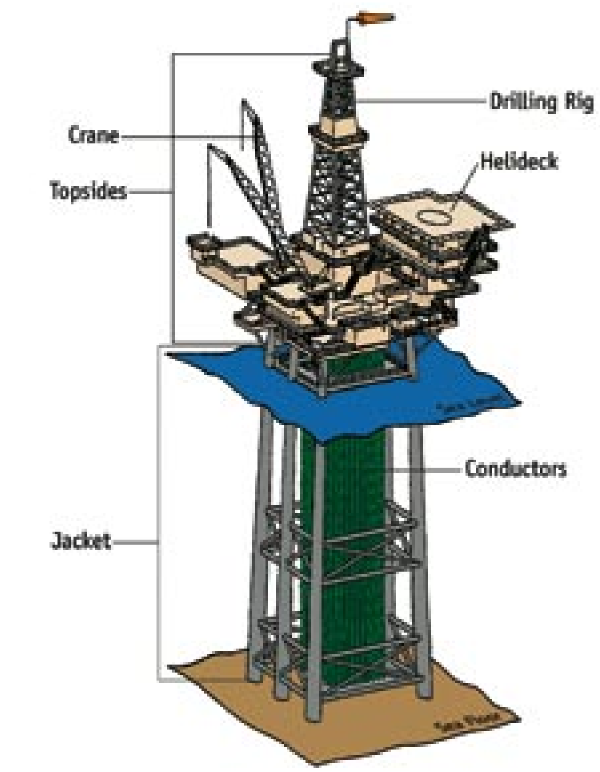


Figure 1.2. A typical oil/gas platform off southern California. Adapted from Manago and Williamson (1998).

and fishes. All of the platforms we studied have a crossbeam on the seafloor, although portions of the beam may be either buried in sediment or undercut by currents.

The seafloor surrounding a platform is littered with mussel shells. This "shell mound" (also called "mussel mound" or "shell hash") is created when living mussels, and other invertebrates, are dislodged during platform cleaning or storms. We observed shell mounds under and around all of the platforms we surveyed. Only a few of the more shallow shell mounds (around platforms Gina, Grace, Henry, and Houchin) have been accurately mapped (Sea Surveyor Inc. 2003). These mounds ranged from 4–6 m (13–19 ft.) high and were either oval or round in shape. Dimensions of these four mounds were: Gina, oval, 45 x 64 m (150 x 210 ft.); Grace, oval, 61 x 118 m (200 x 390 ft.); Henry, round, 76 m (250 ft.) in diameter; Houchin, round, 85 m (280 ft.) in diameter. Current patterns, rate of shell deposition, and age of platform all play a role in the size of shell mounds.

Rock Outcrops

An objective of our research was to compare fish assemblages and fish productivity at platforms and natural outcrops in central and southern California. Understanding spatial variability and trends in fish populations at these sites is important as it aids in understanding the regional importance of platforms as fish habitat. These sites included a wide range of such mesohabitats as banks, ridges, and carbonate buildups, ranging in size from a few kilometers in length to less than a hectare in area. On these features, we focussed on hard bottom macrohabitats, including kelp beds, boulder and cobble fields, and bedrock outcrops following standard, statistically based sampling methods and techniques.

Physical Oceanography and Biogeography of the Platform Study Area

General Description

The study area includes the Santa Barbara Channel and Santa Maria Basin (Figure 1.1). These oceanographic bodies are situated in a dynamic marine transition zone between the regional flow patterns of central and southern California. The Santa Barbara Channel is about 100 km long by about 50 km wide (60 x 20 miles) and is bordered on the south by the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). Within the Santa

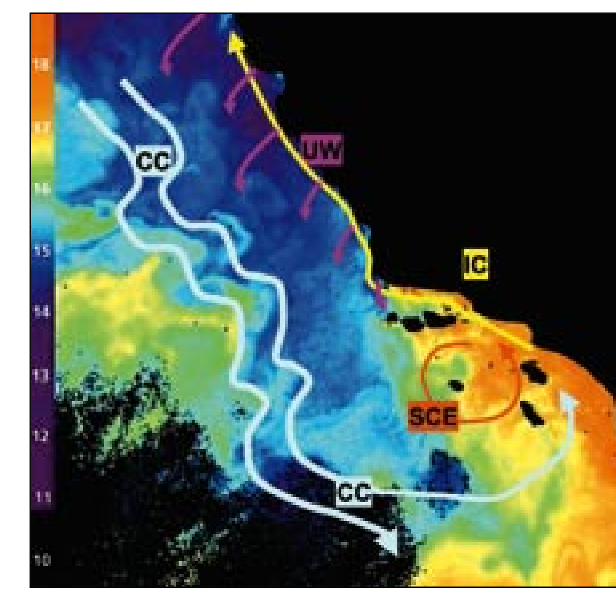


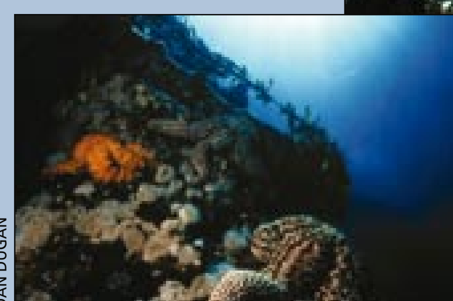
Figure 1.3. Satellite image of sea surface temperature (SST) and a diagram of the large-scale current patterns off the central and southern California coast. This image shows the predominant, large-scale SST pattern along with smaller scale features such as eddies and fronts (temperature scale, degrees Celsius). The generalized flow of the California Current (CC), the Inshore Countercurrent (IC), and Southern California Eddy (SCE) overlay the SST image. Plumes of cold, nutrient-rich, upwelled water (represented by dark blue and purple) originate near the coast and are directed offshore (magenta arrows).

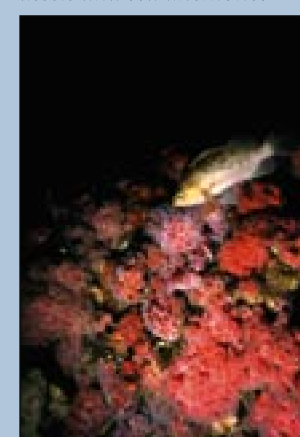
The invertebrate communities of the jacket, conductors and shell mounds


DAN DUGAN
Rock crab

The jackets and conductors of all platforms are very heavily encrusted with invertebrates. Depth zonation of the invertebrate community is evident. An extremely thick layer of mussels extends from the intertidal zone to depths of at least 30 m (100 ft) (and to at least 44 m, 145 ft., on some platforms). Both *Mytilus galloprovincialis* and *M. californianus* occur in these upper depths, although *M. galloprovincialis* is more common in the shallower portions of this zone (J. Dugan, personal communication). Although mussels dominate this habitat, other invertebrate taxa are abundant in this upper layer. Common inhabitants include barnacles, seastars (primarily *Pisaster giganteus*), rock scallops (*Crassadoma gigantea*), rock oysters and jingle shells (*Chama arcana* and *Pododesmus cepio*), sea anemones (*Anthopleura xanthogrammica*, *Metridium* sp.), caprellid amphipods, rock crabs (*Cancer antennarius*), limpets (including *Lottia gigantea*, *Lottia* sp., *Tectura* spp., and *Acmaea mitra*), gooseneck barnacles (*Pollicipes polymerus*), and sessile tunicates. With greater depth, the diverse mussel community wanes and tends to be replaced by a blanket of club anemones (*Corynactis californicus*). At greater depths yet, white anemones (*Metridium* sp.) and sponges begin to dominate these platform structures. These organisms, along with crabs (*Munida* sp.) and sea stars, characterize the deepest parts of the deepwater platforms we surveyed (J. Dugan, personal communication; M. Love, unpublished observations).


DAN DUGAN
Mussels and sea anemones

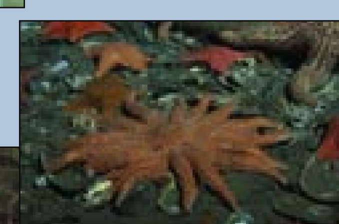

DAN DUGAN
Mussels and sea stars

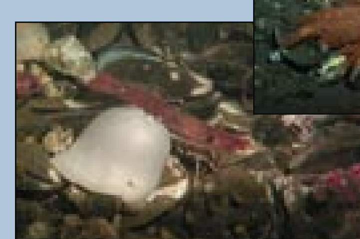

DAN DUGAN
Club anemone and kelp rockfish


LOVELAB
Metridium sp. and galatheid crab


MILTON LOVE
Metridium sp.

Our observations indicate that, depending on bottom depth, a number of invertebrate species are abundant on the shell mounds. Common mound species include three species of seastars (*Pisaster brevispinus, P. giganteus,* and *P. ochraceus*), sunstars (*Pycnopodia helianthoides, Rathbunaster* sp.), bat stars (*Asterina miniata*), brittle stars, rock crabs (*Cancer anthonyi*, *C. antennarius,* and *C. productus*), king crabs (*Paralithodes rathbuni*), opisthobranchs (*Pleurobranchaea californica*), spot prawns (*Pandalus platyceros*), octopi (*Octopus* spp.), and sea anemones (*Metridium* sp.) (M. Love, unpublished observations).


DONNA SCHROEDER
Rathbunaster *sp.*


LOVELAB
Spot prawn

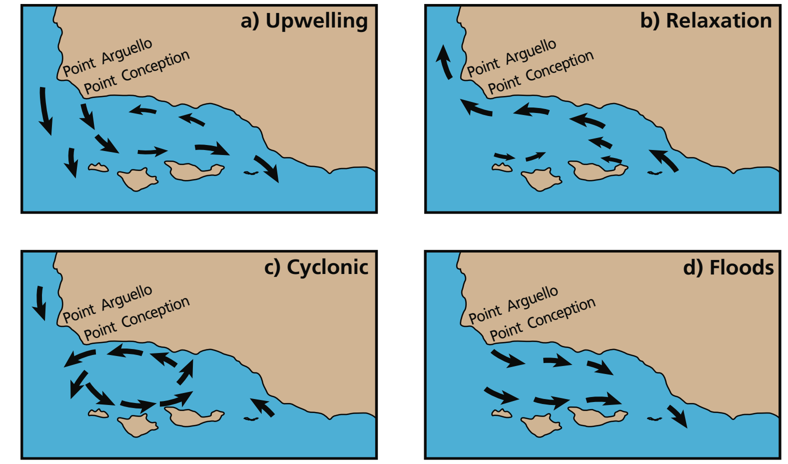


Figure 1.4. Generalized circulation patterns in the Santa Barbara Channel. (a) Upwelling; (b) Relaxation; (c) Cyclonic; (d) Flood east (shown) or west. Westward propagating train of cyclonic and anticyclonic eddies have also been observed (not shown). Adapted from Harms and Winant (1998).

Barbara Channel is a basin that is about 500 m (1,650 ft.) deep. The predominant large-scale patterns of sea surface temperature distributions off California and smaller scale, but persistent, features such as eddies, fronts (strong temperature gradients), and plumes of cold, upwelled water that extend offshore from coastal headlands are depicted in Figure 1.3. The coastal current patterns are embedded in the complex California Current System (CCS) that extends from the Strait of Juan de Fuca at the Canada-US border to the tip of Baja California, Mexico (Hickey 1998). A generalized scheme of the CCS is presented in Figure 1.3. Waters off northern and central California are typically cool because of the southerly flowing California Current offshore the continental shelf and upwelling events generated over the shelf. Upwelling, which is most intense during the spring and summer, is generated by winds that blow toward the south along the coast. Cool coastal waters enter the Santa Barbara Channel through its west entrance at Point Conception. Warm waters from the Southern California Bight flow in the opposite direction into the channel through its eastern entrance. The geographic orientation of the Southern California Bight shelters it from the winds that generate upwelling. Surface waters are substantially warmer in the Bight than north of Point Conception due to less wind-induced vertical mixing, the solar heating of surface waters, and currents of subtropical waters entering from the south (Lynn and Simpson 1987). The convergence of different water masses in the Santa Barbara Channel results in relatively large scale differences in physical parameters (e.g., temperature, salinity, oxygen, and nutrient concentrations) and biotic assemblages (e. g., flora and fauna).

Circulation in the Santa Barbara Channel is complex and highly variable (Hendershott and Winant 1996; Harms and Winant 1998; Winant et al. 1999). Santa Barbara Channel circulation typically is characterized by westward flow along the northern boundary of the Channel and eastward flow along its southern boundary (Figure 1.4). The relative strength of these opposing flows varies on scales of days to weeks and seasonally. Two opposing forces drive channel circulation: a wind gradient that is strongest in the west and a pressure gradient that is caused by higher water temperatures in the east. When these forces are balanced, a singular cyclonic (counter-clockwise rotating) eddy forms in the western channel over its central basin. Cyclonic circulation is observed to be the strongest in the summer and weakest in the winter. Unidirectional currents toward the east or west throughout the Santa Barbara Channel occur predominantly in the winter and tend to be short in duration. Throughout the year, smaller cyclonic and anticyclonic eddies, fronts, and jets are common in the Santa Barbara Channel and may be ephemeral or persistent for days to weeks. Circulation within this channel at any particular time is affected by a tendency for cyclonic flow and by the variability in the alongshelf currents that are of a scale larger than the channel.

The complex flow patterns and ocean conditions within the Santa Barbara Channel are affected by larger-scale oceanographic and atmospheric processes associated with intra-annual (e.g., storms and seasonal patterns) and inter-annual (e.g., El Niño and La Niña events) variability and interdecadal climate regime shifts. These events are teleconnected to tropical Pacific and Pacific basin-wide atmospheric phenomena. Oceanographic conditions within the Santa Barbara Channel and along the California coast at-large changed dramatically between 1997 and 1999. Strong, warm-water El Niño conditions began late in the summer of 1997 and continued into the summer of 1998. Cool-water La Niña conditions manifested in early 1999 (Lynn et al. 1998; Hayward et al. 1999). El Niño events are linked to delayed and reduced phytoplankton productivity, reduced zooplankton biomass, reduced growth and reproduction of coastal fishes, and increased mortality during their planktonic larval phase (Lenarz et al. 1995; McGowan et al. 1998; Kahru and Mitchell 2000). Our findings indicate that fish populations responded rapidly to the shift from El Niño to La Niña conditions along the coast.

Superimposed on the inter-annual variability, which include the El Niño and La Niña anomalies, are climate-ocean changes that occur throughout the entire North Pacific Basin on decadal scales. A well documented climatic shift occurred rapidly during 1976 to 1977. It was marked by abrupt changes in sea surface temperature patterns and the circulation of a predominant atmospheric feature of the northeast Pacific known as the Aleutian Low. Since that time in the northeast Pacific, macrozooplankton biomass and a number of nearshore fish stocks in the California Current system have declined (Roemmich and McGowan 1995). In 1999, a number of physical and biological changes in the northeast Pacific indicated another shift from a warm to cool regime (Bograd et al. 2000). Recruitment of young-of-the-year rockfishes to platforms in the Santa Barbara Channel was exceptionally high in 1999. The permanence of this shift to cool conditions is uncertain.

Small-Scale Oceanographic Variability within the Santa Barbara Channel

Interesting patterns of fish abundance are related to the complexity and dynamics of the hydrography and circulation within the Santa Barbara Channel. Certain aspects of our research are focussed on the biological significance of fronts and eddies to the transport and survival of early juvenile stages of marine fishes. Typically, these features are generated by local-scale interactions of wind, opposing water mass currents, and tides. This is especially true where the coastline is characterized by irregular topography and bathymetry, as is the case in the Santa Barbara Channel and the Southern California Bight (Owens 1980) (Figure 1.1). As mentioned, fronts and eddies affect how fishes are pelagically distributed in the region and may ultimately affect the timing and location of young-of-the-year settlement. For example, we sampled high densities of pelagic juvenile fishes within an eddy in the Santa Barbara Channel. The location of the eddy was determined by analysis of surface current maps generated from remote-sensing radar (Nishimoto and Washburn 2002). Furthermore, we have discovered that sea surface temperature fronts can be used to identify boundaries that separate reef habitat with high and low levels of juvenile rockfish settlement (Love, Nishimoto, Schroeder, and Caselle 1999). Mesoscale features that are visible in sea surface temperature images and surface current maps potentially can be used along with other oceanographic data to identify areas where benthic recruitment is likely.

The Santa Barbara Channel as a biological transition zone

Marine organisms from distinctively different northern and southern biogeographic communities occur in the Santa Barbara Channel as resident populations or as seasonal or occasional visitors making this a rich, biological transition zone (Horn and Allen 1978). A few examples of warm-temperate and subtropical fishes that are more common in southern California (defined as south of Point Conception) than in central California and that we have observed at platforms in the Santa Barbara Channel are Mexican rockfish, kelp bass, yellowtail, and Pacific barracuda. Examples of cool-temperate fishes that have distributions centered from central California to the Pacific Northwest and may occur at platforms include cabezon, kelp greenling, lingcod, and many rockfishes (e.g., blue, canary, widow, and yelloweye).

Methods

A major research objective of this project was to describe and compare the spatial and temporal patterns of fish assemblages around platforms and natural rock outcrops. Between 1995 and 2001, we surveyed platforms sited over a wide range of bottom depths, ranging between 29 and 224 m (95 and 739 ft.) and sited from north of Point Arguello to off Long Beach. We also surveyed shallow-water and deep-water rock outcrops, many in the vicinity of platforms. Scuba surveys were conducted at shallow depths (< 36 m, 119 ft.), and submersible surveys at deeper depths.

Most of our platform surveys were conducted at nine structures (Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Gilda, Grace, Gina, and Gail) located in the Santa Barbara Channel and Santa Maria Basin (Figure 1.1). Between 1995 and 2000, we conducted scuba surveys on the shallow portions of these nine platforms (Figure 1.1b). The shallowest of the nine platforms, Gina, was surveyed from top to bottom using scuba. Deeper-water surveys between 1995 and 2001, using a research submersible, surveyed the same platforms excluding the bottom of Gilda and all of Gina (Figure 1.1a). In 1998, we made one submersible survey around Platform Edith, located off Long Beach (Figure 1.1c) and in 2000 we made partial submersible surveys around platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat (Figure 1.1a). Poor

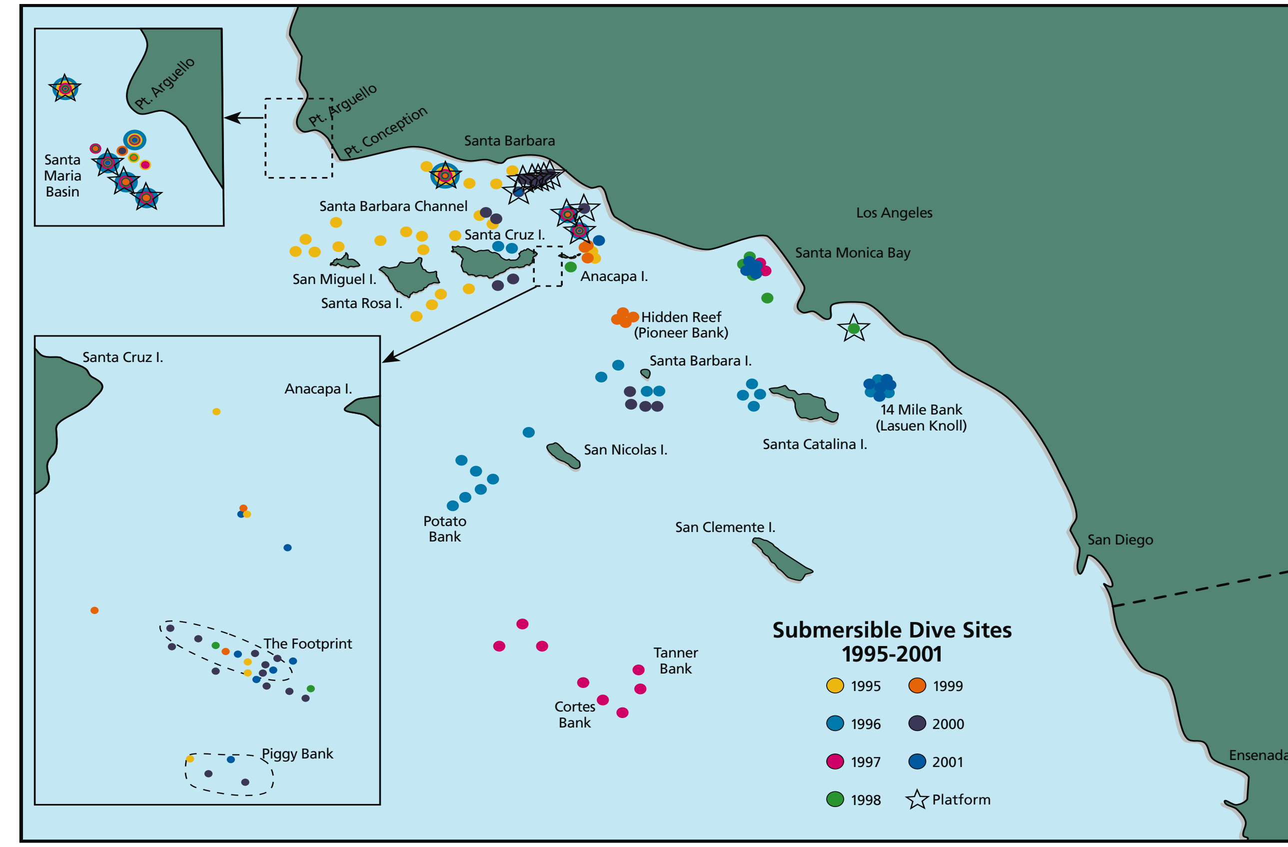


Figure 1.5. Platform and natural outcrops surveyed by Delta submersible, 1995–2001. Concentric rings denote sites surveyed in more than one year. Stars indicate platforms. See Figure 1.1 for names of platforms.

water visibility prevented us from completing the surveys around the latter eight structures. Appendix 1 lists all of the platforms and includes their dimensions, depths, locations, and the years these structures were surveyed.

Nine nearshore, shallow-water rock outcrops, seven on the mainland and two at Anacapa Island were surveyed from 1995 to 2000 by scuba (Figure 1.1b). These surveyed natural outcrops are distributed across the Santa Barbara Channel region and are exposed to water masses similar to that of the surveyed oil platforms. In addition, we surveyed over 80 deeper-water outcrops, in waters between 30 and 360 m (100 and 1,180 ft.) deep (Figure 1.5). Most of these deeper-water sites were visited once, a few were surveyed during as many as four years and one outcrop, North Reef near Platform Hidalgo, was sampled annually.

Shallow Portions of Platforms and Nearshore Natural Outcrops

Scuba surveys estimated density (individuals per hectare), mean size (total length), and species composition of reef fishes in shallow portions of platforms (0–36 m, 0–119 ft. depth) and natural outcrops (6–20 m, 20–66 ft.) (Figure 1.6). Typically, we performed three surveys from July to November of each year during 1995 to 2000, although some platforms were sampled less frequently. Fish enumeration methods consisted of fish counts and fish size estimates using both visual and underwater videography methods. Visual surveys recorded fish density and size (total lengths) using underwater plastic sheets and slates. All divers performing visual counts had received training in size estimation. Additional size estimates were obtained using a Hi-8 mm video camera and laser calibration system. The visual estimates of size and relative abundance were used first in data analyses and video size data were occasionally used to supplement visual estimates.

In each platform survey, scuba divers recorded observations while swimming a pattern which incorporated all four corner legs and the major horizontal crossbeams and portions underneath the platform jacket at three different depths (Level 1 range 6–10 m, 20–33 ft.; Level 2 range 12–21m, 40–70 ft.; Level 3 range 25–36 m, 83–119 ft.) (Figure 1.7). Natural reef surveys consisted of diver observations

Figure 1.6. A scuba diver surveys fishes around Platform Gina.

collected along four haphazardly placed 30 m length x 2 m width x 2 m (100 x 7 x 7 ft.) height belt transects, two transects each at approximately 7 m (23 ft.) and 14 m (46 ft.) bottom depths corresponding to the inshore and offshore portions of the reef. Each transect included sampling of three strata: surface, midwater, and bottom portions of the water column, one above the other. Habitat measures using a random point count method (2 points/m) were taken along the same transects for characterization of physical and biological attributes. Quantified habitat features included relief height (0 to 0.1 m, 0.1 to 1 m, 1 to 2 m, and > 2 m), substrate type (sand/mud, cobble, and rock), and percent cover of sessile invertebrates and fleshy algae. We also measured the percent cover of surface canopy of giant kelp, *Macrocystis pyrifera*, and stipe density of large kelps, especially *M. pyrifera*, *Pterygophora californica*, and *Eisenia arborea*, along the transects.

Deeper Portions of Platforms and Deeper Natural Outcrops

Below scuba depths, we surveyed fish assemblages using the *Delta* submersible, a 4.6 m, 2-person vessel, operated by Delta Oceanographics of Oxnard, California (Figure 1.8). Aboard the *Delta,* we conducted belt transects about two meters from the substrata, while the submarine maintained a speed of about 0.5 knots. At the platforms, transects were made around the bottom of the platform and around each set of cross beams to a minimum depth of 20–30 m (66–100 ft.) below the surface (e. g., midwater habitat). The belt transect was also used to sample the shell mounds and natural rock outcrops. The shell mounds and outcrops were sample in consistently the same fashion as the platform method described above.

Submersible surveys were conducted during daylight hours between one hour after sunrise and two hours before sunset. During each transect, observations were taken from one viewing port on the starboard side of the submersible. An externally mounted Hi-8 mm video camera with associated lights filmed the same viewing fields as seen by the observer. The observer identified, counted, and estimated the lengths of all fishes and verbally recorded those data on the video. All fishes within 2 m (7 ft.) of the submarine were counted. Densities were calculated as fish per 100 m^2. Fish lengths were estimated using a pair of parallel lasers mounted on either side of the external video camera. The projected reference points were 20 cm (8 in.) apart and were visible both to the observer and the video camera. An environmental monitoring system aboard the submarine continuously recorded date, time, depth, and altitude of the vessel above the seafloor. The environmental data was overlaid on the original videotape upon completion of each survey.

Transect videos were reviewed aboard the research vessel or in the laboratory. Field observations were transcribed into a database. For each fish, we recorded the following

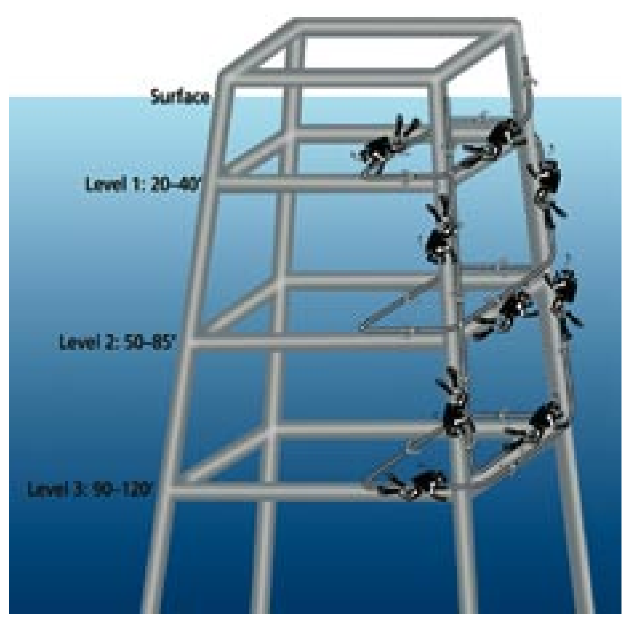


Figure 1.7. A schematic illustration of the diver platform surveys.

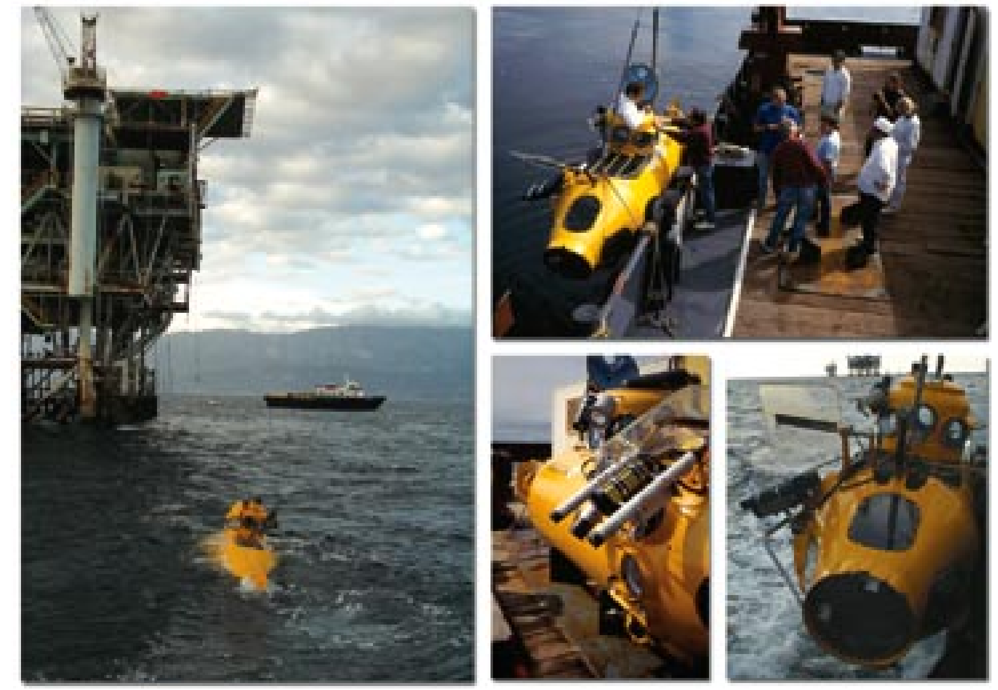


Figure 1.8. The research submersible Delta. Delta *is a 2-person untethered vehicle.*

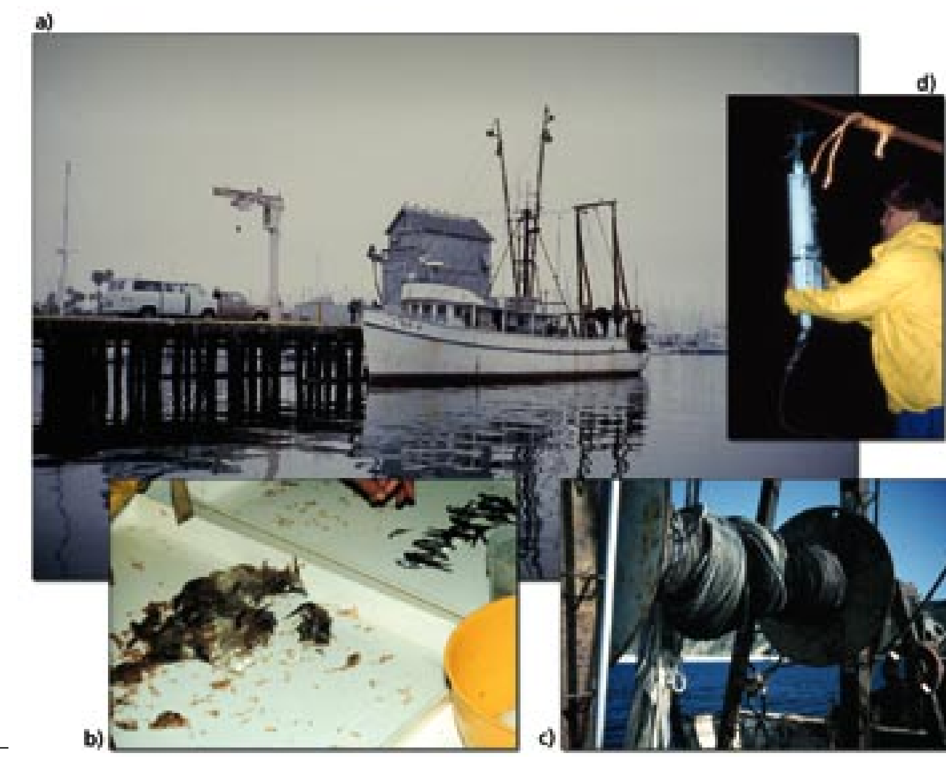


Figure 1.9. Annual midwater trawling and oceanographic surveys, 1995–2000. (a) F/V Gus-D *was chartered for research; (b) pelagic juvenile rockfish and other small fishes were sorted from the catch that included euphausiids and various jellies; (c) modified Cobb trawl rolled around spool; (d) deployment of conductivity-temperature-depth profiler.*

information: (1) species (if known); (2) estimated total length; (3) the habitat it occupied (e.g., rock, sand, mud, cobble, boulder); (4) its position relative to the substrate (e. g., in crevice, on reef crest, on slope, above structure); and (5) the distance of the fish from that substrate.

Midwater Trawling and Oceanographic Surveys

Recruitment, the settlement to a benthic habitat of pelagic juveniles or larvae, is an important process influencing the fish assemblages found on platforms and natural outcrops. To better understand spatial and temporal patterns of recruitment and sources of recruitment variability, we conducted annual midwater trawling and oceanographic surveys in the vicinity of the Santa Barbara Channel and Santa Maria Basin. Our goal was to describe how regional patterns of circulation and distribution of hydrographic features (such as fronts and eddies) influenced the distribution and relative abundance of pelagic juvenile fishes. Our focus on this life stage would allow emphasis on settlement and delineation of nursery habitats, including both platforms and natural outcrops.

Annual midwater trawling and oceanographic surveys were conducted from 1995 through 2000. Sampling was conducted during June to coincide with the time when the most juveniles of the early spring spawning rockfishes would be present in the water column. A modified anchovy trawl with a codend of 9 mm mesh was used to collect samples at depths between 20 m and 55 m (66–182 ft.) below the surface (Figure 1.9). Towing speed was about 2 knots, and trawling time was 15 minutes at the targeted depth. All fishing was conducted at night to minimize net avoidance. Fishes were identified to species if possible and measured in the laboratory. The shipboard surveys included vertical profiling of water properties at all trawling stations so that we could associate patterns of fish abundance with local hydrographic conditions. Salinity, potential temperature, and potential density anomaly, and dynamic height were derived from the data collected using a conductivity-temperature-depth (CTD) profiler (SBE-19, SeaBird Electronics). The CTD was lowered to 200 m (660 ft.) or to about 10 m (33 ft.) above the bottom at shallower stations. Daily satellite imagery, hourly sea surface current maps, and underway sea surface temperature observations were used to direct sampling when it was based on the location of surface circulation features such as fronts and eddies. The specific objective of each survey differed from year to year, see Love et al. (1997, 1999, 2001), Nishimoto (2000), and Nishimoto and Washburn (2002) for details. Surveys were conducted throughout the Santa Barbara Channel, in adjacent waters outside of the channel, and around the Northern Channel Islands (Figure 1.10).

DAN DUGAN

Black-and-Yellow rockfish at Platform Holly.

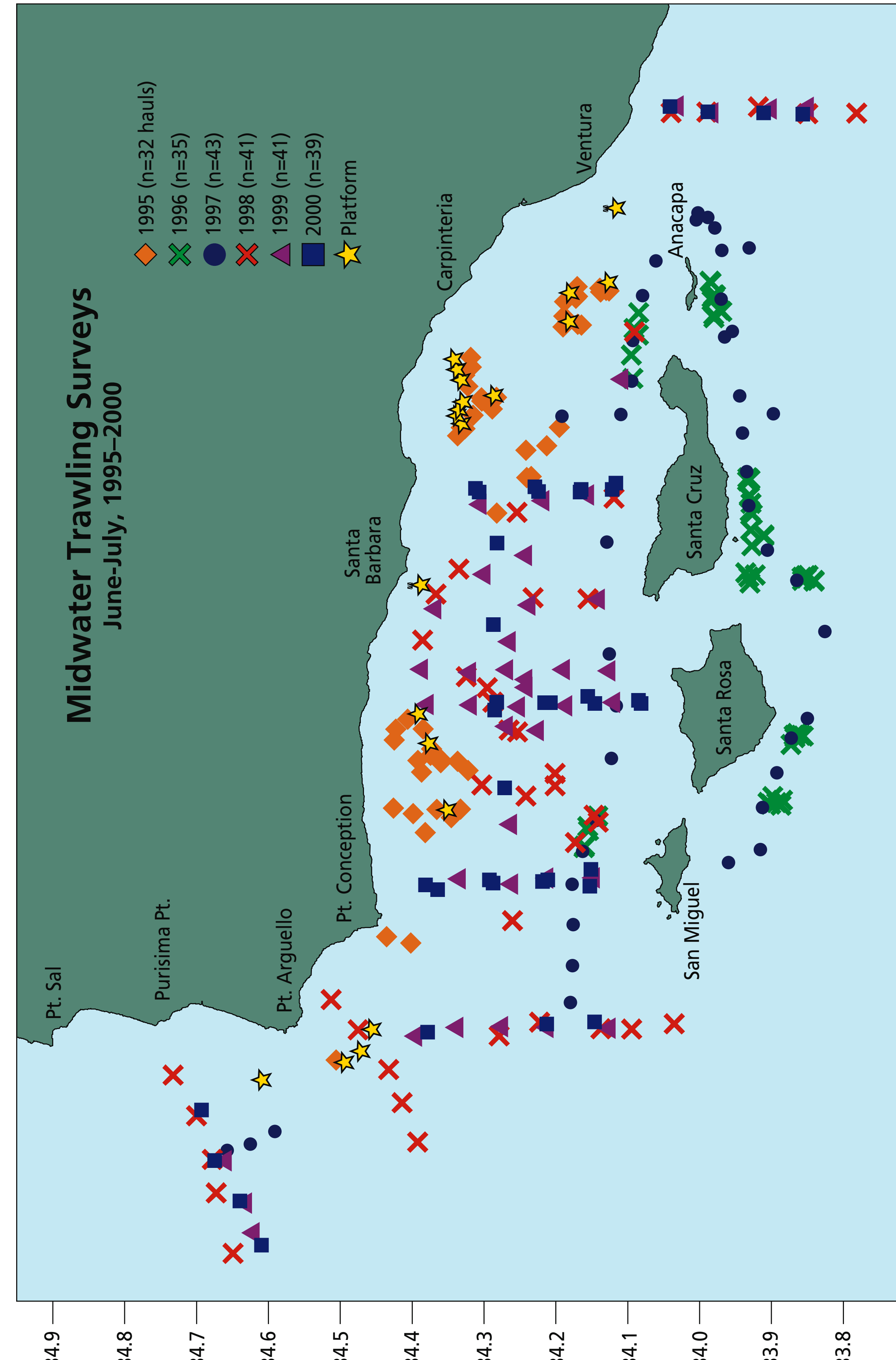
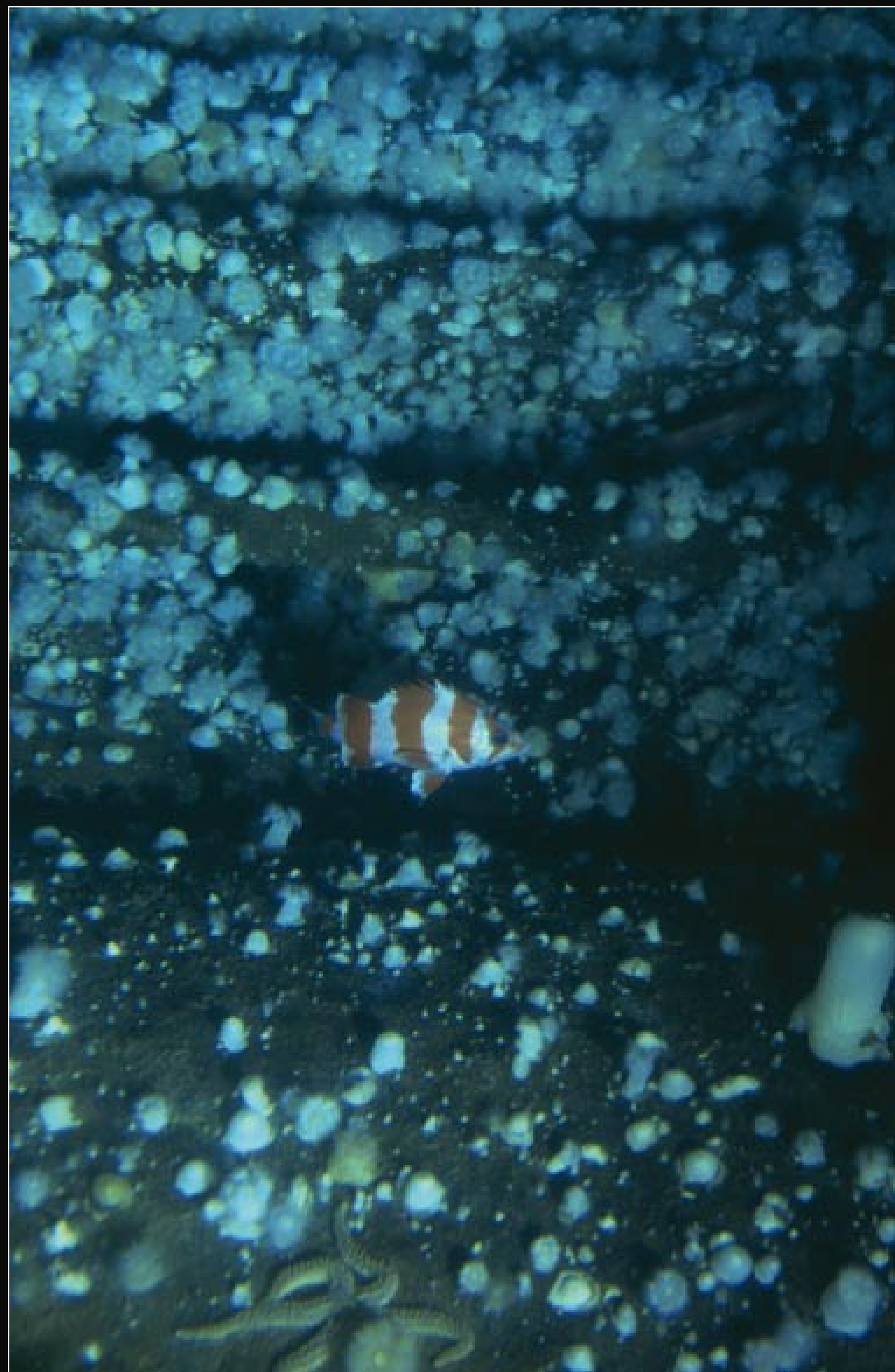


Figure 1.10. Annual midwater trawling surveys, 1995–2000. Map of stations where trawl samples were collected. Surveys typically were conducted in June and included 10 nights of sampling.



Chapter 2

A BRIEF HISTORY OF OIL DEVELOPMENT IN SOUTHERN CALIFORNIA

Milton S. Love

Oil and gas seeps, often the result of geological deformation of the oil-saturated strata, are a common global occurrence. The famous La Brea tarpits, found near downtown Los Angeles, is just one of many seeps found in California. Offshore, seeps are visible on the ocean surface as oil slicks or gas bubbles. As noted by California Resources Agency (1971), "Some [seeps] remain dormant for extended periods of time and then become reactivated, probably by pressure buildup or earth movement. Because of the transient nature of many seeps, an accurate count is difficult to obtain; however, it appears that there are probably 50 to 60 seeps and seep areas on the ocean floor between Point Conception in Santa Barbara County and Huntington Beach in Orange County."

Native Americans in many parts of California, but particularly along the southern California coast, mined those land seeps that contained hard, high-grade asphaltum. The soft tar derived from offshore seeps and diverted to beaches was rarely, if ever, used. California Native Americans used asphaltum in a variety of ways. Baskets and water bottles were made watertight, arrowpoints and hook barbs attached to shafts, broken stone vessels repaired, canoes caulked and sealed and shell decorations were inlaid on various objects. The Chumash of coastal southern California melted asphaltum and mixed it with pine resin to create an effective adhesive for many of these uses.

Early European explorers noted the presence of these seeps. "The Spanish explorer Fages, in 1775, said that 'At a distance of two leagues from this mission [San Luis Obispo] there are as many as eight springs of a bitumen or thick black resin…' Fr. Pedro Font, in 1776, while near Goleta in Santa Barbara County wrote '…much tar which the sea throws up is found on the shores, sticking to the stones and dry. Little balls of fresh tar are also found. Perhaps there are springs of it which flow out into the sea, because yesterday on the way the odor of it was perceptible, and today…the scent was as strong as that perceived in a ship or in a store of tarred ship tackle and rope" (Heizer 1943).

While European settlers in California also utilized asphalt from terrestrial seeps in limited ways, primarily for water proofing and lubrication, there was relatively little interest in oil seeps until about 1850, when it became more widely known that kerosene, an excellent substitute for whale oil in lamps, could be distilled from crude oil. While Dr. Abraham Gesner, a Canadian geologist, is officially credited with inventing this process in 1849, others may also have stumbled onto this idea. In California, the first person known to use partially refined oil for illumination was General Andreas Pico, the brother of Pio Pico, the last Mexican governor of California. In 1850, General Pico distilled kerosene from oil taken from hand dug pits in Pico Canyon (near Newhall, southern California) and used it for lighting a home. By 1854, miners had excavated into Sulphur Mountain in Ventura County (southern California), were hauling out the oil that seeped into their tunnels and had set up stills to produce kerosene. Throughout the 1850 and 1860s, various companies mined seeps for petroleum and produced kerosene or kerosene-like products.

In California, the first well (as opposed to hand-dug pit) that was designed to produce oil was a failure. It was drilled in Humboldt County in 1861 and it, along with others in the same county between 1861 and 1864, came up dry. However, the first productive well, drilled in 1865, came in from this county. This was quickly followed up by successful wells in Ventura and other localities. It was not until 1876 that the first truly commercial well was developed in Pico Canyon, the site of General Pico's first pit mine. The next 20 years saw production rapidly escalate, with new fields explored and developed in a number of locations in central and southern California.

The first oil production from submarine strata in California occurred in Summerland, a sleepy village south of Santa Barbara formally founded in 1889 as a spiritualist colony. For years, Summerland residents had noted both the heavy scent of oil that frequently hung over the community and the numerous seeps that dotted their coastline. In fact, natural gas was so plentiful that when boys wanted to play baseball at night "…they would drive short pieces of pipe into the ground about four or five inches, and would light them, and there would be a gas flame at least a foot high from the top of the pipe. Fifteen or twenty of these pipes along the edge of the road gave plenty of light for them to play after dark. When they got called in to go to bed, each had a flat board, and they would whack the board down over the flame, and out it would go." (Lambert 1975).

In the late 1880s and early 1890s, several Summer-

Opposite: Flag rockfish at Platform Harvest. (Photograph by Donna Schroeder)

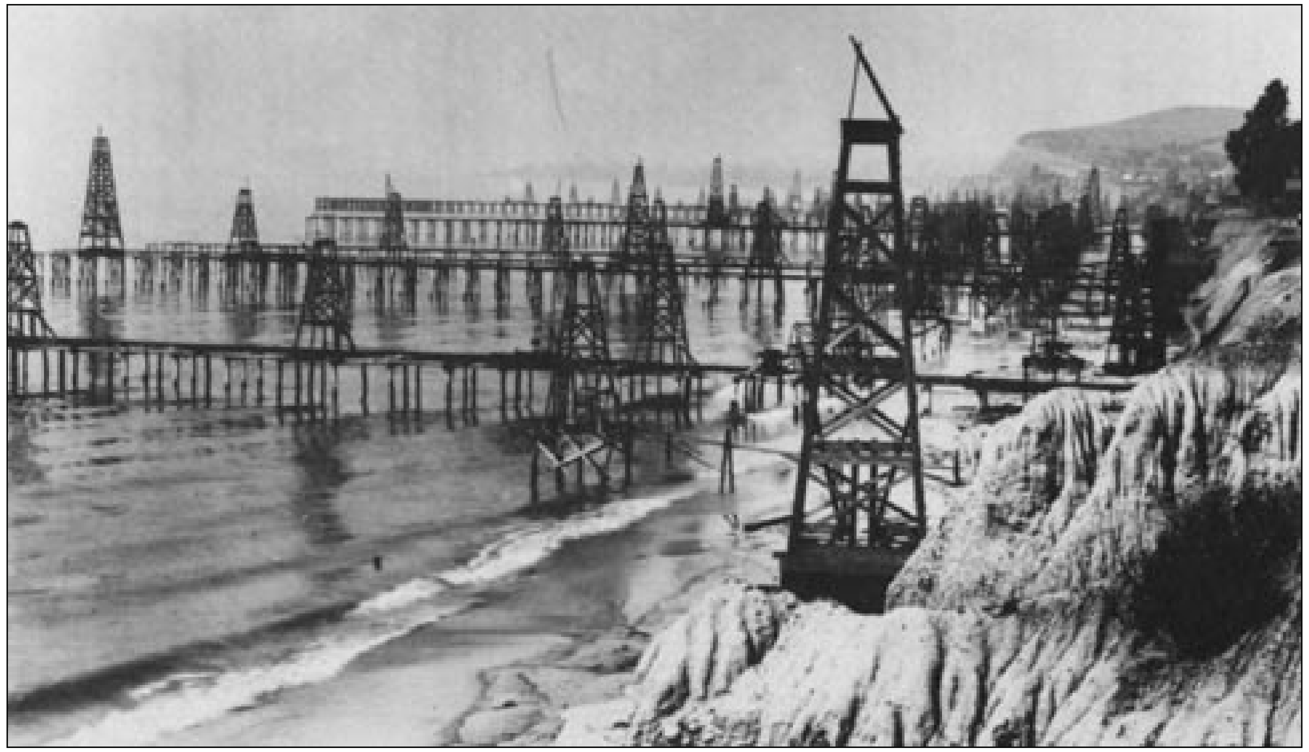


Figure 2.1. Oil piers off Summerland, California, about 1904 (from Rintoul 1990).

land residents had struck oil while digging water wells and at least one would fill barrels from a bucket, haul them by buckboard to Santa Barbara, and sell the oil to laundries. Drilling for oil just back from the ocean commenced shortly after and by 1897 both the beaches and short stretch between ocean and coastal hills were blanketed with drilling rigs. In 1896, W. L. Watts of the California State Mining Bureau reported that "It is also evident that the oil yielding formations extend south into the ocean…At low tide, springs of oil and gas are uncovered on the seashore." (Rintoul 1990).

True to the prediction, the first pier holding a well was built in 1897. This was perhaps the world's first well brought in over water, a record also reportedly claimed for the Baki (formerly Baku) (Republic of Azerbaijan) oil fields in the Caspian Sea and by Pennsylvania for drilling into Lake Erie. Within a few years there were 11 piers (harboring over 200 wells), one of them stretching 1,230 feet offshore (Figure 2.1). The Summerland piers continued to produce oil until 1939, when the last well was destroyed by high tides and high surf.

In the 1920s, a series of discoveries along the Santa Barbara Channel, particularly at Rincon (northwest of Ventura) and Ellwood and Capitan (west of Santa Barbara) led to additional offshore drilling. While all of these discoveries were made on land, development quickly extended onto piers. However, rather than being built of wood, these piers were more heavily constructed of steel pilings and reinforced concrete caissons.

The year 1932 saw the erection of the first oil platform off California and perhaps in the world. In that Depression year, the Indian Petroleum Company was faced with a dilemma. Geological evidence implied that productive oil-bearing strata lay offshore of Rincon (just northwest of Ventura). However, the costs of building a pier out to that formation were prohibitive. The company solved the problem by building part of a pier, located about 1,200 feet beyond the end of the nearest pier. Constructed of steel in 38 feet of water, the aptly named "Steel Island" was eventually home to three wells (Figure 2.2). It lasted until 1 January 1940, when "…mountainous waves battered the platform. The structure went down. There was no loss of life, but equipment was destroyed and wells damaged. Rohl-Connolly Company, marine contractors, removed equipment, derrick and steel pilings from the ocean floor; cut off casing at the floor of the ocean; and placed 6-foot cement plugs in the tops of the water strings" (Rintoul 1990).

Later oil and gas discoveries that were of importance to offshore development included those at Huntington Beach, Wilmington and Seal Beach. However, it was not until 1954, that the next step in offshore production oc-

PHOTO COLLECTION/LOS ANGELES PUBLIC LIBRARY

Figure 2.2. Built off Rincon, southern California, in 1932, the "Steel Island" was one of the first oil platforms in the world.

curred with the creation of the first man-made drilling island, "Monterey", situated 1.5 miles offshore of Seal Beach in 42 feet of water. Construction on the island commenced in 1952, but a lawsuit by the city of Seal Beach prevented drilling until 1954. The circular island "…75 feet in diameter, had an outer rim formed of interlocking sheet-steel piling driven into the ocean floor to depths of 15 to 20 feet. The interior was filled with rock and sand barged in from Catalina Island" (Rintoul 1990). In succeeding years five other oil islands (Grissom, White, Freeman, Chaffee, and Esther) were built.

Oil islands were only practical in relatively shallow waters and when industry-led seismic surveys and bottom coring discovered potential fields in deeper offshore waters, the stage was set for the development of oil platforms. In June 1958, the California State Lands Commission held its first sale of tidelands leases, ending a freeze that had held up offshore drilling on new sites. The first platform constructed was Platform Hazel, located about two miles offshore of Summerland in 100 feet of water. As noted in Rintoul (1990) regarding Hazel's construction, "In that same month, Standard [Oil] towed an imposing tower a distance of 210 miles… to the Summerland tract. The tower was 75 feet square and 170 feet high. It was a major component of Platform Hazel and was to serve as the foundation on which the 110-foot square deck would be mounted…The tower was floated to the job site on the four big caissons that formed the bottom portion of the tower's legs, each 40 feet high and 27 feet in diameter. Each caisson was pressurized to prevent leakage and also ballasted with 90 tons of sand for stability…Once on bottom, the caissons were sunk 22 feet into the ocean floor by means of high pressure water and air jets that literally hosed away the bottom sands, allowing the caissons to rest on hard ground. The final anchoring was accomplished by filling the caissons with 6,000 tons of sand

and concrete…The cost of building and installing the platform was $4 million." In September 1958, Standard Oil began drilling from the newly constructed platform and within one month the first well, bottoming out at 7,531 feet began producing 865 barrels per day. This was followed two years later by the construction of nearby Platform Hilda.

In subsequent years, a number of platforms were installed in both state and (beginning in 1967 with Platform Hogan) federal waters in southern California. However, expansion of offshore oil drilling came to an abrupt halt in 1969, with the disastrous blowout and subsequent oil spill at Platform A (installed in 1968) in the Santa Barbara Channel. And while discussion of both opposition and support for oil development are beyond the scope of this report (see Beamish et al. 1998, Nevarez et al. 1998, and Paulsen et al. 1998 for more information), it is safe to say that the subsequent environmental concerns about the safety of offshore oil exploration, development, and production delayed further drilling for a number of years. It was not until the late 1970s that installation of new platforms resumed. No new platforms have been erected since 1989 (Nevarez et al. 1998).

How do platforms get their names?

On the Pacific Coast, platform names have to conform to a set of rules promulgated by the U. S. Coast Guard. The Coast Guard created a series of zones ("15-minute quadrangles") along the Pacific Coast beginning at the U. S. – Mexican border. The names of all platforms in a zone must begin with the same letter. Platforms in the first zone, off San Diego, would begin with "A". The southern-most platforms (Emmy, Edith etc.) lie off Long Beach, in the "E" zone.

Industry personnel imply that the choice of names have often been made in a disarmingly casual way. For instance, the project engineer for Hermosa apparently named that structure after the elementary school attended by his daughter. Ellen and Elly are said to honor the wives of the engineers in charge of those platforms' construction. Hondo, meaning "big" in Spanish, was so christened because at the time it was the tallest (measured from the seafloor) of the California platforms. One story has it that, because a nearby platform was later installed to tap the same reservoir as Hondo, it was named Harmony. Hogan and Houchin were the surnames of two presidents of Phillips Petroleum.

Why do Platforms A, B and C, despite their locations in the H zone, not have "H" names? These were installed in the days before the Coast Guard regulations were mandatory.

LINDA SNOOK

Stripetail rockfish on shell mound of Platform Gail.

CHAPTER 3

A REVIEW OF BIOLOGICAL AND OCEANOGRAPHIC SURVEYS: RESULTS AND ANALYSES

Milton S. Love, Donna M. Schroeder, and Mary M. Nishimoto

There was no single characteristic fish assemblage that could be described for the oil platforms and natural outcrops of central and southern California. However, we identified a number of patterns in fish diversity and abundance that corresponded to bottom depth, geographic area, and year. Depth played an important role because, in general, rockfishes numerically dominated fish assemblages around platforms and deep natural reefs, and rockfish species segregate themselves according to habitat depth. We also observed biogeographic partitioning in species composition, where northerly platforms show the influence of the Oregonian province and southerly platforms show the influence of the San Diegan province. These zoogeographic patterns were more conspicuous in shallow water fish assemblages. The large inter-annual fluctuations in juvenile fish recruitment observed during the studies may have been generated by the large inter-annual variability in oceanographic conditions (e.g., upwelling, El Niño-Southern Oscillation events). Since juveniles of many species inhabited shallow and midwater portions of oil platforms, the greatest temporal variability in fish abundance occurred at these depths.

We present more detailed summaries of fish assemblages identified by the two different survey methods (scuba and submersible) in the sections below. The common and scientific names of fishes observed in these studies are listed in Table 1.

1. Shallow Water Fish Assemblages: 0–36 m (119 ft.)

Findings at a Glance

A combination of regional and local processes influenced patterns of reef fish assemblages in shallow water. At regional scales, composition and relative abundance of reef fishes often shifted abruptly as oceanography changed. This shift delineated a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. This distinct spatial pattern was reflected in both platform and natural reef habitats. There was greater variability in platform species assemblages and population dynamics compared to natural outcrop assemblages and dynamics, and this was most likely caused by the offshore position and greater sensitivity of platform habitats to changing oceanographic conditions. Local processes which affected fish distribution and abundance were related to habitat features, where depth, relief height, and presence of giant kelp all played important roles. We found that the majority of juvenile rockfish recruits resided at depths greater than 26 m (86 ft.), although there were differences among species.

Except where noted, the following synopsis encompasses platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace, Gilda, Gail, and Gina and are based on diver surveys conducted between 1995 and 2000.

1a. General Patterns

The two primary research objectives were to (1) describe the spatial and temporal variability of shallow water (less than 36 m, 119 ft.) fish assemblages residing on oil/gas production platforms and natural outcrops, and (2) describe the relative importance of regional processes (e.g., oceanographic patterns) compared to local processes (e.g., habitat features) in generating observed patterns of reef fish assemblages. An understanding of mechanisms which structure marine populations is necessary to predict the outcome of resource management decisions related to marine fisheries, platform decommissioning, and marine protected areas on fish assemblages within the Santa Barbara Channel region (including the Santa Maria Basin). A list of species observed at each platform is given in Appendix 2.

We find that a combination of regional and local processes influenced patterns of reef fish assemblages in shallow water. At regional scales, composition and relative abundance of reef fishes often shifted abruptly as oceanography changed. This shift delineated a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. Rockfishes and surfperches dominated the cool-temperate assemblage, and damselfishes, wrasses, and sea chubs dominated the warm-temperate assemblage. This distinct spatial pattern was reflected in both platform and natural outcrop habitats.

Within each of the cool- and warm-temperate assemblages, local habitat features modified patterns of species abundance and distribution. For example, kelp surfperch and giant kelpfish were only observed on rocky outcrops that possessed stands of giant kelp, *Macrocystis pyrifera*. Other factors likely to have been important were outcrop or platform depth and relief height. These local scale features sufficiently decoupled sites within an oceanographic region (cool- or warm-temperate) to make broad generalizations about fish assemblages difficult, especially within platform habitats.

Temporal dynamics of reef fish assemblages also resulted from a complex, dynamic interaction between regional oceanography and local habitat features. The diverse array of oceanographic conditions that occurred during the six-year survey period appeared to strongly influence regional dynamics of fish assemblages. The 1997–1998 El Niño event corresponded to a large increase in juvenile recruitment of species which dominated the warm-temperate fish assemblage (e.g., blacksmith), while the 1999 La Niña event corresponded to a large increase of juvenile recruitment of species which dominated the cool-temperate fish assemblage (e.g., rockfishes). Severe winter storms that accompany El Niño events propagated into small-scale variability at some sites. For example, the scouring effect of severe storm waves depleted red algal turf (a forage base for small crustaceans and fish) on two shallow natural outcrops. This forage base reduction may have been the primary cause of the observed synchronous decline in surfperch abundance at the same outcrops.

1b. Shallow Water Fish Assemblages Surrounding Oil/Gas Production Platforms

As observed on natural outcrops (see Section 1d), shallow water fish assemblages surrounding oil/gas production platforms show distinct spatial patterns which correspond to oceanographic patterns in the Santa Barbara Channel. Rockfishes are numerically dominant in west channel platform fish communities, although 1999 was a strong recruitment year for juvenile rockfish at all platforms. Blacksmith and halfmoon are numerically dominant in east channel platform assemblages. Platform fish assemblages appeared to respond faster and more dramatically to changing oceanographic conditions than natural reef assemblages, perhaps due to their offshore position and higher proportion of juvenile fishes.

There were notable differences among platforms within an oceanographic region. These differences may be due to water depth in which the platform is positioned, where deeper water can inhibit species such as surfperches from migrating onto platform habitat. Among-platform differences may also be influenced by food availability or other factors. During the 1997–1998 El Niño event, juvenile blacksmith recruited onto all platforms, but did not recruit onto Tarantula Reef, the closest natural reef to west channel platforms surveyed in this study. This observation suggests that platforms may "capture" pelagic stages of some reef fish species that might have otherwise perished.

The fish assemblage observed at Platform Gina (depth 29 m, 95 ft.) is noteworthy because of its very high density of kelp bass and because of the large diversity of rockfishes that recruit to its shell mound habitat. Anecdotal observations at a nearby shipwreck did not record either of these characteristics in its local fish assemblage. High turnover of fish species diversity has also been noted at Platform Gina (Love, Nishimoto, Schroeder, and Caselle 1999).

JAMES FORTE

Kelp bass at a nearshore platform.

1c. Depth Distribution of Juvenile Fish Recruitment on Oil Platforms

For all fishes observed at all Southern California Bight platforms surveyed at shallow depths, approximately 27% were observed in the shallowest portions of platform habitat (6–12 m, 20–40 ft.). Most of these were pelagic fishes, such as anchovy and barracuda. Twenty-seven percent of all fishes were observed at intermediate depths (15–26 m, 50–86 ft.), and 46% were observed at deeper depths (27–36 m, 89–119 ft.). We observed that the majority of juvenile rockfish recruits resided at depths greater than 26 m (96 ft.) (Figure 3.1), although there were differences among species. The olive-yellowtail group and copper-complex species group (black-and-yellow, copper, gopher, and kelp rockfishes) had the largest percentages residing at shallower depths. Our observations on copper-complex rockfishes represent a somewhat different vertical distribution than that described by Holbrook et al. (2000). This disparity may be due to differences in surveyed platforms and program duration (6 platforms within one biogeographic area during 1995–7 versus 9 platforms in 3 biogeographic areas during 1995–2000). This difference underscores the importance of evaluating platforms on a case-by-case basis and in developing monitoring programs over multiple years.

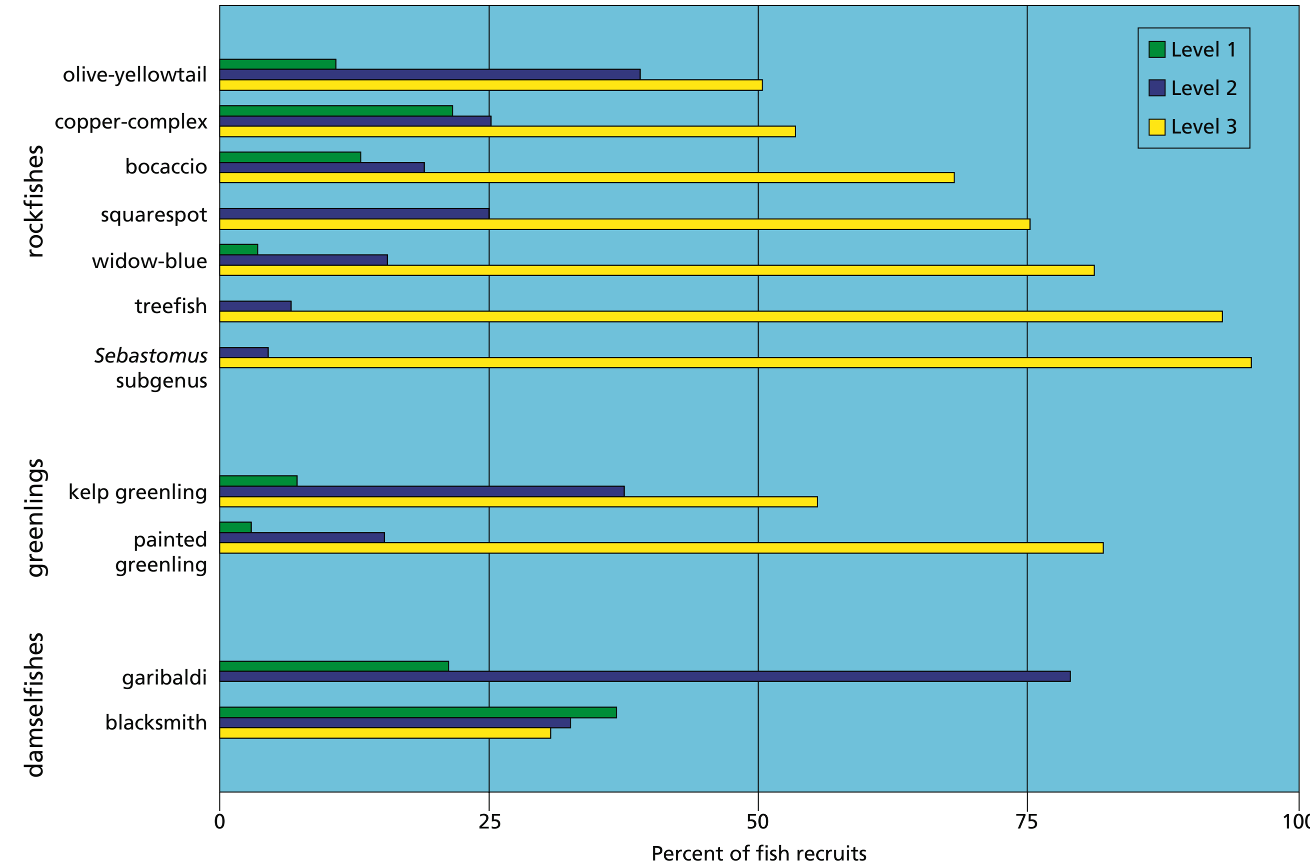
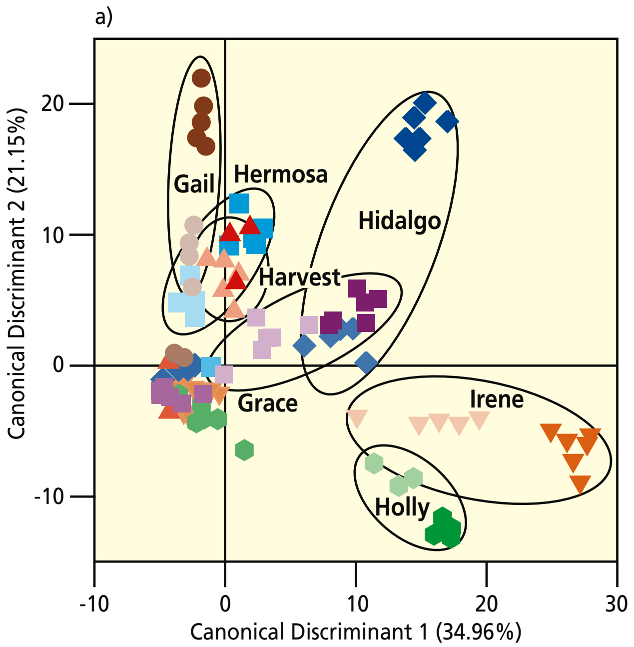


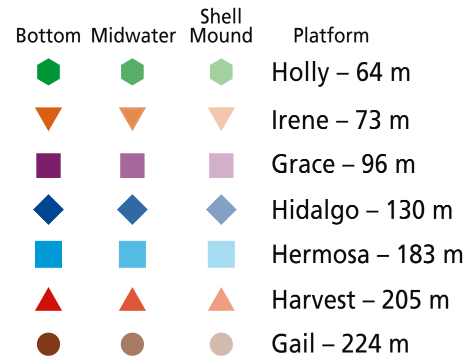
Figure 3.1. Percent of juvenile fish density observed during scuba surveys at different depths on offshore platforms during 1995–2000. Depth ranges for each strata: level 1 (6–12 m), level 2 (15–26 m), level 3 (27–36 m).

Our results correspond with Holbrook et al. (2000) regarding vertical distribution of midwater juvenile rockfishes (e.g., bocaccio, blue, and widow) where the vast majority of individuals recruited to depths greater than 26 m (86 ft.). The majority of individuals of other rockfish species such as squarespot, treefish, and the *Sebastomus* subgenus (e.g., rosy, greenspotted, starry rockfishes, and others) are also found below 26 m (86 ft.). Kelp and painted greenling recruits, two species associated with the cool-temperate fish fauna, mimic the vertical distribution of rockfish recruits, preferring deeper portions. In contrast, garibaldi and blacksmith recruits, two species associated with the warm-temperate fish fauna, favor upper portions of platforms, suggesting temperature may play a role in determining depth distribution of juvenile fishes at platforms.

1d. Fish Assemblages on Nearshore Natural Outcrops

The relative importance of spatial versus temporal variability in structuring fish assemblages on shallow natural outcrops differed among sites. Ordination analysis revealed that natural outcrops in the west channel tended to be more sensitive to temporal variability than those outcrops positioned in the east channel. This seems intuitive since west channel outcrops are closer to areas of intense and temporally variable upwelling processes which affect mean water temperature, primary production, and dispersal processes of larvae.





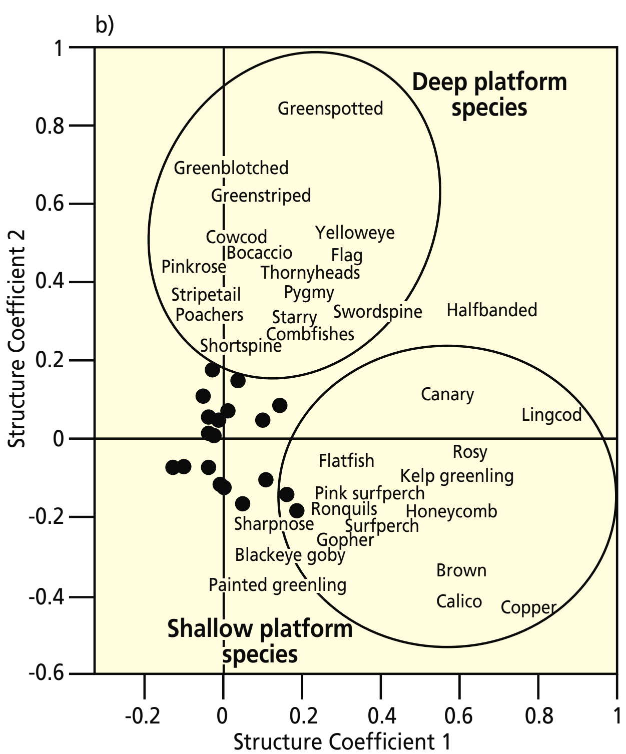


Figure 3.2. 3.2a. Canonical Discriminant Analysis of the bottom and shell mound fish assemblages at seven platforms, 1996–2001. 3.2b. Canonical Discriminant Analysis of the bottom and shell mound species found around seven platforms, 1996–2001. Two groups, one characteristic of shallow platforms, the other of deeper structures are apparent. Black dots represent species that were not strongly associated with either axis.

Similar to platform habitats, the fish assemblages on natural outcrops showed distinct spatial patterns that seemed to correspond to regional oceanographic patterns in the Santa Barbara Channel. Rockfishes and surfperches were important species in west channel fish communities, although 1999 was a strong recruitment year for juvenile rockfishes at most natural outcrops. Blacksmith, garibaldi, sheephead, opaleye, and rock wrasse were important species in east channel fish communities. Kelp bass, black surfperch, and senorita were abundant at all sites. Because we observed abrupt spatial changes in abundance for many species in the Santa Barbara Channel, it is tempting to attribute these patterns solely to oceanographic processes. However, habitat features may covary with oceanography, and we are currently unable to distinguish between these processes.

Dispersal of pelagic stages does not appear to be the primary factor in structuring fish assemblages. For the eight common species in the warm-temperate assemblage that have pelagic larvae, six species exhibited very low or no juvenile recruitment onto shallow rocky outcrops in the Santa Barbara Channel. This suggests that dispersal of benthic stages plays a critical role in the dynamics of reef fish communities and local temperature may be an important criterion in habitat selection. Some species important in the warm-temperate fish assemblage (e.g., kelp bass and opaleye) declined in abundance during the cold La Niña year of 1999. The response of reef fish communities to oceanographic regime shifts may be faster and less persistent than previously thought.

2. Deeper-water Platform Fish Assemblages: 31–224 m (103–739 ft.)

Except where noted, the following synopsis encompasses platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace, and Gail, based on surveys conducted between 1995 and 2001 from the research submersible *Delta*.

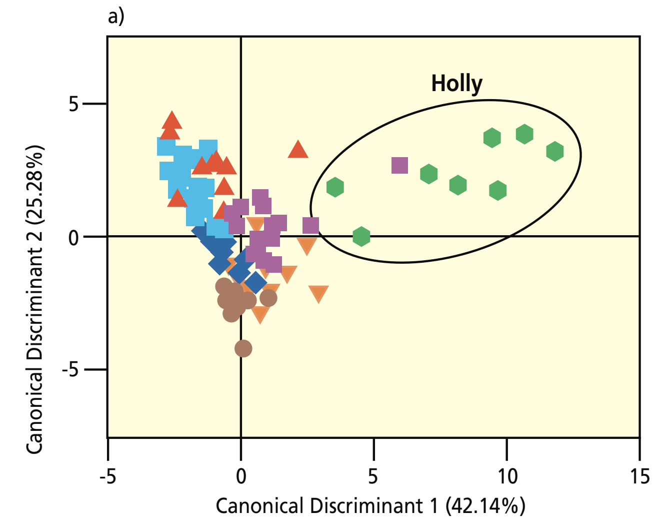
2a. General Patterns

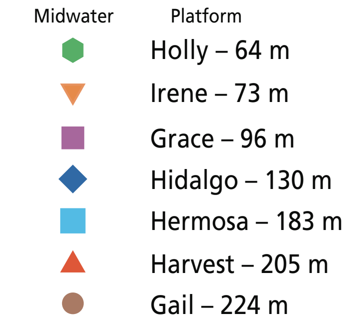
All of the platforms studied by submersible had three distinct fish assemblages, midwater, bottom, and shell mound (Figure 3.2a). Rockfishes, totaling about 35 species, dominated all three fish assemblages. Fish densities at most platforms tended to be highest in the midwater reflecting the depth preferences of young-of-the-year rockfishes that represented the most abundant size class of fishes.

Midwater assemblages were more similar to each other regardless of platform location and bottom depth. The assemblage at Platform Holly had the only distinct midwater assemblage (Figure 3.3a). A suite of species (e.g., calico, copper, and gopher rockfishes, pile, and sharpnose seaperches) characterized this particular assemblage (Figure 3.3b). Holly has the shallowest bottom depth (standing in 64 m, 211 ft.), and it might be that these shallow demersal species were able to occupy these shallow midwater crossbeams. The midwater fish assemblages around the other platforms showed no systematic depth or geographic relationships.

The composition of platform bottom and shell mound fish assemblages was dependent on the bottom depth of the platform (Figure 3.2a) and certain species are characteristic of either shallow or deep benthic habitats (Figure 3.2b). Platforms Holly and Irene (64 m and 73 m; 211 and 241 ft., respectively) were dominated by brown, calico, copper, and vermilion rockfishes and lingcod. In deeper waters, Platforms Hermosa, Harvest, and Gail (183 m, 205 m, and 224 m; 604, 677, and 739 ft., respectively) were dominated by greenblotched, greenspotted, and greenstriped rockfishes. Platform Hidalgo, and to a certain extent Platform Grace, both at intermediate depths (130 m and 96 m, 429 and 317 ft., respectively), were inhabited by species common to both the shallower and deeper platforms. In general, our data suggests that shell mound fish assemblages most closely resemble the fish assemblages of their adjacent platform bottoms (Figure 3.2a). Fishes living on the shell mounds are generally smaller, and presumably younger, than the same species living around the platform bottom.

RESULTS AND ANALYSES





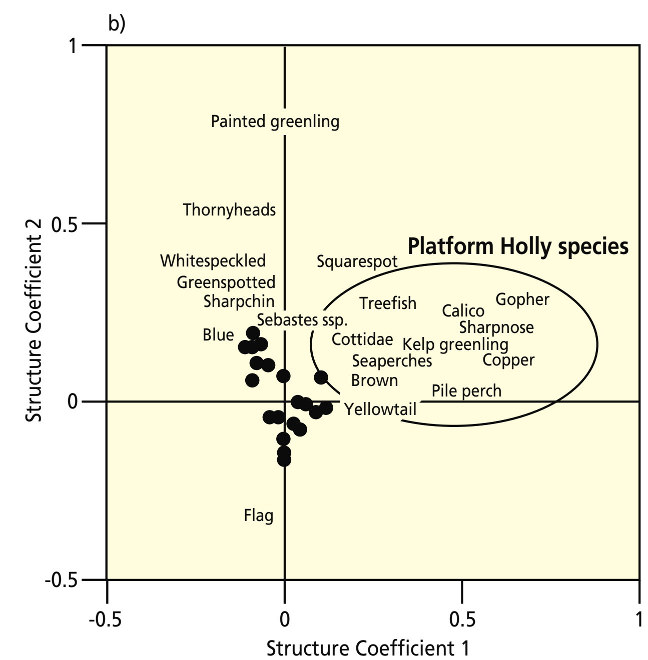


Figure 3.3. 3.3a. Canonical Discriminant Analysis of midwater fish assemblages at seven platforms, 1996–2001. Note that the Platform Holly fish assemblage is distinct from the others. 3.3b. Canonical Discriminant Analysis of the midwater species found around seven platforms, 1996–2001. Note that a group of species tends to be more characteristic of Platform Holly than other platforms. Dots represent species that were not strongly associated with either axis.

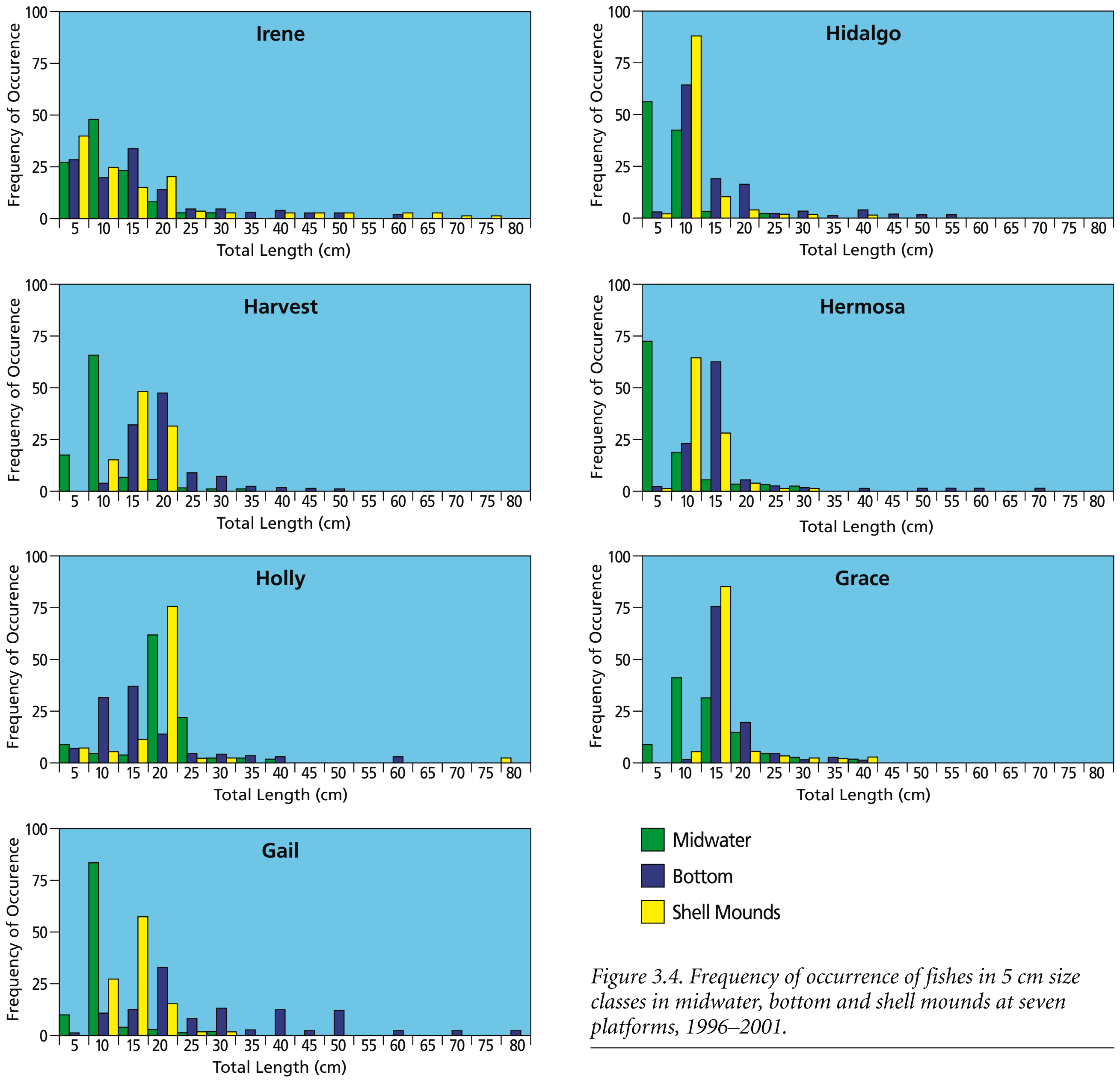


Figure 3.4. Frequency of occurrence of fishes in 5 cm size classes in midwater, bottom and shell mounds at seven platforms, 1996–2001.

The size distribution of fishes differed by habitat type. The midwater assemblages harbored few fishes over 20 cm (8 in.) long (Figure 3.4). Immature, mostly young-of-the-year rockfishes and young painted greenling dominated midwater depths. In addition, seaperches, blacksmith, and several less abundant species inhabited this zone. In contrast, older and larger rockfishes, lingcod, and several other benthic species, occupied the platform bottom habitat. Rockfishes also dominated the shell mounds. The size frequency of shell mound fishes tended to be intermediate between the two other habitats (Figure 3.4). This apparent partitioning of different size modes was most evident in the deepest platforms. Around shallow platforms, there was significant settlement of young-of-the-year rockfishes both in the midwater and at the bottom. This common feature blurred the distinctions between these two habitats.

Young-of-the-year rockfishes showed strong depth preferences around platforms (Figure 3.5). Young-of-the-year were often very abundant in the shallowest portions (above 30 m, 100 ft., depths) of the platform but were also abundant between 31 and 120 m depths (102–396 ft.). They were most abundant at depths between 61 and 90 m (201–297 ft.).

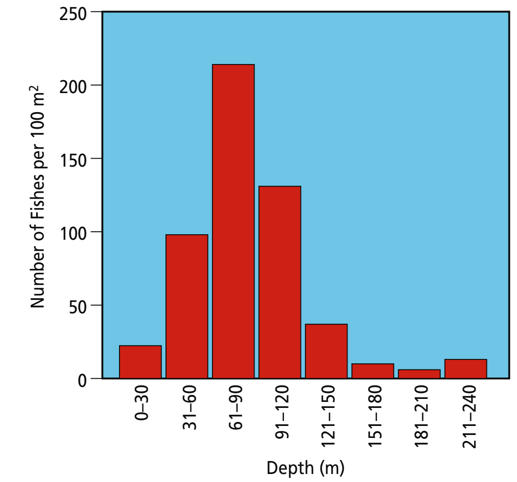


Figure 3.5. Density of young-of-the-year rockfishes observed from the Delta *submersible, by depth, at all platforms surveyed, 1995–2001. Note that large numbers of these fishes were also observed by scuba divers in the shallower sections of the platforms.*

Among platforms, total fish densities typically fell within a relatively small range (Figure 3.6). In general, platforms furthest offshore and in deepest waters had somewhat lower fish densities than did those closer to shore in shallower waters. However, the absolute number of fishes around deeper water platforms may be greater than those in shallower waters, as deeper platforms are much larger than shallower water structures.

2b. Midwater Assemblages

Findings at a Glance

Platform midwaters are nursery grounds for rockfishes as well as for other marine fish species such as cabezon and painted greenling. The young-of-the-year of at least 15 rockfish species inhabit these midwater habitats.

Benthic settlement success is greatly influenced by oceanographic conditions. During our study, densities of young fishes varied greatly between years and platforms. Young-of-the-year rockfish densities often varied

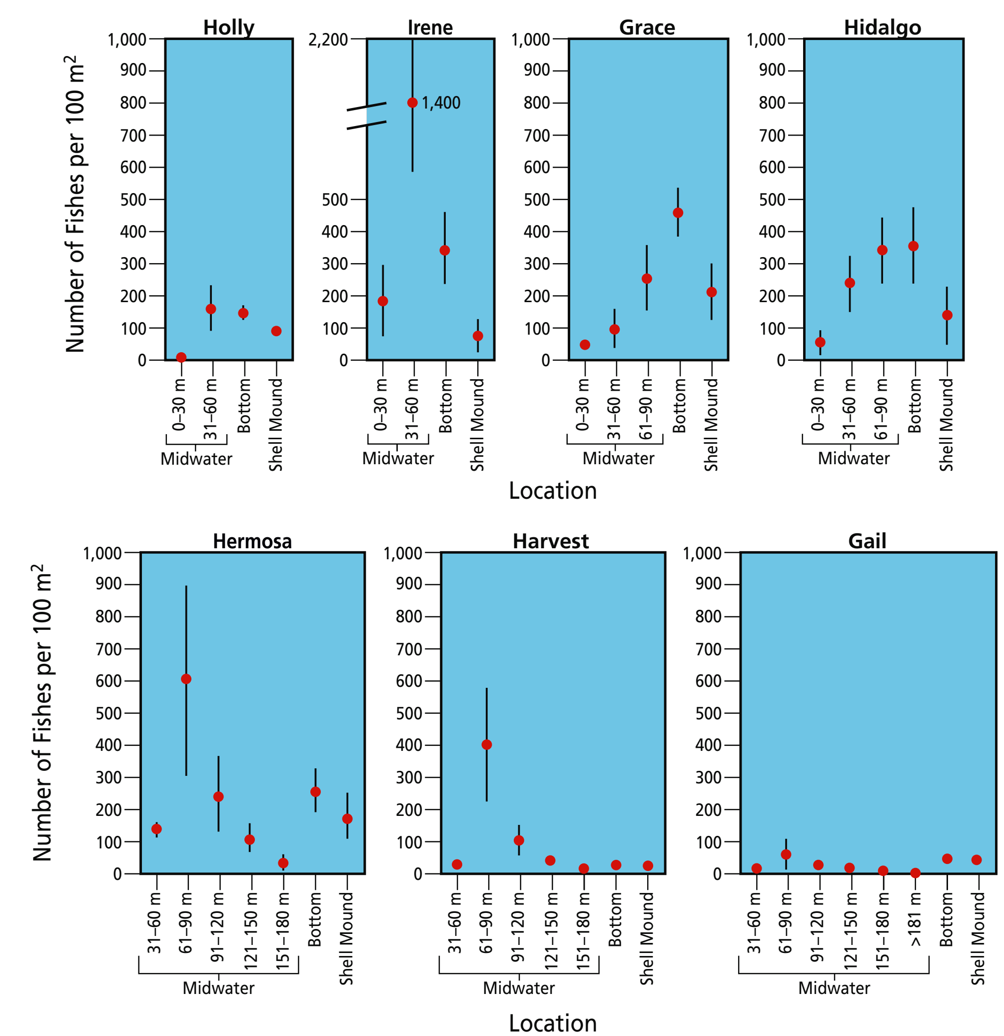


Figure 3.6. Density, with standard error bars, of all fishes in midwater (by 30 m depth zones), bottom and shell mounds, at seven platforms, 1996–2001.

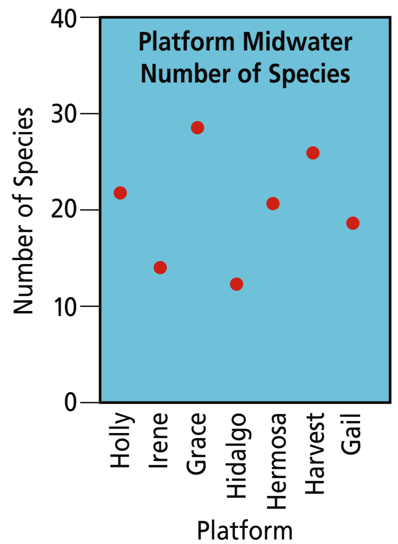


Figure 3.7. Number of species observed in the midwaters of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

by a factor of 10 or even 100 among survey years at some platforms. From 1996 through 1998, rockfish settlement was generally higher around the platforms north of Point Conception compared to those structures in the Santa Barbara Channel, reflective of generally colder, more productive waters in central California. Colder waters in 1999 were associated with relatively high densities of young-of-the-year rockfish recruitment at all of the platforms surveyed. In 2000 and 2001, rockfish recruitment at platforms in the Santa Barbara Channel remained higher than pre-1999 levels. We hypothesize that this was related to the oceanographic regime shift to cooler temperatures that may be occurring in southern California.

Depending on platform location, we observed between 13 and 29 fish species in the midwater habitats below 31 m (102 ft.) depths (Appendix 3). There was no relationship between platform bottom depth and either the number of species or species diversity in the midwater habitat (Figures 3.7 and 3.8). Relatively abundant non-rockfish species included blacksmith, sharpnose seaperch, and juvenile painted greenling. Occasionally, we observed influxes of migratory species such as Pacific sardine, jack mackerel, and Pacific mackerel. However, because our surveys are snapshots in time, they do not adequately capture the importance of platform habitats to these and other pelagic species. The most abundant fishes were young-of-the-year and older juvenile rockfishes and blacksmith. These are planktivorous and thus are not dependent on

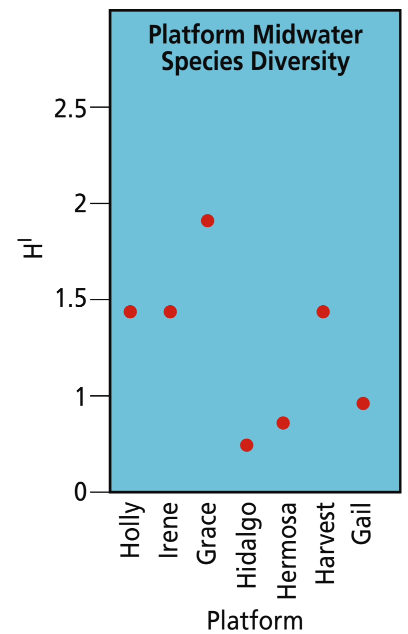


Figure 3.8. Species diversity of fishes in the midwaters of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

the platform for food. They utilize these structures for orientation in the water column and as refuge from predation. Less common species, such as seaperches, painted greenling, opaleye, and cabezon do feed on animals or algae living on the platform jacket or conductors.

Our research shows that oil and gas platforms off California provide important nursery grounds for many species of rockfishes. The most conspicuous faunal characteristic of the platform midwaters below scuba depth is the dominance of young rockfishes. Over the course of the study, young-of-the-year and older juvenile rockfishes almost always comprised more than 90% of all fishes observed in this habitat (Appendix 3). In some years, young-of-the-year rockfishes were virtually the only fishes present at some platform midwaters (Appendix 3).

The young-of-the-year of at least 16 rockfish species (bank, blue, copper, darkblotched, flag, gopher, kelp, olive, pygmy, shortbelly, squarespot, widow, yellowtail rockfishes, bocaccio, cowcod, and one or more members of the subgenus *Sebastomus*) recruited to the midwater habitat. Many of the species that were most abundant (e.g., blue, olive, pygmy, squarespot, widow, and yellowtail rockfishes and bocaccio) are those that are epibenthic or semipelagic as adults. Of these diverse young rockfishes, widow rockfishes were consistently the most abundant species at platforms. Among adult rockfishes, kelp and whitespeckled rockfishes were commonly observed.

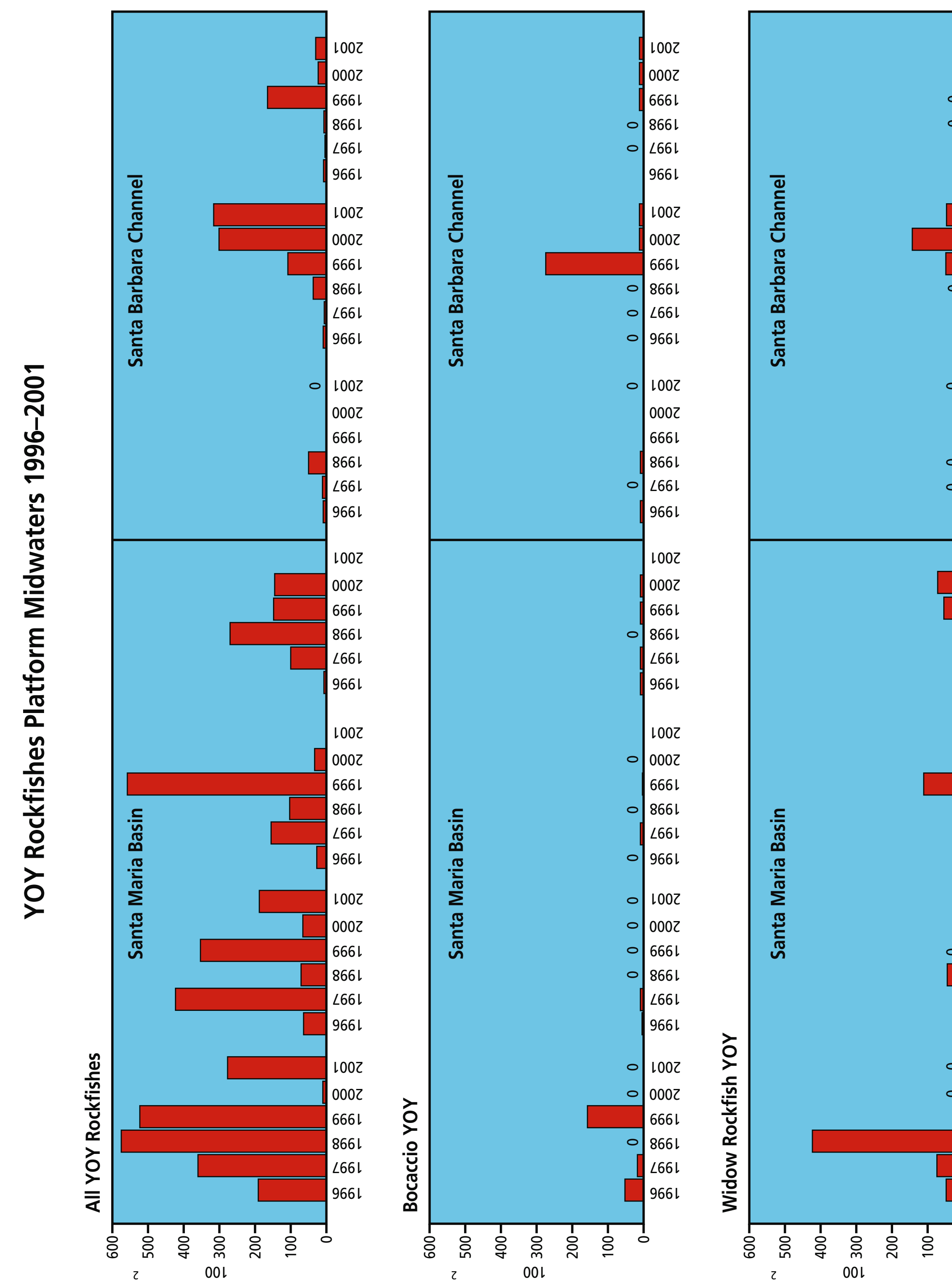


Figure 3.9. Density of all young-of-the-year bocaccio and widow rockfish and all YOY rockfishes combined in platform midwaters, by year and platform, 1996–2001.


DAN DUGAN

Pacific sardines, midwaters of Plaform Holly.


MARY NISHIMOTO

Juvenile bocaccio and widow rockfish, midwaters of Platform Grace.

Young-of-the-year and 1-yr old rockfishes of many species (e.g., bank, blue, olive, pygmy, shortbelly, squarespot, widow, and yellowtail rockfishes, and bocaccio) often formed highly mobile schools in the midwater habitat. During years of high abundance, these schools contained many thousands of individuals. Our experience suggests that these schools remained either inside the platform or ventured only a few meters outside it. Schools of young rockfishes tended to more closely associate with the jacket substrate during years of low recruitment or when water visibility was poor. However, when their numbers were high or water clarity was good, young rockfishes, while still living within the platform structure, only loosely associated with the crossbeams and vertical structure. In general, the schools occurred throughout 50 to 100 m or more (150–300 ft.) of the water column. Young copper, gopher, kelp, and flag rockfishes, treefish, and cowcod, as well as cabezon and painted greenling were generally observed either as solitary individuals or in small groups, usually intimately associated with the platform jacket.


RICK STARR

Young-of-the-year yellowtail rockfish, midwaters of Platform Irene.

Young-of-the-year rockfish settlement (recruitment) to midwater habitats is also strongly influenced by oceanographic conditions. The density of these fishes varied greatly inter-annually by location and among platforms (Figure 3.9). Spatial and temporal differences in young-of-the-year rockfish densities often varied by a factor of 10 or even 100. In several instances, a species that was entirely absent from a platform midwater in one year would recruit in great numbers in the following year. Between 1996 and 1998, young-of-the-year rockfish recruitment was generally higher around the platforms north of Point Conception in the Santa Maria Basin (Irene, Hidalgo, Harvest, and Hermosa) than at the structures in the Santa Barbara Channel (Holly, Grace, and Gail) (Figure 3.9). In contrast, these three years were a period of low rockfish recruitment for many species south of Point Conception both at platforms (Holly, Grace, and Gail) and natural outcrops. The colder water conditions of 1999 brought with it widespread recruitment for a number of rockfish species in California compared to the previous decades. This was reflected at all of the platforms surveyed (Figure 3.9). We should note that the 2000 data at Platforms A, B, C, Hillhouse, Hogan, Houchin, and Henry (see sidebar) strongly suggest that recruitment for some rockfish species, particularly blue and widow rockfishes, had been very successful in 1999. In 2000 and 2001, recruitment of some rockfish at Platforms Gail and Grace remained higher than pre-1999 levels (Figure 3.9). We hypothesize that this represents a successful response to the oceanographic regime shift to cooler temperatures that may be occurring in southern California and the greater northeast Pacific.

The population dynamics of bocaccio exemplifies the annual and geographic variability that occurs in rockfish recruitment at both platforms (Figure 3.9) and natural

Figure 3.10. Patterns of young-of-the-year (YOY) bocaccio settlement in 1999, as observed from the Delta *submersible surveys.*

outcrops (Figure 3.10). Prior to 1999, young-of-the-year bocaccio were absent at the platforms we surveyed (except Irene in 1996 and 1997). During 1999, large densities of young-of-the-year bocaccio were observed at Platforms Irene and Grace; small numbers of at least a few individuals were observed at most other platforms. Platform Grace provided the most striking example of inter-annual variability. Almost no young-of-the-year bocaccio were observed at Platform Grace prior to 1999. In contrast, during 1999, the platform harbored the third highest densities (after 1996 and 1999 at Platform Irene) of young bocaccio we observed around either platforms or natural outcrops during the six years of research. It is important to realize that even in years of relatively high rockfish recruitment, the actual process of settlement may result in a patchy distribution of young-of-the-year benthic recruits. Such patchiness was observed in the bocaccio recruitment pattern in 1999 at Platforms Grace and Gail, which are located only 8 km (5 miles) apart. While Platform Grace harbored large numbers of young bocaccio, they were much less abundant at nearby Platform Gail. Furthermore, our research has shown that successful rockfish recruitment at platforms does not always translate to similar high densities of these species at nearby natural outcrops. Using the *Delta*, in 1999 we also surveyed 12 natural outcrops located in depths suitable for bocaccio recruitment and found little evidence of bocaccio recruitment over any of these structures (Figure 3.10).

In 2000, we studied the midwater habitats of Platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat. These platforms, located off Summerland east of Santa Barbara (Figure 1.1), were home to many typical midwater reef fishes, including juvenile blue, olive, and widow rockfishes (of the 1999 year class), blacksmith, kelp rockfish, kelp bass, painted greenling, halfmoon, and sharpnose seaperch. Unlike the species assemblage of the further offshore and the more northerly platforms, both garibaldi and California sheephead were common. In 1998, we surveyed Platform Edith and again found a typical mix of reef fishes, including blacksmith, halfmoon, opaleye, sheephead, and garibaldi. Complete species assemblages for all of these platforms are found in Appendix 3.

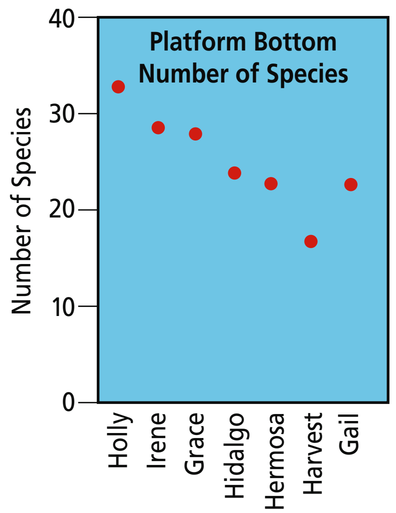


Figure 3.11. Number of species observed at the bottom of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

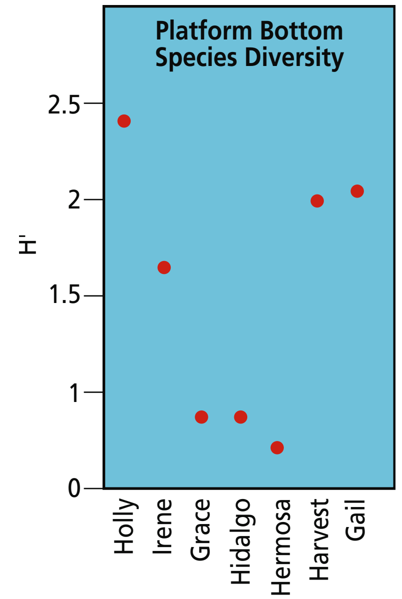


Figure 3.12. Diversity of fishes at the bottom of seven platforms, 1996–2001. Platforms are listed from left to right, from shallowest to deepest.

2c. Bottom Assemblages

Findings at a Glance

The bottom habitat of platforms is dominated by subadult and adult rockfishes. Young-of-the-year rockfishes were also abundant around some platform bottoms, occasionally in large numbers. In general, more than 90% of all the fishes found around platform bottoms were rockfishes. The numbers and estimated densities of all fishes in the bottom habitats are shown by platform in Appendix 3. Bottom depth strongly influenced the number of species, species diversity, and density of fishes living around platform bases. This is in direct contrast to the midwater habitat. The presence of young-of-the-year and older aged juveniles indicates that the bottom habitat of some platforms may be important nursery habitat for some species. The platform base appears to be important to many marine species, as it provides both refuge and prey.

Depth strongly influences fish assemblages in platform bottom habitat. Species richness varied widely from about 33 species at Platform Holly to 17 species at Platform Harvest. Generally, the shallower-water platforms harbored more species than platforms in deeper depths although this trend may have begun to reverse at Gail, the deepest platform (Figure 3.11). Species diversity was high at the shallowest and deepest platforms and lowest among the mid-depth structures (Figure 3.12). Conversely, overall fish densities were much higher at the mid-depth platforms than at the deepest platforms (Figure 3.13).

Diversity and abundance patterns were driven by the depth preferences of a suite of rockfishes that dominate the bottom habitats. For instance, brown, calico, copper, and vermilion rockfishes were most abundant around the shallower structures but were absent from the deepest platforms (Figure 3.13). Pile perch, painted greenling, and young-of-the-year lingcod displayed the same pattern. Juvenile lingcod were also abundant at the shallowest platforms, particularly at Platform Irene, but these were also occasional around even the deepest structures surveyed. Halfbanded rockfish and flag rockfish were typically found at the intermediate-depth platforms. Greenblotched, greenspotted, greenstriped, pinkrose, and stripetail rockfishes were most abundant around the deeper structures (Figure 3.13). The juveniles of many of these species were found in shallower water or on the shell mounds.

Platform structure in the bottom habitats may influence the distribution of fishes. This habitat encompasses that area where the platform jacket and conductors physically meet the seafloor. At all of the platforms surveyed, there is a crossbeam that rests on, or is close to, the bottom. Some portions of this crossbeam may be completely buried by sediment or undercut by currents. The platform jacket and, in particular, the undercut crossbeam, appears to provide many of the attributes of a natural outcrop, providing high relief and large crevices. Many species, such as canary, flag, vermilion, and widow rock-

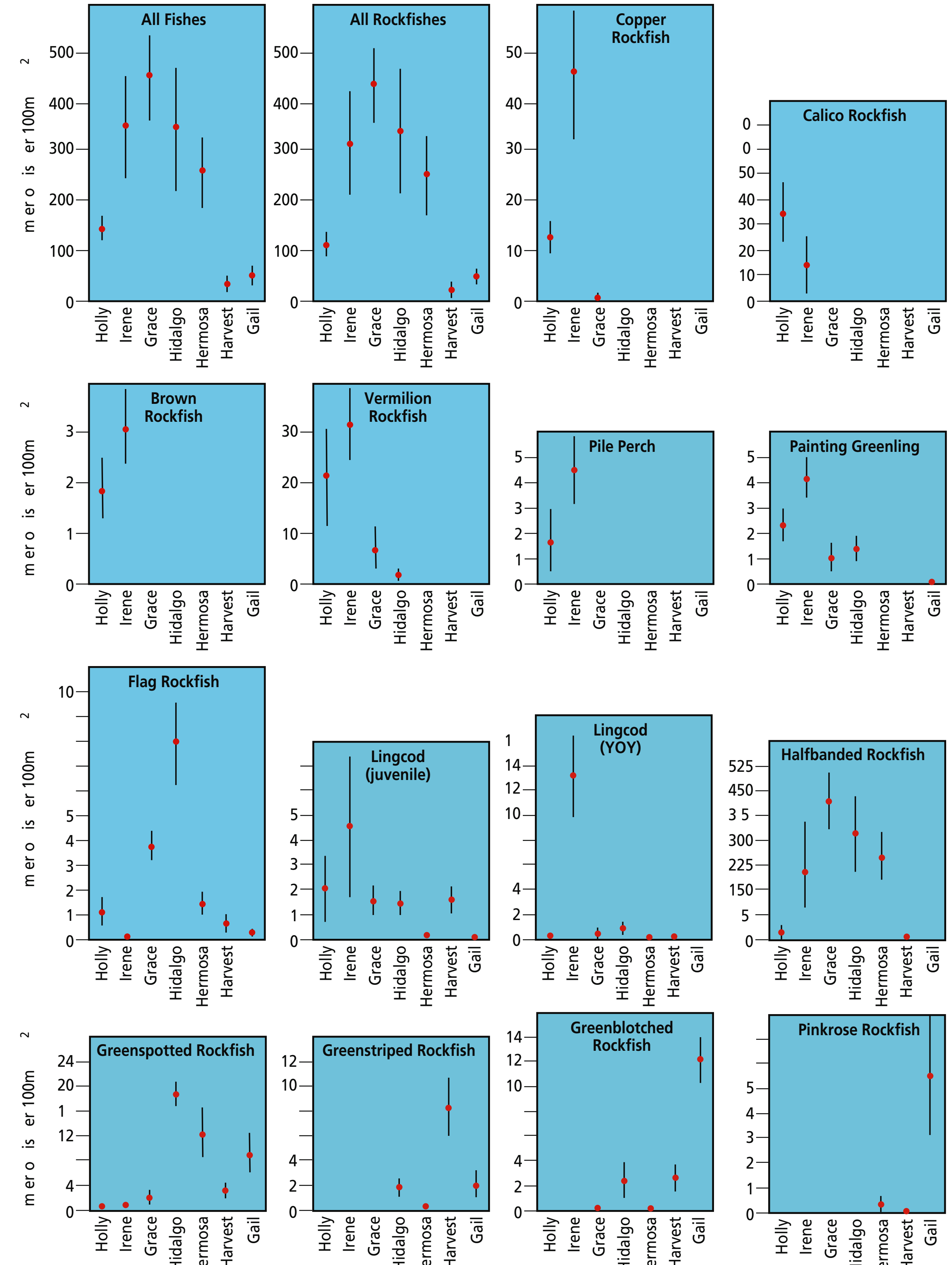


Figure 3.13. Densities (with standard error bars) of all fishes, all rockfishes and the most important species at the bottom of seven platforms, years combined, 1996–2001.

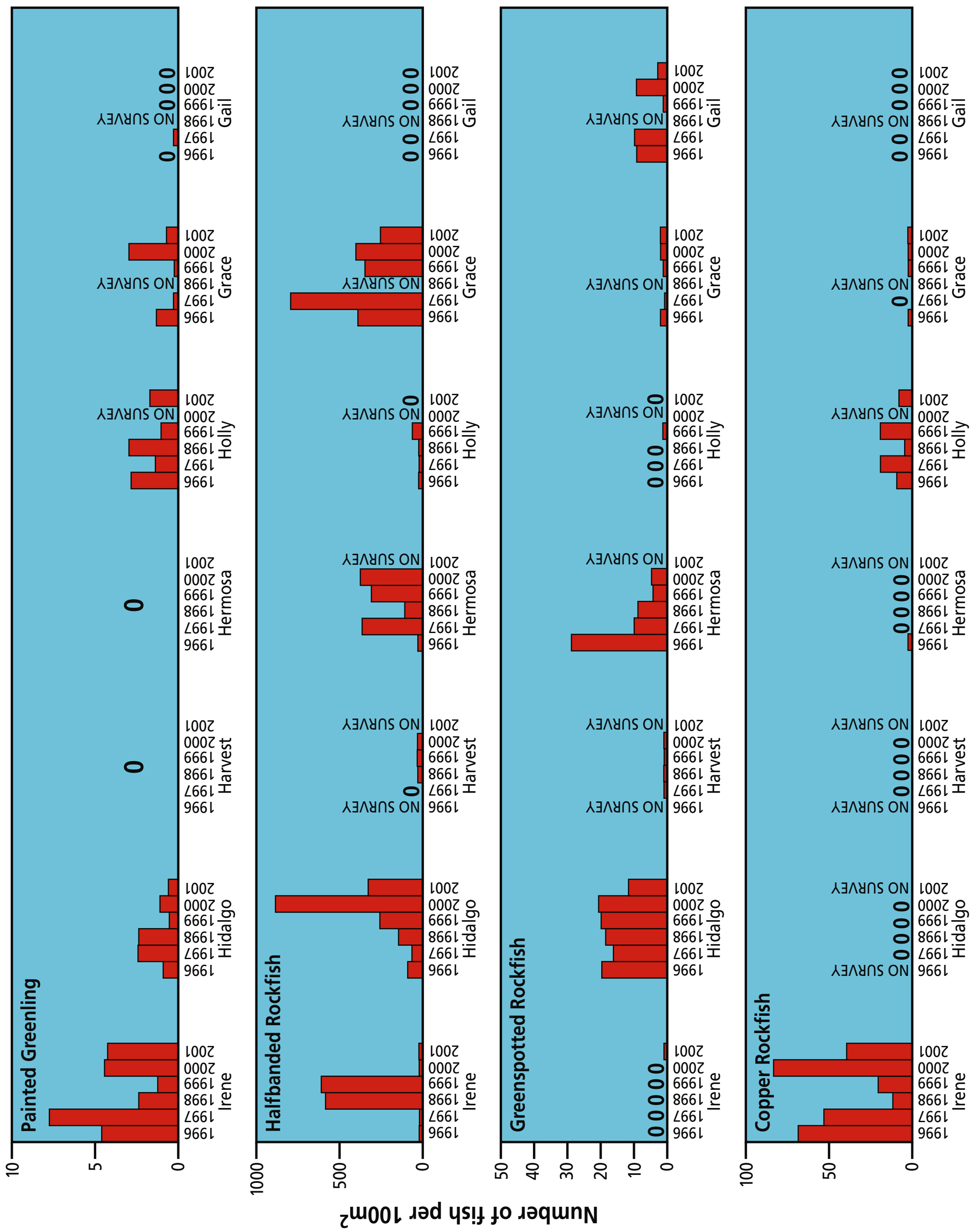


Figure 3.14a. Densities of selected species at the bottom of seven platforms, by platform, by year, 1996–2001.

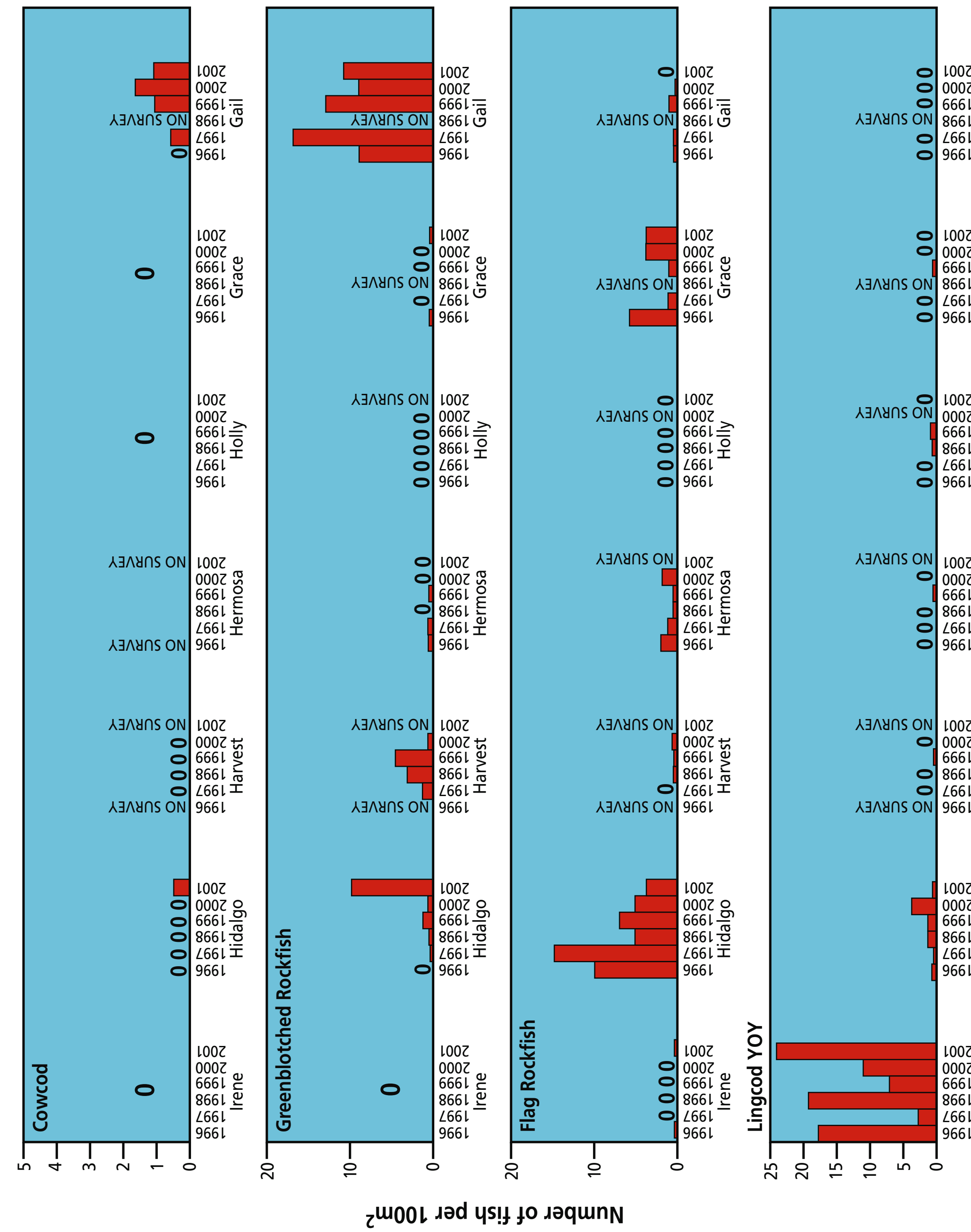


Figure 3.14b. Densities of selected species at the bottom of seven platforms, by platform, by year, 1996–2001.

MILTON LOVE

Bocaccio, bottom of Platform Gail.

DONNA SCHROEDER

Subadult vermilion rockfish, bottom of Platform Grace.

LINDA SNOOK

Cowcod, bottom of Platform Gail.

MILTON LOVE

Lingcod, bottom of Platform Gail.

fishes, bocaccio, pile perch, and painted greenling closely associate themselves with the platform jacket, particularly with the crossbeam. Similarly, larger copper, greenspotted, greenblotched, and pinkrose rockfishes and cowcod tend to shelter inside or immediately next to the platform. These fishes were particularly abundant where a space formed between the lowest crossbeam and the seafloor. Calico and greenstriped rockfishes and various life stages of lingcod were less closely associated with the structure. While most species rarely ascend more than a meter or two above the seafloor, bocaccio and halfbanded rockfish often rose as much as 5 m (17 ft.) above the bottom.

LINDA SNOOK

Mexican and greenspotted rockfishes, bottom of Platform Gail.

Most platform bottom species are either solitary or shelter in small groups. The exceptions are young-of-the-year rockfishes, juvenile and subadult brown, copper, halfbanded, and vermilion rockfishes, and bocaccio. On a number of occasions, we observed aggregations of tens and hundreds of brown, copper, and vermilion rockfishes and bocaccio and large schools of halfbanded rockfish comprised of thousands of individuals.

Compared to midwater habitats, the fish species compositions at platform bottoms were relatively stable over time (Figures 3.14a, b). The dominant species varied little between years at any platform. Thus a platform, such as Gail, that was dominated by adult greenspotted and greenblotched rockfishes, bocaccio, and cowcod in one year tended to be inhabited by these same species in all years in about the same abundances. Similar patterns were observed for such common species as painted greenling (Platforms Irene and Holly), greenspotted rockfish (Platforms Hidalgo and Hermosa), copper rockfish (Platforms Irene and Holly), and flag rockfish (Platform Hidalgo). It is likely that we were observing some of the same individuals each year. This constancy would be expected as these assemblages are at least partially composed of subadult and adult stages of relatively sedentary and long-lived rockfishes. Thus, the composition of the bottom assemblages is not determined by the year-to-year fluctuations in year-class success that is characteristic of the platform midwaters. However, the densities of a few important species, particularly halfbanded rockfish, varied annually. In some years halfbanded rockfish were essentially absent from a platform bottom, only to be extremely abundant the following year. Schools of this species are highly mobile and may have been present but not in the vicinity of the submersible when the survey was made.

Our observations indicate that the bottom habitat of some platforms may be particularly important for certain species. For example, young-of-the-year lingcod densities were much higher at Platform Irene and Hidalgo than at any natural outcrop during any year of the survey (Appendix 4).

Unlike most of the fishes living in the platform midwater, it is likely that the majority of the platform bottom-dwelling species feed on platform-associated prey. Many of these species, such as brown, copper, and flag rockfishes, eat a variety of crustaceans, molluscs, and small fishes, many of which live in and around the jacket, conductors, and shell mound. Other species, such as lingcod, cowcod, and bocaccio are opportunistic feeders, preying on a very wide range of organisms, including benthic and water column fishes, molluscs, and crustaceans (Love et al. 2002). Thus, for many benthic fishes, the platform base provides not only shelter but also an abundant source of food.

We conducted one survey, in 1998, around the base of Platform Edith. We found that California scorpionfish, sharpnose seaperch, blacksmith, and blackeye goby were the most abundant species. See Appendix 3 for a complete species list.

2d. Shell Mound Assemblages

Findings at a Glance

Shell mounds support a rich and diverse fish assemblage. As at other platform habitats, rockfishes comprise the vast majority of the fishes. The many small sheltering sites created by mussels, anemones, and other invertebrates on the shell mounds provided structure in a habitat dominated by small fishes. Many of these fishes are the young-of-the-year and older-aged juveniles of lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod. The adults of these species inhabit the platform bottom.

Depending on platform, we observed between 17 and 30 species living on this habitat. In the shell mound habitat, the patterns of species numbers, diversity, and fish densities were similar to those observed around the platform bottoms. Species numbers generally decreased with increasing depth (Figure 3.15) although it increased sharply at the Platform Gail, the deepest structure. This increase was due to the occurrence of a number of deeper water species (e. g., rex sole, blackgill rockfish, and California smoothtongue) that were absent from other platforms. As in the platform bottom habitat, species diversity was highest at the shallowest and deepest platforms compared to shell mounds in intermediate depths (Figure 3.16).

The shell mounds surrounding all platforms provided habitat and refuge for a diverse assemblage of fishes. Fish densities were highest on the intermediate-depth platform shell mounds (Figure 3.17). However, as in the platform midwater and bottom, a majority of these fishes are rockfishes; between 53% and 98% of all fishes living on the shell mounds are rockfishes (Appendix 3). Furthermore, when highly migratory and non-resident species, such as Pacific hake and Pacific sardine, are eliminated from the analysis, rockfishes comprise more than 80% of the shell mound fauna at each of the seven platforms surveyed. Those species most characteristic of the shell mounds exhibited distinct depth preferences (Figure 3.17) and the abundance of some of these fishes was responsible for the higher densities in the intermediate bottom depths. The dominant species of the shallow water shell mounds were vermilion, copper, and calico rockfishes, young-of-the-year and immature lingcod, and painted greenling. A few species, such as greenspotted and halfbanded rockfishes, were most common in the intermediate bottom depths. It was primarily the very high densities of halfbanded rockfish that were responsible for the overall high densities at intermediate-depth shell mounds. Greenstriped, pinkrose, and stripetail rockfishes

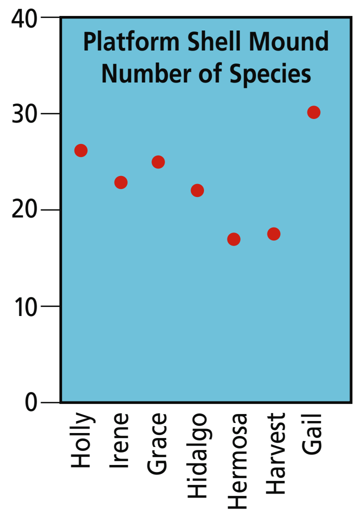


Figure 3.15. Number of fish species observed on the shell mounds of seven platforms, 1996–2001. Platforms listed left to right from shallowest to deepest.

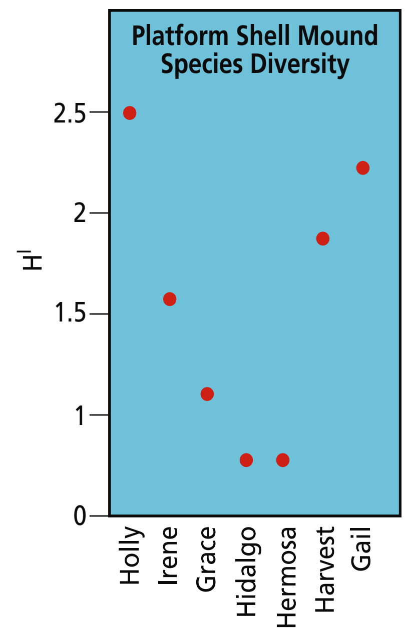


Figure 3.16. Diversity of all fishes observed on the shell mounds of seven platforms, 1996–2001. Platforms are listed left to right from shallowest to deepest.

were most abundant at the deepest platforms surveyed.

The mosaic of small refuge sites created by mussels, anemones, and other invertebrates are occupied by small fishes. Many of these fishes are the juveniles of such species as lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod, whose adults inhabit the adjacent platform bottom. Small sheltering sites are rarely found at the platform bottom. In part, this explains why fishes tend to be smaller on a shell mound than on the associated platform bottom (Table 2). This also explains why the shell mound assemblage so closely resembles its counterpart around the adjacent platform bottom. Painted greenling, calico, and halfbanded rockfishes, shortspine combfish, blackeye goby, and the poachers are among the dwarf species occupying the shell mound. Juveniles of the species characteristic of platform midwaters, such as blue and widow rockfishes, are rare over the shell mounds.

Most shell mound species are solitary fishes, living just above the seafloor or nestled among the shell debris or around anemones, seastars, and other large invertebrates. The only schooling species is the halfbanded rockfish that often forms highly mobile schools of 100 to 1,000 or more individuals.

It is likely that many of the fishes, including most of the rockfishes, combfishes, painted greenling, and other benthic species are resident to the shell mound habitat. Highly mobile and migratory species, such as northern anchovy, Pacific sardine, and juvenile Pacific hake, that were observed over the shell mounds probably spend only a relatively short period associated with this habitat.

Shell mound surveys were conducted around Platform Edith in 1998 and around Platform C in 2000. Young vermilion rockfish, as well as halfbanded and calico rockfish, were the most abundant species around Platform C. These species were also characteristic of the shell mound at Platform Holly, which lies in a similar depth. California scorpionfish and blackeye goby dominated the shell mound around platform Edith. Edith lies a few miles southeast of Long Beach and near a known California scorpionfish spawning grounds (Love et al. 1987). California scorpionfish are relatively uncommon in the Santa Barbara Channel and are rare north of Point Conception. This distribution explains the near absence of this species from other shell mounds we surveyed.

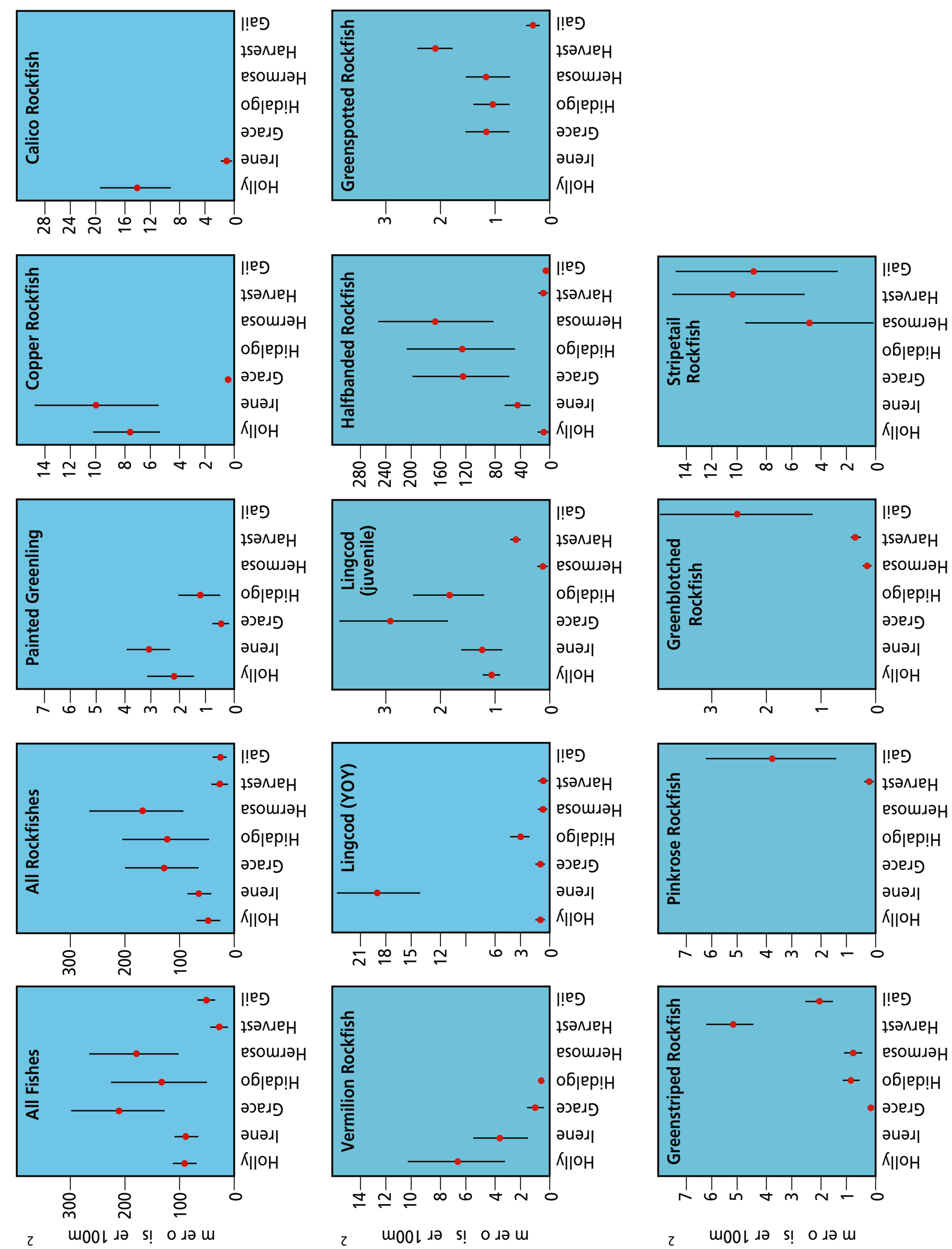


Figure 3.17. Density (with standard error bars) of all fishes, all rockfishes, and the most abundant shell mound fish species found around seven platforms, 1996–2001. Platforms are listed left to right from shallowest to deepest.

Pinkrose rockfish, shell mound of Platform Gail.

Greenspotted and flag rockfishes, shell mound of Platform Gail.

Young-of-the-year cowcod on shell mound of Platform Gail.

Halfbanded rockfish, shell mound of Platform Hidalgo.

3. A Comparison of Fish Assemblages at a Deeper Platform and a Nearby Natural Outcrop: Hidalgo and North Reef

Findings at a Glance

The species composition at Platform Hidalgo and North Reef are quite similar as both structures are dominated by rockfishes. In general, the distinctions between the platform and reef assemblages were based on differences in species densities (rather than species presence or absence). Most species were more abundant at Platform Hidalgo than at North Reef. Halfbanded, greenspotted, flag, greenstriped, and canary rockfishes, all three life stages of lingcod (young-of-the-year, immature, adult), and painted greenling all had higher densities around the platform. Five species (i. e., pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the reef. The dominance of small fishes at North Reef probably reflects fishing pressure that has cropped larger individuals. Young-of-the-year rockfishes were found at both Platform Hidalgo (primarily in the midwaters) and at North Reef. In each of five years, young-of-the-year rockfish density was higher at the platform than at the reef. In several years, densities of these young fishes were more than 100 times greater at Platform Hidalgo than at North Reef.

We surveyed the fish assemblages at Platform Hidalgo and a nearby natural outcrop, North Reef, for the period 1996–2001. North Reef was compared with Platform Hidalgo because it is close to the platform (about 1,000 m, 3,300 ft., north of the platform) (Figure 3.18), and its depth (112 m, 370 ft.) is comparable to the platform's 130 m (430 ft.). North Reef is a hard carbonate scarp, which is 1–4 m (3–13 ft.) high, 3,353 m^2 in area and contains numerous boulders, caves, and crevices.

The species composition at Platform Hidalgo and North Reef are very similar (Table 3). Both habitats are dominated by rockfishes; they comprised 98.3% and

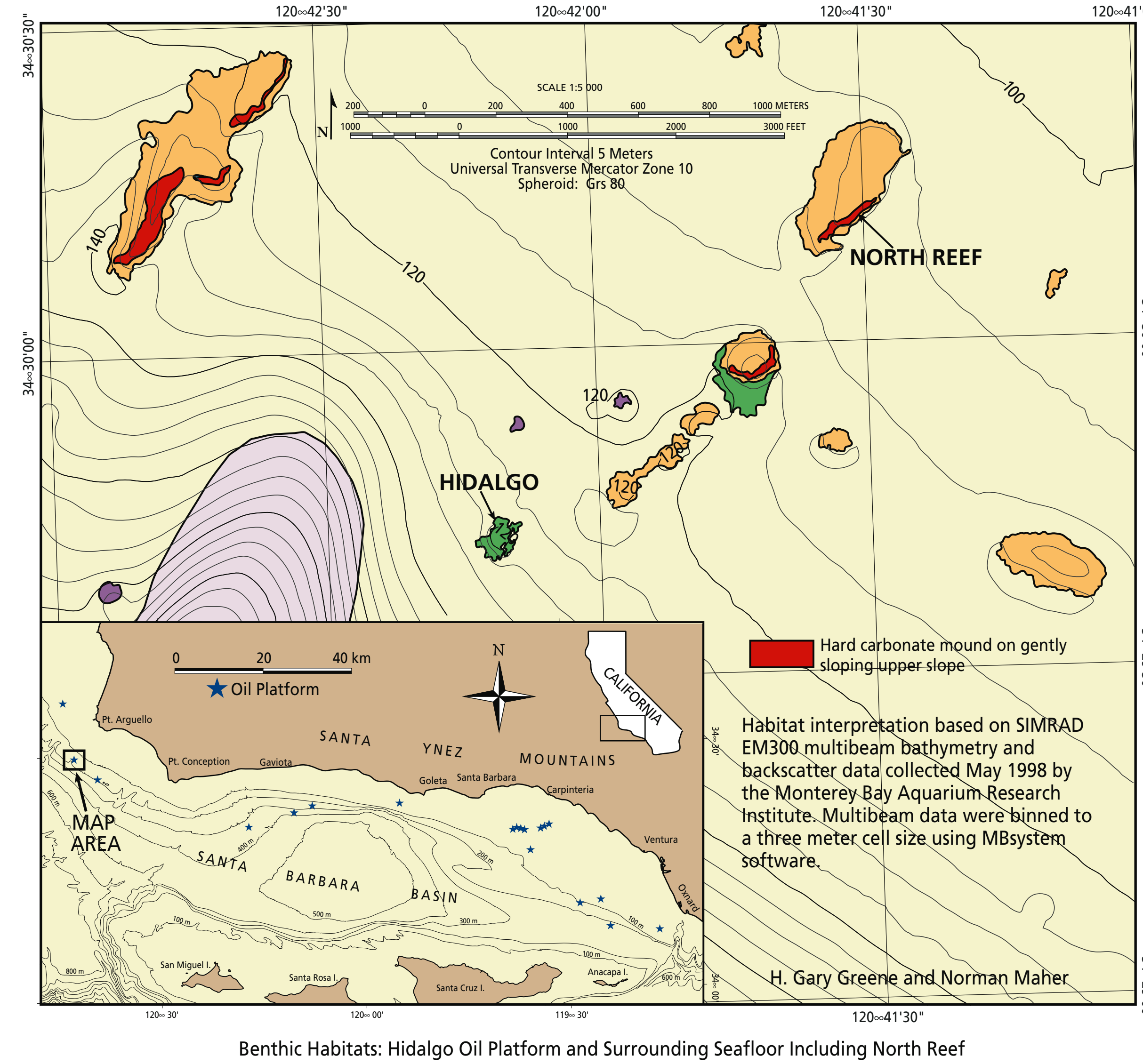


Figure 3.18. Locations of Platform Hidalgo and North Reef. Seafloor characterization by Gary Greene, Moss Landing Marine Laboratory.

96.6% of all fishes at Platform Hidalgo and North Reef, respectively. We observed a minimum of 34 fish species at each location. A few species were unique to each structure. Copper and stripetail rockfishes and California scorpionfish were found only at Platform Hidalgo, while blackeye goby, bluebarred prickleback, Pacific argentine, speckled sanddab, and an unidentified cuskeel were present only at North Reef. None of these species were major constituents of their respective fish communities.

However, when taking into consideration the fish assemblages of the three habitats (midwater, bottom, and shell mounds) at Platform Hidalgo, each was somewhat distinct from that of North Reef (Figure 3.19). To characterize and distinguish between the species assemblages at Platform Hidalgo and North Reef, we compared only the benthic assemblages of the platform bottom and shell mound and North Reef. Canonical discriminant analysis showed that species assemblages at the bottom of Platform Hidalgo and its shell mound were somewhat different from each other and from the North Reef assemblages (Figure 3.20a). The platform bottom assemblage was characterized by a suite of rockfishes, including bocaccio and cowcod, flag, vermilion, and widow rockfishes and lingcod. The shell mound assemblage was similar to and overlapped with the platform bottom, but was characterized by smaller fishes, such as swordspine,

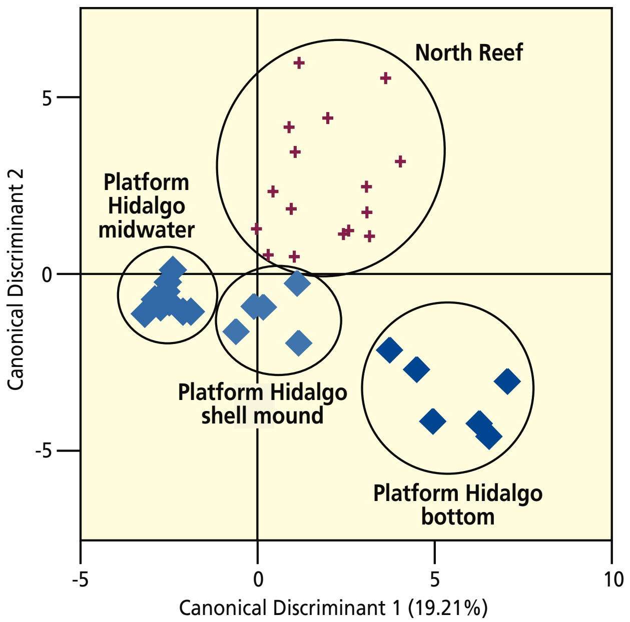


Figure 3.19. Canonical Discriminant Analysis of fish assemblages at Platform Hidalgo, midwater, bottom, and shell mound habitats and North Reef, 1996–2001.

greenstriped and halfbanded rockfishes, painted greenling, and juvenile lingcod (Figure 3.20b).

In general, the distinctions between the platform and reef assemblages were based on differences in species densities rather than species presence and absence. The densities of a range of species varied between the two sites (Figure 3.21) and most exhibited higher densities at Platform Hidalgo than at North Reef (Figure 3.21). Halfbanded, greenspotted, flag, greenstriped, canary rockfishes, all three life stages of lingcod (young-of-the-year, immature, adult), and painted greenling were among the species that were more abundant around the platform. Five species (pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the reef.

Young-of-the-year rockfishes were common at both Platform Hidalgo (primarily in the midwaters) and at North Reef, although species differences were observed. From our submersible surveys, we identified at least seven species of young-of-the-year rockfishes at Hidalgo (e.g., blue, bocaccio, olive, pygmy, squarespot, widow, and yellowtail). Our scuba surveys around that platform also noted young-of-the-year of the "copper complex," composed of black-and-yellow, copper, gopher, and kelp rockfishes. Most of the young-of-the-year rockfishes at North Reef appeared to be pygmy, squarespot, and widow rockfishes.

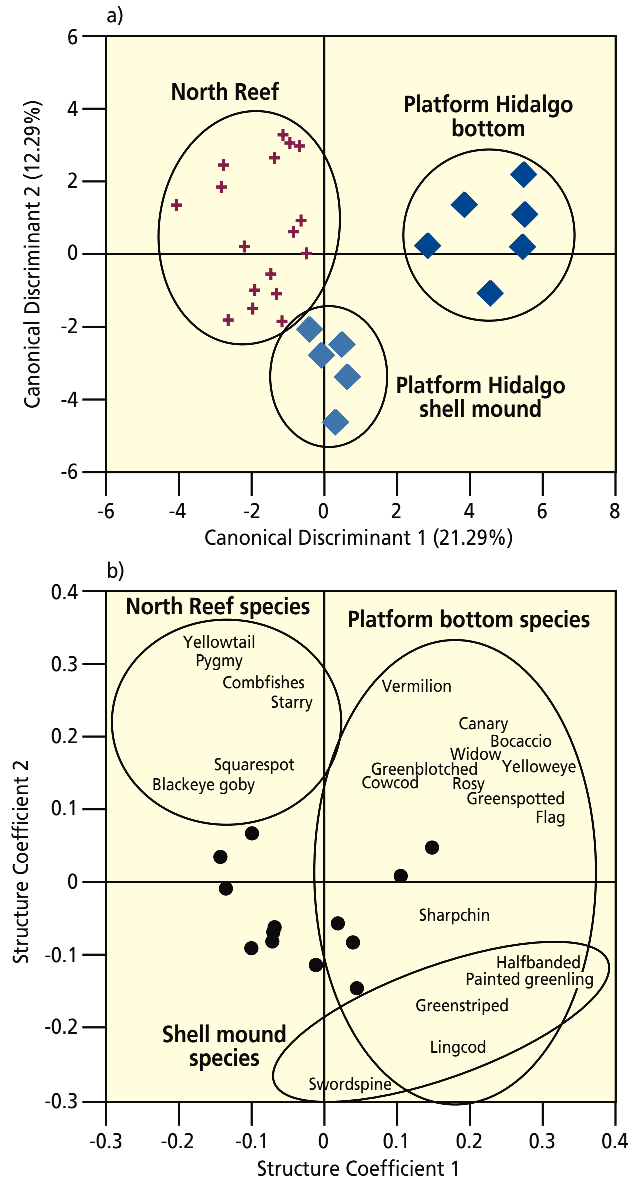


Figure 3.20. 3.20a. Canonical Discriminant Analysis of fish assemblages at Platform Hidalgo bottom and shell mound habitats and North Reef, 1996–2001. Each yearly survey at North Reef was comprised of 2–3 transects and thus each year's survey is represented by more than one cross. 3.20b. Canonical Discriminant Analysis of the species found around Platform Hidalgo, bottom and shell mound and North Reef, 1996–2001. Dots represent species that were not strongly associated with either axis.

The mean density of young-of-the-year rockfishes in the midwater habitat of Platform Hidalgo was higher than at North Reef (Figure 3.21). This probably reflects greater rockfish recruitment to the platform. This has important implications with respect to platform habitat values regarding settlement and fish production around

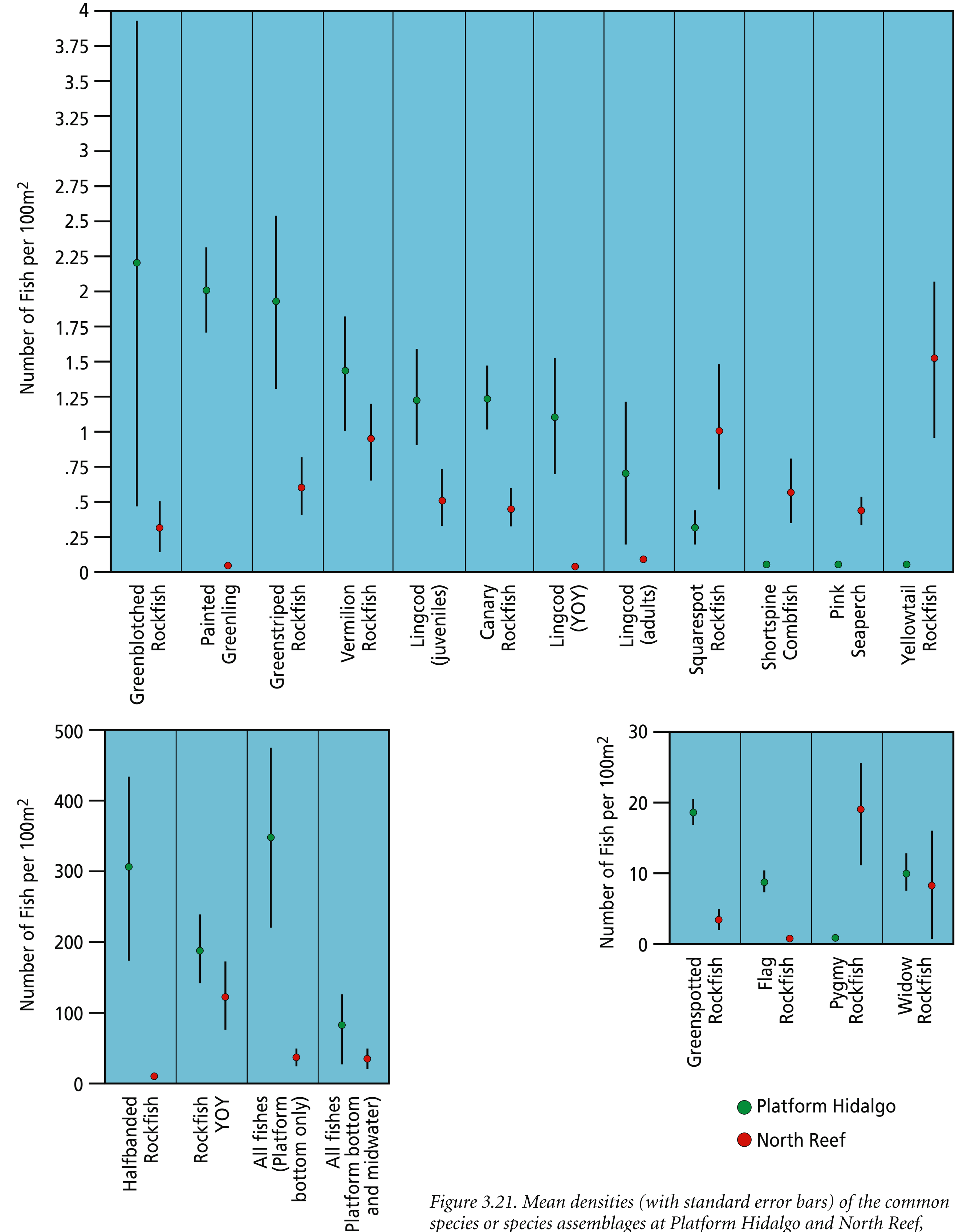


Figure 3.21. Mean densities (with standard error bars) of the common species or species assemblages at Platform Hidalgo and North Reef, 1996–2001. Species or species assemblages are grouped by abundance.

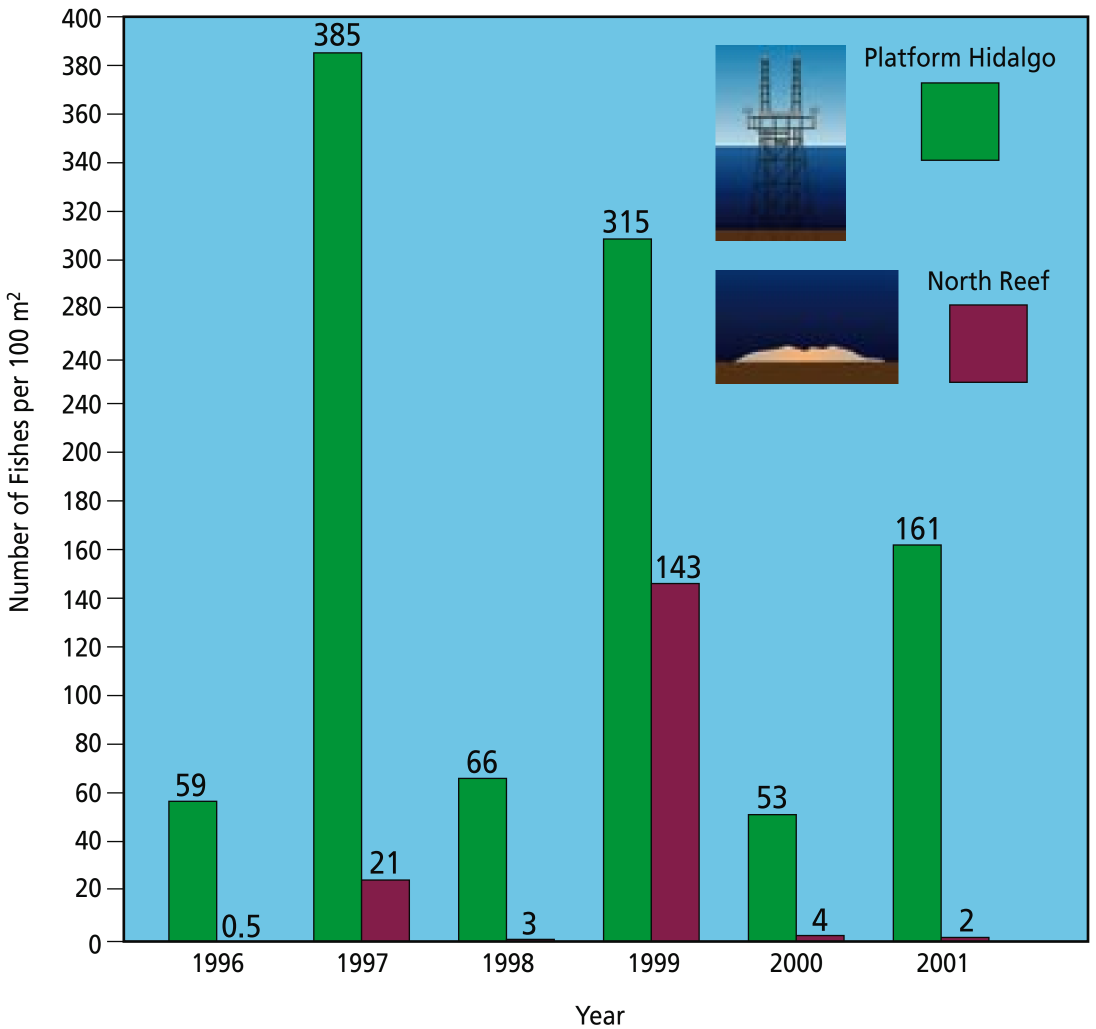


Figure 3.22. Mean densities of young-of-the-year rockfishes, all species combined, at Platform Hidalgo midwater and North Reef, 1996–2001.

these structures. This recruitment pattern was repeated in each year of our surveys as young-of-the-year rockfish densities were always greater at the platform than at the outcrop (Figure 3.22). In some years, densities were more than 100 times greater at the platform.

4. A Comparison of Fish Assemblages of Platforms and Natural Outcrops off Central and Southern California

Findings at a Glance

Based on surveys of seven platforms and over 80 natural outcrops, rockfishes dominate almost all of the platform and hard seafloor habitats. A greater number of species was observed at the natural outcrops (94) than at the platforms (85). There is a high degree of overlap in species composition and differences are primarily due to generally higher densities for more species at platforms. In particular, widow rockfish young-of-the-year, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, and vermilion rockfishes, bocaccio, painted greenling and all life history stages of lingcod were more abundant at platforms. Yellowtail rockfish and the dwarf species pygmy, squarespot, and swordspine rockfishes were more abundant on natural outcrops. Some of these differences can be explained by recruitment (settlement) processes and the greater chance for survival at the platform habitats. We believe that as fish size increases with age the platforms act as de facto marine reserves because fishing pressure is light or nonexistent. Platforms can be characterized as having higher densities of young-of-the-year rockfishes than natural outcrops.

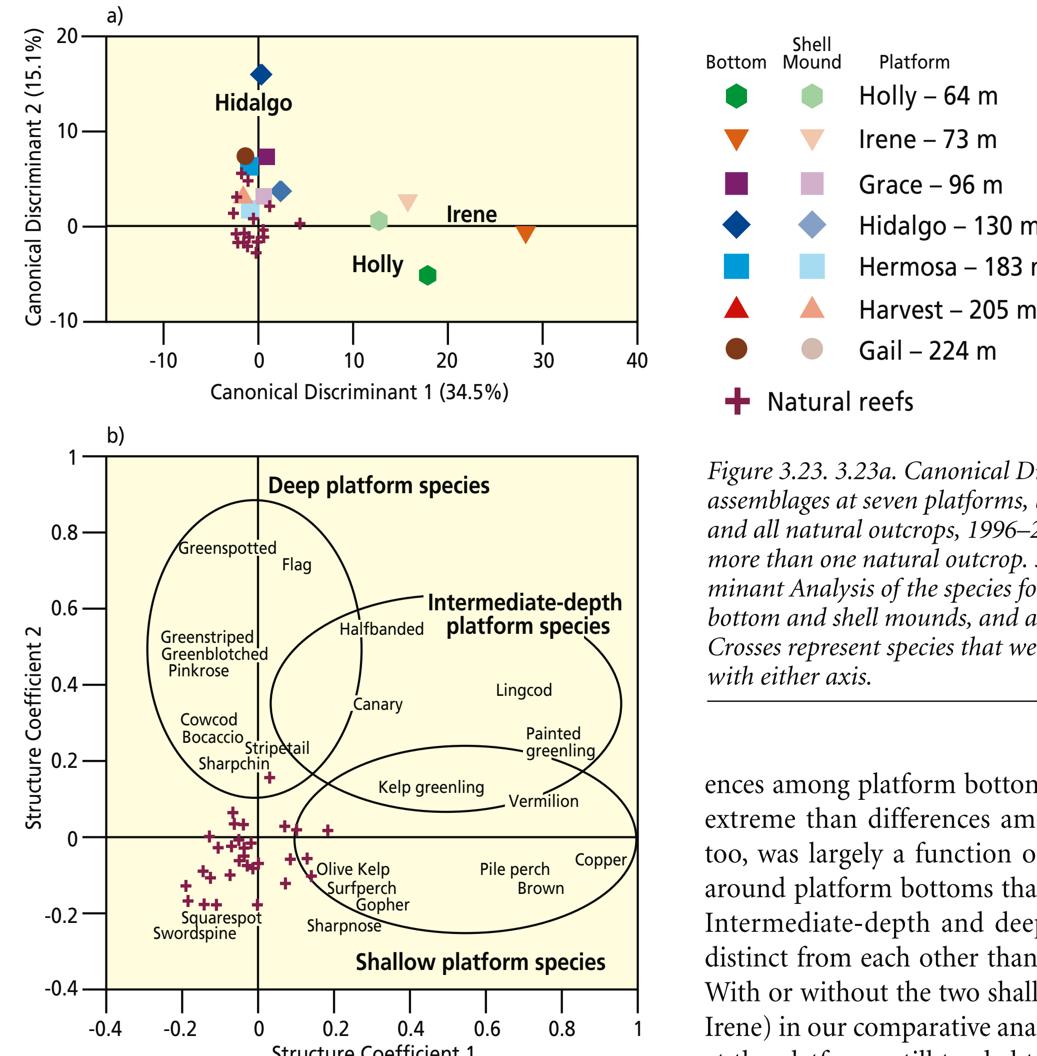


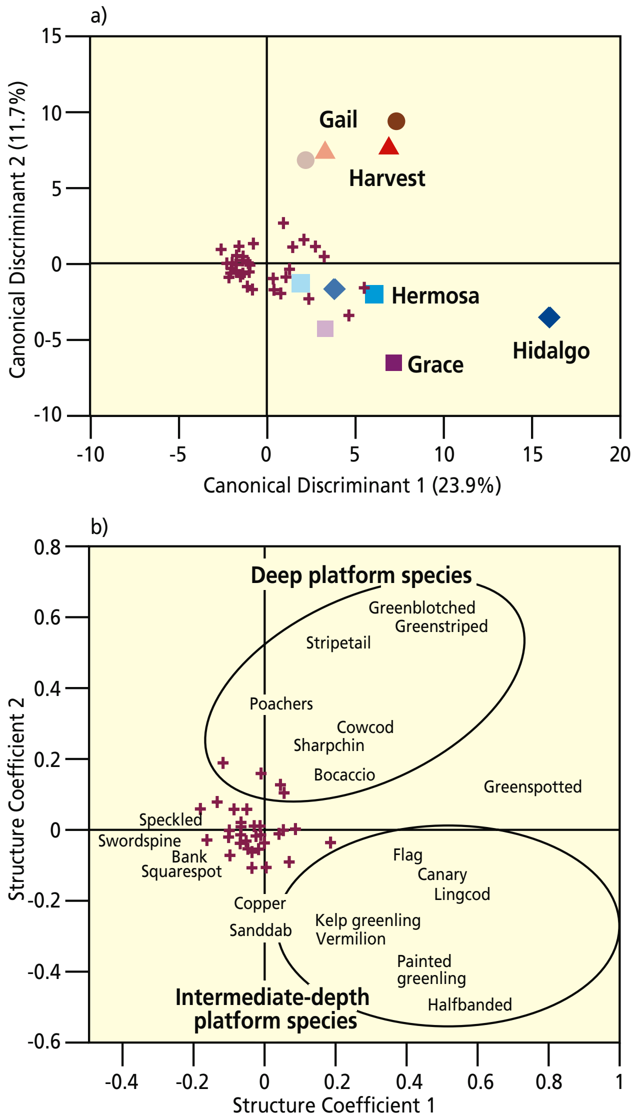
Figure 3.23. 3.23a. Canonical Discriminant Analysis of fish assemblages at seven platforms, bottom and shell mound, and all natural outcrops, 1996–2001. Each cross represents more than one natural outcrop. 3.23b. Canonical Discriminant Analysis of the species found at seven platforms, bottom and shell mounds, and all natural reefs, 1996–2001. Crosses represent species that were not strongly associated with either axis.

We compared the fish assemblages from the deeper parts of seven platforms (below about 30 m, 100 ft.) with those of similar depth natural outcrops. Analyses were based on platform surveys and on 133 dives at over 80 natural outcrops throughout southern California and off Point Conception and Point Arguello (Figure 1.5).

We observed at least 85 species at platforms and 94 species at outcrops (Table 4). Rockfishes dominated both habitats, comprising 89.7% of all fishes at platforms and 92.5% at outcrops. Platform fish assemblages were somewhat different from those of natural outcrops (Figures 3.23a, b). However, these differences were due almost entirely to the generally greater numbers, of more species, of fishes around platforms, rather than differences in species composition between platforms and outcrops.

There was a distinct assemblage of fishes at the two shallow platforms, Holly and Irene, and another composed of species occupying the deeper platforms. Differences among platform bottom assemblages were more extreme than differences among shell mounds. This, too, was largely a function of greater fish abundance around platform bottoms than over the shell mounds. Intermediate-depth and deepest platforms were less distinct from each other than from shallow platforms. With or without the two shallow platforms (Holly and Irene) in our comparative analysis, the fish assemblages at the platforms still tended to be different from those at the natural outcrops (Figures 3.24a, b). These differences were primarily due to most fish species being more abundant at platforms than at outcrops (Figure 3.25). Widow rockfish young-of-the-year, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, and vermilion rockfishes, bocaccio, painted greenling, and all life history stages of lingcod were more abundant at platforms. Species that were more abundant at natural outcrops than platforms included pygmy, squarespot, swordspine, and yellowtail rockfishes.

Platforms tended to harbor higher densities of young-of-the-year rockfishes than did natural outcrops. Young-of-the-year rockfishes primarily occurred in the platform midwaters. Thirteen of the 20 highest young-of-the-year rockfish densities were observed at Platforms Grace, Harvest, Hermosa, Hidalgo, Holly, and Irene (Table 5). The highest young-of-the-year rockfish densities over natural outcrops were usually at high relief sites well away from the mainland. The California Current, which is centered



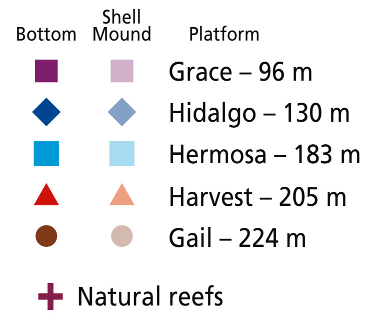


Figure 3.24. 3.24a. Canonical Discriminant Analysis of fish assemblages at five platforms (shallower platforms Holly and Irene deleted), bottom and shell mound, and all natural outcrops, 1996–2001. Each cross represents more than one natural outcrop. 3.24b. Canonical Discriminant Analysis of the species found at five platforms (shallower platforms Holly and Irene deleted), bottom and shell mound, and all natural outcrops, 1996–2001. Crosses represent species that were not strongly associated with either axis.

offshore of the coastal shelf, influences these locations (e.g., San Nicolas and San Miguel islands) more than the mainland sites we surveyed. Furthermore, our observations strongly imply that the midwaters of many platforms bear a striking resemblance to some of the relatively shallow and steep-sided outcrops (such as those on Hidden Reef) that dot the outer continental shelf of southern California. In both cases, the assemblages are dominated by young rockfishes and larger fish predators are relatively uncommon. Thus, survivorship of young fishes may be higher in both habitats due to lowered predation rates.

The role that some platforms play as defacto marine refuges is supported by evidence of greater densities of rockfishes, particularly the larger size classes, at platforms compared to natural outcrops. As an example, densities tended to be higher at some platforms than at natural outcrops for: (1) all rockfishes regardless of size, (2) all rockfishes greater than or equal to 30 cm (12 in.), (3) adult bocaccio, and (4) adult cowcod (Figures 3.26–3.29). Our experience is that rockfishes are most susceptible to being caught by both recreational and commercial gear when they reach about 30 cm (12 in.); thus, densities of fishes of this or larger sizes would be an indication of fishing pressure. Adult bocaccio and cowcod are overfished species with population sizes at levels less than 10% of unfished stock. These fishes at one time were abundant in southern California.

Rockfishes were observed at all of the platforms and outcrops we surveyed, with the exception of two sites on Piggy Bank (Figure 3.26). The highest rockfish densities (500 rockfishes or more per 100 m^2) occurred at four platforms and at five natural outcrops; all of these structures were nursery grounds for young-of-the-year rockfishes. The assemblages of most of the other platforms and outcrops that harbored relatively high rockfish densities also were primarily composed of small rockfishes, both immature individuals and dwarf species. This can be clearly seen when we focussed on rockfishes 30 cm (12 in.) or larger (Figure 3.27). The paucity of rockfishes 30 cm (12 in.) or larger is evident even at the most productive sites (Figure 3.27). Highest densities of large rockfishes (10 rockfishes or more per 100 m^2) occurred at three platforms and two natural outcrops. Many sites harbored no or only a few larger rockfishes.

Almost all of the natural outcrops we studied should have harbored large numbers of larger rockfishes. Their absence or rarity is almost certainly attributable at least

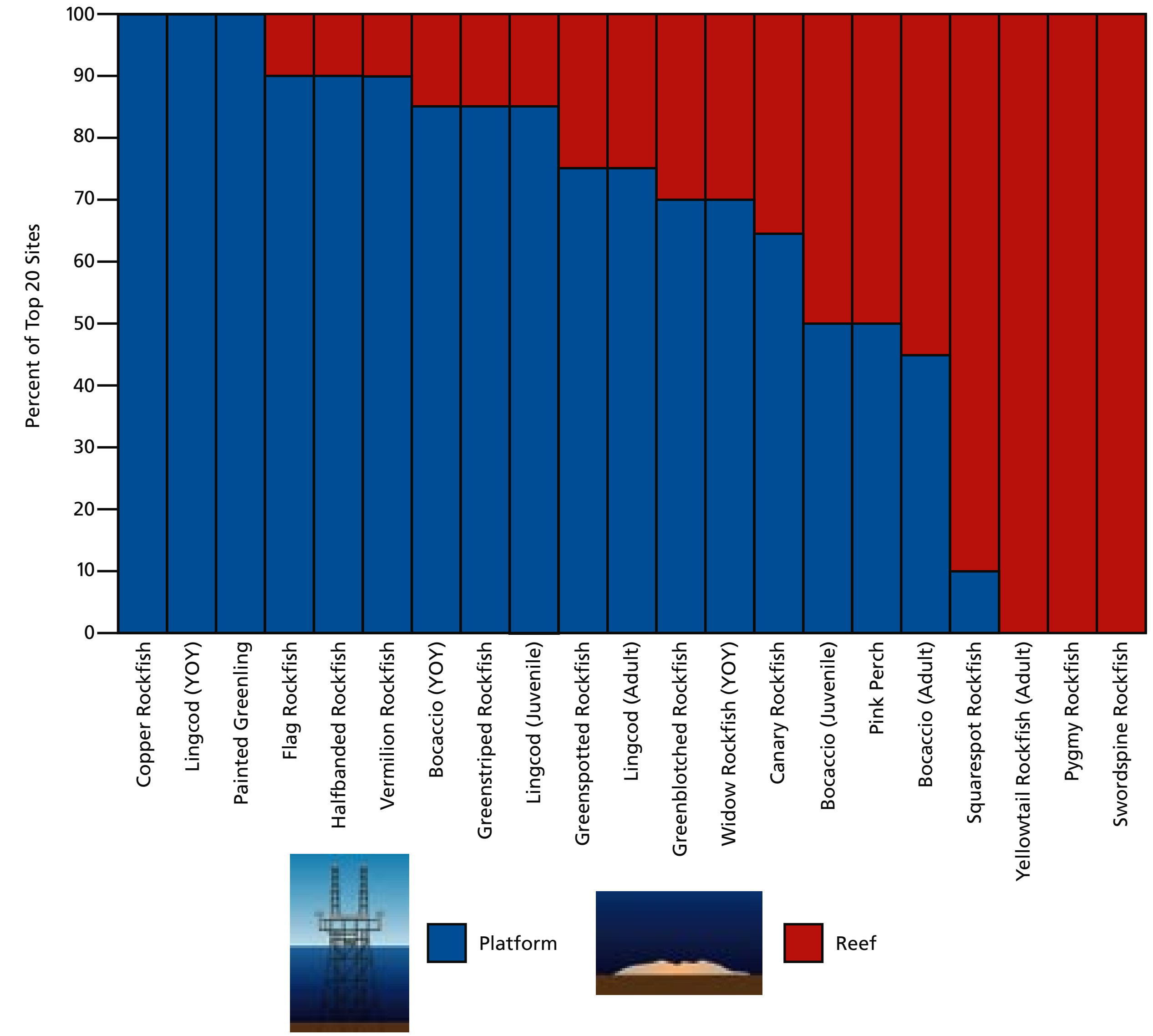


Figure 3.25. The relative importance of seven platforms (Irene, Hidalgo, Harvest, Hermosa, Holly, Grace, and Gail) and about 80 natural outcrops off central and southern California as habitat for common reef fish species. Densities of these species were computed for each year, at each location (platform midwater, bottom and shell mound, and natural outcrops) and ranked from highest to lowest. This figure displays the percentage that platforms or natural outcrops comprised of the top 20 densities for each species (or species' life history stage). For example, of all sites where copper rockfish were observed, the highest 20 densities were at various platforms, in a number of years. Similarly, the highest 20 densities of swordspine rockfish were all at natural outcrops. See Appendix 4 for underlying data.

in part to fishing pressure. These sites were comprised of boulders or other structures that were suitable shelter sites for larger sized rockfishes. A few outcrops, such as sites near the Potato and Osborn Banks, were composed of cobble, a habitat that is less likely to harbor large rockfishes. Adult bocaccio were only abundant around Platform Gail and were relatively common at Platform Hidalgo, Reef "D" near that platform and a few sites around the northern Channel Islands (Figure 3.28). Even at these natural outcrops, many shelter structures contained no or few adult bocaccio. Cowcod densities were also depressed (Figure 3.29). Relatively few rock outcrops surveyed contained adults, and platform Gail harbored the highest densities, although even here numbers were low. In general, the highest densities of adult bocaccio and cowcod occurred at platforms or at those outcrops that were protected from harvest by distance from ports or by being situated in areas susceptible to poor weather conditions.

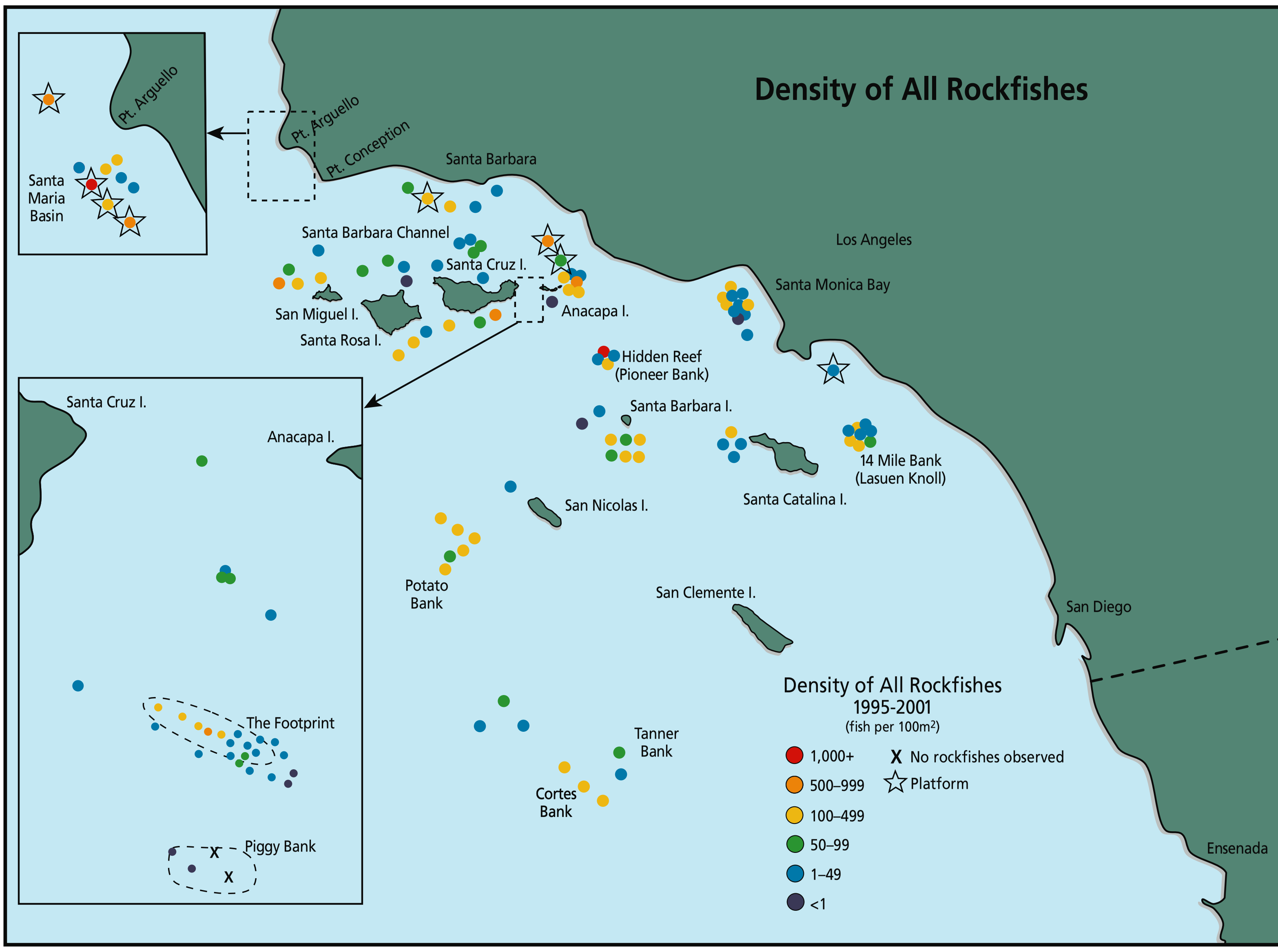


Figure 3.26 . Density of all rockfishes, regardless of size, as observed from the Delta *submersible on platforms and natural outcrops, 1995–2001. Fish densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail, North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years.*

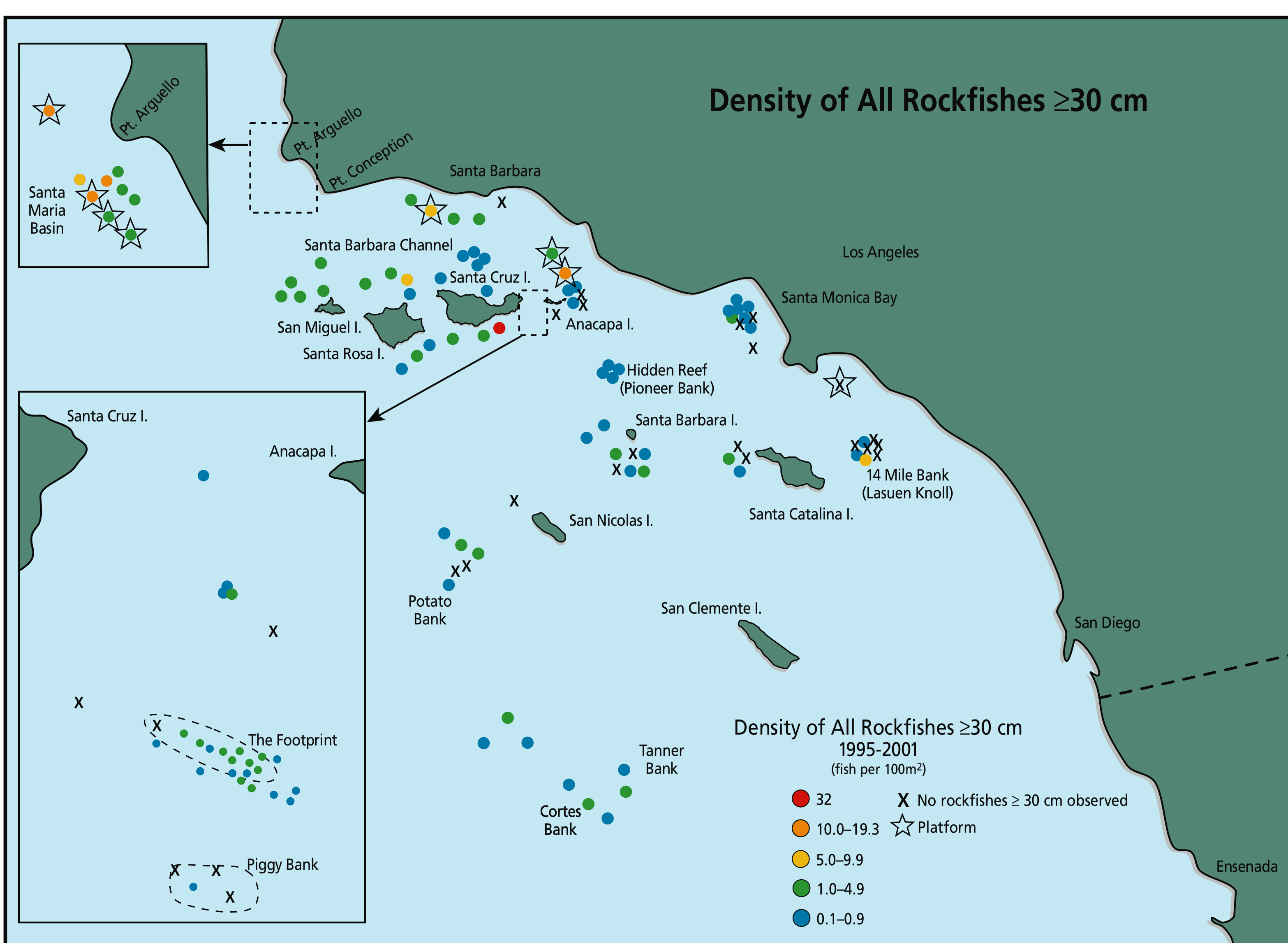


Figure 3.27. Density of all rockfishes larger than or equal to 30 cm as observed from the Delta *submersible on platforms and natural outcrops, 1995–2001. Fish densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hillhouse, Hogan, Houchin, and Henry were not included because they were not completely surveyed.*

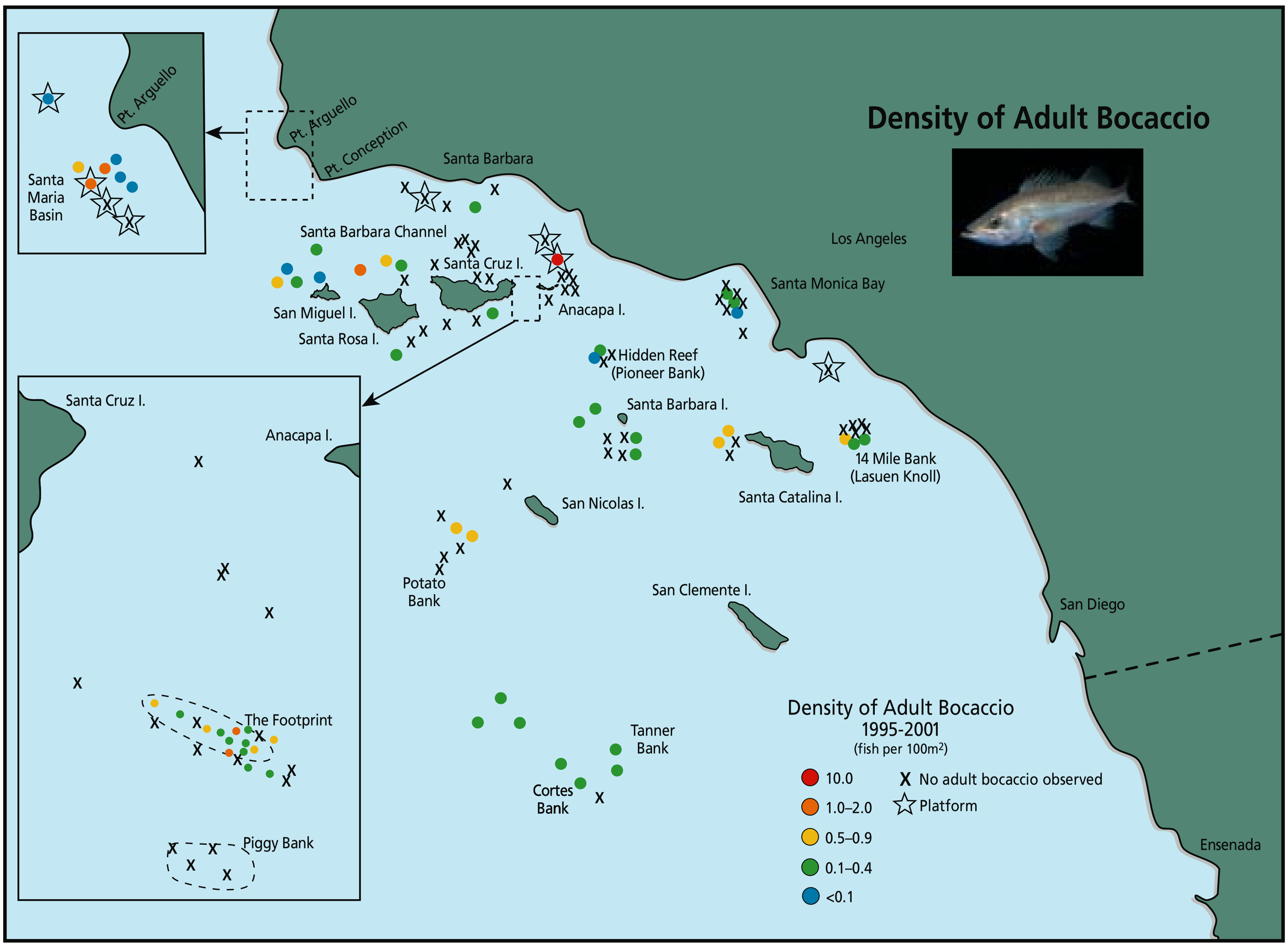


Figure 3.28. Density of adult bocaccio (defined as fish larger than 35 cm total length) as observed from the Delta submersible on platforms and natural outcrops, 1995–2001. Bocaccio densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gail are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hillhouse, Hogan, Houchin, and Henry were not included because they were not completely surveyed.

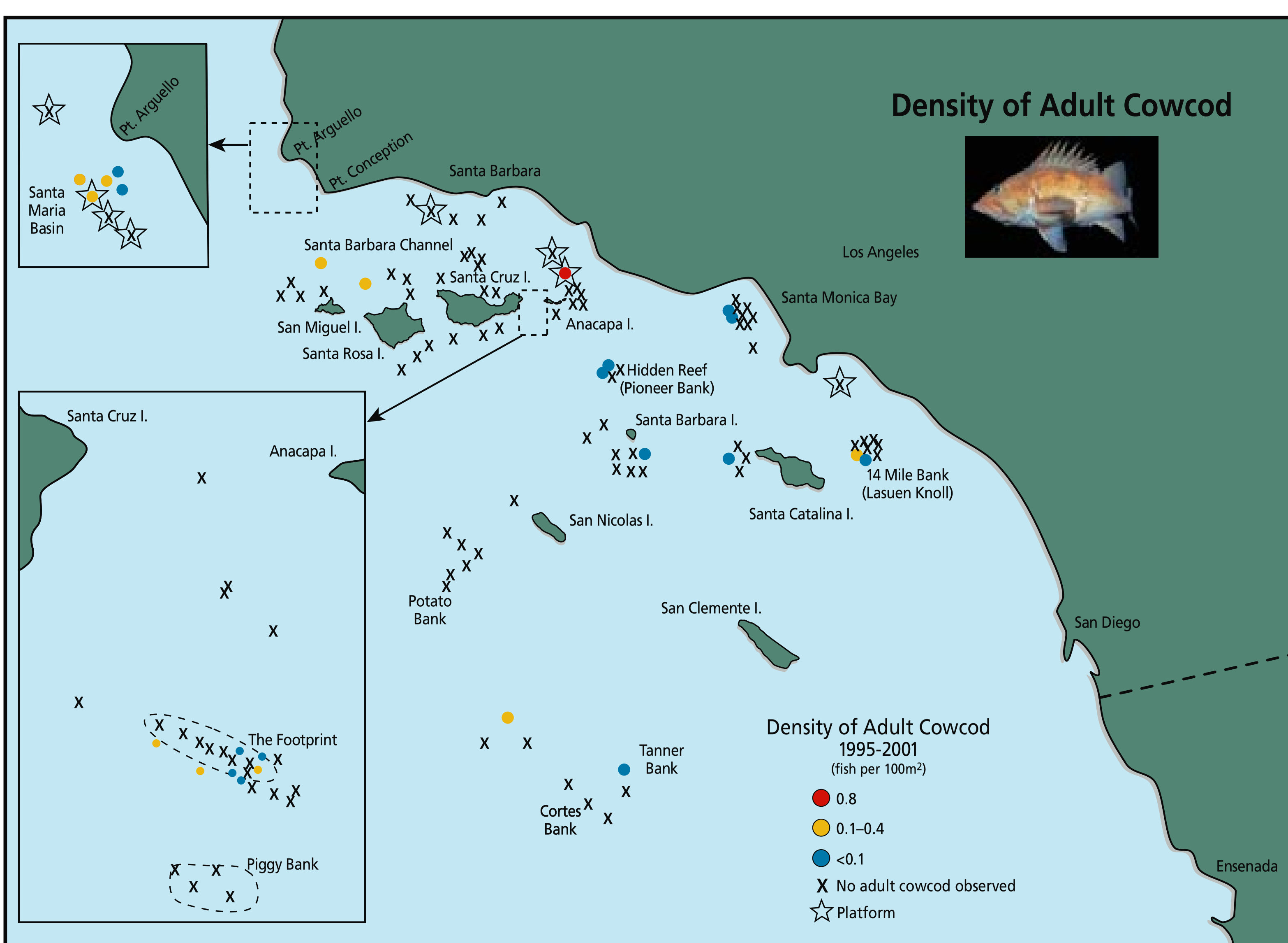


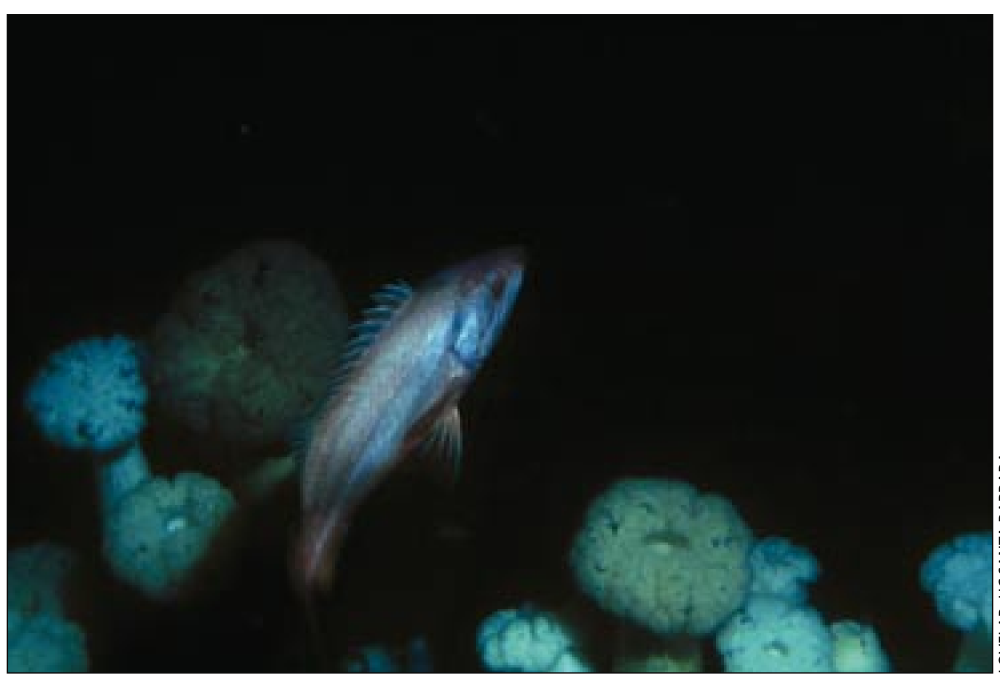
Figure 3.29. Density of adult cowcod (defined as fish larger than 45 cm TL) as observed from the Delta *submersible on platforms and natural outcrops, 1995–2001. Cowcod densities for Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Grace and Gai are from platform bottoms and densities for these seven platforms and for North Reef and reefs "A", "B", "C" and "D" in the vicinity of Platform Hidalgo represent means of years. Platforms C, B, A, Hillhouse, Hogan, Houchin, and Henry were not included because they were not completely surveyed.*

Why platforms support higher densities of young rockfishes than do nearby natural outcrops.

Platforms are important nursery habitat for many species of rockfishes. This research demonstrates that, in general, platforms may be more important nursery habitats than nearby natural outcrops or, indeed, most other outcrops surveyed in central and southern California. Why is this? First, platforms occupy more of the water column than do most natural outcrops. Presettlement juvenile rockfishes, swimming in the midwater, are much more likely to encounter these tall structures than the relatively low-lying natural rock outcrops. It is interesting to note that most of the natural outcrops we found that had high densities of young-of-the-year rockfishes (e.g., Hidden Reef and outcrops around islands) were very high relief features that thrust their way well into the water column.

In addition, there are also relatively fewer large predators in the platform midwaters. By comparison, even on heavily fished outcrops there tend to be at least a few larger fishes. Many of the major predators of young rockfishes are species that live close to the bottom, such as lingcod, copper and vermilion rockfishes, cowcod and large bocaccio. In general, these species do not ascend the platform jacket. Thus, even when they are abundant at the bottom of a platform, they are absent from the platform midwaters. In this respect, platforms are similar to some of the offshore pinnacles on the southern California continental shelf. Predatory species, such as cowcod, lingcod, and greenblotched rockfishes are also not abundant around the steep, smooth sides of offshore outcrops.

At most of the platforms, we observed both harbor seals and California sea lions, both resting on the platforms and swimming in the water column among the jackets and conductors. Based on the known food habits of these animals, it is likely that they feed on platform fishes, but their low numbers probably have little effect on the abundance of young rockfishes. We also observed both harbor seals and California sea lions swimming over natural outcrops and it likely that here, too, predation on young rockfishes occurs.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Bocaccio.

Platforms as defacto marine refuges

The role that some platforms play as defacto marine refuges is supported by evidence of greater densities of rockfishes, particularly the larger size classes, at platforms than at natural outcrops. The role that platforms may play as de facto reserves should not be underestimated at a time when many fish populations are in decline on natural outcrops. A number of benthic fishes, including such economically important species as bocaccio, cowcod, copper, and vermilion rockfishes and lingcod find refuge within the platforms and this is probably a factor in their relatively high densities compared to most natural outcrops. Schroeder and Love (2002) compared the rockfish assemblages at three deeper-water areas subjected to variable fishing pressures. Two were natural outcrops, one outcrop open to all fishing and one open only to recreational fishing, and the third was Platform Gail, acting as a de facto marine refuge. The outcrop allowing open fishing had the highest densities of rockfishes (7,212 fish/ha); however, the assemblage was dominated by dwarf species. The recreational fishing area had the lowest rockfish density (423 fish/ha) and this assemblage was also dominated by small fishes. Platform Gail possessed a relatively high density (5,635 fish/ha), and the fishes tended to be larger than individuals at either of the fished sites. Two federally listed overfished species, cowcod and bocaccio, had 32- and 408-fold higher densities, respectively, at Platform Gail than the recreational site, and 8- and 18-fold higher densities, respectively, than the all-fishing area.

There is some fishing effort around most platforms in the Southern California Bight and Santa Maria Basin. The relative amount of fish pressure among platforms is dependent on ease of access and local ocean conditions. Platforms in the Santa Maria Basin are located in an area that is far from ports, usually windy, and unprotected from weather. It is difficult to fish around the bottom of platforms, especially the deeper ones, because of the threat to gear imposed by the large number of crossbeams, other platform structural elements, conductors, and strong currents. Many anglers also believe that operators do not welcome fishing near their platforms.

Some platforms are important fishing areas for recreational anglers. Historically, commercial passenger fishing vessels and small private vessels fished around some of the shallower platforms in the Santa Barbara Channel (Love and Westphal 1990). Platforms Hilda and Hazel were targeted for kelp bass. During years with strong rockfish recruitment, large numbers of juvenile bocaccio, blue, olive, and widow rockfishes were caught at Platforms Holly, A, B, C and Hillhouse. In all of these instances, fishing effort was directed at surface or midwaters, rather than at the platform bottom. The removal of Hilda and Hazel and the poor rockfish recruitment of the 1980s and much of the 1990s reduced the overall fishing effort at oil/gas platforms. Some recreational fishing continues around Platform Gina, and there is minimal effort around a few other structures in the Santa Barbara Channel.

Overfishing has drastically altered the species composition of many outcrops off central and southern California (Yoklavich et al. 2000; M. Love, unpublished data). Over most moderate-depth and deep outcrops in central and southern California, many, or sometimes all, of the larger predatory fishes, such as lingcod, cowcod, bocaccio, yelloweye, and canary rockfishes are gone. In contrast, surveys made over an unfished outcrop in central California showed very high densities of large predatory fishes, including lingcod, cowcod, bocaccio, and yelloweye rockfish (Yoklavich et al. 2000). At many natural outcrops, these larger individuals have been replaced by very large numbers of dwarf species, particularly pygmy, swordspine, and squarespot rockfishes. Fish assemblages at platforms, such as Gail, Hidalgo, and Irene, with relatively high densities of many economically important species and low numbers of dwarf species, may more closely resemble unfished assemblages than those at many natural outcrops.

5. The Origins of Platform Fishes: Production and Attraction

Finding at a Glance

Our research suggests that platforms, like natural outcrops, both produce and attract fishes, depending on species and location. Platform fish assemblages around the deeper and further offshore platforms may be generated primarily from the recruitment of larval and pelagic juvenile fishes, not from attraction of fishes from natural outcrops. Some fishes may live their entire lives around a single platform but their movement patterns are poorly known. A pilot study comparing growth rates showed that young-of-the-year blue rockfish grew faster at a platform than at a natural outcrop.

In recent years, public attention has been drawn to artificial reefs and their function in the marine environment. While a variety of issues have been raised, much of the discussion has centered around the question of whether artificial reefs are producers or attractors of marine life (Carr and Hixon 1997; Lindberg 1997). Some researchers suggest this question is biologically simplistic, because it "imposes an unrealistic either-or-dichotomy…" (Lindberg 1997). Nevertheless, this issue continues to arise in the context of the importance of platforms as fish habitat off California (Carr and Stephens 1998; Krop 1998).

Attraction suggests the net movement of juvenile and adult fishes away from natural outcrops to platforms. While there is not complete agreement on the definition of production, most researchers agree that it involves larval or pelagic juvenile settlement at a structure and the survival and growth of these organisms in this habitat (Carr and Hixon 1997).The attraction/production debate is framed around three questions (Carr and Stephens 1998; Krop 1998): (1) Do larval and juvenile fishes settle onto platforms from the plankton, or do fishes move from other structures to platforms as older juveniles or adults? (2) If a species does settle onto a platform, are growth and survivorship at least as good as on a natural outcrop? (3) If a species does grow and survive well around a platform, did the structure take away larvae or pelagic juveniles that would have settled onto natural outcrops?

5a. Do Fishes Settle from the Plankton onto Platforms or Do They Swim There from Other Structures as Juveniles or Adults?

A large number of fish species settled out of the plankton and took up residence around platforms. We observed young-of-the-year of about 46 fish species at these structures (Table 6) and, including species observed by other researchers (Carlisle et al. 1964), at least 50 fish settle on to platforms from the plankton. During some years, the midwaters of many platforms had very high densities of juvenile rockfishes. Young-of-the-year blacksmith, kelp and painted greenlings, and cabezon also were abundant in this habitat at times. Young-of-the-year rockfishes, lingcod, and other species were abundant around platform bottoms and shell mounds. With a few exceptions, species that settled on the bottom and shell mound were different from those found in the midwaters.

Juveniles of some species were rarely or never observed around platforms. For instance, young-of-the-year kelp bass were rarely seen around any platform, although adults were very abundant at one platform. Young seaperches also were rare or absent. In these cases, older juveniles or adults immigrated to the platforms or juveniles settled there at times other than our surveys.

5b. The Biological Influence of Oceanographic Conditions on Recruitment Success at Platforms and Natural Outcrops in the Santa Barbara Channel and Santa Maria Basin

Most coastal fishes and invertebrates, including those inhabiting platforms, are planktonic during early stages of their life histories. These life stages, which may last from weeks to months, can begin as fertilized eggs (e.g., lingcod, cabezon, and garibaldi) or larvae (e.g., rockfishes). Some fishes, including rockfishes, continue to develop in the pelagic environment until they transform to the juvenile stage (Figure 3.30).

Pelagic life stages are at risk from starvation and predation and transport away from the specific habitats required for their growth and survival. Therefore, the type of water mass an animal finds itself may have a profound effect on its survival. There are a number of water masses in our study area, including waters from the Southern California Bight, the central California coast, upwelling from Point Conception, and from more distant places such as Baja California. How these waters enter, circulate and mix in the Santa Barbara Channel and Santa Maria Basin affects marine populations and community diversity on both platforms and natural habitats.

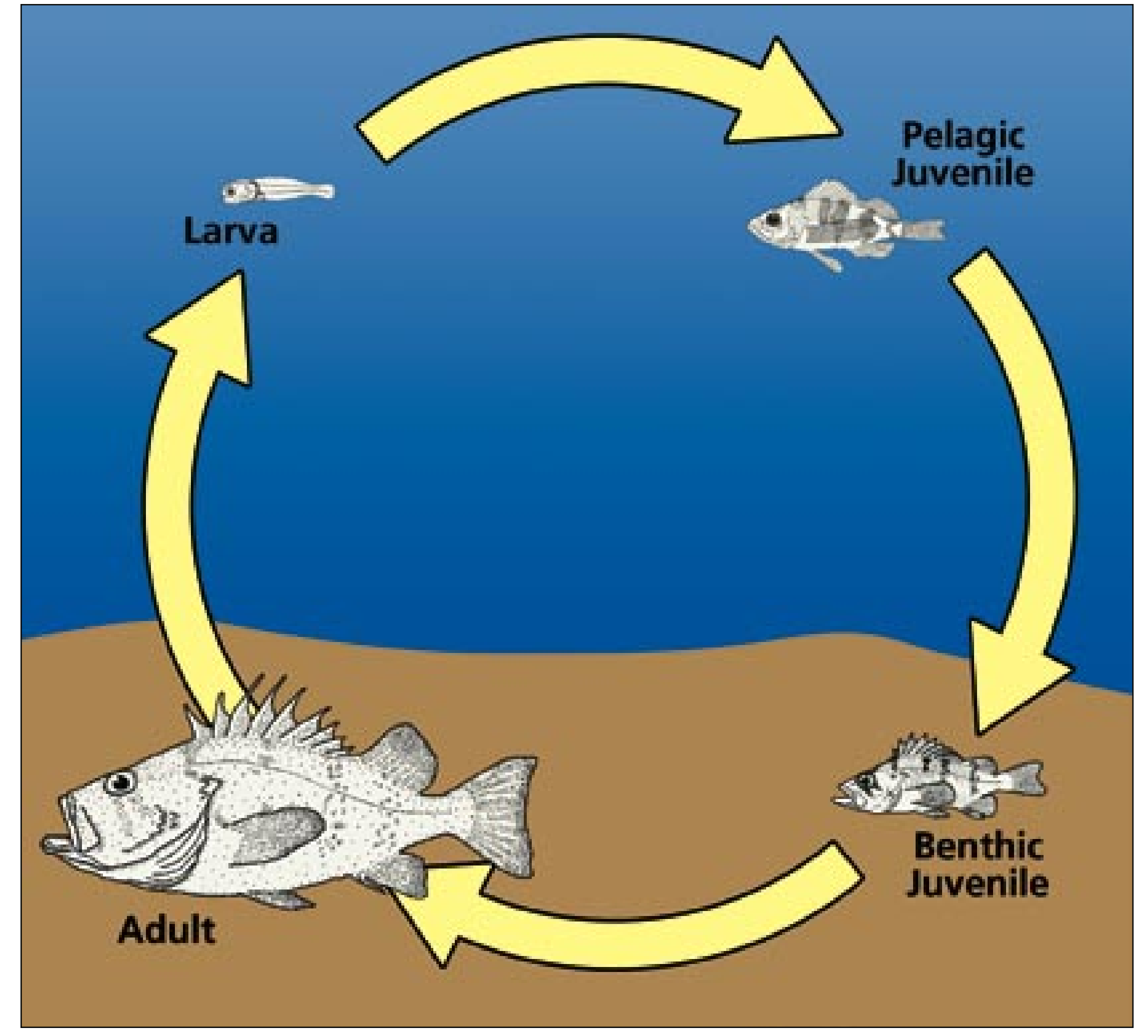

Figure 3.30. A typical rockfish life history cycle using the cowcod as an example.

Upwelling processes, the wind-induced pulling of deeper, colder water to the surface and displacement of warmer waters offshore, is a major factor in larval and pelagic juvenile survival. During years when upwelling coincides with larval fish production, fish survival may be enhanced. Because deep waters are nutrient-rich, upwelling increases reproduction of phytoplankton and encourages the growth of zooplankton, providing food for larval and pelagic juvenile fishes. Upwelling may also increase survivorship of some species by moving larvae and pelagic juveniles somewhat offshore, away from high densities of nearshore predators. Conversely, the offshore transport that accompanies upwelling can be detrimental to the survival of larvae and pelagic juveniles. Wind-induced turbulence in surface waters can make it difficult for larvae to come into contact with prey. Larvae risk being swept well offshore by strong upwelling and far removed from suitable habitat. Spatial and temporal variability in circulation, however, can provide some larvae and pelagic juveniles with conditions that enhance survivorship including delivery to optimum settlement.

The timing, location, intensity, and duration of upwelling events may have a large effect on rockfish settlement. For instance, recruitment may be hampered at sites constantly exposed to newly upwelled water. Through much of the late-spring and summer when presettlement-stage rockfishes are in the pelagic environment, upwelling from the mainland at Point Conception impacts the west channel. Our summer oceanographic data confirm that the upwelling plume can extend across the western portion of the Northern Channel Islands (Love et al. 1999). We found that pelagic juvenile rockfishes were relatively rare in this newly upwelled water (Figure 3.31) (Nishimoto 2000). As an example, when cool upwelled waters moved into an area off the south side

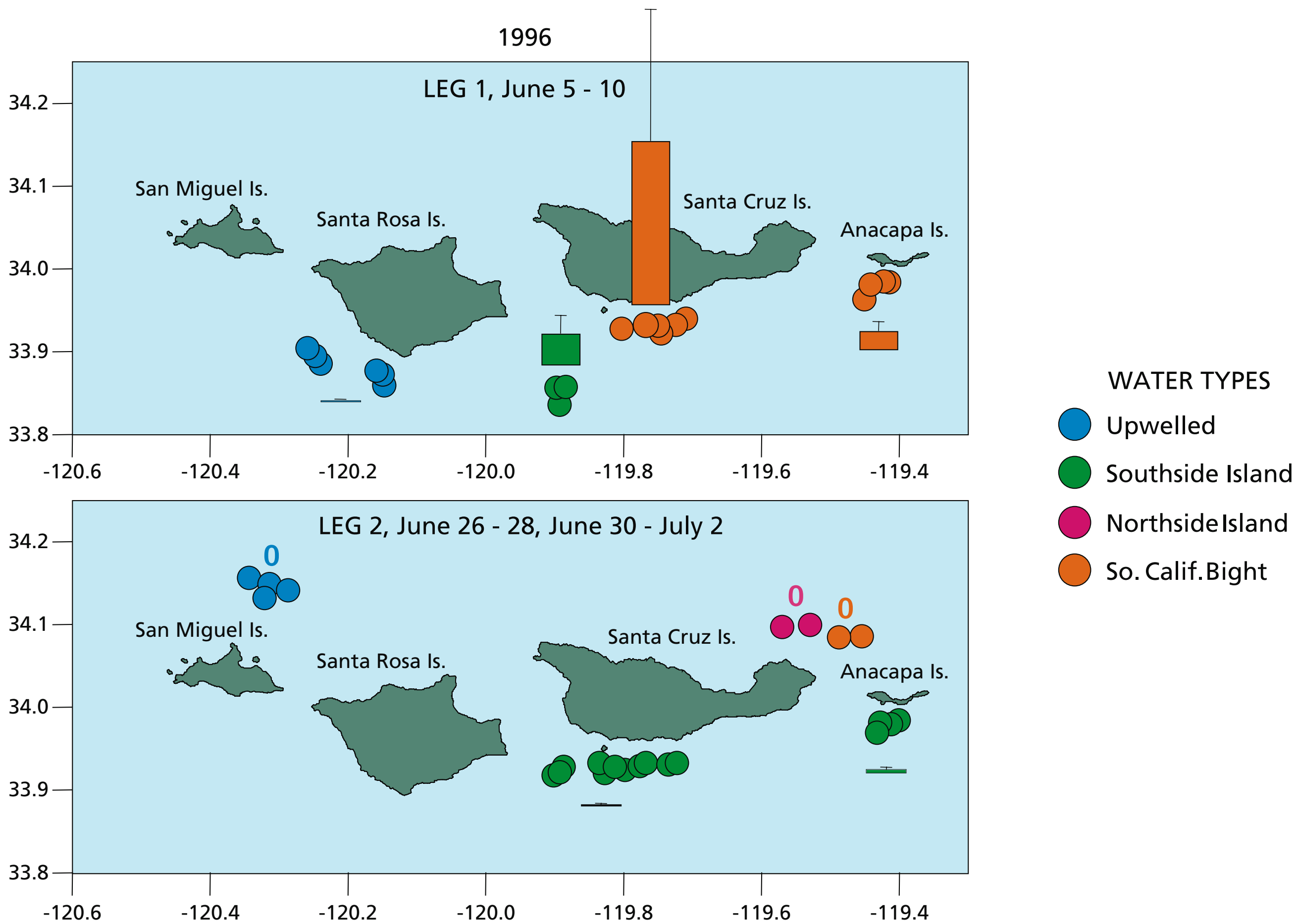

Figure 3.31. The abundance of late-larval stage and pelagic juvenile rockfishes decreases off the south side of Santa Cruz Island when one water mass replaced another between two sampling periods, June–July 1996. Temperature and salinity properties were used to identify four water masses: Upwelled water, Southside Island water, Northside Island water, and Southern California Bight water. Hauls are represented by colored circles. Fish abundance was estimated using the mean collected in midwater trawl hauls within a water mass. Bars illustrate the relative abundances among the water masses. Zeros indicate that no rockfishes were collected in the hauls within a water mass.

of Santa Cruz Island, the fish assemblage changed from one with relatively abundant pelagic juvenile rockfishes to one where these fishes were almost absent. We suspect that the upwelled water, the coldest and most saline water mass that we identified, was recently brought to the surface from depths where few larval and juvenile rockfishes reside**.**

Inter-annual oceanographic conditions, including the intensity of seasonal, coastal upwelling, are highly variable and this affects year class success and population variability. A shift from El Niño to La Niña conditions between 1998 and 1999 was marked by abrupt changes in the marine ecosystem off southern and central California. Our survey data of young-of-the-year rockfishes in 1999 indicates an increase in rockfish recruitment. The number of several juvenile rockfishes and other fish species observed on oil/gas production platforms and rocky outcrops in 1999 far exceeded those of 1998 and previous years. This increased recruitment coincided with intense coastal upwelling off Central California (among the strongest events in 50 years) in spring 1999 followed by high phyto- and zooplankton production (Lynn et al. 1998; Hayward et al. 1999). High productivity in the region likely contributed to the increased survivorship of the fishes including those that recruited to the platforms and natural outcrops.

Relatively transitory phenomena, such as fronts and eddies, may also play an important role in fish settlement and year-class success. Fronts, the zones where different water masses collide and mix, may prevent weak-swimming

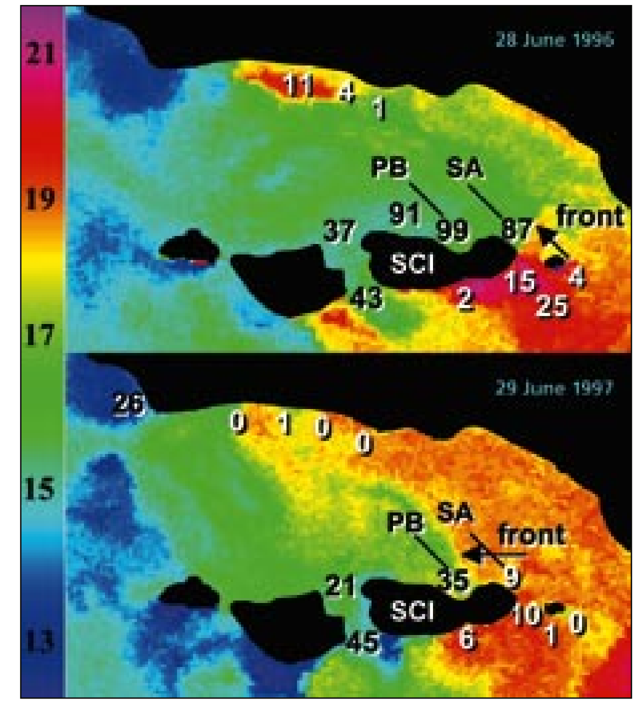

Figure 3.32. The strong correspondence between exposure to cool water and young-of-the-year rockfish density. A shift in position of the thermal front on the north shore of Santa Cruz Island (SCI) in 1996 and 1997 corresponded with a striking spatial shift in juvenile rockfish densities (see sampling sites, Pelican Bay (PB) and Scorpion Anchorage (SA)). Numbers overlaid on images represent mean densities of juvenile rockfishes (number/60 m^2) that recruited to giant kelp canopy at sites within the survey area.

planktonic animals from swimming between these masses (Moser and Smith 1993; Wing et al. 1998). The strength of recruitment to a platform or outcrop may be determined in part by the habitat's exposure to those fronts carrying ready-to-settle fish larvae and juveniles. Our research at Santa Cruz and Anacapa islands indicates that the recruitment of nearshore rockfishes was sparse on outcrops separated from cool, fish-rich waters by a frontal boundary (Figure 3.32) (Love, Nishimoto, Schroeder, and Caselle 1999).

Eddies, cyclonic currents that can concentrate and retain plankton, may retain fishes and affect the dispersal of larval and juvenile fishes to outcrops and platforms. For instance, in summer 1998 we sampled a stationary and persistent cold-core cyclonic eddy in the western Santa Barbara Channel. In this feature, we found very high concentrations of small fishes, including late-stage larval and pelagic juvenile rockfishes (Figure 3.33). Eddies may also be very transitory. During the summer of 1999, we observed a much different circulation pattern of shorter-lived, propagating eddies and collected few young rockfishes.

We suspect that the high levels of recruitment of young-of-the-year rockfishes at some platforms were associated, in part, with eddies and fronts retaining larvae that had been locally produced at either platforms or natural outcrops. For instance, Platform Irene is located to the north of the frontal boundary of the upwelling plume that extends off Point Conception. The platform is also situated in an area where a semi-persistent eddy is frequently observed during spring and summer (L.Washburn, personal communication). Similarly, both fronts and eddies were observed at Platforms Gail and Grace in the eastern channel north of Anacapa. As noted previously, Platform Gail harbors important habitat for adult bocaccio in the Santa Barbara Channel. Local retention of bocaccio larvae produced at Platform Gail would explain the high levels of bocaccio settlement at nearby platform Grace and Gilda.

The variability of oceanographic conditions in the Santa Barbara Channel between 1995 and 2001 appears to have strongly influenced settlement as young-of-the-year recruitment to platforms and natural outcrops was highly variable both temporally and spatially. For instance, while the 1997–1998 El Niño corresponded with a large increase in juvenile recruitment of species that dominate the warm-temperate fish assemblage (such as blacksmith), the 1999 La Niña corresponded to a strong settlement of cool-temperate species, such as rockfishes. While settlement of many rockfish species to platforms was generally higher north of Point Conception than in

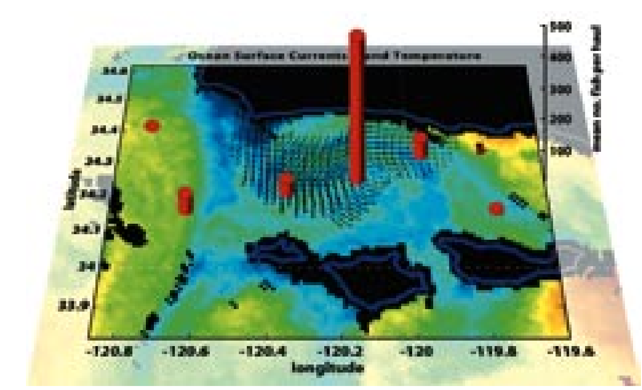

Figure 3.33. The strong link between eddy circulation and the distribution of pelagic young-of-year rockfishes. A persistent eddy about 30 km (19 mi.) wide was evident in satellite sea surface temperature imagery and in surface current mapping generated from coastal-based high frequency radar observations. The abundance of fishes were extraordinarily high in the center of the eddy (red bars represent the mean number of late-stage larval and pelagic juvenile rockfishes in midwater trawl samples from different areas).

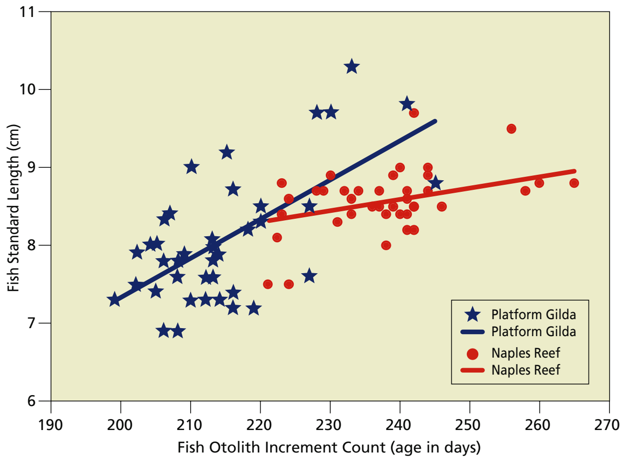

Figure 3.34. A comparison of daily growth rates of young-of-the-year blue rockfish collected at Platform Gilda and Naples Reef in 1999. Fish from Platform Gilda grew at a statistically faster rate than did those from the natural outcrop.

the Santa Barbara Channel during 1996 through 1998, the cooler waters of 1999 brought with it a relatively good year for cool-temperate rockfish recruitment throughout the channel.

The timing of this upsurge in young-of-the-year rockfish settlement in the Santa Barbara Channel also coincided with what may have been a Northeast Pacific oceanographic regime shift from warm to cool waters that overlaid the El Niño and La Niña events. This may have been reflected in the 2000 and 2001 rockfish recruitment at platforms in the eastern channel, which remained higher than pre-1999 levels. We should note that the last cold water regime off southern California occurred in the 1970s, a period that saw heavy settlement of young-of-the-year blue, olive, and widow rockfishes and bocaccio to some of the platforms near Santa Barbara (Love and Westphal 1990).

5c. If a Species Does Settle around a Platform, How Well Does It Grow and Survive, Particularly Compared to the Same Species on a Natural Outcrop?

While our studies in this area are preliminary, they are sufficiently compelling that we can begin to draw some conclusion regarding production of fishes at platforms. On many platforms, we believe that larval and pelagic juvenile recruitment is a major force in shaping platform fish assemblages. We have observed young-of-the-year of about 46 species at the platforms. Of these species, at least 35 were observed as adults at the same structures (Table 7). Adults of some species, such as pygmy, widow, and yellowtail rockfishes, are relatively uncommon around platforms suggesting different habitat requirements. Conversely, adults of many more species, including blacksmith, bocaccio, cabezon, cowcod, lingcod, painted greenling, shortspine and longspine combfishes, and calico, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, kelp, and pinkrose rockfishes are abundant at the platforms.

Pilot research suggests that at least some juvenile fishes may be growing as well or better at the platforms than at natural outcrops. In 1999, we collected young-of-the-year blue rockfish from Platform Gilda and from Naples Reef (Figure 1.1). Daily growth rates derived from these fishes from otoliths (ear bones) indicated that the platform fish grew at a statistically faster rate than did those from the natural outcrop (F-test, $F = 2.96$, $p = 0.0006$) (Figure 3.34).

Recruitment patterns of flag rockfish at Platform Grace and bocaccio at Platform Gail in 1999 and subsequent annual monitoring of year classes at these sites is providing important new information about the production value of platform habitats. In 2000, and again in 2001, we observed the 1999 year classes of these species at the bottoms of the platforms (Figures 3.35 and 3.36). Length-frequency data indicate substantial survival of the 1999 year classes at the platforms (Figure 3.36). Flag rockfish mature at about six years of age (M. Love and M. Yoklavich, unpublished data) and bocaccio at four or five years (A. MacCall, personal communication). Thus, it is conceivable that these fishes will mature at the platforms. This would be strong evidence of production at these structures. [Added in proof: We again observed these fishes during our 2002 surveys of Platforms Gail and Grace.]

DONNA SCHROEDER

Figure 3.35. Flag rockfish at the bottom of Platform Grace, 2001. These fish recruited to the platform as pelagic juveniles in 1999 and moved to the bottom in 2000.

RESULTS AND ANALYSES

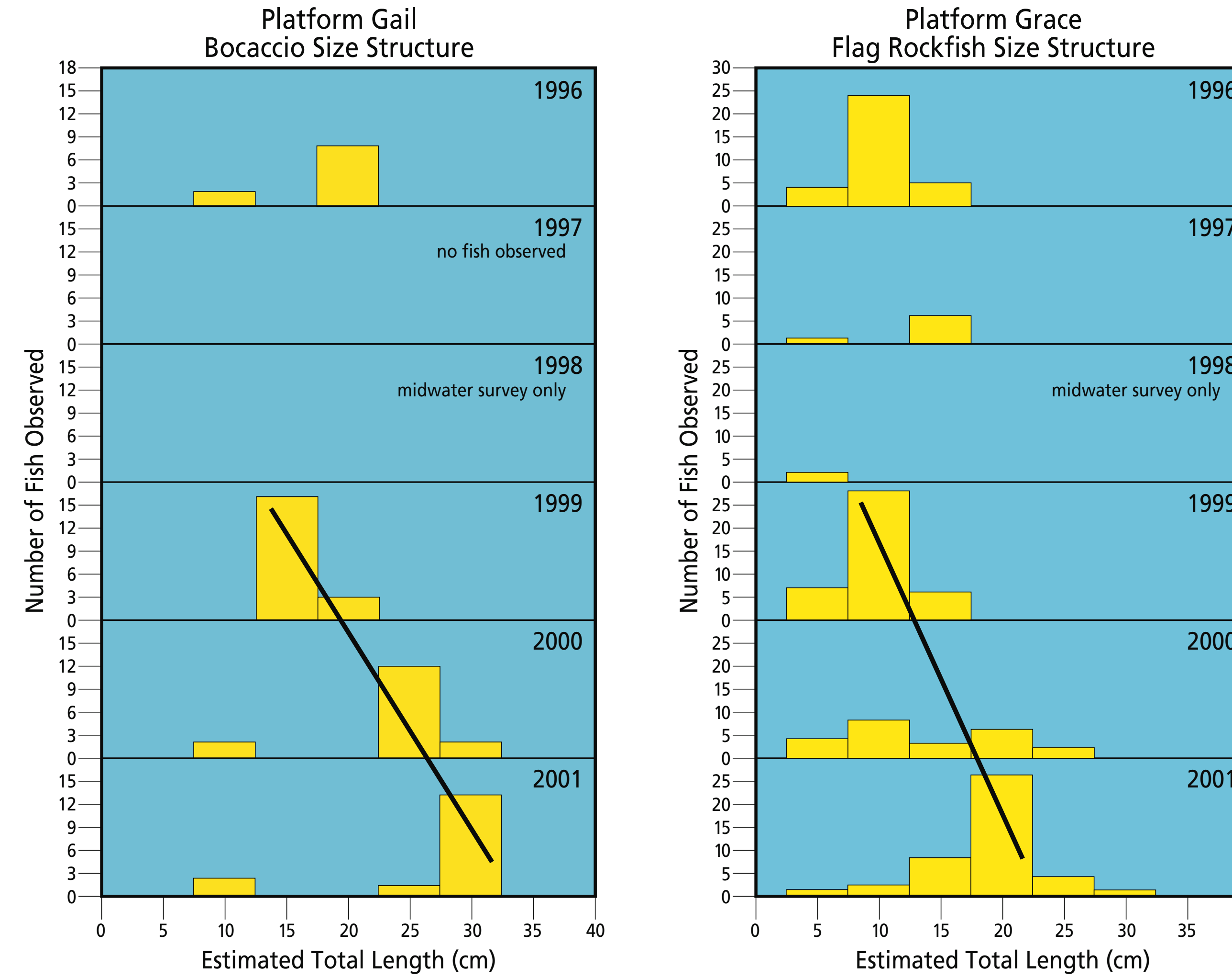

Figure 3.36. Size structure of young bocaccio observed at Platform Gail and flag rockfish observed at Platform Grace, 1996 to 2001. Black line denotes persistence of the successful 1999 year class.

5d. Both Attraction and Production Play Important Roles in Shaping Fish Assemblages at Platforms

Our research suggests that populations of fishes at platforms far removed from natural outcrops, as is true for Platforms Gail and Grace, are most likely dependent on larval and juvenile recruitment from the plankton. Our research is developing information about recruitment and residence of fishes at platforms and we have provided evidence of fishes not only settling out at platforms but also maturing there. Recruitment process is highly variable at all habitats from year to year. Adult abundance, at least for some species, is dependent on the strength of recruitment in previous years. Furthermore, recruitment variability may contribute to the year class success (i.e., demographics) of platform and outcrop species such as flag rockfish and bocaccio.

While the movement patterns of some deeper-water rockfishes are unknown, it is likely that many benthic species, such as greenspotted, greenblotched, pinkrose, and cowcod are residential (Starr et al. 2001; Love et al. 2002). Certainly many are restricted to hard substrata seafloors and probably rarely traverse large expanses of soft sediment (Love et al. 2002). Thus, it is likely that the high densities of many platform rockfishes, as well as such species as combfishes, painted greenling, and perhaps lingcod, are due to successful settlement from the plankton and subsequent survival.

The shallow-water species that do inhabit offshore platforms are further evidence that larval and juvenile recruitment play a dominant role in these structures' assemblages. Shallow species that do occur on Gail and/or Grace include kelp bass, garibaldi, and grass and kelp rockfishes. All of these fishes have pelagic larvae. Pile perch and rubberlip seaperch, species without a pelagic life stage, while found on the shallower platforms, are not present on Gail and Grace. This reflects the difficulty these species have in crossing deep waters along the seafloor.

Thus, there is growing evidence that individuals of a number of species, particularly those that are relatively resident and benthic, not only settle out at platforms but also mature there. Such species include, but are not limited to, blacksmith, bocaccio, cowcod, flag, grass, greenblotched, greenspotted, kelp, pinkrose rockfishes, painted greenling, and combfishes.

A dependence on pelagic juvenile recruitment, rather than attraction of older fishes from other structures, explains some of the differences in species composition we observed among the platforms. For instance, until 1999, we observed high densities of adult flag rockfish only at Platform Hidalgo. These densities were far higher than at other platforms or natural outcrops. In 1999, there was a strong recruitment of pelagic juvenile flag rockfish to Platform Grace, and as noted above, these fish remained there at least through 2001. [Added in proof: We observed these fish in 2002.] Annual recruitment of rockfish is highly variable. Thus, the large numbers of flag rockfish observed at Platform Hidalgo are almost certainly the result of a previous successful recruitment, similar to that at Platform Grace. Spatial variability is indicated by the paucity of this species at the other platforms. Similarly, the high densities of adult bocaccio at Platform Gail, and their absence at Platform Harvest (which is located in about the same depth), also suggests spatial variability in the recruitment process.

In contrast, the fish assemblages at platforms that are closer to shore, and in shallow waters, are probably derived both from larval/pelagic juvenile settlement and movements of juveniles and adults from other structures. Carlisle et al. (1964) clearly demonstrated that inshore reef species, such as kelp bass and sheephead, are very mobile and able to traverse shallow, soft seafloors from outcrop to artificial reef. Platform Gina, for instance, is a shallow water platform that seasonally harbors very large numbers of kelp bass, halfmoon, opaleye, pile perch, and other reef species. Fishes are abundant around that platform during summer and fall, but move elsewhere in late winter and spring.

MARY NISHIMOTO

Adult canary rockfish at bottom of Platform Hidalgo.

CHAPTER 4

A GUIDE TO ECOLOGICAL AND POLITICAL ISSUES SURROUNDING OIL PLATFORM DECOMMISSIONING IN CALIFORNIA

Donna M. Schroeder and Milton S. Love

Decommissioning Alternatives

Within one year of an OCS lease termination, the Minerals Management Service (MMS) requires that the lessee remove the oil platform structure to a depth of fifteen feet below the mud line, and the leased area must be cleared of obstructions (*see generally*, 30 C.F.R. Part 250, subpart Q, § 250.1700 *et seq.*). However, the MMS may waive these requirements to accommodate conversion of a platform structure to an artificial reef provided that (1) the remaining structure does not inhibit future oil or other mineral development, (2) the resulting artificial reef complies with the Army Corps of Engineers permit requirements and procedures outlined in the National Artificial Reef Plan, and (3) a state fishing management agency accepts liability for the remaining structure (30 C.F.R. §§ 250.1703, 250.1730). In addition, the National Fishing Enhancement Act of 1984 (NFEA), which authorizes the Corps of Engineers' permit program and the National Artificial Reef Plan (33 U.S.C. § 2101 *et seq.*), allows other organizations or agencies (such as the operator) to assume liability for the artificial reef, although MMS policy to date has required a state agency to accept liability.

The timing of future decommissioning activities is not fixed. It depends on the length of the lease, the rate of reservoir depletion, the market value of oil or gas, and whether the platform might serve an extended use for the operator, such as a gathering system for the production of other platforms. There are three stages in the decommissioning process: planning, permitting, and implementation. Platform decommissioning alternatives fall into four general categories: complete removal (the default option), partial removal, toppling, and leave-in-place (Figure 4.1). The suite of decommissioning alternatives that proposes to leave part or all of the abandoned platform structure in the marine environment is often collectively referred to as "rigs-to-reefs".

Alternative 1: COMPLETE REMOVAL

A typical full-removal project begins with well abandonment in which the well bores are filled with cement. The conductors are then separated from below the seafloor by being pulled, cut-off, or removed using explosives. Next the topsides, which contain the crew quarters and the oil and gas processing equipment, are cut from the jacket and removed. Finally, the piles that hold the jacket to the seabed are severed with explosives and the jacket is removed. Other typical decommissioning requirements include the removal or abandonment of pipelines and electrical cables and the removal of any debris from the seafloor.

After deciding to totally remove a platform from the seafloor, operators have several options (O'Connor 1999; van Voorst 1999; Gibbs 2000; Terdre 2000). (1) The platform can be taken to shore, where it is disassembled and the components either recycled, sold as scrap, or discarded in landfills or other depositories. To date, managers have selected this option for most decommissioned platforms. (2) The structure can be reconditioned and reused. As an example, in 1997 a platform was removed from the North Sea, taken to shore and cleaned, refurbished, shortened by 10 m (33 ft.), and installed in another North Sea location. A few small platforms have also been reused in the Gulf of Mexico. (3) A platform can be towed to another site and reefed. This has occurred a number of times in the Gulf of Mexico, with the most zealous example towing structures of two Tenneco platforms over 1480 km (920 mi) from offshore Louisiana to a site 1.5 miles off Dade County, Florida (Wilson et al. 1987).

Alternative 2: PARTIAL REMOVAL

In this scenario, the wells are abandoned, the topsides are removed, and the remaining jacket and possibly the shell mound are left in place to continue to function as an artificial reef. Navigation aids are added.

Despite what has been implied in other reports, conductors need not be completely removed. Dauterive (2000) notes "Recognizing the preservation of environmental values associated with the method of partial removal of the platform, the MMS in 1997 established a policy to allow the industry the option to partially remove

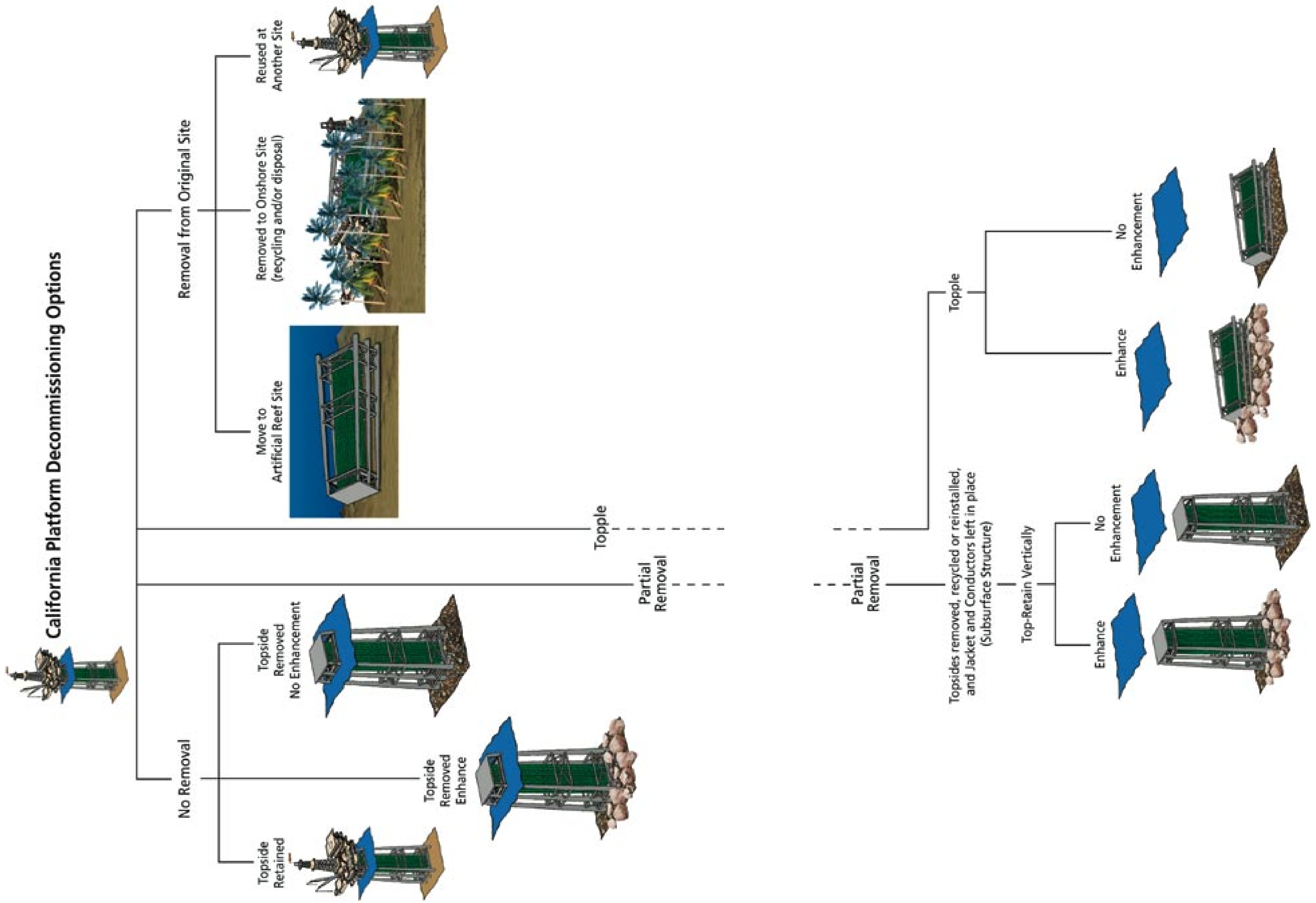

Figure 4.1. Platform decommissioning options.

the well conductors at the same depth below the water line (WL) at which the industry had proposed to remove the platform jacket." Retaining platform conductors has two consequences. First, it adds additional complexity to remaining structure. Second, explosives are usually used to remove the conductors and retaining these pipes eliminates the need for explosives (Dauterive 2000).

After cleaning, disposition of topsides may be handled in a couple of ways. It can be moved to a new platform and reinstalled, or it can be taken onshore, where the steel and other valuable components are recycled and other material sent to landfills. Certain parts of the topsides, such as the cleaned deck, have occasionally be used in forming artificial reefs.

Alternative 3: TOPPLING

As in partial removal, the wells are abandoned and the topsides are removed. The shell mounds may be either removed or left in place. The primary difference between partial removal and toppling is that, in toppling, explosives are used to sever the jacket from the seabed and then a derrick barge or pull barge drags the jacket over and it is allowed to settle to the seafloor (Twachtman 1997). Navigational aids, if necessary, are then put in place.

Alternative 4: NO REMOVAL (LEAVE-IN-PLACE)

A platform and its surrounding shell mound could be left in its original location at the time of decommissioning. The topside would be stripped and cleaned and navigational aids installed.

In the Gulf of Mexico this scenario has been discussed on a number of occasions, although it has not been attempted. For instance, a platform in the Flower Garden Banks National Marine Sanctuary was studied as a possible research laboratory. However, the cost of maintaining cathodic protection and navigational aids (together running to $300,000 per year) proved too high (L. Dauterive, personal communication). Other creative suggestions offered by stakeholders for decommissioned, left-in-place platforms include wind and aquaculture farms, meteorological stations, hospitals, hotels, gambling casinos, and penal institutions.

Agencies Responsible for the Decommissioning Process

By law, various coastal states and the federal government share the administration of submerged lands, subsoils and seabeds off the United States. Thus, depending on where platforms are positioned, responsibility for mineral extraction, including oil and gas development, is either under state or federal jurisdiction. Similarly, decisions regarding the decommissioning of platforms fall under either state or federal control, although the final decisions are based on consultation and mutual agreements among a number of agencies.

Responsibility for the fate of platforms in federal waters rests with the MMS (33 U.S.C. § 1331 *et seq.*) Federal agencies that are consulted in the decommissioning process include the Environmental Protection Agency (33 U.S.C. §§ 1311(a), 1342), Army Corps of Engineers (33 U.S.C. §§ 403,1344), National Oceanic and Atmospheric Administration (NOAA) Fisheries (16 U.S.C. § 1801 *et seq.*), and Coast Guard (14 U.S.C. § 85: 43 U.S.C. § 1333(d)). State agencies, such as the California Department of Fish and Game do not have jurisdiction in federal waters but may comment in the decision making process. Under the federal Coastal Zone Management Act (16 U.S.C. § 1451 *et seq.*), MMS decisions on platform decommissioning that will affect coastal resources are also reviewed by the appropriate state agency for consistency with the state's coastal zone management program. In California, the California Coastal Commission conducts review for consistency with the state program. In turn, state agency consistency decisions can be appealed to the U. S. Department of Commerce (16 U.S.C. § 1456(c)(3)(A), (c)(3)(B)(iii); 15 C.F.R. Part 930, subpart H).

Decisions regarding the decommissioning of platforms in California state waters are the province of the State Lands Commission (Cal. Pub. Res. Code § 6216), along with such agencies as the California Coastal Commission (Cal. Pub. Res. Code § 30330), Department of Fish and Game (Cal. Fish & Game Code § 1602), local Air Pollution Control Districts (Cal. Health & Safety Code 40000), U. S. Army Corps of Engineers (33 U.S.C. §§ 403, 1344), and the U. S. Coast Guard (14 U.S.C. § 85).

Jacket and conductor removal: the role of the U. S. Coast Guard in decommissioning

Local United States Coast Guard districts are responsible for the safety of vessel traffic in their respective geographic areas and have the authority to dictate aids to navigation for obstacles in the water (14 U.S.C. §85; 43 U.S.C. § 1333(d); 33 C.F.R. Part 67). Therefore, in instances where some part or all of a platform is to be reefed, the Coast Guard will specify the necessary navigational aids. Discussions regarding decommissioning of platforms off California have often erroneously assumed that the Coast Guard will require that the jacket be removed to about 26 m (85 ft.) below the surface. However, decommissioning experience in the Gulf of Mexico demonstrates that there is no set removal depth. Indeed, the Coast Guard decision-making process appears to be quite flexible; it reviews each decommissioning on a case-by-case basis. For instance, in the decommissioning of the mile-long Freeport-McMoRan sulfur mine platform and bridge off Louisiana, the Coast Guard required piles to be cut 9 m (30 ft.) beneath the surface (Kasprzak 1999).

Generally, the requirements for aids to navigation become more restrictive (and therefore more expensive) the closer to the surface the obstacle lies. As an example, here is a generic set of conditions for decommissioned platforms in the Gulf of Mexico based on recent Coast Guard decisions (G. Steinbach, personal communication):

- If the obstacle is greater than 61 m (200 ft.) in depth: no requirement for aids to navigation
- If the obstacle is from 61 m to 26 m (200 ft. to 85 ft.) in depth: unlighted buoys are required
- If the obstacle is 26 m to 11 m (85 ft. to 35 ft.) in depth: lighted buoys are required
- If the obstacle is from 11 m (35 ft.) to protruding through the surface: lights or lighted buoys and foghorns are required.

In the rigs-to-reefs programs in the Gulf of Mexico, the states are responsible for aids to navigation on reefed platforms. The costs of these aids are paid for from the funds created by the industry's donations. As a cost savings measure, these states generally have selected greater water clearances. The requirements for California waters may be different from those in the Gulf of Mexico. The local Coast Guard District will determine these requirements based on vessel traffic and other local conditions.

The question of liability for a reefed platform off California

Liability, who retains responsibility for a reefed platform, is a major issue in the decommissioning process. MMS policy states the "The MMS supports and encourages the reuse of obsolete offshore petroleum structures as artificial reefs in U. S. Waters." Current MMS regulations provide that a platform operator may be released from removal obligations in the federal lease instrument if a state agency responsible for managing fisheries resources will accept liability (30 C.F.R. § 250.1730). However, in situations where reefs are not managed by a state agency, another organization or agency must assume liability, as provided in the National Fishing Enhancement Act of 1984 (Stone 1985). In such cases, liability could possibly be retained by the oil company, transferred to a private entity, or handled in some other manner as long as MMS approval is received (G. Steinbach, personal communication).

An extensive body of policy and research outlines proper procedures for siting and deploying artificial reefs, and this information bears upon liability of such structures. The National Artificial Reef Plan (NARP) states "When a reef has been properly located, marked on navigation charts if necessary, and any required surface markers affixed, there should be very little potential for liability" (Stone 1985). Regarding accidents, which may occur during recreational activities near artificial reefs, the NARP further declares, "Diving accidents may occur with use by recreational divers. In this respect, an artificial reef is like a public park — there are dangers in those parks, guardrails and fences cannot be placed everywhere, and everyone who visits the park assumes some risk of injury. A warning could be placed on nautical charts and posted in local dive shops to warn of these dangers. However, each case would probably involve determination of comparative negligence" (Stone 1985). Parker (1999) notes that no lawsuits have ever been filed against the California Department of Fish and Game with respect to their artificial reef program.

Regardless of which decommissioning alternative is selected, the federal government cannot be held liable. Regarding State liability, the NARP notes, "If the permit holder is a State government, it may have sovereign immunity from liability. It is unclear whether the National Fishing Enhancement Act affects any State's claim of sovereign immunity." (Stone 1985)

National Artificial Reef Plan

Decommissioning options other than complete removal must be consistent with the National Artificial Reef Plan (33 U.S.C. § 2104(a)(4)). The National Fishing Enhancement Act of 1984 directed the development of a long-term National Artificial Reef Plan (NARP) to provide guidance and criteria on planning, construction, and evaluating artificial reef use, as well as introducing liability and mitigation issues (33 U.S.C. § 2103). Goals of the NARP seek to enhance fishing and fishery resources and minimize user conflicts and environmental risks without creating unreasonable obstruction to navigation (33 U.S.C. § 2102). In 1998, the NARP was supplemented by the Coastal Artificial Reef Planning Guide, which incorporates new language from relevant federal and state agencies, fishing interests, and the general public.

California Department of Fish and Game Rigs-to-Reef Guidelines

"These guidelines stipulate that the project must benefit living marine resources, habitat, and user groups; that disposal or use of contaminated materials is not permitted; that wherever possible the subsurface structure of the platform should remain in place; that where possible subsurface structure that must be removed could be relocated to the base of the rig or other appropriate sites; and that the remaining structure be augmented by rocks or other materials to assure that the site functions as a diverse and productive reef habitat. To replace the biotic productivity from that part of the platform removed for navigational purposes, rock or concrete reefs should be placed in nearshore locations. A rigs-to-reef project sponsor must provide sufficient funds to the Department to evaluate the benefits to biotic productivity, user groups, and the overall management of fishery resources." (Holbrook et al. 2000)

Social Values in Platform Decommissioning

Defining the social and ecological goals of decommissioned platforms as artificial reefs will be critical in evaluating the efficacy of any potential rigs-to-reef program and the current and future performance of any artificial reef. Therefore, it is likely that various stakeholder groups will vie in defining the goals (and therefore the usefulness) of decommissioned platforms as artificial reefs. In this report, we sort the multitude of stakeholder viewpoints regarding a rigs-to-reef program into three groups, each of which is primarily defined by one concern: community membership, resource accessibility and environmental (marine life) issues. Of course, an individual may be influenced by more than one social value, and others may use arguments from multiple categories to promote a desired decommissioning outcome.

The first group consists of stakeholders who are concerned about community membership, and either oppose or support local presence of the oil industry. Those that wish to promote a community without the oil industry often view reefing alternatives as bundled together with all oil industry activities (e.g., continued exploration and production), the whole of which should be locally opposed (although they may not be opposed to oil industry activities in the Gulf of Mexico). For example, Camozzi (1998a) states that complete removal should be the preferred alternative in decommissioning because, after decades of fighting oil development on the California Coast, it acts as a "catharsis" for the local community. Camozzi (1998b) reiterates this point by stating that, in regard to mussel mound removal, "Sending a message to oil companies that they must clean up our coast when they are done extracting their profits is the most vital issue in this case." Individuals who wish to encourage or maintain the presence of the oil industry in the local community, presumably for economic reasons, favor some sort of reefing option because reefing is less expensive than complete removal (Pulsipher et al. 2000). Further information regarding local community views on the oil industry in California can be found in Lima (1994) and Smith and Garcia (1995).

The second group of stakeholders is primarily concerned with resource accessibility. A heterogeneous group, these citizens will either favor or oppose decommissioning alternatives depending on how these alternatives aid or inhibit their ability to access a particular resource. For example, commercial trawlers in the Southern California Bight favor complete removal because fishing gear may snag on platform structure or shell mounds (Southern California Trawlers Association 1998; McCorkle 1999). Other commercial fishers benefit from oil industry activities. Shrimp trawlers in the Gulf of Mexico drag within 0.4 km (0.25 mi) of platform structures, reporting that these fishing grounds tend to be more productive (Wilson et al. 1987). The rocky habitat associated with Rincon Oil Island in California provides excellent lobster fishing grounds and trap fishers would oppose seeing this habitat removed (Miller 1999). Recreational fishers often dominate the debate surrounding platform decommissioning, and they have driven the formation of artificial reef policy at both state and federal levels (Stone 1985; Wilson et al. 1987). Many recreational fishers favor a reefing alternative in decommissioning because catch per unit effort is often high at offshore platforms for targeted fish species such as kelp bass (Love and Westphal 1990; McCrea 1998). In the Gulf of Mexico, Reggio (1987) estimates that 70% of fishing excursions target oil platform habitats. Citizens participating in non-consumptive activities also possess a variety of viewpoints regarding decommissioning alternatives. Many scuba divers find that underwater portions of oil platforms provide outstanding diving and underwater photographic opportunities, and favor decommissioning alternatives that preserve such opportunities, (Vallette 1999). Other members of the public may view the topside structure of platforms as denying them access to unobstructed, scenic ocean views, and consequently they oppose the leave-in-place decommissioning option (Wiseman 1999).

The third stakeholder group makes decisions regarding decommissioning based on their perception of how certain marine populations or environmental ideals fare under the various decommissioning alternatives. It is this last group that is most likely to use ecological information in making decisions regarding platform decommissioning. A decommissioning option that involves reefing may be supported if a substantial net benefit to the marine environment can be demonstrated (Chabot 1999). Others support complete removal because this option is the only one which promotes a wilderness ideal, that is, a marine environment which fails to retain a visible mark of human activities. If there is a lack of scientific evidence regarding ecological consequences, or if they are unaware of such consequences, these stakeholders may use another social value, such as community membership, in choosing a preferred decommissioning alternative (Chabot 1999).

Economic incentives interact and overlap with social values. In past rigs-to-reefs activities, industry and state entities have equally shared the cost-savings resulting from partial removal or toppling alternatives. Partial removal of deep water platforms will generate estimated savings of one to two orders of magnitude greater than the amount saved in decommissioning smaller platforms. The cost of maintaining navigational equipment (if any is needed) at these reefed platforms will not increase in the same proportion as the increase in cost-savings, and may actually decrease. These additional financial resources may be used to develop or enhance projects of interest to stakeholders, and may be a sufficient incentive to alter the preferred decommissioning option for some groups.

The Interaction of Science, Scale, and Social Values

State and federal regulatory agencies involved in the decommissioning process are required to protect the public interest when managing natural resources. In the face of strongly conflicting viewpoints among stakeholder groups, resource managers may try to convert a controversial issue into a technical one. For instance, they may give preference to the protection of marine life resources, thereby avoiding the appearance of favoring one group's economic concerns over another's. Additionally, legislation such as the Endangered Species Act and the Marine Mammal Protection Act, among others, often give environmental concerns priority over social and economic concerns. In combination, these issues give ecological information a prominent role in the decommissioning process.

Impacts to the environment may be measured at short or long time scales, or within a local or regional context. As time and space scales increase, so does scientific uncertainty about predicting consequences of various management alternatives (due to an increasing number of unknown variables and propagation of error associated with imprecise assumptions or model parameters). When there is greater scientific uncertainty, social values and political or economic factors often become more important in the decision-making process. This phenomenon may result in stakeholders advocating that ecological performance of reefed platforms be evaluated at scales which enhance the possibility of their preferred decommissioning alternative, even if ecological data are irrelevant to their concerns.

For example, proponents of regional ecological assessment at long time intervals may be individuals who oppose the local presence of the oil industry. Since regional assessment is difficult and expensive to accomplish, social values (e.g., antagonistic views of oil industry) will increase in importance. Significantly, these same individuals have not stipulated that other artificial reefs which are similar to reefed platforms, such as steel hulled ships, undergo the same rigorous ecological assessment. Further, the assured instantaneous and lethal effects of explosives are not considered in arguments about marine life effects.

Proponents of small scale ecological assessment tend to be recreational anglers, who often state their support for rigs-to-reef programs in terms of benefits to the environment. They maintain that the local presence of abundant marine life at a platform is sufficient evidence of satisfactory ecological performance. But this support for a rigs-to-reef alternative often evaporates if artificial reefs are designated no-take areas.

Ecological information greatly aids the decision-making process if explicit management goals are specified. The rebuilding of depleted fish stocks might be one goal, the preservation and expansion of marine wilderness might be another. Determination and ranking of ecological goals reflects cultural values. Thus, controversies surrounding platform decommissioning cannot easily be translated into technical issues by giving priority to ecological goals because we lack agreement on the space and time scales in which ecological impacts should be measured. Therefore, the scale at which ecological impacts are measured (local or regional) and considered (short or long term) becomes paramount in the decommissioning process. To date, such specific space and time scales have not been designated by any state or federal government agency.

MILTON LOVE

Juvenile cowcod on pipeline.

Decommissioning Activities in the Gulf of Mexico

To date, almost all platform decommissioning and reefing in the world has occurred in the Gulf of Mexico. Because large-scale offshore drilling first took place in the Gulf of Mexico, it was in this region that the issue of what to do with unwanted platforms first arose. Below, we give a brief summary of the history of decommissioning in the Gulf of Mexico; additional details are found in Lukens (1997), Kasprzak (1998), and Dauterive (2000).

Kerr-McGee erected the first offshore oil and gas platform in the Gulf of Mexico off Louisiana in 1947. Despite its primitive structure and placement in waters only 6 m (18 ft.) deep, oil was struck 22 days after drilling began, presaging a veritable tidal wave of offshore drilling. In 2001, there were over 4,000 platforms in the Gulf of Mexico, the vast majority occurring off Louisiana, followed by Texas, Mississippi and Alabama (Lukens 1997; Moritis 1997; Kasprzak 1998, 1999; Dauterive 2000). Platforms provide a considerable amount of the hard substrate in the north-central Gulf of Mexico, and surveys indicate that 20%–50% more fish live around platforms than on surrounding soft seafloors (Gallaway and Lewbel 1982; Driesen 1985). Because recreational and commercial fishers target fish residing near these structures, they are of considerable economic value (Dimitroff 1982; Reggio 1987; Kasprzak 1998).

By the late 1970s, it was apparent that the economic life span of many of these structures was nearing an end. During that decade, about 150 platforms were removed to shore and scrapped. The first reefing of an oil and gas structure occurred in 1979 when a subsea production system was towed from Louisiana to an artificial reef site off the Panhandle of Florida. In 1982, an obsolete platform jacket was moved from Louisiana to a Dade County, Florida site and over the next few years several additional structures were moved to various artificial reef sites.

Responding to this new activity, Congress passed the National Fishing Enhancement Act (NFEA) in 1984 (33 U.S.C. § 2101 *et seq.*). The NFEA mandated the creation of a "long-term plan for siting, constructing, permitting, installing, monitoring, managing, and maintaining artificial reefs within and seaward of state jurisdictions" (Kasprzak 1998). This document, later called the National Artificial Reef Plan, was published in 1985. In response to NFEA, several Gulf of Mexico states have now passed laws to take advantage of platform decommissioning to help preserve complex habitat in the northern Gulf of Mexico, for example, the Louisiana Fishing Enhancement Act of 1986 (La. Rev. Stat. § 56:639.1 *et seq.*) [Act 100] and the Texas Artificial Reef Act of 1989 (Tex. Parks & Wildlife Code § 89.001 *et seq.*). As an example, Act 100 created a process by which ownership of and liability for uneconomical platforms could be transferred from operators to the state of Louisiana. As noted by Kasprzak (1998), "Act 100 established the State of Louisiana as the permittee for artificial reefs developed under the program's jurisdiction and appointed the Department of Wildlife and Fisheries as agent for the state. The state assumes responsibility for the reefs upon placement within the established reef permit area…Act 100 does not authorize state general funds for the artificial reef program but does establish the Louisiana Artificial Reef Trust Fund. Oil and gas companies that donate structures to the program are asked to contribute half of the disposal savings realized through program participation to the trust fund." A similar program exists in Texas (Texas Parks and Recreation 1999).

A significant amount of money has been collected in rigs-to-reef programs in both Louisiana and Texas. As of 2001, there was about $15 million in the Louisiana fund and at least $4 million in Texas. Contrary to what has been reported (McGinnis et al. 2001), major artificial reef programs of several states, including Louisiana and Texas, receive neither state nor federal funding, they are fully underwritten by the interest paid on their respective rigs-to-reef accounts (J. Culbertson, personal communication; R. Kasprzak, personal communication). The Louisiana Department of Wildlife and Fisheries and Texas Parks and Wildlife Department describe their rigs-to-reefs programs at http://www.wlf.state.la.us (under "Marine Fisheries") and http://www.tpwd.state.tx.us/fish/reef/artreef.htm, respectively.

Since 1942, over 188 Gulf of Mexico platforms have been reefed, primarily off Louisiana and Texas. This represents about 8.4% of all decommissioned platforms (L. Dauterive, personal communication). The reasons for this early low reefing rate were economic. Most of the platforms thus far decommissioned were in shallow water, and it was more cost effective to haul them onshore for salvage or reuse rather then tow them to reefing sites. In the future, it is likely that a higher proportion of platforms will be reefed as more offshore structures become obsolete. Of the platforms that have been reefed, about 60% have been removed from a site and towed to a new location. Contrary to what was stated by Krop (1998), some decommissioned platform structures have been left in place. Thus far, 30% have been toppled in place and the remainder have been partially removed and left standing (Dauterive 2000). As larger platforms in deeper waters are decommissioned, L. Dauterive (personal communication) has noted a trend towards partial removal, rather than towing or toppling. In all but a few instances, only the platform jacket has been used as reef material.

The Future: Ecological Consequences of Offshore Platform Decommissioning in California

Complete Removal (Total Removal) of Platform

The immediate impact of removing and hauling an entire platform to shore is that all attached animals die. If some of the platform structure is hauled to a reef area and replaced in the water, some of these animals may survive, depending on water depth and the length of time the structure is exposed to the air.

Using explosives to separate the jacket from the seafloor kills large numbers of fishes, although limited research makes it difficult to predict how many deaths will occur. Marine mammals and sea turtles may also be indirectly killed by damage to the auditory system. In a study in the Gulf of Mexico (Bull and Kendall 1994), explosives were placed 5 m (15 ft.) below the seafloor to sever the well conductors, platform anchor pilings and support legs, of a platform in about 30 m (100 ft.) of water. All of the fishes on or near the bottom and most of the adult fishes around the entire platform suffered lethal concussion.

Some shallow-water platforms can be removed without explosives. However, "The oil and gas industry has attempted to find alternatives to the use of explosives, such as cryogenic cutting, hydraulic abrasive cutting, mechanical cutting, and torch cutting. Most of these techniques either have proven to be ineffective or are successful only in limited situations. At present, the industry maintains that the use of explosives is by far the safest, most reliable, and most cost-effective method of platform removal" (Kasprzak 1998). A recent assessment of techniques for removing platforms (NRC 1996) found that it is unlikely that any techniques or devices now known will significantly reduce fish kills during removal operations that use explosives.

Shell Mounds at the Base of Platform

The jackets and conductors of all platforms off southern and central California are heavily encrusted with invertebrates, including mussels, barnacles, seastars, rock scallops, rock oysters and jingle shells, sea anemones, caprellid amphipods, rock crabs, limpets, gooseneck barnacles, and sessile tunicates. An extremely thick layer of mussels extends from the intertidal zone to depths of at least 30 m (100 ft.) (and deeper on some platforms). The seafloor surrounding the platforms is covered with mussel shells. This "shell mound" or "mussel mound" is created when mussels, and other invertebrates, are dislodged during platform cleaning or heavy swells. Our observations show that, depending on bottom depth, a number of species of invertebrates, including many species of seastars, brittle stars, and rock crabs, as well as king crabs, opisthobranchs, shrimps, octopi, and sea anemones are abundant on the shell mounds. Substantial number of fishes, primarily the juvenile stages of various rockfishes, adult stages of dwarf rockfish species, as well as lingcod, poachers, painted greenling, and other benthic species also inhabit shell mounds.

Around four platforms in shallow water locations (+/- about 33 m, 109 ft., water depth), the shell mounds were found to be many meters thick, and were found to cover accumulations of drilling muds and cuttings. Investigations of the shell mounds around deep-water platforms have not been completed. Nevertheless, because of the potential for environmental harm, this issue must be addressed for all platforms regardless of the decommissioning option pursued. The level of contamination, while localized, has been shown to vary from platform to platform. Therefore, any remedial actions taken during the decommissioning process will likely be determined on a case-by-case basis. Although the regulatory requirements are still evolving, the alternatives being discussed include leaving the shell mounds undisturbed, smoothing and shaping them to allow for trawling, capping the shell mounds with an impervious material, adding material to the mounds for enhancement, or completely removing the shell mounds.

The removal of shell mounds may have a number of consequences to marine life by (1) removing habitat and (2) the potential for releasing toxins into the water column during the removal process. The biological consequences of either removing, altering, or leaving the shell mounds in-place must be given appropriate attention in the decommissioning process.

Partial Removal of Platform

Since partial removal reduces or eliminates shallow water habitat from the platform structure, this alternative would likely result in lower species composition and diversity than at the start of decommissioning process. Response of biotic communities will depend upon how much of the upper portion is removed. Depending on the platform, fewer nearshore reef fishes, such as surfperches, basses, and damselfishes may occur. Invertebrates that only reside or recruit to shallow water habitat would also be absent. Since the majority of mussels are located at shallow depths, shell mound replenishment will be reduced or absent, and affect the persistence of that community.

Since partial removal does not require the use of explosives, there is relatively little marine mammal, sea turtle, fish and invertebrate mortality compared to complete removal. Vertebrate and invertebrate assemblages associated with the remaining platform structure are assumed to be minimally affected.

A number of misunderstandings surround predictions regarding the potential ecological consequences of partial removal.

(1) Some stakeholders and policy analysts have erroneously assumed that Coast Guard regulations require a minimum depth below the ocean surface to which a reefed platform must be reduced. However, as noted earlier, the decision on how much of the jacket and conductors is left in place is based on both a Coast Guard assessment and the willingness of the liability holder to pay for the requisite navigational aids. As mussels become rare below 30 m (100 ft.) on most platforms, the mistaken assumption that all topped platforms must be cut to 24–30 m (80–100 ft.) below the surface has led some to conclude that partial removal will inevitably lead to a severe reduction in the amount of mussels that fall to the bottom and, thus, to a change in or end to the shell mound community. This is not necessarily the case.

(2) Some reports suggest that partial removal will lead to a large decrease in juvenile rockfish densities; our research does not support this supposition. On the offshore platforms in the Santa Barbara Channel region, the juveniles of most rockfish species (particularly blue, bocaccio, halfbanded, olive, pygmy, squarespot, starry, widow, and yellowtail) are uncommon in waters shallower than 26 m (85 ft.). Partial removal could reduce fish densities if pelagic juvenile stages of these rockfishes first encounter a platform in shallow surface waters, then swim downwards below the 26 m range, causing pelagic juveniles to "miss" a platform. However, young-of-the-year rockfishes of many of these species recruit from the plankton in large numbers both to natural outcrops in nearshore waters and to those coming out of deeper waters that have crests in about 30 m (100 ft.) of water. This indicates that emergent structure is not necessary for these juveniles to locate suitable habitat.

On the other hand, the pelagic stage of a few rockfish species, particularly copper, gopher, black-and-yellow, and kelp may prefer to recruit shallower portions of the platform than other rockfish species (Holbrook et al. 2000; this report). These species recruit to nearshore rocky outcrops and kelp beds and do not appear to settle in deeper waters (Larson 2002a,b). For these species, partial removal of a platform would probably decrease juvenile recruitment, depending on the uppermost depth of the remaining structure.

(3) Errors regarding factors affecting juvenile fish mortality have also lead to confusion. McGinnis et al. (2001), in describing the history of artificial reef research in California, states that "Research has shown that high relief, open structures serve best to attract fish, and better enable fishery exploitation, while low relief, complex structured reefs provide better nurseries and afford more diverse assemblages of fish and other organisms". McGinnis et al. (2001) also cite an anonymous California Department of Fish and Game biologist who notes that "a drawback to rigs as reefs is that they are high relief, which works against survival of young-of-the-year fish, suggesting they may not be a source of production but rather simply an attraction site."

We know of no research that can support the above claims, and the authors do not cite any specific studies. Predators are the main source of juvenile fish mortality in marine systems; death due to starvation or exposure is rare. Thus, variation in habitat structure would modify juvenile fish survivorship by modifying the success rate of predators. Presently, no studies have assessed comparative performance in survivorship rates between platforms and natural habitats. Alternatively, we may begin to infer potential predator vulnerability between habitats by examining the ratio of juvenile fishes to piscivorous fishes. In the shallow portion of Platform Irene, the ratio of juvenile rockfishes to piscivorous fish is about 25:1 and at nearby Tarantula Reef it is 3:1 (Appendix 2; Schroeder, unpublished data). Conversely, in the east Santa Barbara Channel, at Platform Gina the ratio is 1:5, and at Portuguese Rock, Anacapa Island it is 1:1.4.

Toppling of Platform

Toppling would produce reefs with somewhat different fish assemblages than what has been observed around intact platforms. Consequences of removal of shallow water habitat would be similar to that of partial removal. In California, because most platforms reside in fairly deep water, toppled platforms would also harbor fewer young-of-the-year rockfishes, just as the reefs adjacent to Platform Hidalgo harbor fewer of these animals. Depending on the characteristics of the platform, a toppled structure, with twisted and deformed pilings and beams, might have more complexity than an upright one. This might increase the number of such crevice dwelling fishes as pygmy rockfishes.

No Removal (Leave-in-Place) of Platform

The no-removal option would allow the platform and shell mound to continue to function as they had when the structure was occupied. Decommissioning activities would result in small mortality impacts to resident marine populations.

What is the Life Span of a Reefed Platform?

How long can a decommissioned steel platform survive in the marine environment before rusting away? Operating steel platforms are protected by sacrificial anodes, often made of aluminum or zinc, which preferentially corrode before steel, thus preserving the jackets' integrity. This cathodic protection lasts as long as the anodes are intact, usually for a number of decades. It is assumed that, once a platform is reefed, there will be no additional replacement of the sacrificial anodes, although the issue has yet to be addressed for platforms off California. While corrosion rates vary in seawater, depending on water temperature, biofouling and other factors, it is estimated that the life span of a cathodically unprotected platform will range from a minimum of 100 to more than 300 years (Quigle and Thorton 1989; Mishael 1997; Voskanian and Byrd 1998).

Pipelines Associated with Platforms

Pipelines run from all platforms either to shore or to other platforms that collect the oil or gas and then ship it to shore. McGinnis et al. (2001), note that "Both Federal and California regulations allow decommissioned OCS pipelines to be abandoned in place so long as they do not constitute a hazard to navigation, commercial fishing or unduly interfere with other uses of the OCS." (See also 30 C.F.R. § 250.1750; CA. PUB. RES. CODE § 6873.) In the Gulf of Mexico, few pipelines have been completely removed in the course of decommissioning (Breaux et al. 1997).

In 2001, using the research submersible *Delta*, we conducted pilot surveys of a pipeline between Platforms Gail and Grace. We found this pipe to be heavily encrusted with such invertebrates as anemones, crinoids, basket stars, and seastars. We also noted relatively large numbers of fishes, particularly juvenile or dwarf fishes, including cowcod, flag, blackgill, striped, and vermilion rockfishes, along with poachers and flatfishes. Both fish and invertebrate densities were much higher than found on the surrounding mud bottom.

Resource Management Issues Associated with Decommissioning

Habitat Enhancement of Reefed Platform Structure

The California Department of Fish and Game has issued guidelines for rigs-to-reef projects that call for enhancing the remaining structure using quarry rocks or other material (Parker 1998). Adding such material would increase the number of crevices and hiding places suitable for smaller sized fish. Thus, species which are rare or absent from observed platform fish assemblages, such as pygmy rockfish, may then occur. The ecological community response may depend on the type of habitat enhancement and has not been examined.

Marine Protected Areas

To a certain extent, the platforms in the Santa Barbara Channel and Santa Maria Basin currently act as de facto marine protected areas (Schroeder and Love 2002). Fishing pressure around many of these platforms is relatively low because (1) some platforms are relatively far from harbors and thus from fishing vessels, (2) four platforms (Irene, Hidalgo, Harvest, and Hermosa) are located near Point Conception in waters that are extremely rough for much of the year, and (3) it is difficult to fish close to operating platforms because tying up to these structures is discouraged by platform operators.

Clearly, many reefed platforms would be a target for recreational anglers or commercial fishermen because platforms often host sizable local populations of sought-after fish species. Off Florida, Shinn and Wicklund (1989) suggest that patterns of large fish at Tenneco platforms may be in part determined by fishing activities. Thus, in California, it has been proposed that reefed structures be designated as no-take areas (California senate bill introduced by D. Alpert). In addition, it may be possible to modify the architecture of reefed platforms to make them difficult to fish. For instance, because most of the target species are found inside the bottom of platform any structure above the bottom would prevent gear from reaching the seafloor, thus inhibiting the capture of many fishes.

Decommissioning Alternatives in Relation to National Marine Fishery Service's Fishery Rebuilding Plans

The use of explosives to remove or topple a platform may compromise fishery-rebuilding programs. Cowcod provide one example. This species has been declared overfished by NOAA Fisheries (formerly known as the National Marine Fisheries Service) and is the subject of a federal rebuilding plan. The Pacific Fisheries Management Council has approved a cowcod rebuilding plan that limits fishery impacts to 1% per year (about 2.4 metric tons for 2001), as part of a 95-year rebuilding period, and the use of spatial closures south of Point Conception to reduce bycatch mortality. As noted earlier, our observations around Platform Gail indicate it has the highest density of adult cowcod and bocaccio of any natural or artificial structure surveyed. We can make an estimate of the number of cowcod at the bottom of Gail by multiplying the density of cowcod observed by the area of the platform's footprint (the area underneath the platform). For instance, in the last two years of the survey, 1999 and 2000, observed cowcod densities were 0.015 and 0.0183 fish per m^2, respectively. As Gail's footprint is 5,327 m^2 (Holbrook et al. 2000), extrapolation for 1999 and 2000 gives estimates of 79 and 97 individuals respectively. This conservative estimate does not include juveniles we have observed living on the shell mound or on the adjacent pipeline. The current rebuilding plan calls for both a quota on commercial and recreational fisheries combined of 2.4 metric tons, equal to about 600 fish (T. Barnes, personal communication). Assuming that Platform Gail has 75 or more cowcod living under it, and if, as seems likely from all known research, explosives used to remove or topple a platform will kill all of them, that loss may be sufficiently large to complicate the rebuilding plan (T. Barnes, personal communication).


LOVELAB, UC SANTA BARBARA

Spotted ratfish on shell mound at Platform Gail.

CHAPTER 5

RESEARCH AND MONITORING RECOMMENDATIONS

When Governor Davis vetoed SB 1, a bill that would have allotted some of the savings derived from reefing platforms to California, he wrote, "There is no conclusive evidence that converted platforms enhance marine species or produce net benefits to the environment…it is premature to establish this program until the environmental benefits of such conversions are widely accepted by the scientific and environmental communities." And, with respect to assessing the effect of different decommissioning options on marine populations, Holbrook et al. (2000) state that the key marine ecological question is, "What is the effect of each decommissioning alternative on regional stocks of reef-associated species in general, or of particular targeted species?" Clearly, in the decommissioning process, there is a need for additional information.

Below we list examples of research that would be useful in addressing these issues. Many of these examples have been suggested by various resource managers. The first two tasks are necessary to resolve issues regarding attraction or production of platform and natural habitats as well as helping to define essential fish habitat. In addition to aiding in the platform decommissioning process, these three tasks will also aid in future coastal zoning and mapping that would occur in any future boundary expansion of the Channel Islands Marine Sanctuary.

Compare ecological performance between oil platforms and natural outcrops and determine if any oil platforms serve as Essential Fish Habitat for focal species.

What fishes live around platforms and nearby natural reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been well surveyed or have not been surveyed at all. Both scuba and submersible surveys must be conducted.

How does fish production around platforms compare to that at natural outcrops?

Fish production can be assessed and compared between habitats by examining a number of ecological yardsticks. These include (1) fish growth rates, (2) mortality rates, and (3) reproductive output. As an example, we conducted a pilot study comparing the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef. More research needs to be conducted in all of these areas. For instance, mortality rates can be estimated by sequential surveys of the densities of young fishes at a specific platform or natural outcrop. Reproductive output (larval production in the case of rockfishes) can be quantified by first estimating the size frequency and density of a species at a platform or natural outcrop. Then, using size-fecundity relationships from the literature, the potential annual larval production for that species can be calculated.

How does trophic structure around platforms compare to that at natural outcrops?

How do platforms and natural outcrops compare in terms of habitat value?

A relatively new measure called Habitat Value (HV) allows comparisons between habitats, incorporating fish density, fish length, and fish regularity of occurrence. In Stephens et al. (1999), we presented a preliminary analysis of nine platforms and found that platform HVs tended to be much higher than those for open coastal soft substrate, higher than low relief deep rock outcrop and in the same range as wetlands and kelp/rock natural outcrops. An analysis of all of the platforms and as many outcrops as possible should be conducted.

Can we identify areas that are Essential Fish Habitat?

All of the above studies contribute to answering this question.

Define the spatial distribution of economically important species (all life history stages) within the region of interest and define connectivity of habitats within this region.

What is the relative contribution of platforms in supplying hard substrate and fishes to the region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires an assessment of the rocky outcrops in the vicinity of each platform; this is derived from seafloor mapping. Much of the seafloor in the vicinity of platforms remains to be characterized. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How long do fishes reside at platforms?

It remains unclear how long fishes are resident around a platform. For instance, do the large numbers of fishes, such as the overfished bocaccio and cowcod, remain around the platforms for extended periods? One settled on a platform, how long do young-of-the-year fishes remain there? A knowledge of the residence time of these species would allow for a more accurate determination if platforms form optimal habitat for these species and if they are indeed acting as long-term marine reserves. Residence time can be determined through the use of both tagging studies and observations of a year class through time.

Acoustic tags are one way to determine fish residency. In a pilot study, Dr. Christopher Lowe, at California State University, Long Beach, captured and acoustically tagged rockfishes at Platform Gail and, after one year has determined that all have remained around the platform. Broader studies, covering additional platforms, outcrops, and species are needed.

What are the effects of platform retention or removal on fish populations within a region?

As an example, what effect would platform retention or removal have on fish recruitment? For instance, would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle out of the plankton to a platform in substantial numbers. If that platform did not exist, would these young fishes have found, and settled upon, natural outcrops? In a pilot project, we are using radar-derived (CODAR) current data to estimate where the young rockfishes that settled at Platform Irene would have gone if Irene had not existed. We identify the direction and distance of pathways from the platform to natural outcrops. A directional histogram of radar-derived trajectories will show the degree to which surface currents potentially carry larvae in any given direction from the platform site. Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground. Similarly, using a synthesis of oceanographic information, it is possible to model the drift direction of larvae produced by fishes living at a platform.

It would be useful to understand the natal origins of fishes residing at platforms and natural outcrops. Both genetic and otolith microchemistry techniques might aid in determining the degree of dispersal of fishes produced at platforms and natural outcrops.

Understand how habitat modification of platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the seafloor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

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Opposite: Tons o'invertebrates on the Gail-Grace pipeline. (Photograph by Milton Love)

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TABLES

TABLE 1. Common and scientific names of fishes observed in these studies.

Common Name	Scientific Name
Bank rockfish	*Sebastes rufus*
Barred sand bass	*Paralabrax nebulifer*
Barred surfperch	*Amphistichus argenteus*
Bat ray	*Myliobatis californica*
Bearded eelpout	*Lyconema barbatum*
Big skate	*Raja binoculata*
Black-and-yellow rockfish	*Sebastes chrysomelas*
Blackeye goby	*Rhinogobius nicholsi*
Blackgill rockfish	*Sebastes melanostomus*
Black rockfish	*Sebastes melanops*
Blacksmith	*Chromis punctipinnis*
Black perch	*Embiotoca jacksoni*
Bluebanded goby	*Lythrypnus dalli*
Bluebarred prickleback	*Plectobranchus evides*
Blue rockfish	*Sebastes mystinus*
Bluntnose sixgill shark	*Hexanchus griseus*
Bocaccio	*Sebastes paucispinis*
Brown rockfish	*Sebastes auriculatus*
Bull sculpin	*Enophrys taurina*
Cabezon	*Scorpaenichthys marmoratus*
Calico rockfish	*Sebastes dalli*
California halibut	*Paralichthys californicus*
California lizardfish	*Synodus lucioceps*
California scorpionfish	*Scorpaena guttata*
California sheephead	*Semicossyphus pulcher*
California smoothtongue	*Leuroglossus stilbius*
California tonguefish	*Symphurus atricauda*
Canary rockfish	*Sebastes pinniger*
Chilipepper	*Sebastes goodei*
C-O turbot	*Pleuronichthys coenosus*
Copper rockfish	*Sebastes caurinus*
Cowcod	*Sebastes levis*
Darkblotched rockfish	*Sebastes crameri*
Dover sole	*Microstomus pacificus*
Dwarf perch	*Micrometrus minimus*
Embiotoca sp.	Black perch, *Embiotoca jacksoni* or striped perch, *E. lateralis*
Fantail sole	*Xystreurys liolepis*
Flag rockfish	*Sebastes rubrivinctus*
Freckled rockfish	*Sebastes lentiginosus*
Garibaldi	*Hypsypops rubicunda*
Giant kelpfish	*Heterostichus rostratus*
Gopher rockfish	*Sebastes carnatus*
Grass rockfish	*Sebastes rastrelliger*
Gray smoothhound	*Mustelus californicus*
Greenblotched rockfish	*Sebastes rosenblatti*
Greenspotted rockfish	*Sebastes chlorostictus*
Greenstriped rockfish	*Sebastes elongatus*
Halfbanded rockfish	*Sebastes semicinctus*
Halfblind goby	*Lethops connectens*
Halfmoon	*Medialuna californiensis*
Honeycomb rockfish	*Sebastes umbrosus*
Hornshark	*Heterodontus francisci*
Hornyhead turbot	*Pleuronicthys verticalis*
Island kelpfish	*Alloclinus holderi*
Jack mackerel	*Trachurus symmetricus*
Kelp bass	*Paralabrax clathratus*
Kelp goby	*Lethops connectens*
Kelp greenling	*Hexagrammos decagrammus*
Kelp gunnel	*Ulvicola sanctaerosae*
Kelp rockfish	*Sebastes atrovirens*
Kelp perch	*Brachyistius frenatus*
Lavender sculpin	*Leiocottus hirundo*
Leopard shark	*Triakis semifasciata*
Lingcod	*Ophiodon elongatus*
Longnose skate	*Raja rhina*
Mexican rockfish	*Sebastes macdonaldi*
Mola	*Mola mola*
Mussel blenny	*Hypsoblennius jenkinsi*
Northern anchovy	*Engraulis mordax*
Ocean sunfish	*Mola mola*
Ocean whitefish	*Caulolatilus princeps*
Olive rockfish	*Sebastes serranoides*
Opaleye	*Girella nigricans*
Pacific argentine	*Argentina sialis*
Pacific barracuda	*Sphyraena argentea*
Pacific electric ray	*Torpedo californica*
Pacific hagfish	*Eptatretus stouti*
Pacific hake	*Merluccius productus*
Pacific mackerel	*Scomber japonicus*
Pacific pompano	*Peprilus simillimus*
Pacific sanddab	*Citharichthys pacificus*
Pacific sardine	*Sardinops sagax*
Painted greenling	*Oxylebius pictus*
Phanerodon sp.	White seaperch, *Phanerodon furcatus* or sharpnose seaperch, *P. atripes*
Pile perch	*Rhacochilus vaca*
Pink rockfish	*Sebastes eos*
Pink seaperch	*Zalembius rosaceus*
Pinkrose rockfish	*Sebastes simulator*
Plainfin midshipman	*Porichthys notatus*
Pygmy rockfish	*Sebastes wilsoni*

TABLE 1. (cont.) Common and scientific names of fishes observed in these studies.

Common Name	Scientific Name
Rainbow surfperch	*Hypsurus caryi*
Rathbunella sp.	Unidentified ronquil
Redbanded rockfish	*Sebastes babcocki*
Rex sole	*Glyptocephalus zachirus*
Rock wrasse	*Halichoeres semicinctus*
Rosy rockfish	*Sebastes rosaceus*
Roughback sculpin	*Chitonotus pugetensis*
Rubberlip seaperch	*Rhacochilus toxotes*
Sarcastic fringehead	*Neoclinus blanchardi*
Sargo	*Anisotremus davidsoni*
Sebastomus sp.	Unidentified member of rockfish subgenus *Sebastomus*
Senorita	*Oxyjulis californica*
Sharpchin rockfish	*Sebastes zacentrus*
Sharpnose seaperch	*Phanerodon atripes*
Shiner perch	*Cymatogaster aggregata*
Shortbelly rockfish	*Sebastes jordani*
Shortspine combfish	*Zaniolepis frenata*
Shortspine thornyhead	*Sebastolobus alascanus*
Silver surfperch	*Hyperprosopon ellipticum*
Slender sole	*Eopsetta exilis*
Speckled sanddab	*Citharichthys stigmaeus*
Spotted cuskeel	*Chilara taylori*
Spotted ratfish	*Hydrolagus colliei*
Spotted sand bass	*Paralabrax maculatofasciatus*
Squarespot rockfish	*Sebastes hopkinsi*
Starry rockfish	*Sebastes constellatus*
Striped seaperch	*Embiotoca lateralis*
Stripetail rockfish	*Sebastes saxicola*
Swell shark	*Cephaloscyllium ventriosum*
Swordspine rockfish	*Sebastes ensifer*
Thornback	*Platyrhinoidis triseriata*
Threadfin bass	*Pronotogrammus multifasciatus*
Treefish	*Sebastes serriceps*
Tube-snout	*Aulorhynchus flavidus*
Vermilion rockfish	*Sebastes miniatus*
Walleye surfperch	*Hyperprosopon argenteum*
White seabass	*Atractoscion nobilis*
White surfperch	*Phanerodon furcatus*
Whitespeckled rockfish	*Sebastes moseri*
Widow rockfish	*Sebastes entomelas*
Wolf-eel	*Anarrhichthys ocellatus*
Yelloweye rockfish	*Sebastes ruberrimus*
Yellowtail	*Seriola lalandi*
Yellowtail rockfish	*Sebastes flavidus*
Zebra goby	*Lythrypnus zebra*
Zebraperch	*Hermosilla azurea*
Unidentified blennies	Family Blenniidae
Unidentified gunnel	Family Pholidae
Unidentified kelpfishes	Family Clinidae
Unidentified pipefishes	*Syngnathus* spp.
Unidentified poachers	Family Agonidae
Unidentified rockfish juveniles	*Sebastes* spp.
Unidentified ronquils	Family Bathymasteridae
Unidentified sanddabs	*Citharichthys* spp.
Unidentified sculpins	Family Cottidae
Unidentified silversides	Family Atherinidae
Unidentified fish species	

TABLE 2. Mean length of selected species at platform bottoms and shell mounds, 1996–2001.

Species	Location	Holly	Irene	Grace	Hidalgo	Hermosa	Harvest	Gail
LINGCOD	bottom	—	22.6	30.4	34.7	—	32.7	—
	shell mound	—	19.1	30.2	22.2	—	28.8	—
	t	—	7.04	0.15	7.57	—	2.24	—
	d.f.	—	869	124	222	—	49	—
	significant@α=.05	—	*	—	*	—	*	—
PAINTED GREENLING	bottom	—	15.6	—	12.7	—	—	—
	shell mound	—	13.5	—	11.9	—	—	—
	t	—	3.35	—	0.93	—	—	—
	d.f.	—	175	—	80	—	—	—
	significant@α=.05	—	*	—	—	—	—	—
STRIPED ROCKFISH	bottom	—	—	—	17.8	—	22.1	21.3
	shell mound	—	—	—	14.4	—	21.3	17.4
	t	—	—	—	3.11	—	1.75	5.08
	d.f.	—	—	—	82	—	341	119
	significant@α=.05	—	—	—	*	—	—	*
COPPER ROCKFISH	bottom	22.2	20.7	—	—	—	—	—
	shell mound	20	18.4	—	—	—	—	—
	t	22.23	5.95	—	—	—	—	—
	d.f.	327	1,400	—	—	—	—	—
	significant@α=.05	*	*	—	—	—	—	—
PINKROSE ROCKFISH	bottom	—	—	—	—	—	—	20.2
	shell mound	—	—	—	—	—	—	14.2
	t	—	—	—	—	—	—	141.2
	d.f.	—	—	—	—	—	—	278
	significant@α=.05	—	—	—	—	—	—	*
GREENBLOTCHED ROCKFISH	bottom	—	—	—	—	—	—	26.0
	shell mound	—	—	—	—	—	—	17.5
	t	—	—	—	—	—	—	8.86
	d.f.	—	—	—	—	—	—	432
	significant@α=.05	—	—	—	—	—	—	*
FLAG ROCKFISH	bottom	—	—	17.4	—	—	—	—
	shell mound	—	—	13.7	—	—	—	—
	t	—	—	3.23	—	—	—	—
	d.f.	—	—	136	—	—	—	—
	significant@α=.05	—	—	*	—	—	—	—
HALFBANDED ROCKFISH	bottom	12.5	11.6	16.2	12.3	13.5	—	—
	shell mound	7.0	7.0	14.9	10.4	11.7	—	—
	t	7.23	35.6	32.8	32.33	31.37	—	—
	d.f.	438	6,356	15,230	13,158	10,288	—	—
	significant@α=.05	*	*	*	*	*	*	*

TABLE 3. Total numbers and densities (fishes per 100m²) of all fishes observed at Platform Hidalgo and North Reef, 1996–2001.

PLATFORM HIDALGO

Species	Total	Density
Unidentified rockfish YOY	13,462	103
Halfbanded rockfish	13,194	101
Widow rockfish YOY	828	6
Greenspotted rockfish	617	5
Flag rockfish	266	2
Lingcod	224	2
Painted greenling	218	2
Widow rockfish	95	<1
Bocaccio YOY	91	<1
Greenstriped rockfish	84	<1
Greenblotched rockfish	69	<1
Bocaccio	56	<1
Rosy rockfish	56	<1
Vermilion rockfish	44	<1
Canary rockfish	41	<1
Squarespot rockfish	33	<1
Swordspine rockfish	27	<1
Sebastomus sp.	27	<1
Pacific sanddab	17	<1
Pygmy rockfish	16	<1
Sharpchin rockfish	16	<1
Unidentified combfish	14	<1
Cowcod	12	<1
Yelloweye rockfish	12	<1
Kelp greenling	10	<1
Unidentified rockfish	9	<1
Unidentified sanddab	7	<1
Starry rockfish	7	<1
Shortspine combfish	6	<1
Unidentified poacher	5	<1
Yellowtail rockfish	5	<1
Unidentified fishes	5	<1
Pink surfperch	4	<1
Bank rockfish	2	<1
Unidentified ronquil	2	<1
Unidentified sculpin	1	<1
Ratfish	1	<1
Copper rockfish	1	<1
Stripetail rockfish	1	<1
California scorpionfish	1	<1
Longspine combfish	1	<1
TOTAL	**29,587**	**226**
Minimum number of species	34	
Total rockfish YOY	14,381	109
Total rockfishes	29,071	217

Rockfish YOY comprised 48.6% of all fishes surveyed.
All rockfishes comprised 98.3% of all fishes surveyed.

NORTH REEF

Species	Total	Density
Unidentified rockfish YOY	4,786	54
Pygmy rockfish	1,684	19
Widow rockfish YOY	886	10
Halfbanded rockfish	575	7
Greenspotted rockfish	370	4
Sebastomus group	187	2
Yellowtail rockfish	118	1
Vermilion rockfish	100	1
Squarespot rockfish	72	<1
Shortspine combfish	69	<1
Greenstriped rockfish	61	<1
Unidentified rockfish	52	<1
Lingcod	49	<1
Blackeye goby	43	<1
Unidentified fish	40	<1
Pink surfperch	39	<1
Starry rockfish	38	<1
Canary rockfish	38	<1
Greenblotched rockfish	38	<1
Rosy rockfish	34	<1
Unidentified combfish	27	<1
Pacific argentine	23	<1
Swordspine rockfish	19	<1
Flag rockfish	18	<1
Bocaccio	16	<1
Cowcod	12	<1
Widow rockfish	10	<1
Unidentified flatfishes	10	<1
Unidentified ronquils	5	<1
Speckled rockfish	4	<1
Yelloweye rockfish	4	<1
Unidentified sanddab	3	<1
Bank rockfish	3	<1
Unidentified poacher	2	<1
Ratfish	2	<1
Olive rockfish	2	<1
Unidentified Cusk-eel	1	<1
Kelp greenling	1	<1
Painted greenling	1	<1
Bluebarred prickleback	1	<1
Sharpchin rockfish	1	<1
Longspine combfish	1	<1
TOTAL	**9,445**	**108**
Minimum number of species	34	
Total rockfish YOY	5,672	65
Total rockfishes	9,128	99

Rockfish YOY comprised 60% of all fishes surveyed.
All rockfishes comprised 96.6% of all fishes surveyed.

Species observed only at Platform Hidalgo: California scorpionfish, copper and stripetail rockfishes.
Species observed only at North Reef: Blackeye goby, bluebarred prickleback Pacific argentine, speckled sanddab.

TABLE 4. Total numbers of all fishes observed at the deeper, below 30 m, depths at seven platforms and 80 natural outcrops, 1996–2001.

ALL PLATFORMS

Species	Total	Species	Total	Species	Total
Unident. rockfish YOY	47,973	Pile perch	235	Splitnose rockfish	22
Halfbanded rockfish	46,831	Blackeye goby	222	Gopher rockfish	19
Widow rockfish YOY	10,902	Pacific sanddab	215	Pygmy rockfish	17
Shortbelly rockfish	7,443	Unidentified combfish	210	Yelloweye rockfish	16
Squarespot rockfish	3,834	Yellowtail rockfish	198	C-O turbot	15
Pacific sardine	3,308	Whitespeckled rockfish	196	Senorita	14
Blacksmith	2,796	Halfmoon	189	Darkblotched rockfish	14
Widow rockfish	2,540	Unidentified rockfish	184	Unidentified *Rathbunella*	12
Vermilion rockfish	2,288	Kelp rockfish	171	Cabezon	12
Blue rockfish	2,063	Rosy rockfish	167	California smoothtongue	11
Stripetail rockfish	2,037	Northern anchovy	159	Starry rockfish	11
Bocaccio YOY	1,910	Brown rockfish	142	Bank rockfish	11
Copper rockfish	1,836	Unidentified fishes	131	Speckled rockfish	7
Painted greenling	1,738	Chilipepper	122	Spotted ratfish	6
Greenspotted rockfish	1,595	Canary rockfish	113	Hornyhead turbot	5
Widow/squarespot rockfish	1,575	Unidentified flatfish	103	Unidentified cuskeel	4
Lingcod	1,486	Cowcod	98	*Phanerodon* sp.	4
Calico rockfish	1,311	Unidentified seaperch	95	Unidentified skate	4
Shiner perch	1,161	Swordspine rockfish	73	Wolf-eel	3
Bocaccio	742	Kelp greenling	66	Unidentied eelpout	3
Flag rockfish	735	Kelp bass	55	Rex sole	2
Sharpnose seaperch	621	California sheephead	53	Bluebanded goby	2
Greenblotched rockfish	600	Longspine combfish	43	California halibut	2
Unidentified sanddab	576	Dover sole	41	Redbanded rockfish	2
Greenstriped rockfish	572	Opaleye	38	Pink rockfish	2
California scorpionfish	560	Garibaldi	36	Pacific electric ray	2
Pacific hake	531	Honeycomb rockfish	35	Mola	1
Sebastomus sp.	371	Spotted cuskeel	33	White seaperch	1
Jack mackerel	348	Treefish	33	Whitespeckled rockfish/ Chilipepper	1
Sharpchin rockfish	346	Unidentified ronquil	30	Bocaccio/chilipepper	1
Pinkrose rockfish	331	Rubberlip seaperch	30	Shortspine thornyhead	1
Olive rockfish	312	Pacific mackerel	30	California tonguefish	1
Pink seaperch	308	Blackgill rockfish	28		
Unidentified poacher	296	Unidentified sculpin	26		
Shortspine combfish	245	Mexican rockfish	25		

TOTAL 155,973
Minimum number of species 85
Total rockfishes 139,855
All rockfishes comprised 89.7% of all fishes surveyed.

TABLE 4. (cont.) Total numbers of all fishes observed at the deeper, below 30 m, depths at seven platforms and 80 natural outcrops, 1996–2001.

ALL NATURAL OUTCROPS

Species	Total	Species	Total	Species	Total
Widow rockfish YOY	87,238	Splitnose rockfish	214	Black perch	12
Squarespot rockfish	41,344	Pile perch	202	Calico rockfish	12
Pygmy rockfish	36,036	Greenblotched rockfish	167	Pacific hake	9
Shortbelly rockfish	35,439	Cowcod	146	Rubberlip seaperch	9
Halfbanded rockfish	26,169	Bocaccio YOY	146	Kelp rockfish	9
Swordspine rockfish	11,733	White seaperch	137	California halibut	7
Sebastomus spp.	7,648	*Rathbunella* sp	128	Unidentified prickleback	6
Widow rockfish YOY	6,635	Canary rockfish	127	Spotted cuskeel	4
Widow rockfish	6,245	Painted greenling	125	Dover sole	4
Blacksmith	4,744	Unidentified flatfish	123	Redbanded rockfish	4
Pink seaperch	4,495	Honeycomb rockfish	118	California lizardfish	4
Senorita	3,831	Copper rockfish	112	Jack mackerel	4
Rosy rockfish	2,459	Unidentified seaperch	111	Wolf-eel	3
Blue rockfish	2,274	Stripetail rockfish	106	Slender sole	3
Blackeye goby	2,123	Unidentified poacher	104	Bluntnose sixgill shark	3
Pacific sardine	2,070	Pacific argentine	104	Hornyhead turbot	3
Bank rockfish	1,781	Unidentified sanddab	104	Longnose skate	3
Pinkrose rockfish	1,433	Unidentified ronquil	85	White seabass	2
Speckled rockfish	1,285	Olive rockfish	85	Roughback sculpin	2
Greenspotted rockfish	1,094	Unidentified sculpin	73	Northern anchovy	2
Vermilion rockfish	945	Freckled rockfish	65	Rex sole	2
Unidentified rockfish	863	Yelloweye rockfish	65	Kelp greenling	2
Bocaccio	861	Treefish	64	Halfmoon	2
Unidentified combfish	728	Sharpchin rockfish	59	Unidentified pholid	2
Shortspine combfish	663	Shortspine thornyhead	49	English sole	2
Pinkrose rockfish	585	Swell shark	48	Unidentified turbot	2
Lingcod	580	Brown rockfish	40	Unidentified skate	2
Yellowtail rockfish	494	Darkblotched rockfish	38	Pacific electric ray	2
Greenspotted rockfish	462	Unidentified eelpout	36	Pacific sanddab	1
Starry rockfish	440	Gopher rockfish	35	Rainbow surfperch	1
Unidentified fish	381	Longspine combfish	31	California smoothtongue	1
Chilipepper	373	Island kelpfish	27	Bearded eelpout	1
Sharpnose seaperch	325	Blackgill rockfish	26	Unidentified cuskeel	1
Flag rockfish	309	Ocean whitefish	23	*Phanerodon* sp	1
Spotted ratfish	296	Threadfin bass	21	Bluebarred prickleback	1
California sheephead	237	Pink rockfish	17	C-O turbot	1
California scorpionfish	222	Pacific hagfish	14	Big skate	1
Whitespeckled rockfish	221	Bronzespotted rockfish	13		

GRAND TOTAL 298,379
Minimum number of species 94
Total rockfishes 276,034
All rockfishes comprised 92.5% of all fishes surveyed.

TABLE 5. Twenty highest densities of rockfish young-of-the-year juveniles, 1996–2001 as observed from the *Delta* submersible. Platforms are listed in blue, natural outcrops in red.

Site	Year	Habitat Type	Density of Rockfish YOY (fish per 100m^2)
Hidden Reef	1999	Natural	1249.2
Platform Hermosa	1999	Midwater	993. 6
Platform Irene	1998	Midwater	935.4
Platform Harvest	1999	Midwater	555.1
Platform Irene	1999	Midwater	524.3
San Miguel Island	1995	Natural	520.5
Platform Grace	2001	Midwater	486.5
Platform Hidalgo	1997	Midwater	385.2
Potato Bank	1996	Natural	367.7
Platform Irene	1997	Bottom	363.8
Platform Grace	2000	Midwater	346.2
Platform Irene	1997	Midwater	344.1
North Reef	1995	Natural	338.7
Platform Holly	1999	Bottom	326.1
Platform Hidalgo	1999	Midwater	314.6
Platform Irene	2001	Midwater	306.2
San Nicolas Island	1996	Natural	302.9
San Miguel Island	1995	Natural	262.1
Santa Rosa Island	1995	Natural	227.1
Platform Harvest	1997	Midwater	225.6

TABLE 6. Fish species observed as young-of-the-year juveniles at California oil/gas platforms.

Common Name	Common Name
Bank rockfish	Kelp bass*
Black rockfish	Kelp greenling*
Blackeye goby*	Kelp rockfish*
Blackgill rockfish	Lingcod*
Blacksmith*	Olive rockfish
Blue rockfish*	Pacific hake
Bluebanded goby*	Painted greenling*
Bocaccio*	Pinkrose rockfish*
Brown rockfish*	Pygmy rockfish*
Cabezon*	Rosy rockfish*
Calico rockfish*	Sharpchin rockfish
Canary rockfish*	Shortbelly rockfish*
Copper rockfish*	Splitnose rockfish
Cowcod*	Squarespot rockfish*
Flag rockfish*	Starry rockfish*
Garibaldi*	Stripetail rockfish*
Gopher/Black-and-Yellow rockfish*	Treefish
Greenblotched rockfish*	Vermilion rockfish*
Greenspotted rockfish*	Widow rockfish*
Greenstriped rockfish*	Yelloweye rockfish*
Halfbanded rockfish*	Yellowtail rockfish
Halfmoon*	Unidentified combfishes (*Zaniolepis* spp.)*

We also observed adult sarcastic fringehead, as well as unidentified blennies (*Hypsoblennius* spp.) and sculpins. Given the cryptic and sedentary nature of these species, we believe they arrived at platforms via larval recruitment.

In addition, Carlisle et al. (1964) observed young-of-the-year black perch, pile perch, rubberlip seaperch, and white surfperch at Platform Hazel (removed in 1996).

*These species were observed as both newly settled juveniles and adults at platforms.

APPENDICES

APPENDIX 1. Platform Synopses

In this section, we give a brief summary of each of the California platforms. The platforms are listed from the most northwest, Irene, off Point Arguello, to Emmy in the southeast off Long Beach.

Wherever possible, we have included the following information on each platform: (1) the original operator; (2) the current operator of record; (3) the date the platform was installed; (4) the first production date; (5) the platform's distance from shore (including whether it is in state or outer continental shelf [OCS] waters); (6) the bottom depth of the platform; (7) the number of wells; (8) what the platform produces (oil and/or gas); (9) the platform jacket dimensions (generally at the seafloor [bottom]); (10) the size of the shell mound surrounding the platform; (11) the size of the platform's footprint. This data was taken from California Resources Agency (1971), Manago and Williamson (1998), Holbrook et al. (2000), and Sea Surveyor Inc. (2001). We have also included a photograph of most of the platforms and their locations including latitude and longitude.

We follow this with a synopsis of the fish assemblages around each platform. When these summaries are based on our scuba and submersible surveys we include the years these surveys were conducted. Scuba surveys are midwater surveys except at the shallow water Platform Gina. Because of funding limitations, a number of platforms were surveyed only once and in a number of instances poor water visibility prevented complete coverage. Neither ExxonMobil nor Aera gave us permission to survey their platforms. In some instances, we were able to review videos that were taken during mandatory platform inspections. From these, we made a qualitative estimate of platform bottom fish assemblages for those platforms we were unable to survey.

IRENE

Original operator: Union; current operator of record: Nuevo Energy; date installed: 1985; first production: 1987; distance from shore (miles): 4.7 (OCS); water depth: 73 m (242 ft.); number of well slots 72; produces: oil and gas; platform jacket dimensions: 47 x 56 m (155 x 185 ft.) (bottom); platform footprint (m^2): 2,633; location: 120°43.45'N, 34°36.37'W.

Dates and types of surveys:

Scuba: 1995–2000

Submersible:

	Midwater	Bottom	Shell Mound
1995	x		
1996	x	x	x
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001	x	x	x

Platform Irene's midwaters consistently harbored large numbers of YOY (young-of-the-year) and older juvenile rockfishes. Bocaccio, blue, shortbelly, squarespot, treefish, and widow rockfishes, and the complex comprised of young black-and-yellow, copper, gopher, and kelp rockfishes, were abundant. Densities of these fishes were usually among the highest we observed around either platforms or natural outcrops. Young painted greenling, living on the jacket, were also quite abundant. During the 1998 El Niño, YOY blacksmith settled on the platform in large numbers. However, they were gone by the following year. Kelp greenling recruited as young-of-the-year in 1999; they swam to the platform bottom during the next year and were there through 2001. Two pelagic species, jack mackerel and Pacific sardine, were also occasionally seen in high numbers. The platform bottom had particularly high densities of halfbanded rockfish and YOY rockfishes, as well as subadult and adult copper, vermilion, calico, and brown rockfishes. Juvenile lingcod, pile perch and painted greenling were also very abundant and Pacific sanddab, canary and yellowtail rockfishes were frequently seen. On the shell mound, halfbanded and copper rockfish, as well as young lingcod were very common. Platform Irene is particularly noteworthy as it harbored far higher densities of young lingcod than did any other site (platform or natural outcrop) that we surveyed.

Opposite: Vermilion rockfish and assorted invertebrates at the bottom of Platform Grace. (Photograph by Donna Schroeder)

HIDALGO

Original operator: Chevron; current operator of record: Arguello Inc.; date installed: 1986; first production: 1991; distance from shore (miles): 5.9 (OCS); water depth: 130 m (430 ft.); number of well slots: 56; produces: oil and gas; platform jacket dimensions: 78 x 53 m (257 x 176 ft.) (bottom); platform footprint (m^2): 4,154; location: 34°29'N, 120°42'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	x
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001	x	x	x

We observed high densities of YOY and older juvenile rockfishes in the midwaters of Platform Hidalgo. A number of rockfishes, including blue, copper, gopher, kelp, olive, rosy, squarespot, and widow rockfishes and bocaccio were abundant. Halfmoon and young painted greenling were also common. Large numbers of YOY blacksmith recruited to the platform during 1998 and remained there through 2001. Similarly, kelp greenling young settled during 1999, and some remained through 2001. Jack mackerel and northern anchovy were occasional visitors. The bottom of this platform was dominated by halfbanded, greenspotted, and flag rockfishes, YOY rockfishes, and lingcod. Flag rockfish density was higher than at any natural outcrop or other platform. Other important species included canary, greenstriped, vermilion, and widow rockfishes and painted greenling. On the shell mounds, we noted extremely large numbers of halfbanded rockfish. Both juvenile and adult lingcod were also abundant.

HARVEST

Original operator: Texaco; current operator of record: Arguello Inc.; date installed: 1985; first production: 1991; distance from shore (miles): 6.7 (OCS); water depth: 205 m (675 ft.); number of well slots: 50; produces: oil and gas; platform jacket dimensions: 61 x 97 m (200 x 319 ft.) (bottom); platform footprint (m^2): 5,859; location: 34°28'N, 120°40'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x		
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001			

As on most of the other platforms we surveyed, YOY and somewhat older rockfishes characterized the midwaters of Platform Harvest. Of these, bocaccio, as well as blue, olive, squarespot, and widow rockfishes were most abundant. Young painted greenling , as well as halfmoon, also were seen frequently. Blacksmith were abundant, they had recruited in 1998 as YOY and remained at the platform through 2001. Large numbers of kelp greenling settled from the plankton in 1999. Pelagic species, such as northern anchovy and Pacific sardine, were occasional visitors. In the deeper midwaters, we saw many sharpchin and whitespeckled rockfishes. Stripetail, greenstriped, greenspotted, and greenblotched rockfishes and lingcod were commonly seen on the bottom. Stripetail, greenstriped and sharpchin rockfishes were most abundant on the shell mounds.

HERMOSA

Original operator: Chevron; current operator of record: Arguello Inc.; date installed: 1985; first production: 1991; distance from shore (miles): 6.8 (OCS); water depth: 183 m (603 ft.); number of well slots: 48; produces: oil and gas; platform jacket dimensions: 61 x 85 m (200 x 280 ft.) (bottom); platform footprint (m^2): 5,142; location: 34°27'N, 120°38'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x	x	x
1999	x	x	x
2000	x	x	x
2001			

Platform Hermosa's midwaters are noteworthy as rockfish nursery grounds. They harbored the second highest densities of YOY rockfishes of any site we surveyed (second only to Hidden Reef) (Table 5). Bocaccio, blue, olive, squarespot, widow, and whitespeckled rockfishes, as well as painted greenling were very abundant. Blacksmith and halfmoon were also typical species. As at many other platforms, in 1999 kelp greenling settled out of the plankton at Platform Hermosa. Jack mackerel and northern anchovy were also common. While halfbanded rockfish dominated the bottom assemblage, greenspotted rockfish were also abundant. Halfbanded rockfish also were the most abundant species on the shell mound.

HONDO

Original operator: Exxon; current operator of record: ExxonMobil; date installed: 1976; first production: 1981; distance from shore (miles): 5.1 (OCS); water depth: 255 m (842 ft.); number of well slots: 28; produces: oil and gas; platform jacket dimensions: 68 x 68 m (225 x 225 ft.) (bottom); platform footprint (m^2): 4,649; location: 34°23'N, 120°07'W.

Exxon and ExxonMobil did not allow us to survey this platform. However, we were able to review part of an inspection tape made at and near the bottom of Platform Hondo (Divecon International, 3 August 2002). Based on this, a number of rockfishes, including bank, darkblotched, pinkrose, widow and probably blackgill, live around the bottom of Platform Hondo. Darkblotched rockfish appeared to be particularly abundant.

HARMONY

Original operator: Exxon; current operator of record: ExxonMobil; date installed: 1989; first production: 1993; distance from shore (miles): 6.4 (OCS); water depth: 363 m (1,198 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 91 x 117 m (300 x 385 ft.) (bottom); platform footprint (m^2): 10,606; location: 34°22'N, 120°10'W.

Exxon and ExxonMobil did not allow us to survey this platform.

HERITAGE

Original operator: Exxon; current operator of record: ExxonMobil; distance from shore (miles): 8.2 (OCS); water depth: 326 m (1,075 ft.); number of well slots: 60; produces: oil and gas; location: 34°21'N, 120°16'W.

Exxon and ExxonMobil did not allow us to survey this platform. We reviewed part of an ROV inspection of this platform (Divecon International, 2 August 2002) and noted blackgill, darkblotch, pinkrose, and widow rockfish at or near the bottom.

HOLLY

Original operator: Atlantic Richfield, current operator of record: Venoco, date installed: 1966; first production: 1966; distance from shore (miles): 1.8 (state); water depth: 64 m (211 ft.); number of well slots: 30; produces: oil and gas; platform jacket dimensions: 18 x 30 m (60 by 100 ft.) (surface), 36 x 48 m (119 by 158 ft.) (bottom); location: 34°22'N, 119° 52'W.

Dates and types of surveys:
Scuba: 1995–2000
Submersible:

	Midwater	Bottom	Shell Mound
1995	x		
1996	x	x	
1997	x	x	x
1998	x	x	x
1999		x	
2000			
2001	x	x	x

The midwaters around Platform Holly were populated by large numbers of blue, copper, kelp, olive, squarespot, and widow rockfishes and bocaccio. With the exception of kelp rockfishes, most of these fishes were juveniles. Blacksmith, halfmoon, kelp bass, painted greenling, pile perch, and sharpnose seaperch were also abundant. Schools of jack mackerel and Pacific sardines were also noted. The platform bottom fish assemblage was characterized by YOY widow rockfish, calico, vermilion, halfbanded, and copper rockfishes, sharpnose seaperch and blackeye goby. Most of the vermilion and copper rockfishes were juveniles and subadults. Calico, vermilion, and copper rockfishes were the most abundant species on the shell mound.

C

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1977; first production: 1977; distance from shore (miles): 5.7 (OCS); water depth: 58 m (192 ft); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°37'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x (partial)		x

Only part of the platform midwater was surveyed and olive rockfish were most abundant. On the shell mound, vermilion, halfbanded, and calico rockfishes were most common, and blackeye goby, copper rockfish and painted greenling were also frequently encountered. A platform inspection video made on 23 September 1999 (Stolt Comex Seaway) around the platform bottom showed large numbers of juvenile blue, brown, copper, olive, vermilion, and widow rockfishes and lingcod. Both juvenile and adult calico, gopher, halfbanded and kelp rockfishes and painted greenling were also present.

B

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1968; first production: 1969; distance from shore (miles): 5.7 (OCS); water depth: 58 m (190 ft.); number of well slots: 63; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°37'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Juvenile widow rockfish, which had probably settled from the plankton in 1999, were abundant in the platform midwaters in 2000. Blacksmith, young blue, olive and kelp rockfishes, senorita and painted greenling were also common. We reviewed a video of a platform inspection (Stolt Comex Seaway, 21 September 1999) and noted large numbers of juvenile lingcod, blue, flag, and vermilion rockfishes as well as many juvenile and adult calico, gopher, halfbanded, kelp and rosy rockfishes and painted greenling.

A

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed: 1968; first production: 1969; distance from shore (miles): 5.8 (OCS); water depth: 57 m (188 ft.); number of well slots: 57; produces: oil and gas; platform jacket dimensions: 40 x 48 m (133 x 158 ft.) (bottom); platform footprint (m^2): 1,930; location: 34°19'N, 119°36'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith, blue and olive rockfishes were most abundant in the platform midwaters during 2000. Halfmoon, kelp bass and painted greenling were also common. Due to poor visibility, we were unable to survey the bottom and shell mound of Platform A during 2000. However, we reviewed a 2001 platform inspection video tape (Divecon International 2001) conducted with a remotely operated vehicle. That tape showed that there were large numbers of fishes, primarily rockfishes, around the platform bottom. These included many subadult vermilion and copper rockfishes, as well as blue, calico, gopher, kelp, and juvenile widow rockfishes, lingcod and painted greenling.

HILLHOUSE

Original operator: Sun Oil; current operator of record: Nuevo Energy; date installed: 1969; first production: 1970; distance from shore (miles): 5.5 (OCS); water depth: 58 m (190 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 49 x 40 m (163 x 133 ft.) (bottom); location: 34°19'N, 119°36'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith and painted greenling were the most abundant species in the platform midwaters. Poor water visibility prevented us from surveying the platform bottom and shell mound. We reviewed a videotape made during an ROV platform inspection survey (Divecon International, 26 August 2001) and, although this too was conducted during poor visibility, noted juvenile copper, flag, and vermilion rockfishes, as well as painted greenling and pile perch.

HENRY

Current operator of record: Nuevo Energy; date installed: 1979; first production: 1980; distance from shore (miles): 4.3 (OCS); water depth: 52 m (173 ft.); number of well slots: 24; produces: oil and gas; platform jacket dimensions: 45 x 33 m (149 x 110 ft.) (bottom); size of shell mound: 9 m (19 ft) high, circular and 76 m (250 ft.) in diameter; platform footprint (m^2): 1,505; location: 34°19'N, 119°33'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Halfmoon, blacksmith and kelp bass were common in the midwaters of Platform Henry.

HOUCHIN

Original operator: Phillips Petroleum/Continental Oil/Cities Services Oil; current operator of record: Pacific Operators Offshore; date installed: 1968; first production: 1969; distance from shore (miles): 4.1 (OCS); water depth: 49 m (163 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 38 x 38 m (125 x 125 ft.) (bottom); size of shell mound: 6 m (21 ft.) high, circular and 85 m (280 ft.) in diameter; 1,435; location: 34°20'N, 119°33'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Painted greenling and halfmoon were the most abundant species in the platform midwaters.

HOGAN

Original operator: Phillips Petroleum/Continental Oil/Cities Services Oil; current operator of record: Pacific Operators Offshore; date installed: 1967; first production: 1968; distance from shore (miles): 3.7 (OCS); water depth: 47 m (154 ft.); number of well slots: 66; produces: oil and gas; platform jacket dimensions: 38 x 38 m (125 x 125 ft.) (bottom); platform footprint (m^2): 1,435; location: 34°20'N, 119°32'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

The midwaters around Platform Hogan were important habitat for a diverse fish assemblage. Blacksmith, blue and olive rockfishes, painted greenling, sharpnose seaperch, pile perch and California sheephead were all common species.

HABITAT

Original operator: Texaco; current operator of record: Nuevo Energy; date installed: 1981; first production: 1993; distance from shore (miles): 7.8 (OCS); water depth: 88 m (290 ft.); number of well slots: 24; produces: gas; platform jacket dimensions: 60 x 38 m (199 x 125 ft.) (bottom); platform footprint (m^2): 2,284; location: 34°17'N, 119°35'W.

Dates and types of surveys:

Submersible:

	Midwater	Bottom	Shell Mound
1995	x (partial)		
2000	x		

YOY widow rockfish, blacksmith, and one-year-old widow rockfish dominated the midwater at Platform Habitat. Blue and kelp rockfishes and painted greenling were also common species.

GRACE

Original operator: Standard Oil; current operator of record: Venoco; date installed: 1979; first production: 1980; distance from shore (miles): 10.5 (OCS); water depth: 96 m (318 ft.); number of well slots: 48; produces: Grace is a non-producing platform; platform jacket dimensions (at surface and at bottom): 27 x 44 m (90 by 145 ft.) (surface), 48 x 65 m (158 x 213 ft.) (bottom); size of shell mound: 4 m (13 ft.) high, oval, 61 x 118 m (200 x 390 ft.), oriented in a northwest-southeast direction; platform footprint (m^2): 3,090; location: 34°10'N, 119°28'W.

Dates and types of surveys:

Scuba: 1996–2000

Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x		x
1999	x	x	x
2000	x	x	x
2001	x	x	x

The midwaters around Platform Grace contained very large numbers of young rockfishes. Most of these rockfishes recruited between 1999 and 2001.YOY widow rockfish and bocaccio, juvenile squarespot, blue and widow rockfishes, bocaccio and juvenile and adult blacksmith were very common. Painted greenling, sharpnose seaperch, jack mackerel and young flag rockfish were also frequently encountered. Halfbanded rockfish were the most abundant species around the platform bottom. Juvenile widow, vermilion, and flag rockfishes and bocaccio were also abundant. Many of these individuals had settled out of the plankton at the platform in 1999 and had remained there. Squarespot and greenspotted rockfishes, young lingcod, and sanddabs were also common. Over the shell mounds, halfbanded rockfish and shiner perch were the most abundant species. Pink seaperch, sanddabs, YOY bocaccio, young lingcod, juvenile greenspotted, flag and vermilion rockfishes were also characteristic species.

GILDA

Original operator: Union Oil; Current operator of record: Nuevo Energy; date installed: 1981; first production: 1981; distance from shore (miles): 8.8 (OCS); water depth: 62 m (205 ft.); number of well slots: 96; produces: oil and gas; platform jacket dimensions: 45 x 52 m (150 x 170 ft.) (bottom); platform footprint (m^2): 2,342.location: 34°10'N, 119°25'W.

Dates and types of surveys:
Scuba: 1995–2000
Submersible:

	Midwater	Bottom	Shell Mound
2000	x		

Blacksmith, halfmoon, kelp bass, opaleye, senorita, as well as YOY and juvenile blue, olive, squarespot and widow rockfishes and bocaccio were abundant in the midwater of this platform. Many of these rockfishes recruited from the plankton as YOYs during 1999. Due to poor visibility, we were unable to survey the bottom and shell mound of Platform Gilda during 2000. However, we reviewed a 2001 platform inspection video tape (Divecon International 2001) conducted with a remotely operated vehicle. That tape showed high densities of calico and juvenile vermilion rockfishes, as well as blue, brown, copper, halfbanded, olive, and widow rockfishes. Kelp greenling, lingcod, Pacific sanddab, and painted greenling were also noted.

GAIL

Original operator: Standard Oil; current operator of record: Venoco; date installed: 1987; first production: 1988; distance from shore (miles): 9.9 (OCS); water depth: 224 m (739 ft.); number of well slots: 36; produces: oil and gas; platform jacket dimensions: 21 x 52 m (70 x 170 ft.) (surface), 60 x 90 m (197 x 297 ft.) (bottom); platform footprint (m^2): 5,327; location: 34°07'N, 119°24'W.

Dates and types of surveys:
Scuba: 1996–2000
Submersible:

	Midwater	Bottom	Shell Mound
1996	x	x	
1997	x	x	x
1998	x		
1999	x	x	x
2000	x	x	x
2001	x	x	x

Blacksmith, halfmoon, kelp bass and a variety of young rockfishes, including bocaccio, blue, flag, olive, and widow, characterized the midwaters of this platform. Most of the young rockfishes settled from the plankton in 1999. The platform bottom fish assemblage was dominated by adult bocaccio, greenblotched, greenspotted, stripetail and pinkrose rockfishes. Of particular interest, we observed higher densities of both adult cowcod and bocaccio at the bottom of Platform Gail than at any natural outcrop or other platform. The shell mound at Platform Gail was characterized by stripetail, pinkrose, greenblotched and greenstriped rockfishes. On one occasion, large numbers of juvenile hake were observed, on another northern anchovies were abundant.

GINA

Original operator: Union Oil; current operator of record: Nuevo Energy; date installed:1980; first production: 1982; distance from shore (miles): 3.7 (OCS); water depth: 29 m (95 ft.); number of well slots: 15; produces: oil and gas; platform jacket dimensions: 28 x 20 m (94 x 65 ft.) (bottom); shell mound: 4 m (13 ft.) high, oval, 45 x 64 m (150 x 210 ft.), oriented in a northwest-southeast direction; platform footprint (m^2): 561; location: 34°07'N, 119°16'W.

Dates and types of surveys:
Scuba: 1995–2000

Platform Gina had the highest species richness (47) of any platform surveyed using scuba. Blacksmith dominated the assemblage, comprising 38% of all fishes observed. A close second was kelp bass, which counted for 31% of all fishes observed. Platform Gina had the highest number and density of surfperches of any platform, and was the only site where rubberlip surfperch formed part of the assemblage. The shell mound habitat at this platform provided excellent habitat for many species of recruiting rockfishes, where 13 species were observed. However, despite being present at every other surveyed platform, no widow or bocaccio juveniles were observed at Platform Gina. Pelagic species that characterized this assemblage include yellowtail, barracuda, and jackmackerel.

EDITH

Original operator: Standard Oil; current operator of record: Nuevo Energy; date installed: 1983; first production: 1984; distance from shore (miles): 8.5 (OCS); water depth: 49 m (161 ft.); number of well slots: 72; produces: oil and gas; platform jacket dimensions: 58 x 50 m (190 x 165 ft.) (bottom); platform footprint (m^2): 2,879; location: 33°35'N, 118°08'W.

Dates and types of surveys:
Submersible:

	Midwater	Bottom	Shell Mound
1998	x	x	x

Blacksmith, halfmoon, opaleye, sheephead and garibaldi characterized the midwater fish assemblage at Platform Edith. Very high densities of California scorpionfish, along with sharpnose seaperch, blacksmith and blackeye goby were found at the platform bottom. California scorpionfish were also extremely abundant on the shell mound.

ELLEN

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1980; first production: 1981; distance from shore (miles): 8.6 (OCS); water depth: 80 m (265 ft.); number of well slots: 80; produces: oil and gas; platform jacket dimensions: 45 x 56 m (147 x 186 ft.) (bottom); platform footprint (m^2): 2,511; location: 33°34'N, 118°07'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 7 September 2001) and observed very high densities of flag, halfbanded, squarespot and honeycomb rockfishes. We also saw a number of young vermilion rockfish. In the platform midwater, from about 61 m (200 ft) and deeper, there were very large numbers of young rockfishes, including both squarespots and widows.

ELLY

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1980; first production: n/a; distance from shore (miles): 8.6 (OCS); water depth: 77 m (255 ft.); number of well slots: n/a; produces: Elly is a processing facility for Ellen and Eureka; platform jacket dimensions: 48 x 61 m (159 x 202 ft.) (bottom); platform footprint (m^2): 2,949; location: 33°35'N, 118°07'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 9 September 2001) and observed high densities of young vermilion and young widow rockfishes, as well as many flag, honeycomb, olive, and squarespot rockfishes, and lingcod.

EUREKA

Original operator: Shell Oil; current operator of record: Aera Energy; date installed: 1984; first production: 1985; distance from shore (miles): 9.0 (OCS); water depth: 212 m (700 ft.); number of well slots: 60; produces: oil and gas; platform jacket dimensions: 54 x 85 m (179 x 282 ft.) (bottom); platform footprint (m^2): 4,635; location: 33°33'N, 118°06'W.

Aera did not allow us to survey this platform. We reviewed a tape of a platform inspection carried out with a remotely operated vehicle (Divecon International, 5 September 2001) and observed large numbers of pink-rose and juvenile darkblotched rockfishes, as well as juvenile and subadult bocaccio and widow rockfish. Also present were flag, greenblotched and greenspotted, and perhaps speckled, rockfishes and lingcod.

EVA

Original operator: Union Oil Company; current operator of record: Nuevo Energy; date installed: 1964; first production: 1966; distance from shore (miles): 1.8 (state); water depth: 17 m (57 ft.); number of well slots: 39; produces: oil and gas; location: 33°39'N, 118°03'W.

EMMY

Original operator: Signal Oil and Gas Company; current operator of record: Aera Energy; date installed: 1963; first production: 1963; distance from shore (miles): 1.2 (state); water depth: 14 m (47 ft.); number of well slots: 53; produces: oil and gas; location: 33°39N, 118°02'W.

Aera did not allow us to survey this platform.

APPENDIX 2

Density of fishes observed during the oil/gas platform scuba surveys off central and southern California. Platforms are listed from northwest to southeast. Density is in fish per 100 m^2, "<" means "less than."

Common name	Irene	Hidalgo	Harvest	Hermosa	Holly	Grace	Gilda	Gail	Gina
Barred sand bass					0.8				
Black rockfish		<0.1		<0.1		<0.1			<0.1
Black-and-yellow rockfish			<0.1	<0.1		<0.1			
Blackeye goby		<0.1	<0.1			<0.1		0.2	4.0
Blacksmith	1.6	16.2	20.0	8.5	20.9	71.3	57.4	77.4	51.3
Blue rockfish	32.3	3.8	18.9	7.5	36.3	5.3	9.8	3.9	1.3
Bluebanded goby									<0.1
Bocaccio	9.5	0.1	3.7	0.8	36.6	2.7	5.0	5.9	
Brown rockfish		<0.1			<0.1		<0.1		<0.1
Bull sculpin							<0.1		
Cabezon	0.1	0.1	0.2	0.2	0.1	<0.1	0.1	<0.1	1.1
Calico rockfish							<0.1		0.6
California barracuda						0.4	<0.1		0.8
California scorpionfish	<0.1				<0.1				0.1
California sheephead			<0.1			<0.1	0.1	<0.1	0.3
C-O turbot									<0.1
Copper rockfish	0.2	0.2	0.1	0.1	0.8	0.1	<0.1	<0.1	<0.1
Copper-complex juv. rockfishes	6.1	4.7	3.1	1.5	0.7	0.8	0.4	0.1	0.2
Garibaldi						<0.1	0.1	<0.1	0.1
Giant kelpfish					<0.1				
Gopher rockfish	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Grass rockfish					<0.1	<0.1	<0.1	0.2	<0.1
Halfbanded rockfish									0.6
Halfmoon	<0.1	1.3	0.3	0.9	3.1	2.2	16.7	13.7	2.4
Jackmackerel	69.3	22.1		8.0	34.5	6.1	6.3	0.2	9.6
Kelp bass					<0.1	0.5	6.1	1.8	42.9
Kelp greenling	0.1	0.4	0.6	0.4	0.1	0.1	0.1	0.1	<0.1
Kelp rockfish	<0.1	0.7	0.2	0.1	3.7	1.5	0.6	0.4	0.4
Lingcod	<0.1				0.1		<0.1		0.2
Mussel blenny							<0.1		
Northern anchovy		6.3	7.4	7.4					
Ocean sunfish	<0.1								
Ocean whitefish				0.0					0.8
Olive rockfish	0.6	0.7	4.5	3.8	2.5	0.3	1.6	0.9	0.2
Opaleye						<0.1	2.4	0.1	2.5
Pacific butterfish	<0.1								
Pacific mackerel						<0.1			
Painted greenling	3.4	1.6	1.5	2.9	1.9	1.0	0.5		1.7
Pile perch	0.1				0.7		0.2		3.4
Rock wrasse							0.1		0.1
Rosy rockfish	<0.1	0.5	<0.1		<0.1			<0.1	0.1
Rubberlip seaperch									0.6
Sarcastic fringehead						<0.1			
Sardine	7.1		0.2		169.3	36.4	1.2	6.8	
Senorita							3.6	0.2	
Sharpnose seaperch					1.9		0.7		2.3

Common name	Irene	Hidalgo	Harvest	Hermosa	Holly	Grace	Gilda	Gail	Gina
Shortbelly rockfish	57.0								
Spotted sand bass									<0.1
Squarespot rockfish	4.7	8.4	3.3		49.0	5.4	13.3	0.2	4.2
Starry rockfish									<0.1
Stripetail rockfish									1.2
Treefish	0.4	0.1	0.2	<0.1	0.1	0.2	0.1	0.1	0.1
Unidentified Atherinidae					12.3				
Unidentified Blenniidae					<0.1	<0.1		<0.1	
Unidentified Bothidae									<0.1
Unidentified Clinidae					<0.1				
Unidentified Cottidae	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1
Unidentified fish species	<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1
Unidentified rockfish juveniles	4.9	8.6	1.2	0.1	1.6	0.5	0.2	0.1	0.6
Vermilion rockfish									0.1
White seaperch	<0.1				<0.1		<0.1		1.5
Widow rockfish	141.4	10.8	46.9	15.5	54.9	2.7	1.5	<0.1	
Wolf eel	<0.1								<0.1
Yellowtail									0.1

DAN DUGAN

Cabezon in the midwater of Platform Holly.

APPENDIX 3

Number and density of fishes observed in the midwaters, bottoms and shell mounds of oil/gas platforms off central and southern California. Platforms are listed geographically, from northwest to southeast. Species are ranked by number observed. YOY means "young-of-the-year", those are fish that are less than one year old. Density is in fish per 100 m^2, "<" means "less than".

PLATFORM MIDWATERS

Because we could not estimate the lengths of the transects around Platforms Habitat and Gilda, no fish densities are presented.

PLATFORM IRENE (Surveyed 1995–2001)

Species	Number	Density
Shortbelly rockfish YOY	7,300	378
Unidentified rockfish YOY	4,133	214
Widow rockfish YOY	2,310	120
Pacific sardine	1,600	83
Bocaccio YOY	989	51
Widow rockfish	372	19
Yellowtail rockfish	133	7
Blacksmith	120	6
Painted greenling	26	1
Copper rockfish	24	1
Pile surfperch	11	<1
Blue rockfish	5	<1
Unidentified rockfish	2	<1
Kelp greenling	1	<1
Lingcod	1	<1
Olive rockfish	1	<1
TOTAL	**17,028**	**880**
Minimum number of species	14	
Total rockfish YOY	14,732	763
Total rockfishes	15,269	790

Rockfish YOY comprised 86.5% of all fishes surveyed.
All rockfishes comprised 89.7% of all fishes surveyed.

PLATFORM HIDALGO (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	13,134	186
Widow rockfish YOY	794	11
Painted greenling	136	2
Bocaccio YOY	87	1
Halfbanded rockfish	34	<1
Widow rockfish	26	<1
Flag rockfish	6	<1
Kelp greenling	5	<1
Yellowtail rockfish	5	<1
Squarespot rockfish	5	<1
Pygmy rockfish	3	<1
Unidentified fish	3	<1
Greenspotted rockfish	2	<1
Unidentified sculpin	1	<1
Copper rockfish	1	<1
Cabezon	1	<1
TOTAL	**14,243**	**200**
Minimum number of species	13	
Total rockfish YOY	14,015	198
Total rockfishes	14, 097	198

Rockfish YOY comprised 98.3% of all fishes surveyed.
All rockfishes comprised 98.9% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HARVEST (Surveyed 1996–2000)

Species	Number	Density
Unidentified rockfish YOY	5,000	54
Widow rockfish YOY	1,474	16
Squarespot rockfish	1,246	14
Painted greenling	289	3
Sharpchin rockfish	171	2
Whitespeckled rockfish	134	1
Widow rockfish	113	1
Chilipepper	50	<1
Sebastomus sp.	47	<1
Bocaccio YOY	43	<1
Flag rockfish	26	<1
Unidentified rockfish	23	<1
Unidentified fish	22	<1
Greenspotted rockfish	21	<1
Blue rockfish	18	<1
Blacksmith	13	<1
Kelp rockfish	5	<1
Cabezon	2	<1
Kelp greenling	2	<1
Pacific sardine	2	<1
Rosy rockfish	2	<1
Shortbelly rockfish	2	<1
Blackeye goby	1	<1
Bocaccio	1	<1
Calico rockfish	1	<1
Halfbanded rockfish	1	<1
Pygmy rockfish	1	<1
Shortspine combfish	1	<1
Starry rockfish	1	<1
Treefish	1	<1
Wolf-eel	1	<1
Yellowtail rockfish	1	<1
TOTAL	**8,715**	**91**
Minimum number of species	26	
Total rockfish YOY	6,517	70
Total rockfishes	8,382	88

Rockfish YOY comprised 74.8% of all fishes surveyed.
All rockfishes comprised 96.2% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1996–2000)

Species	Number	Density
Unidentified rockfish YOY	17,242	199
Widow rockfish YOY	1,140	16
Painted greenling	480	7
Blue rockfish	436	5
Widow rockfish	256	3
Squarespot rockfish	148	2
Whitespeckled rockfish	47	<1
Sebastomus sp.	42	<1
Blacksmith	30	<1
Bocaccio YOY	29	<1
Unidentified rockfish	22	<1
Pacific hake	19	<1
Greenspotted rockfish	12	<1
Halfbanded rockfish	10	<1
Flag rockfish	8	<1
Copper rockfish	5	<1
Cowcod	5	<1
Unidentified fish	4	<1
Unidentified sculpin	3	<1
Cabezon	3	<1
Lingcod	3	<1
Sharpchin rockfish	3	<1
Chilipepper	2	<1
Stripetail rockfish	2	<1
Treefish	2	<1
Yelloweye rockfish	2	<1
TOTAL	**19,955**	**232**
Minimum number of species	21	
Total rockfish YOY	18,411	215
Total rockfishes	19,413	225

Rockfish YOY comprised 92.2% of all fishes surveyed.
All rockfishes comprised 97.3% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HOLLY (Surveyed 1995–1998, 2001)

Species	Number	Density
Pacific sardine	1,506	78
Squarespot rockfish	315	16
Jack mackerel	287	15
Unidentified rockfish YOY	129	6
Painted greenling	120	6
Kelp rockfish	43	2
Copper rockfish	31	2
Sharpnose seaperch	31	1
Yellowtail rockfish	22	1
Blacksmith	8	<1
Pile perch	7	<1
Brown rockfish	7	<1
Calico rockfish	6	<1
Gopher rockfish	6	<1
Unidentified rockfish	6	<1
Sebastomus sp.	4	<1
Treefish	3	<1
Unidentified sculpin	2	<1
Widow rockfish	2	<1
Blue rockfish	2	<1
Bocaccio YOY	2	<1
Unidentified fish	2	<1
Lingcod	1	<1
Olive rockfish	1	<1
Rubberlip seaperch	1	<1
Widow rockfish YOY	1	<1
Unidentified seaperch	1	<1
TOTAL	**2,546**	**127**
Minimum number of species	22	
Total rockfish YOY	122	6
Total rockfishes	580	27

PLATFORM A (Surveyed 2000)

Species	Number	Density
Blacksmith	421	28
Blue rockfish	336	22
Olive rockfish	126	8
Halfmoon	25	2
Kelp bass	17	1
Painted greenling	11	<1
Unidentified seaperch	9	<1
Sharpnose seaperch	9	<1
Kelp rockfish	8	<1
Garibaldi	7	<1
Unidentified rockfish YOY	6	<1
Pile perch	5	<1
California sheephead	4	<1
Blackeye goby	3	<1
Unidentified fish	1	<1
Unidentified rockfish	1	<1
TOTAL	**989**	**61**
Minimum number of species	13	
Total rockfish YOY	6	<1
Total rockfishes.	477	30

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 48.2% of all fishes surveyed.

Including the one time occurrence of Pacific sardine, YOY rockfishes comprised 4.8%, and all rockfishes comprised 22.8% of all fishes surveyed.

Excluding Pacific sardines, YOY rockfishes comprised 11.7%, and all rockfishes comprised 55.8% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM B (Surveyed 2000)

Species	Number	Density
Widow rockfish	180	12
Blacksmith	124	8
Blue rockfish	44	3
Olive rockfish	26	2
Kelp rockfish	16	1
Senorita	13	<1
Painted greenling	13	<1
California sheephead	9	<1
Kelp bass	6	<1
Sharpnose seaperch	6	<1
Halfmoon	5	<1
Pile perch	4	<1
Bluebanded goby	2	<1
Cabezon	1	<1
Copper rockfish	1	<1
Gopher rockfish	1	<1
Lingcod	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**453**	**26**
Minimum number of species	17	
Total rockfish YOY	1	<1
Total rockfishes	269	18

Rockfish YOY comprised <1.0% of all fishes surveyed.
All rockfishes comprised 59.4% of all fishes surveyed.

PLATFORM C (Partially Surveyed 2000)

Species	Number	Density
Olive rockfish	13	3
Kelp rockfish	7	2
Pile perch	4	<1
Blue rockfish	4	<1
Phanerodon sp.	3	<1
Vermilion rockfish	2	<1
Unidentified rockfish	2	<1
Lingcod	1	<1
Unidentified fish	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**38**	**5**
Minimum number of species	7	
Total rockfish YOY	1	<1
Total rockfishes	27	5

All rockfishes comprised 71.1% of all fishes surveyed.

PLATFORM HILLHOUSE (Surveyed 2000)

Species	Number	Density
Blacksmith	23	2
Painted greenling	22	2
Kelp bass	7	<1
Olive rockfish	7	<1
Pile perch	3	<1
Kelp rockfish	1	<1
Lingcod	1	<1
Phanerodon sp.	1	<1
Unidentified rockfish	1	<1
TOTAL	**66**	**4**
Minimum number of species	8	
Total rockfishes	9	<1

PLATFORM HENRY (Surveyed 2000)

Species	Number	Density
Halfmoon	57	6
Blacksmith	20	2
Kelp bass	12	1
Painted greenling	8	<1
Kelp rockfish	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**99**	**9**
Minimum number of species	5	
Total rockfish YOY	1	<1
Total rockfishes	2	<1

Rockfish YOY comprised 1% of all fishes surveyed.
All rockfishes comprised 2% of all fishes surveyed.
All rockfishes comprised 13.6% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM HOUCHIN (Surveyed 2000)

Species	Number	Density
Painted greenling	41	4
Halfmoon	12	1
Kelp rockfish	9	<1
Blacksmith	4	<1
Unidentified rockfish YOY	4	<1
Garibaldi	3	<1
Pile perch	2	<1
California sheephead	1	<1
Olive rockfish	1	<1
Sharpnose seaperch	1	<1
Unidentified sculpin	1	<1
TOTAL	**99**	**6**
Minimum number of species	10	
Total rockfish YOY	4	<1
Total rockfishes	14	<1

Rockfish YOY comprised 4% of all fishes surveyed.
All rockfishes comprised 14% of all fishes surveyed.

PLATFORM HOGAN (Surveyed 2000)

Species	Number	Density
Blacksmith	75	7
Blue rockfish	72	6
Olive rockfish	41	3
Painted greenling	28	3
Sharpnose seaperch	26	2
Pile perch	16	1
California sheephead	15	1
Kelp rockfish	4	<1
Unidentified rockfish YOY	4	<1
Garibaldi	1	<1
Kelp bass	1	<1
Rubberlip seaperch	1	<1
TOTAL	**293**	**23**
Minimum number of species	11	
Total rockfish YOY	4	<1
Total rockfishes	121	9

Rockfish YOY comprised 1.4% of all fishes surveyede
All rockfishes comprised 41.3% of all fishes surveyed.

PLATFORM HABITAT (Partially Surveyed 1995, Surveyed 2000)

Species	Number	Density
Widow rockfish YOY	470	
Blacksmith	122	
Widow rockfish	111	
Unidentified rockfish YOY	41	
Blue rockfish	25	
Painted greenling	14	
Kelp rockfish	14	
Bocaccio YOY	12	
Flag rockfish	7	
Halfmoon	5	
Olive rockfish	5	
Copper rockfish	4	
Garibaldi	4	
Kelp bass	1	
Sebastomus sp.	1	
TOTAL	**836**	
Minimum number of species	13	
Total rockfish YOY	523	
Total rockfishes	690	

Rockfish YOY comprised 62.6% of all fishes surveyed.
All rockfishes comprised 82.5% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM GRACE (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	5,454	79
Widow rockfish YOY	2,768	40
Squarespot rockfish	1,554	22
Blue rockfish	1,029	15
Widow rockfish	633	9
Bocaccio YOY	396	6
Blacksmith	313	4
Bocaccio	142	2
Painted greenling	86	1
Sharpnose seaperch	54	<1
Jack mackerel	54	<1
Flag rockfish	46	<1
Kelp rockfish	35	<1
Olive rockfish	30	<1
Pacific mackerel	30	<1
Unidentified rockfish	28	<1
Halfmoon	26	<1
Chilipepper	25	<1
Sebastomus sp.	15	<1
Brown rockfish	10	<1
Copper rockfish	10	<1
Lingcod	7	<1
Whitespeckled rockfish	5	<1
Unknown fish	4	<1
Unknown sculpin	3	<1
Greenspotted rockfish	3	<1
Rosy rockfish	2	<1
Swordspine rockfish	2	<1
Treefish	2	<1
Calico rockfish	1	<1
Cowcod	1	<1
Kelp greenling	1	<1
Pink seaperch	1	<1
Vermilion rockfish	1	<1
White seaperch	1	<1
Unidentified seaperch	1	<1
TOTAL	**12,773**	**178**
Minimum number of species	29	
Total rockfish YOY	8,618	125
Total rockfishes	12,192	173

Rockfish YOY comprised 67.5% of all fishes surveyed.
All rockfishes comprised 95.5% of all fishes surveyed.

PLATFORM GILDA (Surveyed 2000)

Species	Number	Density
Widow rockfish	650	
Blue rockfish	23	
Olive rockfish	15	
Kelp bass	6	
Kelp rockfish	6	
Painted greenling	5	
Squarespot rockfish	3	
Blacksmith	2	
Bocaccio	2	
Lingcod	1	
Mola	1	
Opaleye	1	
Pile perch	1	
Senorita	1	
Sharpnose seaperch	1	
TOTAL	**718**	
Minimum number of species	15	
Total rockfishes	699	

All rockfishes comprised 97.4% of all fishes surveyed.

PLATFORM MIDWATERS, cont.

PLATFORM GAIL (Surveyed 1996–2001)

Species	Number	Density
Unidentified rockfish YOY	2,371	24
Blacksmith	241	2
Flag rockfish YOY	102	1
Widow rockfish YOY	93	<1
Painted greenling	46	<1
Bocaccio YOY	28	<1
Unidentified fish	23	<1
Pinkrose rockfish	12	<1
Widow rockfish	8	<1
Squarespot rockfish	7	<1
Whitespeckled rockfish	6	<1
Bank rockfish	4	<1
Unidentified rockfish	4	<1
Greenblotched rockfish	3	<1
Blue rockfish	2	<1
Cabezon	2	<1
Greenspotted rockfish	2	<1
Olive rockfish	2	<1
Bocaccio	1	<1
Chilipepper	1	<1
Kelp greenling	1	<1
Pacific hake	1	<1
Sebastomus sp.	1	<1
Swordspine rockfish	1	<1
TOTAL	**2,962**	**26**
Minimum number of species	19	
Total rockfish YOY	2,593	25
Total rockfishes	2,648	25

Rockfish YOY comprised 87.5% of all fishes surveyed.
All rockfishes comprised 89.4% of all fishes surveyed.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
Blacksmith	1,241	265
Halfmoon	59	13
Opaleye	37	8
Sheephead	23	5
Garibaldi	20	4
Sharpnose seaperch	8	1
Kelp bass	5	1
Painted greenling	4	1
TOTAL	**1,397**	**298**
Minimum number of species	8	

No rockfishes observed.

PLATFORM BOTTOMS

PLATFORM IRENE (Surveyed 1996–2001)

Species	Number	Density
Halfbanded rockfish	5,393	217
Unidentified rockfish YOY	1,411	57
Copper rockfish	1,187	47
Vermilion rockfish	799	40
Lingcod	468	19
Calico rockfish	381	15
Widow rockfish YOY	335	13
Pile perch	115	5
Painted greenling	105	4
Pacific sanddab	96	4
Brown rockfish	78	3
Yellowtail rockfish	30	1
Canary rockfish	28	1
Blue rockfish	25	1
Rosy rockfish	21	<1
Kelp greenling	20	<1
Rubberlip seaperch	19	<1
Bocaccio YOY	17	<1
Sebastomus sp.	12	<1
Olive rockfish	8	<1
Unidentified seaperch	5	<1
Gopher rockfish	5	<1
Sharpnose seaperch	4	<1
Squarespot rockfish	4	<1
Widow rockfish	4	<1
Unidentified fish	4	<1
Greenspotted rockfish	3	<1
Unidentified rockfish	3	<1
Bocaccio	2	<1
Flag rockfish	2	<1
Kelp rockfish	2	<1
Honeycomb rockfish	1	<1
Yelloweye rockfish	1	<1
Unidentified ronquil	1	<1
Unidentified sanddab	1	<1
Unidentified flatfish	1	<1
TOTAL	**10,591**	**427**
Minimum number of species	29	
Total rockfish YOY	1,766	70
Total rockfishes	9,748	395

Rockfish YOY comprised 16.7% of all fishes surveyed.
All rockfishes comprised 92% of all fishes surveyed.

PLATFORM HIDALGO (Surveyed 1996–2001)

Species	Number	Density
Halfbanded rockfish	9,664	305
Greenspotted rockfish	587	19
Unidentified rockfish YOY	307	10
Flag rockfish	256	8
Lingcod	97	3
Greenblotched rockfish	69	2
Widow rockfish	69	2
Greenstriped rockfish	60	2
Bocaccio	56	2
Painted greenling	47	1
Vermilion rockfish	43	1
Canary rockfish	39	1
Rosy rockfish	36	1
Widow rockfish YOY	34	1
Squarespot rockfish	28	<1
Sebastomus sp.	26	<1
Sharpchin rockfish	15	<1
Pygmy rockfish	12	<1
Yelloweye rockfish	12	<1
Swordspine rockfish	10	<1
Cowcod	8	<1
Unidentified rockfish	8	<1
Starry rockfish	6	<1
Unidentified combfish	6	<1
Kelp greenling	5	<1
Bocaccio YOY	4	<1
Shortspine combfish	2	<1
Bank rockfish	1	<1
Stripetail rockfish	1	<1
Unidentified poacher	1	<1
TOTAL	**11,509**	**358**
Minimum number of species	24	
Total rockfish YOY	345	11
Total rockfishes	11, 351	354

Rockfish YOY comprised 3.0% of all fishes surveyed.
All rockfishes comprised 98.6% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM HARVEST (Surveyed 1997–2000)

Species	Number	Density
Stripetail rockfish	250	10
Greenstriped rockfish	207	8
Greenspotted rockfish	78	3
Greenblotched rockfish	67	3
Sharpchin rockfish	44	2
Lingcod	35	1
Sebastomus sp.	24	<1
Flag rockfish	17	<1
Unidentified rockfish	12	<1
Unidentified combfish	10	<1
Unidentified rockfish YOY	6	<1
Chilipepper	5	<1
Halfbanded rockfish	4	<1
Shortspine combfish	4	<1
Unidentified flatfish	3	<1
Cowcod	2	<1
Pinkrose rockfish	2	<1
Unidentified poacher	2	<1
Bank rockfish	1	<1
Bocaccio	1	<1
Swordspine rockfish	1	<1
TOTAL	**775**	**27**
Minimum number of species	17	
Total rockfish YOY	6	<1
Total rockfishes	721	26

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 93.0% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1996–2000)

Species	Number	Density
Halfbanded rockfish	6,718	262
Greenspotted rockfish	321	13
Flag rockfish	42	2
Sebastomus sp.	26	1
Lingcod	24	1
Unidentified rockfish YOY	9	<1
Pinkrose rockfish	7	<1
Shortspine combfish	7	<1
Cowcod	6	<1
Greenstriped rockfish	6	<1
Greenblotched rockfish	5	<1
Shortbelly rockfish	4	<1
Unidentified rockfish YOY	4	<1
Pacific hake	2	<1
Ratfish	2	<1
Swordspine rockfish	2	<1
Unidentified rockfish	2	<1
Bocaccio YOY	1	<1
Canary rockfish	1	<1
Darkblotched rockfish	1	<1
Pink seaperch	1	<1
Sharpchin rockfish	1	<1
Starry rockfish	1	<1
Whitespeckled rockfish	1	<1
Widow rockfish	1	<1
Unidentified combfish	1	<1
Unidentified fish	1	<1
Unidentified flatfish	1	<1
Unidentified poacher	1	<1
TOTAL	**7,195**	**279**
Minimum number of species	23	
Total rockfish YOY	14	<1
Total rockfishes	7,159	278

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 99.5% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM HOLLY (Surveyed 1996–1999, 2001)

Species	Number	Density
Widow rockfish YOY	1,028	49
Calico rockfish	726	35
Vermilion rockfish	444	21
Sharpnose seaperch	407	19
Halfbanded rockfish	405	19
Copper rockfish	285	13
Squarespot rockfish	221	10
Blackeye goby	67	3
Unidentified seaperch	66	3
Unidentified rockfish YOY	54	3
Pink seaperch	53	3
Painted greenling	51	2
Rosy rockfish	43	2
Brown rockfish	38	2
Pile perch	37	2
Lingcod	36	2
Widow rockfish	29	1
Flag rockfish	24	1
Sebastomus sp.	24	1
Unidentified flatfish	20	<1
Honeycomb rockfish	19	<1
Canary rockfish	18	<1
Unidentified rockfish	13	<1
Blue rockfish	12	<1
Unidentified ronquil	10	<1
Rubberlip seaperch	9	<1
Treefish	9	<1
Kelp rockfish	8	<1
Olive rockfish	8	<1
Gopher rockfish	7	<1
Kelp greenling	5	<1
Unidentified fish	4	<1
California scorpionfish	3	<1
Bocaccio YOY	2	<1
Rathbunella sp.	2	<1
Yellowtail rockfish	2	<1
Unidentified combfish	2	<1
Cowcod	1	<1
Greenspotted rockfish	1	<1
Shortspine combfish	1	<1
Shortspine thornyhead	1	<1
TOTAL	**4,195**	**191**
Minimum number of species	33	
Total rockfish YOY	1,084	52
Total rockfishes	3,421	157

PLATFORM GRACE (Surveyed 1996, 1997, 1999–2001)

Species	Number	Density
Halfbanded rockfish	11,078	408
Widow rockfish	413	15
Squarespot rockfish	220	8
Vermilion rockfish	205	8
Bocaccio YOY	203	7
Bocaccio	183	7
Shiner perch	130	5
Flag rockfish	103	4
Unidentified sanddab	79	3
Greenspotted rockfish	66	2
Lingcod	41	2
Painted greenling	29	1
Unidentified rockfish YOY	28	1
Chilipepper	26	<1
Sebastomus sp.	24	<1
Rosy rockfish	21	<1
Pink seaperch	19	<1
Unidentified flatfish	12	<1
Blue rockfish	9	<1
Kelp greenling	9	<1
Copper rockfish	8	<1
Unidentified rockfish	8	<1
Canary rockfish	7	<1
Unidentified fish	6	<1
Treefish	5	<1
Greenblotched rockfish	4	<1
Unidentified combfish	4	<1
Whitespeckled rockfish	3	<1
Widow rockfish	3	<1
Shortspine combfish	3	<1
Yellowtail rockfish	2	<1
Pink rockfish	1	<1
Rathbunella sp.	1	<1
Yelloweye rockfish	1	<1
Unidentified sculpin	1	<1
TOTAL	**12,955**	**471**
Minimum number of species	28	
Total rockfish YOY	231	8
Total rockfishes	12,621	460

Rockfish YOY comprised 1.8% of all fishes surveyed.
All rockfishes comprised 97.4% of all fishes surveyed.

Rockfish YOY comprised 25.8% of all fishes surveyed.
All rockfishes comprised 81.5% of all fishes surveyed.

PLATFORM BOTTOMS, cont.

PLATFORM GAIL (Surveyed 1996, 1997, 1999–2001)

Species	Number	Density
Greenblotched rockfish	369	12
Bocaccio	328	11
Greenspotted rockfish	278	9
Stripetail rockfish	200	7
Pinkrose rockfish	168	6
Sebastomus sp.	63	2
Greenstriped rockfish	61	2
Cowcod	34	1
Mexican rockfish	22	<1
Lingcod	17	<1
Unidentified rockfish	14	<1
Flag rockfish	11	<1
Chilipepper	7	<1
Unidentified rockfish YOY	5	<1
Unidentified poachers	4	<1
Swordspine rockfish	3	<1
Dover sole	2	<1
Unidentified fish	2	<1
Unidentified flatfish	2	<1
Bank rockfish	1	<1
Bocaccio YOY	1	<1
Darkblotched rockfish	1	<1
surveyed.		
Northern anchovy	1	<1
Painted greenling	1	<1
Pink rockfish	1	<1
Redbanded rockfish	1	<1
Sharpchin rockfish	1	<1
Widow rockfish	1	<1
Unidentified combfish	1	<1
TOTAL	**1,600**	**50**
Minimum number of species	23	
Total rockfish YOY	5	<1
Total rockfishes	1,570	50

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 98.2% of all fishes surveyed.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
California scorpionfish	274	63
Sharpnose seaperch	71	16
Blacksmith	35	8
Blackeye goby	22	5
Treefish	9	2
Unidentified seaperch	8	2
Painted greenling	6	1
Unidentified rockfish YOY	5	1
Pile perch	3	<1
Cabezon	3	<1
Unidentified fish	3	<1
Honeycomb rockfish	2	<1
Squarespot rockfish	1	<1
Sebastomus sp.	1	<1
California sheephead	1	<1
Unidentified rockfish	1	<1
TOTAL	**445**	**98**
Minimum number of species	12	
Total rockfish YOY	5	<1
Total rockfishes	19	

Rockfish YOY comprised 1.1% of all fishes

All rockfishes comprised 1% of all fishes surveyed.

PLATFORM SHELL MOUNDS

PLATFORM IRENE (SURVEYED 1996–2001)

Species	Number	Density
Halfbanded rockfish	965	45
Lingcod	404	19
Copper rockfish	215	10
Pacific sanddab	92	4
Vermilion rockfish	76	4
Painted greenling	72	3
Calico rockfish	32	2
Pile perch	18	<1
Rosy rockfish	9	<1
Kelp greenling	8	<1
Unidentified rockfish YOY	8	<1
Olive rockfish	5	<1
Unidentified fish	5	<1
Canary rockfish	3	<1
Unidentified flatfish	3	<1
Unidentified sanddab	3	<1
Bocaccio YOY	2	<1
Brown rockfish	2	<1
Sebastomus sp.	2	<1
Widow rockfish	2	<1
Wolf-eel	2	<1
Yellowtail rockfish	2	<1
Unidentified ronquil	2	<1
Flag rockfish	1	<1
Pink seaperch	1	<1
Unidentified rockfish	1	<1
Unidentified sculpin	1	<1
TOTAL	**1,936**	**87**
Minimum number of species	23	
Total rockfish YOY	8	<1
Total rockfishes	1,341	61

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 69.3% of all fishes surveyed.

PLATFORM HIDALGO (SURVEYED 1996–2001)

Species	Number	Density
Halfbanded rockfish	3,496	124
Lingcod	127	4
Painted greenling	35	1
Greenspotted rockfish	28	<1
Greenstriped rockfish	24	<1
Unidentified rockfish YOY	21	<1
Rosy rockfish	20	<1
Pacific sanddab	17	<1
Swordspine rockfish	17	<1
Unidentified combfish	8	<1
Unidentified sanddab	7	<1
Cowcod	4	<1
Flag rockfish	4	<1
Pink seaperch	4	<1
Shortspine combfish	4	<1
Unidentified poacher	4	<1
Canary rockfish	2	<1
Unidentified fish	2	<1
Bank rockfish	1	<1
Longspine combfish	1	<1
Pygmy rockfish	1	<1
Ratfish	1	<1
Rathbunella sp.	1	<1
Sebastomus sp.	1	<1
Sharpchin rockfish	1	<1
Starry rockfish	1	<1
Vermilion rockfish	1	<1
Unidentified rockfish	1	<1
Unidentified ronquil	1	<1
TOTAL	**3,835**	**129**
Minimum number of species	22	
Total rockfish YOY	21	<1
Total rockfishes	3,623	124

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 94.5% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM HARVEST (Surveyed 1997–2000)

Species	Number	Density
Stripetail rockfish	373	14
Greenstriped rockfish	136	5
Sharpchin rockfish	91	3
Greenspotted rockfish	41	2
Unidentified poacher	18	<1
Sebastomus sp.	17	<1
Lingcod	16	<1
Greenblotched rockfish	9	<1
Unidentified rockfish	8	<1
Unidentified flatfish	7	<1
Shortspine combfish	7	<1
Unidentified combfish	6	<1
Pinkrose rockfish	5	<1
Unidentified rockfish YOY	5	<1
Halfbanded rockfish	4	<1
Unidentified fish	3	<1
Chilipepper	2	<1
Bank rockfish	1	<1
Cowcod	1	<1
Flag rockfish	1	<1
Pacific hake	1	<1
Ratfish	1	<1
Rathbunella sp.	1	<1
Swordspine rockfish	1	<1
Unidentified sanddab	1	<1
TOTAL	**756**	**24**
Minimum number of species	18	
Total rockfish YOY	5	<1
Total rockfishes	695	24

surveyed.
Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 91.9% of all fishes surveyed.

PLATFORM HERMOSA (Surveyed 1997–2000)

Species	Number	Density
Halfbanded rockfish	3,572	188
Shortbelly rockfish	114	6
Stripetail rockfish	64	3
Shortspine combfish	38	2
Greenspotted rockfish	27	1
Greenstriped rockfish	14	<1
Unidentified sanddab	11	<1
Lingcod	9	<1
Unidentified combfish	9	<1
Flag rockfish	6	<1
Sebastomus sp.	6	<1
Cowcod	4	<1
Unidentified poacher	3	<1
Greenblotched rockfish	3	<1
Unidentified fish	3	<1
Longspine combfish	2	<1
Pink seaperch	2	<1
Rosy rockfish	2	<1
Unidentified rockfish YOY	2	<1
Blackeye goby	1	<1
Ratfish	1	<1
Widow rockfish	1	<1
Unidentified rockfish	1	<1
TOTAL	**3,895**	**200**
Minimum number of species	17	
Total rockfish YOY	2	<1
Total rockfishes	3,814	

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 97.9% of all fishes

PLATFORM SHELL MOUNDS, cont.

PLATFORM HOLLY (Surveyed 1997, 1998, 2001)

Species	Number	Density
Pacific sardine	200	25
Calico rockfish	129	16
Vermilion rockfish	64	8
Copper rockfish	44	5
Halfbanded rockfish	35	4
Blackeye goby	31	4
Squarespot rockfish	21	3
Pink seaperch	18	2
Lingcod	14	2
Honeycomb rockfish	13	2
Painted greenling	13	2
Flag rockfish	11	1
Rosy rockfish	9	1
Canary rockfish	8	<1
Brown rockfish	6	<1
Kelp greenling	6	<1
Pile perch	6	<1
Unidentified fish	6	<1
Rathbunella sp.	5	<1
Sebastomus sp.	5	<1
Unidentified flatfish	4	<1
Unidentified ronquil	4	<1
Olive rockfish	3	<1
Pacific hake	3	<1
Unidentified combfish	3	<1
Unidentified rockfish	2	<1
California halibut	1	<1
California scorpionfish	1	<1
Sharpnose seaperch	1	<1
Treefish	1	<1
Widow rockfish	1	<1
Sebastomus sp.	1	<1
Unidentified seaperch	1	<1
Unidentified rockfish YOY	1	<1
TOTAL	**670**	**75**
Minimum number of species	26	
Total rockfish YOY	1	<1
Total rockfishes	354	40

Including the one-time observation of Pacific sardine, YOY rockfishes comprised <1%, and all rockfishes comprised 52.8% of all fishes surveyed.
Excluding sardines, YOY rockfishes comprised <1%, and all rockfish comprised 75.3% of all fishes.

PLATFORM C (Surveyed 2000)

Species	Number	Density
Vermilion rockfish	153	74
Halfbanded rockfish	59	29
Calico rockfish	33	16
Olive rockfish	19	9
Blackeye goby	16	8
Copper rockfish	15	7
Painted greenling	10	5
Kelp rockfish	9	4
Lingcod	8	4
Brown rockfish	1	<1
Canary rockfish	1	<1
Widow rockfish	1	<1
Yellowtail rockfish	1	<1
TOTAL	**326**	**156**
Minimum number of species	13	
Total rockfishes	292	139

All rockfishes comprised 89.5% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM GRACE (Surveyed 1997–2001)

Species	Number	Density
Halfbanded rockfish	4,154	144
Shiner perch	1,031	36
Pink seaperch	171	6
Unidentified sanddab	148	5
Bocaccio YOY	91	3
Lingcod	88	3
Unidentified rockfish YOY	80	3
Greenspotted rockfish	38	1
Flag rockfish	35	1
Vermilion rockfish	34	1
Shortspine combfish	27	<1
Unidentified combfish	26	<1
Hornyhead turbot	15	<1
Painted greenling	10	<1
Blue rockfish	8	<1
Sebastomus sp.	5	<1
Bocaccio	4	<1
Canary rockfish	4	<1
Swordspine rockfish	4	<1
California scorpionfish	2	<1
Copper rockfish	2	<1
Kelp greenling	2	<1
Rathbunella sp.	2	<1
Rosy rockfish	2	<1
Unidentified flatfish	2	<1
Greenstriped rockfish	1	<1
Hornyhead turbot	1	<1
Squarespot rockfish	1	<1
Treefish	1	<1
Unidentified fish	1	<1
Unidentified rockfish	1	<1
Unidentified seaperch	1	<1
TOTAL	**5,992**	**203**
Minimum number of species	25	
Total rockfish YOY	171	6
Total rockfishes	4,464	153

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 74.5% of all fishes surveyed.

PLATFORM GAIL (Surveyed 1997, 1999–2001)

Species	Number	Density
Pacific hake	470	15
Stripetail rockfish	242	8
Northern anchovy	158	5
Pinkrose rockfish	112	4
Greenblotched rockfish	65	2
Greenstriped rockfish	60	2
Unidentified poacher	46	2
Unidentified combfish	29	<1
Swordspine rockfish	25	<1
Shortbelly rockfish	23	<1
Sharpchin rockfish	18	<1
Darkblotched rockfish	12	<1
Dover sole	11	<1
Unidentified fish	11	<1
Sebastomus sp.	9	<1
Unidentified rockfish	9	<1
Pacific sanddab	8	<1
Unidentified rockfish YOY	8	<1
Unidentified sculpin	8	<1
Greenspotted rockfish	8	<1
Jack mackerel	7	<1
Blackgill rockfish	5	<1
Chilipepper	4	<1
Unidentified flatfish	4	<1
Cowcod	3	<1
Flag rockfish	3	<1
Mexican rockfish	3	<1
Pacific electric ray	2	<1
Unidentified ronquil	2	<1
Bocaccio	1	<1
California smoothtongue	1	<1
California tonguefish	1	<1
Halfbanded rockfish	1	<1
Redbanded rockfish	1	<1
Rex sole	1	<1
TOTAL	**1,371**	**38**
Minimum number of species	30	
Total rockfish YOY	8	<1
Total rockfishes	603	16

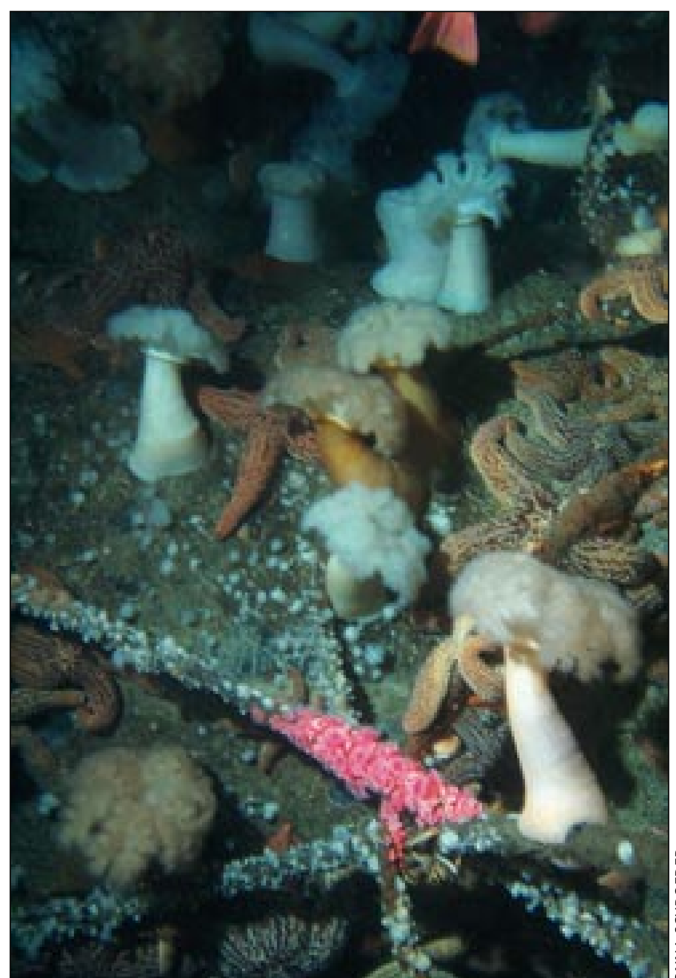
Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised 44.0% of all fishes surveyed.

PLATFORM SHELL MOUNDS, cont.

PLATFORM EDITH (Surveyed 1998)

Species	Number	Density
California scorpionfish	280	67
Blackeye goby	81	19
Unidentified fish	3	<1
Unidentified rockfish YOY	3	<1
Unidentified seaperch	3	<1
Calico rockfish	2	<1
Sharpnose seaperch	2	<1
Painted greenling	1	<1
Pile seaperch	1	<1
Unidentified flatfish	1	<1
TOTAL	377	**0.86**
Minimum number of species	8	
Total rockfish YOY	3	<1
Total rockfishes	5	<1

Rockfish YOY comprised <1% of all fishes surveyed.
All rockfishes comprised <1% of all fishes surveyed.


DONNA SCHROEDER

An invertebrate tossed salad at the bottom of Platform Grace.

APPENDIX 4

Densities, at the top 20 sites, of some of the most abundant species in our deepwater surveys. Platforms are listed in blue, natural outcrops in red.

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Lingcod (adult)	Hidalgo	1996	Bottom	3.2
	Irene	1997	Bottom	1.7
	Irene	1997	Shell Mound	1.5
	Hermosa	1996	Bottom	1.0
	Footprint	2001	Natural	1.0
	Hermosa	1997	Bottom	0.9
	Reef “A”	1997	Natural	0.8
	Reef “A”	1998	Natural	0.7
	Hermosa	1999	Bottom	0.7
	Gail	2001	Bottom	0.7
	Santa Monica Bay	2001	Natural	0.7
	Santa Cruz I.	2000	Natural	0.6
	Santa Monica Bay	2001	Natural	0.5
	Hermosa	2000	Bottom	0.5
	Gail	1996	Bottom	0.5
	Gail	1997	Bottom	0.5
	Gail	1999	Bottom	0.5
	GAIL	2000	Bottom	0.5
	Irene	1998	Bottom	0.5
	Irene	2000	Bottom	0.5
	Irene	2001	Bottom	0.5
Lingcod (juvenile)	Irene	1996	Bottom	18.8
	Holly	1999	Bottom	6.1
	Grace	2000	Shell Mound	5.4
	Grace	2001	Platform pipe	4.6
	14 Mile Bank	2001	Natural	4.5
	Grace	2000	Bottom	3.8
	Hidalgo	1999	Shell mound	3.6
	Platform “C”	2000	Shell mound	3.4
	Grace	2001	Shell mound	3.2
	Irene	2001	Bottom	2.7
	Hidalgo	1997	Bottom	2.7
	Grace	1999	Shell Mound	2.3
	Harvest	2000	Bottom	2.2
	Grace	2001	Bottom	2.2
	Irene	1999	Bottom	2.2
	Hidalgo	2000	Bottom	2.1
	Harvest	1999	Bottom	1.9
	More Mesa	1995	Natural	1.9
	Irene	1997	Shell Mound	1.9
	12 Mile Reef	2000	Natural	1.8
Lingcod YOY	Irene	1998	Shell Mound	31.5
	Irene	2001	Shell Mound	29.2
	Irene	2001	Bottom	24.1
	Irene	1998	Bottom	19.6
	Irene	1996	Bottom	17.9
	Irene	2000	Shell Mound	12.0
	Irene	1997	Shell Mound	10.9
	Irene	2000	Bottom	10.6

Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Lingcod YOY (cont.)	Irene	1999	Shell Mound	9.7
	Irene	1999	Bottom	7.5
	Hidalgo	1999	Shell Mound	4.6
	Hidalgo	2000	Shell Mound	4.3
	Hidalgo	2000	Bottom	3.0
	Irene	1997	Bottom	2.9
	Hidalgo	2001	Shell Mound	2.6
	Hidalgo	1998	Shell Mound	1.9
	Hidalgo	1997	Shell Mound	1.8
	Grace	1999	Shell Mound	1.2
	Hidalgo	1998	Bottom	1.1
	Hidalgo	1999	Bottom	1.1
Painted greenling	Holly	1998	Midwater	18.0
	Harvest	1999	Midwater	9.9
	Harvest	1997	Midwater	9.9
	Holly	2001	Midwater	8.2
	Hermosa	1997	Midwater	8.1
	Irene	1997	Bottom	8.0
	Hermosa	1998	Midwater	6.9
	Hermosa	1999	Midwater	5.5
	Houchin	2000	Midwater	5.3
	Irene	1997	Shell Mound	5.3
	Irene	2000	Shell Mound	5.1
	Irene	1996	Bottom	4.8
	Harvest	1999	Midwater	4.7
	Holly	1998	Shell Mound	4.6
	Irene	2000	Bottom	4.6
	Irene	2000	Midwater	4.5
	Platform "C"	2000	Shell Mound	4.4
	Hermosa	2000	Midwater	4.4
	Irene	2001	Bottom	4.4
	Hidalgo	2000	Midwater	4.2
Greenspotted rockfish	Hermosa	1996	Bottom	30.3
	Hidalgo	2000	Bottom	21.8
	Gail	1996	Bottom	21.3
	Hidalgo	1996	Bottom	20.6
	Hidalgo	1999	Bottom	19.9
	Hidalgo	1998	Bottom	19.1
	Hidalgo	1997	Bottom	17.6
	Hidalgo	2001	Bottom	12.1
	Gail	1997	Bottom	10.8
	Hermosa	1997	Bottom	10.6
	North Reef	1997	Natural	9.8
	Gail	2000	Bottom	9.3
	Hermosa	1998	Bottom	9.1
	Hermosa	2000	Bottom	5.8
	Reef "A"	1997	Natural	5.0
	North Reef	1998	Natural	5.0
	Reef "C"	1999	Natural	4.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Greenspotted rockfish (cont.)	Reef "A"	2000	Natural	4.8
	Hermosa	1999	Bottom	4.3
	Grace	1996	Bottom	4.0
Copper rockfish	Irene	2000	Bottom	88.5
	Irene	1996	Bottom	71.6
	Irene	1997	Bottom	53.6
	Irene	2001	Bottom	40.8
	Irene	2000	Shell Mound	27.1
	Holly	1997	Bottom	21.8
	Holly	1999	Bottom	21.5
	Irene	1999	Bottom	21.5
	Holly	1998	Shell Mound	12.0
	Holly	1996	Bottom	11.4
	Irene	2001	Shell Mound	10.4
	Irene	1998	Bottom	10.4
	Holly	1997	Shell Mound	9.3
	Holly	2001	Bottom	8.4
	Platform "C"	2000	Shell Mound	7.3
	Irene	1997	Shell Mound	5.2
	Irene	1999	Shell Mound	4.5
	Holly	1998	Bottom	4.4
	Irene	2001	Midwater	3.9
	Irene	2000	Midwater	3.7
Swordspine rockfish	14 Mile Bank	1996	Natural	94.4
	14 Mile Bank	1996	Natural	47.4
	14 Mile Bank	2001	Natural	45.8
	Footprint	2000	Natural	41.0
	Footprint	2000	Natural	39.6
	Footprint	1999	Natural	29.7
	Osborn Bank	2000	Natural	27.5
	Footprint	2001	Natural	24.9
	Catalina I.	1996	Natural	22.4
	Santa Monica Bay	2001	Natural	21.9
	Tanner Bank	1997	Natural	20.1
	Footprint	2000	Natural	20.1
	Santa Barbara I.	2000	Natural	18.3
	Footprint	2001	Natural	15.3
	Footprint	2000	Natural	14.2
	Cortes Bank	1997	Natural	12.8
	Santa Monica Bay	1998	Natural	10.6
	Footprint	2001	Natural	9.9
	Footprint	2000	Natural	8.3
	Footprint	1999	Natural	8.2
Greenstriped rockfish	Harvest	2000	Bottom	14.7
	Harvest	1999	Bottom	9.2
	Gail	2000	Bottom	7.5
	Harvest	1997	Shell Mound	7.1
	Harvest	1997	Shell Mound	6.1
	Harvest	2000	Shell Mound	5.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Greenstriped rockfish (cont.)	Harvest	1998	Bottom	5.2
	Harvest	1999	Shell Mound	4.3
	Harvest	1997	Bottom	3.6
	Harvest	1998	Shell Mound	3.5
	Hidalgo	1998	Bottom	3.4
	Hidalgo	2000	Bottom	3.4
	Reef "A"	2000	Natural	3.3
	Gail	1997	Shell Mound	2.6
	Reef "A"	1997	Natural	2.5
	Gail	1999	Shell Mound	2.4
	Hidalgo	2001	Bottom	2.3
	Gail	2000	Shell Mound	2.2
	Santa Rosa Passage	1995	Natural	2.2
	Hidalgo	1998	Shell Mound	2.1
Widow rockfish (YOY)	Irene	1998	Midwater	344.0
	Irene	1996	Midwater	253.3
	Holly	1999	Bottom	252.9
	Harvest	1999	Midwater	188.9
	Grace	2000	Midwater	175.7
	Irene	1997	Midwater	173.6
	San Nicholas I.	1996	Natural	173.5
	Catalina I.	1996	Natural	116.8
	Irene	1998	Bottom	79.1
	Grace	2001	Midwater	73.8
	San Nicolas I.	1996	Natural	68.1
	Grace	1997	Bottom	66.3
	Cortes Bank	1997	Natural	66.0
	Santa Cruz I.	2000	Natural	65.4
	North Reef	1999	Natural	63.6
	Hidalgo	1998	Midwater	52.9
	Footprint	1995	Natural	45.9
	Hermosa	2000	Midwater	44.4
	Footprint	2001	Natural	40.3
	Grace	1999	Midwater	39.6
Squarespot rockfish	Santa Cruz I.	2000	Natural	282.5
	Santa Barbara I.	2000	Natural	263.0
	Santa Monica Bay	1998	Natural	196.4
	Harvest	1999	Midwater	180.0
	Cortes Bank	1997	Natural	149.6
	Grace	2001	Midwater	130.6
	San Miguel I.	1995	Natural	122.1
	Footprint	1998	Natural	94.6
	San Nicolas I.	1996	Natural	93.9
	Anacapa Passage	1999	Natural	88.8
	Santa Monica Bay	1998	Natural	85.0
	Hidden Reef	1999	Natural	72.6
	San Nicolas I.	1996	Natural	69.7
	Guano Bank	1995	Natural	69.6
	Footprint	2000	Natural	61.8

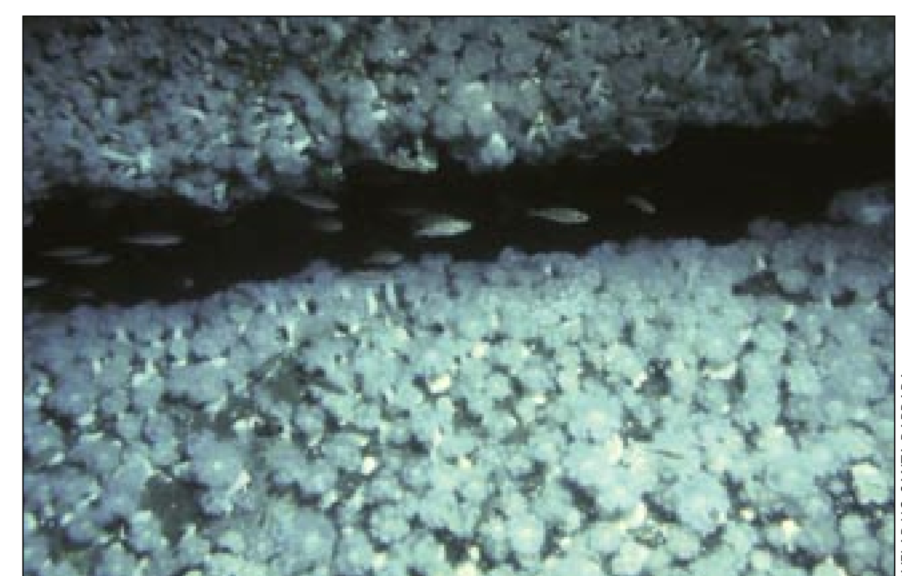
Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Squarespot rockfish (cont.)	Osborn Bank	2000	Natural	54.9
	Osborn Bank	2000	Natural	51.9
	Anacapa Passage	1995	Natural	50.5
	Santa Monica Bay	2001	Natural	44.3
	Santa Rosa I.	1995	Natural	43.4
Vermilion rockfish	Platform "C"	2000	Shell Mound	74.5
	Holly	2001	Bottom	58.1
	Irene	2000	Bottom	55.2
	Irene	1996	Bottom	47.8
	Irene	1997	Bottom	32.8
	Grace	2001	Platform pipe	30.8
	Irene	1999	Bottom	30.4
	Anacapa Passage	1995	Natural	30.1
	Grace	2001	Bottom	29.9
	Holly	1999	Bottom	23.8
	Holly	1996	Bottom	22.0
	Irene	2001	Bottom	14.0
	Irene	1998	Bottom	12.5
	Holly	2001	Shell Mound	11.9
	Irene	2000	Shell Mound	10.6
	Grace	2001	Bottom	8.8
	Holly	1998	Shell Mound	8.3
	Irene	2001	Shell Mound	6.1
	Santa Cruz I.	2000	Natural	5.2
	Holly	1997	Bottom	4.5
Bocaccio (adult)	Gail	1997	Bottom	18.2
	Gail	1999	Bottom	11.0
	Gail	1996	Bottom	10.8
	Gail	2000	Bottom	6.2
	Gail	2001	Bottom	3.5
	Hidalgo	2001	Bottom	3.0
	Hidalgo	1996	Bottom	2.7
	Reef "A"	1997	Natural	1.9
	Reef "D"	1999	Natural	1.6
	Hidalgo	1997	Bottom	1.3
	Santa Rosa Passage	1995	Natural	1.2
	Footprint	1995	Natural	1.1
	Hidalgo	1998	Bottom	0.9
	Footprint	2001	Natural	0.9
	Footprint	2001	Natural	0.9
	Footprint	2000	Natural	0.8
	Footprint	2000	Natural	0.7
	Catalina I.	1996	Natural	0.6
	Footprint	1999	Natural	0.6
	San Nicolas I.	1996	Natural	0.6
Bocaccio (juvenile)	Grace	2000	Bottom	39.6
	Grace	2000	Midwater	13.0
	Santa Cruz I.	2000	Natural	5.6
	14 Mile Bank	2001	Natural	5.1

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
Bocaccio (juvenile) (cont.)	Santa Barbara I.	2000	Natural	2.5
	Santa Monica Bay	2001	Natural	2.4
	Gail	2001	Bottom	2.3
	Osborn Bank	2000	Natural	2.3
	12 Mile Reef	2000	Natural	2.0
	Gail	2000	Bottom	1.8
	Footprint	2000	Natural	1.2
	Grace	2001	Platform pipe	0.9
	Reef“A”	1997	Natural	0.9
	Footprint	2000	Natural	0.8
	Hidalgo	2000	Bottom	0.8
	Gail	1997	Bottom	0.7
	Footprint	2000	Natural	0.6
	Grace	2000	Shell Mound	0.6
	Hidalgo	1996	Bottom	0.6
	Hidalgo	2001	Bottom	0.6
Bocaccio (YOY)	Irene	1999	Midwater	166.4
	Irene	1996	Midwater	91.8
	Grace	1999	Bottom	44.9
	Grace	1999	Midwater	24.1
	Irene	1997	Midwater	17.2
	Grace	1999	Shell Mound	15.9
	Hidalgo	1996	Midwater	5.6
	Harvest	1999	Midwater	4.0
	Grace	2001	Midwater	3.0
	Hidden Reef	1999	Natural	2.3
	Irene	1999	Bottom	2.2
	Grace	2001	Midwater	1.5
	Harvest	1999	Midwater	1.3
	Santa Barbara I.	1996	Natural	1.3
	Irene	1997	Bottom	1.2
	Harvest	1997	Midwater	1.1
	Grace	2000	Midwater	1.0
	Hidalgo	1997	Midwater	0.9
	Santa Monica Bay	2001	Natural	0.9
	Hidalgo	2000	Bottom	0.8
Canary rockfish	Irene	2001	Bottom	5.5
	Holly	2001	Bottom	3.4
	Hidalgo	1999	Bottom	1.9
	Holly	2001	Shell Mound	1.7
	Hidalgo	1998	Bottom	1.7
	North Reef	1999	Natural	1.7
	Reef “D”	1999	Natural	1.6
	Hidalgo	1996	Bottom	1.3
	Reef “A”	1999	Natural	1.2
	Irene	1997	Bottom	1.2
	Reef “B”	1997	Natural	1.1
	Hidalgo	1997	Bottom	0.9
	Hidalgo	2001	Bottom	0.9

Species	Site	Year	Habitat Type	Density(Fish per 100 m^2)
	Grace	2000	Bottom	0.9
	Holly	1996	Bottom	0.8
	North Reef	2000	Natural	0.7
	Reef “C”	1998	Natural	0.7
	Irene	2001	Shell Mound	0.7
	Reef “A”	1998	Natural	0.5
	Grace	1998	Shell Mound	0.5
Greenblotched rockfish	Gail	1997	Bottom	17.7
	Gail	1999	Bottom	13.7
	Gail	2001	Bottom	11.3
	Hidalgo	2001	Bottom	10.6
	Gail	1996	Bottom	9.7
	Gail	2000	Bottom	9.2
	Gail	1997	Shell Mound	5.9
	Harvest	1999	Bottom	4.6
	Harvest	1998	Bottom	3.8
	Gail	1999	Shell Mound	3.3
	Harvest	1997	Bottom	1.6
	San Miguel I.	1995	Natural	1.4
	Hidalgo	1999	Bottom	1.3
	North Reef	1997	Natural	1.0
	Footprint	2001	Natural	1.0
	Reef “A”	1999	Natural	0.9
	Reef “B”	1997	Natural	0.8
	Hidalgo	2000	Bottom	0.8
	North Reef	2001	Natural	0.7
	Gail	2001	Shell Mound	0.7
Flag rockfish	Hidalgo	1997	Bottom	15.5
	Hidalgo	1996	Bottom	11.0
	Hidalgo	1999	Bottom	7.2
	Grace	1996	Bottom	6.6
	Grace	2001	Bottom	5.7
	Hidalgo	1998	Bottom	5.5
	Hidalgo	2000	Bottom	5.1
	Grace	2000	Bottom	4.4
	Hidalgo	2001	Bottom	3.8
	Holly	2001	Bottom	3.1
	Grace	2001	Bottom	3.1
	Santa Barbara Point	1995	Natural	3.0
	Hermosa	1996	Bottom	2.7
	Grace	1999	Midwater	2.6
	Gail	1999	Midwater	2.5
	Hermosa	2000	Bottom	2.2
	Grace	2001	Shell Mound	2.2
	Santa Rosa Passage	1995	Natural	2.0
	Holly	1998	Shell Mound	1.8
	Holly	2001	Shell Mound	1.7

Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Halfbanded rockfish	Hidalgo	2000	Bottom	907.1
	Grace	1997	Bottom	800.5
	Anacapa I.	1999	Natural	703.1
	Irene	1999	Bottom	621.2
	Irene	1998	Bottom	595.9
	Hidalgo	2000	Shell Mound	461.0
	Grace	1999	Shell Mound	415.1
	Hermosa	2000	Shell Mound	406.9
	Grace	2000	Bottom	405.2
	Hermosa	2000	Bottom	398.1
	Grace	1996	Bottom	395.1
	Hermosa	1997	Bottom	381.4
	Grace	1999	Bottom	344.2
	Hidalgo	2001	Bottom	318.4
	Hermosa	1999	Bottom	313.2
	E. End Anacapa I.	1995	Natural	284.9
	Hidalgo	1999	Bottom	275.8
	Grace	2001	Bottom	266.4
	Grace	2001	Shell Mound	259.1
	Grace	2001	Bottom	237.7
Pygmy rockfish	Hidden Reef	1999	Natural	263.7
	San Nicolas I.	1996	Natural	236.9
	Footprint	2001	Natural	125.7
	Cortes Bank	1997	Natural	119.7
	North Reef	2000	Natural	93.8
	Santa Monica Bay	1998	Natural	93.7
	San Miguel I.	1995	Natural	87.3
	Santa Monica Bay	2001	Natural	84.1
	Cortes Bank	1997	Natural	76.7
	Footprint	2000	Natural	72.2
	Santa Cruz I.	2000	Natural	71.9
	Osborn Bank	2000	Natural	71.2
	San Nicolas I.	1996	Natural	64.6
	14 Mile Bank	2001	Natural	64.5
	San Nicolas I.	1996	Natural	64.2
	Santa Rosa I.	1995	Natural	60.6
	Footprint	2000	Natural	54.6
	Reef "D"	1999	Natural	47.0
	Footprint	1999	Natural	42.3
	Santa Monica Bay	2001	Natural	38.3
Pink seaperch	Santa Monica Bay	1998	Natural	304.5
	Grace	1998	Shell Mound	39.2
	Holly	1998	Shell Mound	11.1
	Holly	1999	Bottom	9.1
	Catalina I.	1996	Natural	4.0
	Grace	1997	Shell Mound	2.9
	Grace	1997	Bottom	2.7
	Holly	1996	Bottom	1.8

Species	Site	Year	Habitat Type	Density(Fish per 100 m²)
Pink seaperch (cont.	Reef "D"	1999	Natural	1.7
	Santa Monica Bay	1997	Natural	1.3
	Holly	1997	Bottom	1.3
	Catalina I.	1996	Natural	1.2
	Holly	1997	Shell Mound	1.2
	Santa Monica Bay	1997	Natural	1.2
	Santa Rosa I.	1995	Natural	1.2
	Grace	2000	Bottom	1.1
	Grace	2001	Platform pipe	1.0
	Reef"A"	1997	Natural	0.9
	Santa Cruz I.	1996	Natural	0.8
	North Reef	1998	Natural	0.8
Yellowtail rockfish (adult)	Reef "B"	1995	Natural	3.9
	San Miguel I.	1995	Natural	3.5
	North Reef	1996	Natural	2.8
	North Reef	1995	Natural	2.1
	Santa Rosa I.	1995	Natural	2.1
	San Miguel I.	1995	Natural	1.9
	San Miguel I.	1995	Natural	1.7
	Reef "D"	1999	Natural	1.6
	North Reef	2000	Natural	1.5
	Reef "A"	2000	Natural	1.0
	San Miguel I.	1995	Natural	0.7
	Reef "A"	1998	Natural	0.7
	Reef "B"	1997	Natural	0.5
	North Reef	1999	Natural	0.5
	Santa Rosa I.	1995	Natural	0.4
	Reef "A"	1997	Natural	0.3
	North Reef	1997	Natural	0.3
	Santa Rosa I.	1995	Natural	0.2
	North Reef	1998	Natural	0.2


LOVELAB UC, SANTA BARBARA

Young-of-the-year rockfish in the platform midwater.

PROJECT TITLE: The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California

START DATE: 06/01/05 **END DATE**: 12/31/06

PROJECT CONTACT:

Dr. Milton Love
Marine Science Institute
University of California
Santa Barbara, California 93106
Phone: 805-893-2935
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1. PROJECT DESCRIPTION

In 1995, the USGS/BRD initiated cooperative research with the University of California at Santa Barbara (UCSB) to conduct research to address a critical marine resource management issue defined by the Minerals Management Service (MMS). MMS requested that the DOI's National Biological Survey (now U. S. Geological Survey/Biological Resources Division, USGS/BRD) conduct a study to address the need to understand how offshore oil/gas platforms contributed to the fish populations and fishery productivity in the Santa Maria Basin and Santa Barbara Channel. In 2000, the California Artificial Reef Enhancement (CARE) program began to contribute a substantial portion of the research funds devoted to this project.

The on-going research has involved broad scale sampling at numerous oil/gas platforms and natural reefs. The research has been coordinated with researchers and managers of the National Oceanic and Atmospheric Administration's National Ocean Service (Channel Island Marine Sanctuary), National Marine Fisheries Service, California Sea Grant Program, California Department of Fish and Game, and various other state agencies involved in fisheries management and conservation biology.

During the course of this study, much of our research has focused on: 1) characterizing the fish assemblages around platforms and natural reefs; 2) examining how oceanography affects patterns of recruitment and community structure of reef fishes; 3) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types (e. g., platforms and natural reefs).

From these studies, it is clear that platforms harbor a wide range of fishes and fish assemblages. However, as noted in "Ecological Issues Related to Decommissioning of California's Offshore Production Platforms" (Holbrook et al. 2000) "to best evaluate decommissioning alternatives one would need several other types of information that address (1) spatial and temporal patterns of distribution and abundance of reef-associated species in different parts of the Southern California Bight, including on natural reefs and associated with platforms, (2) distribution, abundance and quality of natural hard substrate in the area, and (3) physical oceanographic data to identify patterns of water

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JAY K. ELDER *Harbor Manager*
THOMAS D. GREEN *Legal Counsel*
PHILLIP J. SEXTON, CPA *Treasurer*

May 10, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 - Bldg. 1
Seattle, WA 98115-0070

Subject: Comments on the “Pacific Coast Groundfish Fishery Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts” Draft EIS Support of Modified Alternatives of Collaborative Efforts between Environmental Non-Governmental Organizations and Fishermen and Protection and Consideration of Impacts to Coastal Communities

Dear Mr. Robert Lohn:

We appreciate this opportunity to comment on the "Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS)." We support the Pacific Fisheries Management Council and National Marine Fisheries Service’s efforts to assess the environmental and socioeconomic effects of the alternatives presented in the Draft EIS. Our review of the Draft EIS document and discussions we have had with NMFS staff, including Dr. Rebecca Lent and Mr. Steve Copps, provided us with a good understanding of the intent and variables of the Essential Fish Habitat program. Our comments are broad with respect to the fisheries issues but are focused on the effects of the Essential Fish Habitat program on local coastal communities and fishing dependent harbors.

The Magnuson-Stevens Act and a 2000 court order require the preparation of this DEIS. The purpose of this DEIS is to evaluate the effects of fishing on essential fish habitat and to identify measures that will minimize those impacts to the extent practical. The project will also designate “Habitat Areas of Particular Concern” and identify other actions that encourage the conservation and enhancement of Essential Fish Habitat (source: DEIS). The Pacific Coast Groundfish Management Plan (FMP) will ultimately be amended to incorporate the alternatives selected by the Pacific Fisheries Management Council (PFMC) and as may be approved by the National Marine Fisheries Service (NMFS).

Fisheries and Non-Governmental Organizations

There are an estimated 4-6 permit holders that we believe regularly bottom trawl in the San Luis Obispo central California region. These commercial fishermen have historically moored and offloaded seafood product at Avila Beach/Port San Luis Harbor. We strongly support the environmental non-governmental organizations (NGO's) and these 4-6 commercial fishermen's (and their associated representatives) efforts to agree on designating zones in the study area (such as Alternative C.12 as may be modified) as no-bottom trawl zones. Of course, other areas would remain available for trawling and other types of fishing, both sport and commercial use. As we understand it, the NGO's, individuals and Fishing Associations (local Fishermen's Associations, FMA, PCFFA and others) are working to identify areas they think should be kept open to bottom trawl fishing and those remaining areas that should be closed to bottom trawlers. Again, we strongly support these efforts and recommend that whatever collaborative proposals are eventually submitted to the Pacific Fisheries Management Council be taken seriously and adopted by NMFS and the Commerce Department. We believe that the collaborative efforts of the NGO's and the commercial fishermen will result in the best alternative for the central California coast area regarding designations of the Essential Fish Habitat, while also meeting the requirements of the court order and the Magnuson-Stevens Act, et seq.

Port San Luis Harbor staff is working with the NGO's and some of the fishermen to educate and encourage the development of information for the GIS mapping of the Alternatives in the draft EFH EIS. The outcome, which is subject to modification, may also include some of the local trawl permits and vessels being purchased with private funds.

We respectfully request both the PFMC and NMFS allow the NGO's to continue working with the trawl fishermen, the group most greatly impacted by this process, in order to prepare recommendations on open trawl areas and trawl closed zones within the central California coast study region. We expect these groups to present a preliminary zoning plan at the PFMC meeting in June 2005. We support any alternative submitted by a collaborative effort of NGO's and commercial fishermen.

In addition, we respectfully request that both the Pacific Fisheries Marine Council and the National Fisheries Marine Service accept and support any Alternative submitted by these groups in a joint effort as one of the preferred alternatives in the EFH EIS. We believe that the fishermen and NGO's should be allowed, if not encouraged, to continue their collaborative work to identify essential fish habitat, to designate habitat areas of particular concern, to minimize, to the extent practical, the adverse effects of fishing on the essential fish habitat, and to identify other actions that will encourage the conservation and enhancement of the essential fish habitats within any modified Alternative for the central California coastal region.

Ports, Harbors and Coastal Communities

There are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has a direct effect on the coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities. We ask that both the PFMC and the NMFS carefully consider the socioeconomic effects of any designation of essential fish habitat in the central California region.

We understand that it is very difficult to quantify the exact social and economic effects of the proposed closures and cannot offer, at this time, solid evidence of those effects, other than our past experience and day-to-day observation of the fishing industry and the benefits it provides to our communities. There is a synergy that occurs which is un-measurable in terms of cash value that also needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public visits the ports and harbors and loves to get their fresh seafood while watching the boats offload their catch. Without community interest, these small craft harbors become stagnant and turn into yacht harbors for the wealthy, or marine malls selling plastic sharks and T-shirts. The small independent business persons (fishermen) are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. With this in mind, please use care in implementing the EFH's and HACP's and take our comments into consideration.

We have attached our specific comments to this letter for your consideration in preparing the final "Environmental Impact Statement for the Essential Fish Habitat Plan on the West Coast for the Pacific Fisheries Management Council." In advance, we appreciate your consideration of these comments and observations.

Again, we thank the Council and Fisheries Service for your attention to this alternative. We are available for future discussions on this issue. Should you require additional information please contact me by phone at (805) 595-5409, ext. 14, or by email at jaye@portsanluis.com.

Sincerely,

Jay K. Elder
Harbor Manager
Port San Luis Harbor District

Encl.: Attachment A – Detailed Comments

cc: Harbor Commission
Dr. Rebecca Lent, Dept. Asst. Administrator – Regulatory Programs, NMFS
Mr. Steve Copps, Sr. Policy Analyst, NMFS
Mr. Don Hansen, Chair, PFMC
Port San Luis Commercial Fishermen's Association

Attachment A

Memorandum

To: Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 - Bldg. 1
Seattle, WA 98115-0070

From: Port San Luis Harbor District
Avila Beach, CA

Date: May 10, 2005

Re: Comments on the “Pacific Coast Groundfish Fisheries Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts” Draft EIS

The following are comments offered for consideration with regard to the “Draft Environmental Impact Statement on Pacific Coast Groundfish Fisheries Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts.” The Proposed Action is to amend the “Pacific Coast Groundfish Fishery Management Plan (“FMP”) pursuant to section 303(a)(7) of the Magnuson-Stevens Act, to (**1**) describe and identify essential fish habitat (EFH) for the fishery, (**2**) designate Habitat Areas of Particular Concern, (**3**) minimize to the extent practicable the adverse effects of fishing on EFH, and (**4**) identify other actions to encourage the conservation and enhancement of EFH. The project area for this action extends from the seaward boundary of the Pacific Coast Exclusive Economic Zone shoreward to the inland extent of estuaries.

We appreciate the opportunity to offer these comments, which focus on the possible effects of the proposed action on coastal fishing communities in the central California coast study area (Port San Luis/Avila Beach to Pillar Point - Princeton).

There are numerous alternatives offered and considered in the Draft EIS that would have distinct effects on the coastal fishing communities. We are also aware that the socioeconomic effects of the proposed action are difficult to calculate due to the lack of available hard data for both the fisheries biomass and onshore activities related to the fishing industry. The fisheries models and economic models are models and, as such, are subject to a margin of error. We appreciate the efforts of the NMFS staff economists who have worked hard to develop these economic models and are not being critical of the work presented here. However, we believe there is much to be learned about the socioeconomics of any essential fish habitat designation that may be adopted. We urge the Council and NMFS to proceed with caution as we are dealing with a very tender social community which is on the verge of collapse. As we all agree, the estimates of the rockfish biomass is still uncertain and we support the continued funding of monitoring and research to improve the science of rockfish biomass determination to continue the sustainability of these important fisheries.

In general, the calculations that use the "Habitat Suitability Probability" ("HSP") are acceptable and raise the question of "What is the definition of Essential Fish Habitat?" We believe that the entire ocean is an essential fish habitat and, therefore, any human use would have an impact to its protection designation. We also understand that essential fish habitat is defined in the statutes, but in reality, we must make a reasonable determination that allows human interaction with the habitat as long as the final effect of the human factor does not reduce the species (in this case, rockfish) below the sustainability levels set by the NMFS and PFMC. We request that you continue to allow human use of the resources to the greatest extent feasible for the benefit of both fishing and harbors. We believe that we can co-exist in the environment by properly designating some areas for the protection of the essential fish habitat and other areas for resource harvest and harbor functions.

Alternatives to Designate and Describe Essential Fish Habitat ("EFH")

This Draft EIS states that the "Actions taken by a Council to minimize adverse effects of fishing on EFH may include fishing equipment restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing effects to fish habitats and/or promote recovery of disturbed habitats. <u>These measures may result in socioeconomic effects for the affected sectors of the fishing industry</u>, but would be designed to promote sustainable fisheries and long-term socioeconomic benefits. The environmental consequences of proposed actions would be evaluated in applicable NEPA documents before they are implemented." The designation of EFH's is a good idea but should only be adopted if the socioeconomics and historic uses (specifically fisheries and harbors) of those areas are seriously considered, understood and protected in the final EIS. We do not believe that the long-term cumulative socioeconomic effects on harbors in the designation of EFH's were fully explored, identified or mitigated in this draft EIS. More work is required to identify and mitigate the long-term socioeconomic impacts of any designation of EFH's on coastal harbors and the fishing industry.

A.1: The no action plan or status quo encompasses 317,690 sq. miles. We do not support this alternative for obvious reasons.

A.2: Designate the entire region west of the 3,500 meter as EFH (100% of HSP is greater than zero); encompasses 187,741 sq. miles. We do not support this alternative as it could have severe effects on the existing fishing and harbor industries that rely on the resources in that designated area.

A.3: Designate the region as EFH (100% of HSP is greater than zero); encompasses 87,160 sq. miles. Same comment as A.2 above.

A.4: Designate the region as EFH (60-90% of HSP overfished areas, precautionary areas, all other ground fish and all seamounts); encompasses 79,481 sq. miles. May support if some areas were opened to all gear types for continued fishing.

A.5: Designate the region as EFH (70% of HSP is greater than zero); encompasses 78,569 sq. miles. May support if adequate areas were opened to all gear types for continued fishing and limited effects to coastal communities.

A.6: Designate the region as EFH (30% of HSP is greater than zero); encompasses 66,589 sq. miles. May support if adequate areas were opened to all gear types for continued fishing and limited effects to coastal communities.

With regard to the matter of the errors on some of the essential fish habitat maps generated from information collected on the managed species, we wish to reserve the right to comment further if there are substantial differences in those maps from what is represented in the Draft EIS.

Alternatives to Designate Habitat Areas of Particular Concern ("HAPC")

This Draft EIS states that the "Designation of HAPC's, like designation of EFH generally, does not have any direct environmental or socioeconomic affect, but may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPC's." The designation of HAPC's is a good idea but should be adopted only if the socioeconomics and historic uses of those areas are seriously considered by the PFMC and NMFS in the final EIS. The long-term effects of designation of HAPC's must be further considered in the final EIS with a focus on the probability of further regulation restricting the fisheries and possibly the functions of ports and harbors in these designated zones. We do not believe that the long term cumulative effects of the designation of HAPC's were fully explored and identified in this draft EIS. More work is required to establish the long-term impacts of any designation of HAPC's.

B.1: The no action plan or status quo. We do not support this alternative as we understand that HAPC's must be identified and designated.

B.2: Estuaries designation: This alternative is understandably an important one and is supported. However, many estuaries also include harbors and marinas and the effects of a HAPC on any of these coastal dependent harbors could have an effect on the basic functions of harbors and marinas and should be seriously considered in the process. We do not believe that this Draft EIS fully explores the possible effects of such a designation on ports, harbors and marinas located in or near estuaries. More work needs to be done with regard to the continued ability of harbors to perform basic maintenance functions such as dredging and repairs to facilities.

B.3: Canopy Kelp: This alternative is also an important one and is supported. Again, however, we urge the consideration that a 100% designation of all kelp forest (current and historic) could have an effect on some commercial harvest operations and, of course, some harbors and marinas. Excluding some areas should be considered, which might have a negative effect on the harvesters and or coastal communities with facilities in or near kelp forest.

B.4: Sea Grass: See our comments on B.3. Clearly an important species, but must consider the impacts to ports, harbors and marinas and their continued ability to continue in maintaining their facilities and providing services.

B.5: Core Habitat (upper 10% of overfished and precautionary species): Clearly an important alternative and is supported. However, there may be some areas which should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.6: Rocky Reefs: Again, this is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.7: Areas of Interest: This is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.8: Oil Production Platforms: The artificial reef alternative is not supported. Also consideration of existing lease sales, (Mineral Management Service) especially in the Santa Maria Basin should be discussed. Designation of EFH and HAPC's of those existing Outer Continental Shelf (OCS) lease sites should be done to protect the habitat from future oil exploration and production on the central coast.

B.9: Process for New HAPC Designations: Great idea, but another process also needs to be developed. The "Process to Un-Designate HAPC's" should be designed for the possibility of future re-designation or changes to this HAPC program. Please add the decommissioning of HAPC process to this alternative.

Alternatives to Minimize Adverse Impacts to EFH

This Draft EIS states that the "Federal and state agency actions that may adversely affect EFH trigger consultation and/or recommendations under sections 305(b)(2)-(4) of the Act. Under section 305(b)(4)(A) of the Act, NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would adversely affect EFH."

"EFH recommendations from NMFS or a Council to federal or state agencies are non-binding. Nevertheless, as a result of EFH coordination, consultations, and recommendations, Federal or state agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding."

"Costs associated with consultations will likely vary depending on the number of species associated with an EFH designation, and the amount of habitat designated as EFH. If an entity chooses not to participate in consultations, then the EFH designation will ultimately have no effect on that entity. If consultations result in conservation recommendations, then there are likely to be increased costs in the short-term and possibly in the long-term depending on the amount of offsetting benefits realized from enhanced habitat productivity resulting from EFH designation."

This Draft EIS fails to fully consider the probable effects of the EFH designation on coastal communities, especially ports, harbors and marinas. The final EIS should detail what the effects might be to these coastal facilities if designation of EFH's are adopted and include the community's facilities. The increase in costs to mitigate an EFH in a harbor location may have an adverse socioeconomic effect and/or close down existing facilities which support coastal access, commerce, recreational uses and marine transportation corridors.

C.1: No Action: No comment.

C.2: Depth-based Gear –specific Restriction:

C.2.1: For the central California region, we believe that this action is already in place and, if so, would support the status quo, with some exceptions that might open up some historic trawl zones to allow some take with bottom gear.

C.2.2: For the central California region, we believe that this action is already in place and, if so, would support the status quo. We would object to the prohibition of all fixed gear shoreward of 150 fathoms and request that some fixed gear be allowed in the region, specifically in areas of historic take.

C.2.3: We would not support this alternative option as it would have a significant impact on the historic fisheries and harbor functions.

Consideration of the effects of all the C.2 options should be analyzed for the economic and social impacts to the coastal communities.

C.3: Close Sensitive Habitat:

C.3.1: "Greater than or equal to the recovery index where the value is greater than one. Closed to all gear types."(?) We would support this option if the pelagic fisheries and other less invasive bottom gear fisheries would still be allowed in the EFH zones.

C.3.2: "Greater than or equal to the recovery index where the value is greater than one. Closed to all gear types."(?) We would support this option if the pelagic fisheries and other less invasive bottom gear fisheries would still be allowed in the EFH zones.

C.3.3: Same comment as above.

C.3.4: Same comment as above.

Consideration of the effects of all the C.3 options should be analyzed for the economic and social impacts to the coastal communities. The use of the 100 hours rule and the limited time period (i.e., 2000-2002) is not reasonable. We strongly suggest that the period be expanded to include at least the past ten - if not the past twenty - years of trawling. The one hundred hour rule may be sufficient, but we would request that the NMFS and PFMC take into consideration the trawl fleet reply for this central coast area on this matter. There is a limited fleet here and the time periods (hours and years) used may not be applicable for our small fleet.

C.4: <u>Prohibit the Geographic Expansion of Fishing</u>: Areas that have not been fished recently (2000-2002) would be closed to fishing to protect areas that are potentially pristine.

<u>C.4.1</u>: Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002.

<u>C.4.2</u>: Apply the expansion limit to all bottom-tending gear types. The closure would extend west from a line approximating the 2,000 m (1,094 fm) depth contour to the seaward margin of the EEZ.

Consideration of the effects of all the C.3 options should be analyzed for the economic and social impacts to the coastal communities. The use of the 100 hours rule and the limited time period (i.e., 2000-2002) is not reasonable. We strongly suggest that the period be expanded to include at least the past ten - if not the past twenty - years of trawling. The one hundred hour rule may be sufficient, but we would request that the NMFS and PFMC take into consideration the trawl fleet reply for this central coast area on this matter. There is a limited fleet here and the time periods (hours and years) used may not be applicable for our small fleet.

C.5: <u>Prohibit a Krill Fishery</u>: We support as long as other fisheries and the harbor functions are not impacted and continue to be allowed.

C.6: <u>Close Hotspots:</u> Prohibits trawling in hotspot areas, where – in this case – hotspots are defined as habitat that has high probability of being EFH for a large number of groundfish. Areas that are associated with 50 or more species/lifestage combinations would be closed to bottom trawling.

We support this as long as other types of non-trawling fisheries are allowed in the "Hotspot" areas.

C.7: <u>Close Areas of Interest</u>: Closes any combination of the areas of interest HAPC's designated under Alternative B.7 to fishing by specified gear types. (The 21 areas of interest listed under Alternative B.7 are underwater features, such as seamounts and submarine areas, or are currently under some form of protection.) Closures affect the following activities:

<u>Option C.7.1</u>: Close areas of interest to bottom trawling.

<u>Option C.7.2</u>: Close areas of interest to all bottom-contacting fishing activities.

This is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on effect to historic and existing use by fishermen and harbors is required.

C.8: <u>Zoning Fishing Activities:</u> Limits the use of bottom-tending fishing gear to specified zones.

First, all areas deeper than the 2,000 m (1,094 fm) contour along the continental slope extending to the maximum westward range of groundfish EFH are closed to certain bottom-tending fishing gear types, according to the options described below.

Second, a five-year transition period to gear specific zones is established for the remaining area inside the 2,000 m contour, which remains open to these activities, subject to any other restrictions, for the five years from implementation (e.g., 2007-2011). Third, during this five-year period, NMFS conducts the research necessary to delineate zones where specified fishing activities would be permitted. At the end of the five-year transition period, the gear-specific zones come into effect and any remaining unzoned area is closed to affected gear types, according to the options described below. (Restrictions applied outside 2,000 m remain in effect.)

In identifying fishing zones, NMFS must demonstrate that any unavoidable adverse impacts would be minimal and temporary, based on the best scientific information available.

<u>Option C.8.1</u>: Fishing zones are established for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear types are unaffected by the zoning system, including the prohibition outside 2,000 m.

We support as long as some bottom trawl and bottom-contact fishing is allowed and that all other types of fisheries are not impacted (i.e., pelagic and mid-water trawl/net).

<u>Option C.8.2</u>: Fishing zones are established for all bottom-contacting gear types, including bottom longlines, traps, and pots. The immediate closure outside of 2,000 m applies to all bottom-contacting gear types. In addition to establishing the zoning system, NMFS will conduct a gear substitution and modification research program, intended to redesign bottom fishing gear to reduce damage to habitat. This program will have a significant cooperative research element by employing fishermen in the design and testing of new gear.

We support as long as some bottom trawl and bottom-contact fishing is allowed and that all other types of fisheries are not impacted (i.e. pelagic and mid-water trawl/net).

The zoning system will be regularly modified to incorporate new information about habitat sensitivity and recovery factors, gear impacts on habitat, and to accommodate use of newly developed or modified gear.

This is an important statement that requires a follow up mitigation measure and policy to insure it is implemented.

C.9: Gear Restrictions: Specific gear modifications and prohibitions that are based on that interaction. The following gear restrictions would be implemented in areas identified as EFH for groundfish:

C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls.
C.9.2: Prohibit the use of flat trawl doors (i.e., require cambered doors).
C.9.3: Limit the length of a single longline groundline to 3 nm.
C.9.4: Employ Habitat-Friendly Anchoring System.
C.9.5: Prohibit dredge gear.
C.9.6: Prohibit beam-trawl gear.
C.9.7: Prohibit set-gillnets in waters deeper than 60 fm.
C.9.8: Prohibit dingle bar gear (troll groundfish gear).

We support these mitigation measures and policies.

C.10: Central California No-trawl Zones: Based on a project being undertaken by two environmental advocacy organizations, The Nature Conservancy (TNC) and Environmental Defense Fund (EDF). Involves private funds used to purchase groundfish limited entry trawl licenses and vessels in concert with the designation of no-trawl zones off the central California coast. The project area extends from Point Conception to Davenport, California, and includes adjacent offshore seamounts (Gumdrop, Guide, Pioneer, Davidson, and Rodriguez).

TNC/ED have identified 23 permit holders they believe regularly trawl inside the project area. Most home port in Morro Bay, Moss Landing, Monterey, or Half Moon Bay. TNC/EDF intend to purchase a significant majority of the bottom trawling permits and vessels in this region if the Council/NMFS designates a significant portion of the project area as no-bottom-trawl zones.

TNC/ED will identify areas they think should be designated no-trawl zones using the GIS data developed as part of this EIS in combination with a participatory process involving trawl fishermen in the project area. If this alternative is adopted as an FMP and regulatory amendment, these areas will be closed to bottom trawling by NMFS once TNC/EDF have negotiated purchase contracts or options for at least half of the limited trawl permit holders they have identified as operating in the project area.

We generally support this Alternative only if a majority of the limited entry permit holders of local bottom trawl fishermen and other impacted fishermen cooperate with the NGO's in establishing the open trawl areas and agree with the closed areas. We suggest that a modified alternative be considered which allows for the collaboration of the NGO's and the bottom trawl fishermen to present a pilot project in the southern area of this Alternative study area (Pt. Conception to Pt. Sur) and then expand to the northern boundary of this Alternative study area in the nine months allocated for final action by the Pacific Fisheries Management Council. Consideration of the buy out program and unintended effects to the local harbors should be considered and offset with mitigation measures to insure the continued infrastructure is in place, new markets are explored, funding for new shore side fisheries support facilities are provided and the economic synergy is maintained for the shore side businesses in the local coastal communities. The Final EIS should also implement mitigation measures to prevent the buy back program from becoming a burden to the local coastal communities and harbors if the subject vessels are abandoned and fall into disrepair, creating a nuisance.

C.11: Relax Gear Endorsement Requirements: Vessels holding a groundfish limited entry permit account for a large portion of groundfish landings. Currently, limited entry permits include a gear endorsement specifying the type of gear the permit holder may use. These endorsements identify three gear categories: trawl, longline, and pot. In addition, longline and pot gear permit holders may also have a sablefish endorsement. Permit holders with this species-specific endorsement may participate in the high-value primary sablefish fishery and are allocated vessel-specific catch quotas, known as tier limits because the endorsements fall into one of several categories, or tiers, with different catch quotas. Under this alternative, gear endorsements are relaxed but the sablefish endorsement is not. This would allow permit holders to switch gear types, providing fishermen greater flexibility in changing strategies based on prevailing conditions in the fishery.

We support this Alternative.

C.12: Close Ecologically Important Areas to Bottom Trawl: This alternative was proposed by the environmental group Oceana. The alternative would close a network of areas to bottom trawling; set a maximum footrope size of eight inches on bottom trawl gear within open area; require Vessel Monitoring Systems on all bottom trawl vessels with positions recorded every 5 minutes; increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates; establish a process for setting a limit on the bycatch of habitat-forming invertebrates; require ongoing research including comprehensive benthic mapping.

We would support this Alternative only if a majority of regional limited entry bottom trawl fishermen cooperate with this NGO in establishing the open trawl areas and agree with the closed areas and if all other fishing gear types would continue to be allowed in the EFH designated in the Alternative.

C.13: Close Ecologically Important Areas to Bottom-contacting Gear: The areas identified in Alternative C.12 would be closed to all bottom-contacting gear types, defined as both fixed gear (longlines, pots, and traps) and bottom trawl.

We oppose this alternative.

C.14: Close Ecologically Important Areas to Fishing: The areas identified in Alternative C.12 (see Figure 2-28) are closed to all fishing.

We oppose this alternative.

The Draft EIS fails to take into consideration or explain the current regulations and restrictions that are in place and should prepare a map with overlays in the Final EIS. The PFMC and NMFS should seriously consider these existing and possible future (such as the California State Blue Ribbon committee studying MPA's) actions that may overlap any designations being considered in this EIS.

This EIS includes the following statement: ***6.1.7*** *EO 12866 (Regulatory Impact Review)* EO 12866, Regulatory Planning and Review was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The information and analyses in Chapter 4 of this EIS would be relevant to a Regulatory Impact Review (RIR) analysis of future regulations developed from this process. If proposed regulations are promulgated, an RIR would be prepared as part of a proposed regulatory package.

The question here is whether the Draft EIS sufficiently meets this requirement of an analysis of the benefits and costs of regulatory actions with regard to the designation of EFH and or HAPC. We would request that the NMFS expand the discussion on this EO and provide additional analysis of the proposed regulations on both the fishing fleets and the harbors and marinas within the study area.

We appreciate your consideration on this very important matter and look forward to the Final EIS including a response to our questions. Overall, we believe that the contents meet the minimum requirements of NEPA but the document must be expanded in the areas identified in our comments. We are available for consultation on our comments if you wish to discuss them further. Again, thank you for the opportunity to comment on this EIS.

circulation off the coast of California, coupled with estimates of populations connectivity for species of interest."

Beginning in 2003, we have integrated this report's recommendations, along with the needs expressed by both BRD and MMS, into our research plans. This year's research, described in Sections 4 and 5, will compliment and build upon our previous studies.

2. ACHIEVEMENTS IN 2004

A. Scientific Research

1) Platform and Natural Reef Surveys – In September 2004, with funding from MMS and CARE, we were able to survey the largest number of platforms since 1999. Complete surveys, including mussel mounds, were conducted at platforms Irene, Hidalgo, Harvest, Hermosa, Hondo (first time), Heritage (first time), Holly, Gail, Grace, and Gilda. Due to poor water visibility, only midwater surveys were conducted at platforms C, B, A, Hillhouse, Henry, and Habitat. In addition, we surveyed a number of natural reefs (some first mapped in spring 2004) in the Santa Barbara Channel and (with additional funding from the Channel Islands National Marine Sanctuary) around the northern Channel Islands.

Once again, we have found that many platforms harbor higher densities of both juvenile and adult fishes than do most natural reefs. In particular, the new seafloor maps produced by the USGS (see 3A) and partially ground-truthed by us demonstrated that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. Thus, our research continues to demonstrate the importance of the Santa Barbara Channel platforms as providers of habitat for reef fishes.

2) Research on Recruitment of Young-of-the-Year Rockfishes to Platforms – In the spring and summer of 2004 (funded by MMS and CARE), we conducted intensive diver surveys of platforms Gail and Gilda, documenting the young fishes that recruited out of the plankton to these structures. At the same time, we determined both surface and midwater current patterns, to determine the current patterns that lead to the large numbers of young rockfishes we saw. In this way, we are attempting to understand why platforms are often so heavily populated by young rockfishes.

B. Scientific Publications Submitted, In Press, Or In Preparation

1) *The Unexpected Utility of Offshore Marine Structures in Rebuilding an Overfished Species*

The bocaccio (*Sebastes paucispinis*) is an historically important rockfish species, found on the West Coast of North America, that through overfishing has been reduced to about 7.4% of its unfished population. Based on our surveys, we estimated that there was a minimum of 433,682 juvenile bocaccio around the six platforms we surveyed in the Santa Barbara Channel. With assistance from NOAA Fisheries, we determined that this number of juvenile bocaccio is about 20% of the average number of juvenile bocaccio that survive in a year for the species' entire range (over 4,000 km of North American coastline) and, when adults, will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. This research demonstrates, for the first time, that a small amount of artificial nursery habitat placed in the ocean may be quite valuable in rebuilding an overfished species.

Status: We submitted this important research to the biological journal Canadian Journal of Fisheries and Aquatic Sciences. The findings in this paper were sufficiently surprising that we been asked to rewrite the paper, adding additional data to bolster our case. This paper is being revised and will be resubmitted to that journal.

2) *Comparing Potential Larval Production of Bocaccio* (Sebastes paucispinis*) and Cowcod* (Sebastes levis*) around Oil Platforms and Natural Outcrops off California*

There is increasing evidence that some central and southern California oil platforms form important habitats for a number of economically important fishes. Given the overfished status of several of these species, we asked to what extent might platforms be important as producers of larvae of these species on a local, or even regional, basis. We conducted a pilot study that focused on bocaccio (*Sebastes paucispinis* Ayres, 1854) and cowcod (*S. levis* Eigenmann and Eigenmann, 1889), two overfished species, comparing adult densities and potential larval export of these species at platforms and natural outcrops in central and southern California. Densities of mature bocaccio and cowcod were highly variable among survey sites, but were generally very low at both natural reefs and platform habitats. However, the mean densities for both species around platforms were higher than at natural reefs. In addition, two of the three platforms (Gail and Hidalgo) that harbored mature bocaccio had larger mature individuals than did any natural reef. Platform Gail had by far the highest densities of both mature bocaccio and cowcod of any natural or human-made habitat. Because of these very high densities, the potential larval production of both species at Platform Gail was much higher than at any other site surveyed. We estimated that for bocaccio one hectare of sea floor at that platform was equivalent to 68 hectares at an average natural reef and for cowcod one platform hectare was equivalent to 26 at the average natural reef.

Status: Submitted to Bulletin of Marine Science

3) *A comparison of the Fish Assemblages Associated with an Oil/Gas Pipeline and Adjacent Seafloor in the Santa Barbara Channel, Southern California Bight.*

This paper summarizes our comparisons of the fishes that live on the platform Gail-Grace pipeline and the surrounding seafloor. Based on differences in fish assemblages, we found there were four habitats (shallow and deep pipeline and shallow and deep seafloor). Fish densities along the shallow portion of the pipeline were about seven times higher than on the adjacent seafloor and densities along the deep pipeline portion were nearly six times that of the deeper seafloor. Along the pipeline, rockfishes comprised 84% of the fishes and included 22 species. Unidentified sanddabs (probably most or all *Citharichthys sordidus*), forming 33.2%, and combfishes (*Zaniolepis frenata* and *Z. latipinnis*), comprising 19% of the total, were most often observed on the seafloor. Most of the fishes living on the pipeline were either juveniles of such larger species, such as blackgill, flag, and vermilion rockfishes, cowcod, and lingcod or dwarf species such as halfbanded and stripetail rockfishes, combfishes, and poachers (Family Agonidae), Of particular interest were the relatively high densities of juvenile cowcod along the deeper parts of the pipeline, densities that were far higher than any seen at over 80 natural outcrops and at ten platforms.

Status: Bulletin of Marine Science, in press.

4) *Do Oil and Gas Platforms off California Affect the Fate of Recruiting Bocaccio* (Sebastes paucispinis)*? An Analysis Based On High Frequency Radar Derived Surface Trajectories*.

Among some environmentalists, there is a concern that recruitment of high densities of many species of juvenile rockfishes (*Sebastes* spp.) from the plankton to some oil and gas platforms off southern and central California may reduce recruitment at natural nursery habitat. To investigate the likelihood of a platform interfering with the transport of recruiting pelagic juvenile fishes to natural nursery habitat, we estimated the proportion of fish recruiting to a platform that would arrive at natural juvenile habitat in the absence of that platform. In this study, we simulated the surface current movements originating at Platform Irene, located west of Point Conception, during the bocaccio (*Sebastes paucispinis*) recruiting seasons, May through August, of 1999 and 2002 using high frequency radar current measurements. Our results from 1999 and 2002 indicate that 7% and 23%, respectively, of the young fishes would have survived to shallow water natural nursery habitat. Thus, we predict that the vast majority of the juvenile bocaccio settling on the platform during the recruitment season would have perished if that structure did not exist. If this is correct, the platform helped produce bocaccio.

Status: Submitted to Fishery Bulletin

5) *The Role of Bottom Crossbeam Complexity in Influencing the Fish Assemblages at California Oil and Gas Platforms*

In this paper, we documented that many of the overfished and economically important fishes that live around oil platforms, such as bocaccio, cowcod, copper, greenblotched and vermilion rockfishes, were found most often where the bottom-most crossbeam (located at the seafloor) was present. In particular, a group of fishes (e. g., bocaccio, cowcod, blue and vermilion rockfishes) lived primarily where the crossbeam was undercut and formed a long crevice. This research suggests that enhancing the seafloor in and around decommissioned platforms with materials such as quarry rock or concrete will likely lead to higher densities of many economically important species.

Status: Submitted to Fishery Bulletin

6) *Growth Rates of Blue Rockfish at Three Platforms and Three Natural Reefs off California*

One of the issues confronting decommissioning authorities is the question of the “ecological performance” of the fishes living at platforms compared to the same species living on natural reefs. In other words, how “healthy” are fishes living at these human-made structures? In this study, we compared the daily growth rates of young blue rockfish (*Sebastes mystinus*) living around three platforms (Irene, Holly, and Gilda) and at three natural reefs in the same areas. In all instances, the fishes at the platforms grew faster than the fishes at the paired reefs.

Status: Report being prepared.

C. Presentations Regarding Platform Fish Ecology

Between March 2004 and January 2005, we gave presentations on fishes and platforms at the following meetings and to the following organizations: Centro de Investigacion Cientifica y de Educacion Superior Ensenada (CICESE), Ensenada, Mexico; Friends of Moss Landing, Moss Landing, California; University of Alaska, Juneau; Plains Oil Company.

3. CONCURRENT PLATFORM RESEARCH in 2004

Along with MMS and CARE-sponsored fish assemblage characterizations, we participated in the following platform-related research.

A. Sea floor mapping and characterization of the Santa Barbara Channel and Santa Maria Basin by USGS (MMS-Sponsored)

In 2004, Guy Cochrane of the U. S. Geological Survey conducted sea floor mapping of previously uncharacterized areas in the eastern Santa Barbara Channel. This research established that much of the sea floor in the Santa Barbara Channel is composed of soft sediments and bolsters the contention that platforms provide some of the only reef structure in the area.

B. Ecological Performance of OCS Platforms as Fish Habitat off California (MMS-Sponsored).

This MMS-funded program included the following tasks. 1) Estimating the potential annual production of larvae from reproductively mature cowcod and bocaccio at Platform Gail versus natural reefs (see paper #2 above). 2) Determining the growth rate of YOY rockfish that settle at platforms versus nearby natural reefs. 3) Estimating the survival and mortality rates of juvenile rockfish at platforms versus natural reefs.

C. Residence Time At Oil and Gas Offshore Platforms by Characteristic Fish Species (CARE and MMS-Sponsored)

This research, funded by MMS and CARE, will build on a pilot program conducted in 2002-2003. Dr. Chris Lowe, of Long Beach State University, will tag fishes with acoustic tags around Platform Gail and monitor their movements.

D. Fish Recruitment Processes at Platforms (MMS and CARE-sponsored)

In this study, funded by both MMS and CARE, we explored the processes that lead to successful settlement of rockfishes on platforms Gail and Gilda (see 2A2).

4. CONCURRENT PLATFORM RESEARCH 2005-2007

In addition to the CARE and MMS-sponsored surveys, the following platform-related research will occur in 2005.

A. Sea floor mapping and characterization of the Santa Barbara Channel and Santa Maria Basin (MMS-Sponsored)

In 2005, Guy Cochrane of the U. S. Geological Survey will continue to conduct sea floor mapping of previously uncharacterized areas in the eastern Santa Barbara Channel.

B. Investigation of Otolith Microchemical Signatures Specific to Fishes at Platforms (MMS-Sponsored).

This research, to be conducted between 2005 and 2007, will examine whether fishes living around platforms have a characteristic elemental “signature” in their ear bones. If a platform-dwelling fish does have this signature, it would remain in place even if that fish moved away from the platform to a natural reef. In essence, part of that fish’s ear bone would have a permanent “tag”, allowing researchers to trace the fish back to living around the platform.

C. Pollutant Body Burden of Fishes at Platforms and Natural Habitats (MMS-Sponsored)

A concern in the decommissioning process is the question of whether fishes living around platforms have higher levels of pollutants than those living in natural habitats. This research, to be conducted between 2005 and 2007, is intended to compare pollutant levels in fishes living around platforms and both over natural reefs and on soft sea floors.

D. Residence Time At Oil and Gas Offshore Platforms by Characteristic Fish Species

This research, funded by MMS and CARE, continues research begun in 2004. Dr. Chris Lowe, of Long Beach State University, intends to tag fishes with acoustic tags around platforms Grace and Gilda, monitor their movements and transfer some tagged fishes to natural reefs.

5. PROPOSED CARE-FUNDED RESEARCH FOR 2004-2005

This year, some of our most important platform-related work will center on several questions of direct importance to the issue of decommissioning.

A. What is the Relative Contribution of Platforms in Supplying Hard Substrate and Fishes to Regional Fish Populations?

Clearly, platforms harbor large numbers of both adults and juvenile fishes. But what is the relative importance of these platform fish communities in the context of their regions?

The most accurate way to gauge this contribution is to understand 1) the quantity of natural hard features and 2) the fish assemblages on these features, in the region around a platform. To accurately assess this, we have to have a good understanding of the amount of natural reefs in our area and, until 2004, this information was mostly lacking. However, as noted previously, in 2004 and continuing into 2005, Dr. Guy Cochrane of the USGS will map and characterize the sea floor habitat of much of the Santa Barbara Channel.

We will use this data to pinpoint new reefs for our fish surveys. These techniques will allow us to more accurately understand the contribution of a platform to the overall amount of rocky outcrops in the vicinity of the platform. In addition, this data will allow us to vastly expand our estimates of the contributions of platforms to the reproductive capacity of fishes in the region.

B. What is the fate of the 1999 rockfish year class at platforms and natural reefs in the Santa Barbara Channel and Santa Maria Basin using the *Delta* submersible?

In central and southern California, the La Nina conditions of 1999 lead to good survival of the larvae and young juveniles of a number of rockfish species. Specifically, using the *Delta* submersible, we saw large numbers of young bocaccio, flag, blue, olive, and widow rockfishes at some platforms. Densities of these rockfishes, particularly bocaccio and flag and widow rockfishes, were higher at some platforms than at any natural reef surveyed. From 2000 through 2003, we have revisited these platforms and observed high densities of 1999 year class fishes of the same species. Clearly, many of those rockfishes settling on the platforms in 1999 survived and were present through 2002. Some, such as bocaccio, have now spent all of their juvenile and parts of their adult lives around platforms, a good indication that some platforms are producing fish, rather than only attracting them.

By continuing our platform and natural reef surveys, we will learn more about the fate of these fishes. Will they remain around the platforms, ultimately maturing and reproducing? Will they move onto adjacent reefs? If either occurs, this will provide additional evidence that platforms produce fishes.

The Minerals Management Service is providing some funds for this research. However, as we have noted in the past, this is complex research and requires a considerable amount of data to arrive at defensible answers. In particular, it requires a relatively large number of surveys and, hence, a large number of submersible dive days. The MMS funding, while extremely useful, will not provide adequate funding for the needed dive days and personnel time. Thus, we are requesting funding from CARE to help us with these efforts.

6. BUDGET FY 2005-2006

A detailed budget is attached.

MMS Department of the Interior

Offshore Facility Decommissioning Costs
Pacific OCS Region

September 17, 2004

OFFSHORE FACILITY DECOMMISSIONING COSTS
PACIFIC OCS REGION
September 17, 2004

By the Offshore Facility Decommissioning Costs Team:
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MMS *Securing Ocean Energy & Economic Value for America*

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Appendices

Executive Summary

The Pacific OCS Region (POCSR) Offshore Facility Decommissioning Cost Team (OFDC) was formed to develop cost estimates for decommissioning offshore oil and gas facilities in the POCSR. This OFDC cost report covers operator compliance with OCS oil and gas regulations (30 CFR 250 and 256) for permanent plugging of wells; removal of well conductors and platform jackets to 15 feet below the mudline; decommissioning and removal of platform decks; decommissioning and removal of pipelines and powercables as appropriate; site clearance; and other lease and permit requirements. The report is one of the inputs used by the POCSR to determine if a Supplemental Bond is required from a lessee.

This report assumes that POCSR platforms will be completely removed and transported to shore for disposal. The decommissioning cost estimates for individual platforms are based on a decommissioning scenario that was developed by the OFDC for the 23 Pacific OCS oil and gas platforms. The scenario assumes six decommissioning projects will be conducted during the 2010-2025 period, and that 2-6 platforms will be removed during each project to minimize the high cost of mobilizing/demobilizing a heavy lift vessel from the Gulf of Mexico, North Sea, or Asia. The decommissioning scenario and methodology assumptions are described in detail in Section 2 of this report.

The decommissioning costs were developed by the OFDC based on information obtained from MMS files, oil and gas operators, consultants, and technical decommissioning studies funded by the Minerals Management Service (MMS). The decommissioning scenario developed by the OFDC for this cost study represents MMS's best professional judgment regarding the sequence and timing of future platform decommissioning activities in the POCSR. The MMS is planning to conduct a detailed update of this report every five years to incorporate new information that results from advances in technology or changes in market conditions, and Federal, State and local regulatory requirements. More frequent updates may be required if unanticipated advances in technology occur or if there is a significant change in regulatory requirements.

The cost report estimates costs for each phase of the decommissioning process: Engineering and Planning, Permitting and Regulatory Compliance, Platform Preparation, Well Plugging and Abandonment, Conductor Removal, Mobilization and Demobilization of Heavy Lift Vessels, Platform Structure Removal, Pipeline and Powercable Decommissioning, Platform Transportation and Disposal, and Site Clearance.

Platform decommissioning costs can vary widely due to factors such as location and type (complexity) of the facility, number of structures to be removed, water depth and weight associated with the structure, the number and depth of wells and conductors, removal method, and transportation and disposal options. Although water depth and weight (size) are key variables in determining the decommissioning costs for any particular activity, other factors may have significant impact on the decommissioning cost. For example, the costs of plugging and abandoning a well with deviation greater than 60 degrees will be much greater than the cost of plugging and abandoning a well with no deviation. Similarly, the cost of decommissioning a pipeline that must be removed will be much greater than the cost of decommissioning a pipeline that is approved to be abandoned in-place.

The costs of mobilizing and demobilizing a heavy lift vessel can also vary widely depending on the origin of the derrick barge and the number of platforms that are being decommissioned as a group. This cost of mobilizing and demobilizing a heavy lift vessel will be very high in POCSR due to fact that such vessels are currently stationed in the North Sea, Gulf of Mexico, or Asia. It is very unlikely that heavy lift vessels would be stationed in the POCSR unless there was a strong and prolonged market demand for such vessels. This situation is not considered likely to change in the foreseeable future.

Table 1 shows the estimated decommissioning cost for each platform in the POCSR. Appendix B shows the total cost for decommissioning for each platform by cost category.

Table 1 Platform Decommissioning Costs (2004 Dollars)

Platform	Decommissioning Cost
Platform A	$21,533,000
Platform B	$22,579,000
Platform C	$19,401,000
Edith	$22,265,000
Ellen	$33,176,000
Elly	$19,946,000
Eureka	$73,569,000
Gail	$70,191,000
Gilda	$33,906,000
Gina	$10,291,000
Grace	$27,405,000
Habitat	$23,550,000
Harmony	$129,842,000
Harvest	$71,274,000
Henry	$15,755,000
Heritage	$128,654,000
Hermosa	$64,827,000
Hidalgo	$52,859,000
Hillhouse	$20,743,000
Hogan	$21,849,000
Hondo	$77,051,000
Houchin	$21,318,000
Irene	$25,715,000
Total POCSR	$1,007,699,000

Figure 1 is a map showing the location of the POCSR platforms and pipelines. Maps showing platforms included in each decommissioning project are included in Appendix A.

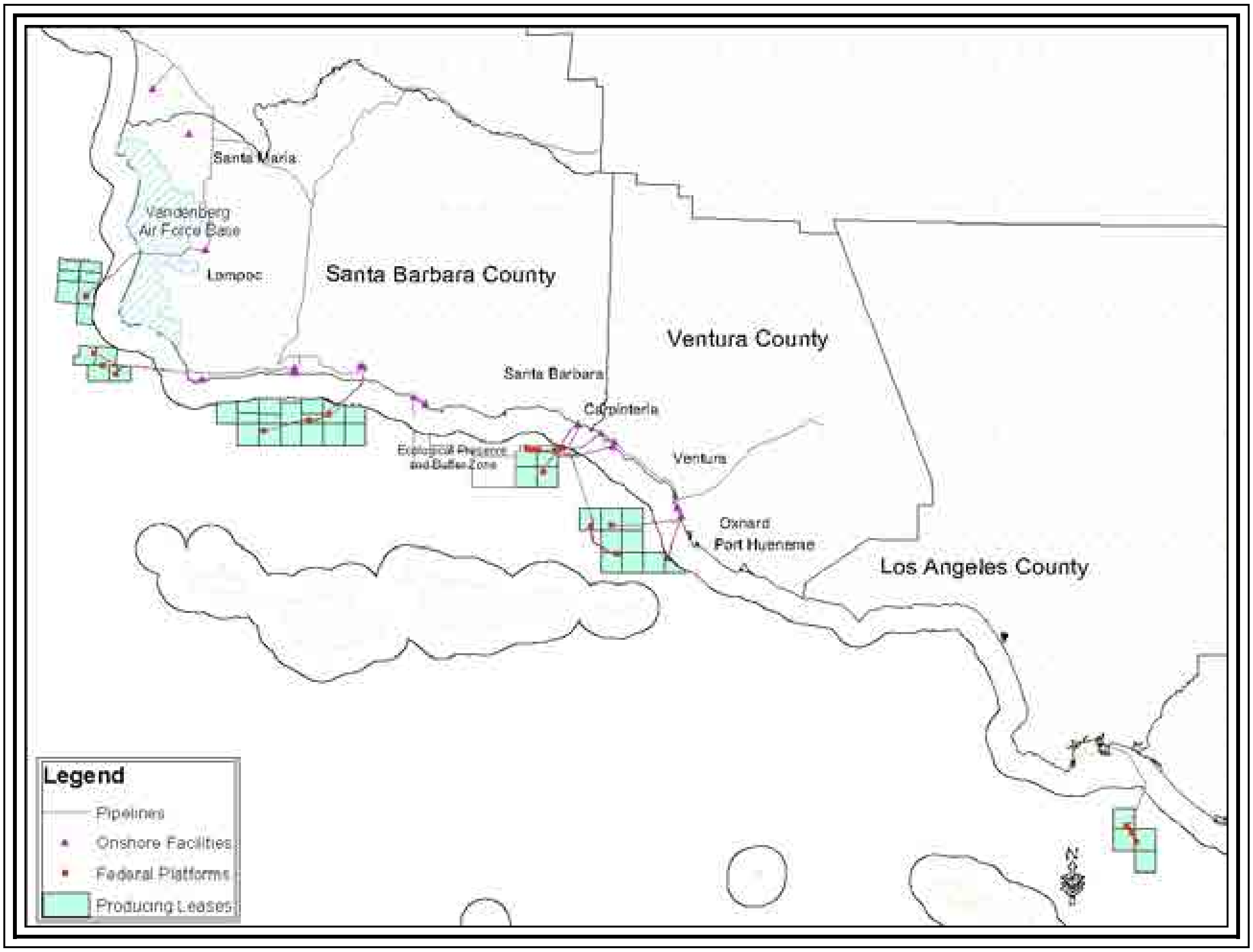

Figure 1 Federal Platforms and Pipelines in the Pacific OCS Region

Section 1: Introduction

The Pacific OCS Region (POCSR) Offshore Facility Decommissioning Cost Team (OFDC) was formed to develop cost estimates for decommissioning OCS oil and gas facilities in the POCSR. This cost study was prepared by the OFDC in accordance with Federal regulations (30 CFR 250 and 256) governing oil and gas operations decommissioning conducted on the OCS. The regulations specify requirements for plugging wells, decommissioning platforms and pipelines, and clearing a lease site. This report is one of the inputs used to determine if a lessee is required to post a Supplemental Bond to insure OCS lease decommissioning obligations are met. 30 CFR 256 and MMS Notice to Lessees No. 2003-N06 specify the requirements for Supplemental Bonds.

Development of the cost estimates required compilation of detailed and updated information on the offshore facilities in the POCSR, including: number of wells, number and weight of conductors, depth of productive interval, water depth, number of modules and weight of platform decks, depth and weight of platform jacket, location and size of pipelines, and location of powercables. The OFDC also conducted a literature review and collected cost data from industry sources. Much of the cost information presented in this report was obtained from technical decommissioning studies funded by the MMS, industry sources, and engineering and environmental consulting firms that have provided technical services to oil and gas companies in the POCSR and the Gulf of Mexico Region.

Decommissioning experience offshore California is very limited, as is information on costs. To date, only seven relatively small structures have been decommissioned; all were located in State waters. The most recent project occurred in 1996 when Chevron (now ChevronTexaco) removed Platforms Hope, Heidi, Hilda, and Hazel. These platforms were in water depths ranging from 100 to 140 feet and had an approximate total weight of 12,000 tons. In a news release dated April 17, 1996, Chevron reported that the cost of the final phase of dismantling and removing the four platforms was approximately $19 million. This cost did not include the costs to permanently plug 134 wells on the platforms. Local media coverage and industry journal articles reported that the total project cost ranged between $35 million and $40 million.

The private sector has compiled a significant amount of technical and cost data on platforms that have been decommissioned in the Gulf of Mexico. The majority of this data covers platforms that were located in water depths of less than 200 feet. From 200 to about 300 feet, there is less data available because fewer decommissioning projects have occurred in these water depths. Beyond a water depth of about 300 feet, the experience and data decline to the point where industry estimates and our cost estimates are based primarily on projections. It is clear, however, that decommissioning costs will rise steeply as decommissioning activities move from shallow water near shore to deeper water environments farther offshore.

Relative to the Gulf of Mexico, the POCSR has a high percentage of large deepwater structures. Of the 23 platforms, 14 (61%) are located in water depths exceeding 200 feet.

Moreover, 8 (35%) of OCS platforms are located in water depths that exceed 400 feet, which approximates the current worldwide water depth record for a platform removal project. The removal weight for individual platforms ranges from about 1,100 to nearly 70,000 tons. Table 1-1 provides information on water depth, weight, year installed, and field/unit for each of the 23 Pacific OCS platforms.

Each step in the decommissioning process is discussed individually in the sections that follow: Engineering and Planning, Permitting and Regulatory Compliance, Platform Preparation, Well Plugging and Abandonment, Conductor Removal, Mobilization and Demobilization, Platform and Structural Removal, Pipeline and Powercable Decommissioning, Platform Transportation and Disposal, and Site Clearance. Although water depth and weight (size) are key variables in determining the decommissioning costs for any particular activity, other factors may have significant impact on the decommissioning cost. These factors are addressed in the appropriate section.

The appendices include detailed specifications for the offshore facilities in the POCSR, estimated decommissioning cost by component for each platform, and detailed cost tables for selected decommissioning elements. Also included in the appendices are maps of the decommissioning projects used to determine the costs for this report.

The OFDC Team consisted of subject matter experts from several offices in the POCSR: Frederick L. White, Catherine Hoffman, John Smith, Michael Mitchell, Glenn Shackell, Eddie Lee Lim, and David Gebauer, with Rishi Tyagi as the team sponsor.

Table 1-1 Pacific OCS Region Platforms

Platform	Water Depth (in feet)	Estimated Removal* Weight (tons)	Year Installed**	Field/Unit
A	188	4,090	1968	Dos Cuadras
B	190	4,095	1968	Dos Cuadras
C	192	4,010	1977	Dos Cuadras
Edith	161	8,298	1983	Beta/Beta
Ellen	265	11,300	1980	Beta/Beta
Elly	255	9,400	1980	Beta/Beta
Eureka	700	34,000	1984	Beta/Beta
Gail	739	31,320	1987	Sockeye/Santa Clara
Gilda	205	9,342	1981	Santa Clara/Santa Clara
Gina	95	1,102	1980	Hueneme/Pt. Hueneme
Grace	318	9,390	1979	Santa Clara/Santa Clara
Habitat	290	8,853	1981	Pitas Point/Pitas Point
Harmony	1,198	69,920	1989	Hondo/Santa Ynez
Harvest	675	30,190	1985	Pt. Arguello/Pt. Arguello
Henry	173	3,118	1979	Carpinteria
Heritage	1,075	60,556	1989	Pescado/Santa Ynez
Hermosa	603	28,131	1985	Pt. Arguello/Pt. Arguello
Hidalgo	430	21,421	1986	Pt. Arguello/Pt. Arguello
Hillhouse	190	3,738	1969	Dos Cuadras
Hogan	154	4,110	1967	Carpinteria
Hondo	842	27,250	1976	Hondo/Santa Ynez
Houchin	163	4,637	1968	Carpinteria
Irene	242	7,652	1985	Pt. Pedernales/Pt. Pedernales Tranquillon Ridge/Tranquillon Ridge

* Estimated Removal Weight includes the weight of the jacket, deck, piles, and conductors and assumes that they are removed to a depth of 15 feet below the mudline.

** Year Installed Date is the jacket installation launch date.

Section 2: Decommissioning Cost Assumptions and Scenario

This section provides a description of the decommissioning cost assumptions and scenario used in this report to estimate decommissioning costs for POCSR platforms and associated pipelines and powercables. The decommissioning scenario assumes that the platforms will be completely removed and the materials transported to shore for recycling or disposal. The decommissioning costs were developed by the OFDC based on information obtained from MMS files, oil and gas operators, consultants, and technical decommissioning studies funded by MMS and others. The decommissioning scenario represents MMS's best professional judgment regarding the sequence and timing of future platform decommissioning activities in the POCSR. The timing and scope of future decommissioning operations could differ markedly from this scenario, due to economic, technological, and other factors.

Decommissioning Cost Assumptions

- Costs are estimated in 2004 dollars.
- Conventional state-of-the-art technology (reverse installation using heavy lift vessels) will be used to remove platforms.
- A total of 6 OCS decommissioning projects are projected to be conducted during 2010-2025; all of the POCSR oil and gas platforms (23 facilities) will be removed during this period.
- During each project a total of 2-6 platforms will be decommissioned using heavy lift vessels mobilized from the Gulf of Mexico, North Sea or Asia.
- Platforms will be completely removed and transported to shore for disposal.
- Pipelines will be decommissioned in-place, partially removed, or completely removed from the OCS as appropriate (costs are estimated on a case-by-case basis).
- Powercables will be decommissioned in-place, partially removed, or completely removed from the OCS (costs are estimated on a case-by-case basis).

Scope of Cost Analysis

This section provides a listing of the items that are included in the cost estimates presented in this report. Also listed are items for which costs were not estimated. The cost estimates presented in this report were developed to support Federal bonding decisions to cover decommissioning obligations on Federal OCS leases. The report therefore does not include cost estimates for decommissioning oil and gas facilities and equipment located onshore or in State waters. The report also does not include certain other costs which could be individually and cumulatively significant if they happen to be included in an actual decommissioning project. These other costs include environmental mitigation costs imposed by other agencies, shell mound remediation, and the cost of retaining of a decommissioning agent (e.g., a civil engineering firm) having the specialized expertise to plan and manage a decommissioning project.

The decommissioning costs for platform structure removal and pipeline and powercables include a weather contingency of 10% or 20% . The 20% contingency factor has been applied only to Platforms Harvest, Hermosa, Hidalgo, Heritage, and Irene due to the harsher oceanographic conditions that exist in the areas where these platforms are located. In addition to the weather contingency, we have applied a 20% general contingency factor to cover unanticipated problems and potential cost overruns. The weather and general contingency factors were not applied to the mobilization and demobilization portion of the decommissioning costs.

Costs Included

- Engineering and Planning
- Permitting and Regulatory Compliance (including selected environmental mitigation costs typically required)
- Platform Preparation
- Well Plugging and Abandonment
- Conductor Removal
- Mobilization and Demobilization (Mob/Demob) of Heavy Lift Vessels
- Platform Structure Removal
- Pipeline and Powercable Decommissioning
- Platform Transportation and Disposal
- Site Clearance and Verification
- General and Weather Contingency Factors

Costs Not Included

- Decommissioning of pipelines and powercables located on State Tidelands (submerged lands located 0-3 miles offshore) or onshore.
- Decommissioning of onshore pipelines and powercables.
- Decommissioning of marine terminals, piers, and other associated equipment located on State Tidelands.
- Decommissioning of associated onshore oil and gas processing facilities.
- The costs of capping or removing shell mounds at OCS platforms, since this will be reviewed on a case-by-case basis.
- The cost of retaining a Decommissioning Agent.
- Special environmental mitigation costs (e.g., air emissions/vessel engine retrofit expenses, water quality, and habitat restoration) that are difficult to estimate due to their variability and case-by-case applicability.
- Non-MMS agency permit processing fees and reimbursable expenses.

Decommissioning Scenario

This section describes the 6 decommissioning projects that are projected to be conducted during 2010-2025 (see Table 2-1.) As noted above, a total of 2-6 platforms are expected to be removed during each project. For each project, a heavy lift vessel (HLV) is assumed to be mobilized from the Gulf of Mexico, North Sea, or Asia. The HLV's projected to be used have lift capabilities of 500 tons, 2,000 tons, and 4,400 tons. The type of HLV selected for each project was determined based on the size (total weight) of each individual platform included in the project, the projected maximum lift packages, and oceanographic considerations. A number of factors were considered in developing the projects, including the size, age and geographic location of the platforms, remaining oil and gas reserves, water depth, and company operators/ownership. For each project, the HLV mob/demob costs are allocated evenly among platforms.

Project I – Eastern Santa Barbara Channel

- Platforms Hogan and Houchin are projected to be removed during 2010-2015.
- An HLV with a lift capability of 500 tons will be mobilized from Asia.
- The estimated mob/demob time is 100 days.

Project II – South Coast (Los Angeles/Orange County)

- Platforms Eureka, Elly, Ellen and Edith are projected to be removed during 2010-2015.
- An HLV with a lift capability of 2,000 tons will be mobilized from Asia.
- The estimated mob/demob time is 100 days.

Project III – Eastern Santa Barbara Channel

- Platforms A, B, C, Henry, Hillhouse and Gina are projected to be removed during 2010-2015.
- An HLV with a lift capability of 2,000 tons will be mobilized from Asia.
- The estimated mob/demob time is 100 days.

Project IV – Eastern Santa Barbara Channel

- Platforms Gilda, Irene and Habitat are projected to be removed during 2010-2015.
- An HLV with a lift capability of 2,000 tons will be mobilized from Asia.
- The estimated mob/demob time is 100 days.

Project V – Southern Santa Barbara Channel/Santa Maria Basin

- Platforms Gail, Grace, Hermosa, Harvest, and Hidalgo are projected to be removed during 2015-2020.
- An HLV (dynamically positioned mono-hull) with a lift capability of 4,400 tons will be mobilized from the Gulf of Mexico or North Sea.
- The estimated mob/demob time is 200 days.

Project VI – Western Santa Barbara Channel

- Platforms Hondo, Harmony, and Heritage are projected to be removed during 2020-2025.
- An HLV (dynamically positioned mono-hull) with a lift capability of 4,400 tons will be mobilized from the Gulf of Mexico or North Sea.
- The estimated mob/demob time is 200 days.

Table 2-1 Projected Decommissioning Projects

Platform	Year Installed	Water Depth (feet)	Deck Weight (tons)	Jacket Weight* (tons)	Projected Removal Timeframe	Projected HLV Lift Capability (tons)
Project I – Eastern Santa Barbara Channel						
Hogan	1967	154	2,259	1,263	2010-2015	500
Houchin	1968	163	2,591	1,486	2010-2015	500
Project II – South Coast (Los Angeles/Orange County)						
Eureka	1984	700	8,000	19,000	2010-2015	2,000
Elly	1980	255	4,700	3,300	2010-2015	2,000
Ellen	1980	265	5,300	3,200	2010-2015	2,000
Edith	1983	161	4,134	3,454	2010-2015	2,000
Project III – Eastern Santa Barbara Channel						
A	1968	188	1,357	1,500	2010-2015	2,000
B	1968	190	1,357	1,500	2010-2015	2,000
C	1977	192	1,357	1,500	2010-2015	2,000
Henry	1979	173	1,371	1,311	2010-2015	2,000
Hillhouse	1969	190	1,200	1,500	2010-2015	2,000
Gina	1980	95	447	434	2010-2015	2,000
Project IV – Santa Barbara Channel/Southern Santa Maria Basin						
Gilda	1981	205	3,792	3,220	2010-2015	2,000
Irene	1985	242	2,500	3,100	2010-2015	2,000
Habitat	1981	290	3,514	2,550	2010-2015	2,000
Project V – Santa Barbara Channel/Southern Santa Maria Basin						
Gail	1987	739	7,693	18,300	2015-2020	4,400
Grace	1979	318	3,800	3,090	2015-2020	4,400
Hermosa	1985	603	7,830	17,000	2015-2020	4,400
Harvest	1985	675	9,024	16,633	2015-2020	4,400
Hildalgo	1986	430	8,100	10,950	2015-2020	4,400
Project VI – Western Santa Barbara Channel						
Hondo	1976	842	8,450	12,200	2020-2025	4,400
Harmony	1989	1,198	9,826	42,900	2020-2025	4,400
Heritage	1989	1,075	9,839	32,420	2020-2025	4,400

* Jacket Weight is the weight of the jacket only and does not include the weight of the deck, conductors or piles.

Section 3: Decommissioning Methodology

This section describes the methodology on which the decommissioning costs in this report are based. The methodology is consistent with the cost assumptions previously described and with MMS decommissioning requirements (30 CFR Parts 250 and 256) and standard industry practice.

Well Plugging and Abandonment

- All unplugged and temporarily abandoned wells will be permanently plugged and abandoned (P & A) consistent with MMS requirements.
- An existing platform rig or an acquired rig will be used to P & A wells (rigless methods will not be used except on Platform Grace).
- This work will be completed prior to arrival of the heavy lift vessel (HLV).

Conductor Removal

- All conductors will be removed to 15 feet below the original mudline.
- Mechanical cutting methods will be used to sever the conductors below the mudline.
- Casing jacks will used to make the initial lift to confirm that conductors have been completely severed below the mudline.
- The platforms drilling rig and crane or a combination of the rig and jacks or portable leapfrog cranes will be used to pull conductors.
- Mechanical cutting methods will be used to cut the conductors into 40-foot-long segments.
- The platform crane will place the cut sections on a workboat for transport to an onshore disposal site.
- This work will be completed prior to arrival of the HLV.

Platform Preparation

- A platform inspection, above and below the water line, will be conducted to determine the condition of the platform and identify potential problems with salvage. The inspection will be conducted by divers or by a combination of divers and remotely operated vehicles.
- All piping and equipment on the platform that contained hydrocarbons will be flushed and cleaned.
- All modules to be removed separately from the deck will be detached from the platform structure using oxygen-acetylene cutting torches.
- The piping, electrical, and instrumentation connections between modules will also be cut.
- Modules and captrusses (support frames) will be prepared for removal; new padeyes and lift supports will be installed; welds around bearing joints will be removed; and external equipment obstructing module lifts will be removed.
- It is assumed that 50% of the number of padeyes necessary for making the deck structure lifts must be fabricated and installed.

- Diving crews will use 10,000 psi water blasters to remove marine growth from the jacket to a water depth of approximately 100 feet; the dive spread will be set up on the platform; this work will be completed prior to the arrival of the HLV.
- The remaining marine growth attached to the deeper jacket sections will be removed after the HLV places the sections on the cargo barges; topside crews will use high-pressure water blasters to remove the marine growth.

Pipeline Decommissioning

- All pipelines will be flushed and cleaned
- Divers or an ROV will then expose the ends of the pipeline and cut the line above the riser bend and approximately 10 feet from the base of the jacket.
- Pipelines will be evaluated by MMS on a case-by-case basis during the permitting process, to determine whether they will be approved to be left in place or required to be partially or totally removed.
- Pipelines approved to be left in place will be required to be capped and their ends buried 3 feet below the mudline or covered with protective mats (e.g., articulated concrete mats).
- Pipelines or pipeline segments that have the potential to present an obstruction to other users will be removed.
- Pipeline segments that are removed will be transported to shore, cut into smaller segments, and transported to a disposal site.
- A small crane barge will be mobilized from the southern California area to remove pipelines if necessary.

Powercable Decommissioning

- Powercables that an operator has committed to removing will be removed (e.g., ExxonMobil's Santa Ynez Unit powercables).
- Other powercables will be evaluated on a case-by-case basis by MMS to determine whether they may be left in place or will be required to be partially or totally removed.
- Powercables or segments of powercable determined to have the potential to present an obstruction to other users will be removed.
- Powercable segments that are removed will be transported to shore, cut into segments, and transported to a disposal site.
- Powercables approved to be left in place will be required to have their ends capped and buried 3 feet below the mudline, or covered with protective coverings (e.g., articulated concrete mats).
- A special cable lay/retrieval vessel will be mobilized from the east coast of the U.S., Europe, or Asia to remove large segments of cable if necessary.

Mobilization and Demobilization of Vessels

- HLV's and their anchor handling tugs will be mobilized from the Gulf of Mexico, North Sea or Asia.
- Cargo barges will be mobilized from California or the Pacific Northwest

- Cargo barges will be outfitted at a fabrication yard with steel pads (load spreaders) to support the point loads of the deck modules and jacket sections.
- Support vessels and dive boats will be mobilized from southern California.
- Local crew boats and workboats will be utilized to the maximum extent practicable.

Topsides Removal

- Topside modules will be removed (reverse installation) and placed on cargo barges.
- The deck section or support frames (captrusses) will be removed by cutting the welded connections between the piles and the deck legs with oxygen-acetylene torches.
- Slings will be attached to the deck/captrusses lifting eyes and to the HLV crane.
- The HLV crane will lift the deck sections from the jacket and position the sections in load spreaders.
- The deck sections will be secured by welding steel pipe from the deck legs to the deck of the cargo barge.

Topsides Transport and Onshore Disposal

- Tugboats and cargo barges will transport the topside modules and deck structures to a scrap yard located in the United States, Mexico, or Asia.
- Possible U.S. west coast destinations are Los Angeles, Long Beach, San Diego, San Francisco, California and Portland, Oregon.
- The modules will be lifted off the cargo barges by dockside cranes or skidded off the barge.
- All of the structural components will be cut into small pieces and transported to a scrap yard.
- Non-metallic materials (cement, plastics, wood, etc.) will be transported to shore for disposal in a landfill.

Jacket Removal

- Jackets will be sectioned in situ (in place) and removed.
- Piles and skirt piles will be severed 15 feet below the original mudline by explosives or abrasive cutting tools.
- Divers will be deployed to sever structural members and section the jackets.
- Saturation diving techniques will be required below 150 foot water depths.

Jacket Transport and Onshore Disposal

- Tugboats and cargo barges will transport the jacket sections to an onshore scrap yard located on the west coast of the U.S., in Mexico, or in Asia.
- Possible U.S. west coast destinations are Los Angeles, Long Beach, San Diego, San Francisco, California and Portland, Oregon.
- The jacket sections will be lifted off the barges by dockside cranes or skidded off the barge.
- The jacket sections will be cut into small pieces and transported to a scrap yard.

Site Clearance

- The seafloor impacted as a result of oil and gas exploration, development, production, and decommissioning operations will be restored to a condition that ensures the area has been cleared of all obstructions to other activities.
- Site clearance procedures will include the following elements:
    1. Pre-decommissioning high resolution side-scan survey (SSS)
    2. Post-decommissioning high resolution SSS
    3. ROV/diver target identification and recovery of obstructions
    4. Test-trawling
- The pre-decommissioning SSS will cover all areas of the lease where operations occurred, including pipeline and powercable routes, and anchoring and mooring locations to identify any potential oil and gas related obstructions.
- The post-decommissioning SSS will cover all areas where decommissioning activities occurred to identify debris and obstructions resulting from decommissioning operations.
- A dive boat/ROV spread will be deployed to inspect and retrieve debris or obstructions identified during the SSS surveys.
- Test trawling will be conducted to verify that all potential obstructions have been cleared from the OCS lease(s).

Section 4: Engineering and Planning

The engineering and planning phase of the decommissioning process typically begins two to three years before production ceases and involves (1) a review of contractual obligations, (2) engineering analysis, (3) operational planning, and (4) contracting. The first step involves conducting a detailed review of all records and decommissioning requirements including lease, operating, production/unit, pipeline, and production sales agreements. A detailed engineering analysis is also conducted of drilling records, as-built drawings, construction reports, maintenance records and inspection reports. Field inspections are done to verify the structural integrity of the platform and examine the present condition of the wellheads and equipment. Based on this information, detailed engineering plans are developed for plugging and abandoning the wells, severing the conductors and piles, removing the topsides and jacket, and disposing of the materials. Concurrently, a comprehensive survey of decommissioning vessels and equipment is made to determine their availability and cost. Bids are then solicited and contractors selected.

Due to the limited availability of heavy lift vessels, contracting for such vessels is typically done two to three years in advance. Although some engineering functions can be conducted in-house if expertise exists, many steps in the decommissioning process require specialized expertise and the company must contract for this expertise. These steps include mechanical, abrasive, or explosive cutting services, civil engineering services to design and prefabricate the modules for individual lifts, and diving services. In addition, the services of firms having project management and engineering expertise specific to decommissioning are often secured to manage the complex logistics of the overall project.

Cost Assumptions

The costs of engineering and planning for decommissioning an offshore structure can vary widely, depending on the type of structure, its size and water depth, removal procedures, and transportation and disposal options. The costs can also vary widely depending on the degree to which costs can be internalized due to the availability of in-house engineering expertise. For this study, engineering and planning costs are estimated to be 8%, 10%, or 12% of the total structure removal cost which is calculated at $1,200 per ton (total platform removal weight). The percentage varies with platform water depth/size and is applied in the following manner: 0-200 foot water depths 12%, 201-450 foot water depths 10%, and >450 feet of water 8%. The $1,200 per ton cost figure was based on data obtained from a civil engineering company that compiles annual cost data on oil and gas platform decommissioning projects in the Gulf of Mexico. The cost figure represents the average cost of platform structure removal in 2002, the most recent year for which data was available.

Cost Estimates

The range of costs for the engineering and planning cost component is shown in Table 4-1. The costs range from a low of $159,000 to a high of $6.7 million. The tonnage figure is based on MMS's projection of the total weight to be removed during the dismantlement and removal phase of the project. The $1,200 per ton figure does not include well plugging and abandonment and conductor removal.

Table 4-1 Engineering and Planning Costs

Platform	Water Depth (feet)	Factor	Total Weight (tons)*	Total Costs
A	188	0.12	4,090	$589,000
B	190	0.12	4,095	$590,000
C	192	0.12	4,010	$578,000
Edith	161	0.12	8,298	$1,195,000
Ellen	265	0.10	11,300	$1,356,000
Elly	255	0.10	9,400	$1,128,000
Eureka	700	0.08	34,000	$3,264,000
Gail	739	0.08	31,320	$3,007,000
Gilda	205	0.10	9,342	$1,122,000
Gina	95	0.12	1,102	$159,000
Grace	318	0.10	9,390	$1,127,000
Habitat	290	0.10	8,853	$1,063,000
Harmony	1,198	0.08	69,920	$6,713,000
Harvest	675	0.08	30,190	$2,899,000
Henry	173	0.12	3,118	$449,000
Heritage	1,075	0.08	60,556	$5,814,000
Hermosa	603	0.08	28,131	$2,701,000
Hidalgo	430	0.10	21,421	$2,571,000
Hillhouse	190	0.12	3,738	$539,000
Hogan	154	0.12	4,110	$592,000
Hondo	842	0.08	27,250	$2,616,000
Houchin	163	0.12	4,637	$668,000
Irene	242	0.10	7,652	$919,000
Total	-	-	-	$41,659,000

* Total Weight is the estimated platform removal weight and includes the weights of the jacket, deck, piles, and conductors being removed to 15 feet below the mudline.

Section 5: Permitting and Regulatory Compliance

Permitting and regulatory compliance costs are incurred in obtaining the necessary Federal, State, and local permits required to conduct decommissioning operations and prepare the environmental documentation to satisfy the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The costs to satisfy special environmental mitigation requirements that typically are placed on the project by regulatory agencies are also included in this cost component. Examples include marine mammal protection measures, air emission mitigation measures, commercial fishermen preclusion agreements, and pre- and post-decommissioning biological surveys. For decommissioning projects offshore California, these costs can be significant.

Federal agencies that have regulatory authority over various aspects of decommissioning projects include the MMS, National Marine Fisheries Service, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Coast Guard, and the U.S. Department of Transportation, Office of Pipeline Safety. State and local agencies having regulatory jurisdiction over decommissioning operations in California include the California Coastal Commission, California State Lands Commission, California Department of Fish and Game, California Division of Oil, Gas and Geothermal Resources, California State Fire Marshal, County Planning and Resource Management Departments, and local Air Pollution Control Districts. Due to the numerous permits required and the complexity of the process, companies that have decommissioned structures offshore California have typically contracted with local consulting firms to obtain technical, environmental and administrative support services.

Information on permitting and regulatory compliance costs for decommissioning projects is limited. To develop information on these costs, we surveyed public literature and contacted several local consulting firms that have provided technical, environmental, and administrative services for decommissioning projects in southern California. Based on this survey, we determined that the majority of the costs were for air emission mitigation measures, marine mammal mitigation measures, agency administrative fees, environmental consultants, and commercial fishermen preclusion agreements. Much of the information that is available pertains to the removal of Platforms Hope, Heidi, Hilda, and Hazel, commonly referred to as the Chevron 4-H Project, which was completed in 1996. Table 5-1 provides a perspective on some of the major permitting and regulatory compliance costs associated with this project:

Table 5-1 Chevron 4-H Permitting and Regulatory Compliance Costs

Permitting and Regulatory Cost Elements	Cost
Santa Barbara County Air Emission Offset Fees	$450,000
California State Lands Commission Administrative Fees	$450,000
Marine Mammal and Wildlife Protection Plan	$200,000
Environmental Consultants	$200,000
Commercial Fishermen Preclusion Agreements	not available

The costs of air emission offsets were obtained from the Chevron news release dated April 17, 1996. The California State Lands Commission (SLC), Marine Mammal and Wildlife Protection Plan, and environmental consultant cost estimates were provided by SLC, Chevron, and environmental consulting firms. The $450,000 paid by Chevron to SLC was required to cover the SLC's engineering and CEQA environmental document preparation fees and mitigation monitoring expenses. Chevron also developed and implemented a comprehensive marine mammal and wildlife protection plan for the project. Chevron estimated that it cost approximately $200,000 to develop and implement the plan, which equates to $50,000 per platform.

Companies conducting oil and gas projects offshore California typically provide compensation to commercial fishermen who are precluded from fishing in areas they commonly fish due to the presence of barges, workboats, and other construction related vessels. The cost of preclusion agreements is contingent upon the scope, location, and duration of the project. The costs are considered proprietary by the companies and fishermen.

Cost Assumptions

For this study, we have included costs for NEPA and CEQA environmental documentation, marine mammal observers, environmental consultants, pre- and post construction biological surveys, and compensating fishermen for being precluded from fishing in the area where decommissioning operations are conducted. The MMS estimates that it would cost $1.2 million dollars to prepare a NEPA Environmental Impact Statement for a decommissioning project that would involve removing two or more platforms. For the purposes of this study, we have assumed the costs of NEPA/CEQA environmental documentation will total $300,000 per platform. For marine mammal monitoring, we estimate that the costs will be $50,000 per platform. As noted earlier, explosives are likely to be used to sever the pilings of the structure. We have also assumed that this cost would be incurred even if explosives were not used, since marine mammal mitigation measures have been required for many recent offshore projects that did not involve the use of explosives. We have estimated the cost of environmental consultants to be $100,000 per platform, the cost of biological surveys to be $50,000 per platform and the cost of compensating fishermen to be $50,000 per platform. It should be noted that this report does not attempt to estimate costs for other potential environmental mitigation measures such as air emission/vessel engine retrofit expenses, and habitat restoration. Air emission offset fees were not considered applicable due to the fact that a state law was enacted subsequent to the Chevron 4-H Project that prohibits local Air Pollution Control Districts from imposing such fees.

Cost Estimates

Based on the above information, permitting and regulatory compliance costs are estimated to total $550,000 per platform. The costs are itemized in Table 5-2.

Table 5-2 Permitting and Regulatory Compliance Costs

Permitting and Regulatory Cost Elements	Cost
NEPA/CEQA costs	$300,000
Marine Mammal Monitoring	$50,000
Environmental Consultants	$100,000
Special Biological Surveys	$50,000
Commercial Fishing Preclusion Agreements	$50,000
Total Per Platform	$550,000

Section 6: Platform Preparation and Marine Growth Removal

Platform preparation includes the procedures associated with shutting down and preparing the facility for removal. Normally a crew paid on a day rate prepares the structure for decommissioning after the wells have been permanently plugged and abandoned. Above water and below water inspections are generally conducted to determine the condition of the structure and to identify any problems to removal. Divers and/or remotely operated vehicles (ROV's) assist in the inspections. On the surface, the work includes the flushing/cleaning and degassing/purging of tanks, processing equipment and piping, disposal of residual hydrocarbons, removal of platform equipment, cutting of piping and cables between deck modules, separation of modules into individual units, installation of padeyes for deck module lifting, removal of obstructions to lifting, and structural reinforcement. Below the water surface, the jacket can be prepared to aid in jacket facilities removal, including the removal of marine growth from the structure.

The key factors affecting the cost of platform preparation include structure size and complexity, topsides equipment (especially amount of processing equipment), and age of the facility. The costs can vary widely depending on the type of facility, removal procedures, and transportation and disposal options. The costs can also vary depending upon the degree to which costs can be internalized due to the availability of in-house manpower and expertise.

For this study, we assumed that marine growth will be removed from the structure, including the conductors and boat landings, by divers down to approximately 100 feet below the ocean surface. This will remove most of the heavy, hard marine growth. The balance of the marine growth will be removed using topside crews and high-pressure water blasters and/or fixed firewater monitors (nozzles) once the jacket or jacket section is on the deck of the barge. The in-water cleaning operations will be completed with the dive equipment set up on the platform to eliminate the need and added cost that would be incurred if the operations were conducted from a dedicated dive vessel.

Range of Costs and Assumptions

MMS has reviewed past Technology Assessment and Research Program studies, other studies conducted by various companies and contractors, and technical publications to assist us in estimating platform preparation costs. We also consulted with engineering firms that conduct such cost studies and a company that conducts marine growth cleaning operations. Table 6-1 shows our estimate of the number of days and platform preparation spread rate, marine growth removal cost, and total cost that would be required to prepare each of the 23 POCSR platforms for decommissioning as described above, including removing the marine growth from each structure. We assumed that a platform removal preparation spread would consist of a utility boat, helicopter use (1 trip/3 days), a preparation crew and materials and supplies. A higher spread rate and cost, due to a larger platform preparation crew and more equipment, was assumed for the larger, more complex topside structures based upon previous cost studies.

Table 6-1 Platform Preparation and Marine Growth Removal Costs

Platform	Platform Prep. Days	Prep. Spread Rate	Marine Growth Removal	Total Cost*
A	19	$19,000	$400,000	$761,000
B	19	$19,000	$400,000	$761,000
C	19	$19,000	$400,000	$761,000
Edith	18	$19,000	$600,000	$942,000
Ellen	20	$19,000	$600,000	$980,000
Elly	46	$19,000	$600,000	$1,474,000
Eureka	31	$45,000	$850,000	$2,245,000
Gail	43	$45,000	$850,000	$2,785,000
Gilda	44	$19,000	$600,000	$1,436,000
Gina	22	$19,000	$150,000	$568,000
Grace	35	$19,000	$600,000	$1,265,000
Habitat	39	$19,000	$600,000	$1,341,000
Harmony	59	$45,000	$1,500,000	$4,155,000
Harvest	55	$45,000	$850,000	$3,325,000
Henry	31	$19,000	$400,000	$989,000
Heritage	55	$45,000	$1,200,000	$3,675,000
Hermosa	55	$45,000	$850,000	$3,325,000
Hidalgo	47	$45,000	$700,000	$2,815,000
Hillhouse	32	$19,000	$400,000	$1,008,000
Hogan	19	$19,000	$400,000	$761,000
Hondo	50	$45,000	$850,000	$3,100,000
Houchin	19	$19,000	$400,000	$761,000
Irene	35	$19,000	$600,000	$1,265,000
Total	-	-	$14,800,000	$40,498,000

*Total Cost is the Platform Prep. Cost (Platform Prep. Days times Prep. Spread Rate) plus Marine Growth Removal Cost.

Section 7: Well Plugging and Abandonment

Requirements

One of the major cost components of a decommissioning project is the plugging and abandonment of platform wells. Regulations covering this area are contained in Subpart Q of 30 CFR 250 and are summarized below:

- All wells shall be abandoned in a manner to assure downhole isolation of hydrocarbon zones, protection of freshwater aquifers, clearance of sites so as to avoid conflict with other uses of the Outer Continental Shelf (OCS), and prevention of migration of formation fluids within the wellbore or to the seafloor.

Procedures

Planning and operations are two distinct phases in the well plugging process. The planning and actual abandonment process entails: data collection (including review of existing well design encompassing degree of deviation, maximum angles, and dog leg severities, past performance, and present geological and reservoir conditions), preliminary inspection (including inspection of wellhead and tree to verify that valves and gauges are operational, with repairs made as necessary), selection of abandonment methods(s) (including consideration of using either rig methods, rigless methods, or coiled tubing methods, or a combination of these three methods), and submittal of an application for MMS approval.

The actual well abandonment operation involves: well entry preparations (including skidding the rig to the appropriate well slot, installation of back pressure valve, and the nippling-up and testing of blowout prevention equipment), use of slickline unit (including confirmation of the presence or absence of wellbore obstructions, verification of measured depths, and the pulling of downhole safety valves), filling the well with fluid (including establishing an injection rate into open perforations, and pressuring-up the tubing and annulus to verify integrity), removal of downhole equipment (including the pulling of packers, pumps, and tubing strings), cleaning out the wellbore (utilizing casing scrapers and a variety of special purpose fluids), plugging open-hole and perforated intervals(s) at the bottom of the well (including squeeze cementing, setting cast-iron bridge plugs, or the placement of cement plugs), plugging casing stubs (where casing has been cut and recovered), plugging of annular space (using squeeze cementing techniques), placement of a surface plug, and placement of fluid between plugs. Figure 7-1 provides a schematic view of the typical wellbore configuration.

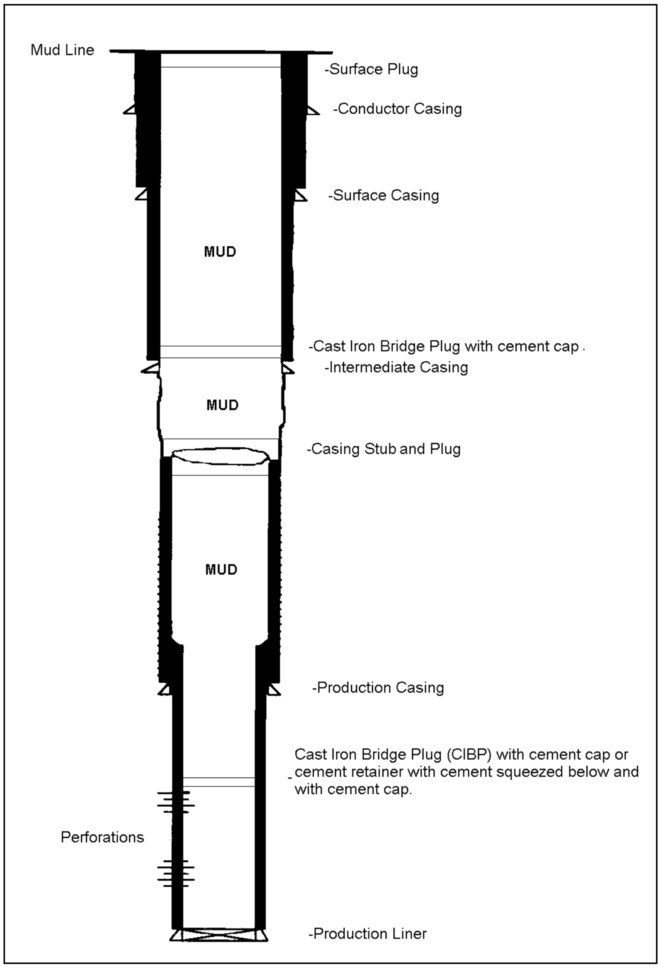

Figure 7-1 Schematic View of the Typical Wellbore Configuration

Cost Factors

The primary factor in determining costs to plug wells is the time required to complete the operation, which depends on the difficulty of each well. Table 7-1 shows the average daily cost for well plugging and abandonment.

Table 7-1 Average Daily Well Plugging and Abandonment Costs

Cost Item	Cost/Day
Workover rig and crew and supervision	$18,000
Mud/Mud Engineering	$2,000
Boat and helicopter support	$4,500
Cementing crew and cement	$3,000
Wireline unit and crew; perforations; rentals, tanks and other consumables	$7,500
Total	$35,000

The difficulty of each plugging and abandonment procedure is tied to the complexity of the well. For this study, four cost categories are used in estimating well plugging and abandonment costs.

- A low cost well will be a straightforward well without deviation problems or sustained annular pressures, and without pumps. A well of this type could be plugged in two to three days.
- A medium low cost well would be more complex with mid-range horizontal displacements with deviations less than 50° at the surface casing shoe. A medium low cost well could have minor complications such as stuck pipe or short-term milling or fishing operations. A medium low cost well can be plugged in three to four days.
- A medium high cost well could have high deviations between 50° and 60° at the surface casing shoe or extended reach wells. They may contain electric submersible pumps or sucker rod pumps. A medium high cost well would have greater operational difficulties and time delays due to hydrogen sulfide concerns, longer fishing or milling operations. A medium high cost well would take four to five days to plug.
- A high cost well could have high deviations with greater than 60° maximum angles, severe dog legs or extended reach. A high cost well can have operational difficulties including sustained annular pressures, parted casing, long term fishing or milling work, repeated trips in and out of the hole, etc. A high cost well would take six to ten days or longer to plug.

In all four cases it is assumed that a rig method would be used (most POCSR platforms have rigs on them that are capable of performing plugging and abandonment operations). Regardless of the technique used, plugs must be tagged to ensure proper placement and/or pressure-tested to verify integrity. Table 7-2 shows the average cost of plugging and abandoning a well for each cost category. Table 7-3 provides data regarding the number of wells, average well depth, number of conductors, and water depth for each platform in the POCSR. Total well plugging and abandonment costs by platform are shown in Table 7-4. There are 687 wellbores that require plugging and abandonment in the POCSR. The cost to plug and abandon these wells is estimated to total $89 million. Appendix C provides a detailed breakdown of well costs for each platform.

Table 7-2 Average Well Plugging and Abandonment Costs by Cost Category

Cost Category (Level of Complexity)	Cost/Well
Low cost well (2-3 days to plug and abandon)	$87,500
Med low cost well (3-4 days to plug and abandon)	$122,500
Med high cost well (4 – 6 days to plug and abandon)	$175,000
High cost well (6 – 10 days to plug and abandon)	$280,000

Table 7-3 Well and Conductor Details

Platform	Number of Wells to Plug	Average Well Depth (in Feet)	Number of Conductors to Remove	Water Depth (in Feet)	Conductor Length (in Feet)
A	52	2,500	55	188	268
B	57	2,500	55	190	270
C	38	2,500	43	192	272
Edith	18	4,500	23	161	241
Ellen	61	6,700	64	265	345
Elly	0	0	0	0	0
Eureka	50	6,500	60	700	780
Gail	21	8,400	22	739	819
Gilda	63	7,900	64	205	285
Gina	12	6,000	12	95	175
Grace	26	N/A	35	318	398
Habitat	20	12,000	20	290	370
Harmony	26	11,900	51	1,198	1,278
Harvest	19	10,000	21	675	755
Henry	23	2,500	24	173	253
Heritage	27	10,300	49	1,075	1,155
Hermosa	13	9,500	16	603	683
Hidalgo	10	10,700	10	430	510
Hillhouse	47	2,500	52	192	272
Hogan	40	5,400	40	154	234
Hondo	29	12,700	28	842	922
Houchin	36	5,100	36	163	243
Irene	24	9,800	24	242	322

Well depth is a less significant cost factor than plugging difficulty. Deeper wells involve longer tripping times and may include additional cement volumes. Measured depths of productive intervals for wells in the POCSR range from less than 1,000 feet to more than 17,000 feet.

Service and supply companies are highly competitive and offer substantial discounts (up to 35%) for multiple well packages. Costs associated with plugging of wells in all four well categories are based on multiple-well price packages, and represent the lowest daily unit costs for some goods and services.

There are 687 wellbores requiring plugging in the POCSR for a total abandonment cost of over $89 million. The average costs of plugging each well is $129,000. Table 7-3 shows the average cost for the different levels of complexity. Appendix C shows the detailed breakdown of well costs for each platform. Total well plugging and abandonment costs by platform are shown on Table 7-4.

Table 7-4 Well Costs

Platform	Total Well Cost
A	$5,005,000
B	$5,478,000
C	$3,710,000
Edith	$1,995,000
Ellen	$7,158,000
Eureka	$6,335,000
Elly	$0
Gail	$2,748,000
Gilda	$8,068,000
Gina	$1,435,000
Grace	$1,033,000
Habitat	$2,678,000
Harmony	$5,390,000
Harvest	$3,850,000
Henry	$2,328,000
Heritage	$5,565,000
Hermosa	$2,590,000
Hidalgo	$1,960,000
Hillhouse	$4,568,000
Hogan	$3,885,000
Hondo	$5,443,000
Houchin	$3,535,000
Irene	$4,305,000
Total	$89,062,000

Section 8: Conductor Removal

Requirements

Regulations for well plugging and abandonment are found in Subpart Q of 30 CFR 250, in subsections 250.1703 and 1728, and are summarized below.

- All platform components including conductor casings shall be removed by the lessee to a depth of at least 15 feet below the ocean floor or to a depth approved by the Regional Supervisor based upon the type of structure or ocean-bottom conditions.

Procedures

Conductor casing removal combines three distinct procedures: severing, pulling, and offloading. Severing of the conductor casings requires the use of explosive, mechanical, or abrasive cutting methods. Casing jacks are utilized to make the initial lift to confirm that conductors have been completely severed prior to pulling. Pulling the conductor casings entails utilization of the platform rig to pull the conductors which are unscrewed or cut into 40 feet-long segments. Offloading involves utilization of the platform crane to lay down each conductor casing segment in a platform staging area and then offloading to a boat.

Cost Factors

The primary factor in determining conductor casing removal costs is water depth. Water depths in the POCSR range from 95 feet to 1,198 feet. The number of conductors to be removed from each platform in the POCSR ranges from 10 to 64. Table 7-2 provides data regarding the number of wells, average well depth, number of conductors, and water depth for each platform in the POCSR.

Mechanical cutting methods are the most expensive of the three severing alternatives considered. This cost was used in our calculations because mechanical cutting is the most commonly used method. The cost to plug the wells and to remove the conductors is essentially the same regardless of whether all wells are plugged before any of the conductors are removed, or if individual conductors are removed immediately after each well is plugged. Because most POCSR platforms have derricks and cranes capable of performing conductor casing removal operations, we assumed that a derrick barge will not be used.

Conductor casings are assumed to be coated with marine growth which will be removed as they are pulled. Conductors extend approximately 65 feet above the water line to the wellhead on the platform. The average size and weight of conductors are assumed to be 24 inches outside diameter and 100 pounds per foot, respectively. Transportation and disposal costs are not included in these estimates but are included in the Transportation and Disposal Section. There have been well-documented studies that place the cost of conductor removal at $200 per linear foot. This study has verified that this cost continues to be accurate. Using $200/foot, conductor removal costs range from $35,000 to $255,600 per conductor. Table 8-1 shows total conductor removal costs by platform.

Table 8-1 Total Conductor Removal Costs

Platform	Conductor Removal Cost
A	$2,948,000
B	$2,970,000
C	$2,340,000
Edith	$1,109,000
Ellen	$4,416,000
Elly	$0
Eureka	$9,360,000
Gail	$3,604,000
Gilda	$3,648,000
Gina	$420,000
Grace	$2,786,000
Habitat	$1,480,000
Harmony	$13,036,000
Harvest	$3,171,000
Henry	$1,215,000
Heritage	$11,319,000
Hermosa	$2,186,000
Hidalgo	$1,020,000
Hillhouse	$2,829,000
Hogan	$1,872,000
Hondo	$5,164,000
Houchin	$1,750,000
Irene	$1,546,000
Total	$80,189,000

Section 9: Mobilization and Demobilization

Mobilization and demobilization (mob/demob) costs cover the transit time required to bring a heavy lift vessel (HLV) to the project site and return the HLV to its point of origin. In the POCSR, the infrastructure required to support decommissioning operations is severely lacking. There are currently no HLV's on the west coast capable of removing large deepwater platforms. The HLV's would be mobilized to southern California from the North Sea, Gulf of Mexico, Southeast Asia or other distant locations. It is very unlikely that HLV's would be stationed in the POCSR unless there was a strong and prolonged market demand for such vessels. This situation is not likely to change in the foreseeable future.

Cost Assumptions

This report assumes HLV's having 500, 2,000 and 4,400 ton lift capabilities will be mobilized from Southeast Asia, the North Sea, or the Gulf of Mexico (see Section 2). The mob/demob time for HLV's having lift capabilities of 500 and 2,000 tons is estimated to be 100 days. These HLV's would likely be mobilized from Southeast Asia. The mob/demob time for HLV's having 4,400 ton lift capabilities is estimated to be 200 days. These HLV's would likely be mobilized from the North Sea or Gulf of Mexico.

The current day rates for the HLV's that are projected to be used to remove POCSR platforms are: 500 ton lift capability - $80,000; 2,000 ton lift capability - $185,000; 4,400 ton lift capability - $225,000. This cost also covers the HLV's accompanying anchor handling tug. For cost estimating purposes, we have assumed that a rate of 90% of the day rate (rate charged during onsite operations) would be charged for mob/demob time.

Range of Costs

The mob/demob costs for the HLV's projected to be used to remove POCSR platforms are shown in Table 9-1. The costs range by project from $2.8 million to $13.5 million per platform. The calculation was made by taking 90% of the day rate of the HLV, multiplying that figure by the mob/demob time (100 or 200 days), and dividing by the number of platforms that would be removed during the project.

Table 9-1 Average Mob/Demob Cost by Project

Project	HLV Lift Capability	Mob/Demob Cost Calculation	Average Cost Per Platform
Project I	500 ton	$80,000 x 0.90 x 100 days ÷ 2 platforms	$3,600,000
Project II	2,000 ton	$185,000 x 0.90 x 100 days ÷ 4 platforms	$4,163,000
Project III	2,000 ton	$185,000 x 0.90 x 100 days ÷ 6 platforms	$2,775,000
Project IV	2,000 ton	$185,000 x 0.90 x 100 days ÷ 3 platforms	$5,550,000
Project V	4,400 ton	$225,000 x 0.90 x 200 days ÷ 5 platforms	$8,100,000
Project VI	4,400 ton	$225,000 x 0.90 x 200 days ÷ 3 platforms	$13,500,000

Section 10: Platform and Structural Removal

MMS regulations on the decommissioning of OCS platforms are covered in 30 CFR 250.1700 through 1754.

The depth of removal requirements for platforms and other facilities are at 30 CFR 250.1728 and are as follows:

(a) Unless the Regional Supervisor approves an alternate depth under (b) of this section, you must remove all platforms and other facilities (including templates and pilings) to at least 15 feet below the mudline.

(b) The Regional Supervisor may approve an alternative removal depth if:

  (1) The remaining structure would not become an obstruction to other users of the seafloor or area, and geotechnical and other information you provide demonstrate that erosional processes capable of exposing the obstructions are not expected; or

  (2) You determine, and MMS concurs, that you must use divers and the seafloor sediment stability poses safety concerns; or

  (3) The water depth is greater than 800 meters (2,624 feet).

In this report, we assume that platforms and other structures will be removed to a depth of 15 feet below the ocean floor (or mudline) and that sections will be removed in the reverse order in which they were installed. Figures 10-1 and 10-2 provide schematics representative of typical platform deck and jacket configurations.

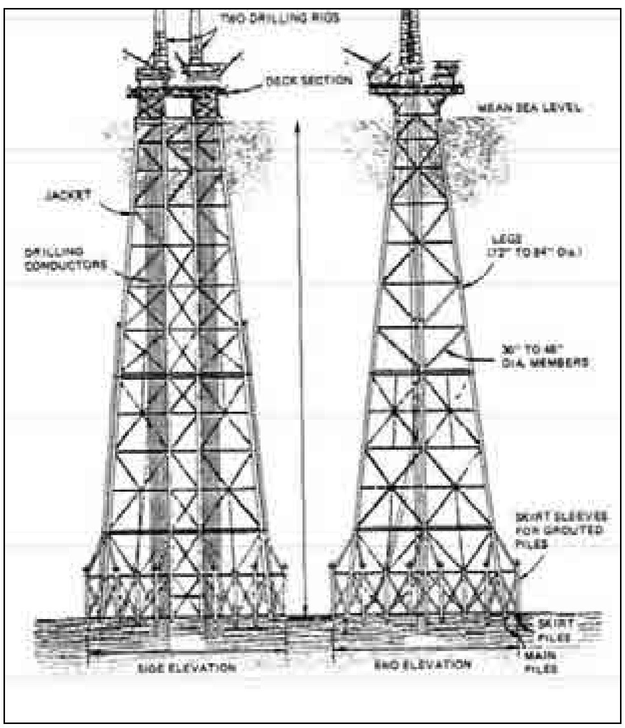

Figure 10-1 Deepwater Platform

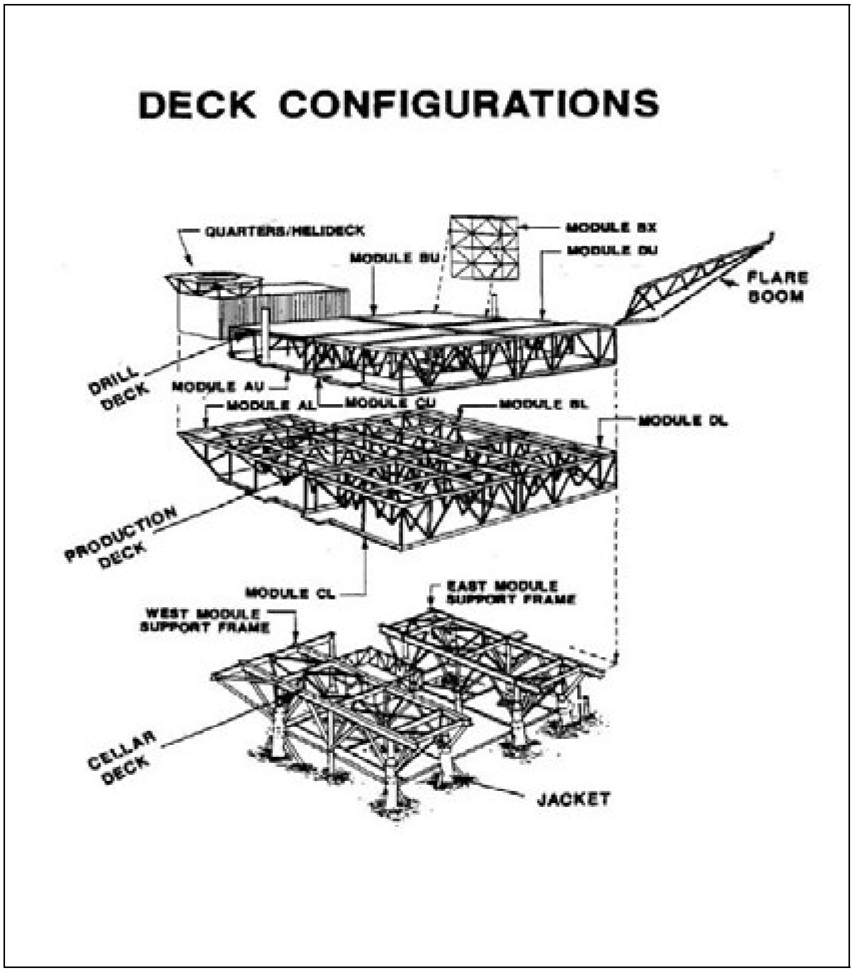

Figure 10-2 Deck Configurations

Deck/Topside Removal

The removal of topside facilities is one of the first steps in any decommissioning activity for an offshore platform. Topsides can vary significantly in size, functionality and complexity, so we have identified a range of decommissioning options. The diversity and range of complexity suggest that no one option is likely to be the most appropriate in all cases. In the POCSR, we have identified platforms that have topside facilities that range in weight from approximately 447 to almost 10,000 tons. Generally between 6 and 17 lifts were required to install these topsides. The largest lift for the modules or the modular support structures was approximately 2,000 tons.

Topsides may be integrated, modular, or hybrid in design. Integrated topside refers to a system where the process facilities are installed in the deck structure in the fabrication yard. Integrated facilities are usually installed by a single offshore lift. A modular design is used for larger topsides where the deck structure is subdivided into modules that can be lifted by the derrick barge. The modules are typically supported on the jacket by a modular support frame. Many of the very large topsides use a combined approach.

Topsides can be removed by any of the following methods:

- Removal in one piece
- Remove groups of modules together
- Removal in reverse order to installation
- Removal by small pieces

Removal of the entire topsides in one piece requires a heavy lift crane vessel (HLV) with sufficient lifting capacity, or a large specialized decommissioning vessel, or an alternative heavy lift technology such as the Versatruss lifting system, GM Heavy Lift Vessel, or other innovative lifting systems that are still in the developmental stage. One piece removal is more practical for small platforms. Major problems in removing large topsides this way are both how and where to offload the topsides onshore where crane lift capability is limited and how to dismantle these large structures once onshore.

The removal of combined modules is another method to remove the topsides. The advantage of this method is in reducing the time the heavy-lift vessels are required since fewer lifts are needed. Additional strengthening to allow for combined lifting will probably be needed. The position of the modules on the platform and their weight will dictate whether or not combined removal is possible and which modules may be lifted at one time.

Reverse installation is another method of topside removal. This involves dismantling the topsides in the reverse order in which they were installed. If the topsides were installed as modules, they would be removed as modules. If they were not installed as modules, topside structural components would be removed in the reverse order that they were installed. Discussions with civil engineering firms that work on many decommissioning projects indicate that reverse installation is the most likely method of platform removal on the west coast for the foreseeable future. For purposes of this study, we assume that topsides will be decommissioned using this method for this report.

Removal of the topsides by reducing them to small pieces is another method of removal. In this method the topsides are dismantled using mechanical and other cutting devices along with platform cranes, temporary deck mounted cranes or other cranes and a small HLV. The advantage of this method is that a smaller HLV would be required, and thus costs are substantially reduced.

Platform/Structural Removal
This aspect of platform decommissioning is the costliest operation in the field abandonment process, due to the large and expensive equipment that is required for the lifting and removal operations. Some of the major considerations that have to be made when evaluating the cost of removal are the weight and size of the structure, the oceanographic conditions of the area where the platforms are located, the heavy lifting method used, the method of cutting the main piles and skirt piles, piling access for the cutting operations, diving requirements, water depth, tie-down and transportation considerations of each removed component, and the planned disposition of the salvaged equipment and structure. Extensive saturation diving can add greatly to the cost of any

removal project. Jacket removal is initiated after bottom cuts have been made below the mudline on the piles. The entire jacket is removed in sections or as a single lift. Single lifting of the jacket is not likely except for the smaller structures located in less than 200 feet water depth.

In the POCSR, platform jacket weights range from approximately 400 tons to almost 43,000 tons. The platforms are located in 95 to 1,198 feet of water, respectively. In Appendix D we have listed the projected weight that will be required to be removed when the POCSR platforms are decommissioned. These numbers are only approximate as additional modifications (i.e., deck extensions, equipment additions or removals, etc.) have been made at many facilities. We have listed the jacket and deck weights and calculated roughly the weight of the piles and conductors that will have to be removed assuming that they will be removed to a depth of 15 feet below the mudline. Some of the weights are our best estimates, as detailed information was not readily available. We used the best sources that we had, such as the design, installation, load-out, or fabrication reports, installation manuals, operator correspondence, seismic analyses, etc. A deck and jacket specification table in Appendix E details the background information that we obtained from our records and used for this report. In some cases in this specification table, not all the information and numbers for every block in the table were available for each platform. We did however list which numbers that we were able to obtain for each of the 23 POCSR platforms to use as a source of background information. We used our best professional judgment concerning which numbers to use in the various sections of this decommissioning cost report.

Since the derrick barge is usually the highest cost item on location, the use of less expensive support equipment to minimize the heavy lifting equipment time is often justifiable. Reducing the derrick barge time is one of the best ways to reduce overall removal costs. Heavy lifting equipment must be evaluated for its lifting capability at the required working radius and oceanographic conditions in which it is to operate, and also for its height capability. Safety must always be the prime consideration in any removal project. Deepwater structures present much greater challenges for complete removal. The immense weight and extreme water depth of many of the structures on the west coast places a one step removal outside the limits of current proven and demonstrated technology.

A method known as progressive transport or jacket hopping was considered by some operators and engineering consultants at one time, but because of the difficulty of clearing large areas of the ocean floor to set down the jacket and reset the HLV anchors, this methods appears unlikely to be used on the west coast. Jacket hopping, however, would reduce the risk to divers as less diving time would be needed compared to in-situ dismantlement. In the hopping method, the structure would be rigged up and lifted after severing the piles. The jacket would be winched vertically off the bottom and moved into shallower water and set down. The upper portion of the jacket would then be cut and the rigging reattached underwater for another lift. The process is repeated until the structure is completely removed. In the future it may be possible to re-float the jacket or use additional buoyancy assist to remove some of the deepwater structures, but the technology is still in the developmental stage at this time.

Other alternative heavy lift vessels/systems are being considered for lifting the large jackets such as Offshore Shuttle, MPU, Pieter Schelte, Versatruss, and various buoyancy systems, such as the Control Variable Buoyancy System (CVBS). These approaches are currently undergoing test trials and may eventually be proposed to decommission these large structures.

The most common method of jacket removal is dismantlement in place (in-situ) in which the jacket is cut (with divers using cutting torches, diamond wire cutting tools, or other systems) into manageable pieces at the site and removed piece by piece with the HLV. The jacket can be cut up into small or large pieces. For this study, we assumed that the small piece (1,000 tons or less) removal method will be used for removing the very large structures in the POCSR, jackets located in deep water (water depth greater than 400 feet), as this method appears to be the most likely method to be used based on current information. In addition, smaller HLV's would be needed to do the work. Except for Platforms Hogan and Houchin, we are making the assumption that smaller jackets (1,500 tons or less) located in less than 200 feet water depth would be removed in a single lift with the 2,000 ton HLV after the topsides are removed. We are making the assumption that Platforms Hogan and Houchin would be removed using a 500 ton HLV, as the operator has only 2 platforms and it would be more costly to use a larger HLV. If a 500 ton HLV is used to remove these platforms, the jackets would be cut in-situ into lighter than 300 ton sections for removal.

Pile Severing

Piles can be cut using explosives, mechanical means, abrasive technology, or torches. Use of explosives has been the most reliable, most economical, and safest method for many years. The bottom cut required to remove the jacket must be clean to allow for a safe lift from the surface. A barge making such a lift at sea may exceed its lift capability if an incomplete cut left the load secured to the sea floor. The use of torches places divers at risk as piles are to be removed to at least 15 feet below the ocean floor. Abrasive and other similar technologies do not yet have a reliable means to verify that a complete pile cut has been made, but continue to evolve and may prove to be a preferred technique for cutting applications in the future. They are being used increasingly to sever piles in the Gulf of Mexico and other parts of the world. We assume that some of the piles would be cut using abrasives and others may require the use of explosives.

Range of Costs and Assumptions

Based upon the sizes and weights of the structures, the number of modules, the number of lifts needed and other factors, as described above, including the maximum weights of the lifts that will be needed, we believe all the POCSR platforms can be removed using HLV's with 500, 2,000, and 4,400 ton capabilities in groupings of platforms that we call projects. A number of other factors were also considered in developing the scenario that we are using including the age and oceanographic location of the platforms, remaining oil and gas reserves, water depth, and company operators/ownership. Our decommissioning scenario anticipates six decommissioning projects taking place between 2010 and 2025 (See Table 2-1). A total of 2 to 6 platforms are projected to be removed during each project. The HLV's needed for these projects will have the following lift capabilities: 500 tons (Project I), 2,000 tons (Projects II, III, & IV) and 4,400 tons (Projects V & VI). The costs and method of removal of the very large structures in deep water are very speculative and await further advances in technology as to the approach that would be needed for complete removal. We made cost projections for planning purposes only, assuming in-situ dismantlement of these jackets.

In addition to the barge and anchor-handling tug costs, we have included related diver support, survey and other related vessels and equipment, including ROV and severing equipment spread, which we estimate could be $40,000 per day for Platform Gina in 95 feet of water and $55,000 per day for Platforms Hogan and Houchin in 154 and 163 feet water depth, respectively. All other platforms would be in deeper water and we estimate $65,000 per day for all of their support services. We assumed that it would take 6 hours to cut and remove each platform main or skirt pile. We assumed that topside module removal would take approximately 1/2 day per module in most cases. Topsides that do not have modules would take longer and be cut up into manageable pieces for removal. Generally, we assumed approximately 1 day for each of these sections.

Table 10-1 details the formulas that were used to project platform decommissioning costs and contains an example of calculations for each of the projects. See Table 10-2 Platform Deck and Jacket Decommission Costs, for the projected costs for each of the 23 POCSR platforms. We have increased estimated costs by 10% to 20 % to allow for weather contingency depending on the area in which the platforms are located. We used 20% for Platforms Heritage, Harvest, Hermosa, Hidalgo, and Irene and 10% for all other platforms due to the harsher oceanographic conditions that these five platforms encounter. Appendix F shows the cost calculations for each platform by Decommissioning Project.

Table 10-1 Examples of Platform Deck and Jacket Decommissioning Cost Calculations

Project	Cost Calculation Formula	Cost Example
Project I -500 ton HLV	($80,000/day + $55,000/day + 10% weather contingency) x number of days	Platform Hogan Example: $135,000 x 1.1 x 28 days = $4,158,000
Projects II, III, & IV-2000 ton HLV	($185,000/day + $65,000/day + 10% weather contingency) x number of days	Platform Henry Example: $250,000 x 1.1 x 10 days = $2,750,000
Projects V & VI - 4400 ton HLV	($225,000/day + $65,000/day + 10% or 20% weather contingency) x number of days	Platform Heritage Example: $290,000 x 1.2 x 104 days = $ 36,192,000

Table 10-2 Platform, Deck and Jacket Decommissioning Costs

Platform	Platform, Deck, and Jacket Removal Costs
A	$3,025,000
B	$3,025,000
C	$3,025,000
Edith	$4,400,000
Ellen	$3,850,000
Elly	$4,125,000
Eureka	$20,075,000
Gail	$24,244,000
Gilda	$3,575,000
Gina	$1,485,000
Grace	$4,785,000
Habitat	$3,025,000
Harmony	$36,047,000
Harvest	$24,708,000
Henry	$2,750,000
Heritage	$36,192,000
Hermosa	$22,620,000
Hidalgo	$17,748,000
Hillhouse	$2,750,000
Hogan	$4,158,000
Hondo	$21,054,000
Houchin	$4,158,000
Irene	$3,600,000
Total	$254,424,000

Section 11: Pipeline and Powercable Decommissioning

Requirements

The MMS regulations at 30 CFR 250.1750 allow an operator to decommission a pipeline in place if the MMS determines that the "pipeline does not constitute a hazard (obstruction) to navigation and commercial fishing operations, unduly interfere with other uses of the OCS, or have adverse environmental effects." If the MMS determines that the pipeline is an obstruction, then the decommissioned pipeline must be removed per the regulations at 30 CFR 250.1752.

Procedures

Since 1990, the POCSR has required pipeline operators to conduct biennial ROV pipeline surveys to assess a pipeline's external integrity and to monitor 3rd party impacts. The surveys have verified that the pipelines historically have not been obstructions and could therefore be decommissioned in place. However, a decision on the final disposition of a specific pipeline cannot be made until a thorough technical and environmental review is conducted during the decommissioning permitting process.

To decommission a pipeline in place, the pipeline must first be cleaned by flushing water through the pipeline. The pipeline is then disconnected from the OCS platform, and filled with sea water. The cut end is plugged and buried at least 3 feet below the seafloor or covered with protective concrete mats. In addition to cutting and burying the ends, all pipeline valves/fittings, pipeline crossings and spanned areas that could unduly interfere with other uses of the OCS must be removed from the pipeline, and the cut ends plugged and covered or buried at least 3 feet below the seafloor.

Cost Factors

Appendix G shows the estimated pipeline and powercable decommissioning costs. The factors used to calculate the cost estimates are based on information provided by MMS and operator decommissioning studies, and contractors. There are three worksheets in Appendix G which are titled "Pipelines and Powercables," "Pipelines," and "Powercables," respectively.

"Pipelines and Powercables" and "Pipelines" Worksheets/Tables

The cost estimates for the "Pipelines" and the "Pipelines and Powercables" worksheets assume that all project vessels (small crane barge, dive boat, etc.) would be available locally. The costs incurred during the decommissioning operations reflect both fixed (e.g., mobilization/demobilization) and hourly rates for vessels (small crane barge and support vessels) and diver-related services. The two factors which have the greatest influence on the cost estimates are the water depth and the number of obstructions per pipeline that would have to be removed.

The estimated costs rely on data input values for: 1) mobilization/demobilization, 2) daily rate for on-site operations, 3) estimated time to complete the decommissioning activity, and 4) disposal costs. Below is a description of the type of work included in each of the data input values.

The mobilization/demobilization cost includes the mobilization/demobilization of the diving support vessel, diving system equipment, small crane barge(s), and any required third party equipment needed; planning and engineering; pigging and testing the pipeline(s); mooring installation/removal; and miscellaneous equipment or work needed.

The on-site daily rate includes 24-hour diving operations from a diving support vessel, 24-hour barge with crane, tug and construction crew, materials barge for transport and onshore support and project management.

The estimated time to complete a pipeline decommissioning is based on the number of risers and pipeline sections that would need to be cut out, rigged and lifted to a barge. The time is also dependent on the water depth in which the work is to take place. For this exercise, the amount of pipe that would be removed is based on Appendix A-4 of the 1999 Offshore Facility Decommissioning Costs Report. The Appendix provides information on the removal lengths for spans, pipeline crossings, and subsea tie-ins. With the exception of the Point Arguello Unit platforms, and Platforms Irene and Heritage, a 10% weather contingency was calculated into the estimated time. A 20% weather contingency was applied to the Point Arguello Unit platforms and Platforms Irene and Heritage due to the harsher oceanographic conditions in these areas.

The disposal costs include dockside wharfage fees and crane services, transportation of pipeline by truck to the disposal site, and disposal fees for cleaned pipe and hazardous materials. It is assumed for the purposes of these estimates that the removed pipelines and powercables could not be recycled.

"Beta and Santa Ynez Powercable Complete Removal" Worksheet/Table
The Beta Unit and Santa Ynez Unit (SYU) powercables will most likely be removed completely. The biennial ROV surveys of the Beta Unit show considerable evidence of third party impacts to the two powercables that run from Platforms Eureka to Ellen. There has been no evidence that the SYU powercables are interfering with other OCS users; however, ExxonMobil, operator of the SYU, has committed to the Santa Barbara County as part of a recent power system repair project that it will remove all powercables at the eventual end of the SYU development and production project life.

This table shows the estimated costs for completely removing the SYU and Beta Unit powercables using both local infrastructure and a cable removal vessel mobilized from outside the west coast. Using local infrastructure, the powercables would be cut into sections and lifted onto a barge. It is assumed that the cutting could be done using an ROV, and that divers will not be necessary. A cable removal vessel would simply pull the powercable up onto a reel. Although there is considerable time saved by using a cable removal vessel, the cost to mobilize a vessel from other areas is so great that it is far more economical to use equipment available locally and spend more time doing the work. Recycling of the powercable is highly unlikely and was therefore not taken into account.

Table 11-1 shows pipeline and powercable decommissioning costs by platform.

Table 11-1 Pipeline and Powercable Removal Costs

Platform	Pipelines	Powercables	Total Cost
A	$0	$44,165	$45,000
B	$364,537	$53,512	$419,000
C	$160,536	$53,512	$215,000
Edith	$340,245	$160,776	$502,000
Ellen	$0	$0	$0
Elly	$217,254	$1,100,345	$1,318,000
Eureka	$574,051	$0	$575,000
Gail	$441,523	$0	$442,000
Gilda	$316,307	$105,436	$422,000
Gina	$88,330	$44,165	$133,000
Grace	$210,871	$0	$211,000
Habitat	$133,813	$114,508	$249,000
Harmony	$490,573	$767,012	$1,258,000
Harvest	$231,355	$0	$232,000
Henry	$160,536	$53,512	$215,000
Heritage	$341,485	$6,447,317	$6,789,000
Hermosa	$212,041	$0	$213,000
Hidalgo	$231,355	$0	$232,000
Hillhouse	$107,024	$53,512	$161,000
Hogan	$577,861	$94,458	$673,000
Hondo	$330,073	$1,967,702	$2,298,000
Houchin	$311,415	$103,805	$416,000
Irene	$379,496	$106,021	$486,000
Total	$6,220,681	$11,269,758	$17,504,000

Section 12: Platform Transportation and Disposal

There are three primary methods of disposal for steel and other materials associated with dismantling a platform: refurbish and reuse, scrap and recycle, and dispose of in designated landfills. Opportunities for refurbishing and reusing facilities in the POCSR are very limited due to the age of many of the platforms, the current lack of additional oil and gas development in the POCSR, and inherent limitations associated with meeting the strict technical standards now required. Thus, it is assumed that the steel and other materials removed from platforms will be transported to shore for scrapping and recycling or disposal in landfills.

Due to the limited number of offshore decommissioning projects that have occurred in the POCSR, information pertaining to transportation and disposal costs is limited to that which was made available by Chevron in the 4-H Project. As noted earlier, the project involved the decommissioning of four platforms having a combined weight of approximately 12,000 tons. The materials were transported by barge from the Santa Barbara Channel a distance of 100 miles to San Pedro, California. Chevron reported that the steel was sold as scrap for $330,000 and that it cost $1.3 million to process the steel, resulting in a net loss of $1.0 million or $333.00 per ton of steel. In addition, Chevron had to dispose of 3,000 tons of marine growth ($800,000), 1,000 tons of cement ($275,000), and 300 tons of drilling muds and cuttings ($275,000) which aggregates to approximately $1.4 million for disposal materials other than steel. The costs for disposal of these other materials therefore approximated about $350,000 per platform.

Materials disposal and transportation costs in the POCSR are higher than in the Gulf of Mexico and other areas due to the lack of onshore disposal infrastructure. The local (San Pedro) scrap yard that was used by Chevron is no longer in service and existing scrap yards in southern California do not have the capability to process the large quantity of steel present in platforms. Due to consolidated ownership of scrap yards on the west coast and environmental constraints in southern California, scrap yards having the capability to process the quantity of steel present in offshore platforms are not likely to re-open in the foreseeable future. The nearest scrap yard facilities having such capability are located in the San Francisco Bay area (400 miles away) and Portland, Oregon (1,000 miles away).

Cost Assumptions

This report assumes that platform structures will be transported by barge from southern California to offloading facilities/scrap yards located along the west coast of the U.S., Mexico, or possibly Asia. It is assumed that other materials (nonferrous metals, cement, plastics, wood, etc.) will be transported to landfills in southern California for disposal. For steel, the disposal cost is estimated to be $400 per ton. This cost does not include any credit for scrap steel. This cost was estimated by MMS based on information presented in technical decommissioning studies of POCSR platforms conducted by engineering consultants for MMS and industry. The cost covers transportation, site preparation, and platform topsides and jacket offloading, demolition, and scrapping. For the purposes of this study we have assumed that the cost to dispose of other materials (nonferrous metals, cement, plastics, wood, etc.) will total $350,000 per platform for platforms in less than

400 feet of water, and $700,000 per platform for larger platforms located in greater than 400 feet of water. This cost is based on cost estimates provided by Chevron for the Chevron 4-H Project and information presented in technical decommissioning studies funded by MMS. Table 12-1 shows the platform transportation and disposal costs for each platform.

Table 12-1 Platform Transportation and Disposal Costs

Platform	Total Weight tons)*	Steel Disposal Cost	Misc. Disposal	Total Cost
A	4,090	$1,636,000	$350,000	$1,986,000
B	4,095	$1,638,000	$350,000	$1,988,000
C	4,010	$1,604,000	$350,000	$1,954,000
Edith	8,298	$3,319,200	$350,000	$3,670,000
Ellen	11,300	$4,520,000	$350,000	$4,870,000
Elly	9,400	$3,760,000	$350,000	$4,110,000
Eureka	34,000	$13,600,000	$700,000	$14,300,000
Gail	31,320	$12,528,000	$700,000	$13,228,000
Gilda	9,342	$3,736,800	$350,000	$4,087,000
Gina	1,102	$440,800	$350,000	$791,000
Grace	9,390	$3,756,000	$350,000	$4,106,000
Habitat	8,853	$3,541,200	$350,000	$3,892,000
Harmony	69,920	$27,968,000	$700,000	$28,668,000
Harvest	30,190	$12,076,000	$700,000	$12,776,000
Henry	3,118	$1,247,200	$350,000	$1,598,000
Heritage	60,556	$24,222,400	$700,000	$24,923,000
Hermosa	28,131	$11,252,400	$700,000	$11,953,000
Hidalgo	21,421	$8,568,400	$700,000	$9,269,000
Hillhouse	3,738	$1,495,200	$350,000	$1,846,000
Hogan	4,110	$1,644,000	$350,000	$1,994,000
Hondo	27,250	$10,900,000	$700,000	$11,600,000
Houchin	4,637	$1,854,800	$350,000	$2,205,000
Irene	7,652	$3,060,800	$350,000	$3,411,000
Total		$158,369,200	$10,850,000	$169,225,000

* Total Weight is the estimated total platform removal weight and includes the weights of the jacket, deck, piles, and conductors being removed to a depth of 15 feet below the mudline.

Section 13: Site Clearance

Site clearance operations are performed to ensure that the post-decommissioning lease and operational area surrounding platforms is free of obstructions that would interfere with other uses of the OCS, such as commercial trawling operations. OCS oil and gas decommissioning requirements including clearing a lease site are at 30 CFR 250.1700-1754.

Site clearance procedures for decommissioning a platform and associated pipelines and powercables in the POCSR will typically involve the following four step process (1) pre-decommissioning survey, (2) post-decommissioning survey, (3) Remotely Operated Vehicle (ROV)/diver target identification and recovery, and (4) test trawling. A survey vessel equipped with high-resolution sidescan sonar is used to conduct the pre- and post-decommissioning surveys. The pre-decommissioning survey documents the location and quantity of suspected debris targets. The survey is also used to map the location of pipelines, powercables, and sensitive environmental habitats (hard bottom areas and kelp beds) to ensure that the deployment and retrieval of anchors is done in a safe and environmentally sound manner. The post-decommissioning survey identifies debris lost during the project and documents any impacts from the operations such as anchor scars. An ROV and divers are deployed to further identify and remove any debris that could interfere with other uses of the area. Test trawling is conducted to verify that the area is free of any potential obstructions.

Cost Assumptions

Site clearance costs can vary significantly from project to project due to factors such as: water depth; the size of the area to be cleared and verified; the quantity, size, and type of debris; and weather conditions. The site clearance cost estimates presented below include costs for pre- and post-decommissioning sidescan-sonar surveys (SSS), ROV deployment, diving spreads, test trawl operations, and shell mound geotechnical and biological sampling. The costs do not include any expenses that would be incurred to remove shell mounds or mitigate impacts to commercial trawlers who may be precluded from trawling areas where shell mounds are located. The subject of shell mounds is still under study, in order to generate information on all aspects of the issue that will assist in the preparation of a thorough environmental assessment and appropriate decision on their final disposition based on a case-by-case review. The costs are based on information obtained from oil and gas companies and contractors that have conducted site clearance programs in the POCSR.

For platforms located in water depths up to 300 feet, we assumed that an air/gas diving spread would be used. For platforms located in water depths exceeding 300 feet, we assumed a saturation diving spread will be required. We also assumed that the time required to conduct ROV and test trawl operations will increase from 7 days for platforms located in less than 300 feet of water to 14 days for platforms located in greater than 300 feet of water.

Site Clearance Costs

The estimated costs for site clearance and verification are $722,000 for platforms in less than 300 feet of water depth and $1,139,000 for platforms in greater than 300 feet of water. The cost calculations are shown in Table 13-1 below.

Table 13-1 Site Clearance Cost Calculations

Platform Water Depth (<300 feet)		**Platform Water Depth (>300 feet)**	
Pre-Decommissioning SSS		Pre-Decommissioning SSS	
3 days x $11,000	$33,000	3 days x $11,000	$33,000
Mob/Demob	$12,000	Mob/Demob	$12,000
Data Analysis	$10,000	Data Analysis	$10,000
	$55,000		$55,000
Post-Decommissioning SSS		Post-Decommissioning SSS	
3 days x $11,000	$33,000	3 days x $11,000	$33,000
Mob/Demob	$12,000	Mob/Demob	$12,000
Data Analysis	$10,000	Data Analysis	$10,000
	$55,000		$55,000
ROV Deployment		ROV Deployment	
7 days x $11,000	$77,000	14 days x $11,000	$154,000
Diving Spread (air/gas diving)		Diving Spread (saturation diving)	
10 days x $30,000	$300,000	10 days x $60,000	$600,000
Test Trawl Program		Test Trawl Program	
7 days x $5,000	$35,000	14 days x $5,000	$70,000
Shell Mound Surveys		Shell Mound Surveys	
Geotechnical & Biological	$200,000	Geotechnical & Biological	$200,000
Total Cost	$722,000	Total Cost	$1,134,000

Appendix A: Maps of the Decommissioning Projects

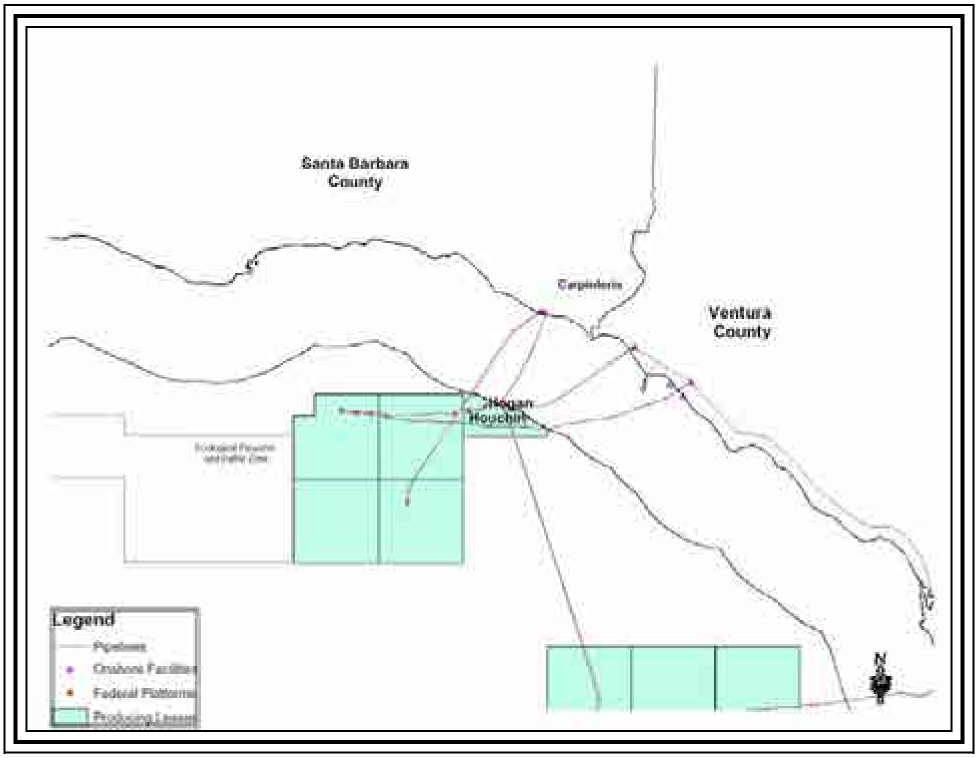

Figure A-1 Project I Eastern, Santa Barbara Channel

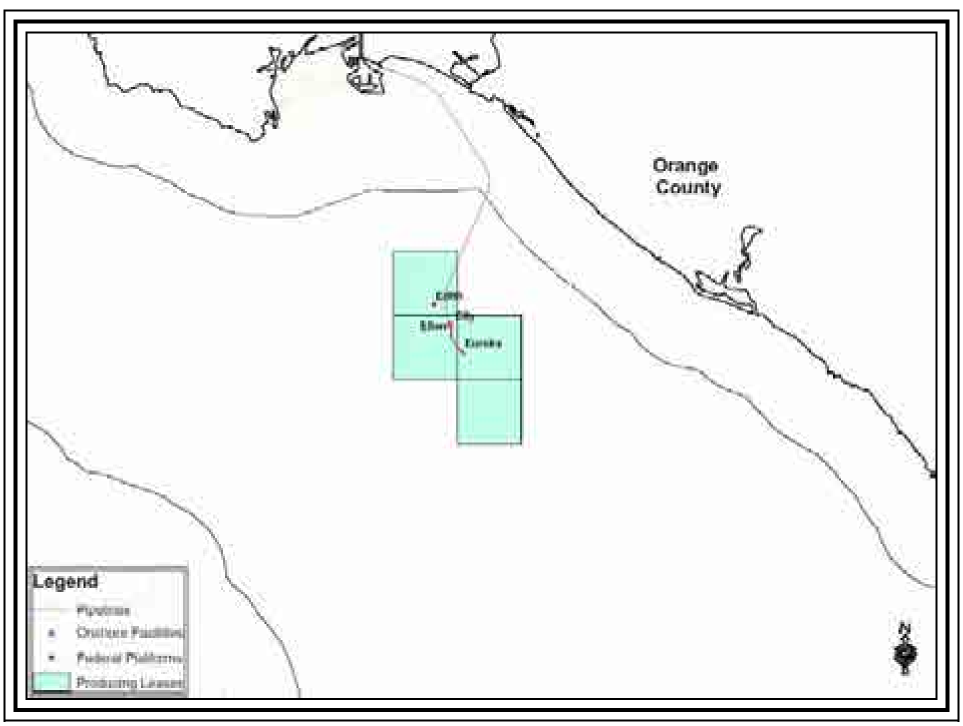

Figure A-2 Project II, South Coast

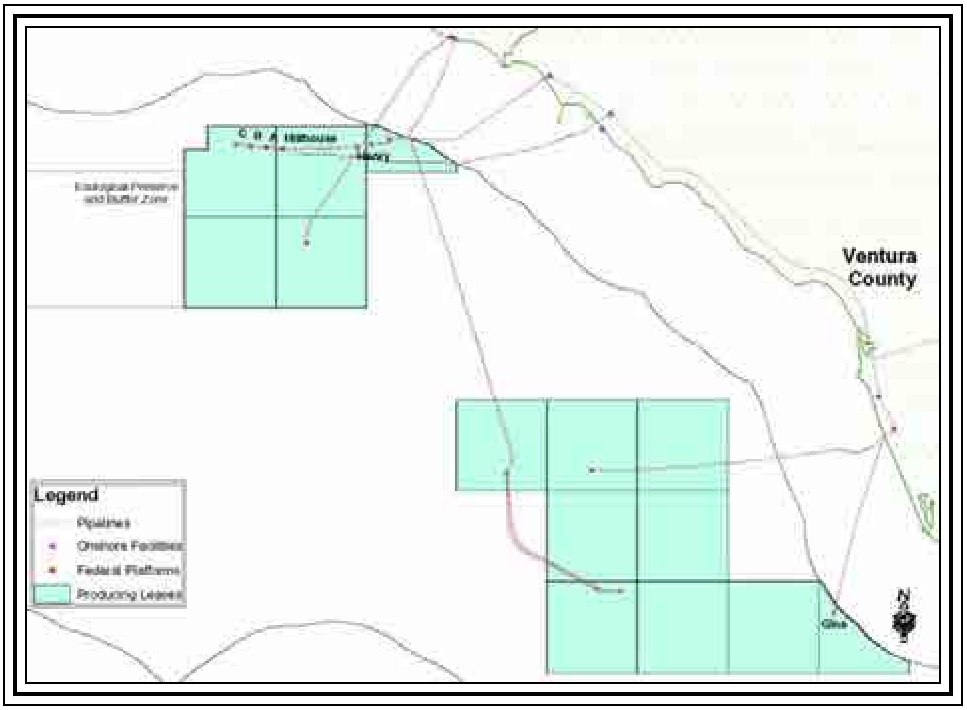

Figure A-3 Project III, Eastern Santa Barbara Channel

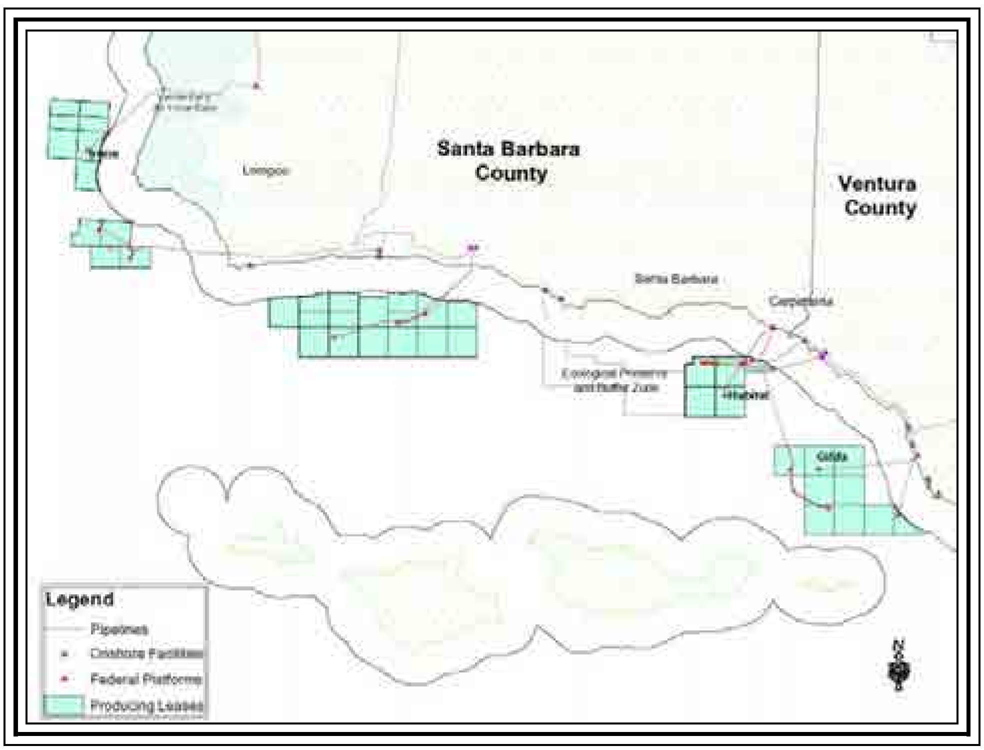

Figure A-4 Project IV, Santa Barbara Channel-Southern Santa Maria Basin

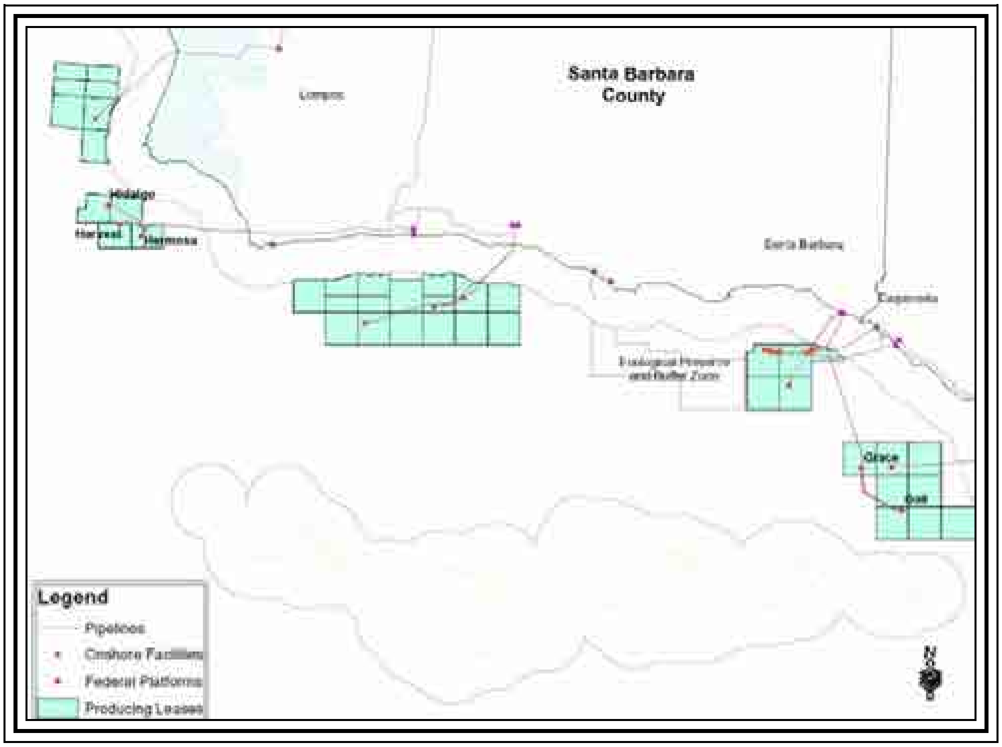

Figure A-5 Project V, Santa Barbara Channel-Santa Maria Basin

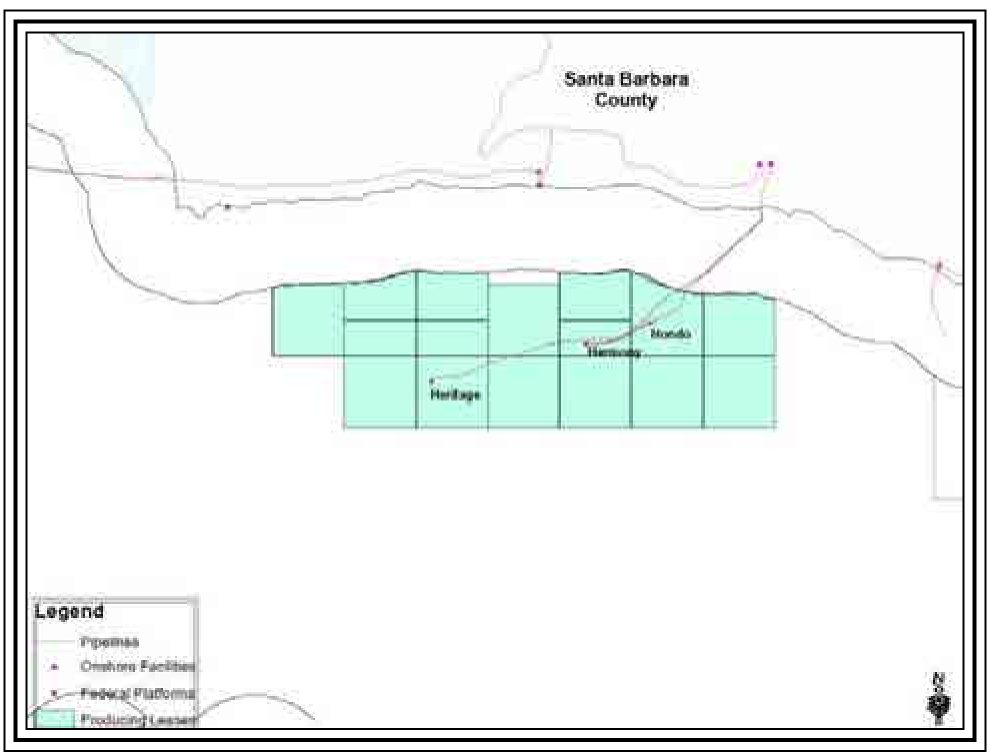

Figure A-6 Project VI, Western Santa Barbara Channel

Appendix B: Total Cost by Decommissioning Category

	Platform A	Platform B	Platform C	Edith	Ellen	Elly
Engineering & Planning	$589,000	$590,000	$578,000	$1,195,000	$1,356,000	$1,128,000
Permitting	$550,000	$550,000	$550,000	$550,000	$550,000	$550,000
Platform Preparation	$761,000	$761,000	$761,000	$942,000	$980,000	$1,474,000
Well P&A	$5,005,000	$5,478,000	$3,710,000	$1,995,000	$7,158,000	$0
Conductors	$2,948,000	$2,970,000	$2,340,000	$1,109,000	$4,416,000	$0
Mobilization & Demobilization	$2,775,000	$2,775,000	$2,775,000	$4,163,000	$4,163,000	$4,163,000
Platform & Structural Removal	$3,025,000	$3,025,000	$3,025,000	$4,400,000	$4,125,000	$3,850,000
Pipelines & Power Cables	$45,000	$419,000	$215,000	$502,000	$0	$1,318,000
Transportation & Disposal	$1,986,000	$1,988,000	$1,954,000	$3,670,000	$4,870,000	$4,110,000
Site Clearance	$722,000	$722,000	$722,000	$722,000	$722,000	$722,000
MMS Estimate w/o Contingency	$18,406,000	$19,278,000	$16,630,000	$19,248,000	$28,340,000	$17,315,000
Contingency Factor (20% does not apply to Mob/demob)	$3,127,000	$3,301,000	$2,771,000	$3,017,000	$4,836,000	$2,631,000
MMS Total Estimate	$21,533,000	$22,579,000	$19,401,000	$22,265,000	$33,176,000	$19,946,000

	Eureka	Gail	Gilda	Gina	Grace	Habitat
Engineering & Planning	$3,264,000	$3,007,000	$1,122,000	$159,000	$1,127,000	$1,063,000
Permitting	$550,000	$550,000	$550,000	$550,000	$550,000	$550,000
Platform Preparation	$2,245,000	$2,785,000	$1,436,000	$568,000	$1,265,000	$1,341,000
Well P&A	$6,335,000	$2,748,000	$8,068,000	$1,435,000	$1,033,000	$2,678,000
Conductors	$9,360,000	$3,604,000	$3,648,000	$420,000	$2,786,000	$1,480,000
Mobilization & Demobilization	$4,163,000	$8,100,000	$5,550,000	$2,775,000	$8,100,000	$5,550,000
Platform & Structural Removal	$20,075,000	$24,244,000	$3,575,000	$1,485,000	$4,785,000	$3,025,000
Pipelines & Power Cables	$575,000	$442,000	$422,000	$133,000	$211,000	$249,000
Transportation & Disposal	$14,300,000	$13,228,000	$4,087,000	$791,000	$4,106,000	$3,892,000
Site Clearance	$1,134,000	$1,134,000	$722,000	$722,000	$1,134,000	$722,000
MMS Estimate w/o Contingency	$62,001,000	$59,842,000	$29,180,000	$9,038,000	$25,097,000	$20,550,000
Contingency Factor (20% does not apply to Mob/demob)	$11,568,000	$10,349,000	$4,726,000	$1,253,000	$3,400,000	$3,000,000
MMS Total Estimate	$73,569,000	$70,191,000	$33,906,000	$10,291,000	$28,497,000	$23,550,000

	Harvest	Henry	Heritage	Hermosa	Hidalgo	Hillhouse
Engineering & Planning	$2,899,000	$449,000	$5,814,000	$2,701,000	$2,571,000	$539,000
Permitting	$550,000	$550,000	$550,000	$550,000	$550,000	$550,000
Platform Preparation	$3,325,000	$989,000	$3,675,000	$3,325,000	$2,815,000	$1,008,000
Well P&A	$3,850,000	$2,328,000	$5,565,000	$2,590,000	$1,960,000	$4,568,000
Conductors	$3,171,000	$1,215,000	$11,319,000	$2,186,000	$1,020,000	$2,829,000
Mobilization & Demobilization	$8,100,000	$2,775,000	$13,500,000	$8,100,000	$8,100,000	$2,775,000
Platform & Structural Removal	$24,708,000	$2,750,000	$36,192,000	$22,620,000	$17,748,000	$2,750,000
Pipelines & Power Cables	$232,000	$215,000	$6,789,000	$213,000	$232,000	$161,000
Transportation & Disposal	$12,776,000	$1,598,000	$24,923,000	$11,953,000	$9,269,000	$1,846,000
Site Clearance	$1,134,000	$722,000	$1,134,000	$1,134,000	$1,134,000	$722,000
MMS Estimate w/o Contingency	$60,745,000	$13,591,000	$109,461,000	$55,372,000	$45,399,000	$17,748,000
Contingency Factor (20% does not apply to Mob/demob)	$10,529,000	$2,164,000	$19,193,000	$9,455,000	$7,460,000	$2,995,000
MMS Total Estimate	$71,274,000	$15,755,000	$128,654,000	$64,827,000	$52,859,000	$20,743,000

	Hogan	Hondo	Houchin	Irene	Regional Liability
Engineering & Planning	$592,000	$2,616,000	$668,000	$919,000	$41,659,000
Permitting	$550,000	$550,000	$550,000	$550,000	$12,650,000
Platform Preparation	$761,000	$3,100,000	$761,000	$1,265,000	$40,498,000
Well P&A	$3,885,000	$5,443,000	$3,535,000	$4,305,000	$89,062,000
Conductors	$1,872,000	$5,164,000	$1,750,000	$1,546,000	$80,189,000
Mobilization & Demobilization	$3,600,000	$13,500,000	$3,600,000	$5,550,000	$138,152,000
Platform & Structural Removal	$4,158,000	$21,054,000	$4,158,000	$3,600,000	$254,424,000
Pipelines & Power Cables	$673,000	$2,298,000	$416,000	$486,000	$17,504,000
Transportation & Disposal	$1,994,000	$11,600,000	$2,205,000	$3,411,000	$169,225,000
Site Clearance	$722,000	$1,134,000	$722,000	$722,000	$20,314,000
MMS Estimate w/o Contingency	$18,807,000	$66,459,000	$18,365,000	$22,354,000	$863,677,000
Contingency Factor (20% does not apply to Mob/demob)	$3,042,000	$10,592,000	$2,953,000	$3,361,000	$145,114,000
MMS Total Estimate	$21,849,000	$77,051,000	$21,318,000	$25,715,000	$1,008,791,000

Appendix C: Total Well Cost

	Well Complexity								
	Low		Med Low		Med High		High		
Platform	# of Wells	Total Cost	# of Wells	Total Cost	# of Wells	Total Cost	# of Wells	Total Cost	Total Platform Cost
A	45	$3,937,500	5	$612,500	1	$175,000	1	$280,000	$5,005,000
B	49	$4,287,500	6	$735,000	1	$175,000	1	$280,000	$5,478,000
C	33	$2,887,500	3	$367,500	1	$175,000	1	$280,000	$3,710,000
Edith	12	$1,050,000	4	$490,000	1	$175,000	1	$280,000	$1,995,000
Ellen	18	$1,575,000	39	$4,777,500	3	$525,000	1	$280,000	$7,158,000
Elly	0	$0	0	$0	0	$0	0	$0	$0
Eureka	6	$525,000	38	$4,655,000	5	$875,000	1	$280,000	$6,335,000
Gail	1	$87,500	18	$2,205,000	1	$175,000	1	$280,000	$2,748,000
Gilda	8	$700,000	47	$5,757,500	6	$1,050,000	2	$560,000	$8,068,000
Gina	7	$612,500	3	$367,500	1	$175,000	1	$280,000	$1,435,000
Grace*	0	$0	1	$122,500	3	$525,000	0	$0	$1,033,000
Habitat	1	$87,500	16	$1,960,000	2	$350,000	1	$280,000	$2,678,000
Harmony	0	$0	0	$0	18	$3,150,000	8	$2,240,000	$5,390,000
Harvest	0	$0	0	$0	14	$2,450,000	5	$1,400,000	$3,850,000
Henry	20	$1,750,000	1	$122,500	1	$175,000	1	$280,000	$2,328,000
Heritage	0	$0	0	$0	19	$3,325,000	8	$2,240,000	$5,565,000
Hermosa	0	$0	0	$0	10	$1,750,000	3	$840,000	$2,590,000
Hidalgo	0	$0	0	$0	8	$1,400,000	2	$560,000	$1,960,000
Hillhouse	40	$3,500,000	5	$612,500	1	$175,000	1	$280,000	$4,568,000
Hogan	35	$3,062,500	3	$367,500	1	$175,000	1	$280,000	$3,885,000
Hondo	0	$0	1	$122,500	24	$4,200,000	4	$1,120,000	$5,443,000
Houchin	31	$2,712,500	3	$367,500	1	$175,000	1	$280,000	$3,535,000
Irene	0	$0	2	$245,000	20	$3,500,000	2	$560,000	$4,305,000
TOTALS	306	$26,775,000	195	$23,887,500	139	$24,325,000	47	$13,160,000	$89,058,000

*1 Unplugged well 25 Wells temporarily abandoned, 3 of which need to be reentered. Total cost includes $385,000 for Permanent Plugging of the remaining 22 wells.

Appendix D: Platform Removal Weights (tons)*

Platform	Water Depth (feet)	Jacket	Piles	Conductors	Deck	Total Weight*
A	188	1,500	600	633	1,357	4,090
B	190	1,500	600	638	1,357	4,095
C	192	1,500	600	553	1,357	4,010
Edith	161	3,454	450	260	4,134	8,298
Ellen	265	3,200	1,100	1,700	5,300	11,300
Elly	255	3,300	1,400	0	4,700	9,400
Eureka	700	19,000	2,000	5,000	8,000	34,000
Gail	739	18,300	4,000	1,327	7,693	31,320
Gilda	205	3,220	1,030	1,300	3,792	9,342
Gina	95	434	125	96	447	1,102
Grace	318	3,090	1,500	1,000	3,800	9,390
Habitat	290	2,550	1,500	639	3,514	8,853
Harmony	1,198	42,900	12,350	4,831	9,839	69,920
Harvest	675	16,633	3,383	1,150	9,024	30,190
Henry	173	1,311	150	286	1,371	3,118
Heritage	1,075	32,420	13,950	4,360	9,826	60,556
Hermosa	603	17,000	2,500	802	7,830	28,131
Hidalgo	430	10,950	2,000	371	8,100	21,421
Hillhouse	190	1,500	400	638	1,200	3,738
Hogan	154	1,263	150	438	2,259	4,110
Hondo	842	12,200	2,900	3,700	8,450	27,250
Houchin	163	1,486	150	410	2,591	4,637
Irene	242	3,100	1,500	552	2,500	7,652

* Total Weight is the estimated platform removal weight and includes the weights of the jacket, deck, piles and conductors and assumes that they are removed to a depth of 15 feet below the mudline.

Appendix E: Deck and Jacket Specifications

Platform	Jacket Weight (tons)	Total Pile Weight (tons)	Total Conductor Weight (tons)	Total Jacket Weight (tons)	Module Weights or Lift Weights (tons)	Total Deck Weight (tons)	Total Platform Weight (tons)	Number Jacket Legs	Number Main Piles and Size	Number Skirt Piles and Size	Number Lifts to Install Decks
Gina 95 ft. water depth	434	253			Deck 418 Helideck 29 Others ---	447	1,500 Approx.	6	6/42" to 140' BML*	0	
Hogan 154 ft water depth	1,263			1,566 Incl. Piles	Drilling Deck & Equip. 302 Workover Rig 315 Prod. Deck & Equip. 649 Deck Structure 997	2,259	3,825 w/workover rig	12	12/36"	0	12 main lifts
Edith 161 ft. water depth	3,454	1,048 Incl. boat landing		4,502	Mod 1-471 Piperacks 246 2-466 Helipad 118 3-522 Quarters 438 4-585 Cap trusses 341 5-473 Flare 19/ 6-455	4,134	8,636	12	12/54" 200 to 280' BML	0	6 modules 2 cap trusses misc. other lifts
Houchin 163 ft. water depth	1,486			1,786	Drlg. Deck Structure 432 Prod. Deck Structure 314 Drilling Rig 220 Pipecrack & Equip. 289 Other item of Equip.	2,591	4,376	8	8	0	9 main lifts
Henry 173 ft. water depth	1,311 launch load w/appurtenances				Drilling Deck 465 Prod. Deck #1 356 Prod. Deck #2 550 (incl. some equip. but exclude rig & other equip.)	1,371 Excludes rig & other equip.		8	8/42" w/36" inserts to 170' BML	0	

*Below Mud Line

Platform	Jacket Weight (tons)	Total Pile Weight (tons)	Total Conductor Weight (tons)	Total Jacket Weight (tons)	Module Weights or Lift Weights (tons)	Total Deck Weight (tons)	Total Platform Weight (tons)	Number Jacket Legs	Number Main Piles and Size	Number Skirt Piles and Size	Number Lifts to Install Decks
A 188 ft. water depth	1,500				Drill Deck Structure 425 Drilling Rig 237 Production Deck 325 Pipe Rack 370 36 Items Total	1,357		12	12/40" to 80' BML	0	
B 190 ft. water depth	1,500					1,357		12		0	
Hillhouse 190 ft. water depth	1,500					1,357		8		0	
C 192 ft. water depth	1,500					1,200		12		0	
Gilda 205 ft. water depth	3,220	1,030 tons BML	4,830	9,080 (w/cond.) 4,250 (w/o cond.)	Drill Deck Equip. 1,004 Drill Deck Steel 260 Drill Rig 227 Prod. Deck Equip. 798 Prod. Deck Steel 305 Vert. added mass 1,192	3,792	12,872 (w/cond) 8,042 (w/o cond.)	12	12/48" 150 to 190' BML	0	

Platform	Jacket Weight (tons)	Total Pile Weight (tons)	Total Conductor Weight (tons)	Total Jacket Weight (tons)	Module Weights or Lift Weights (tons)	Total Deck Weight (tons)	Total Platform Weight (tons)	Number Jacket Legs	Number Main Piles and Size	Number Skirt Piles and Size	Number Lifts to Install Decks
Irene 242 ft. water depth	3,100	2,537		5,637 (w/o cond.)	West Section 1,000 tons E Section 860 Quarters 220 Cranes 30 Flare 25 Misc.	2,500		8	8/60"	0	
Elly 255 ft. water depth	3,300	2,600	0 No conductors	5,900	Cap trusses 395 Prod. Skid 441 SW deck 495 Gen. Bld. 348 NW deck 436 Comp. Skid 295 E deck 697 Control Bld. 260 C deck 496 Others ---- Prod. Skid 418	4,700	10,600	12	4-48" to 250' BML 2-42" interior to 220' BML 6-48" exterior to 220' BML	0	16 main lifts 10 modules
Ellen 265 ft. water depth	3,200	1,960	2,940	8,100	E Deck 867 Quarter 505 W Deck 816 Mud pumps 707 C Deck 813 Sub St. 1-445 Misc. --- Sub St. 2-445	5,300	13,400	8	4/66" to 260' BML 4/48" to interior 230' BML	0	17 main lifts 12 modules
Habitat 290 ft. water depth	2,550				Skid Base 70 Derrick w/ sub. 562 Pump Package 1,363 Engine Package 639 Quarters 200 Reser. Mud/P Tank 680	3,514		8			
Grace 318 ft. water depth	3,090 w/appurtenances	1,822		4,912 (w/o cond.)		3,800		12	12/42"	8/48"	

Platform	Jacket Weight (tons)	Total Pile Weight (tons)	Total Conductor Weight (tons)	Total Jacket Weight (tons)	Module Weights or Lift Weights (tons)	Total Deck Weight (tons)	Total Platform Weight (tons)	Number Jacket Legs	Number Main Piles and Size	Number Skirt Piles and Size	Number Lifts to Install Decks
Hidalgo 430 ft. water depth	10,950			11,600	W/H Mod. 1,378 Prod. Mod 1,254 Comp. Mod 1,171 Util Mod. 955 Power Mod. 1,233 Pipe rack 266 Cap truss 1,071 Crew Quarters ----	7,500 - 8,100	19,100 - 19,700	8	8/60"	8/72"	8 main lifts
Hermosa 603 ft. water depth	17,000			18,500	W/h Mod. 1,203 Prod. Mod. 1,269 Comp. Mod. 1,113 Util Mod. 1,150 Power Mod. 1,297 Pipe rack 320 Cap truss 777 Crew Quarters 700	7,830	26,330	8	8/60"	12/72"	9 main lifts
Harvest 675 ft. water depth	16,633	3,383 Piles to 15' BML	2,334 Conductors from 60' above water to15' BML	22,350	N Deck 1,698 Comp. 1,445 S Deck 1,425 Flare 50 G/SG 1,429 Quarters 921 C/U 931 Prod. 1,125 Total 9,024	9,024	31,374	8	8/60" to 255' BML	20/72" to 235' BML	
Eureka 700 ft. water depth	19,000	5,000	6,000		Modules up to 1,200 tons	2,000 Deck 6,000 Equip. 8,000 Total	38,000	8	0	24/60"	10 modules

Platform	Jacket Weight (tons)	Total Pile Weight (tons)	Total Conductor Weight (tons)	Total Jacket Weight (tons)	Module Weights or Lift Weights (tons)	Total Deck Weight (tons)	Total Platform Weight (tons)	Number Jacket Legs	Number Main Piles and Size	Number Skirt Piles and Size	Number Lifts to Install Decks
Gail 739 ft. water depth	18,300	8,370			East Deck 1,894 West Deck 1,850 Driling Mod. 953 Comp. Mod. 869 Gen. SG Mod. 1,178 Flare 77 Crew Quarters 873	7,693		8	8/60"	12/72"	7 main lifts
Hondo 842 ft. water depth	12,200	5,300	3,700	21,200		8,450	29,650	8	8/48" & 42" inserts to 340' BML	12/54" & 48" inserts to 250' BML	30 lifts
Heritage 1,075 ft. water depth	32,420	20,750	10,250	63,420	WMSF 509 AU Mod. 1,040 EMSF 403 Quarters 947 AL Mod. 886 CU/DU 804/800 CL Mod. 861 BU 1,310 BL 1,050 BX 237 DL 854 Flare 125	9,826	73,246	8	8/72"	26/84"	13 main lifts
Harmony 1,198 ft. water depth	42,900	18,750	11,200	72,850	WMSF 509 AU 1,025 EMSF 403 CU 804 AL Mod. 896 Quarters 957 CL 866 BU 1,310 BL 1,046 DU 800 DL 854 BX 242 Flare 127	9,839	82,689	8	8/72"	20/84"	13 main lifts

Appendix F: Platform, Deck and Jacket Removal Cost Calculations

	Project I	
Platform Name	Hogan	Houchin
Water Depth (feet)	154	163
Derrick Barge Capacity (tons)	500	500
Rig Up/Rig Down Days	2	2
Deck Weight (tons)	2,259	2,591
Deck Modules		
Max Weight Per module (tons)	350	430
Number of Modules	8	9
Days per Module	1.3	1.2
Total Deck Removal Days	10	11
Jacket Weight (tons)	1,263	1,486
Jacket Sections		
Max Weight per Section (tons)	300	300
Number of Sections	5	5
Days per Section	2.5	2.5
Total Jacket Removal Days	13	13
Number of Piles	12	8
Pile Cut/Removal Days	3	2
Total HLV Days	28	28
HLV Cost Per Day	$80,000	$80,000
Support Services/Day Cost	$55,000	$55,000
Total Cost w/o Weather Contingency	$3,780,000	$3,780,000
Total Cost w/ 10%Weather Contingency	$4,158,000	$4,158,000

Project II

Platform Name	Edith	Elly	Ellen	Eureka
Water Depth (feet)	161	255	265	700
Derrick Barge Capacity (tons)	2000	2000	2000	2000
Rig Up/Rig Down Days	2	2	2	2
Deck Weight (tons)	4,134	4,700	5,300	8,000
Deck Modules				
Max Weight Per module (tons)	585	697	867	1,200
Number of Modules	12	10	12	10
Days per Module	0.5	0.5	0.5	0.5
Total Deck Removal Days	6	5	6	5
Jacket Weight (tons)	3,454	3,300	3,200	19,000
Jacket Sections				
Max Weight per Section (tons)	1,200	1,100	1,600	1,000
Number of Sections	3	3	2	19
Days per Section	1.7	1.7	2	3.2
Total Jacket Removal Days	5	5	4	60
Number of Piles	12	12	8	24 skirt
Pile Cut/Removal Days	3	3	2	6
Total HLV Days	16	15	14	73
HLV Cost Per Day	$185,000	$185,000	$185,000	$185,000
Support Services/Day Cost	$65,000	$65,000	$65,000	$65,000
Total Cost w/o Weather Contingency	$4,000,000	$3,750,000	$3,500,000	$18,250,000
Total Cost w/ 10% Weather Contingency	$4,400,000	$4,125,000	$3,850,000	$20,075,000

Project III

Platform Name	Gina	A	B	C	Henry	Hillhouse
Water Depth (feet)	95	188	190	192	173	190
Derrick Barge Capacity (tons)	2,000	2,000	2,000	2,000	2,000	2,000
Rig Up/Rig Down Days	2	2	2	2	2	2
Deck Weight (tons)	447	1,357	1,357	1,357	1,371	1,200
Deck Modules						
Max Weight Per module (tons)	418	425	425	425	550	425
Number of Modules	2	4	4	4	4	4
Days per Module	1	1	1	1	1	1
Total Deck Removal Days	2	4	4	4	4	4
Jacket Weight (tons)	434	1,500	1,500	1,500	1,311	1,200
Jacket Sections						
Max Weight per Section (tons)	434	1,500	1,500	1,500	1,311	1,200
Number of Sections	1	1	1	1	1	1
Days per Section	1	2	2	2	2	2
Total Jacket Removal Days	1	2	2	2	2	2
Number of Piles	6	12	12	12	8	8
Pile Cut/Removal Days	1	3	3	3	2	2
Total HLV Days	6	11	11	11	10	10
HLV Cost Per Day	$185,000	$185,000	$185,000	$185,000	$185,000	$185,000
Support Services/Day Cost	$40,000	$65,000	$65,000	$65,000	$65,000	$65,000
Total Cost w/o Weather Contingency	$1,350,000	$2,750,000	$2,750,000	$2,750,000	$2,500,000	$2,500,000
Total Cost w/ 10% Weather Contingency	$1,485,000	$3,025,000	$3,025,000	$3,025,000	$2,750,000	$2,750,000

Project IV

Platform Name	Gilda	Irene*	Habitat
Water Depth (feet)	205	242	290
Derrick Barge Capacity (tons)	2,000	2,000	2,000
Rig Up/Rig Down Days	2	2	2
Deck Weight (tons)	3,792	2,500	3,514
Deck Modules			
Max Weight Per module (tons)	1,004	1,000	1,363
Number of Modules	6	5	6
Days per Module	0.5	0.5	0.5
Total Deck Removal Days	3	3	3
Jacket Weight (tons)	3,220	3,100	2,550
Jacket Sections			
Max Weight per Section (tons)	1,100	1,600	1,300
Number of Sections	3	2	2
Days per Section	1.7	2.5	2
Total Jacket Removal Days	5	5	4
Number of Piles	12	8	8
Pile Cut/Removal Days	3	2	2
Total HLV Days	13	12	11
HLV Cost Per Day (dollars)	$185,000	$185,000	$185,000
Support Services/Day Cost	$65,000	$65,000	$65,000
Total Cost w/o Weather Contingency	$3,250,000	$3,000,000	$2,750,000
Total Cost w/ Weather Contingency	$3,575,000	$3,600,000	$3,025,000

Weather Contingency is 10% unless marked with an asterisk* in which case it is 20 %

Project V

Platform Name	Grace	Hidalgo*	Hermosa*	Harvest*	Gail
Water Depth (feet)	318	430	603	675	739
Derrick Barge Capacity (tons)	4,400	4,400	4,400	4,400	4,400
Rig Up/Rig Down Days	2	2	2	2	2
Deck Weight (tons)	3,800	8,100	7,830	9,024	7,693
Deck Modules					
Max Weight Per module (tons)	1,000	1,378	1,269	1,698	1,894
Number of Modules	6	8	8	9	7
Days per Module	0.5	0.5	0.5	0.5	0.5
Total Deck Removal Days	3	4	4	5	4
Jacket Weight (tons)	3,090	10,950	17,000	16,633	18,300
Jacket Sections					
Max Weight per Section (tons)	1,100	1,000	1,000	1,000	1,000
Number of Sections	3	11	17	17	19
Days per Section	1.7	3.7	3.2	3.4	3.4
Total Jacket Removal Days	5	41	55	57	65
Number of Piles	12 main 8 skirt	8 main 8 skirt	8 main 8 skirt	8 main 20 skirt	8 main 12 skirt
Pile Cut/Removal Days	5	4	4	7	5
Total HLV Days	15	51	65	71	76
HLV Cost Per Day	$225,000	$225,000	$225,000	$225,000	$225,000
Support Services/Day Cost	$65,000	$65,000	$65,000	$65,000	$65,000
Total Cost w/o Weather Contingency	$4,350,000	$14,790,000	$18,850,000	$20,590,000	$22,040,000
Total Cost w/ Weather Contingency	$4,785,000	$17,748,000	$22,620,000	$24,708,000	$24,244,000

Weather Contingency is 10 % unless marked with an asterisk* in which case it is 20 %

Project VI

Platform Name	Hondo	Heritage*	Harmony
Water Depth (feet)	842	1075	1198
Derrick Barge Capacity (tons)	4,400	4,400	4,400
Rig Up/Rig Down Days	2	2	2
Deck Weight (tons)	8,450	9,826	9,839
Deck Modules			
Max Weight Per module (tons)	1,310	1,310	1,310
Number of Modules	13	13	13
Days per Module	1	1	1
Total Deck Removal Days	7	7	7
Jacket Weight (tons)	12,200	32,420	42,900
Jacket Sections			
Max Weight per Section (tons)	1,000	1,000	1,000
Number of Sections	13	33	43
Days per Section	4	2.6	2.2
Total Jacket Removal Days	52	86	97
Number of Piles	8 main 12 skirt	8 main 26 skirt	8 main 20 skirt
Pile Cut/Removal Days	5	9	7
Total HLV Days	66	104	113
HLV Cost Per Day	$225,000	$225,000	$225,000
Support Services/Day Cost	$65,000	$65,000	$65,000
Total Cost w/o Weather Contingency	$19,140,000	$30,160,000	$32,770,000
Total Cost w/ Weather Contingency	$21,054,000	$36,192,000	$36,047,000

Weather Contingency is 10 % unless marked with an asterisk * in which case it is 20 %

Appendix G: Pipelines and Powercables Spreadsheets

Pipelines and Powercables – Identified To Be Left In Place

Input Data	Water Depth		
	Less than 200'	200 ' to 500'	Greater than 500 '
Mob/Demob Rate ($)	766000	1060000	1060000
On-Site Operations ($/day)	97600	93600	93600
Decommissioning Time (Hours)			
Cut and Bury a Pipeline End	2	2	2
Cut and Lift 120' pipe (powercable) section	5	6	7
Disposal/Miscellaneous ($/mile pipeline)	116025	116025	116025
Weather Contingency (%)*	10	10	10
* Pt. Arguello Unit, Heritage and Irene is	20		

Project I-Eastern Santa Barbara Channel

Number of Pipelines 7

Number of Powercables 2

Pipeline	**Deepest Water Depth (ft)**	**Platform Disconnect**	**Add'l Sections-Removal[1]**	**Days for OCS Work (with contingencies)**	**Mob/Demob**	**Dive Operations**	**Disposal/Misc.**	**Total OCS Cost**
Houchin to Hogan Oil	163 / 154	2		0.14	85111	13420	5274	103805
Houchin to Hogan Gas	163 / 154	2		0.14	85111	13420	5274	103805
Houchin to Hogan Gas Lift	163 / 154	2		0.14	85111	13420	5274	103805
Hogan to Shore Emulsion	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Gas	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Water	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Gas Lift	154	1	2	0.53	85111	51443	7911	144465
Powercable								
Houchin to Hogan	1	2		0.14	85111	13420	5274	103805
Hogan to Shore	154	1		0.07	85111	6710	2637	94458
Total				**2.73**	**766000**	**266163**	**55376**	**1087539**

Project II-South Coast (Los Angeles/Orange County)

Number of Pipelines 6

Number of Powercables 1

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Operations	Disposal/Misc.	Total OCS Cost
Eureka to Elly Oil	700 / 225	2		0.14	151429	12870	5274	169572
Eureka to Elly Gas	700 / 225	2	2	0.78	151429	72930	10548	234906
Eureka to Elly Water	700 / 225	2		0.14	151429	12870	5274	169572
Edith to Elly Oil	161 / 225	2		0.14	151429	13420	5274	170122
Edith to Eva Gas	161 / ?	2		0.14	151429	13420	5274	170122
Elly to Shore Oil	255	1	2	0.62	151429	57915	7911	217254
Powercable								
Edith to Shore	161	1		0.07	151429	6710	2637	160776
Elly to Eureka	Complete Removal-See "Powercable Removal" Spreadsheet							
TOTAL				**2.02**	**1060000**	**190135**	**42191**	**1292326**

Project III-Eastern Half of Santa Barbara Channel

Number of Pipelines 15

Number of Powercables 7

Pipeline	**Water depth (ft)**	**Platform Disconnect**	**Add'l Sections-Removal**[1]	**Days for OCS Work (with contingencies)**	**Mob/Demob**	**Dive Operations**	**Disposal/Misc.**	**Total OCS Cost**
"C" to "B" Oil	192 / 190	2		0.1	34818	13420	5274	53512
"C" to "B" Gas	192 / 190	2		0.1	34818	13420	5274	53512
"C" to "B" Water	192 / 190	2		0.1	34818	13420	5274	53512
"B" to "A" Oil	190 / 188	2	1	0.4	34818	35787	7911	78516
"B" to "A" Gas	190 / 188	2	1	0.4	34818	35787	7911	78516
Hillhouse to "A" Oil	190 / 188	2		0.1	34818	13420	5274	53512
Hillhouse to "A" Gas	190 / 188	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Oil	173 / 190	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Gas	173 / 190	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Water	173 / 190	2		0.1	34818	13420	5274	53512
"B" to Shore Oil	190	1	1	0.3	34818	29077	5274	69169
"B" to Shore Gas	190	1	1	0.3	34818	29077	5274	69169
"B" to Shore Water	190	1	1	0.3	34818	29077	5274	69169
Gina to Shore Gas	95	1		0.1	34818	6710	2637	44165
Gina to Shore Oil/Water	95	1		0.1	34818	6710	2637	44165
Powercable								
"C" to "B"	192 / 190	2		0.1	34818	13420	5274	53512
"B" to "A"	190 / 188	2		0.1	34818	13420	5274	53512
Hillhouse to "A"	190 / 188	2		0.1	34818	13420	5274	53512
Henry to Hillhouse	173 / 190	2		0.1	34818	13420	5274	53512
"A" to Shore	188	1		0.1	34818	6710	2637	44165
Gina to Shore	95	1		0.1	34818	6710	2637	44165
TOTAL				**3.55**	**731182**	**346683**	**105477**	**1183342**

Project IV-Santa Barbara Channel/Southern Santa Maria Basin

Number of Pipelines 7

Number of Powercables 4

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Gilda to Shore Oil	205	1		0.07	96364	6435	2637	105436
Gilda to Shore Gas	205	1		0.07	96364	6435	2637	105436
Gilda to Shore Water	205	1		0.07	96364	6435	2637	105436
Irene to Shore Oil	242	1		0.08	96364	7020	2637	106021
Irene to Shore Gas	242	1	1	0.38	96364	35100	5274	136738
Irene to Shore Water	242	1	1	0.38	96364	35100	5274	136738
Habitat to Shore Gas	290	1	1	0.34	96364	32175	5274	133813
Powercable								
Gilda to Shore	205	1		0.07	96364	6435	2637	105436
Irene to Shore	242	1		0.08	96364	7020	2637	106021
Habitat to "A"	290 / 188	2		0.14	96364	12870	5274	114508
TOTAL				**1.66**	**963636**	**155025**	**36917**	**1155578**

Project V-Santa Barbara Channel Souther Santa Maria Basin

Number of Pipelines	11
Number of Powercables	0

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Gail to Grace Oil	739 / 318	2	1	0.46	96364	42900	7911	147174
Gail to Grace Gas	739 / 318	2	1	0.46	96364	42900	7911	147174
Gail to Grace Gas (sour)	739 / 318	2	1	0.46	96364	42900	7911	147174
Harvest to Hermosa Oil	675 / 603	2		0.15	96364	14040	5274	115678
Harvest to Hermosa Gas	675 / 603	2		0.15	96364	14040	5274	115678
Hidalgo to Hermosa Oil	430 / 675	2		0.15	96364	14040	5274	115678
Hidalgo to Hermosa Gas	430 / 675	2		0.15	96364	14040	5274	115678
Grace to Shore Oil	318	1		0.07	96364	6435	2637	105436
Grace to Shore Gas	318	1		0.07	96364	6435	2637	105436
Hermosa to Shore Oil	603	1		0.08	96364	7020	2637	106021
Hermosa to Shore Gas	603	1		0.08	96364	7020	2637	106021
TOTAL				**2.26**	**1060000**	**211770**	**55376**	**1327146**

Project VI-Western Santa Barbara Channel

Number of Pipelines 7

Number of Powercables 4

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Hondo to Harmony Oil	842 / 1198	2		0.14	151429	12870	5274	169572
Heritage to Harmony Oil	1075 / 1198	2		0.15	151429	14040	5274	170742
Heritage to Harmony Gas	1075 / 1198	2		0.15	151429	14040	5274	170742
Harmony to Hondo Gas	1198 / 842	2		0.14	151429	12870	5274	169572
Harmony to Shore Oil	1198	1		0.07	151429	6435	2637	160501
Harmony to Shore Water	1198	1		0.07	151429	6435	2637	160501
Hondo to Shore Gas	842	1		0.07	151429	6435	2637	160501
Powercable								
Heritage to Harmony	Complete Removal-See "Powercable Removal" Spreadsheet							
Harmony to Hondo	Complete Removal-See "Powercable Removal" Spreadsheet							
Hondo to Harmony A	Complete Removal-See "Powercable Removal" Spreadsheet							
Hondo to Harmony B	Complete Removal-See "Powercable Removal" Spreadsheet							
Hondo to Salm	Complete Removal-See "Powercable Removal" Spreadsheet							
Heritage to Shore	Complete Removal-See "Powercable Removal" Spreadsheet							
Harmony to Shore A	Complete Removal-See "Powercable Removal" Spreadsheet							
Harmony to Shore B	Complete Removal-See "Powercable Removal" Spreadsheet							
TOTAL				**0.78**	**1060000**	**73125**	**29006**	**1162131**

Input Data

	Water Depth		
	Less than 200'	200 ' to 500'	Greater than 500 '
Mob/Demob Rate ($)	766000	1060000	1060000
On-Site Operations ($/day)	97600	93600	93600
Decommissioning Time (Hours)			
Cut and Bury a Pipeline End	2	2	2
Cut and Lift 120' pipe (powercable) section	5	6	7
Disposal/Miscellaneous ($/mile pipeline)	116025	116025	116025
Weather Contingency (%)*	10	10	10
* Pt. Arguello Unit, Heritage and Irene is	20		

Project I-Eastern Santa Barbara Channel

Number of Pipelines 7

Number of Powercables 2

Pipeline	Deepest Water Depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Operations	Disposal/Misc.	Total OCS Cost
Houchin to Hogan Oil	163 / 154	2		0.14	85111	13420	5274	103805
Houchin to Hogan Gas	163 / 154	2		0.14	85111	13420	5274	103805
Houchin to Hogan Gas Lift	163 / 154	2		0.14	85111	13420	5274	103805
Hogan to Shore Emulsion	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Gas	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Water	154	1	2	0.53	85111	51443	7911	144465
Hogan to Shore Gas Lift	154	1	2	0.53	85111	51443	7911	144465
Total				**2.52**	**595778**	**246033**	**47465**	**889276**

Project II-South Coast (Los Angeles/Orange County)

Number of Pipelines 6

Number of Powercables 1

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Operations	Disposal/Misc.	Total OCS Cost
Eureka to Elly Oil	700 / 225	2		0.14	151429	12870	5274	169572
Eureka to Elly Gas	700 / 225	2	2	0.78	151429	72930	10548	234906
Eureka to Elly Water	700 / 225	2		0.14	151429	12870	5274	169572
Edith to Elly Oil	161 / 225	2		0.14	151429	13420	5274	170122
Edith to Eva Gas	161 / ?	2		0.14	151429	13420	5274	170122
Elly to Shore Oil	255	1	2	0.62	151429	57915	7911	217254
TOTAL				**1.95**	**908571**	**183425**	**39554**	**1131550**

Project III-Eastern Half of Santa Barbara Channel

Number of Pipelines 15

Number of Powercables 7

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Operations	Disposal/Misc.	Total OCS Cost
"C" to "B" Oil	192 / 190	2		0.1	34818	13420	5274	53512
"C" to "B" Gas	192 / 190	2		0.1	34818	13420	5274	53512
"C" to "B" Water	192 / 190	2		0.1	34818	13420	5274	53512
"B" to "A" Oil	190 / 188	2	1	0.4	34818	35787	7911	78516
"B" to "A" Gas	190 / 188	2	1	0.4	34818	35787	7911	78516
Hillhouse to "A" Oil	190 / 188	2		0.1	34818	13420	5274	53512
Hillhouse to "A" Gas	190 / 188	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Oil	173 / 190	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Gas	173 / 190	2		0.1	34818	13420	5274	53512
Henry to Hillhouse Water	173 / 190	2		0.1	34818	13420	5274	53512
"B" to Shore Oil	190	1	1	0.3	34818	29077	5274	69169
"B" to Shore Gas	190	1	1	0.3	34818	29077	5274	69169
"B" to Shore Water	190	1	1	0.3	34818	29077	5274	69169
Gina to Shore Gas	95	1		0.1	34818	6710	2637	44165
Gina to Shore Oil/Water	95	1		0.1	34818	6710	2637	44165
TOTAL				**2.86**	**522273**	**279583**	**79108**	**880964**

Project IV-Santa Barbara Channel/Southern Santa Maria Basin

Number of Pipelines 7

Number of Powercables 4

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Gilda to Shore Oil	205	1		0.07	96364	6435	2637	105436
Gilda to Shore Gas	205	1		0.07	96364	6435	2637	105436
Gilda to Shore Water	205	1		0.07	96364	6435	2637	105436
Irene to Shore Oil	242	1		0.08	96364	7020	2637	106021
Irene to Shore Gas	242	1	1	0.38	96364	35100	5274	136738
Irene to Shore Water	242	1	1	0.38	96364	35100	5274	136738
Habitat to Shore Gas	290	1	1	0.34	96364	32175	5274	133813
TOTAL				**1.38**	**674545**	**128700**	**26369**	**829615**

Project V-Santa Barbara Channel Southern Santa Maria Basin

Number of Pipelines 11

Number of Powercables 0

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Gail to Grace Oil	739 / 318	2	1	0.46	96364	42900	7911	147174
Gail to Grace Gas	739 / 318	2	1	0.46	96364	42900	7911	147174
Gail to Grace Gas (sour)	739 / 318	2	1	0.46	96364	42900	7911	147174
Harvest to Hermosa Oil	675 / 603	2		0.15	96364	14040	5274	115678
Harvest to Hermosa Gas	675 / 603	2		0.15	96364	14040	5274	115678
Hidalgo to Hermosa Oil	430 / 675	2		0.15	96364	14040	5274	115678
Hidalgo to Hermosa Gas	430 / 675	2		0.15	96364	14040	5274	115678
Grace to Shore Oil	318	1		0.07	96364	6435	2637	105436
Grace to Shore Gas	318	1		0.07	96364	6435	2637	105436
Hermosa to Shore Oil	603	1		0.08	96364	7020	2637	106021
Hermosa to Shore Gas	603	1		0.08	96364	7020	2637	106021
TOTAL				**2.26**	**1060000**	**211770**	**55376**	**1327146**

Project VI-Western Santa Barbara Channel

Number of Pipelines 7

Number of Powercables 4

Pipeline	Water depth (ft)	Platform Disconnect	Add'l Sections-Removal[1]	Days for OCS Work (with contingencies)	Mob/Demob	Dive Boat	Disposal/Misc.	Total OCS Cost
Hondo to Harmony Oil	842 / 1198	2		0.14	151429	12870	5274	169572
Heritage to Harmony Oil	1075 / 1198	2		0.15	151429	14040	5274	170742
Heritage to Harmony Gas	1075 / 1198	2		0.15	151429	14040	5274	170742
Harmony to Hondo Gas	1198 / 842	2		0.14	151429	12870	5274	169572
Harmony to Shore Oil	1198	1		0.07	151429	6435	2637	160501
Harmony to Shore Water	1198	1		0.07	151429	6435	2637	160501
Hondo to Shore Gas	842	1		0.07	151429	6435	2637	160501
TOTAL				**0.78**	**1060000**	**73125**	**29006**	**1162131**

Cut Up and Retrieval Method

Input Data		
Mob/Demob Rate (dollars)	500000	
Removal Rate	0.43	mi/day
Day Rate	39600	$/day
Disposal/Miscellaneous	98475	/ mile
Weather Contingency*	10	%
*Platform Heritage	20	%

Project VI- Western Santa Barbara Channel (Santa Ynez Unit) Powercables-Cut Up and Retrieve

Number of Powercables 9

Powercables	Length (miles)	Days for Work (with contingencies)	Mob/Demob	Removal Costs	Disposal/Misc.	Total Cost
Heritage to Harmony	1	2.80	55556	110880	98475	264911
Harmony to Hondo	1	2.57	55556	101640	98475	255671
Hondo to Harmony A	4	10.27	55556	406560	393900	856016
Hondo to Harmony B	4	10.27	55556	406560	393900	856016
Hondo to Salm	1	2.57	55556	101640	98475	255671
Heritage to Shore	17	47.60	55556	1884960	1674075	3614591
Heritage to Shore (failed cable)	12	33.60	55556	1330560	1181700	2567816
Harmony to Shore A	1	2.57	55556	101640	98475	255671
Harmony to Shore B	1	2.57	55556	101640	98475	255671
					TOTAL=	**9182030**

Project II- South Coast (Los Angeles/Orange County Beta Unit) Powercables-Cut Up and Retrievel

Number of Powercables 2

Powercables	Length (miles)	Days for Work (with contingencies)	Mob/Demob	Removal Costs	Disposal/Misc.	Total Cost
Elly to Eureka East	1.5	3.85	250000	152460	147713	550173
Elly to Eureka West	1.5	3.85	250000	152460	147713	550173
					TOTAL=	**1100345**

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.

MMS Securing Ocean Energy & Economic Value for America

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FISH ASSEMBLAGES ON MUSSEL MOUNDS SURROUNDING SEVEN OIL PLATFORMS IN THE SANTA BARBARA CHANNEL AND SANTA MARIA BASIN

Milton S. Love, Jennifer Caselle and Linda Snook

ABSTRACT

Mussel shell mounds surround all offshore oil and gas platforms in California. These biotic reefs are formed when large clumps of mussels are dislodged from the superstructure. In 1997, we surveyed the fish assemblages on the mussel mounds surrounding seven platforms in the Santa Barbara Channel and in the Santa Maria Basin, California. The objectives of this study were (1) to document the fish assemblages on the mussel reefs, (2) to investigate the spatial patterns of use of parts of mussel reefs by various fish species and (3) to compare species assemblages, population densities and fish sizes on the mussel reefs with those on adjacent platform bottoms. We observed at least 35 species on the mussel mounds, 18 of which were rockfishes (genus *Sebastes*). Most of the species that were found both in large numbers and were encountered at a number of mussel mounds were solitary, benthic forms. Most species appeared to be non-randomly distributed among parts of the mussel mounds with different percent shell cover. All species combined and all rockfish species tended to be slightly but significantly over-represented on areas of 80–100% cover (all species: $\chi^2 = 227$, n = 5, P < 0.001, all rockfishes: $\chi^2 = 211$, n = 5, P < 0.001). Species richness, density (fish 100 m^{-2}) and mean lengths of fishes were all less on the mussel mounds than on the platform bottoms. However, cluster analysis revealed that the species composition on each mussel mound is more similar to its adjacent platform bottom than to other mounds. There did not appear to be a distinct "mussel mound community", instead the mussel mounds should be considered as an integral part of the oil platform system.

Since 1958, offshore oil platforms have been a part of the southern California marine ecosystem. Currently, there are 19 platforms in operation in the Santa Barbara Channel and off central California (Fig. 1). While some of these platforms are as small as 23 m on the side at the surface, the newer structures are over 100 m long (MBC, 1987).

These platforms have a finite economic lifespan and, as they become uneconomical, questions have arisen as to their final disposition. Through 1997, all uneconomical structures have been removed. However, today there is considerable debate regarding the fate of oil platforms. In particular, questions have arisen as to the potential ecological and economic importance of the platforms as artificial reef systems (Seaman and Sprague, 1991). Therefore, understanding the biological communities on and around the platforms is one crucial element to deciding whether to remove or convert obsolete structures into permanent fish habitat.

A major feature of these platforms is the large number of sessile invertebrates (primarily mussels, barnacles and anemones) that encrust the pilings, crossbeams and well pipes. Among animals encrusting these surfaces, mussels (*Mytilus californianus* and *M. galloprovincialis*) are the dominant animals in about the first 15 m of the water column and are occasionally found down to at least 24 m (Carlisle et al., 1964). In shallow waters, thick layers of mussels tend to cover all available surfaces. These bivalves are held to the platform and to each other by byssal threads. Eventually, the weight of these mussel masses is sufficiently large that the holding strength of the byssal threads is approached or surpassed. When this occurs, wave action or storm surge loosens and then dislodges mussel clumps and they fall to the bottom. The amount of mussels dislodged can be substantial; on one platform an estimated 70 kg wet weight of mussels fell to the seafloor each day (Wolfson et al., 1979).

As these invertebrates cover the bottom, they form an extensive, low-relief reef, called a "mussel mound", that may cover a fairly extensive area. Current estimates are that these mounds rise above the sea floor an average of 6–8 m and are on average 60 m in diameter (C. Fusaro, pers. comm.). While mussels form the bulk of the mussel mounds, a large variety of invertebrates, including various species of crabs, seastars, sea cucumbers, anemones and other organisms are also common (Simpson, 1977).

However, while there have been some surveys of the invertebrates on these mounds, there has been no directed research on the fishes inhabiting these communities. In 1997, as part of a survey of the fishes living on offshore platforms of southern and central California, we conducted a survey of the fishes living on these mussel reefs. The objectives of this study were (1) to document the fish assemblages on the mussel reefs adjacent to seven oil platforms, (2) to investigate the spatial patterns of use of parts of mussel reefs by various fish species and (3) to compare species assemblages, population densities and fish sizes on the mussel reefs with those on adjacent platform bottoms.

Methods

Using the submersible Delta, we surveyed fish assemblages on mussel mounds surrounding seven oil platforms situated in the Santa Barbara Channel and Santa Maria Basin (Fig. 1). These surveys were part of a larger study investigating fish communities on the oil platforms (Love et al., in press). Surveys were conducted between 10–14 October 1997. Late fall is the optimal time to conduct surveys of this type because of generally good weather and water clarity. In addition, many species have completed their seasonal juvenile recruitment by this time. We conducted belt transects on the mussel mounds. The submarine maintained a speed of approximately 0.5 kt and stayed approximately 1m above the bottom. Dives were conducted during daylight hours, between 1 hr after sunrise and 2 hr before sunset. For a discussion of the oceanography around the survey areas see Love et al., (in press).

During the transects, researchers made their observations from the central starboard side viewing port. An externally mounted Hi-8 mm video camera with associated lights filmed the same viewing field as seen by the observers. Observers identified, counted and estimated the lengths of all fishes and verbally recorded those data on the video. All fishes within 2 m of the submarine were counted. Fish lengths were estimated during the survey using a pair of dual-beam lasers mounted on either side of the external video camera. The projected reference spots were 20 cm apart and were visible both to the observer and the video camera. An environmental monitoring system aboard the submarine continuously recorded date and time, depth and altitude of the vessel above the sea floor.

After the dive, the environmental data was overlaid on the original videotape. Either aboard the research vessel or in the laboratory, we then reviewed the transect videos. For each fish, we recorded: (1) species to lowest identifiable taxa; (2) estimated total length to the nearest cm; and (3) percent shell coverage of the substrata under each individual.

We estimated transect length by first determining the submersible speed. This was done by evaluating a 10 s segment for every one minute of transect. The video was manually forwarded frame by frame and the number of 20 cm segments passing the lasers in a 10 s section was counted. To obtain speed in cm s^{-1}, the number of 20 cm segments per 10 s was divided by 2. All subsamples were then

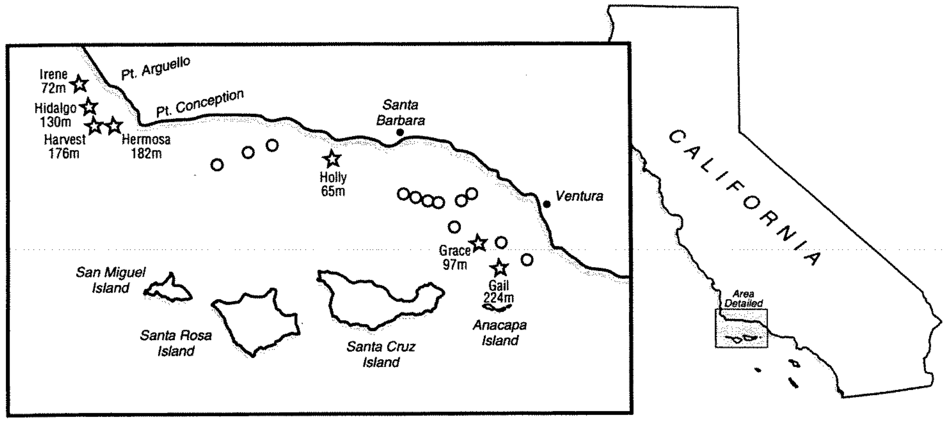

Figure 1. Locations of oil platforms and mussel mounds in the Santa Barbara Channel and Santa Maria Basin.

averaged to obtain mean transect speed (cm^{-s}). The mean speed was then multiplied by the number of seconds in the transect and divided by 100 to obtain transect length in meters. The length was then multiplied by 2 m (the transect width) to obtain transect area, allowing us to estimate fish densities. All densities are presented in fish 100 m^{-2}.

Compared to carbonate reefs, mussel mounds are fairly homogeneous in terms of relief and complexity. Even at the edges of the mounds, we saw no abrupt changes in vertical relief, but rather a slow diminishment of shell cover. In general, the mounds contain few crevices larger than the largest mussel shell. At this time, the spatial extent of the mounds around these platforms is unknown.

Mussel mounds vary in the percentage of mussel cover, ranging from sandy patches with no shells to 100% coverage. Percent cover was categorized as 0–20, 21–40, 41–60, 61–80 and 81–100%. We assessed the patterns of use of the mounds by comparing the number of fishes observed over each area of differing percentage cover with the number of fishes expected according to the proportional availability of that percentage cover. We did this for all mounds combined. For example, if 50% of the area of all the mussel mounds is 100% cover, than assuming no preference for mussel cover, 50% of all fishes observed should be over the 100% cover. We plotted frequency histograms of the observed and expected numbers of fishes for all of the common species in the survey. To test for non-random mound use we used chi-square goodness-of-fit tests. Since calculated values of chi-square are biased when expected frequencies are small, and we observed low numbers of individuals of most species, we only performed the test on species that had zero or one expected frequency less than 5 (Siegel and Castellan, 1988).

Mean lengths of fishes on the mussel mounds and adjacent platforms were compared using Students t-tests in all cases where the variances were equal. When variances were found to be unequal, we used Welch approximate t-test.

To compare the assemblage structure on the mussel mounds with that on the platform bottoms, species abundance data were converted to a triangular matrix of similarity between every pair of samples using the Bray-Curtis similarity coefficient (Bray and Curtis, 1957). Densities (fish 100 m^{-2}) were log (x+1) transformed to decrease the importance of the abundant species. Species present on only one mussel mound or one platform were dropped from the analysis. Samples were clustered using group-average sorting on the Bray-Curtis similarities. The resulting dendrogram ordered samples into groups of increasingly greater similarity based on relative species abundance.

Results

Mussel Mound Assemblages.—Thirty-four identifiable fish species (or groups) were found associated with the mussel mounds of the seven platforms (Table 1). Rockfishes were the most speciose group; a minimum of 18 species was seen. While no species was found on every mound, several species or species groups (Pacific sanddab, lingcod, halfbanded rockfish and *Sebastomus* group) were found on six. Other commonly seen species included greenspotted and rosy rockfishes (five mussel mounds), and painted greenling, shortspine combfish, greenstriped and flag rockfishes, and young-of-the-year (YOY) rockfish (four mounds).

Most of the species that were both abundant (found in large numbers) and common (encountered at a number of mussel mounds) were solitary, benthic forms. Typical of this group were greenspotted, greenstriped and rosy rockfishes, lingcod and Pacific sanddab. The first four species were usually found resting on the bottom and were often sheltered among the mussel shells. We often saw Pacific sanddab swimming slightly above the bottom, although they were also commonly encountered resting either on soft substrata or occasionally on the shells. The only commonly encountered schooling forms were the halfbanded rockfish and YOY rockfishes. Halfbanded rockfish were very abundant on a number of the mounds. They were almost always seen in large, active schools that often numbered in the hundreds of individuals. These schools were usually positioned from less than 1 m to approximately 3 m above the substrata. The small numbers of YOY rockfishes observed on the mounds relative to the platforms were in small groups and usually very close to the shell-covered substratum.

Several other species of schooling fishes were found in large numbers at only single platforms. At Platform Grace, thousands of shiner surfperch were encountered over the mussel mound and adjacent to the platform (Table 1). Pacific sardines were seen over the mussels at Holly and northern anchovies were observed over the mussels at Gail. It is likely that the sardines and anchovies, and perhaps the shiner surfperches, are highly motile and not representative mussel mound fauna.

We recorded 11 identifiable fish species around Platform Irene (Table 1). Halfbanded rockfish were by far the most common species. Pacific sanddab, lingcod (primarily juveniles), copper rockfish (juveniles) and painted greenling were also frequently encountered. The high density of juvenile lingcod on the Irene mussel mounds is particularly noteworthy, as we have never observed this species in such high density on any other artificial or natural structure in southern or central California (Love, unpubl. data). Halfbanded rockfish were also the most abundant species on the Hidalgo mussel mound, where we found 13 species. Young greenspotted rockfish, lingcod, YOY rockfish, rosy rockfish and painted greenling were also quite abundant. Relatively few species (10) were seen at Harvest and it also had the lowest fish densities overall. Sharpchin rockfish, greenstriped rockfish, greenspotted rockfish and poachers were most common. As with a number of other sites, halfbanded rockfish were the most abundant species on the Hermosa mound, where 13 species were noted. Greenspotted rockfish, shortspine combfish and greenstriped rockfish were also fairly common. A school of Pacific sardines dominated the mound at Holly, where 10 species were seen. As noted above, it is likely that this was a transient event, as sardines are highly mobile. Among the more typical species, young copper rockfish were the most abundant, followed by calico rockfish, pink surfperch, rosy rockfish and halfbanded rockfish. While a very large school of shiner surfperch

Table 1. Densities (number fish 100 m^{-2}) of all species observed on each platform (P) and its corresponding mussel mound (MM). Dots indicate zero density values. Platforms and mounds are ordered by depth from shallow to deep with bottom depths given. The minimum number of species was calculated by not including any unidentified species that could be confused with an identifiable species.

		Holly 49 m		Irene 72 m		Grace 97 m		Hildago 130 m		Harvest 176 m		Hermosa 182 m		Gail 224 m		Total	
Name	Common Name	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P
SCORPAENIDAE																	
S. auriculatus	Brown rockfish	·	2.75	·	1.52	·	·	·	·	·	·	·	·	·	·	·	4.28
S. caurinus	Copper rockfish	9.34	21.83	5.25	48.33	·	·	·	·	·	·	·	·	·	·	14.59	70.16
S. carnatus	Gopher rockfish	·	0.21	·	0.44	·	·	·	·	·	·	·	·	·	·	·	0.65
S. chlorostictus	Greenspotted rockfish	·	·	·	·	0.73	0.97	3.75	16.80	3.05	3.46	3.36	9.27	0.16	10.16	11.05	40.67
S. constellatus	Starry rockfish	·	·	·	·	·	·	·	0.54	·	·	·	·	·	·	·	0.54
S. crameri	Darkblotched rockfish	·	·	·	·	·	·	·	·	·	·	·	0.15	1.61	·	1.61	0.15
S. dalli	Calico rockfish	4.87	30.94	·	1.31	·	·	·	·	·	·	·	·	·	·	4.87	32.25
S. elongatus	Greenstriped rockfish	·	·	·	·	·	·	0.72	·	6.71	5.69	1.68	0.15	2.57	0.31	11.68	6.15
S. ensifer	Swordspine rockfish	·	·	·	·	0.36	·	0.54	·	·	·	·	·	3.85	·	4.75	·
S. entomelas	Widow rockfish	·	·	·	0.22	·	72.82	·	0.36	·	·	·	·	·	·	·	73.39
S. flavidus	Yellowtail rockfish	·	0.21	·	0.22	·		·	·	·	·	·	·	·	·	·	0.43
S. goodei	Chilipepper	·	·	·	·	·	0.24	·	·	·	·	·	·	0.64	0.78	0.64	1.02
S. hopkinsi	Squarespot rockfish	·	1.70	·	·	·	·	·	·	·	·	·	·	·	·	·	1.70
S. levis	Cowcod	·	·	·	·	·	·	·	·	·	·	0.34	·	·	0.47	0.34	0.47
S. miniatus	Vermilion rockfish	·	4.45	0.75	29.61	·	1.94	0.18	2.17	·	·	·	·	·	·	0.93	38.17
S. paucispinis	Bocaccio	·	·	0.19	1.31	·	·		1.63	·	·	·	0.15		17.67	0.19	20.75
S. pinniger	Canary rockfish	·	0.21	·	1.09	·	0.24	0.18	1.08	·	·	·	0.15	·	·	0.18	2.78
S. rosaceus	Rosy rockfish	1.22	2.33	1.12	3.48	0.36	0.49	2.68	0.90	·	·	0.34		·	·	5.72	7.20

Table 1. Continued.

		Holly 49 m		Irene 72 m		Grace 97 m		Hildago 130 m		Harvest 176 m		Hermosa 182 m		Gail 224 m		Total	
Name	Common Name	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P
S. rosenblatti	Greenblotched rockfish	·	·	·	·	·	·	·	0.18	0.41	2.47	0.50	0.45	5.94	16.57	6.85	19.67
S. ruberrimus	Yelloweye rockfish	·	·	·	0.22	·	0.24		0.54	·	·	·	·	·	·	·	1.00
S. rubrivinctus	Flag rockfish	0.41	1.48	·	·	1.46	1.70	0.36	14.82	·	·	0.17	0.90	·	0.16	2.39	19.05
S. rufus	Bank rockfish	·	·	·	·	·	·	·	·	0.20	·	·	·	·	·	0.20	·
S. saxicola	Stripetail rockfish	·	·	·	·	·	·	·	·	·	·	·	·	26.17	29.55	26.17	29.55
S. semicinctus	Halfbanded rockfish	1.22	6.99	119.73	9.14	48.08	878.88	38.62	74.62	0.20	·	68.16	333.60	·	·	276.01	1303.24
S. serriceps	Treefish rockfish	·	0.64	·	·	·	0.24	·	·	·	·	·	·	·	·	·	0.88
S. wilsoni	Pygmy rockfish	·	·	·	·	·	·	·	0.36	·	·	·	·	·	·	·	0.36
S. zacentrus	Sharpchin rockfish	·	·	·	·	·	·	·	·	18.11	10.88	·	·	2.41	0.16	20.51	11.04
Scorpaena guttata	Spotted scorpionfish	·	0.42	·	·	0.36	·	·	·	·	·	·	·	·	·	0.36	0.42
Sebastes spp.	Rockfish YOY*	·	0.42	·	302.81	·	·	2.86	16.80	1.02	0.49	0.17	·	1.44	0.63	5.49	321.16
Sebastomus group		·	·	0.19	0.44	0.36	1.70	0.18	0.72	0.61	0.74	0.34	0.75	0.64	2.03	2.32	6.38
HEXAGRAMMIDAE																	
Hexagrammos decagrammus	Kelp greenling	·	0.21	·	0.22	·	·	·	·	·	·	·	·	·	·	·	0.43
Ophiodon elongatus	Lingcod	0.81	0.85	14.24	5.44	0.36	·	3.40	3.07	1.02	1.48	0.67	0.90	·	0.63	20.50	12.37
ZANIOLEPIDIDAE																	
Oxylebius pictus	Painted greenling	0.81	1.27	5.25	7.18	0.36	0.24	1.43	2.35	·	·	·	·	·	0.16	7.85	11.20
Zaniolepis frenata	Shortspine combfish	·	0.21	·	·	1.46	·	0.72	·	0.41	0.25	1.85	0.30	·	·	4.43	0.76
Zaniolepis sp.	Combfish sp.	0.81	·	·	·	1.82	0.49	·	0.18	·	·	·	·	1.61	·	4.24	0.67

Table 1. Continued.

		Holly 49 m		Irene 72 m		Grace 97 m		Hildago 130 m		Harvest 176 m		Hermosa 182 m		Gail 224 m		Total	
Name	Common Name	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P
EMBIOTOCIDAE																	
Cymatogaster aggregata	Shiner surfperch	·	·	·	·	375.17	31.55	·	·	·	·	·	·	·	·	375.17	31.55
Phanerodon atripes	Sharpnose surfperch	·	83.92	·	·	·	·	·	·	·	·	·	·	·	·	·	83.92
Rhacochilus toxotes	Rubberlip surfperch	·	1.27	·	1.74	·	·	·	·	·	·	·	·	·	·	·	3.01
Rhacochilus vacca	Pile perch	·	0.85	0.94	9.58	·	·	·	·	·	·	·	·	·	·	0.94	10.43
Zalembius rosaceus	Pink seaperch	1.22	1.27	0.19	·	2.91	2.91	·	·	·	·	0.17	0.15	·	·	4.49	4.33
COTTIDAE																	
	Unident. sculpins	·	·	·	·	·	·	·	·	·	·	·	·	0.16	·	0.16	·
GOBIIDAE																	
Coryphopterus nicholsi	Blackeye goby	·	1.48	·	·	·	·	·	·	·	·	·	·	·	·	·	1.48
BATHYMASTERIDAE																	
	Unident. Ronquil	·	1.48	0.19	0.22	·	·	·	·	·	·	·	·	0.16	·	0.35	1.70
Rathbunella sp.	Ronquil	·	·	·	·	0.36	·	0.18	·	·	·	·	·	·	·	0.54	·
AGONIDAE																	
	Unident. Poachers	·	·	·	·	·	·	·	·	1.83	0.49	0.50	·	0.96	·	3.30	0.49
BOTHIDAE																	
Citharichthys sordidus	Pacific sanddab	1.62	2.75	17.80	20.90	2.91	1.21	1.07	·	0.20	0.25	1.51	·	·	·	25.13	25.11
PLEURONECTIDAE																	
Microstomus pacificus	Dover sole	·	·	·	·	·	·	·	·	·	·	·	·	0.16	·	0.16	·

Table 1. Continued.

Name	Common Name	Holly 49 m		Irene 72 m		Grace 97 m		Hildago 130 m		Harvest 176 m		Hermosa 182 m		Gail 224 m		Total	
		MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P	MM	P
ENGRAULIDAE																	
Engraulis mordax	Northern anchovy	·	·	·	·	·	·	·	·	·	·	·	·	25.36	0.16	25.36	0.16
CLUPEIDAE																	
Sardinops sagax	Pacific sardine	81.21	·	·	·	·	·	·	·	·	·	·	·	·	·	81.21	·
TORPEDINIDAE																	
Torpedo californica	Pacific electric ray	·	·	·	·	·	·	·	·	·	·	·	·	0.32	·	0.32	·
CARANGIDAE																	
Trachurus symmetricus	Jackmackerel	·	·	·	·	·	·	·	·	·	·	·	·	1.12	·	1.12	·
UNIDENT. FISH	Unidentified fish	0.81	·		0.65	·	0.24	·	·	·	·	0.17	·	0.32	0.16	1.30	1.05
	Total Density	104.4	170.17	165.8	446.1	437.1	996.1	56.9	137.1	33.8	26.2	79.9	347.0	75.6	79.7	953.6	2202.3
	Total min. # of spp.	10	24	11	19	14	15	13	15	10	7	13	11	16	12	34	40

* YOY means young-of-the-year

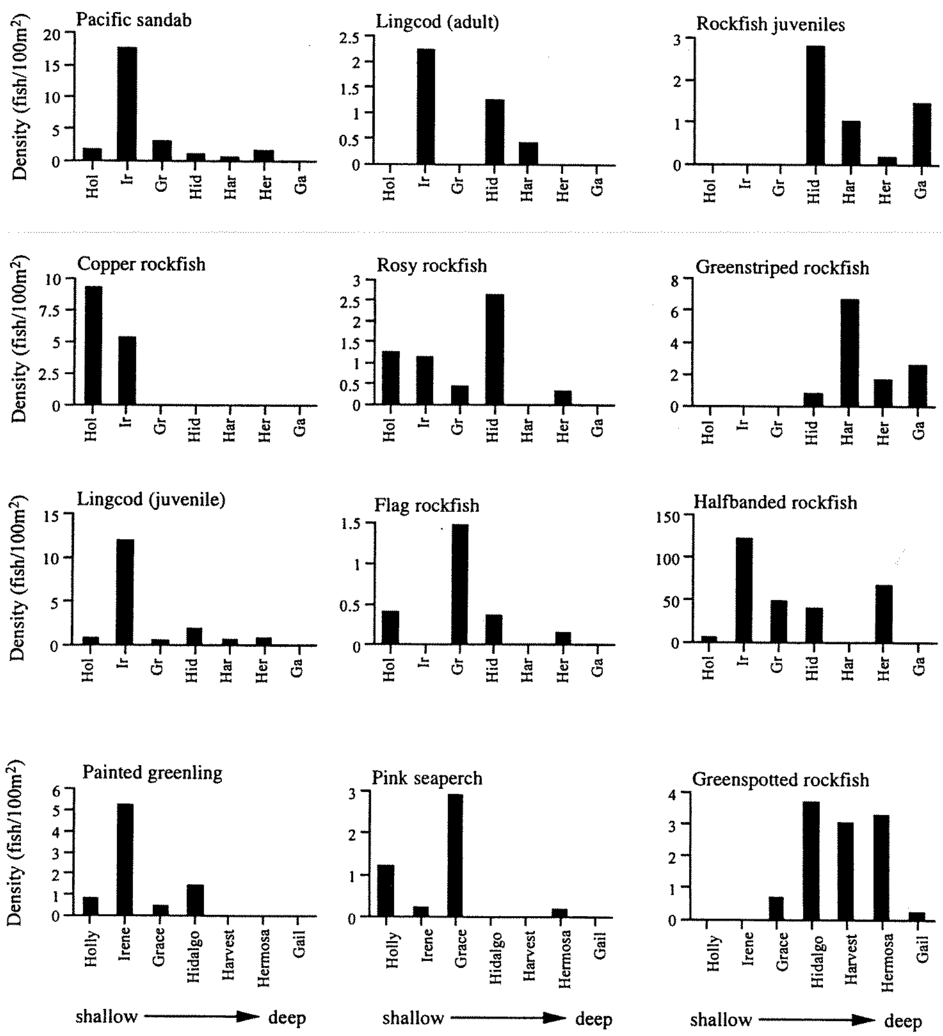

Figure 2. Densities of common mussel mound species on each mound. Mounds arranged by depth from shallow (Holly) to deep (Gail).

dominated the mussel mound around Grace (14 species observed), halfbanded rockfish, pink seaperch, combfish and young flag rockfish were also often seen. Sixteen species were noted around Gail, the greatest species richness among the mounds. Around Gail, a single, large school of northern anchovy was present, which caused it to be the most dense species here. Other common species at Gail included stripetail, greenblotched, swordspine, sharpchin and greenstriped rockfishes.

Some of these differences among mussel mound species assemblages appear to be related to bottom depth (Table 1, Fig. 2). Among the rockfishes, coppers tended to found on the shallowest mounds while rosies, halfbandeds, flags and greenspotteds were most common in midrange (Fig. 2). Sharpchins, darkblotched, greenblotched, greenstriped and rockfish YOY tended to be found on the deepest mussel mounds (Table 1, Fig. 2). Painted

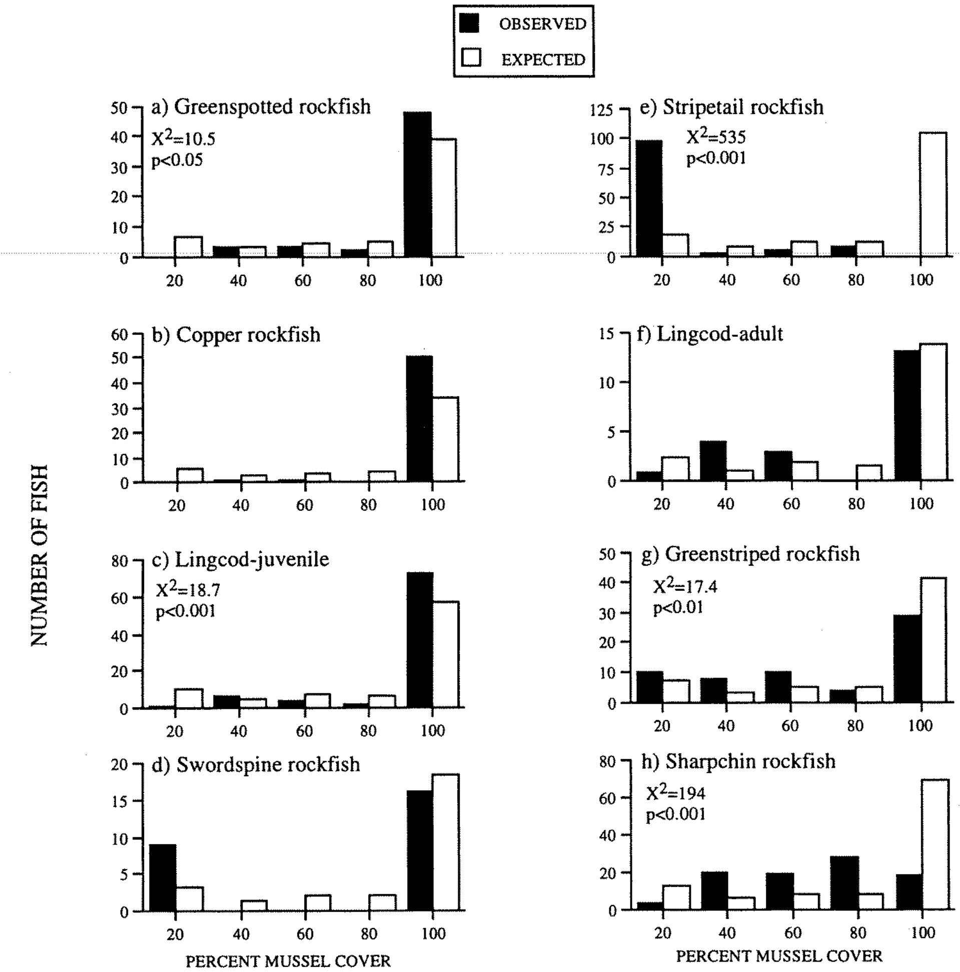

Figure 3. Observed and expected numbers of individuals of various species on mussel mounds. Expected numbers were calculated based on the availability of the different percentage classes of mussel cover. Chi-square goodness-of-fit tests were performed on species with zero or one expected frequency less than 5 (Siegel and Castellan, 1988).

greenling, juvenile lingcod, pink seaperch and Pacific sanddab also were found in shallow waters (Fig. 2).

Differential Use of Parts of Mussel Mounds.—Most species appeared to be nonrandomly distributed among parts of the mussel mounds. We compared the distributions of individuals across areas with different percent mussel cover with the expected distributions based on the availability of areas of different percent cover (Fig. 3A–H). We did this graphically or with chi-square goodness-of-fit tests (see Methods).

Among the more abundant species, greenspotted and copper rockfishes, as well as juvenile lingcod, were all disproportionately present over areas with 80–100% mussel cover (Fig. 3A–C). Greenspotted rockfish and lingcod juveniles showed a significant deviation from the expected based on the availability of different percent covers (Fig. 3A,C). At the other extreme, swordspine, stripetail and greenstriped rockfishes and adult

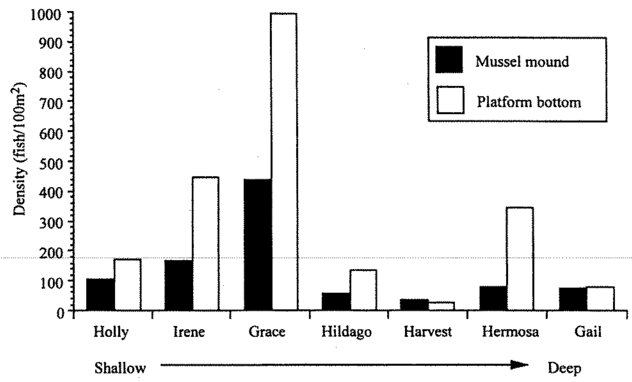

Figure 4. Density (fish 100 m^{-2}) of all species of fishes per platform and mound. Platforms ordered by depth.

lingcod were over-represented on bottoms with relatively little shell cover, with stripetail and greenstriped significantly so (Fig. 3D–G). Sharpchin rockfish were significantly non-randomly distributed and were most abundant over a mixed shell-mud bottom (Fig. 3H).

COMPARISONS WITH PLATFORM BOTTOMS.—*Species Richness and Diversity.*—Species richness was slightly greater on the platform bottoms (40 species) than on the mussel mounds (34 species). Mean number of species on a platform bottom was 14.7 (range 7–24) compared to an average of 12.6 species per mussel mound (range 10–16) (Table 1). This difference was not significant ($t = -0.88$, $df = 6$, $P = 0.4$).

Density.—The mean density of all species combined was 136.2 fish 100 m^{-2} on the mussel mounds compared to 314.6 fish 100 m^{-2} on the platform bottoms and the difference was significant ($t = -2.3$, $df = 6$, $P = 0.03$). At five of the seven sites, the total density of all species on the mussel mounds was approximately half that on the adjacent platform bottom (Fig. 4). The exceptions were around Platforms Harvest and Gail, where densities were very similar. In no case was total fish density substantially greater on the mound compared to the adjacent platform bottom. However, the large-scale spatial pattern of densities among platform bottoms and adjacent mussel mounds was similar. That is, there was a significant correlation between the density of fishes on a platform and on the adjacent mound (Spearmans rank correlation, $Rs = 0.93$, $n = 7$, $P < 0.005$). However, there was no relationship between total fish density on the mussel mounds and either bottom depth ($Rs = 0.057$, $n = 7$, $P > 0.05$) or geography (measured as the ranking of the platforms from north to south) ($Rs = 0.18$, $n = 7$, $P > 0.05$). We have also previously shown that the densities of fishes around platform bottoms also show no relationship with either bottom depth or geography (Love et al., in press).

Fish Lengths.—In general, the mean lengths (TL) of fishes inhabiting the mussel mounds were significantly smaller than fishes on the platforms (Table 2). For the 14 species that were present in relatively large numbers on both types of habitat, 10 were significantly smaller on the mussel mounds, one was significantly larger and three showed no significant length differences. The size differences were particularly large for copper, greenblotched, flag and halfbanded rockfishes and lingcod, all of which were larger on the platforms. Only stripetail rockfish were, in general, larger on the mounds than on the platforms.

Table 2. Mean total length (cm) and 1 SE and sample size for species of fish inhabiting both mussel mounds and platform bottoms. P-values are for student t-tests except in cases where variances are unequal. Welch approximate t-test's were substituted in these cases and are noted with *.

		Platforms		Mussel mounds		
	Common name	Mean ln (SE)	N	Mean ln (SE)	N	p-value
Platform >Mound	Copper rockfish*	19.8 (0.4)	325	14.9 (0.6)	51	<0.001
	Greenspotted rockfish	17.3 (0.3)	238	13.6 (0.6)	58	<0.001
	Greenstriped rockfish*	21.9 (1.3)	26	18.6 (0.5)	63	<0.05
	Rosy rockfish*	13.9 (0.8)	32	11.0 (0.4)	27	<0.01
	Greenblotched rockfish*	21.7 (0.6)	120	16.7 (0.8)	42	<0.001
	Halfbanded rockfish*	14.5 (0.0)	6,341	9.8 (0.1)	1,397	<0.001
	Flag rockfish	19.8 (0.5)	102	12.5 (1.1)	6	<0.001
	Lingcod	37.3 (2.0)	59	24.7 (1.2)	107	<0.001
	Painted greenling	13.6 (0.7)	53	11.5 (0.7)	39	<0.05
	Pink seaperch	16.1 (0.8)	19	13.5 (0.9)	13	<0.05
No Difference	Pacific sanddab	12.9 (0.4)	96	13.6 (0.4)	92	NS
	Shiner surfperch	15.0 (0.0)	130	15.0 (0.0)	1,030	NS
	Sharpchin rockfish	14.4 (0.4)	45	13.5 (0.3)	104	NS
Mound >Platform	Stripetail rockfish	13.4 (0.3)	191	15.0 (0.3)	163	<0.001

Community Composition.—We asked whether species compositions were more similar among the various mussel mounds or between each mussel mound and adjacent platform bottom. That is, is there a mussel mound fish community that differs from a platform bottom community? Numerical classification revealed that, in general, each mussel mound is more similar to its adjacent platform bottom than to other mounds (Fig. 5). The only exception to this pattern is the Hidalgo mussel mound, which is more similar to the Hermosa platform/mound pair than to the Hidalgo platform. Overall, the mean similarity (average Bray-Curtis coefficient on log (x+1) transformed densities) was lower among all platforms (0.27, n = 21 platform-platform pairs) and among all mussel mounds (0.28, n = 21 mound-mound pairs) than among each adjacent mussel mound-platform pair (0.61, n = 7).

The strongest differences distinguish fish assemblages from platform/mound pairs at different depths. Three major clusters arose (Fig. 5). Cluster 1 contains the shallowest sites (Holly mound/platform and Irene mound/platform). Cluster 2 generally contains the mid-depth sites, while cluster 3 contains the deepest sites. The exception to this pattern is that Hermosa (platform and mound at 182 m) clustered with Hidalgo (130 m) and Grace (97 m), while Harvest (176 m) clustered with Gail (the deepest at 224 m).

Despite the similarities in assemblage structure between a mussel mound and its adjacent platform bottom, there were also some notable differences in term of species presence and absence. This was particularly true among the rockfishes. Widow and canary rockfishes and bocaccio were found either entirely or primarily on the platforms whereas swordspine rockfish were observed solely on the mussel mounds (Table 1). Greenstriped rockfish and shortspine combfish were both more abundant on the mussel mounds than on the platform bottoms.

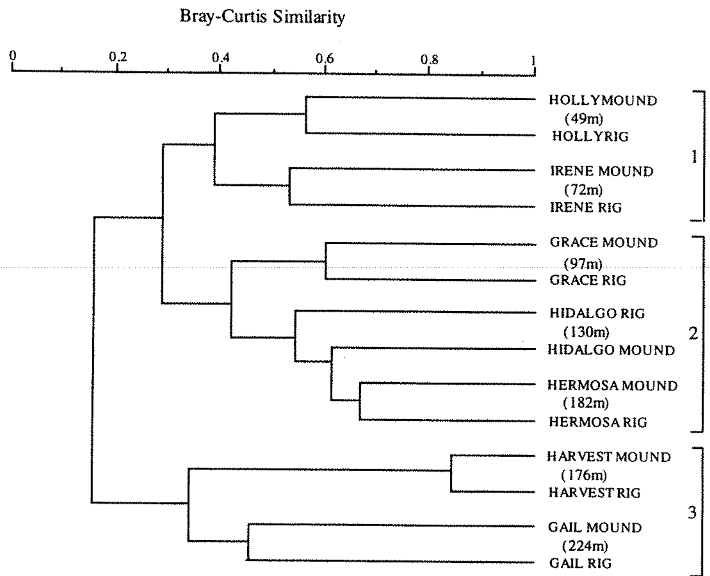

Figure 5. The dendrogram resulting from clustering (Group-Average sorting) of Bray-Curtis similarities on fish species composition between samples at all platform bottoms and mussel mounds. Three major clusters were found and numbered 1 through 3. The depth of each platform and mussel mound is shown in parentheses between each pair.

Discussion

A major objective of this study was to document the fish assemblages on mussel mounds and to compare the mussel mounds to nearby oil platforms. One significant finding is that there does not appear to be a unique "mussel mound assemblage" that differs from assemblages found on nearby platforms. Instead, each mussel mound is more similar in terms of relative species abundance to its adjacent rig than it is to other mounds. A pilot study comparing the fish assemblage on one oil platform to several natural reefs in the vicinity showed that there were distinct differences in species composition and abundance between the platform and the natural reefs (Love et al., 1994). Several of the natural reefs in that study were located within 3 km of the platform. Thus it appears that the mussel reefs which are directly below and adjacent to the platforms could be considered more as a part of one "platform system" than even relatively close-by natural reefs. Natural reefs, mussel reefs and oil platforms all differ in habitat. That the species composition between a mussel reef and adjacent platform is more similar than among all mussel reefs is likely due simply to close proximity. Movement from a mussel reef to the adjacent platform must be more easily accomplished than movements among platforms surrounded by large expanses of sand or mud bottom. Thus, there is likely to be a greater flux of individuals between a platform and the adjacent mussel mound than between various platforms.

This study cannot address the issue of movement between platforms and mussel mounds. It should be noted that the surveys discussed here are a "snapshot" in time. Whether the assemblages at the various platforms/mussel reefs are stable over time remains to be seen. Longer-term surveys of the fish fauna on two platforms in the Gulf of Mexico as well as one in the Santa Barbara Channel showed considerable diel and seasonal variation in the number of species present (Carlisle et al., 1964; Hastings et al., 1975). In addition, monthly SCUBA observations on one shallow-water platform indicate that there may be large temporal changes in assemblage structure (D. Schroeder, unpub data). Despite this, no obvious differences were detected between the mussel mound and platform assemblages.

Although there are similar species assemblages on a platform and adjacent mussel mound, there are depth-related differences among the platform/mussel mound pairs (hereafter referred to as "sites"). Cluster analysis showed differences in the fish assemblages between sites in shallow, moderate and deep waters. It is widely accepted that fish have depth preferences and there was a large range of depths surveyed in this study (49 to 224 m). We have previously shown that fish assemblages differ between the midwater portions and the bottoms of the platforms (Love et al., in press). We related those differences to both depth preferences and to habitat structure. The strongest differences in this study were between the two shallowest sites (Holly and Irene at 49 and 72 m, respectively) and the others. Both Holly and Irene are located in relatively nearshore, shallow waters compared to all the other platforms that are situated farther from shore and in deeper water. Several rockfish and surfperch species were only present at these two shallow sites. These included brown, gopher, yellowtail, calico, and squarespot rockfishes and sharpnose, rubberlip and pile surfperches. Surfperches are livebearers and tend to live in shallow water. As livebearers, this family has no pelagic phase; thus juvenile dispersal across deep water is probably extremely limited. Surfperches, by swimming along the bottom, may only be able to reach the shallower of the sites. The moderate and deepest sites were less distinctive. There may be a threshold depth and/or distance from shore that once exceeded, determines which species can colonize or survive at a site. Only one species, the stripetail rockfish, was present only at the deepest site (Gail, 224 m). Thus, bottom depth may be more important in determining differences in species composition among widely separated sites than specific features of microhabitat. That is, species will only occupy or disperse between platforms within a certain depth range. Within the preferred depth ranges, fish may distribute themselves randomly or based on other characteristics such as habitat structure (e.g., mussel mound or platform members), presence or absence of competitors or predators, or food availability.

Similarity in species composition might indicate random and frequent movements between mounds and platforms. Although we could not distinguish a "mussel mound community" from a "platform community", there were several important differences between the mounds and platforms that suggest that movements may not be frequent or random. First, mussel reefs are inhabited almost entirely by small individuals. Fishes greater than about 20 cm in TL were relatively rare at all of the mounds. In the case of rockfishes, the smaller fishes on the mussel mounds were either juveniles or dwarf species that do not grow large (e.g., swordspine and halfbanded). A number of the other common mussel mound species, such as Pacific sanddab, painted greenling and shortspine combfish, are also small taxa.

On the other hand, the fishes observed at the bottom of the platforms are, in general, larger than those found on the mounds. What might account for this size difference? Both the type and amount of habitat structure have been shown to influence the species composition and abundance of fishes (Choat and Ayling, 1987; Anderson et al., 1989; Caselle and Warner, 1996; Light and Jones, 1997; Friedlander and Parrish, 1998). Although we did not measure characteristics of the habitats in this study, there were easily observable differences. First, the platform superstructure, particularly the crossbeam usually found near the bottom, provide large crevices that tend to harbor large rockfishes and lingcod. These crossbeams appear to provide shelter to these larger fishes (Love et. al., in prep). Smaller individuals may be avoiding this predator-filled habitat. By the same token, many larger fishes may avoid the relatively low relief mussel mounds, because of a lack of sheltering caves and crevices. This allows small fishes the opportunity to inhabit a mound habitat relatively free of predators. The only large individuals commonly seen on the mounds were lingcod. Lingcod are known to inhabit a wide range of habitats, from relatively smooth bottom to high, rocky relief (Miller and Geibel, 1973). Lingcod are also predatory on small fishes and may make periodic forays to the mussel mound to forage.

There were also differences in the density of fishes between the mounds and the platforms. The total density of all species on the platform bottoms was almost twice as high as on the mounds. Given that the fishes are larger on the platform bottoms, estimates of biomass density are even higher on the platforms compared to the mussel mounds. The density differences observed in this study support the notion that there may be competition for the higher structural complexity space offered by the platforms. Younger individuals and smaller individuals tend to be found on the mounds, but in most cases can also be found on the platforms. The similarities in assemblage structure but differences in individual sizes and densities suggest that younger and smaller fish may be using the mussel mounds instead of the platforms due to competition with larger or older individuals for space or predator avoidance. These alternatives could be tested in the future with field manipulations and measurement of survival and growth rates in the two habitats. The patterns observed do suggest that if there are movements between the two habitats, they are probably uni-directional, with younger fish settling or colonizing the mound and later moving to the platforms. Clearly, the differences in habitat structure between the mussel mounds and the platform bottoms influence the distribution of various size classes and the abundance of fishes. Whether these distributions are formed in response to predation, competition for space or other factors such as food availability or food preference remains to be seen.

While it might be expected that dwarf or small rockfishes would preferentially inhabit those parts of the mussel mounds with the highest mussel concentrations, thus affording themselves maximum protection from predation, this was not the case. To some extent, the affinity exhibited by some species for certain degrees of mussel cover, reflects their preferences in natural habitats. Both greenstripe and stripetail rockfishes are most often found over a substrata composed of both mud and rock (Yoklavich et al., submitted for publication) and over the mussel mounds both species were more prevalent over a substrata with relatively low mussel density. Similarly, copper rockfish were always found over the heaviest mussel cover, which would be expected from this high-relief outcrop dweller. However, some of the mussel mound data does not neatly fit expected patterns. Greenspotted rockfish are, relative to many rockfish, habitat generalists, and thus are frequently found over virtually all habitat types (Yoklavich et al., submitted for publication). Yet over the mussel mounds, they were most likely to live over the highest mussel cover. Just as we do not know for certain the extent of fish movements from the mussel mound to platform bottom at a site, we also do not know the extent to which there is temporal variation in use of parts of the mussel mounds. However, the analyses investigating differential use of the mounds were all performed on data from all mounds combined. The fact that there were significant patterns in mussel mound use, indicates that the preferences shown by some species for different parts of the mounds, may be consistent.

The entire mussel mound-platform system is characterized by high levels of spatial variability in fish assemblage structure. Although each mussel mound is more similar to its platform than to other mounds, the overall levels of similarity were quite low (Fig. 5). The differences in assemblage structure appear to reflect different habitat requirements for at least several species. Species that appear to need large shelter areas, such as bocaccio and vermilion, canary and flag rockfishes are common around some platforms and are rare or absent on the adjacent mounds. However, a number of species seem equally abundant (though with differences in size compositions) both near and away from the platforms. Only a few taxa appear to prefer the low relief afforded by the mussel mounds; these include the greenstripe rockfish and the shortspine combfish. On our surveys of natural reefs, these two species are usually found on reef edges and other low relief habitats.

In summary, mussel mounds harbor lower densities, fewer species, smaller species and smaller individuals than platform bottoms. Larger spatial scale patterns of species composition appear to be determined by depth with the two, nearshore shallow mounds having different species composition than the offshore deeper sites. Based on our first-year survey, it appears that these mussel mounds may provide a nursery function for some species, particularly for some of the rockfishes. We found a few YOY rockfishes and large numbers of somewhat older juveniles, particularly of copper and greenspotted rockfishes, on some of the mussel mounds. However, based on only 1 yr of work, we cannot determine the stability of the patterns we observed. For instance, it is quite possible that 1997, an El Niño year, was a poor one for recruitment of many rockfish species. Our surveys of the adjacent platforms showed 1997 rockfish recruitment to be very low compared to past years. It is quite possible that recruitment on these mounds might be considerably greater during more favorable years. At this point, it appears that there is not a unique mussel mound community. We suggest that the mussel mounds adjacent to the oil platforms in the Santa Barbara Channel be considered an integral part of the "platform system".

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Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX), Phase I: Sublethal responses to contaminant exposure — introduction and overview

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Abstract: The Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX) is a three-phase study to test and evaluate a range of biological, biochemical, and chemical methodologies to detect and assess chronic sublethal biological impacts in the vicinity of long-duration activities associated with oil and gas exploration and production. A chronic impact is defined as an effect on the biota caused by exposure to the long-term accumulation of chemicals in the environment. The basic program, comprising four field activities over a 2-yr period, was designed to detect nearfield impacts and contaminant gradients extending out from each site. Five test sites were evaluated and three selected as most appropriate for long-term study: MU-A85, MAI-686, and HI-A389. The sampling design included a radial pattern with stations at 30–50, 100, 200, 500, and 3000 m distance and employed a dose–response model to test the hypotheses that biological, chemical, and biochemical variations are due to platform-derived contaminants. Study components included contaminant (trace metals and hydrocarbons) analysis in sediments, pore waters, and biological tissues; assemblage analysis of benthic meiofauna, infauna, and epifauna, assessment of community health based on life history and reproduction studies; and the induction of detoxification responses.

Résumé : L'Expérience de surveillance des opérations extracôtières dans le golfe du Mexique, dite « GOOMEX », est une étude en trois étapes visant à vérifier et à évaluer une gamme de méthodes biologiques, biochimiques et chimiques de détection et d'évaluation des effets biologiques sublétaux chroniques au voisinage d'activités de longue durée, associées à la prospection et à la production de pétrole et de gaz. Un effet chronique s'entend d'un effet sur le biote d'une exposition à l'accumulation prolongée de produits chimiques dans l'environnement. Le programme de base, comportant quatre activités sur le terrain en 2 ans, vise à détecter les effets des contaminants à proximité de chaque site et leurs gradients en s'en éloignant. Cinq sites d'essai ontété évalués, et trois ont été choisis comme les plus appropriés pour une étude à long terme : MU-A85, MAI-686 et HI-A389. Dans le plan d'échantillonnage de géométrie radiale, où les stations étaient réparties à des distances de 30–50, 100, 200, 500 et 3 000 m, le modèle dose–réponse retenu visait à vérifier les hypothèses selon lesquelles les variations biologiques, chimiques et biochimiques tiennent aux contaminants de plate-forme. Les volets de l'étude comprenaient l'analyse des contaminants (hydrocarbures et métaux à l'état de traces) dans les sédiments, les eaux interstitielles et les tissus biologiques, l'analyse d'assemblages de la méiofaune, de l'endofaune et de l'épifaune benthiques, l'évaluation de la santé du milieu d'après des études du cycle biologique et de la reproduction et l'induction de réponses de détoxification.
[Traduit par la Rédaction]

Introduction

The most significant unanswered questions related to the environmental impacts of offshore oil and gas development and production are those involving chronic, low-level stresses on ecosystems. These stresses result from discharges, spills, and leaks associated with the long-term development of energy resources on the continental shelf (Boesch et al. 1987; Aurand 1988; Ahlfeld 1990; Kendall 1990). A three-phase program, called the Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX), is being conducted to test and evaluate a range of biological, biochemical, and chemical methodologies that may indicate whether the local environment around platforms is responding to chronic, sublethal exposure to discharged contaminants. A multidisciplinary team of scientists was assembled to implement Phase I of the program (Table 1). Work elements included ancillary physical, chemical, and sedimentological variables, analysis of contaminants (trace metals and hydrocarbons) in sediments, pore waters, and biological tissues; assemblage analysis of benthic meiofauna, macroinfauna, and megafauna, meiofaunal and megafaunal invertebrate life history and reproduction studies, and the presence and intensity of inducible detoxification responses in megafaunal biota (Table 2).

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Table 1. Summary of the GOOMEX team of investigators.

Work element activity	Principal investigator	Collaborators
Program Manager	M.C. Kennicutt II[a]	R. Darnell (deputy)[b]
Study design	R. Green[c]	P. Montagna[d]
Field logistics	R. Fay[a]	J. Jobling,[a] H. Barnett[a]
Data management	G. Wolff[a]	
Physical oceanography	F. Kelly[a]	S. Sweet[a]
Sedimentology	R. Rezak[b]	
Contaminant chemistry		
Hydrocarbons	J. Brooks[a]	T. Wade[a]
Metals	B.J. Presley[b]	P. Boothe[b]
Meiofauna	P. Montagna[d]	G. Street[d], R. Kalke[d]
Macroinfauna	D. Harper[e]	S. Powers[e]
Megafauna		
Invertebrates	E. Powell[f]	B. Ormond-Wilson,[e] M. Ellis[f]
Demersal Fish	R. Darnell,[b] J. McEachran,[h] J. Fournie[a]	H. Konstantinou,[h] L. Courtney
Detoxification	S. Safe[i]	S. McDonald,[a] K. Willet[i]
Pore water toxicity	S. Carr[j]	P. Montagna[d]

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[g]Environmental Protection Agency, Gulf Breeze, Fla.
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[i]Department of Physiology and Pharmacology, Texas A&M University, College Station, Tex.
[j]National Biological Service.

The program involved an intensive sampling of the study sites and utilization of a variety of analytical techniques to produce a comprehensive data set to test the programmatic hypotheses. Field and laboratory methods are summarized in Tables 3 and 4. All study components were linked by common study and sampling designs to ensure an integrated synthesis. A comprehensive summary of the samples collected is provided in Table 5.

The objective of GOOMEX Phase I was to test a variety of variables representing all levels of biological organization for suitability as indicators to detect chronic, sublethal biological responses to long-term production activities. The central question is whether the variables measured are significantly different near a platform as compared with away from the platform and can these differences be attributed to the release of contaminants from the platform. While contaminants were identified as the primary agent of concern, it was recognized that the physical presence of the structure will lead to other alterations in the local environment. For example, disposal of coarse materials to the surrounding sediments also sets the stage for a shift in community structure. The outcome of these events is commonly referred to as rig ecology. Differences in various parameters or variables related to distance from the platform can only be fully understood in the context of cause, effect, and biological significance. Any two places on the continental shelf can be demonstrated to be different, if the areas are analyzed to a sufficient level of detail. Tacit in the design of the GOOMEX program is an effort to provide correlative support for cause and effect at several levels of biological organization and provide a focus for the scope of future studies. Concordance amongst independent biological responses was evaluated to determine if it supported the interpretations. Another guiding principle was biological significance. The goals of monitoring are to detect resource degradation or damage and to provide guidance on how to prevent or reverse the undesired response.

Detection of impacts or biological effects responding to contaminant exposure requires confirmation that the exposure has taken place and that the observed "biological patterns" are beyond those attributable to natural variations (Carney 1987). Biological response to exposure can be highly variable in both mechanism and intensity. Biological changes can have a short time span (i.e., induced detoxification or reduced reproductive effort in an individual) or a long time span (i.e., compositional shifts in communities). Impact can be expected to manifest itself differently from species to species and from population to population due to differences in the history of exposure and the response to exposure.

Based on the objectives, the GOOMEX Phase I study was designed to collect a data set to provide statistical tests of two interrelated hypotheses. The null hypotheses tested were as follows:

H_0: There are no differences in any sedimentological, chemical, community, population, reproductive, toxic, or detoxification measures between seasons, among platforms (or platform groups), or with distance or direction away from platforms (or platform groups).

H_0: There are no functional relationships between chemical

Table 2. Summary of GOOMEX Phase I work elements.

Work element	Variables
	Independent variables: sediments/water column
Physiochemical	Salinity, oxygen, nutrients, light transmittance, and temperature
Sedimentology	Grain size, carbon content (organic and inorganics), minerology, redox condition
Contaminants	Hydrocarbons and metals
	Independent variables: biota
Contaminants	Hydrocarbons and metals in fish livers, fish stomach contents, and invertebrate soft tissues
Physiological	Percent moisture and lipid content
	Independent variables: pore waters
Contaminants	Hydrocarbons and trace metals
	Dependent variables
Meiofauna[a]	Abundance, diversity, community structure, nematode trophic dynamics, life history and reproduction, and genetic diversity
Macroinfauna[b]	Abundance, diversity, community structure
Megafauna: invertebrates	Catch per unit effort, size and frequency, histopathology, reproductive effort, reproductive development, and detoxification response[c]
Megafauna: fish	Fish food analysis, histopathology, and detoxification response[d]

[a]Also pore water toxicity testing: bioassays with meiobenthic species.
[b]Also pore water toxicity testing: sea urchin fertilization and embryological development test.
[c]Detoxification response: AHH activity, in vitro rat hepatoma H-4IIE cell assays.
[d]Detoxification response: EROD and AHH activity, biliary PAH metabolites, P4501A and mRNA levels, laboratory dosing experiments.

contaminant gradients and community, population, reproductive, toxic, or detoxification measures.

To test the first hypothesis, univariate analysis of variance (ANOVA) for all variables being measured at all stations in the study design was the method of choice. The categorical variables in such a design, particularly distance from a platform, are surrogates of the contaminant gradients that might exist among and within platform stations. Therefore, the approach to test the second hypothesis was a multivariate approach.

Study design

Two study designs formed the basis of the GOOMEX Phase I program. Both rely on a dose–response model but differ in the details of the sampling design. The first design provided for an assessment of the benthos by using a quantitative boxcorer to sample sediments and resident organisms adjacent to platforms. The sampling plan was designed to detect near-field impacts and contaminant gradients extending out from a platform. The sampling design included a radial pattern to ≥3000 m distance to define the platform's contamination gradient. The sediment sampling design included five radii, five distances per radii, and two or three pseudoreplicates, i.e., replicates from within boxcores, at each station (Fig. 1). The number of stations was maximized to test for directional and distance patterns. With four sampling events, this led to a total of 600 or 900 samples for the three study sites (Table 5). Twenty-five stations comprised the sampling grid at each site (5 distances × 5 radii at 50, 100, 200, 500, and ≥3000 m distance; Fig. 1). Control sites were provided by extension of the radii beyond the distance of measurable contaminants, generally ≥3000 m distance. Controls were chosen to be as similar in setting to the near-field stations as possible to minimize differences due to non-platform-related variations.

The second study design employed a Near (or impacted) versus Far (or unimpacted) pairwise comparison of indicators of contaminant exposure. Due to the need for large amounts of biomass for the various work elements, boxcorers were insufficient as a collection technique. Therefore, biomass sample collection relied primarily on otter trawls. Samples were taken as close as possible to the platform (<100 m) and at a comparison station (≥3000 m). The studies utilizing this design employed laboratory techniques that were generally time intensive and/or relatively untested so that they were only evaluated at the presumed extremes of exposure.

The study design is based on a dose–response model. Contaminant concentrations are expected to decline exponentially with distance away from a platform. Biological variables should respond to the contaminant gradient; thus, the magnitude of the response is expected to decrease with increasing distance from a platform. These five distances away from the platform were chosen on a log scale. This model indicates that contaminant concentration and organism abundance variables should be transformed using the natural logarithm. Percentage data, e.g., percent sand, or toxicity test results

Table 3. Summary of field methods.

Work element	Description	Reference(s)
Boxcorer	Ocean Instruments BX-600 deep ocean corer	Hessler and Jumars 1974; Jumars 1975
Trawling	Otter trawl:mesh 4.04 cm, mouth opening 17.58 m, bridle 67.58 m, wood doors (1.83 × 0.92 m), time 10–15 min, speed 0.5 kt	—
Navigation	DGPS (±3 m)	
Continuous profiles	Seabird SEACAT Profiler, Sea-Tech transmissometer	—
Discrete water samples	5-L Niskin bottle; nutrients, frozen (−20°C), plastic bottles; salinity: glass bottles	
Sedimentology grain size, mineralogy	Refrigerated (4°C), plastic bags	
Redox potential	Combination platinum electrode	Whitfield 1969
TOC, TIC	Frozen (−20°C), glass jars	NOAA 1993
Contaminants: sediments		
Hydrocarbons	Frozen (−20°C), glass jars	NOAA 1993
Metals	Frozen (−20°C), plastic jars	
Contaminants: tissues		
Hydrocarbons	Disected, frozen, glass jars	NOAA 1993
Metals	Dissected, frozen, plastic jars	NOAA 1993
Meiofauna		
Abundance, diversity, life history, reproduction	1.9-cm i.d. core tube, depth 0–2 cm, anesthetized with 7% $MgCl_2$ (5 min), preserved 10% buffered formalin; two replicates	Montagna 1991; Hulings and Gray 1971
Genetic diversity	Depth 0–2 cm, preserved in EDTA–buffered alcohol, stored at 4°C	Dessauer et al. 1990
Macroinfauna	Depth 9–10 cm, sieve: 0.5 mm, preserved 5% buffered seawater–formalin	Harper et al. 1981, 1991
Megafauna	Stored at 4°C until fixation in isoane $MgCl_2$ or seawater, egg sacs: immediately frozen in LN_2, dimensions measured, sex determined, stage of reproductive development described	King 1948; Chamerlain and Lawrence 1983; Hill et al. 1989; Hard 1942
Immunological probe	Egg sacs frozen in LN_2	Choi et al. 1994
Contaminants (fish livers, fish stomach contents, invertebrate soft tissues)	Dissected, frozen (−20°C) in precleaned teflon-lined jars	NOAA 1993
Toxicology	Kept alive until processing, dissected, frozen in LN_2, bile removed into vacutainers and stored at −20°C	Bradford 1976

received a special treatment, the "arcsin square root" transformation. Log transformation of some of the variables was appropriate for another reason. An important assumption in ANOVA is that sample variances are homogeneous. This means that the variance of a parameter for each sample should be the same. A common feature of benthic organism abundance and chemical concentration data is that the mean and variance are correlated, and thus violate the assumption of homogeneity of variances. It is common in these cases to use a logarithmic transformation. The data from the first two cruises were tested and it was found that the variances of contaminant variables and organism abundances were stabilized by log transformation.

Univariate analyses

Four different views were used to interpret the GOOMEX Phase I sampling design (Table 6). The following describes the statistical model and the decomposed models used to test the first hypothesis and explore interactions among the sources of variation in the design. The models are given in SAS (SAS Institute Inc. 1990) notation. Interaction terms (·) are used to indicate that the variables are crossed. For crossed variables, every level of a variable occurs in every level of the other variable. For example, every platform (P) was sampled on every cruise (C). Nested terms, designated with parentheses, are used to indicate that the variables are hierarchical. For hierarchical variables, the nested term occurs only once in each level. For example, each radius is unique to a platform. Radius *A* at one platform has no relationship to radius *A* at another platform. In this sense, radii (R) are also random variables and represent a form of replication. In contrast, platforms and distance (D) from a platform are fixed variables. The terms random and fixed are important in determining the expected mean squares, and thus the appropriate denominators for *F*-tests.

First, in the overall design analysis, all platforms (P) and all cruises (C) were included (Table 7). This analysis demonstrated that platforms are heterogeneous, and that the model is best decomposed to perform analyses "by P", i.e., at each individual study site. R is nested within P. Here, distance (D)

Table 4. Summary of laboratory methodologies.

Variable	Method	Reference(s)
Nutrients		
NO_3	Autoanalyzer	Armstrong et al. 1967
PO_4	Autoanalyzer	Murphy and Riley 1962
SiO_3	Autoanalyzer	Brewer and Riley 1966
Salinity	Guideline 8400 Autosal	Unesco Technical Papers in Marine Science 1981
Dissolved O_2	MicroWinkler technique	Carpenter 1965
Grain size	Settling/gravimetric	Folk 1974: NOAA 1993
Mineralogy	X-ray diffraction	—
TOC/TIC	Leco total combustion	NOAA 1993
Redox Eh	Platinum electrode	Whitfield 1969
Hydrocarbons	GC/FID, GC/MS	NOAA 1993
Metals	INAA, CVAAS, AES	NOAA 1993; USEPA 1991
Meiofauna	Concentration techniques	Pfannkuche and Thiel 1988
Taxonomy	Counting	Sherman et al. 1984
Nematode feeding type	Mouth morphology	Wieser 1953; Romeyn and Bouwman 1983
Nematode biomass	Body measurements	Andrassy 1956
Harpacticoid life history and reproduction	Microscopy	Webb and Montagna 1993
Diversity	Computational	Ludwig and Reynolds 1988
Genetic variability	PCR/RFLP	Avise 1994; Bucklin et al. 1992; Nei 1987
Macroinfauna	Microscopy	Harper et al. 1981, 1991
Megafauna		
Invertebrates		
Reproductive effort	Histology	Preece 1972; Bell and Lightner 1988; Freeman and Bracegirdle 1971
Immunological probe		Choi et al. 1994
Demersal fish		—
Histopathology	Macrophage aggregates	Hinton et al. 1992; Blazer et al. 1994
Fish food	Visual inspection	Darnell 1958; Rogers 1977
Detoxification		
Microsomal protein	Centrifugation	Bradford 1976
EROD activity	Assay	Pohl and Fouts 1980
AHH activity	Assay	Nebert and Gelboin 1968
Rat hepatoma H-4IIE	Assay	
mRNA	Assay	Chomczynski and Sachi 1987
PAH metabolites	HPLC/fluorescence	Krahn et al. 1984, 1986*a*, 1986*b*
Pore water toxicity	Assays	Carr 1993; Carr and Chapman 1992

and C are crossed with both P and R(P). R is a random effect, and C, P, and D are fixed effects. P is tested against R(P), and D and P·D against D·R(P), C and P·C are tested against D·C·R(P). R(P), D·R(P), C·R(P), and D·C·R(P) are tested against replicate error. Second, the platform-by-platform analysis model was used to test and describe distance and direction effects at each platform, given that the total design model, which includes P in it, shows significant interactions involving P (Table 7). This is a fully crossed model because levels of R are now sampled at all C and D. Although R is now a crossed variable, it is still a random effect. So, C is tested against C·R, R is tested against a composite error term, and D is tested against R·D. The double interaction terms C·R, C·D, and R·D are tested against the triple interaction term C·R·D. The triple interaction term is tested against replicate error. The by-cruise analysis was used when seasonal or interannual interactions were occurring (Table 7). It is necessary to analyze each cruise separately if there are significant seasonal or temporal interactions. By-cruise·platform analyses had only limited usefulness. It was only useful for specific questions about R and D patterns at a specific platform at a specific time (Table 7). It implies that there is no generality. This model was used to discover directional (i.e., R) effects at specific platforms that were different during each cruise. All terms were tested against the error term.

For trawling, there were only two stations. There was no need to specify R and D, since there were no replicates and this designation decomposes to just two stations (S), which were designated Near and Far. Each model was modified, and R and D are replaced by S. In these instances, P, C, and S were always crossed variables and fixed effects. Therefore, the effects were always tested against the mean square error

Table 5. GOOMEX Phase I: final sample inventory by work element.

Work element	No. of samples				
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Total
Physicochemical					
Nutrients	417	252	252	252	1173
Salinity	416	251	251	252	1170
Dissolved O_2	417	252	249	252	1170
CTD's	125	75	75	75	350
Total					3863
Sedimentology					
Grain size	268	150	150	150	718
Mineralogy	125	—	—	—	125
Total organic carbon	268	150	150 (+42)	152	720 (762)
Total carbon	268	150	150 (+42)	152	720 (762)
Redox	268	150	150	152	720
Total					3003 (3087)
Contaminant analyses					
Hydrocarbons					
Sediments	268	150	150 (+42)	152	760
Tissues	283	184	181	199	810
Pore water	30	30	—	—	60
Total					1630
Trace metals					
Sediments	268	150	150 (+42)	152	720 (762)
Tissues	283	184	181	199	847
Pore water	30	30	—	—	60
Total					1627 (1669)
Meiofauna					
Sort	268	150	150	150	718
Taxonomy to species					
Nematodes	268	150	150	150	718
Harpacticoids	268	150	150	150	718
Reproduction	268	150	150	150	718
Life history	268	150	150	150	718
Toxicity testing	—	150	—	—	150
Genetic diversity	—	30	30	—	60
Total					3800
Macroinfauna					
Wash/preserve	405	225	225	225	1080
Sorting					
Polychaete	405	225	225	225	1080
Nonpolychaete	405	225	225	225	1080
Identification					
Polychaete	405	225	225	225	1080
Nonpolychaete	405	225	225	225	1080
Total					5400
Macroinvertebrates					
Histology	200	290	280	229	999
Immunological probe	—	—	74	81	155
Total					1154
Demersal fish					
Histopathology	189	127	126	113	555
Splenic MA image analysis	71	83	126	113	393
Statistical analysis	71	83	126	113	393
Fish food	212	269	238	226	945
Total					2286
Detoxification					
Catalytic enzyme activity	202	147	117	160	626

Table 5 (*concluded*).

Work element	No. of samples				
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Total
Biliary metabolites	81	103	89	124	397
Rat hepatoma H-4IIE cell bioassays	35	30	30	36	131
P4501A mRNA levels in fish	—	41	86	100	227
Total					1381
Pore water toxicity bioassay	125	75	—	—	200

[a]Depth profiles in the sediment on Cruise 3.

term. In the total design analyses, P, C, and S were crossed. The data set was analyzed by platform, by cruise, and by platform and cruise, when interactions were present.

Multivariate analyses

The univariate analyses are fine for testing the first null hypothesis, where distance from the platform is the most interesting main effect. A second issue is how all the variables measured, and there were almost 200, relate to one another. In addition, many of the variables measured came from a specific sample, meaning that this was a true multivariate sampling design. Also, distance is simply used as a surrogate for the actual environmental gradient at each platform. We expect that the rig effect will cause many of the variables to covary with distance from the platform. Also, the rig effect may not be symmetric around the rig, even though it is easy to sample that way. A directional effect would cause significant interactions, which makes interpretation of the univariate ANOVA very difficult. Concordance of biological responses with increasing measures of contamination would be strong evidence that contaminants are causing the changes that might be observed near platforms. It is obvious that experiment-wise error rates must be controlled; therefore, a huge matrix of *t*-tests is not appropriate. The second null hypothesis can be tested using multivariate statistical techniques. Many exist, but we chose to use principal components analysis (PCA). This allows us to reduce the large data set of 91 abiotic variables to two factors that represent the first and second principal components (PC1 and PC2) that contain most of the variability in the data set. Then regression or correlation analysis can be used where PC1 and PC2 are the independent variables representing the covarying variables that make up the contamination gradient, and biotic responses are the dependent variables. Within the contaminant gradient, there may also be other gradients that covary with distance or direction from platforms, e.g., sediment grain size. The data set was prepared for PCA by merging the means of all the transformed pseudoreplicates according to the boxcore from which the data were derived. This produced a data set with 300 observations (4C × 3P × 5D × 5R), one for each boxcore sample.

Study sites

Initially, five sites were sampled during Cruise 1 (Fig. 2). After evaluation of the Cruise 1 results, three sites were selected for final study. The criteria for site selection included the following: (1) The site must be located in an area with a long history of oil and/or gas development and production must have been active for no less than 10 yr, (2) the site must be located in the western and/or central Gulf of Mexico far enough to the west to be outside the perpetual, confounding influence of the Mississippi River plume, and (3) comparison stations (controls) must be available that are located away from suspected present or past influences of any platform or pipeline and be similar to the near-platform stations in depth, sediment characteristics, physicochemical parameters, ambient current regime, and benthic fauna.

The Mississippi River discharge can cause fluctuations in the physical and sedimentological setting leading to significant confounding, natural variability over time and space. It was deemed important to choose sites outside the confounding influence of the Mississippi River plume to enhance one's ability to recognize a perturbation. In this particular study, "river" influence was primarily judged based on homogeneity of benthic substrate. However, it was recognized that the Mississippi River has substantial influence on water masses throughout the Gulf of Mexico. Given consideration of these criteria and the regional occurrence of major petroleum- producing reservoirs, site selection was restricted to the western Gulf of Mexico which is primarily a gas/condensate-producing region. As such, "oil" platform sites per se were not included in the study. Long-term production activity and water depth were also constraining factors in site selection. Other secondary considerations in site selection included the availability of previous studies at a site and the known presence of a detectable chemical contaminant gradient.

The five sites chosen were Mustang Island Block-A85 (MU-A85), Matagorda Island Block-686 (MAI-686), Matagorda Island Block-622 (MAI-622), High Island Block-A389 (HI-A389), and Galveston Area Block-288 (GA-288; Fig. 2). Due to the short time between GOOMEX Cruises 1 and 2, only preliminary results were available to reduce the number of study sites from five to three as mandated. A primary consideration was the documentation of a gradient in chemical contaminants in sediments surrounding the platform sites. The presence of a detectable spatial contaminant gradient was seen as the most important factor in selecting the final three study sites. The underlying assumption was that the stronger (steeper) the gradient, the greater the likelihood of observing statistically significant biological effects between near- and far-field samples. A comparison of indicators of

Fig. 1. Example of boxcorer and trawl locations at a study site for Cruises 1 (January 1993) and 2 (June 1993).

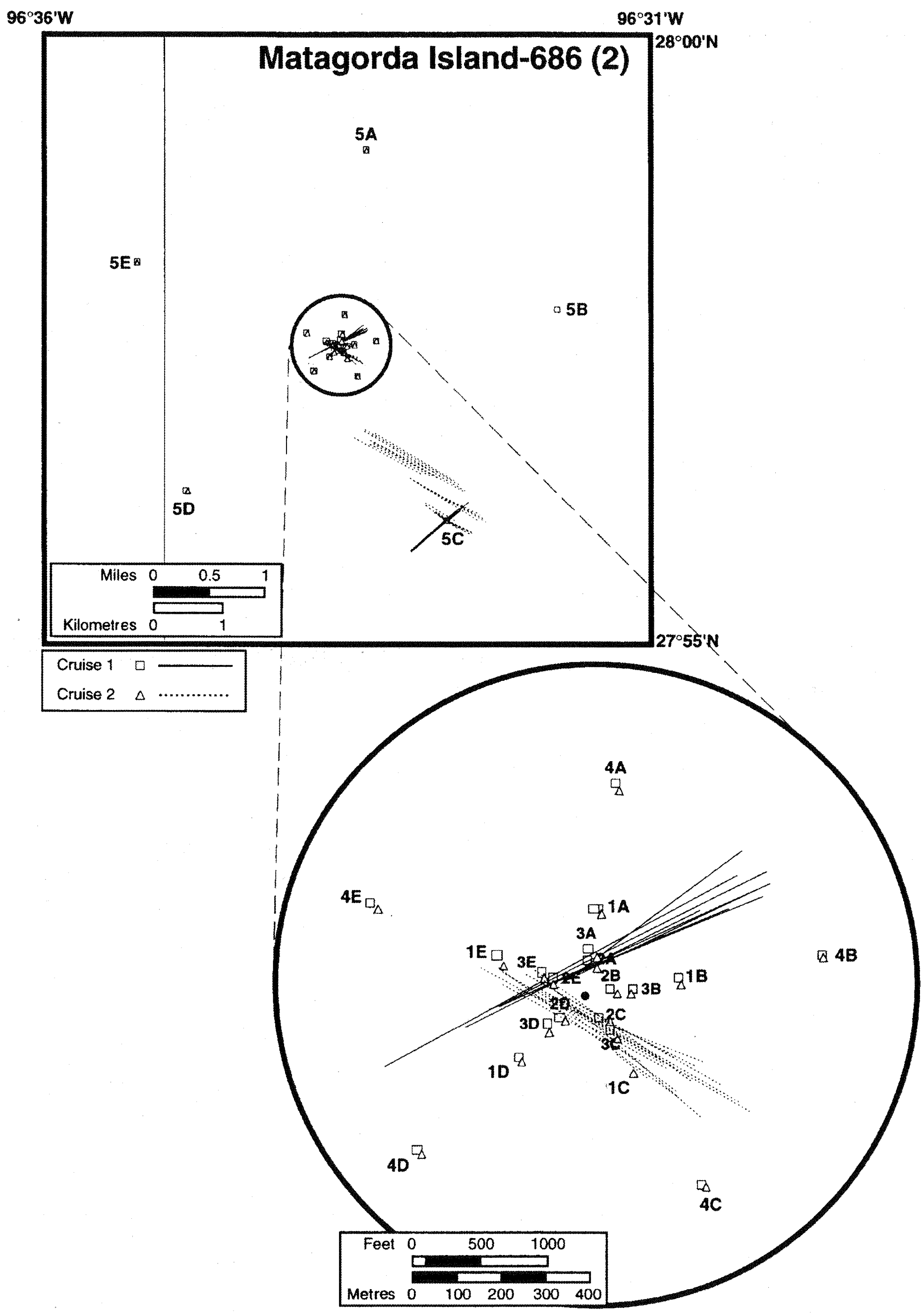


Table 6. Different analysis categories for different subsets to examine the total design and interactions within the design.

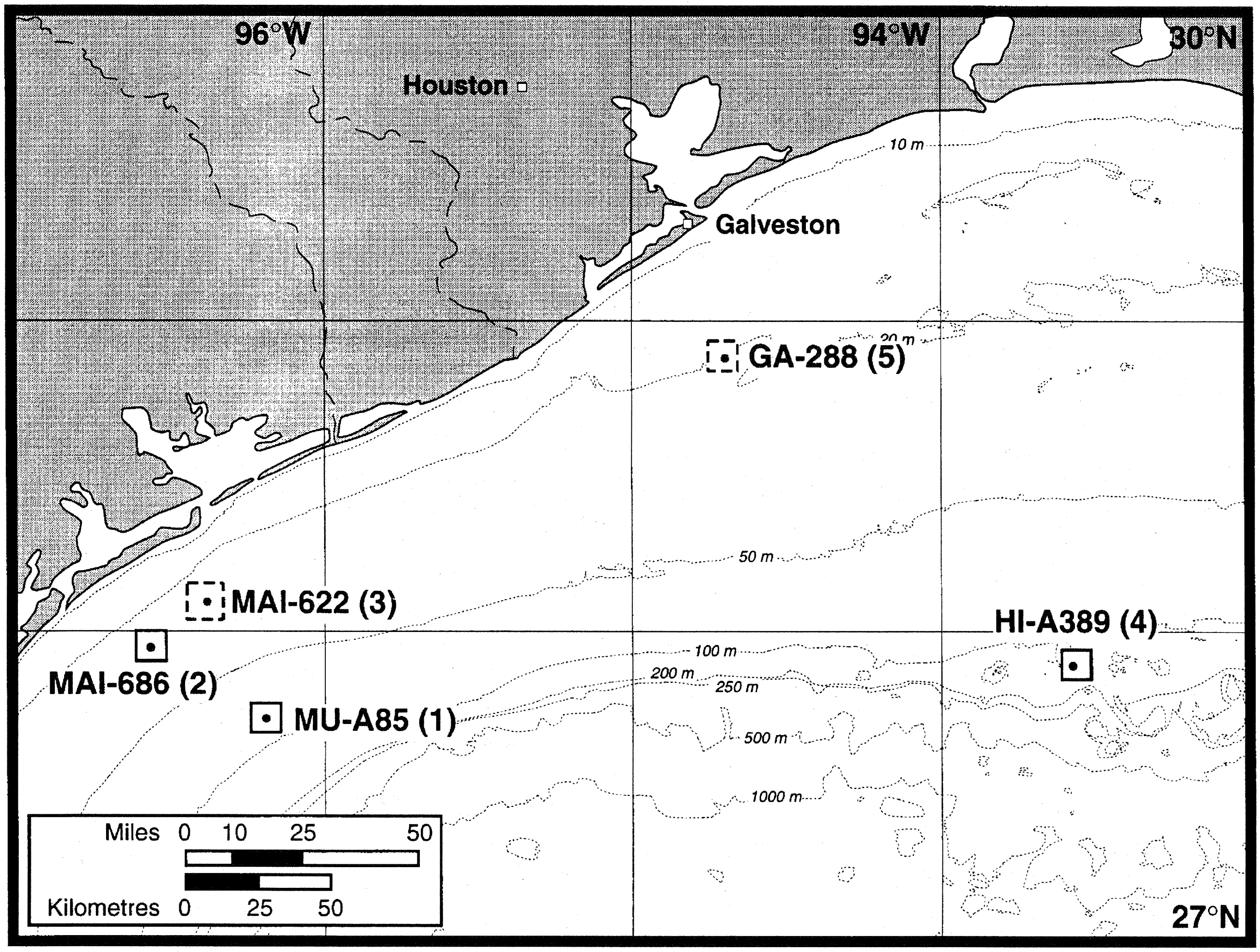
Number of cruises (C)	Number of platforms (P)	
	3	1
4	Total design analyses	By-platform analyses
1	By-cruise analyses	By-C·P analyses

hydrocarbon contamination clearly demonstrated that the highest contaminant values were at the MU-A85 and HI-A389 sites. MAI-686 and MAI-622 were similar; however, MAI-686 exhibited elevated alkanes due to the leakage of condensate near the platform. GA-288 exhibited little or no gradient in hydrocarbons. The steepest gradients in barium were at MU-A85 and HI-A389. Metal contaminants at both sites were significantly elevated and clearly related to drilling discharges. GA-288 showed no trend in barium concen-

Table 7. ANOVA designs for statistical analyses (P = platform, R = radius, D = distance, and C = cruise).

Source	df	Test against	df if D is continuous
Overall design analysis (model: Y = C P C·P R(P) C·R(P) D P·D D·R(P) D·C P·D·C D·C·R(P) where R(P), C·R(P), D·R(P), and D·C·R(P) are declared random)			
1 P	3 − 1 = 2	2	2
2 R(P)	(5 − 1)3 = 12	(7 + 8) − 11	12
3 D	5 − 1 = 4	7	1
4 C	4 − 1 = 3	8	4
5 P·D	(3 − 1)(5 − 1) = 8	7	2
6 P·C	(3 − 1)(4 − 1) = 6	8	6
7 D·R(P)	(5 − 1)(5 − 1)3 = 48	11	12
8 C·R(P)	(4 − 1)(5 − 1)3 = 36	11	36
9 D & C	(5 − 1)(4 − 1) = 12	11	3
10 P·D·C	(3 − 1)(5 − 1)(4 − 1) = 24	11	24
11 D·C·R(P)	(5 − 1)(4 − 1)(5 − 1)3 = 144	12	36
12 Rep. error	(3)(4)(5)(5)(2 − 1) = 300		461
Total	(3)(4)(5)(5)(2) − 1 = 599		599
By-platform analysis (model: Y = C R C·R D C·D R·D C·R·D where R, C·R, R·D, and C·R·D are declared random)			
1 C	4 − 1 = 3	4	3
2 R	5 − 1 = 4	4 + 6 − 7	4
3 D	5 − 1 = 4	6	1
4 C·R	(4 − 1)(5 − 1) = 12	7	12
5 C·D	(4 − 1)(5 − 1) = 12	7	3
6 R·D	(5 − 1)(5 − 1) = 16	7	4
7 C·R·D	(4 − 1)(5 − 1)(5 − 1) = 48	8	24
8 Rep. error	(4)(5)(5)(2 − 1) = 100		197
Total	(4)(5)(5)(2 − 1) = 100		249
By-cruise analysis (model: Y = C R C·R D C·D R·D C·R·D where R, C·R, R·D, and C·R·D are declared random)			
1 P	5 − 1 = 4	2	4
2 R(P)	(5 − 1)5 = 20	5	20
3 D	5 − 1 = 4	5	1
4 P·D	(5 − 1)(5 − 1) = 16	5	4
5 D·R(P)	(5 − 1)(5 − 1)5 = 80	6	20
6 Rep. error	(5)(5)(5)(2 − 1) = 125		200
Total	(5)(5)(5)(2) − 1 = 249		
By-cruise·platform analyses (model: Y = R D R·D where R is declared a random effect)			
1 R	5 − 1 = 4	3	4
2 D	5 − 1 = 4	4	1
3 R·D	(5 − 1)(5 − 1) = 16	4	4
4 Rep. error	(5)(5)(2 − 1) = 25		40
Total	(5)(5)(2) − 1 = 49		49

Fig. 2. Location of the five study sites sampled on Cruise 1.



trations and, in fact, the control stations were slightly elevated over background; therefore, this site was eliminated as a location for further study. MAI-686 and MAI-622 were similar in sediment contaminant levels; however, barium variations with distance from the MAI-686 platform were more significant. A more consistent contaminant field was demonstrated at MAI-686 than at MAI-622 with several metals covarying with barium. Primarily because of the existence of chemical gradients, MU-A85, MAI-686, and HI-A389 were chosen as the final study sites.

Matagorda Island Area Block-686 (MAI-686)

A total of 12 wells were drilled from the MAI-686 platform between 1977 and 1981. This gas field produces from depths of 9152 to 12 260 ft (1 ft = 0.3048 m). A summary of the drilling history and associated discharges until 1980 is provided in Table 8. Monthly production of condensate, gas, and water is summarized in Fig. 3.

Mustang Island Area Block-A85 (MU-A85)

In the MU-A85 field, drilling has occurred as recently as 1986, and a total of 18 wells have been spudded. Discharges associated with the first six wells are summarized in Table 9 (Gettleson and Laird 1980). Monthly production of condensate, gas, and water is summarized in Fig. 4. Exploratory well Nos. 1, 2, and 3 were drilled between 1976 and 1978. In most instances, drilling muds and cuttings were discharged near the seafloor due to the proximity of the drill site to Baker Bank, a topographic high that serves as a fishing bank on the outer continental shelf. Pre- and postdrilling sediment barium surveys documented a benthic barium plume extending 1000 m from the drill site.

High Island A389 (HI-A389) – East Flower Garden Bank

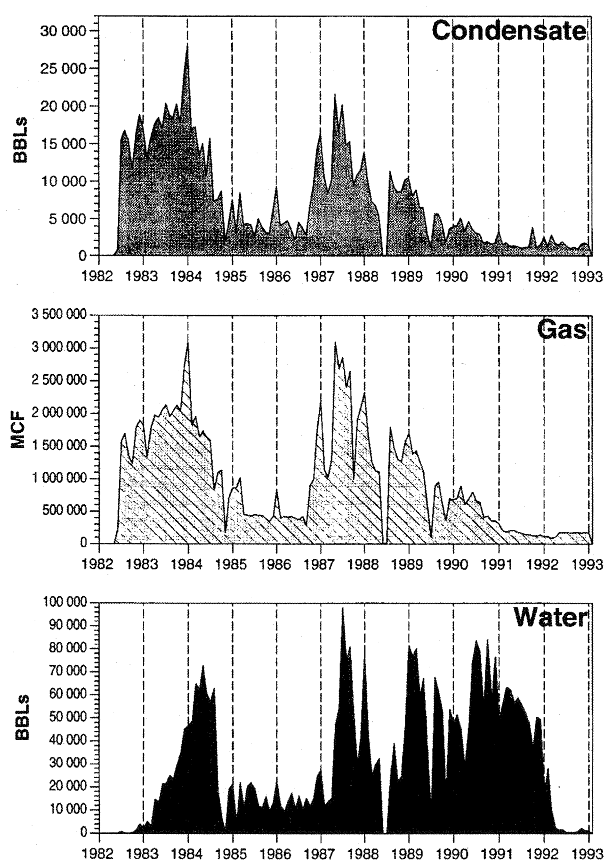
The HI-A389 platform has six wells, and current production is 22.0 million million cubic feet per day (MMCFD) of natural gas. A comprehensive history of hydrocarbon development at the site is given in Boland et al. (1983). Preliminary exploratory drilling near the East Flower Garden Bank took place in the spring of 1975. Drilling continued in the fall of 1977 in 129 m of water. Totals of 129 000 L of drilling fluid and 1 035 000 kg of drill cuttings were discharged during October and November 1977. Residues from the fluids and cuttings were detected up to 1000 m from the drill site by

Table 8. Summary of the drilling history and associated discharges at the Matagorda Island Block-686 (MAI-686) site through 1980 (after Boothe and Presley 1985).

Characteristic	MAI-686
Type of drilling activity	Development
Type of wells	Gas
Number of wells	8 (4 additional wells drilled after 1980)
Total well depth (sum of all wells, m)	24 938
Total volume of cuttings discharged (sum of all wells, m^3)[a]	3 130
Drill mud components used (total of all wells in kg × 10^3)[b]	5 334
Total barite used (total of all wells in kg × 10^3, percent of total components used)	4 547 (85)
Total barium used (TBU, total of all wells in kg × 10^3)[c]	2 326
Discharge pipe location bearing in °T from rig (±water surface, m)	022 (−6)
Number of adjacent drilling sites (number of wells drilled within 3000-m radius of study rig)	1 (1)
Nearest adjacent drilling site to study site (m, °T)	1 500 (095)

[a]Estimated as 1.1 times total volume all wells.
[b]Mud systems used: seawater/gel (to 900 m), lignite/lignosulfonate (below 900 m).
[c]Assuming the barite used was 87% $BaSO_4$ and that the percent composition of Ba in $BaSO_4$ was 58.8%.

Fig. 3. Monthly production of condensate, gas, and water at MAI-686.



Continental Shelf Associates, Inc. (1985), but not on the reef monitoring stations 2000 m away. Results of the exploratory phases indicated the presence of commercial quantities of natural gas. The present platform was installed in October 1981, approximately midway between the two exploratory wells.

Additional drilling began on 26 April 1982 and continued into 1983. Drilling fluid and cuttings were shunted to within 10 m of the bottom prior to release. This procedure was required because the platform is located within the "shunting and monitoring" zone around the East Flower Garden Bank. Discharges were stopped when operations required oil-based drilling fluids. Oil-based fluid drilling requires a closed system. Cuttings, muds, and discharge water were barged for disposal elsewhere. Six production wells were drilled. The last drilling occurred on 19 April 1983. The depth of the six wells ranged from 1827 to 4313 m. Monthly production of condensate, gas, and water is summarized in Fig. 5.

Study results

The following seven articles provide a review of the major findings and an integrated synthesis of the data produced during Phase I of GOOMEX. Kennicutt et al. set the stage by documenting the abiotic setting around platforms. The hydrographic, sedimentologic, and contaminant conditions around the study sites are described in detail. Contaminant distributions in sediments and organisms provide a first-order evaluation of the degree to which long-term platforms are polluting the surrounding environment. Montagna and Harper provide a detailed description of the benthic ecology around a platform. Meiofaunal and macroinfaunal studies provide the basis for evaluating contaminant effects on life history, community

Table 9. Summary of drilling discharges from the first six wells at Mustang Island Block-A85 (MU-A85) (from Gettleson and Laird 1980).

Well	Amount of muds used (lb)	Percent barite by weight of mud used	Weight of cuttings discharged (lb)[a]	Weight of mud discharged (lb)	Weight of barium discharged (lb)
No.1 Block A-85	4 157 000	—	—	2 536 916[a]	317 765[b]
No.2 Block A-85	1 875 000	—	—	1 144 267[a]	143 327[b]
Platform A Nos. A-3 through A-6 Block A-85	8 798 636	87	7 696 087	509 852[b]	

[a]Estimated from mean (mud discharged/mud used) of Platform A well Nos. A-3, 4, and 5 (A-6 judged atypical).
[b]Estimated from barium content of muds discharged from Platform A well Nos. A-5 and 6.

Fig. 4. Monthly production of condensate, gas, and water at MU-A85.

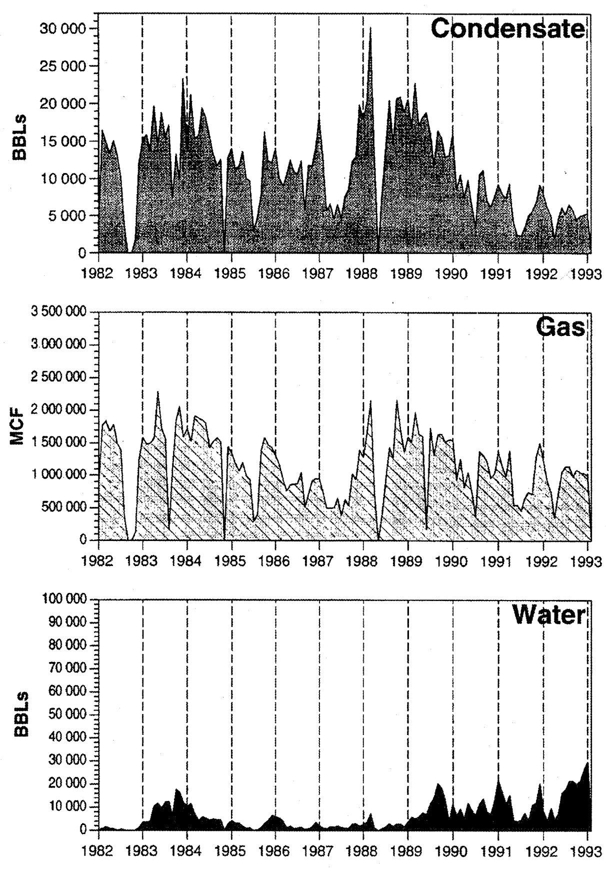
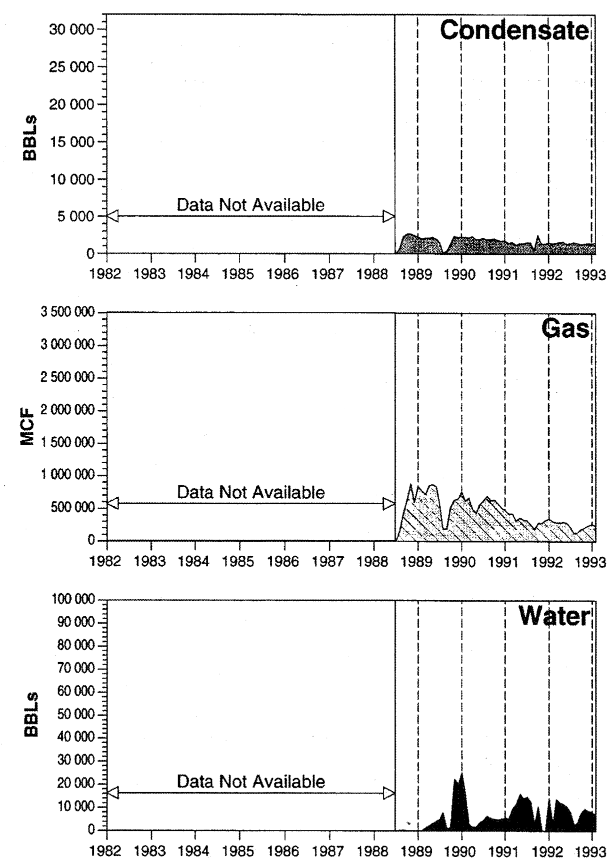


Fig. 5. Monthly production of condensate, gas, and water at HI-A389.



structure, and reproduction. Ellis et al. deal with epibenthic organisms, primarily invertebrates, and provide an assessment of platform effects on reproduction, size, and size frequency and pathologies in megafauna. McDonald et al. provide an evaluation of the induction of detoxification enzyme systems in demersal fish as a response to contaminant exposure. As a link to sediment toxicity, Carr et al. present sediment pore water bioassay results. Green and Montagna evaluate of the generality of results, a test of coherence among diverse work elements (a sediment quality triad approach), an evaluation of heterogeneity of variance as an impact response, and a discussion of study design in general. Finally, Peterson et al. provide a summary of programmatic results and recommendations for future studies.

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Final Report to the Synthetic Based Muds (SBM) Research Group

Concentrations of Total Mercury and Methylmercury in Sediment Adjacent to Offshore Drilling Sites in the Gulf of Mexico

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EXECUTIVE SUMMARY

This report presents the results from a study of concentrations of total mercury (Hg) and methylmercury (MeHg) in seabed sediments near six offshore drilling sites in the Gulf of Mexico. The purpose of this study is to help determine whether drilling discharges lead to enhanced concentrations of MeHg in sediments near drilling sites. Surface (0-2 cm) and subsurface (2-20 cm) sediments for this study were collected during May 8-20, 2002, within the following three zones at each of six drilling sites: <100 m (nearfield), 100-250 m (midfield) and >3 km (farfield).

Total Hg levels in sediment (n = 196) from this study range from 11-92 ng/g (parts per billion, dry weight) for all farfield samples and 25-558 ng/g for all nearfield samples. Concentrations of total Hg are significantly higher at nearfield stations than at farfield stations for five of the six drilling sites due to inputs from drilling discharges. In nearfield sediments where total Hg levels exceed background levels, concentrations of barium (Ba) range from 2-28% (dry weight), relative to ambient Ba concentrations of about 0.05-0.15%. A strong linear relationship is observed between concentrations of Ba and total Hg in sediment from nearfield stations. The strong linear relationship between Ba and total Hg, coupled with the high levels of Ba as barite ($BaSO_4$) in these sediments, support the contention that barite, a common additive to drilling mud, is the primary source for anthropogenic Hg in these sediments. Furthermore, the relationship between concentrations of total Hg and Ba at a given site can be used to estimate total Hg levels in the industrial barite used during drilling. Estimated average concentrations of total Hg in industrial barite at different sites, based on the Ba versus Hg relationships, range from about 400-1000 ng/g. These estimated concentrations of total Hg in barite are consistent with regulations by the U.S. Environmental Protection Agency that set allowable total Hg levels in industrial barite at 1000 ng/g.

Concentrations of MeHg range from 0.11-1.05 ng/g for all farfield sediments and <0.03-2.7 ng/g for all nearfield sediments. In contrast with results for total Hg, this study shows that concentrations of MeHg in surficial (0-2 cm) sediment from all six drilling sites do not vary significantly between nearfield and farfield stations. When subsurface samples (at depths of 2-20 cm) are included, no significant differences between MeHg concentrations at nearfield and farfield stations are observed at five of the six sites. At a sixth site, significantly higher concentrations of MeHg are found at nearfield versus farfield stations due to the presence of anomalous, sandy sediment with low levels of total Hg and MeHg at three of the farfield stations from this one drilling site.

Concentrations of MeHg average 0.44 ± 0.27 ng/g for all farfield sediments (0-20 cm) and 0.45 ± 0.41 ng/g for all nearfield sediments (0-20 cm). However, considerable variability is observed in concentrations of MeHg at several sites. For example, MeHg concentrations range from <0.03-0.40 ng/g within one nearfield zone; whereas, they range from 0.35-2.7 ng/g within another nearfield zone. Observed variability in concentrations of MeHg is partly related to local variability in redox state in the top 10 cm of sediment. Low to non-detectable levels of MeHg are observed in nearfield stations where the redox potential (Eh) is <-100 mV (anoxic and highly reducing) in the presence of abundant total H_2S (>1 millimolar, mM). Higher values of MeHg are found in a few nearfield stations where levels of TOC are higher and where Eh values are about 0 mV (anoxic, moderately reducing). These observations are consistent with previous studies that suggest that optimum conditions for formation of methylmercury are in anoxic sediment with sulfide-poor interstitial water and sufficient levels of biodegradable organic matter and nutrients.

Overall, the results from this study show that excess total Hg in sediments at the drilling sites studied is associated with barite. Furthermore, statistical comparisons of MeHg levels in nearfield versus farfield sediments at six drilling sites, along with data from two of those sites that show lower levels of MeHg in some nearfield sediments than farfield sediments, suggest that elevated levels of MeHg in sediments around drilling platforms are not a wide-spread phenomenon in the Gulf of Mexico. The data presented in this report also make a reasonable initial argument for the conclusion that Hg introduced with barite during offshore drilling cannot be directly linked to enhanced levels of MeHg in nearfield sediments. At most drilling sites, nearfield samples with high levels of total Hg (i.e., 200-500 ng/g) have similar or lower levels of MeHg than found at background (farfield) stations. Results for a few samples from one site are somewhat ambiguous in that concentrations of MeHg are enhanced; however, the MeHg values are equivalent to ~3% or less of natural concentrations of total Hg. Therefore, these anomalously high levels of MeHg could have either a natural or an anthropogenic source of Hg.

INTRODUCTION

The purpose of this study is to provide data that can be used to help determine whether drilling discharges lead to enhanced concentrations of MeHg in sediments near offshore drilling sites. The impetus for this study developed because concentrations of total mercury (Hg) in sediment adjacent to offshore drilling sites in the Gulf of Mexico are often two to ten times higher than in nearby natural sediment (see summary by Neff, 2002). Most of the excess Hg in sediment at offshore drilling sites is believed to be associated with barite ($BaSO_4$) as a component of spent drilling mud that is discharged during drilling. Present regulations set the upper limit for total Hg in barite at 1 µg/g (1000 ng/g; EPA, 1993). Questions have been raised about the degree to which excess total Hg in sediment around offshore drilling sites becomes methylmercury (MeHg) and whether conditions in sediments near drilling sites are more conducive to the formation of MeHg than those in nearby ambient sediment.

No data are presently available for concentrations and reactions involving MeHg in sediment near exploration and production sites in the Gulf of Mexico. The work described here was carried out to help fill the data gap for concentrations of total Hg and MeHg in sediment from the Gulf of Mexico. Sampling for this study was completed during May 8-20, 2002, as a supplemental part of ongoing research on the environmental effects associated with the discharge of cuttings drilled with synthetic-based mud (SBM) in the Gulf of Mexico. The SBM study was not designed specifically to investigate the fate and effects of Hg in the Gulf of Mexico. Thus, the results presented here cannot be used to estimate the rates of methylation or demethylation of Hg, the rates of diffusion of any MeHg within the sediment and to the overlying water, or to address uptake of MeHg by organisms. However, the data presented in this report do provide the first comparisons of MeHg levels in sediment at drilling sites relative to nearby reference sites in the Gulf of Mexico as well as present some information for developing a preliminary interpretation of observed concentrations.

The information acquired during this study helps to advance the process of determining whether drilling discharges lead to enhanced levels of MeHg in sediments near offshore-drilling sites. Preliminary answers to the four questions raised below will be given in the conclusions to support discussion and decisions regarding the need for additional investigations.

- Are the excess amounts of total Hg found in sediment near drilling sites associated with barite?
- Are concentrations of MeHg elevated in sediment adjacent to offshore drilling sites?
- Can any increases in sediment levels of MeHg be directly attributed to Hg introduced by oil and gas activities?
- Do drilling discharges create an environment that is more favorable to the conversion of Hg to MeHg?

METHODS

Sampling

Sediment samples were collected from areas surrounding six offshore-drilling sites during May 8-20, 2002 (Figure 1). Three of the sites were situated at water depths of 60-119 m on the continental shelf and three were at depths of 534-556 m on the upper slope (Figure 1 and Table 1). Platforms were present at three of the sites (MP299, MP288 and EI346) during sampling and seafloor templates or wellheads were in place at the remaining three sites. Sediments in the nearfield (NF) were collected at six random stations within 100 m of each drilling site and two fixed (discretionary) stations within 100 m of each drilling site. The discretionary stations were chosen based on previous data that showed elevated levels of Ba and synthetic-based mud (SBM) at specific locations near each drilling site. Surface samples (0-2 cm) were collected at each NF site. Subsurface (2-20 cm) samples were collected from five successively deeper layers below the sediment-water interface from two NF discretionary (D) stations at all six sites. Subsurface samples also were collected at one random NF station for three drilling sites (MP299, MP288 and MC496). Farfield (FF) samples were collected from six random stations around each drilling site at a distance >3 km from the structure. Surface samples were collected from each FF location and subsurface samples were collected at one FF location from each site. In addition, samples also were collected for each drilling site at two to six midfield (MF) locations that were at distances of 100-250 m from the drill site.

Figure 1. Map showing locations of offshore drilling sites in the Gulf of Mexico where sediment samples for this study were collected. Exact locations and water depths for each site are given in Table 1.

Table 1. Summary location data for offshore drilling sites.

Site	Name	Water Depth (m)	Latitude (Degrees, Min., N)	Longitude (Degrees, Min., W)	SBM Type	Surface Structure Present *	# of SBM Wells**	Total Wells Drilled at Site
Main Pass 299	MP299	60	29°15.43’	88°46.38’	Linear Alpha Olefin	yes	3	20
Main Pass 288	MP288	119	29°14.39’	88°24.57’	Internal Olefin	yes	4	31
Eugene Island 346	EI346	92	28°09.83’	91°22.14’	Internal Olefin	yes	3	6
Ewing Bank 963	EW963	540	28°00.65’	90°07.47’	Internal Olefin	no	3	3
Green Canyon 112	GC112	534	27°51.32’	90°44.09’	Internal Olefin	no	4	4
Mississippi Canyon 496	MC496	556	28°27.03’	89°22.44’	Internal Olefin	no	1	3

* Surface structure "yes" indicates that a platform rising above the sea surface is present at the site. Sites without surface structures have subsea wellheads or other seabed structures at the drill site.
** The number of wells drilled with synthetic-based drilling fluids.

Sediments were collected using a stainless steel box corer (50 cm x 50 cm x 50 cm). Once on deck, the surface 2 cm of sediment were removed using a Teflon® spatula and ~30 mL of sediment were placed in 50-mL, polystyrene vials (for Ba, TOC and total Hg) and ~30 mL of sediment were placed in 60-mL Series 300 I-CHEM, cleaned glass containers (for methylmercury). The polystyrene vials were sealed with a layer of Parafilm® and stored frozen. Samples in glass containers were frozen immediately after collection and shipped using dry ice. At a total of fifteen stations, the box core was carefully subsampled by pushing a Teflon® tube into the sediment. The sediment was extruded from the bottom in 2-cm increments. The outer few millimeters of sediment from each increment were removed and the remaining portion was placed in polystyrene and glass containers. All sampling equipment was cleaned with acid and rinsed with distilled-deionized water (DDW). The Teflon® tubes were decontaminated between each use with soap, water, nitric acid, water, acetone and DDW. All sampling of the box core was carried out away from the stainless steel walls.

One subsample from every box core was collected for probe measurements of dissolved oxygen and Eh. The pH was measured in sediment cores from stations where interstitial water also was collected. The core was immediately analyzed for oxygen using a 5-cm long microprobe (Microelectrodes, Inc. MI-730 O_2 probe) lowered from the top of the core. The probe was mounted on a microscope stage that was fixed vertically above the core. By lowering the microscope stage in millimeter increments, according to the attached scale, oxygen measurements were taken to the depth of oxygen depletion. Next, Eh and pH were measured through holes pre-drilled at 2-cm intervals in the wall of the core tube. The holes were covered with tape during sampling of the box core, and the tape was removed immediately before inserting a probe. The Eh was measured first, using an Orion Model 96-78-00 Platinum Redox Electrode, and pH and temperature measurements were then carried out using a Sentron Red Line pH probe.

All probes were calibrated prior to use for each core. The oxygen probe was calibrated using two beakers of water, one that was equilibrated with the atmosphere via an air stone and one that was de-oxygenated by purging with nitrogen. The meter was adjusted to 20.9% while the probe was immersed in the first solution and was zeroed with the probe submerged in deoxygenated water. A one point calibration with an Orion standard was performed for the Eh probe. The pH probe was calibrated with pH 7 and pH 10 buffers.

In addition to the data collected with oxygen, redox and pH probes, samples of interstitial water also were collected at selected sites, some of which matched cores collected for MeHg. Some of the results obtained for the interstitial water will be presented in this report to support inferences from the oxygen and redox probes. The detailed methods for sampling and at sea analyses for ammonia and total H_2S are described in McElvaine (2001). The interstitial water data will be compiled in the final report of the SBM study. Interstitial water was obtained by taking one 7-cm diameter subcore and transferring it to a whole core squeezer, similar to that described by Bender et al. (1987), for pore water extraction. Samples (~10 mL) were collected directly into acid-washed glass syringes at 1-cm intervals in the uppermost 5 cm, 2-cm intervals from 5 to 13 cm, and 3-cm intervals below 13 cm.

Analytical Methods

Measurements of total Hg and supporting parameters were made at Florida Institute of Technology. Methylmercury concentrations were determined at Frontier Geosciences, Inc., under the direction of Lucas Hawkins.

Total Mercury and Supporting Parameters

Sediment samples were thawed and brought to room temperature. Each wet sediment sample was homogenized in the original 50-mL polystyrene vial using a Teflon® mixing rod. Then, a portion (~ 20 g) of each sample was transferred into a pre-weighed plastic vial to determine water content. Once transferred, the wet sediment and the vial were re-weighed. In addition, about 2-4 g of sample were transferred to polypropylene-copolymer centrifuge tubes to determine the Hg content of the sediments. Samples intended for water content measurement were frozen, freeze-dried, and re-weighed to determine the water content. The dried sediment samples were again homogenized using a Teflon® mixing rod.

Sediment samples to be analyzed for Hg were digested by heating 2-4 g of wet sediment in acid-washed, polypropylene-copolymer centrifuge tubes with 4 mL nitric acid (HNO_3) and 2 mL sulfuric acid (H_2SO_4) as described by Adeloju et al. (1994). Sample tubes were heated for 1 hour in a 90°C water bath and allowed to cool. Each tube was centrifuged at 2,000 rpm and the supernatant decanted into a 25-mL graduated cylinder. The sediment pellet was rinsed twice with 5 mL distilled-deionized water (DDW), centrifuged, and decanted into the graduated cylinder before diluting to a final volume of 20 mL with DDW. The final solutions and procedural blanks were analyzed by cold-vapor atomic absorption spectrometry (CVAAS) using a Laboratory Data Control Mercury Monitor with manual injection 0.5 mL of solution.

Labware used in the digestion process was acid-washed with hot, 8N HNO_3 and rinsed three times with DDW. Two procedural blanks, two duplicate samples, and two certified reference materials (CRMs) were prepared with each set of 40 samples. The sediment CRM MESS-2, obtained from the National Research Council of Canada, was used to help establish data quality for total Hg, Al, and Ba.

For Al and Ba analysis, 20 mg of sediment were digested with $HClO_4$-HNO_3-HF and diluted to 20 mL. For samples found to have very high concentrations of Ba, based on residual white solid after digestion, a smaller mass of sample (<10 mg of sediment) was digested and analyzed for Ba. The digested samples were analyzed for Al by flame atomic absorption spectrometry (FAAS) using a Perkin-Elmer Model 4000 instrument. Concentrations of Ba were determined by inductively-coupled plasma-mass spectrometry (ICP-MS) using a Perkin-Elmer ELAN 5000 instrument.

In preparation for analysis of sediment for total organic carbon (TOC), inorganic carbon was removed by adding 10% phosphoric acid to the samples. The samples were weighed before the addition of acid and after drying of the acid to account for mass changes during the decomposition of carbonates. The TOC content of dried sediment samples was determined by combustion with a Shimadzu TOC-5050A using an attached solid sample module (SSM-5000A). For TOC analysis, sucrose was analyzed to generate a calibration curve and MESS-2 was analyzed as a CRM.

For the interstitial water results mentioned in this report, concentrations of nitrate and sulfate were determined using a Dionex DX-600 ion chromatograph (IC). Concentrations of total H_2S were determined at sea using standard colorimetric methods as described along with additional details in McElvaine (2001).

For this project, Quality Control measures included balance calibration, instrument calibration (FAAS, CVAAS, ICP-MS, TOC analyzer), matrix spike analysis for each metal, duplicate sample analysis, CRM analysis, procedural blank analysis and standard checks. With each batch of up to 40 samples, two procedural blanks, two CRMs, two duplicate samples and two matrix-spiked samples were analyzed. The Quality Assurance/Quality Control (QA/QC) results are summarized in Appendix I.

Methylmercury

Frozen sediment samples were sent directly from Louisiana to Frontier Geosciences, Inc., Seattle, in coolers packed with dry ice. Chain of custody sheets are included in Appendix I.

Methyl mercury in sediments was isolated by acid bromide/methylene chloride extraction and the aqueous phase was analyzed by ethylation, isothermal GC separation, and CVAFS detection (Frontier SOPs FGS-045, FGS-070). The methods used by Frontier Geosciences have evolved from a long history of analyzing samples for MeHg (e.g., Bloom and Crecelius, 1983; Bloom, 1989). All results are reported on both a wet and dry weight basis. More detailed information on methodology and QA/QC is presented in Appendix I.

RESULTS AND DISCUSSION

Total Mercury in Sediment

The results for total Hg in sediment from this study are used as a framework for introducing and discussing the MeHg data. The data for total Hg from this study also provide a link to previous results for total Hg in sediment from the Gulf of Mexico. This link helps establish the degree to which concentrations of total Hg from this study are representative of drilling sites in the Gulf of Mexico. Concentrations of total Hg also can be correlated with Ba levels in sediment to help show whether barite is the primary source of excess Hg in sediments near drilling sites.

Concentrations of total Hg range from 11-92 ng/g for all FF samples (parts per billion, dry weight) and 25-558 ng/g for all NF samples. Data for concentrations of total Hg for surficial sediment (0-2 cm) are summarized in Table 2 and Figure 3. The complete data set is tabulated in Appendix II. Data for surficial sediment, as opposed to surface plus subsurface sediment, are introduced first because they incorporate all stations evenly and avoid the bias of including values for deeper, background sediment in averages for NF cores. Furthermore, the top 2 cm of sediment are important as a possible source of MeHg to benthic food webs and the overlying water column. In Figure 2, and elsewhere throughout the text, data for surface sediment and all data (surface plus subsurface) are compared and discussed individually and together as appropriate.

Overall, concentrations of total Hg are significantly higher at NF stations relative to FF stations for all drilling sites except MP299 (t-test at alpha = 0.05, double-tailed for surface or collective data set for surface + subsurface samples, detailed results in Appendix III). For drilling sites EI346, EW963 and GC112, average concentrations of total Hg at NF stations are 3.9, 2.5 and 3.1 times greater than at FF sites. The NF stations at each of these sites contain higher levels of total Hg and barium than at FF stations, as discussed below. The distinctly higher levels of total Hg at the NF sites are observed whether using just the surface 2 cm of sediment or surface plus subsurface sediment (Figure 2).

The small standard deviations for concentrations of total Hg in FF samples from each drilling site show the overall uniformity in background levels of total Hg on a site-by-site basis. For example, at site MC496, the mean concentration of total Hg is only about one-third higher in the NF than FF; however, due to the low standard deviation for the FF samples, the difference in means is significant.

For site MP299, concentrations of total Hg are not significantly different among NF, MF and FF sites for comparisons based on surficial data or all data. Based on measured Ba concentrations for sediment at site MP299 discussed below, sediments at this site contain small amounts of drilling mud. At station MP288, sediment from stations FF1, FF2 and FF3 were sandy, naturally low in Al, Ba and total Hg, and not similar in texture (grain size) to any NF, MF or other FF stations from the area around site MP288 that contained

Table 2. Concentrations of total Hg (ng/g, dry wt.) in surficial sediment (0-2 cm) from nearfield (NF), midfield (MF) and farfield (FF) stations at each of the six drilling sites studied.

Site	Parameter	**NF** Total Hg (ng/g)	**MF** Total Hg (ng/g)	**FF** Total Hg (ng/g)
MP299	**Mean**	**58**	**59**	**61**
(Water Depth 60 m)	Std. Dev.	7	7	6
	Maximum	72	66	66
	Minimum	48	47	51
	(n)	8	6	6
MP288	**Mean**	**52**	**54**	**29***
(Water Depth 119 m)	Std. Dev.	11	5	20*
	Maximum	73	62	54
	Minimum	41	48	11*
	(n)	8	6	6*
EI346	**Mean**	**185**	**72**	**47**
(Water Depth 92 m)	Std. Dev.	84	23	3
	Maximum	291	88	49
	Minimum	64	55	42
	(n)	8	2	6
MC496	**Mean**	**96**	**78**	**71**
(Water Depth 556 m)	Std. Dev.	27	9	5
	Maximum	154	94	78
	Minimum	66	67	65
	(n)	8	6	6
EW963	**Mean**	**180**	**106**	**71**
(Water Depth 540 m)	Std. Dev.	109	30	3
	Maximum	422	130	76
	Minimum	74	72	68
	(n)	9	3	7
GC112	**Mean**	**248**	**101**	**79**
(Water Depth 534 m)	Std. Dev.	64	26	8
	Maximum	323	119	92
	Minimum	117	82	68
	(n)	8	2	7

* Includes sandy samples from stations FF1, FF2 and FF3.

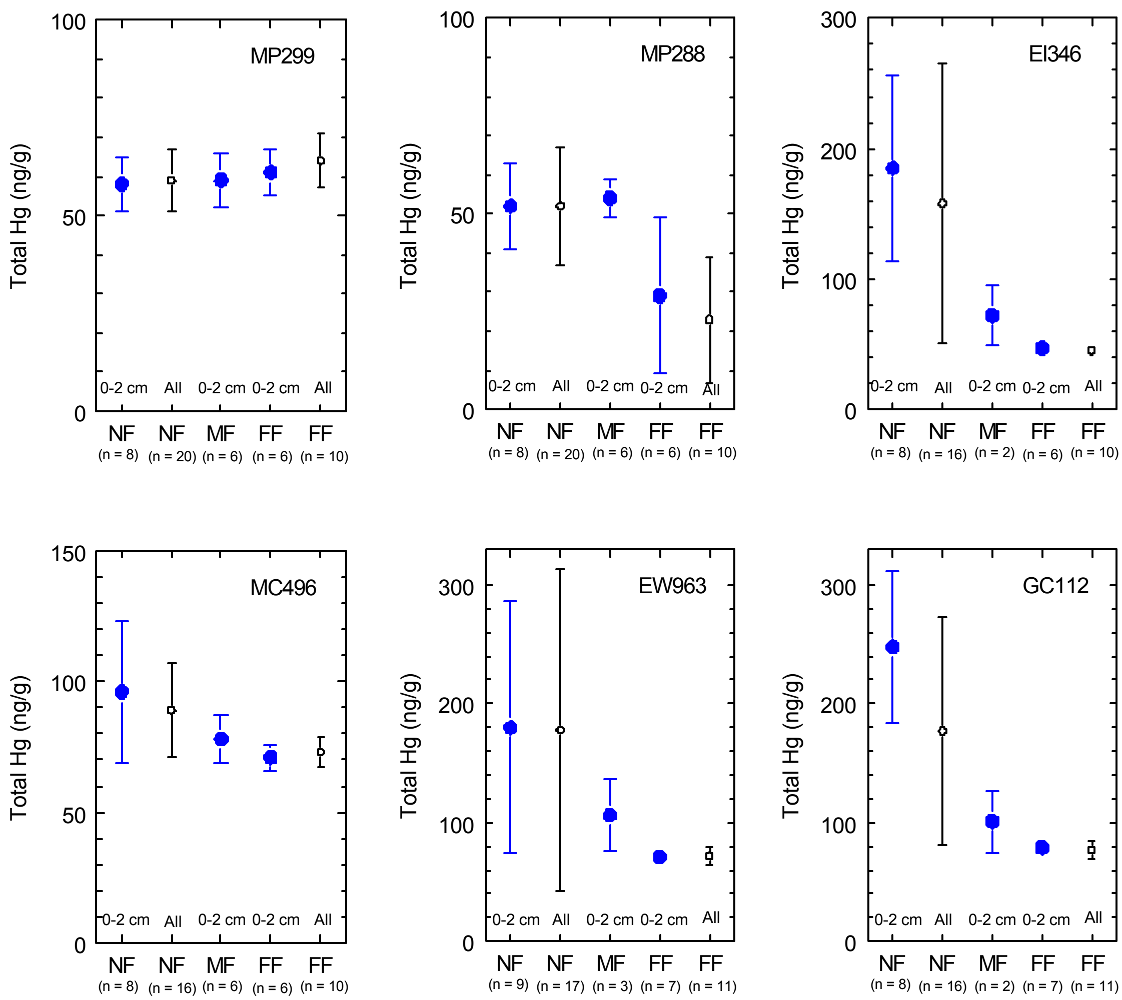

Figure 2. Concentrations of total Hg at nearfield (NF), midfield (MF) and farfield (FF) stations at each of six drilling sites. Solid circles show mean concentrations and lines show standard deviations for surficial sediment (0-2 cm). Open circles show mean concentrations and lines show standard deviations for all sediment samples. The number of data points (n) is shown for each mean and standard deviation. When the standard deviation line is not visible, it is smaller than the circle.

more clay and Al. Additional detail regarding Al and Ba follow below. The low concentrations of total Hg in the sandy samples at site MP288 yield a standard deviation for total Hg in the FF samples that is large relative to the other sites.

Most of the discussion in this report will focus on NF and FF samples because they make up the most pertinent and complete data sets. The data for the midfield (MF) samples are included in the summary tables and figures (e.g., Table 2 and Figure 2). In general, mean concentrations of total Hg at the MF stations are closer to those from FF stations (Figure 2). Concentrations of total Hg at MF and FF stations and are not significantly different except at site MP288 where values for the sandy FF sediments distort the mean value for total Hg as described previously.

Overall, total Hg levels in sediments from the six drilling sites studied for this report are representative of concentrations of total Hg in sediments at most sites where offshore activities have been carried out in the Gulf of Mexico (Figure 3). Total Hg levels >1000 ng/g are uncommon and have been reported only for the area immediately adjacent to HIA389 (Neff, 2002).

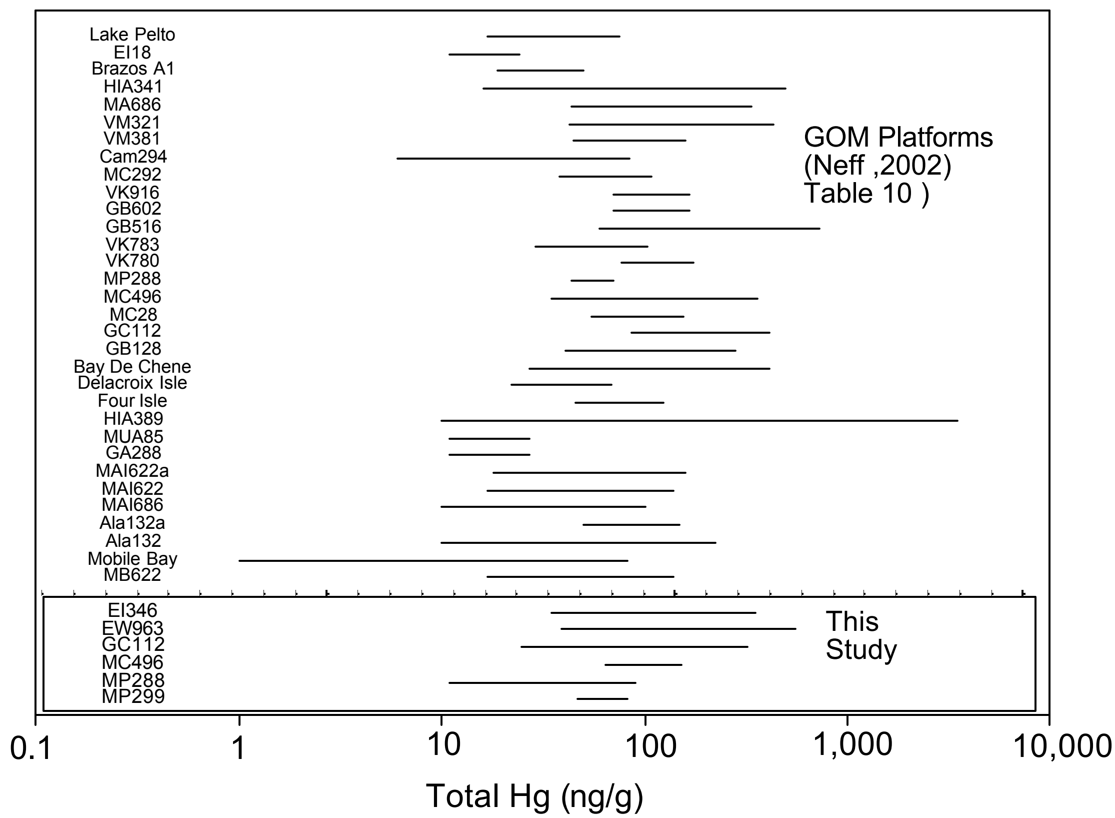

Figure 3. Ranges in concentrations of total Hg in sediments from areas adjacent to offshore drilling sites in the Gulf of Mexico from Neff, 2002). Box at bottom of figure highlights results from this study.

Total Mercury and Barium in Shelf Sediment (Sites MP299, MP288 and EI346)

Natural levels of total Hg are lower in shelf sediments (40-60 ng/g) than in upper slope sediments (70-90 ng/g). The background ratio of total Hg/Al also is lower for shelf sediment ($7.3 \pm 1.7 \times 10^{-6}$) than for sediments from the upper slope ($9.1 \pm 1.0 \times 10^{-6}$). This difference is mostly due to the slower sedimentation rate on the upper slope and increased scavenging time for particles to adsorb Hg from the water column. For this reason, continued discussion of the total Hg data in sediment from the shelf and upper slope will be carried out separately.

Concentrations of total Hg in natural sediment from the Gulf of Mexico are positively correlated with concentrations of Al. Fine-grained, clay-rich sediment contains higher concentrations of Al and most trace metals, including Hg due to the greater abundance of metal-richer aluminosilicates and greater surface area for adsorption of metals. The coarser fraction contains more quartz sand and/or calcium carbonate, both of which contain very low levels of Al and total Hg. In previous studies, including one that we carried out in Florida Bay, the relationship between TOC and Hg has been strong and the natural relationship for total Hg in sediment has been developed with concentrations of Hg versus TOC or Hg versus TOC + Al (e.g., Lindberg and Harriss, 1974; Kang et al., 2000). However, for sediments in this study from the shelf and upper slope of the Gulf of Mexico, concentrations of TOC were <1% in all FF samples and a weak correlation was observed between TOC and total Hg (r = 0.38). Thus, a plot of Al versus Hg with a good correlation coefficient (Figure 4a, r = 0.91) was used to normalize concentrations of total Hg for FF shelf sediment from this study. Natural sediment from the area is expected to plot within or close to the 95% prediction intervals shown on Figure 4a. Figure 4a shows data from shelf stations (MP299, MP288 and EI346), and not slope stations, because of differences in the Hg/Al ratio between sediments from the shelf and upper slope.

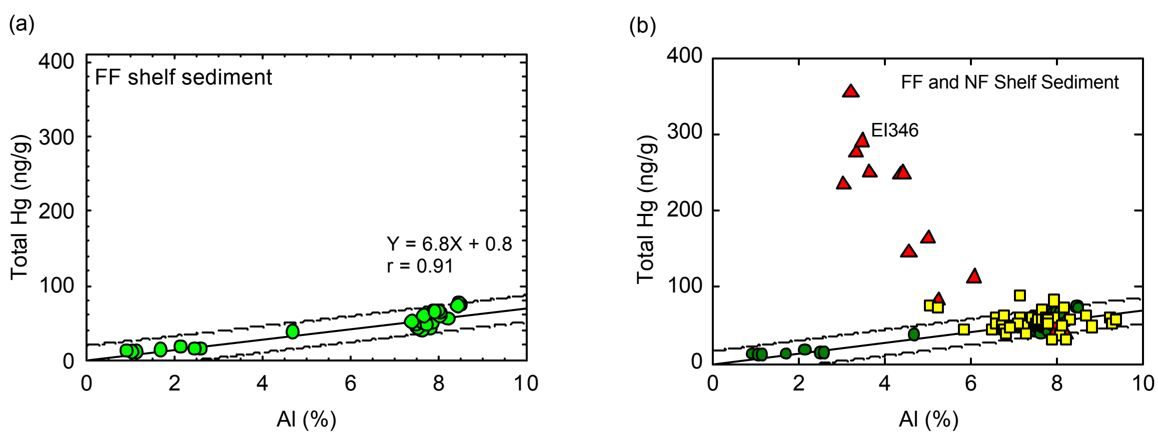

Figure 4. Concentrations of Al versus total Hg in shelf sediment from (a) farfield (FF) sites at MP299, MP288 and EI346. The solid line is from a linear regression (with equation and correlation coefficient) and dashed lines showing 95% prediction interval and (b) FF sites (circles) along with nearfield (NF) shelf sediment from sites MP299 and MP288 (squares) and EI346 (triangles). Linear regression lines are the same as in figure (a).

When concentrations of total Hg from the NF stations are added in Figure 4b, most of the data points from sites MP299 and MP288 fall within the 95% prediction interval as expected based on previous discussion about total Hg levels at these two sites. In contrast, many of the data points from NF stations at site EI346 show considerable enrichment of total Hg relative to background levels.

Correlations between concentrations of Ba and total Hg can be used to assess the likelihood that excess total Hg in sediment is associated with inputs of barite. Such comparisons also can be used to calculate the levels of total Hg in the barite used at a particular site. Mercury is most often present in sulfide impurities as part of the original barite ore (Kramer et al., 1980; Trefry, 1998). Barite has been specifically identified by x-ray diffraction in many NF samples from this study. Figure 5a shows that total Hg concentrations are directly related to Ba levels in FF sediment from shelf locations in much the same way as shown in Figure 4a for concentrations of total Hg and Al. The weaker fit for Ba versus total Hg, relative to Al versus total Hg, results in part from the somewhat elevated levels of Ba, not total Hg, in sediment from the area of Main Pass.

When data for the NF stations are added in Figure 5b, a strong linear relationship is observed for Ba versus total Hg in sediment from site EI346. The strong correlation suggests that Ba (i.e., barite) is the primary variable controlling the excess amount of total Hg (i.e., Hg at levels above ~50-60 ng/g) in the NF sediment from site EI346. If the line in Figure 5b is extrapolated to pure barite at 58.8% Ba, the concentration of total Hg is 653 ng/g (obtained by substituting 58.8% Ba for x in the equation in Figure 5b). Typical "industrial barite" contains 85-95% barite (i.e., 50-56% Ba). Based on the range of Ba levels in industrial barite (50-56% Ba), the average total Hg content of barite used at site EI346 is estimated at 594 ng/g (from the average of 563 ng/g at 50% Ba and 624 ng/g at 56% Ba).

These estimated values are in line with EPA regulations that allow a maximum Hg level of 1000 ng/g in barite (EPA, 1993). Concentrations of Ba in sediment from NF stations at sites MP299 and MP288 are too low to permit a reasonable extrapolation to the total Hg content of any barite that may be present.

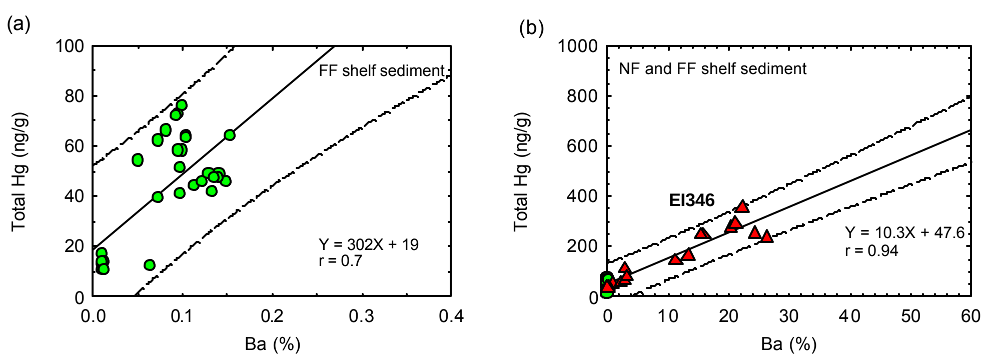

Figure 5. Concentrations of Ba versus total Hg in shelf sediment from (a) farfield (FF) sites at MP299, MP288 and EI346. The solid line is from a linear regression (with equation and correlation coefficient) and dashed lines showing 95% prediction interval and (b) FF sites (circles) along with nearfield (NF) shelf sediment from sites MP299 and MP288 (squares) and EI346 (triangles). The square markers for FF samples from MP299 and MP288 are not clearly visible because of the larger scale used for the axes. The solid line is from a linear regression of Ba versus total Hg for site EI346 and the dashed lines denote the 95% prediction interval.

Total Mercury and Barium in Upper Slope Sediment (Sites MC496, EW963 and GC112)

Concentrations of total Hg for all FF sediments from the upper slope in the Gulf of Mexico average 74 ± 7 ng/g with a relatively uniform Hg/Al ratio of $9.1 \pm 1.0 \times 10^{-6}$. The Hg/Al ratio is ~25% higher in FF sediments from the upper slope than in FF sediments from the shelf ($7.3 \pm 1.7 \times 10^{-6}$) as previously discussed. No significant relationship was found for concentrations of TOC versus total Hg for FF sediments from the upper slope (r = 0.13). The key use of the Hg/Al relationship here is to identify the relative degree of enrichment of total Hg concentrations in NF samples relative to FF samples and to point out the difference in ambient Hg levels between shelf and slope sediment. Figure 6 shows that concentrations of total Hg in many NF samples from sites GC112 and EW963 are significantly greater than levels found in FF samples as represented by the straight line and cluster of points on the lower right side of Figure 6.

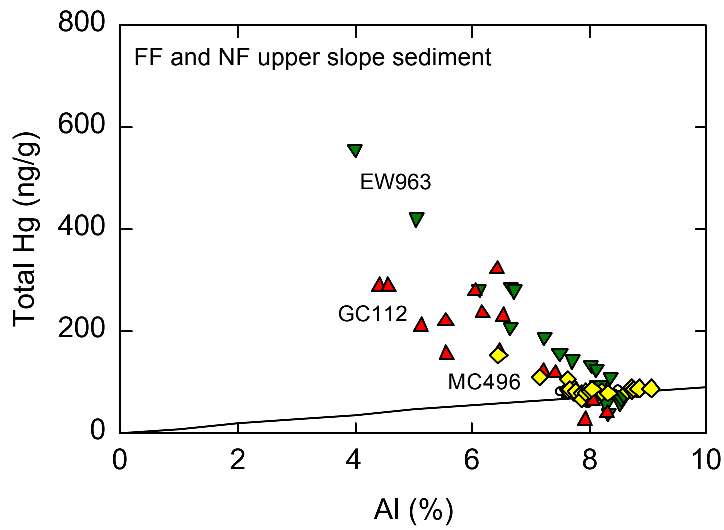

Figure 6. Concentrations of Al versus total Hg for sediment from farfield (FF) stations on the upper slope (hidden circles) along with nearfield (NF) stations from the upper slope for sites MC496 (diamonds), EW963 (inverted triangles) and GC112 (triangles). The solid line shows the slope for the Hg/Al ratio for sediment from FF stations.

In FF sediment from sites on the upper slope, total Hg concentrations are not well correlated with Ba levels (Figure 7a, r = 0.28). This weak correlation is due to natural diagenetic effects that sometimes yield Ba-rich layers in sediment (e.g., van Os et al., 1991) and to the widespread distribution of small amounts of anthropogenic and natural barite (Trocine and Trefry, 1983). However, the strong relationship between total Hg and Ba (barite) for NF samples on the expanded x-axis (Figures 7b-d) can be used to estimate the total Hg content of the industrial barite used at each site.

If the lines in Figures 7b-d are extrapolated to pure barite at 58.8% Ba, the concentrations of total Hg are as follows: 449 ng/g for site MC496, 1077 ng/g for site EW963 and 768 ng/g for site GC112. The estimated average concentrations of total Hg in the industrial barite used at each site (with an average of 53% Ba) are as follows: 413 ng/g for site MC496, 978 ng/g for site EW963 and 698 ng/g for site GC112, values that are in line with EPA regulations. Once again, the strong relationships between concentrations of Ba and total Hg support the contention that the excess total Hg in sediment near drilling sites is associated with barite.

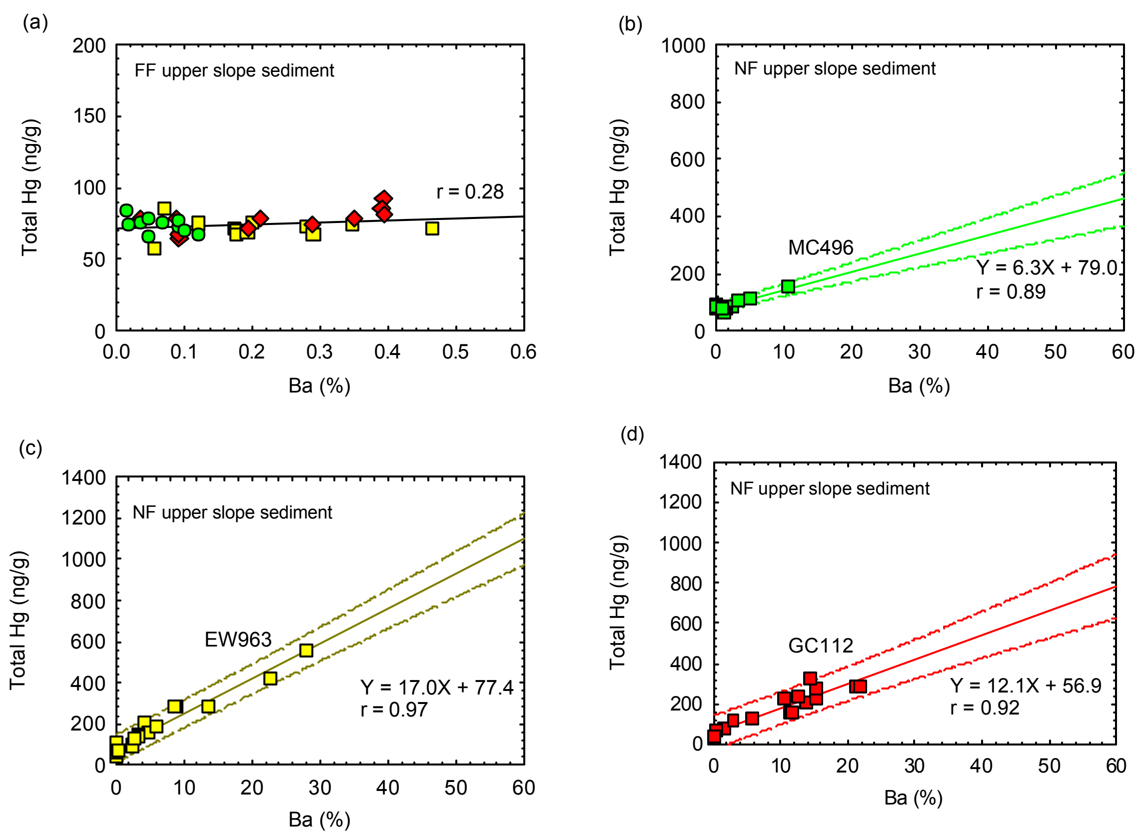

Figure 7. Concentrations of Ba versus total Hg in sediments from the upper slope for (a) farfield (FF) stations at sites MC496 (circles), EW963 (squares) and GC112 (diamonds), (b) NF stations at site MC496, (c) NF stations at site EW963 and (d) NF stations at site GC112. Solid lines show linear regression fits to the data with equation, correlation coefficient (r) and 95% prediction interval (dashed lines).

Methylmercury in Sediment

Concentrations of MeHg in sediments from this study range from 0.11-1.05 ng/g for all FF samples and <0.03-2.7 ng/g for all NF samples. The grand means ± standard deviations for MeHg in all samples from this study are as follows: FF = 0.44 ± 0.27 (n = 62), MF = 0.49 ± 0.17 (n = 25) and NF = 0.43 ± 0.41 ng/g (n = 109). Data for surficial sediment (0-2 cm) are summarized in Table 3. The complete data set is tabulated in Appendix II.

Table 3. Concentrations of MeHg (ng/g, dry wt.) in surficial sediment (0-2 cm) from nearfield (NF), midfield (MF) and farfield (FF) stations from each of the six drilling sites studied.

Site	Parameter	**NF** MeHg (ng/g)	**MF** MeHg (ng/g)	**FF** MeHg (ng/g)
MP299	**Mean**	**0.34**	**0.39**	**0.42**
(Water Depth 60 m)	Std. Dev.	0.10	0.12	0.20
	Maximum	0.58	0.46	0.70
	Minimum	0.25	0.22	0.18
	(n)	8	6	6
MP288	**Mean**	**0.34**	**0.44**	**0.29***
(Water Depth 119 m)	Std. Dev.	0.07	0.09	0.17*
	Maximum	0.48	0.58	0.58
	Minimum	0.30	0.32	0.14*
	(n)	8	6	6*
EI346	**Mean**	**0.19**	**0.34**	**0.30**
(Water Depth 92 m)	Std. Dev.	0.15	0.07	0.10
	Maximum	0.40	0.39	0.40
	Minimum	<0.03	0.29	0.11
	(n)	8	2	6
MC496	**Mean**	**0.49**	**0.50**	**0.51**
(Water Depth 556 m)	Std. Dev.	0.21	0.13	0.18
	Maximum	0.85	0.67	0.79
	Minimum	0.24	0.34	0.35
	(n)	8	6	6
EW963	**Mean**	**0.52**	**0.77**	**0.65**
(Water Depth 540 m)	Std. Dev.	0.19	0.24	0.24
	Maximum	0.81	1.0	1.0
	Minimum	0.24	0.76	0.29
	(n)	9	3	7
GC112	**Mean**	**1.42**	**0.61**	**0.87**
(Water Depth 534 m)	Std. Dev.	0.81	0.07	0.20
	Maximum	2.7	0.66	1.0
	Minimum	0.35	0.56	0.49
	(n)	8	2	7

* Includes sandy samples from stations FF1, FF2 and FF3.

No statistically significant differences in concentrations of MeHg in surficial sediment between NF and FF stations are observed for any of the six sites studied (based on Student's t-test at alpha = 0.05, double-tailed, as shown in Figure 8 and Appendix III). When surface and subsurface data are combined, no significant differences in concentrations of MeHg at NF versus FF stations are observed for sites MP299, EI346, MC496, EW963 and GC112; however, MeHg levels are significantly higher at the NF versus FF stations for site MP288 (Figure 8).

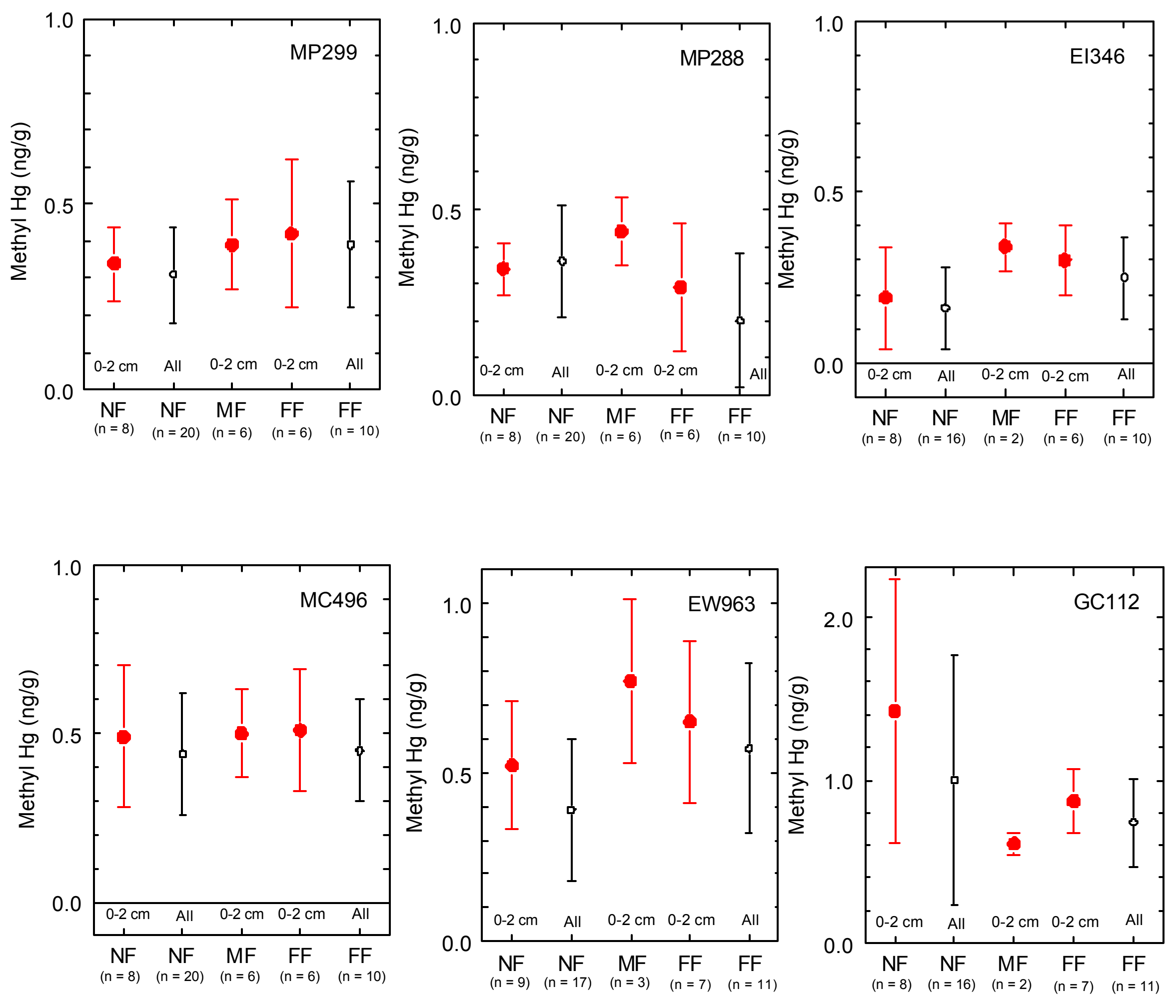

Figure 8. Concentrations of methylmercury at nearfield (NF), midfield (MF) and farfield (FF) stations at each drilling site. Solid circles show mean concentrations and lines show standard deviations for surficial sediment (0-2 cm). Open circles show mean concentrations and lines show standard deviations for all sediment samples. The number of data points (n) is shown for each mean and standard deviation.

A more detailed perspective for concentrations of total Hg and MeHg in surface sediment is given in Figures 9-11. These figures show the uniform distribution of total Hg in the FF stations, except for the sandy samples from site MP288. They also show the variable, but higher levels of total Hg in the NF stations from sites EI346, MC496, EW963 and GC112.

For MeHg, Figures 9-11 show the within-site and site-to-site variability in concentrations and the generally higher levels of MeHg in the upper slope stations. For example, mean values for MeHg in sediment at FF stations on the shelf are ~0.3-0.4 ng/g relative to 0.5-0.8 ng/g in sediment from FF stations on the upper slope (Table 3, Figures 8-11). The observation of generally higher concentrations of MeHg in ambient sediments from the upper slope versus the shelf is related to higher background levels of total Hg and different redox conditions in sediments from the upper slope versus the shelf, as discussed later in the report.

Concentrations of MeHg are least variable in NF stations at sites MP299 and MP288 (CV<30%), most likely due to the lower and relatively uniform levels of total Hg (Figure 9) and more uniform redox conditions in sediment at these two sites. Significantly higher levels of MeHg in NF than FF sediments at site MP288, when all samples are considered, are identified because of sandy sediment in some FF samples. A low level of total Hg and MeHg in surface samples at stations FF1, FF2 and FF3 and throughout the core at station FF1 is due to naturally occurring sand found only at these FF locations. These low levels skew the mean for FF stations relative to NF stations.

Concentrations of MeHg are below detection limits of 0.03 ng/g in surface sediment from three NF stations at site EI346. High concentrations of total H_2S (>1 mM) and low values for Eh (<-100 mV) help explain this observation for NF sediments from site EI346. Greater variability in concentrations of MeHg (CVs of 30-40%) is common to NF and FF stations from sites MC496 and EW963 where no significant differences are observed between NF and FF stations for levels of MeHg in surface sediment. At GC 112, the largest variability in levels of MeHg (CV = 70%) and higher concentrations of MeHg in surface sediment are found for the NF stations. These observations for GC112 appear to be a complex function of total Hg concentrations and redox conditions as discussed below.

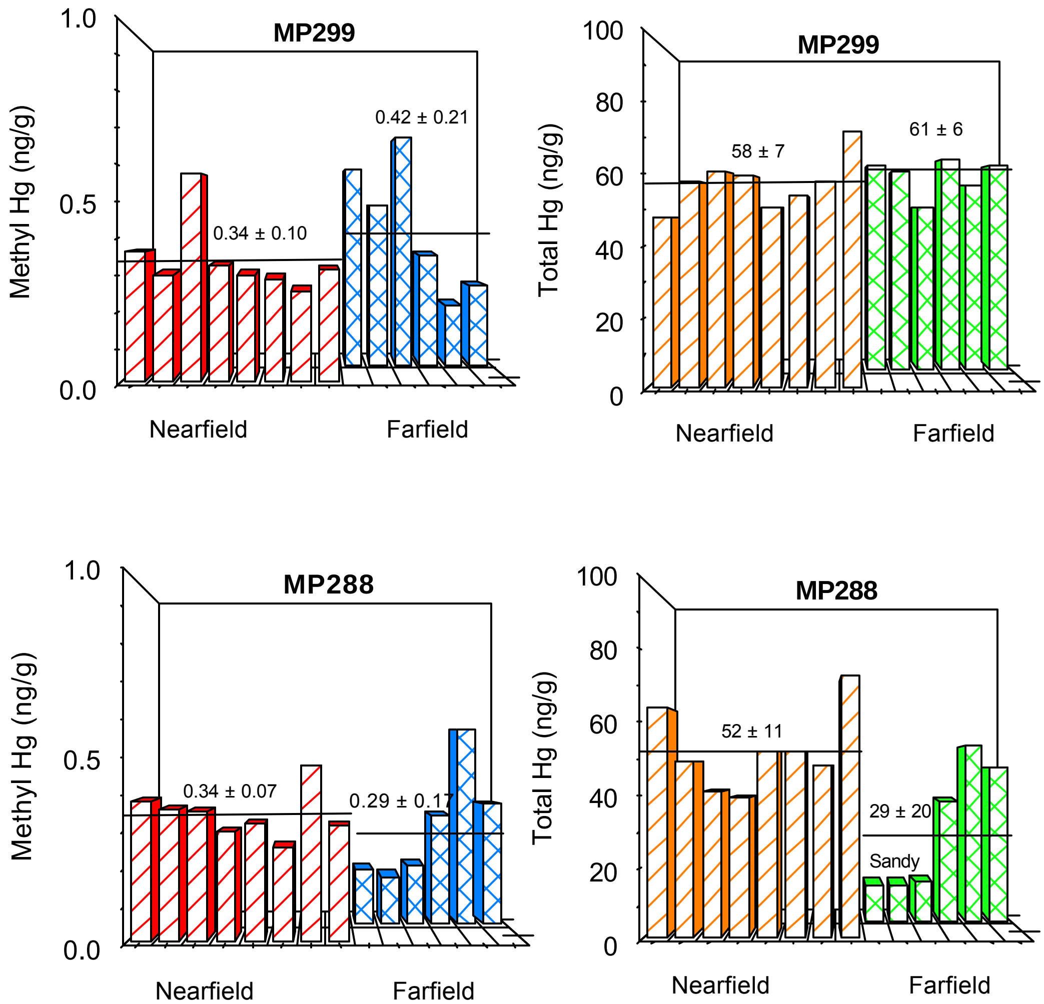

Figure 9. Concentrations of methylmercury and total Hg for surface (0-2 cm) sediment from nearfield and farfield stations at shelf sites MP299 and MP288. Numbers above each data set show mean ± standard deviation and solid line is drawn at the mean concentration.

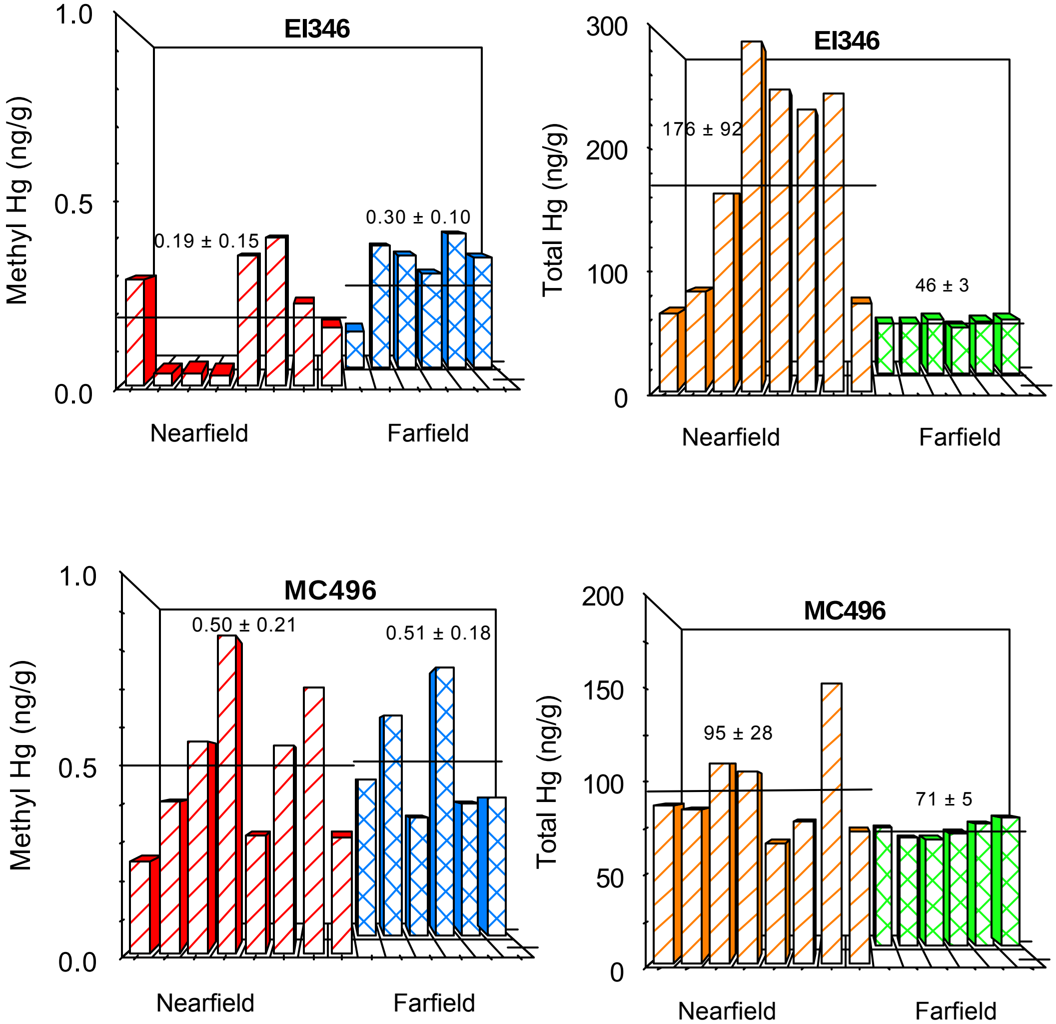

Figure 10. Concentrations of methylmercury and total Hg for surface (0-2 cm) sediment from nearfield and farfield stations at shelf site EI346 and upper slope site MC496. Numbers above each data set show mean ± standard deviation and solid line is drawn at the mean concentration.

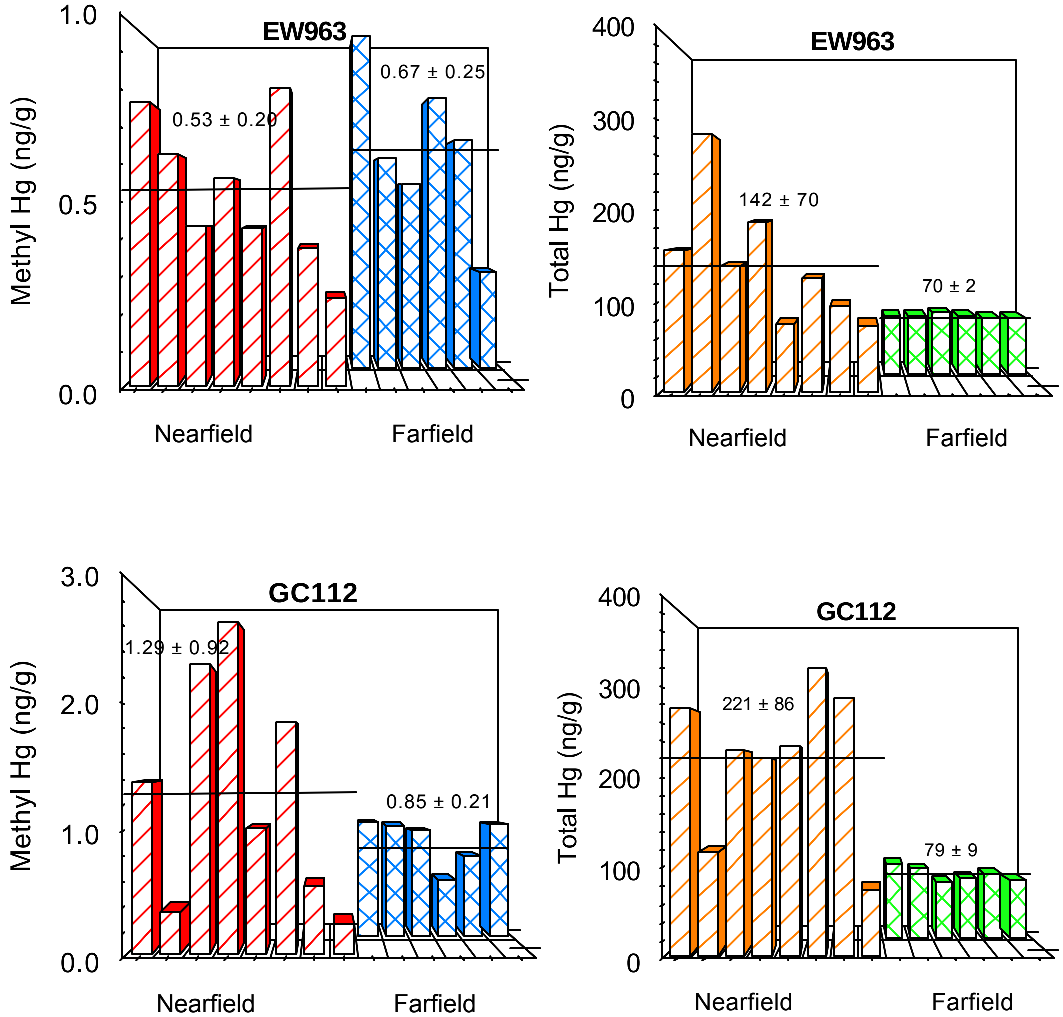

Figure 11. Concentrations of methylmercury and total Hg for surface (0-2 cm) sediment from nearfield and farfield stations at upper slope shelf sites EW963 and GC112. Numbers above each data set show mean ± standard deviation and solid line is drawn at the mean concentration.

Previous studies in various sedimentary environments show that optimum conditions for methylation of Hg occur in anoxic, but weakly sulfidic (low total H_2S) sediments (Gilmour et al., 1992, Gagnon et al., 1996). Neff (2002) summarizes previous results for MeHg in sediments from numerous U.S. and foreign locations. Concentrations of MeHg range from 0.03-10 ng/g and total Hg levels are as high as 783 ng/g in the sediments from Lavaca Bay, Texas, where a chlor-alkali facility was in operation during the late 1960s (Bloom et al., 1999). Kannan et al. (1998) reported a range of <0.001-0.32 ng/g for MeHg in various estuaries along the Gulf of Mexico coast of Florida. In studies of sediment cores from the Saguenay Fjord, Canada, Gagnon et al. (1996) showed that concentrations of MeHg rose from <0.1 ng/g in the oxic surface layers of sediment to ~2 ng/g at 1-2 cm and >10 ng/g at 6-8 cm where total Hg levels were 145, 175 and 700-800 ng/g, respectively. Concentrations of MeHg in sediment from our study in the Gulf of Mexico are below values from Lavaca Bay and are within the lower range of values reported for the Sanguenay Fjord in Canada.

Methylmercury in Shelf versus Slope Sediment

The mean value for MeHg in all FF sediment from the shelf is 0.28 ± 0.17 ng/g relative to a mean of about two times more MeHg (at 0.59 ± 0.26 ng/g) for FF sediments from the upper slope (Figure 12). A similar trend is observed for all NF stations where average levels of MeHg are 0.28 ± 0.16 ng/g and 0.59 ± 0.52 ng/g, for shelf and upper slope sediments, respectively (Figure 12). These trends in concentrations of MeHg are consistent with general trends for concentrations of total Hg (Figure 12) with ~60-70% higher levels of total Hg at both NF and FF stations on the upper slope relative to the shelf. Concentrations of total Hg alone do not explain the variance in the data for MeHg as will be discussed in more detail below. However, a key observation from Figure 12 is that concentrations of both MeHg and total Hg increase from shelf to upper slope sediment for the sites studied.

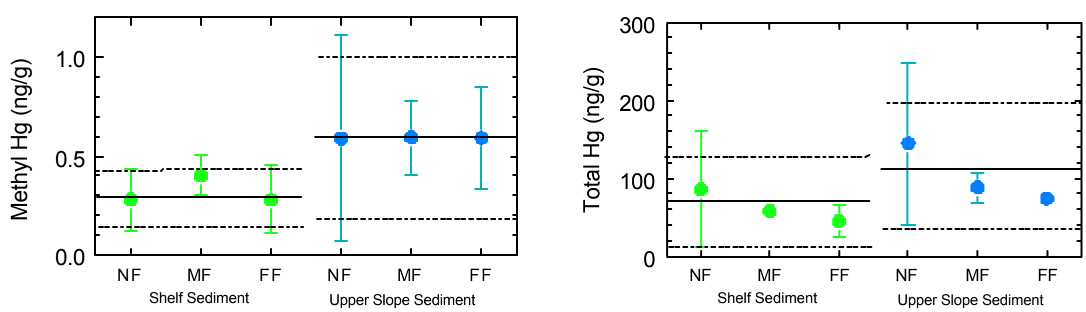

Figure 12. Means (solid circles) and standard deviations (vertical lines) for concentrations of (a) methylmercury and (b) total Hg in sediment from nearfield (NF), midfield (MF) and farfield (FF) stations on the shelf and upper slope. Solid horizontal lines show means and dashed horizontal lines show standard deviations for all shelf or upper slope samples.

Concentrations of MeHg range from 0.16-1.47% of total Hg levels in all FF sediment and <0.01-1.45% of total Hg levels in all NF samples (Figure 13). The grand average for the fraction of total Hg that is present as MeHg is 0.60 ± 0.31% for all shelf sediment, the same as the value of 0.60 ± 0.32% for all upper slope sediment. Although these average percentages are similar, some variations within the data set are observed.

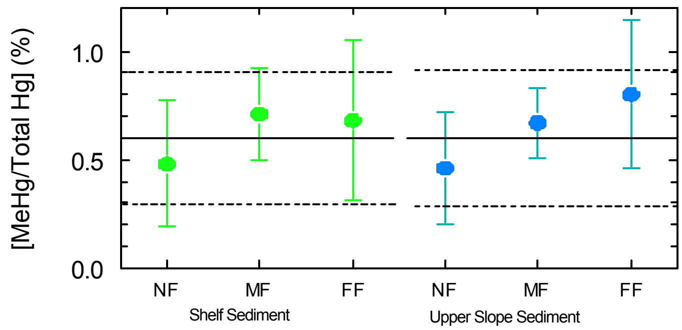

Figure 13. Means (solid circles) and standard deviations (vertical lines) for the percent of total merucry that is methylmercury in sediment from nearfield (NF), midfield (MF) and farfield (FF) stations on the shelf and upper slope. Solid horizontal lines show means and dashed horizontal lines show standard deviations for all shelf or upper slope samples.

Concentrations of MeHg are positively correlated (r = 0.60) with concentrations of total Hg for FF samples from the shelf, partly due to the influence of the Hg-poor, sandy samples from site MP288 (Figure 14a). When data for NF sediments from the shelf are added in Figure 14b, most of the data points from sites MP299 and MP288 fit within the prediction interval established for the FF sediments in Figure 14a. In other words, no significant differences in the concentrations of total Hg, MeHg or the percent MeHg are observed between NF versus FF stations at sites MP299 and MP288. At site EI346, many samples with elevated levels of total Hg contain lower levels of MeHg than expected based on the natural distribution for FF samples (Figure 14b). For example, at the extreme, five samples from NF stations at site EI346 contain total Hg levels >200 ng/g; however, concentrations of MeHg are non-detectable (<0.03 ng/g) and account for <0.02% of the total Hg. The observation for site EI346 suggests that the excess Hg in barite at site EI346 is not being converted to MeHg. Nearfield sediment from site EI346 also contains high levels of total H_2S (>1 mM). The presence of reduced sulfide is thought to inhibit methylation because Hg precipitates as HgS (Gilmour et al., 1998).

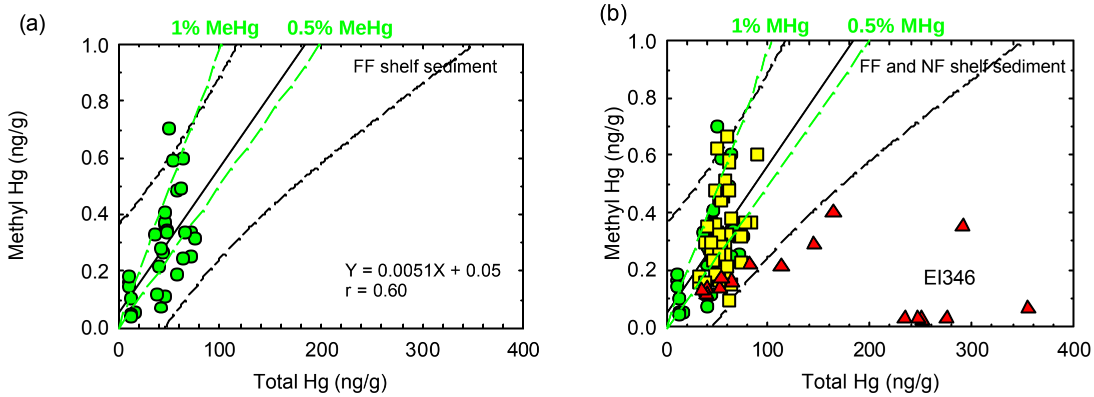

Figure 14. Concentrations of total Hg versus MeHg in shelf sediment from (a) farfield (FF) stations at shelf sites MP299, MP288 and EI346. The solid line is from a linear regression (with equation and correlation coefficient) and dashed lines around solid line show 95% prediction interval, and (b) FF stations (circles) along with nearfield (NF) shelf sediment from sites MP299 and MP288 (squares) and EI346 (triangles). The solid line is from a linear regression for the FF data and dashed lines around solid line show 95% prediction interval (the line, equation and correlation coefficient for the line are the same as in graph a). Dashed lines with labels of 0.5% MeHg and 1% MeHg on both graphs are reference lines that provide a convenient perspective for estimating the percent of total Hg that is present as methylmercury for each data point.

In FF sediment from the upper slope, concentrations of MeHg range from 0.2-1.05 ng/g and show no significant relationship (r = 0.12) with concentrations of total Hg (Figure 15a). When data for FF stations from the shelf are added (Figure 15b), the distinctly higher concentrations of both total Hg and MeHg in ambient sediments from the upper slope are clearly shown. The combined data set for FF samples from the shelf and upper slope is used here to establish a better and more significant frame of reference for comparing results for NF samples. Samples from NF stations at site MC496 group close to the FF samples from the upper slope (Figure 15c). However, the NF samples from site EW963, with high levels of total Hg, have levels of MeHg that are consistent with FF sediments (Figure 15c). This observation for site EW963 is similar to that made for site EI346 on the shelf and again supports the argument that excess Hg in barite at site EW963 is not being converted to MeHg. In the case of EW963, this trend also is related to the presence of total H_2S in the sediment at some stations. In sharp contrast to the observations for NF samples from MC496 and EW963, seven NF samples from site GC112 contain higher levels of both total Hg and MeHg than observed at FF sites from the upper slope (Figure 15d). However, an additional four NF samples from site GC112, with total Hg concentrations >100 ng/g, contain MeHg at levels that are below the average of ~0.6 ng/g for ambient sediment from the upper slope. The above trends show that enhanced levels of barite-related total Hg in NF sediments around drilling sites do not generally lead to higher levels of MeHg, with the possible exception of several stations at site GC112. However, even at site GC112, the highest concentration of MeHg (2.7 ng/g) is only ~3% of the ambient concentration of total Hg and thus the additional MeHg Hg could be from either an anthropogenic or natural source of Hg.

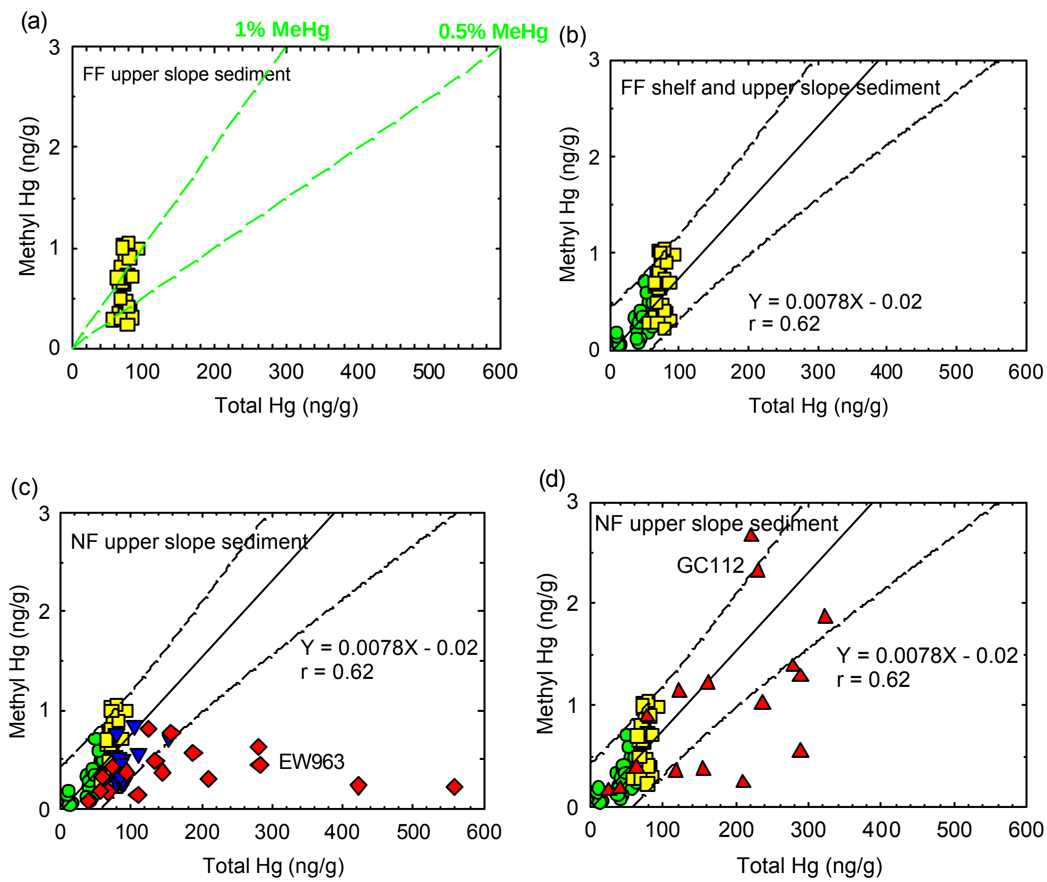

Figure 15. Concentrations of total Hg versus MeHg in sediment from (a) farfield (FF) stations on the upper slope at MC496, EW963 and GC112, (b) FF stations from the upper slope (squares) and the shelf (circles), (c) FF stations from the upper slope (squares) and the shelf (circles) along with nearfield (NF) sediment from upper slope sites MC496 (inverted triangles) and EW963 (diamonds), (d) FF stations from the upper slope (squares) and the shelf (circles) along with NF sediment from upper slope site GC112 (triangles). Dashed lines with labels of 0.5% and 1% MeHg on graph (a) are reference lines that provide a convenient perspective for estimating the percent of total Hg that is present as methylmercury for each data point and can be visually applied to all four graphs.

Total Organic Carbon in Sediment

The importance of organic matter for microbial methylation of Hg is well documented (e.g., Compeau and Bartha, 1985; Gagnon et al., 1996). As the rate of deposition of organic matter in sediments increases, a more reducing environment is created. The optimum environment for formation of MeHg in marine sediment seems to be one that is enriched with organic carbon and nutrients, anoxic, yet low in concentrations of dissolved sulfide (Gagnon et al., 1996). Discharges of cuttings with SBM (olefin-rich organic substances) or increased deposition of organic matter from organisms inhabiting offshore structures may alter the sediment environment and render it more favorable for methylation of Hg. Thus, TOC also is an important factor to consider in the overall assessment process.

Concentrations of TOC in surficial sediment (0-2 cm) at FF stations from this study range from 0.06% in sandy sediment at site MP288 to 1.39% at MP299. At NF stations, levels of TOC range from 0.73-4.1%, with both the minimum and maximum values at site EI346. The grand mean for TOC at all NF stations of 1.43 ± 0.91% is about 50% greater than the grand mean of 0.96 ± 0.35% for all FF stations. The maximum concentration of TOC was 5.89% in subsurface sediment from station NFD1 at site EI346. Data for surficial sediment (0-2 cm) are summarized in Table 4. The complete data set is tabulated in Appendix II.

No significant differences in concentrations of TOC in surficial sediment are observed between NF and FF stations for sites MP299, MP288, and MC496 (based on Student's t-test at alpha = 0.05, double-tailed, as shown in Figure 16 and Appendix III). However, levels of TOC are significantly higher in surficial sediment at the NF versus FF stations for sites EI346, EW963 and GC112. When surface and subsurface data are combined, no significance differences in concentrations of TOC at NF versus FF stations are observed for sites MP299 and MC496 and significantly higher levels of TOC are found at NF sites for MP288, EI346, EW963 and GC112 (Appendix III). The significant differences observed for NF versus FF stations at site MP288 are related to very low levels of TOC in sandy sediment at three FF stations.

Concentrations of TOC at FF stations on the upper slope (1.15 ± 0.20 %) are about 40% higher than on the shelf (0.80 ± 0.41%). A similar trend for TOC occurs for NF stations on the upper slope (1.67 ± 0.82%) versus the shelf (1.21 ± 0.95%). Variability in TOC levels at FF stations (average CV = 8%, excluding site MP288) is much lower than in the NF stations (average CV = 37%) showing both the relative uniformity in TOC in ambient sediments and the patchiness in TOC levels near drilling sites. Increased variability in the NF zone is most likely related to the irregular distribution patterns of drilling discharges.

Table 4. Concentrations of total organic carbon (TOC as %) in surficial sediment (0-2 cm) from nearfield (NF), midfield (MF) and farfield (FF) stations from each of the six drilling sites studied.

Site	Parameter	**NF** TOC (%)	**MF** TOC (%)	**FF** TOC (%)
MP299	**Mean**	**1.20**	**1.26**	**1.24**
(Water Depth 60 m)	Std. Dev.	0.35	0.11	0.09
	Maximum	1.93	1.43	1.39
	Minimum	0.75	1.16	1.14
	(n)	8	6	6
MP288	**Mean**	**0.96**	**1.01**	**0.51***
(Water Depth 119 m)	Std. Dev.	0.19	0.23	0.49*
	Maximum	1.21	1.30	1.24
	Minimum	0.67	0.73	0.08*
	(n)	8	6	6*
EI346	**Mean**	**1.81**	**1.01**	**0.86**
(Water Depth 92 m)	Std. Dev.	1.12	0.01	0.03
	Maximum	4.10	1.01	0.92
	Minimum	0.73	1.00	0.82
	(n)	8	2	6
MC496	**Mean**	**1.80**	**1.30**	**1.29**
(Water Depth 556 m)	Std. Dev.	0.78	0.20	0.13
	Maximum	3.28	1.55	1.42
	Minimum	1.08	0.95	1.06
	(n)	8	6	6
EW963	**Mean**	**1.68**	**1.30**	**1.13**
(Water Depth 540 m)	Std. Dev.	0.67	0.30	0.06
	Maximum	2.87	1.93	1.20
	Minimum	1.15	1.10	1.03
	(n)	9	3	7
GC112	**Mean**	**2.06**	**1.31**	**0.89**
(Water Depth 534 m)	Std. Dev.	0.60	0.48	0.14
	Maximum	2.76	1.65	1.05
	Minimum	1.02	0.97	0.64
	(n)	8	2	6

* Includes sandy samples from stations FF1, FF2 and FF3.

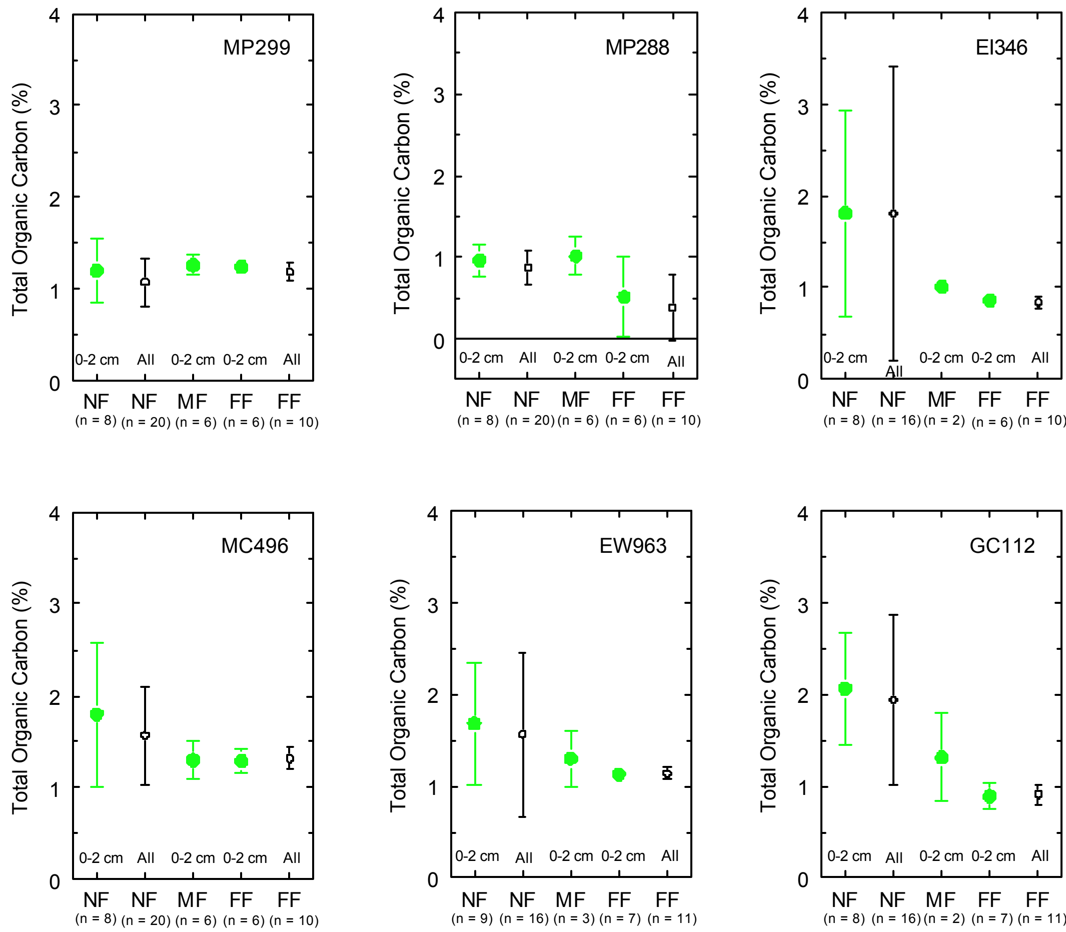

Figure 16. Concentrations of total organic carbon (TOC) for nearfield (NF), midfield (MF) and farfield (FF) stations at each drilling site. Solid circles show mean concentrations and lines show standard deviations for surficial sediment (0-2 cm). Open circles show mean concentrations and lines show standard deviations for all sediment samples. The number of data points (n) is shown for each mean and standard deviation.

Concentrations of TOC correlate positively with concentrations of total Hg for sediments from the shelf (r = 0.72) and the shelf plus upper slope (r = 0.81, Figure 17a), but not for the upper slope data alone (r = 0.11). This trend is analogous to the positive relationship between Al and total Hg shown previously (Figure 4), where higher levels of TOC corresponded to increased amounts of aluminosilicate clays. When data for NF stations from the shelf are added (Figure 17c), results for NF stations at sites MP299 and MP288 plot with the FF data. In NF sediment from site EI346, elevated concentrations of total Hg coincide with elevated levels of TOC (Figure 17c). This trend is related the presence of both total Hg and TOC (as SBM) in the drilling discharges. Greater scatter in the relationship between TOC and total Hg (Figure 17c) than for total Ba versus total Hg (Figure 5b) occurs because the Hg is directly associated with the barite and not the TOC (as SBM). A similar trend for the co-occurrence of elevated levels of TOC and total Hg is observed in NF sediment from sites EW963 and GC112 (Figure 17e).

Concentrations of MeHg correlate positively with TOC in sediment from FF stations on the shelf (r = 0.63, including sandy samples from site MP288); however, no significant correlation was observed in FF sediments from the upper slope (r = 0.13) or the combined data set for FF sediments from the shelf and upper slope (r = 0.38, Figure 17b). These trends for TOC versus MeHg in FF sediment show that TOC alone is not a key variable in determining how much MeHg is in sediment. However, low levels of MeHg in the sandy, TOC-poor sediment from three FF stations at site MP288 show that sediments with very low levels of TOC (i.e., <0.2%) are likely to have low levels of MeHg.

When data for NF stations at sites MP299 and MP288 are added to the data for FF stations, the points overlap almost completely (Figure 17d). At site EI346, sediment containing higher levels of TOC contains lower concentrations of MeHg (Figure 17d). The lower levels of MeHg at higher concentrations of TOC in these sediments may be the result of higher levels of total H_2S (>1 mM) that inhibit methylation of Hg.

Some NF sediments at upper slope sites MC496, EW963 and GC112 contain 2-4 times more TOC than the other NF stations; however, levels of MeHg are within the same range as the other NF and FF stations from these sites (Figure 17c). In contrast, sediment from several stations at site GC112 with elevated levels of TOC (about double ambient TOC concentrations), are marked by the highest concentrations of MeHg (as much as 2-3 times higher than ambient concentrations). These varied trends will be discussed in more detail below. However, the TOC relationships are complicated because olefins in synthetic-based mud may account for 50-100% of the TOC-rich sediment from NF stations.

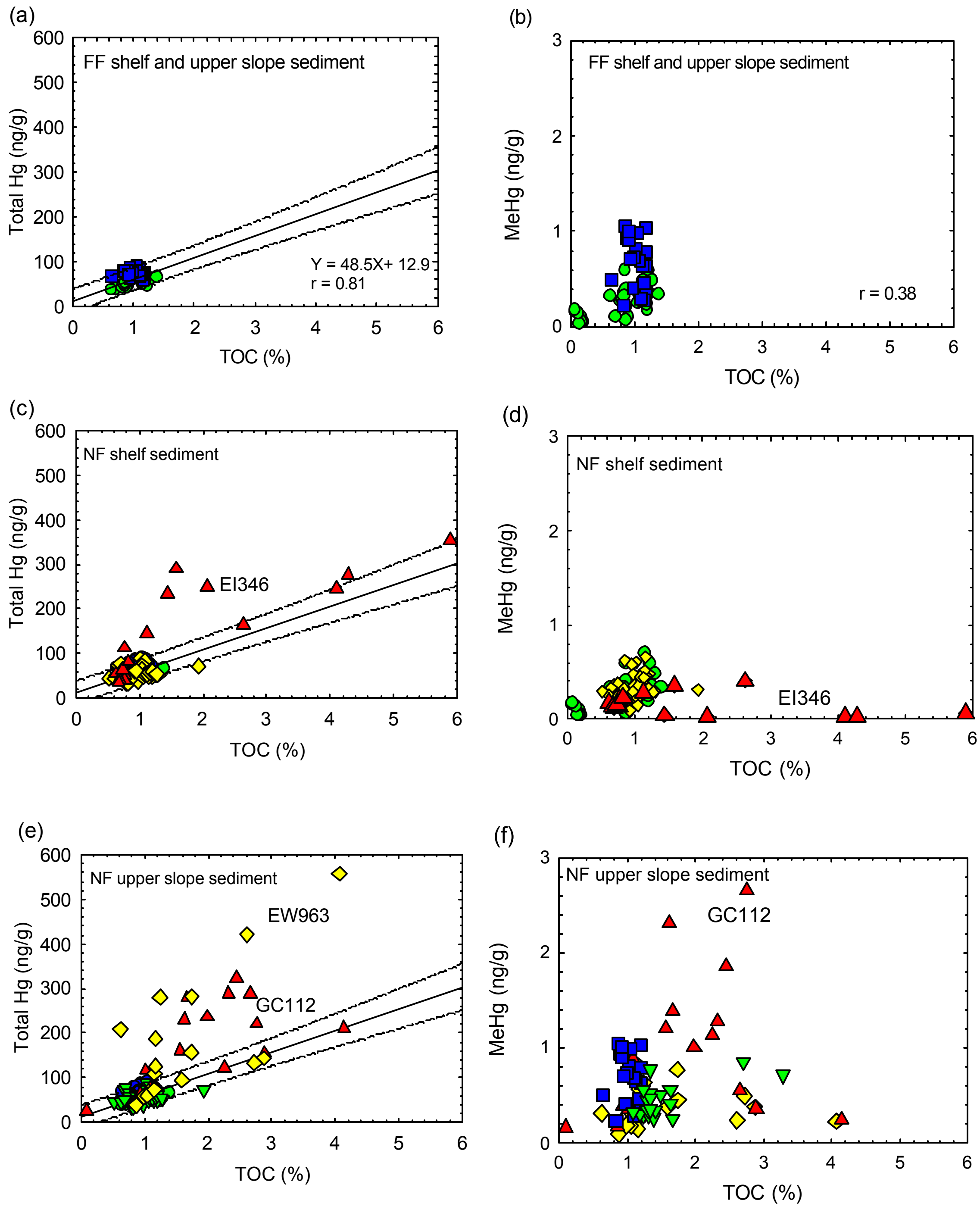

Figure 17. Concentrations in sediment of total organic carbon (TOC) versus (a) total Hg from farfield (FF) stations on the shelf (circles) and upper slope (squares), (b) MeHg in FF stations on the shelf (circles) and upper slope (squares), (c) total Hg from farfield (FF) stations on the shelf (circles) and upper slope (squares), and nearfield (NF) stations MP299 and MP288 (diamonds) and EI346 (triangles), (d) MeHg in FF stations on the shelf (circles) and nearfield (NF) stations MP299 and MP288 (diamonds) and EI346 (triangles), (e) total Hg from farfield (FF) stations on the shelf (circles) and upper slope (squares) and nearfield (NF) stations from upper slope stations MC496 (inverted triangles), EW963 (diamonds) and GC112 (triangles) and (f) MeHg from farfield (FF) stations on the upper slope (squares) and nearfield (NF) stations from upper slope stations MC496 (inverted triangles), EW963 (diamonds) and GC112 (triangles).

__Vertical Distributions of Total Mercury and Methylmercury and Relationships to Redox Conditions__

Vertical profiles for concentrations of MeHg and total Hg were obtained for 11 cores from the shelf (sites MP299, MP288 and EI346) and 10 cores from the upper slope (sites MC496, EW963 and GC112). Eighteen of these profiles are presented in Figures 19-24 with the results for dissolved oxygen and Eh.

The measured Eh values represent the sum of all oxidation and reduction reactions that are occurring in the sediment. An approximate Eh value can be given for the occurrence of various redox reactions (Figure 18). For example, the onset of bacterial reduction of nitrate (a replacement oxidizing agent for oxygen) to ammonia occurs at an Eh ~200 mV. The onset of sulfate reduction to H_2S occurs as Eh values fall below 0 to –100 mV (Figure 18). The redox environment defined in this report will be mainly based on the Eh; however, in some cases, supporting concentrations for interstitial water are available from the SBM study. All probe and interstitial water data will eventually be compiled in the final report of the SBM study.

At shelf site MP299, concentrations of MeHg in the sediment column at the FF stations (0.39 ± 0.14 ng/g) are not significantly different than at NF stations (0.29 ± 0.13 ng/g) (Figure 19). Concentrations of total Hg in FF (68 ± 7) and NF (60 ± 10 ng/g) cores are relatively uniform (CV<20%) and not statistically different. Levels of dissolved oxygen decrease to below detection limits (<1 µM) within the top 0.2-1.0 cm and Eh values are uniformly distributed at 80-100 mV in both NF and FF cores (Figure 19). The highest concentrations of MeHg (0.4-0.6 ng/g) in any of the cores from site MP299 were

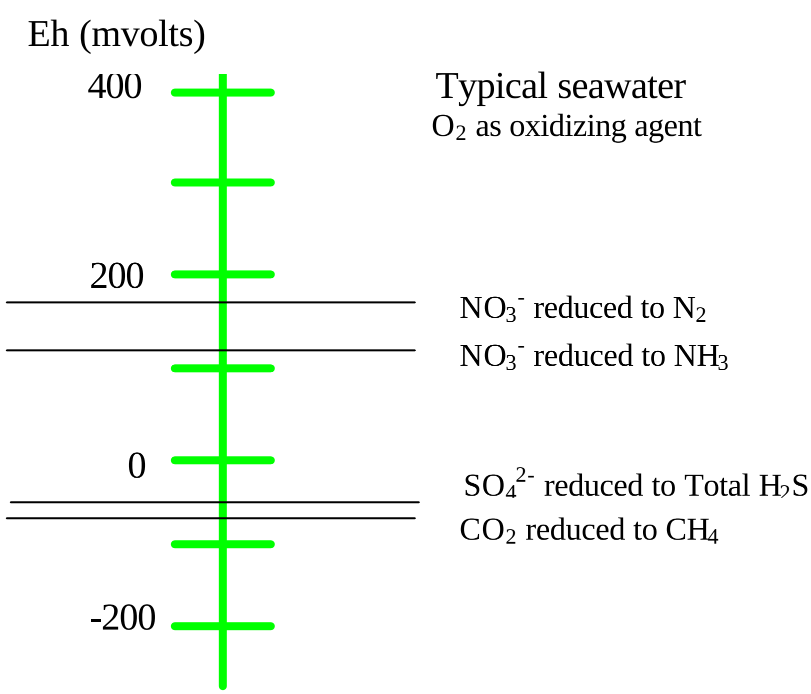

Figure 18. Approximate Eh values for various redox reactions in water (after Drever, 1997)

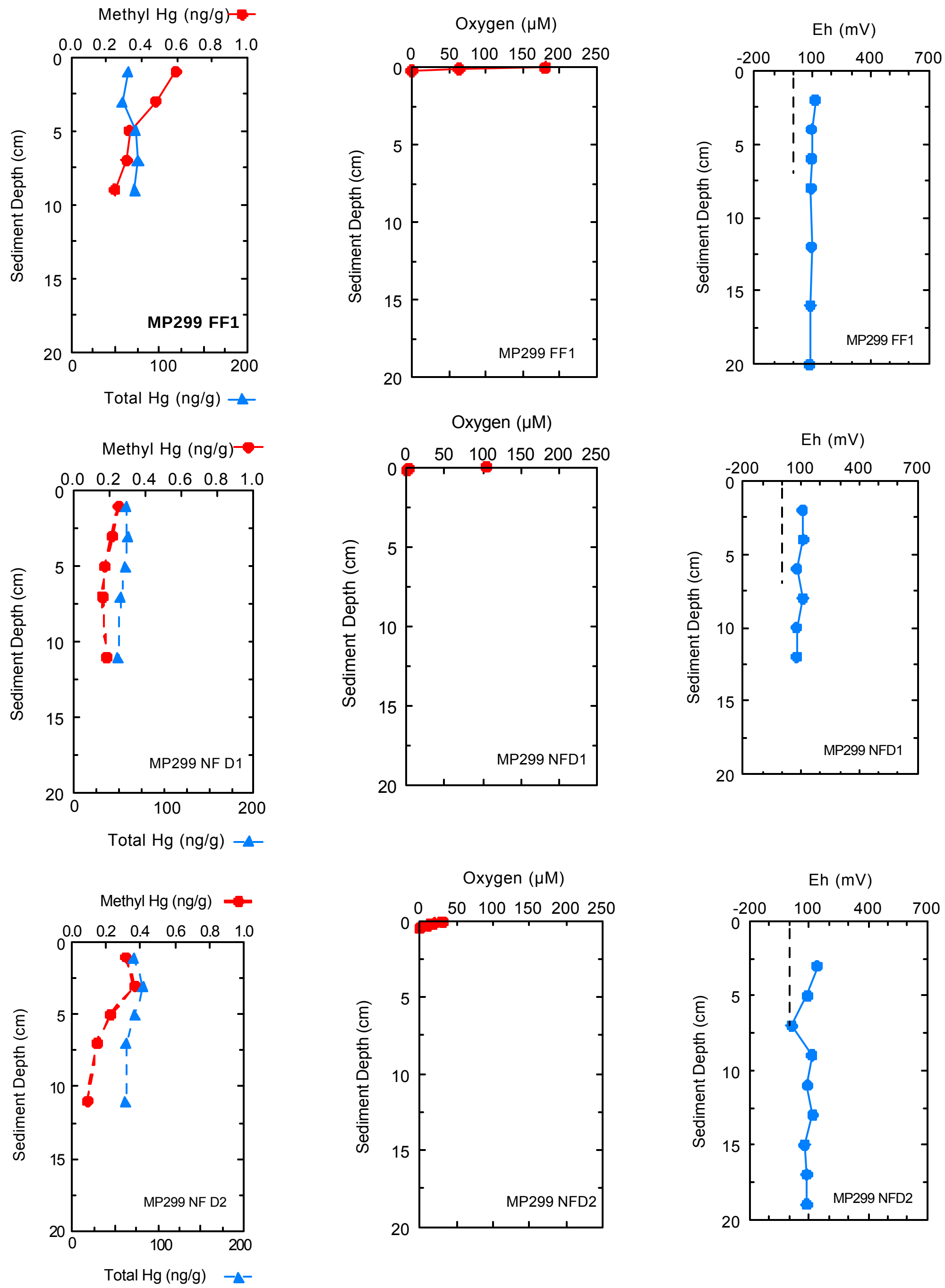

Figure 19. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen and Eh in sediment cores from site MP299 on the shelf.

observed in the surface layer from station FF1 (Figure 19) and the subsurface layers from station NF1 (Appendix II). Such similar distributions of MeHg in NF and FF sediment at site MP299 are consistent with relatively uniform levels of total Hg and redox conditions in NF and FF sediment. Once again, sediments from this site contain small amounts of drilling mud and cuttings.

At site MP288, low levels of MeHg (<0.2 ng/g) in the sediment core from station FF1 are consistent with low levels of total Hg in the sandy-textured deposit. Unfortunately, the probes did not easily penetrate the sand and thus oxygen and Eh data are unavailable. In contrast with the sandy FF core, concentrations of MeHg were at 0.4 ng/g or higher in the top few centimeters of the NF cores (Figure 20). Concentrations of dissolved oxygen are depleted by depths of <0.5 cm in all NF cores. A sharp redoxcline (sharp change in Eh) also is observed from available data for stations NFD1 and NFD2 (Figure 20). The decreases in Eh are commensurate with ongoing nitrate reduction. No sulfate reduction is observed in the top 30 cm of sediment at site MP288 based on interstitial water data for stations NFD2 and FF6.

The most striking observation in the vertical profiles for site EI346 is that concentrations of MeHg are below detection limits (<0.03 ng/g) in the top 5 cm of sediment from station NFD1, even though concentrations of total Hg are almost eight times greater than ambient levels (Figure 21). Oxygen is depleted in the top mm of the core from NFD1 and the Eh is about –150 mV (Figure 21). As predicted from the Eh data, sulfate reduction is occurring in the top few centimeters of the core from station NFD1 where levels of dissolved total H_2S are >1mM. Such conditions are consistent with observations by other investigators that methylation of Hg is inhibited under such conditions (Gagnon et al., 1997).

In contrast with the MeHg profile for station NFD1 at site EI346, oxygen penetrates to a depth of ~2.5 cm in the sediment at station FF1, a point below which the Eh approaches 0 mV and there is an increase in sediment levels of MeHg (Figure 21). At station NFD2, the Eh ranges between 50 and –60 mV, and concentrations of MeHg are greater than at the FF1 station. No interstitial water data are available for these sites. However, the three vertical profiles for MeHg at site EI346 suggest that some MeHg is formed and retained in these sediments at Eh levels of +100 to about –50 mV. When Eh values are lower at levels of about –150mV, the methylation process appears to be inhibited.

In sediment from upper slope site MC496, the strongest redoxcline is observed in the top 5 cm at station NFD1 where concentrations of MeHg peak at 0.76 ng/g relative to levels of 0.45 ng/g at station F1 and 0.4-0.79 ng/g in the top 2 cm at the FF stations (Figure 22). The Eh in the sediment at the base of the redoxcline at station NFD1 also is about 0 mV, and lower than observed at the other stations (Figure 22). Furthermore, the decrease in Eh is greatest over the top few centimeters at station NFD1. Comparison of the Eh profiles for stations FF1, NFD2 and NF1 (Figure 22) show that the peak levels in MeHg roughly parallel the trend in Eh.

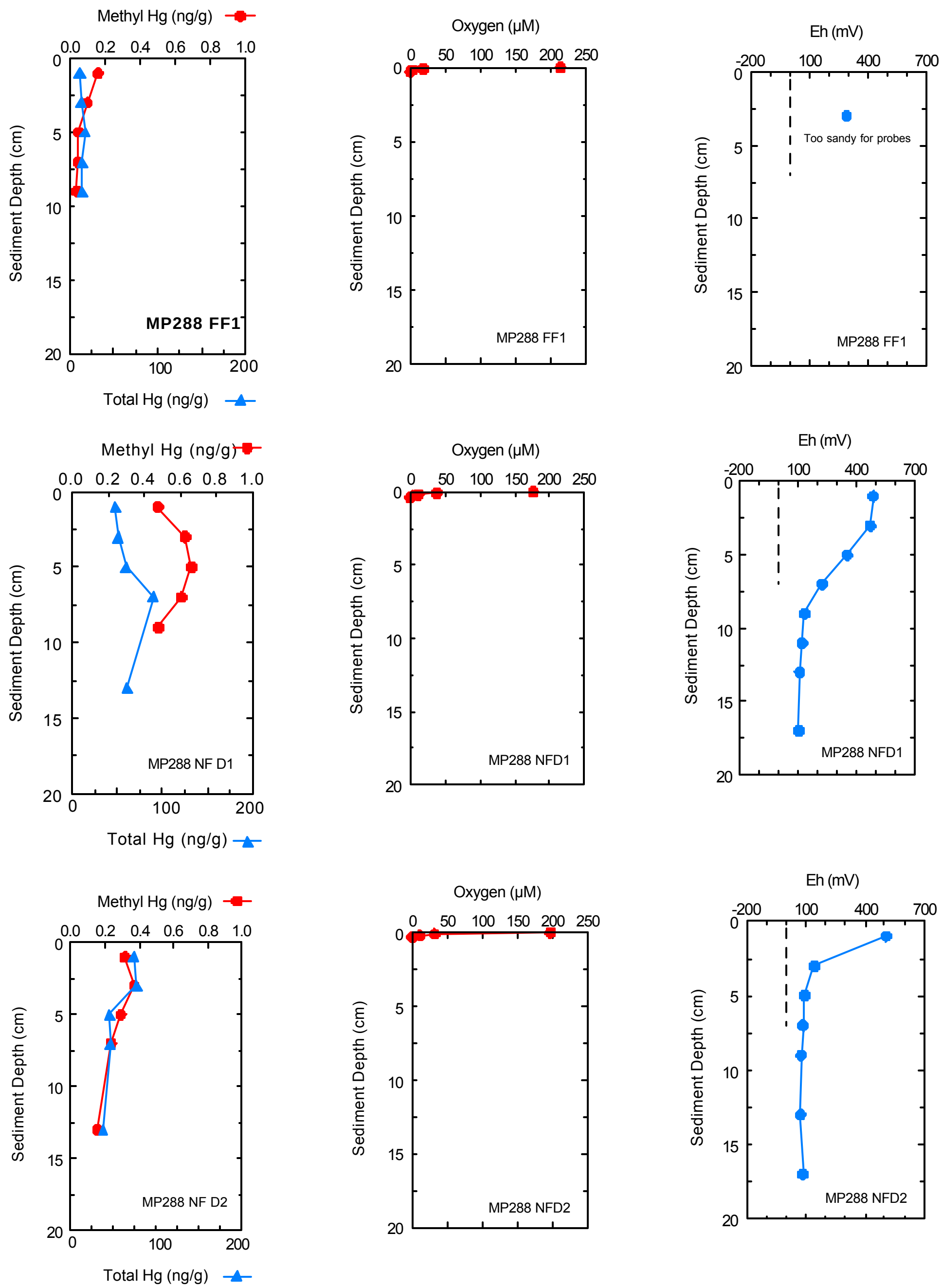

Figure 20. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen and Eh in sediment cores from site MP288 on the shelf.

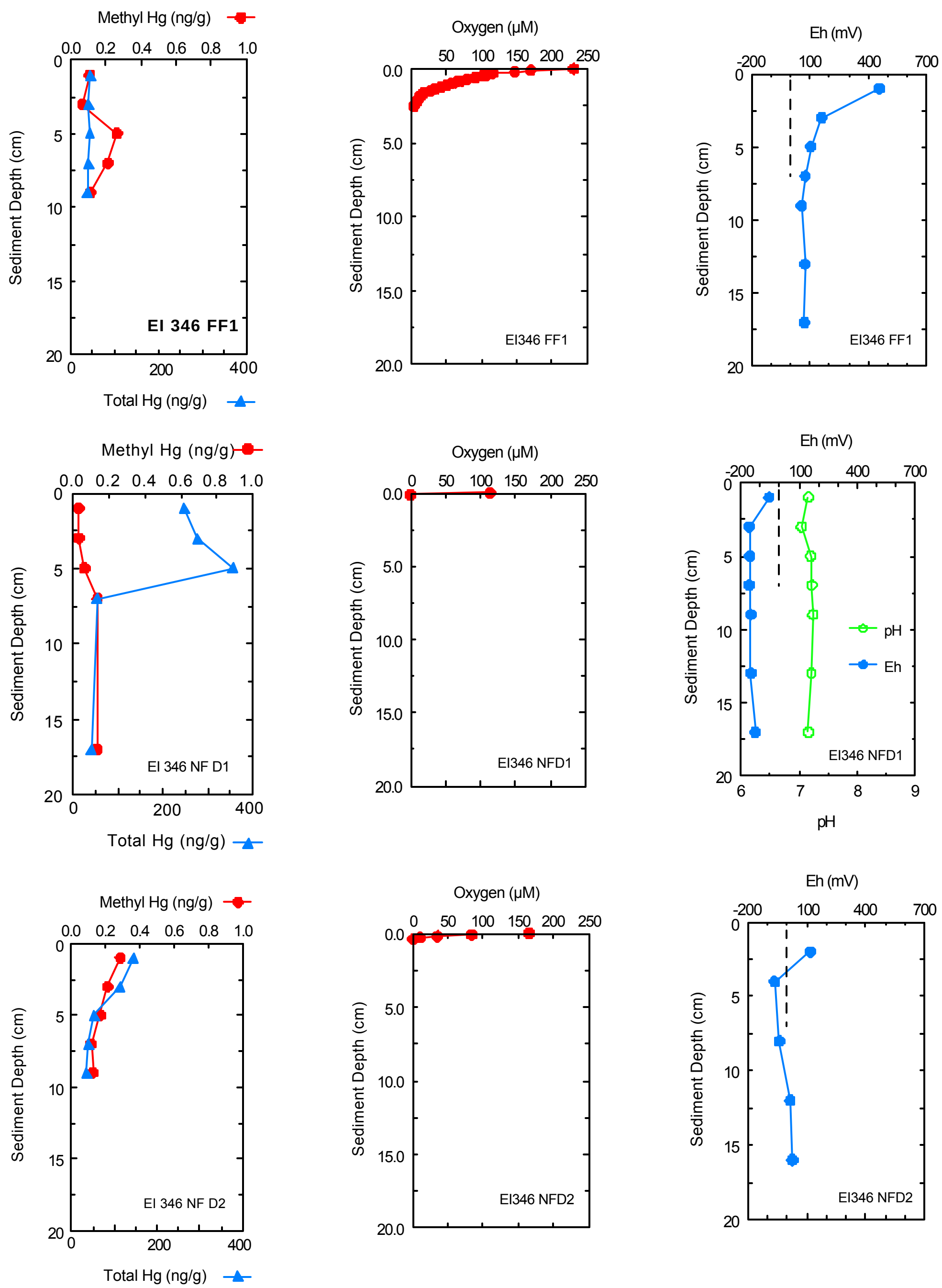

Figure 21. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen, Eh and pH in sediment cores from site EI346 on the shelf.

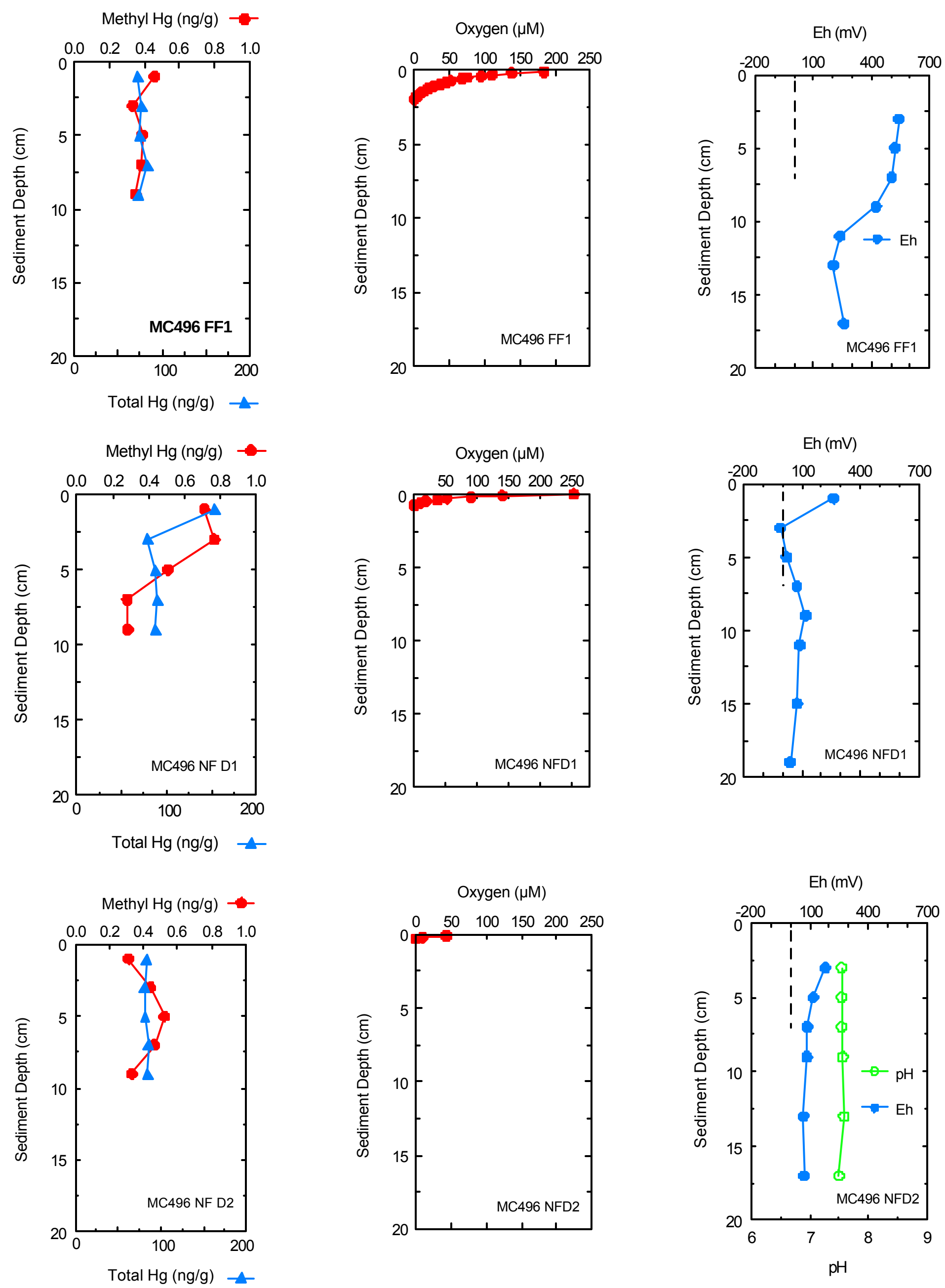

Figure 22. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen and Eh in sediment cores from site MC496 on the upper slope.

At site EW963, very low Eh values (about –100 mV) and oxygen depletion in the top 1 mm of sediment are found in sediment at station NFD2 in concert with low levels of MeHg (Figure 23). No interstitial water was collected from these sediments; however, it is reasonable to expect a significant amount of total H_2S. A somewhat similar scenario is also observed at station NFD1 (Figure 22). In contrast, at station FF1, oxygen persists to a depth of 3 cm, a modest redoxcline is observed with nitrate reduction and concentrations of MeHg are the highest observed at this site. Thus, at site EW963, the drilling mud may have led to a slight weakening of the methylation process and thus the FF sediment contains significantly more MeHg than the NF sediment.

Finally, at GC112, the redoxcline for most FF and NF stations is quite strong (Eh of 300 to 400 mV in the top 10 cm) with Eh values in the top 10 cm at NF stations are close to or slightly less than 0 mV (Figure 24). For the sediments studied for MeHg, at station NFD1, no redoxcline is observed and the Eh is rather uniform at –100 mV. Under this condition, the amount of MeHg in the surface 5 cm is lower than in sediment from station FF1. However, higher levels of MeHg are observed in sediment from station NFD2. These trends are more complicated than observed at the other sites and are beyond the scope of this report.

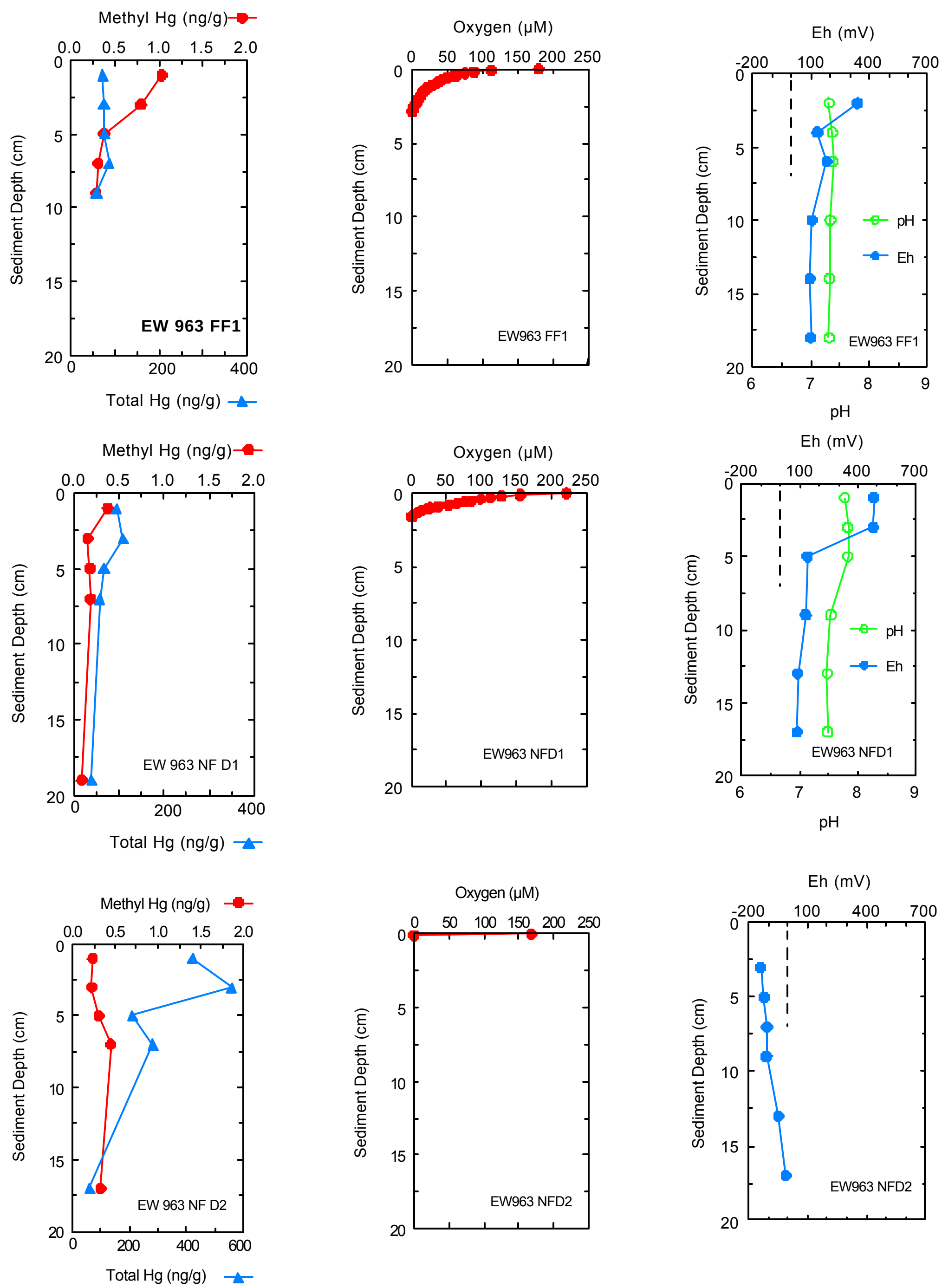

Figure 23. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen, Eh and pH in sediment cores from site EW963 on the upper slope.

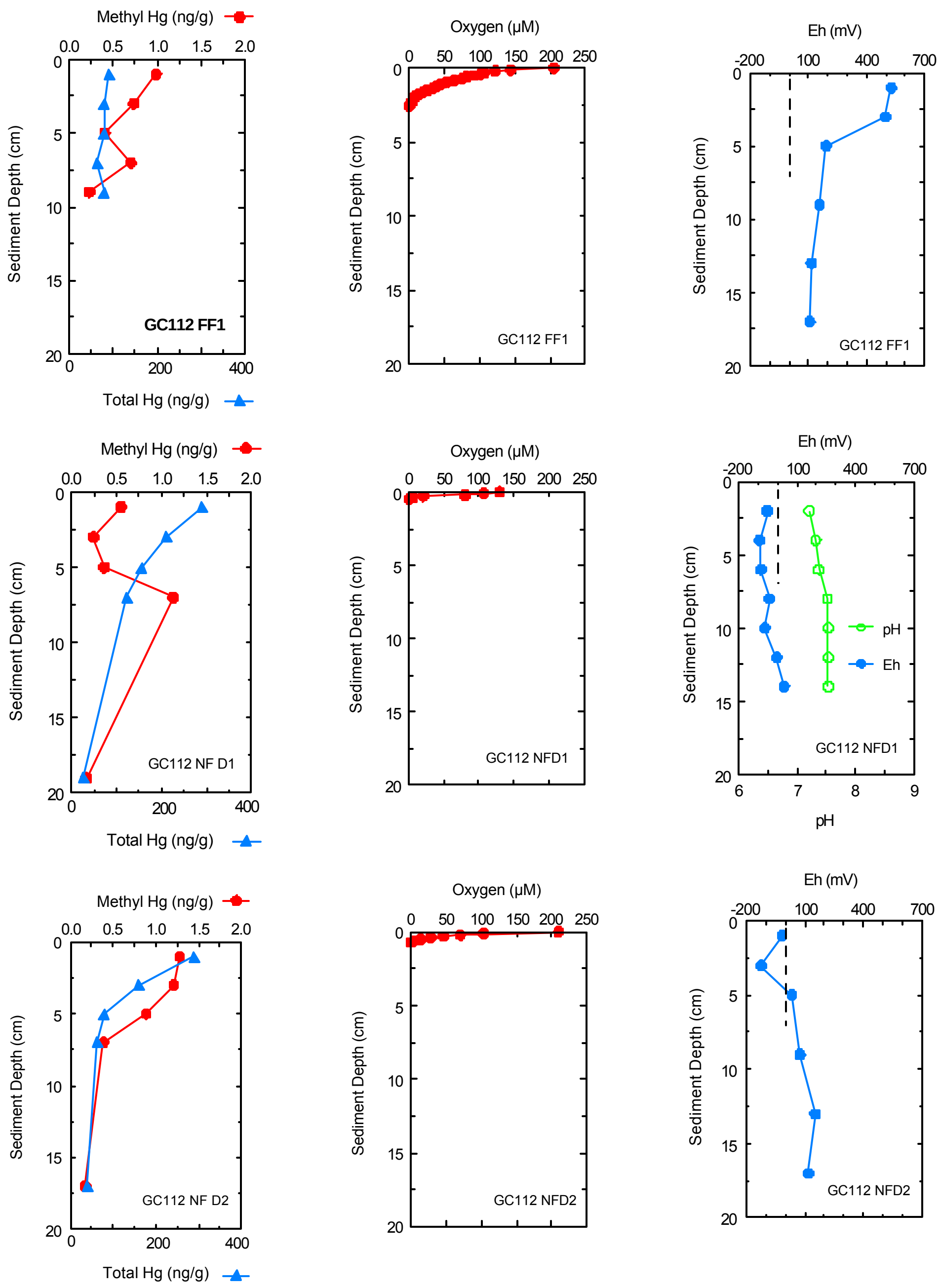

Figure 24. Vertical profiles for concentrations of total mercury, methylmercury, dissolved oxygen, Eh and pH in sediment cores from site GC112 on the upper slope.

CONCLUSIONS

The results from this study provide the first data showing the distribution of MeHg in sediments near offshore-drilling sites in the Gulf of Mexico. The new information acquired during this study advances the process of determining whether drilling discharges lead to enhanced levels of MeHg in sediments near offshore-drilling sites. Preliminary answers to the four questions raised in the Introduction can be used to support discussion and decisions regarding the need for additional investigations.

- Are the excess amounts of total Hg found in sediment near drilling sites associated with barite?

The data presented here support the argument that excess total Hg in sediments at the drilling sites studied is associated with barite. Concentrations of total Hg in sediments from reference sites for this study range from 11-92 ng/g relative to values of 48-558 ng/g for sediment collected within 100 m of drilling sites. Strong linear relationships (r values of 0.89-0.97) are observed between concentrations of Ba and total Hg in sediment from NF stations where total Hg levels exceeded background levels by a factor of 3-10. Barium levels in these NF sediments range from 20-28%, relative to ambient Ba concentrations of ~0.05-0.15%. The presence of barite was definitively identified in the sediment as part of the SBM Program. The strong linear relationships between total Hg and Ba, coupled with the high levels of Ba (as barite) in these sediments, support barite as a common source for both metals and facilitate estimation of the total Hg content of the industrial barite used during drilling. Average concentrations of total Hg in the industrial barite used at each site, as calculated from the Hg/Ba ratio, are below the limit of 1000 ng/g set by EPA for Hg in barite.

- Are concentrations of MeHg elevated in sediment adjacent to offshore drilling sites?

The results from this investigation show that concentrations of MeHg in surficial (0-2 cm) sediment do not vary significantly between nearfield and farfield stations at any of the six sites studied. When subsurface samples (2-20 cm) are included, no significant difference between MeHg concentrations at nearfield and farfield stations is observed at five of six sites. At a sixth site, significantly higher concentrations of MeHg are found at nearfield than at farfield stations due to the presence of sandy sediment with low levels of total Hg and MeHg at three farfield stations from this one site.

The average concentration of MeHg for all FF sediments (0.44 ± 0.27 ng/g) is nearly identical to the average for all NF sediments (0.45 ± 0.41 ng/g), although greater variability in values is found at NF stations due to the patchiness of drilling discharges. The range in concentrations of MeHg is 0.11-1.05 ng/g for all FF sediments and <0.03-2.7 ng/g for all NF sediments. Levels of total Hg are 60-70% higher in ambient (FF) sediments from the upper slope versus the shelf and MeHg concentrations in ambient sediments from the upper slope (0.59 ± 0.26 ng/g) are double values of 0.28 ± 0.17 ng/g in shelf sediments. These trends in concentrations of total Hg and MeHg from the shelf to the upper slope identify an interesting natural variability in the Gulf of Mexico that may be one of the more important contributions of this study to global Hg issues.

Results from several stations at one shelf site (EI346) and one site from the upper slope (EW963) show that redox conditions in sediment at NF stations (especially production of total H_2S) can lead to levels of MeHg at NF stations that are 3-10 times lower than in ambient (FF) sediment. In contrast, at site GC112 on the upper slope, concentrations of MeHg are higher by a factor of 1.2 to about 2.5 in a few NF samples relative to FF samples. The combination of factors that led to higher values in the sediments from site GC112 seems to be higher levels of TOC and total Hg, along with what may be optimal redox conditions. In contrast, however, four NF samples from the GC112 site have lower than ambient levels of MeHg.

Overall, the statistical results from this study of six offshore drilling sites, coupled with data from sites EI346 and EW963 that show lower levels of MeHg in some NF sediments than FF sediments, suggest that elevated levels of MeHg in sediments around drilling platforms are not a wide-spread phenomenon.

- Can increases in sediment levels of MeHg be directly attributed to Hg introduced by oil and gas activities?

The data presented here make a reasonable initial argument for the conclusion that Hg introduced with barite during offshore drilling cannot be directly linked to enhanced levels of MeHg in NF sediments. The opposing argument that sediment levels of MeHg are attributable to Hg introduced during offshore drilling is certainly weak based on results from this study.

Graphs showing concentrations of total Hg versus MeHg are most useful in addressing this question. At sites EI346 and EW963, for example, samples with high levels of total Hg (i.e., 200-500 ng/g) have similar or lower levels of MeHg than found at background (FF) stations. Such observations show that despite 4-10 times higher levels of total Hg, concentrations of MeHg are not elevated and are often depleted relative to ambient sediments. As an example, the sample with the highest concentration of total Hg (558 ng/g), contained only 0.23 ng/g of MeHg, less than half the mean for MeHg at FF stations from that site. These observations support the argument that excess Hg held in barite is not being converted to MeHg. Results for site GC112 are somewhat ambiguous in that concentrations of MeHg are enhanced at a few stations; however, the higher MeHg values are equivalent to ~3% or less of natural concentrations of total Hg. Therefore, these anomalously high levels of MeHg could have either a natural or an anthropogenic source of Hg.

- Do drilling discharges create an environment that is more favorable to the conversion of Hg to MeHg?

The results from this study suggest that, in most instances, changes in redox environment associated with the presence of drilling mud and cuttings do not lead to higher concentrations of MeHg in sediments. Relative to ambient sediments, much lower levels of MeHg are found in NF sediment adjacent to drilling sites where the sediments are anoxic, highly reducing and enriched with dissolved H_2S. In a few cases, more MeHg was found in NF sediment than FF sediment when the sediments were less sulfidic.

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Date: 4 / 28 ,2005

NMFS received 755 comments of this type.

Dear Mr. Lohn:

A healthy Pacific Ocean is crucial for our way of life including our economy and recreation.

For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt a management alternative which protects habitat and maintains vibrant fisheries.

Sincerely,

Name: Christopher Smith Email: csmithhr@ucla.edu
Address: 11 Tirrenia Drive Signature: Christopher Smith
City, State, Zip: Dana Pt, CA 92629

#1

NMFS received 8,266 comments of this type.

ENVIRONMENT CALIFORNIA

www.EnvironmentCalifornia.org

Save Our Ocean Legacy

#2

Dear Mr. Lohn, Regional Administrator, National Marine Fisheries Service:

A healthy Pacific Ocean is crucial for our way of life, including our economy and recreation. For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor, such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt a management alternative which protects habitat and maintains vibrant fisheries.

Name Christina Walters
Address 650 Corcoran Ave #32

Phone 925-586-6574
E-mail cwalters@ucsc.edu Volunteer? Student? ✓

April 14, 2005

D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0070

NMFS received 382 comments of this type.

Dear Administrator Lohn,

As you consider alternatives to protect Pacific groundfish habitat, I urge you to close ecologically important areas to destructive gears, such as bottom trawls, and to create areas where all groundfish and their habitats are protected.

Pacific groundfish are in trouble. Years of heavy fishing have taken their toll so that today both the fish and the fishermen are suffering. We must take steps today to restore our oceans so that our marine wildlife and our fisheries can thrive in the future. Protecting essential fish habitat is one of the most important steps on this path.

Deep-sea corals, sponges, and rocky reefs are part of the seascape that supports ocean life and must be preserved. I also support actions that would help fishermen move away from destructive gears to more sustainable fishing.

I value the oceans and I want to see them healthy and vibrant in the years to come. I ask you to take real action now to protect underwater habitats.

Sincerely,

Ann Volk
1143 A Roxie Lane
Walnut Creek, CA 94597-1806
USA

#3

NMFS received 11,647 comments of this type

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Sandra Schultz <sandraschultz@earthlink.net>
Date: Wed, 11 May 2005 17:35:06 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 11, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

I urge you to protect ecologically important and sensitive ocean habitats, including deep water corals and sponges, from destructive fishing practices in the Pacific Ocean.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Miss Sandra Schultz
PO Box 460118
Fort Lauderdale, FL 33346-0118

NMFS received 18,529 comments of this type.

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Renee Saville <renee_saville@yahoo.com>
Date: Wed, 11 May 2005 15:50:46 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation.

For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.
Renee Saville
1364 Todd St

Mountain View, CA 94040

NMFS received 58 comments of this type.

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: "adriana@girardsdressings.com" <adriana@girardsdressings.com>
Date: Wed, 27 Apr 2005 19:00:39 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

Dear Mr. Lohn, Regional Administrator, National Marine Fisheries Service:

A healthy Pacific Ocean is crucial for our way of life, including our economy and recreation.

A key to keeping the Pacific Ocean healthy is the protection of marine habitats necessary to support its diverse assemblage of ocean life, including economically valuable fish species. Sadly, many of these habitats have and continue to be impacted by destructive fishing practices. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive fishing practices.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt a management alternative that protects these ecologically sensitive habitats necessary to maintain vibrant fisheries.

Adriana Briseno
1318 S. Sycamore St.
Santa Ana, CA 927071719

Note: The Council received duplicate copies of this letter from 6 different people.

3-15-05

RECEIVED
MAR 16 2005
PFMC

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Pacific Fishery Management Council,

Bottom contact gear, such as trawls, longlines, pots and traps, are dangerously destructive to marine life and the habitat they depend on. In your plan to minimize the adverse effects of such gear to essential fish habitat, please close ecologically sensitive areas to bottom trawling and other bottom contact gear, establish a process for setting a limit on the bycatch of habitat-forming invertebrates, such as corals and sponges, and create other provisions agreed upon by conservationists and scientists to protect the health of our oceans for future generations.

Please consider this an official comment on the 2005 Pacific Coast Groundfish EFH DEIS.

Louise Marquis

THE GOLDEN GATE NATIONAL PARKS
Louise Marquis
PO Box 2285
Berkeley, CA 94702-0285

Subject: RE: clean oceans
From: ibtpepvrv@aol.com
Date: Tue, 05 Apr 2005 10:07:43 -0400
To: GroundfishEFHDEIS.nwr@noaa.gov

keep our oceans clean

Subject: EIS
From: "Kiech, James" <jkiech@Exchange.FULLERTON.EDU>
Date: Thu, 7 Apr 2005 10:05:17 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

As a California sport fisherman and an officer of a large, 22 year old, sportfishing club, I want to personally thank you for your efforts to preserve our local fisheries. I appreciate your e-mail updates of information related to your efforts. My only suggestion at this time is that you try to set your open fishing dates for bottom fish a little more in tune with the sport fisherman's season. Typically we fish for surface species from June through October and would like to fish for bottom dwellers during the winter months. Closing the bottom fishing in the warm months would not impact the industry nearly as bad as closing it in the cold months. The sportfishing landings are suffering, trying to find anything to fish for during the winter months with the closures to bottom fishing. Please consider my comments and try to schedule closure times that will not negatively effect the sportfishing industry.
Thanks   Jim Kiech

Subject: Ground fish
From: "R.J. Perrone" <skrtmstr@pacific.net>
Date: Fri, 8 Apr 2005 23:05:53 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Mr.D.Robert Lohn; and interested agencys:

I am replying to the request for comments on ground fish management, so far all the agencies are trying to do a good job but they are missing a few points that should be viewed. In the North central district we are limited to 120' during the season.
The most pressure on the fish is from the party boat operators.

The 120' depth is a large part of the spawning and rookeries for nearshore fishes, if you restrict the party boat operator from the area and let them fish 120' to 250' there is no way the private boaters could make a impact in the nearshore fishes as they cannot fish because of distance,weather and ocean conditions but for a limited part of the season this would save most of this recourse.

As for Lingcod, again many restrictions and rules have been tried at one point even the fish were confused. if there were a slot limit 24" to 30" on lingcod, because of their survival rate after being released the spawn rate would increase dramatically, slot limits work, look at the sturgeon for example

I have been fishing for more than 50 years and would like to see future generations enjoy the same as I have so listen to some us old fishermen as we have seen the problems and I tried telling them 25 years ago to manage the fishery better.

Thanks for listening:
R.J.(Dick) Perrone

Subject: EFH Alternatives- Public Comments sought
From: "sheri hafer" <somethingsfishy@charter.net>
Date: Wed, 13 Apr 2005 10:03:18 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Dear Mr. Robert Lohn,

Yet again a heavily financed enviromental group(Oceana) is pushing their agenda of removing fisherman from existance. Despite now 10 years of heavy regulatory action protecting the groundfish, they still aren't happy until we are all out of business.

In the middle of listening to all the rheotoric regarding the implementation of The MLPA on the central coast attempting to make essentially most of our fishing grounds no-take zones, we receive your notice of further attacks on the fishing community. Honestly, does anyone consider that if this continues we will be importing all our fish from disease ridden fish farms, or unregulated fisheries of foreign countries. California has vast resources that are being wasted. The fishery managers should use simple tools to regulate the groundfishery, ie seasonal closures, size limits on the nearshore, quotas, gear modifications, mammal population controls, etc but chooses to continue with complex models of unending restrictions as if the fishery is not protected enough only because of these pretensious enviromental idealist and their money.

I am a trap fisherman for nearshore live-fish and spot prawns. I have been dealing with the development of a Nearshore Fishery Management Plan for the last 8 years including a 80% reduction in TAC, restricted access from 1200 to 200 permits, gear limits and modifications including a 5"ring to prevent large fish into the traps, trip limits, state wide allocations etc. With the spot prawns, all trawling was stopped and a restricted access program is in place with less than 30 permits. I have carried a Federal Observer the last 5 years with results demonstrating less than a 2% bycatch rate. The California nearshore fisheries are catch and release selective harvesting. It is the cleanist fishing in the world. How can you justify eliminating it?

Many fisherman are going out of business, there was a 50% reduction in fisherman just in our local Morro Bay community. We lost our local weather bouye and weather station recently with no effort to replace them. I feel the state/feds are too biased towards the enviromental community and letting the fishing communities die on the vine. 10 years from now, after the currrent older fisherman retire, their will not be commercial fishing in California at the rate we are going because it will be economically impossibe to survive, but maybe that is what everyone seems to want. Tom Hafer

April 13, 2005

Dr. Robert Lohn
Administrator, Northwest Region
National Marine Fisheries Service
7600 Sand Point Way, NE
Seattle, WA 98115-0070

NOAA-NMFS
RECEIVED
APR 18 2005
NORTHWEST REGIONAL OFFICE

Dear Administrator Lohn:

Re: Comment on 2005 Pacific Coast Groundfish EFH DEIS
Please adopt Alternative 12

I am writing because a healthy Pacific Ocean is crucial for our way of life, which includes our economy and recreation.

For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep-sea corals and sponges from bottom trawling.

I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

Deep-sea corals are a true natural wonder. Deep-sea corals are perhaps the oldest living seafloor animals on the planet. Extremely sensitive to disturbance and slow growing, these ancient animals can live hundreds of years. Corals, sponges, and other living seafloor animals provide oases of life on the seafloor, supporting ecological diversity crucial for healthy sustainable oceans.

Bottom trawling destroys far more ocean habitat than any other fishing practice on the West Coast. Commercial fishing vessels drag large weighted nets across the ocean floor, clear cutting a swath of habitat in their wake. When disturbed by bottom trawling, as much as 90% of a coral colony may perish, and up to 67% of sponges may be damaged.

Corals, sponges, and other living seafloor animals are important for healthy sustainable oceans. These animals cannot withstand the destructive fishing practice of bottom trawling.

Because living seafloor is not found everywhere, it is possible to both protect this important ocean habitat while maintaining vibrant fisheries.

This can be accomplished by prohibiting bottom trawling in areas where corals, sponges, and other living seafloor animals or known or likely to exist.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.

Thank you for your consideration and help in this urgent matter.

Respectfully,

J. Capozzelli

J. Capozzelli
315 West 90th Street
New York, NY 10024

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Judge Roy Bean <bigdog@hotmail.com>
Date: Wed, 13 Apr 2005 13:04:22 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
Hells Bells, people, leave the biology to the biologists and get the blazes out of the silly petition business! What's wrong with you people that you can't let a day go by without protesting some damn thing? I say we tell the "Oceana" crowd to get jobs and stop harassing honest folks!
Judge Roy Bean
Yes

Georgetown, DC 20005

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: lucy vega <lucyvega@newlywedsfoods.com>
Date: Wed, 13 Apr 2005 13:53:46 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
I agree that It is very important that we keep the corals sponges and other seafloor animals alive. They are important to have in the ocean for the fish.
lucy vega
1962 w. fargo
2
chicago, IL 60626

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Sherri Tucker <angez_sher_lee@yahoo.com>
Date: Thu, 21 Apr 2005 18:16:58 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
Humans made a big mistake by living everyday without learning about what goes on and how to correct what we do wrong with our world in a everyday issue, now we see our trees crumbling from disease and we just sit and over look it, I say we better open our eyes to all of it, because together without all of it working together serves a great purpose for us to Thrive we all need each other to make a perfect life!
Thank you Sherri Tucker
Sherri Tucker
5607 208th St Ct East

Spanaway, WA 98387

Subject: Re: Comment on Pacific coast groundfish EFH DEIS
From: "BARBARA GREEN" <cgbg@clatskanie.com>
Date: Thu, 21 Apr 2005 22:13:23 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

CAN YOU HELP OUT? THERE ARE 4 PROPOSED LNG PLANTS IN THE SITING PROCESS ON THE LOWER COLUMBIA RIVER. PLEASE SEE www.columbiarivervision.org
THANK YOU,
BARBARA L GREEN
cgbg@clatskanie.com
----- Original Message ----- From: <GroundfishEFHDEIS.nwr@noaa.gov>
To: <cgbg@clatskanie.com>
Sent: Thursday, April 21, 2005 10:02 PM
Subject: Re: Comment on Pacific coast groundfish EFH DEIS

> Your comments have been received by NOAA Fisheries regarding the Pacific Coast Groundfish FMP Essential Fish Habitat Draft EIS. Thank you for your response.

Subject: Re: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: michelle millwee <bonzaibaby64@yahoo.com>
Date: Wed, 27 Apr 2005 10:57:16 -0700 (PDT)
To: GroundfishEFHDEIS.nwr@noaa.gov

To Whom It May Concern: Please not only receive, but consider that with every form of life that we compromise, destroy, and cause extinction for, we move one step closer to doing so to ourselves. Every form of life has a purpose. It has an important part to play in the delicate balance of our planets' ecosystem..Please choose to do what is right....for the overall good of marinelife, and the bigger picture of mankinds' future survival. Thank you! Michelle Millwee

--- GroundfishEFHDEIS.nwr@noaa.gov wrote:

> Your comments have been received by NOAA Fisheries regarding the Pacific Coast Groundfish FMP Essential Fish Habitat Draft EIS. Thank you for your response.

EXCLUSIVE FRESH, INC.
"Purveyors of Fine Seafood"
PRINCETON BY-THE-SEA

Exclusive Fresh, Inc.
P.O. Box 308
165 Airport St.
El Granada, CA 94018
(650) 728-7321 • (650) 728-7322
FAX (650) 728-7372

April 27, 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Mr. Lohn,

I am a seafood wholesaler in El Granada, a firm supporter of sustainable fisheries, and the need to protect essential fisheries habitat (EFH). I also support fisherman who attempt to fish using non-destructive methods which do not catch or impact other species of fish. There is a need to differentiate between destructive methods and those that are not.

The Scottish Seine is a gear which is non-destructive and will not impact an EFH. It is a very light and easily damaged encircling gear that can only be used over soft bottom. A presence of even the smallest anomaly on the bottom results in damage and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that is able to fish and damage the hard bottom, Scottish Seines do not actively tow. Instead the net is gathered slowly and reeled in hydraulically. This method greatly reduces and often eliminates any possible impact to an EFH.

Presently, I believe that Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. Due to this improper inclusion in the trawl category, Scottish Seine fishing is prohibited.

When determining the final EFH, please exclude Scottish Seine from any fishing prohibitions designed to protect fish from trawling methods. While it is important to protect an EFH, it is also important for NMFS to encourage non-destructive fishing methods, such as the Scottish Seine, that do not impact the bottom and help reach the goals of the EFH.

Thank you for your consideration.

Sincerely,

Philip L. Bruno
President/Owner
Exclusive Fresh, Inc.

4/28/05

To Dr. John Lohn:

I am writing you regarding the classification of Scottish Seine fishing as trawl gear. Osprey Seafood is celebrating 28 years of business in the Bay Area on May 1st. We are a seafood wholesale company located in San Francisco and a seafood retail outlet in Napa. In our years of doing business we have always supported the small fisherman, the fisherman that cares for their product as well as their enviornment. This concern for the integrity of the small guy has yielded a better product and a livelyhood for someone that knows the proper way to fish, that doesnt destroy their enviorn and shows a passion for the oceans that provide for their future. To be able to sell a top quality product that was caught with little or no by-catch and that didn't tear up the ocean floor is one of our goals. Imagine a targetted fishery where the fishermen only catches what they seek and doesn't leave a trail of destruction in their wake. We have that with Scottish Seine fishing. The delicate gear prohibits fishing the hard ocean bottom as well and active trawling. Thus the impact on habitat is minimal at best. Scottish Seine fishing has been placed in the trawl gear category in many of the essential fisheries habitat proposals. This categorization puts a halt to Scottish Seineing due ~~to the impact caused by other~~ types of trawl gear. We believe that all involved would be best served by excluding the Scottish Seine method, allowing a less invasive industry to grow and encouraging other fishermen to look at this method as a sustainable and profittable method of fishing. We hope that you will consider our input in this matter and look at this small fishery as one of the many steps needed to improve our oceans and preserving managable fishing techniques. Thank you for your time.

Best Fishes,

Michael Weinberg-Lynn
President, Osprey Seafood of CA, Inc.

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Angelina Odievich <angeltd@hotmail.com>
Date: Wed, 27 Apr 2005 12:46:56 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
Don't allow our oceans to be screwed up by our lack of understanding or consideration to it's ecosystem.

I urge you to act with the future in mind, the lives of not just the ocean but us humans too, we sure get a lot from the ocean...please protect it.

Angelina Odievich
705 27th Ave.

Seattle, WA 98122

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Lynne Mahlstedt-Burley <LynneMsc@aol.com>
Date: Thu, 28 Apr 2005 02:36:40 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
The issue seems to be very clear to me.

In St. Lucias it has been proven that when the coral is damaged it becomes chocked with algae which in turn drives the fish away, most especially LARGE.

In Jamaica they can only obtain very small fish. Their coral is seriously damaged.

In order to have large fish we must protect the coral. One is dependent on the other.

In St Lucias where they have set up sanctuaries where no fishing is allowed. As the coral has recoverd, the large fish and predators have returned.

How much must we loose? The worlds leading authorities on the matter state that ninety percent of the worlds large fish are gone. This has happened in two generations.

Sir, respectfully, it is a no brainer. We must protect what we have. If we do not, we will perish.

Lynne Mahlstedt-Burley
726 Railroad Avenue

Cayce, SC 29033

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Jon Koppenhoefer <jonkopp@glasscity.net>
Date: Thu, 28 Apr 2005 01:04:56 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
Having just seen a segment in the National Geographic series "Strange Days on Planet Earth" I am aware of the importance of saving the coral reef as a way to protect the ocean as a habitat and a source of food for human beings.

Creatures that feed on the coral algae in turn supply larger sea life with their nutrition, and these larger creatures (groupers, 'snappers', and the like) are valuable sources of food and commercial income for humans.

Protecting the coral reefs in the Pacific not only is good ecology, it's good economics.

Thanks for considering this in your future decisions.
Jon Koppenhoefer
264 Oakridge Drive

Springfield, OH 45504

Subject: Groundfish Essential Fish Habitat Draft Enviromental Impact Statement
From: "Robert Craven" <cravenr@charter.net>
Date: Thu, 28 Apr 2005 14:47:44 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Gentlemen: I am a small charter operator in the central Oregon coast area (Newport). I am also Vice resident of the Oregon Coast Sportfishing Association. I hope my comments on the proposed changes comming in the coastal groundfish fishery will help you to do a better job of managing this difficult challange facing you now.

alternative A.4 is my Prefered option

No comment on section B

alternative C.3 It is not acceptable to close Habitat areas to all fishing because some types of fishing have little or no impact on the habitat. Option C.3.1 or C.3.2 is a much more rational approach to the problem, and would have the least economic impact on the coastal communities.

alternative C.14 NOT acceptable (see comments on alternative C.3 which apply to this alternative also.)

alternative D.2 Option D.2.1 One more Logbook! This will not set well with the smaller commercial, and charter vessel owners some operate only 4 months of the year, and have very little envirmental impact. Option D2.2 Better, but from my point of view, it is still not good.

alternative D.3 This could be the ecconomic straw that breaks the back of the small vessel operators. The impact of these vessels is minimal or none existant, but more people work on the small vessels than on the larger ones in this area. Do you really want to put all those people out of work? Do you really want to turn off the lights of the small coastal communities? I know the main thrust of this draft proposal is enviromental, but I would like to remind all of you that Homo Sapiens is also part of the enviroment, and to fail to consider them in your proposals or to give them a lesser status is to fall short of the job. Please consider us also. Thank you for your time and attention.

Robert E Craven managing owner
Sea Quell Charters LLC
Hustler Charters LLC
Newport Oregon

2

From: "josestone" <josestone@actionnet.net>
Date: Thu, 28 Apr 2005 18:56:22 -0700
To: pfmc.comments@noaa.gov

I am writing this letter because, again, I find governing fishing bodies possibly considering some very disturbing fishing changes.

First, I would explain some of my background of my fishing expertise. I started fishing at the age of 13 and am now 61 & still fishing. I started in the troll fisher, as most fishermen did at that time, & then moved into bottom trawling where in 1962 I was running bottom trawlers at the age of 20. I have seen the Russians and the Polish take "ocean run" on our grounds. I survived hook changes, mesh size changes, season changes, mercury scares, Demoic acid & Listeria. Fish too white, fish too black, fish too old, fish too young & through all of this I have tried to apply common sense. It is too bad you can't teach common sense because it would be more valuable that today's gasoline.

I understand that as biologists and council members you are being forced down this path by litigation. I am convinced that no matter how we proceed the environmental groups will not be placated and as I look at some these alternatives I cannot see the logic behind them.

Under alternative 6.9, option 9.2 would eliminate the pink shrimp fishery. We have spent 20 changing & fine tuning this particular door arrangement. I actually believe that this door with its 8" wide shoe probably rides lighter on the bottom than the cambered designed doors the option prefers. I have some doubt that we are doing damage to the bottom when we will sometimes fish the same grounds for months with good catch rates.

Option 9.5 would completely curtail my scallop fishing.

Optiom 9.8 would raise havoc with the troll fishery. Troll fishermen fish from the top to the bottom of the water column, and to eliminate the bottom would devastate that fishery.

The reason I have written about these options is because they were the PMFC preferred alternatives.

We have experienced some huge changes in the last few years. We have seen the bottom fish fleet reduced & their area reduced drastically. No fishing from 50-250 fathoms which has , as I see it, solved the problem of bottom contact. This is a tremendous area that is closed with no fishing. As far as I am concerned, is a reserve.

The pink shrimp fleet has implemented sorting grates that eliminate the groundfish catch. The halibut fleet has been moved from inshore to outside of 100 fathoms, another example of our effort to help the council solve these problems.

I think it is time for the industry, the council and the environmentalists to stop making rules that will harm the fishing community. The council has repeatedly said that Rock fish recovery is a slow process so I think we need to give these latest changes (bottom fish 50-250 fathoms, halibut outside of 100 fathoms, shrimp boats with sorting grates) a chance to work. This is why I would endorse the status quo option at this time. It makes the most common sense, something that we all could use a healthy dose of now.

Thank you for considering this letter.

Joseph Rock

Subject: proposed lng
From: "BARBARA GREEN" <cgbg@clatskanie.com>
Date: Sun, 1 May 2005 12:57:05 -0700
To: "John White" <John.White@state.or.us>

HELLO,
THIS LETTER IS TO STATE THAT I AM TOTALLY AGAINST PLACING ANY LNG FACILITIES ON OR ABOUT THE LOWER COLUMBIA RIVER........FROM CLATSKANIE TO WARRENTON.
WITH THE AVAILABILITY OF BIO FUEL, THERE IS ABSOLUTELY NO REASON TO FURTHER EXPLOIT FOSSIL FUEL IN ANY WAY SHAPE OR FORM.
RESPECTFULLY,
BARBARA L GREEN
cgbg@clatskanie.com

Subject: [Fwd: EFH]
From: "Jim Seger" <Jim.Seger@noaa.gov>
Date: Tue, 03 May 2005 14:41:29 -0700
To: Kit Dahl <kit.dahl@noaa.gov>

Public comments on EFH.

-------- Original Message --------
Subject:EFH
Date: Sat, 30 Apr 2005 15:44:19 -0700
From: Bill Diller <wdiller@sbcglobal.net>
To: Jim Seger <Jim.Seger@noaa.gov>

Dear Jim, I don't know if you are the person that I should be addressing this to, but if not, will you please forward it to the appropriate parties. These are my comments regarding EFH. First a note of introduction. My name is Bill Diller. I have been commercial fishing since 1970. I have been trawling since 1974 as a crewman first and then with my own boat since 1980.My permit number if GF0068. With EFH mandates becoming a reality, I would like to say that I fully endorse the Nature Conservancy proposal of buying some of us trawlers out of the fishery and creating no trawl zones with our help.No matter what scientists think about trawlers, we do know quite alot about the bottom of the ocean , fish behavior, and habitats. I could easily give an accurate discription of much of the bottom characteristics of the area from Santa Monica Bay to Point Sur. I venture to say that I could do that as accurately as I could describe my own real estate property. The Nature Conservancy approach to working with the fishermen while justly compensating them for their hard earned knowledge and abilities along with the financial investments that they have made is the only fair solution to this problem of addressing EFH.I would also like to point out that Oceana has not bothered to discuss any of this with the most affected stakeholders. They are basicly ramming this down our throats without so much as consulting those with a liflong stake in the health of the ocean.For the sake of doing this right while protecting human interests, the Nature Conservancy plan is the right way to go.Thanks, Bill Diller

--
Jim Seger
Staff Officer - Fishery Economics
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384
503-820-2280
866-806-7204 (toll-free)
www.pcouncil.org

3

Subject: [Fwd: Comment on 2005 Pacific Coast GroundfishDEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Wed, 04 May 2005 09:51:07 -0700
To: Kit Dahl <Kit.Dahl@noaa.gov>
CC: John DeVore <John.DeVore@noaa.gov>

-------- Original Message --------
Subject: Comment on 2005 Pacific Coast GroundfishDEIS
Date: Tue, 3 May 2005 09:41:15 -0700
From: Rod Lee <rod@staffjennings.com>
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

Dear Mr. Lohn,

I am writing you to express my opinions on the upcoming EIS groundfish proposal.

As a sportfisher and ex-commercial salmon troller, I have some experience with the fisheries off of the Oregon coast. I recently sold my boat and license after learning of the impending doom of the salmon fishery and I'm glad I did.

I understand the concern for wanting to protect our groundfish; however the problem I have is with the implementation of drastic methods without the convincing evidence to justify them. Based on my own observations it appears as though the stocks of Canary and Yelloweye rockfish are doing just fine, at least in the common "sportfishing" areas. Now I don't have "scientific" data to support that observation, but I don't think you or any of the government agencies have any "scientific" data to tell me I'm wrong either.

It is my understanding that Trawlers have created most of the concern for over harvesting of these protected groundfish? To my knowledge, the areas in which these trawlers fish is not the same as the areas the EIS is proposing to close to fishing? I'm curious as to how closing these areas are supposed to help and why it is necessary to penalize the sportfishermen for the trawler's over harvest?

I understand we are all in this together but if my neighbor kills off all the grass in his yard that doesn't give him the right to come over and use my yard to play in, right?

Here is the point of my email;

1. There are obviously areas that produce large amounts of these protected fish that are not commonly fished by sportfishermen. Why are you trying to isolate the areas that sportfishermen fish as opposed to closing areas Trawlers would use?
2. If you close an area, commercial or sport, use the correct and corresponding data for those areas. Do not base sport restrictions on Trawl data or vice versa.
3. The economic impact these closures would inflict to the coastal economies will be devastating. The demise of the commercial industries have already made a mark on the coastal community and caused them to focus more efforts on sport fishing. The closures proposed would kill not only the local fishers but also the thousands and thousands of tourists drawn to the area for that very reason.
4. There is a huge domino effect that happens when you close one area to sportfishers, as was witnessed last year after closing the >40 fathom area to bottomfishing, thus creating more pressure on the inshore reefs and the blue/black rockfish.
5. Rather than close existing habitat, why not make more habitat for them to thrive in? (i.e. artificial reefs) They are proven and would not only reverse the stock decline but create MORE fishing opportunities, thus creating a win-win situation for everyone.

Every time you hear a plane fly over I'm sure you don't run for cover for fear it's dropping a bomb in your area, and thus you shouldn't start closing the entire ocean because a few trawlers exceeded their catch limits, or because our neighbors (California) are having stock issues.

I appreciate you and your agencies trying to protect our fish, I just want to make sure we are using valid reasoning and not unnecessarily penalizing those who have done nothing wrong.

Thank you for your time and consideration,

Rod Lee
Concerned fisherman

6900 SW 130th Ave.
Beaverton, OR 97008

503-626-7264

Cc: Hal Weeks(ODFW) and the PFMC

Pacific Fishery Management Council

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May 4, 2005
Mr. D. Lohn
Regional Administrator. NMFS
C/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C15700
Seattle, WA 98115-0070

Comment on 2005 Pacific Coast GroundfishDEIS

Dear Administrator,

I am a member of the Recreational Fishing Alliance and also an avid fisherman paying taxes in both Oregon and Washington and am opposed to regulators closing vast areas of the coastal zones to the new EIS regulations. I respectfully recommend that your office consider the economic disaster of imposing these new unproven regulations on the coastal communities that thrive on tourists visiting and recreating in these public areas. These is no justifiable rationale or studies that prove these area need to be closed to the public harvesting species within these areas. It is an unreasonable program developed without sufficient analysis and is not justifiable, regardless of any support the plan may have. I believe the National Marine Fisheries Service needs to better evaluate the impacts of these proposals and preserve fishing opportunities for future generations of anglers. I also believe that this plan is an economic disaster waiting to happen to the already economically depressed coastal communities.

The National Marine Fisheries Service has not fully analyzed the potential impacts on the anglers who harvest and recreate these areas. I for one will review my monies spent on the Oregon Coast and all the clients that I draw to the coast to fish the waters off Oregon and Washington. I will better manage my assets and tax dollars and reinvest in areas that Are not impacted by these inappropriate regulations.

Sincerely,
Tom Merriman

cc. PFMC, ODFW Marine Resources Program

Subject: Sport Bottom Fishing
From: <rcwenger@adelphia.net>
Date: Wed, 4 May 2005 10:48:18 -0400
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: pfmc.comments@noaa.gov, Hal.Weeks@state.or.us

To Whom it May concern;
Please do not close bottom fishing to sport fisherman off the coast of Oregon. Areas listed as "Areas of Interest" and "Ecologically Important Areas". are important recreation areas for sport fishing, and there is no data that sport fishing has any negative impact. It is my understanding that so far decisions are based on Trawl Data only. This should not be the basis for restricting sport fishing. There are not huge numbers of sport fisherman, but the numbers represent a much bigger number of visitors to the coast of Oregon to do other activities. If the fishing is restricted unneccessarliy, it will have a large negative impact on the economies of the coastal towns that are already in poor economic condition.

Please use sport fishing data, and Fishery based data to make such critical decisions on future sport fishing. This should be based on biological justification for an Area to be designated as Important or Critical, not opinion or data based on activities such as trawling when sport fishing is concerned.

Thank you for your consideration.

Dick & Carolyn Wenger
249 West Saint James Pl
Longview, Washington
360-577-5991

Subject: Comment on 2005 Pacific Coast GroundfishDEIS
From: Slabhunter@aol.com
Date: Tue, 3 May 2005 13:27:11 EDT
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: pfmc.comments@noaa.gov

Hello there,

I'm concerned about the perception that the trawl data is being used across the spectrum. Sport and charter fishers are much more selective due to the terminal gear used.
This "reality" is just like saying sportfishing impacts(we release unmarked fish without removing them from the water) are the same as the impactsof gillnets in the mainstem Columbia River.
I'm a volunteer with the Angler Education Program offered by WDFW. Impacts are minimized when people are taught the proper techniques.
I believe this fact and the (positive) economic factors in rural communities should be given priority.

Regards,
Hans M. Mak
Shelton WA 98584

Subject: Marine sanctuaries
From: <bernie@e-z.net>
Date: Wed, 4 May 2005 07:44:45 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Dear Sirs,

Please do not continue to bow to special interest groups who are presuring you to consider marine santuaries. This is the last thing we need on the west coast to continue our economic slide into ablivian. Over regulation such as this takes the pure joy out of fishing as you must be an expert lawyer to interpret the laws and a master sailor to know where, when and why you cannot fish in a certain area.

This year in Oregon a knee jerk reaction closed the Stonewall Banks off of Newport to bottom fish in what is referred to as a control zone. It is obvious what is happening here that a santuary is trying to be set up for no good reason. There have been no credible scientific studies to prove that the little Orange guys are in danger or should even be considered for a listing. Very little is known about these species and how they breed. I would suggest a study be proposed to get the reality check we all deserve not just an asumption.

Environmentalist want to keep us all in a box and evidently have no joy in their lives to speak of but to make the rest of the population miserable and angry. I am angry that this proposal has even been given merrit and or consideration. Just what are we thinking here?

I would urge all of you to think this propsal through carefully and weigh the ramifications both economically and recreationally. Thank you for listening and I appreciate your time

Sincerely,

Bernie C. Buckle
10004 SE Foster Rd
Portland OR 97266
503 775 6585

Pacific Fishery Management Council
770 NE Ambassador Pl., Ste #200
Portland, OR 97220-1834
MAY 4, 2005

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MAY 0 5 2005
PFMC

Ladies and Gentlemen,

I am writing to express my concerns with several of the proposals being considered by the NFMS about closures to areas of the Oregon coast.

One proposal would ban all bottom-contact fishing. This would eliminate all bottom fishing including crabbing in those areas. That seems a very severe measure, especially based on the lack of good scientific evidence that sport fishing or crabbing has a big impact on the fishery.

Sport fishing has been the lifeblood of many small communities along the Oregon coast and represents a substantial infusion of money to local and the state economy.

Another proposal would close certain, "Ecologically Important Areas", to all fishing. Who decides what areas and what data supports that sport fishers have impacted the fishery. Sport fishermen have historically been very responsive in following guidelines for bag limits, size and gender identification. Little or no EIS data is based on sport fishing. It is based almost exclusively on Trawl Data.

Please take into account when you consider the current closure proposals that the sport fishing fleet does represent a major influence on the economy and does virtually no harm to the ecology or the fishery.

Sincerely Yours,

Edmund Keene

Edmund Keene
920 SW 13th Ave.
Portland, OR 97205

Email; ekeene@ecomphotos.com

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: "S. Lee Stone" <leeprairie@austin.rr.com>
Date: Thu, 5 May 2005 23:38:32 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 5, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

I would like to see aggressive protection of fragile ocean habitats from bad fishing practices. For now my attention is given especially to our west coast ocean habitats which are so impacted by the hated bottom trawling method. Coral and sponges need protection, as do many non-commercial fish species.

Thank you.

Sincerely,

Ms. S. Lee Stone
494 SH 71 W STE 140-318
Bastrop, TX 78602

Subject: [Fwd: Groundfish EIS comments]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Fri, 06 May 2005 10:16:50 -0700
To: Kit Dahl <Kit.Dahl@noaa.gov>
CC: John DeVore <John.DeVore@noaa.gov>

-------- Original Message --------
Subject: Groundfish EIS comments
Date: Thu, 5 May 2005 21:34:38 -0700
From: Dean Ferguson <ciferguson37733@charter.net>
Reply-To: Dean Ferguson <ciferguson37733@charter.net>
To:<pfmc.comments@noaa.gov>

Hi, my name is Dean Ferguson. I live in Astoria, OR and would like to comment on the Groundfish EIS. I personally participate in sportsfishing activities off the Oregon coast out of Astoria. I understand the need to rebuild fish stock, but we must find a way to work together without the preservationist agenda. We need to have open dialog between all parties and understand that we are all interested in the same outcome - healthy fish stocks. I fail to see how preventing any contact with the ocean bottom will accomplish this goal. This action seems more like an attempt to enact legislature to prevent all fishing, boating, etc. I DO NOT support this. I support healthy dialog that will result in healthy fish stocks.

Dean Ferguson
37733 Highway 30
Astoria, OR 97103
503-325-8474

Pacific Fishery Management Council

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Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Tom Aldridge <thomasaldridge95112@yahoo.com>
Date: Fri, 6 May 2005 12:58:14 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 6, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

I kind of think it is almost hopeless to get our government to actually protect and save our marine life because it seems to me that the law of the day is to let business do anything to make a profit even if it causes the death of all kinds of species and even if it means mass extinction of all kinds of marine life.It seems to me that if our government continues to act with little care for the oceans and the fish and the marine life, this will truly become the century of mass extinction.Year after year we read of the crisis in the oceans and year after year business intersts seem to run amuk and kill all they can kill and the government simply does nothing to stop this slaughter.Remember how close we came to killing all the buffalo-and how about the number we did on the carrier pigeon!!Our government seems to be incapable of protecting the great works of God and only capable of protecting big business and their right to destroy the works of God and all life in the sea!!I urge you to protect ecologically important and sensitive ocean habitats, including deep water corals and sponges, from destructive fishing practices in the Pacific Ocean.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Mr. Tom Aldridge
296 S 13th St
San Jose, CA 95112-2143

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: John Savlove <john@savlove.com>
Date: Fri, 6 May 2005 13:13:41 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 6, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

Ideas and projects constantly undergo revision. It is obvious that human endeavors - regardless of their value, which is of course in many cases very high - are tapping our resources at a pace that our minds refuse to comprehend. As the dominant force on this planet, we must take drastic measures now to make up for how successfully we've despoiled the ecology that sustains our lives.
The rest of this text is prepared, but I stand by every word for it because I understand the delicate yet powerful and altogether miraculously logical links between coral reefs, biodiversity, fish habitats, and the cycle of life that permits us to rule as we do. We have a moral AND economic imperative to get really smart and courageous NOW about how we treat our fellow life-forms. To ignore these messages - or even to blithely let them wait until tomorrow - is to betray our virtue and our future. I have seen environmental catastrophe. It is not pretty. In spite of their laziness, normal humans can be taught (or required) to respect our oceanic foundations in the face of greater and greater tragedies.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Mr. John Savlove
PO Box 19
11 Water St
North Bennington, VT 05257-9516

Subject: Comment on Pacific coast groundfish EFH DEIS
From: Christopher Lish <lishchris@yahoo.com>
Date: Sun, 8 May 2005 18:03:53 -0700 (PDT)
To: GroundfishEFHDEIS.nwr@noaa.gov

D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Administrator Lohn,

As you consider alternatives to protect Pacific groundfish habitat, I urge you to close ecologically important areas to destructive gears, such as bottom trawls, and to create areas where all groundfish and their habitats are protected.

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."
-- Aldo Leopold, The Conservation Ethic

Pacific groundfish are in trouble. Years of heavy fishing have taken their toll so that today both the fish and the fishermen are suffering. We must take steps today to restore our oceans so that our marine wildlife and our fisheries can thrive in the future. Protecting essential fish habitat is one of the most important steps on this path.

"An unwritten compact between the dead, the living and the unborn requires that we leave the unborn something more than...depleted natural resources."
-- A Washington State Court decision

Deep-sea corals, sponges, and rocky reefs are part of the seascape that supports ocean life and must be preserved. I also support actions that would help fishermen move away from destructive gears to more sustainable fishing.

"The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value."
-- Theodore Roosevelt

I value the oceans and I want to see them healthy and vibrant in the years to come. I ask you to take real action now to protect underwater habitats.

Thank you for your consideration of my comments. Please let me know how you intend to proceed on this issue. I look forward to your response. Please respond by e-mail to lishchris@yahoo.com if possible.

Sincerely,
Christopher Lish
PO Box 113
Olema, CA 94950
lishchris@yahoo.com

Subject: Comments on 2005 Pacific Coast Groundfish EFH DEIS
From: Jordan Epstein <yaakovm@northwest.com>
Date: Mon, 9 May 2005 11:57:43 -0700
To: "'groundfishefhdeis.nwr@noaa.gov'" <groundfishefhdeis.nwr@noaa.gov>
CC: "'nepa.comments@noaa.gov'" <nepa.comments@noaa.gov>

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn,

As a member of the Oregon Shores Conservation Coalition, and as a person who regularly monitors a mile along the Oregon coast, I am very concerned about the draft EIS and what alternatives it recommends. Like our land-based resources, our oceans are in trouble: we as a civilization have to do a better job of protection. To that end, I strongly suggest that your recommendations include the following.

* Increase protection for sensitive creatures like kelp, corals, and sponges that are essential to groundfish productivity.

* Protect a representative sample of unique habitat types from all types of fishing impacts.

* Make it as easy as possible for the fisheries industry to switch to less destructive fishing methods.

* Establish a network of reference reserves to study and better understand fishing impacts on all habitat types.

* Develop a management plan that is based upon ecosystem values, not economic ones. Aim to protect the long-term health of the marine environment.

* Apply the "precautionary principle" in all cases where information needed for decision making is unavailable. Don't gamble with the viability of this unique and precious resource.

Thank you very much for considering my suggestions.

Sincerely yours,

Jordan Epstein
6243 SW 47th Place
Portland, OR 97221

c: Susan A. Kennedy
NOAA Strategic Planning Office

Subject: [Fwd: Comment on 2005 Pacific Coast Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Mon, 09 May 2005 16:48:11 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comment on 2005 Pacific Coast Groundfish DEIS
Date: Mon, 9 May 2005 16:26:08 -0700
From: Fischer, Rhonda <rhonda.fischer@oregonstate.edu>
To: <GroundfishEFHDEIS.nwr@noaa.gov>, <pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

To: Maryann Nickerson

As a third generation commercial fisherman and long time Sea Grant Extension Educator, I have a number of comments on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (Groundfish EFH/EIS).

- I strongly support protecting fish habitat and using the tool of Habitat Areas of Particular Concern (HAPC) is important. I support the Council's preferred alternatives, B.2, B.3, B.4 and B.6.
- Under Alternative C.12, C.13 and C.14 there is only one near shore area listed for Oregon. That area runs from Coos Bay south to Bandon and out to approximately 80 fathoms. This area is rarely trawled because of rough bottom and communication cables, thus restricted bottom trawling (C.12) would have little affect. But this area is the only area available to recreational groundfish fleet and a small number of hook and line groundfish commercial vessels. Alternative C.13 would eliminate those fisheries, a real blow to Coos Bay and Bandon. Alternative C.14 would also cut out a large portion of very productive salmon trolling grounds out of Coos Bay and Bandon. A double blow to the communities.
- Alternative C.9 (option 9.8) would prohibit dingle-bar gear (troll groundfish gear). I have fished this gear for lingcod for over 20 years and prohibiting it would be a real mistake. Dingle-bar gear is very selective for lingcod. If setup right rockfish catch is nearly zero. The gear is primarily used by salmon trollers allowing an alternative fishery during salmon closures. Because the fish are handled carefully, one at a time, landed price is double trawl caught and is usually sold to niche markets. The bottom impact is minimal.

Maybe there is a misconception of what the gear is and how it is used. The dingle-bar is a 5 to 7 foot, 1½ inch diameter steel bar and replaces the lead cannonball weight. The trolling gear is a string of 5 or 6 weighted jig hooks spread six feet apart and floats are used to keep the gear off the bottom. The dingle-bar is lowered to the bottom with a salmon gurdie and then raised and lowered to meet bottom conditions. The dingle-bar is not drug along the bottom, but raised slightly off the bottom and only allowed to occasionally contact bottom. The jig line does not hit the bottom as it is set two to three feet above the bottom of the dingle-bar. The gear is towed at 2.0 to 2.5 knots with only occasional bottom contact (maybe every 100 feet) with a 1½ diameter footprint bottom impact is very minimal.

Instead of prohibiting this gear I think the Council and NMFS should be encouraging gear that is selective, has minimal impact, is available for small boats and produces a high value product.

Thank you

Paul Heikkila
F/V Andante
786 S. 1st Avenue
Coquille OR 97423
(541) 396-3096

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OREGON STATE
UNIVERSITY

Dr. Mark A. Hixon
Department of Zoology
Oregon State University
Corvallis, OR 97331-2914

phone: 541-737-5364 fax: 541-737-0501 e-mail: hixonm@science.oregonstate.edu http://www.onid.orst.edu/~hixonm/index.htm

10 May 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way
Seattle, WA 98115-0070

re: Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn:

I wish to endorse the comprehensive review of the EFH-DEIS submitted by an independent panel of academic scientists appointed by the Pacific Marine Conservation Council: Dr. Selina Heppell of Oregon State University (Chair), Dr. Peter Auster of the University of Connecticut, Dr. Don Gunderson of the University of Washington, Dr. Ralph Larson of San Francisco State University, and Dr. Les Watling of the University of Maine.

All of these marine scientists are respected experts on EFH-related issues, both regionally and nationally, ranging from spatially explicit population dynamics (Heppell), to groundfish habitat assessment (Auster), to West Coast groundfisheries (Gunderson), to rockfish recruitment and population structure (Larson), to benthos and biogenic habitat (Watling).

As the sole West Coast academic fish biologist serving on the Marine Protected Areas Federal Advisory Committee (http://mpa.gov/), I find the report by this panel of experts to be objective, thoughtful, and reasonable. I fully endorse their recommendations regarding the EFH-EIS alternatives, and urge NMFS and PFMC to consider their assessment carefully.

Thank you for considering my suggestions.

Sincerely,

Mark A. Hixon

Mark A. Hixon
Professor

cc: Oregon Department of Fish and Wildlife
Pacific Fisheries Management Council
Pacific Marine Conservation Council

Subject: Restore Ocean Habitat
From: "Ben Kitchen" <bkitchen@hotmail.com>
Date: Tue, 10 May 2005 19:40:09 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Dear Mr. D. Robert Lohn,
My Name is Benjamin Kitchen and I live in Lake Oswego, Oregon. The reason why I am writing you today is to let you and others know that I support sustainable fishing in the Pacific Ocean off of the Oregon coast. The Audubon Society of Portland and I feel it is important that the Pacific Fisheries Management Council take action to:
*** increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,**
*** protect a representative sample of unique habitat types from all types of fishing impacts,**
*** make it easier for fishermen to change to less destructive gear,**
*** establish a network reference reserves in order to better understand fishery impacts on all habitat types,**
*** develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.**
As an Oregonian I favor these goals, and that I strongly urge application of "precautionary management principles" in all cases where information needed for decision making is unavailable. Please listen to me, it is our duty as Americans to defend and protect our country. Thank you for your time.
Sincerely,

Ben Kitchen

Subject: Comments 2005 Groundfish DEIS
From: "Frank Quinn" <marfran@harborside.com>
Date: Tue, 10 May 2005 17:37:43 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Mr. Robert D. Lohn, Regional Administrator

National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

In developing policy for protecting marine habitats and managing offshore fishing within federal waters, surely two of the primary concerns of the Pacific Fisheries Management Council will be how to promote sustainable fishing to meet the needs of our growing population, and how to advise and assist fishermen to develop practices that assure a viable future for the industry.

In our area, where groundfish are particularly important, the fishing industry is already hurting and has been in serious decline for years. Overfishing and the use of bottom trawl nets and other heavy fishing gear have depleted fish stocks and caused much damage to the marine habitats the fish depend on for sustenance. Effective measures to protect those critical habitats and to regenerate and restore fish populations are essential if commercial fishing is to have a future here along the Pacific Coast.

We urge strongly that the Council adopt policies that will increase protection of sensitive habitats needed for the replenishment of groundfish stocks, and that representative sample habitat areas be reserved and protected from all types of fishing impacts for future study and as a source for regenerating fish populations. We hope the Council will be able to assist fishermen to develop and employ fishing gear and techniques that are less destructive than those that have caused so much damage.

Lastly, we believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.

Sincerely,

Francis E. Quinn and Marjorie Feldman

425 Bandon Ave., SW

Bandon, OR 97411

Subject: Comments on 2005 Groundfish DEIS
From: "George Alderson" <george7096@comcast.net>
Date: Tue, 10 May 2005 13:59:21 -0400
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

Please consider our comments which follow in reaching decisions on the 2005 groundfish DEIS. I (George) grew up in Oregon, and my sister's family still lives there. Here in Maryland we consume fish from the Northwest that arrive through commercial channels.

We ask NMFS to adopt a top priority of assuring a sustainable, natural fishery resource. We would like to see increased protection for sensitive habitat such as kelp, sponges and corals, essential factors to support groundfish populations. We ask NMFS to adopt policies that will encourage fishing operators to adopt fishing gear that is less destructive to the habitat and to non-target species of fish and invertebrates.

NMFS should identify examples of the main habitat types and protect reserved areas to serve as ecological benchmarks, somewhat like using exclosures and research natural areas in terrestrial habitat management. Reference reserves should be established to give researchers a basis for identifying the impacts of fisheries on all the habitat types in the region.

At any time when essential information for decisionmaking is lacking, "precautionary management principles" should be used.

NMFS should adopt a management plan based on the natural ecosystems. This is an essential foundation for managing fisheries over the long term, so we will have a productive marine fishery in the future.

Thank you for considering our views.

Sincerely,
George & Frances Alderson
112 Hilton Ave.
Baltimore, MD 21228-5727
Tel. 410-788-7096
Email: george7096@comcast.net

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS.
From: "Gayle Hansen" <gayle.hansen@oregonstate.edu>
Date: Tue, 10 May 2005 15:16:32 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <nepa.comments@noaa.gov>

Dear Dr. Robert Lohn and Susan Kennedy,

I briefly looked over the Draft EIS on essential fish habitat for groundfish. I was happy to see some mention of kelp beds as habitat structure for fish. But there are many things missing from the statement about seaweeds in general and their importance to ground fish.

In the Estuary chapter, you mention the importance of seagrasses to fish, but you overlook the tons of ephemeral green algae and diatoms that infest our bays also providing shelter and/or food (through the food chain) for fish and other animals. On the outer coast, multiple seaweed species provide shelter for fish -- and both seaweeds and phytoplanton provide essential food sources for fish through the food web. I recently asked Rick Brodeur, who works on food chain dynamics, how many pounds of algae (both phytoplanton and seaweeds) it takes to make 1 pound of salmon -- he said "about 1000 pounds". I had to determine how he calculated this 1000:1 ratio -- but you would have to go through at leasst 4 trophic levels, each with only 10% efficiency, to get to salmon -- so this does appear to be accurate -- and it is undoubtedly the same for groundfish. Also, in an early report by Leigh et al. (1986), kelps and rockweeds were determined to be more productive per unit area per year than plants in any other ecosystem on earth, exceeding even those in tropical rain forests -- and far exceeding the seagrasses.

If algae (both phytoplanton and seaweeds) are so essential to the habitat and diet of fish, including groundfish, I feel that it should receive more ephasis in your EIS. If seaweed beds (both kelp and other seaweeds) were destroyed, groundfish and many other fish would suffer tremendously and more than likely many would be wiped out.

Although I don't have the statistics on this, I find it astonishing that so few government agencies have marine botanists working for them on this very subject. As far as I can tell, NOAA doesn't have a single marine botanist in their Habitat division. The state of Oregon has put their Parks Department in charge of seaweeds, but they don't seem to have a clue about their importance.

In the terrestial environment, dominant tree types and other plants are well recognized for their importance to animals. It is such an undeniable fact that I cannot figure out why this hasn't happened in the marine environment. Without the shelter, food, and oxygen provided by these "plants" (both phytoplanton and seaweeds), there would be no fish out there. Many freshwater algae are considered to be indicator species of environmental change. Their tolerances to changes in temperature, water chemistry, and light are minimal, and when they die, it is obvious something is awry. This is also true of many marine algal species, but they have yet to be studied to recognize which ones are actually true indicator species. There has been little money available for this in the past -- explaining the lact of data.

I hope that you will rewrite this EIS to include more emphasis on these important organisms so that we can recognize their critical role in the marine environment and determine how to use them as indicator species in order to prevent future catastrophies like the depletion of our groudfish stocks.

Sincerely,

Gayle Hansen
Associate Professor, Oregon State University
Hatfield Marine Science Center
2030 SE Marine Science Drive
Newport, Oregon 97365

gayle.hansen@oregonstate.edu

Subject: Advocacy for Marine Reserves and Ecosystem Based Management
From: Lynn <lynnhe@qwest.net>
Date: Tue, 10 May 2005 20:37:37 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn:

It is important that the Pacific Fisheries Management Council take action to:
* increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* make it easier for fishermen to change to less destructive gear,
* establish a network reference reserves in order to better understand fishery impacts on all habitat types,
* develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

I strongly urge application of "precautionary management principles" in all cases where information needed for decision making is unavailable.

Sincerely,

Lynn Herring
1090 Chandler Road
Lake Oswego, OR 97034

F/V Regina
Thomas J. Stickel
938 Pacific Street
Morro Bay, CA 93442

May 11, 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE
BIN C15700, Bldg. 1,
Seattle, WA 98115-0070

Via email: GroundfishEFHDEIS.nwr@noaa.gov;

Susan A. Kennedy
NOAA Strategic Planning Office (PPI/SP)
SSMC3, Room 15603
1315 East-West Highway
Silver Spring, MD 20910

Via email: nepa.comments@noaa.gov.

Re: Comments on 2005 Pacific Coast Groundfish EFH DEIS

To Whom It May Concern:

I am an open access fisherman who utilizes vertical hook-and-line gear. I have fished for a living all of my adult life, and I earn 100 percent of my income from fishing.

For many years, a large percentage of my income was derived from fishing vertical gear for chilipepper rockfish, working from about the Cordell Banks to the Channel Islands; that fishery is now virtually closed to me forever. In order to replace this lost income, in recent years I have fished the same type of vertical hook-and-line gear for blackgill rockfish, with some incidental blackcod. In 2004, I carried a federal observer on board my vessel on numerous occasions. It was observed that my fishery had no bycatch.

The only fishing grounds accessible for me to be able to participate in this fishery from my homeport of Morro Bay, California, is the Santa Lucia Banks. I have already been displaced from all closer grounds, where I traditionally fished for chilipeppers. Please do not close the last place I have left to fish this highly selective gear type.

Thank you for your consideration of my comments.

Sincerely,

/s/THOMAS J. STICKEL

Thomas J. Stickel

Subject: [Fwd: Comment on 2005 Pacific Coast GroundfishDEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:31:43 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comment on 2005 Pacific Coast GroundfishDEIS
Date: Mon, 9 May 2005 22:09:17 -0700
From: Janice and Harry Green <hjgreen@jeffnet.org>
To:<GroundfishEFHDEIS.nwr@noaa.gov>
CC:<pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

May 7, 2005

Mr. D. Robert Lohn
Regional Administrator, NOAA Fisheries
c/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C15700
Seattle, WA 98115-0070

Re: Comment on Groundfish EFH DEIS

Dear Mr. Lohn:

Your staff and the Pacific Council are to be congratulated for such an intelligent and comprehensive approach to providing a rational basis for analyzing fisheries conditions and their effects on essential habitat. If what I say indicates a limited comprehension of what exists in the DEIS, I will be happy to be corrected, and will make my excuses beforehand: It is an extensive document which I am not sure I comprehend.

My concern is an evident "pass" on analyzing the impacts of sportfisheries. I believe I saw references to Appendix A, which had an Appendix 13. But all I ever found was a perfunctory textual re-reading of MRFSS data graphs. There was no attempt to resolve any (startling) data inconsistencies. There was no attempt to use better state data. There seemed to be no attempt to sort salmon trolling and tuna fishing from bottom fishing, though I am not sure about this last from the text. There was no attempt to even discuss the abundance depressions where groundfish are accessible to small boats (increasing in severity as a point of access is approached). I am certain there is literature on this subject. There was so far as I know, no data search, or even discussion, of the effects of estuary fishing on stocks which use estuaries for reproduction. There is no discussion of the effects of the livefish fishery burgeoning in the past 10 years in traditional sport groundfish territory (also leading to depletion and most likely contributing to the "port effect"). Surely there are some measures somewhere of the likely impact of mooching, of jigging on the bottom with a weight, etc. Or at least we could look forward to some attempts to quantify those impacts.

In a time when some media report how sportfishing is more responsible for fisheries depletion than commercial fishing (!), and when many organizations concerned with sustainable fisheries seem to go out of their way to mention only sustainable commercial fishing, I believe that sportfishing needs to be brought up to the point of having an important place in every discussion. Since most sportfishing probably does have less impact than most commercial fishing, and in many cases an equal or greater community economic impact, it seems clear that one way to minimize the impact on EFH would be to allocate more fish to sportfishers. This would have the added benefit of extracting a greater economic benefit from the limited allowable catches of some of the more constraining species of groundfish. While I realize that such views might not meet with enthusiasm in some quarters, it seems to me that such ideas at least warrant some discussion in a comprehensive review.

Sportfishers do need to consider what impacts they are having, and perhaps how best to minimize them. While I might think to myself that the truth might be rather benign, right now we are left with no data with which to argue any point in any direction. Sportfishers and regulators need to get started somewhere.

Very truly yours,

Janice Green
Oregon Sport Advisory Committee

cc via e-mail
Marine Program, ODFW
Pacific Fishery Management Council

Pacific Fishery Management Council

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Subject: Pacific Fisheries Management Council
From: jholland@mcn.org
Date: Mon, 9 May 2005 12:39:37 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: <rcozens@pon.net>

Mr. D. Robert Lohn, NOAA Fisheries Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn,

I am writing to express my support for the effort to identify, restore, and protect ocean habitats that are essential to Pacific Coast groundfish.

Groundfish share a vulnerability to overfishing with open water, schooling fish. But because many groundfish species live in and around the same rocky reefs and other bottom features for most of their adult life, they are also vulnerable to destruction of their homes, feeding areas, and breeding grounds from certain kinds of fishing activity.
I support efforts to identify and protect habitat areas of concern essential to groundfish, and I favor efforts to protect some areas from further damage by prohibiting the use of fishing gear known to damage groundfish habitat. I believe that the elimination of habitat-damaging fishing gear should be done in such a way as to minimize economic hardships on fishermen, as they are simply applying techniques and tools created before mankind realized their potential for damage.

Lastly, I would caution that precautionary management principles be used in all cases where information needed for decision making is unavailable. The history of U.S. and Canadian management of North Atlantic fishing grounds contains instance after instance where socioeconomic interest prevailed over precautionary management principles. Using precautionary management principles when protecting groundfish habitat will help ensure that Pacific groundfish escape the fate of North Atlantic cod.

Sincerely,

John Holland
Virginia Yager
P.O. Box 68
Annapolis, CA 95412

Subject: Mr. D. Robert Lohn, Regional Administrator
From: "Karen Ashford" <ashfordk@ohsu.edu>
Date: Tue, 10 May 2005 10:28:10 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

and Pacific Fishery Management Council.

MY OPINION: I absolutely support sustainable fishing in the Pacific Ocean off of the Oregon coast. I have lived in Oregon for 56 years, my entire life, and want our state to be completely resource sustainable- on land and in our oceans.

CONCERNING: Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS).

I believe it is EXTREMEMLY important that the Pacific Fisheries Management Council take action to:

* increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* make it easier for fishermen to change to less destructive gear,
* establish a network reference reserves in order to better understand fishery impacts on all habitat types,
* develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

I strongly believe we need to apply "precautionary management principles" in all cases where information needed for decision making is unavailable.

Subject: Re: "Comments 2005 Groudfish DEIS
From: "Jeff Ouderkirk" <jeffo@mail.ouderkirkhollen.com>
Date: Tue, 10 May 2005 12:33:03 -0400
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Dear Sir:

I am writing to urge you to insure that the rules and regulations which apply to this important topic include the following:

Increase protection for sensitive habitat types such as kelp, corals, and sponges that are essential to groundfish productivity.

Protect a representative sample of unique habitat types from all types of fishing impacts,

Make it easier for fishermen to change to less destructive gear,

Establish a network of reference reserves in order to better understand fishery impacts on all habitat types,

Develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

Apply "precautionary management principles" in all cases where information needed for decision making is unavailable.

Jeff Ouderkirk
Ouderkirk & Hollen
P.O. Box 1167
Newport, Oregon 97365
www.ouderkirkhollen.com
541-574-1630 office
541-574-1638 fax

Sent via the WebMail system at mail.ouderkirkhollen.com

Sent via the WebMail system at mail.ouderkirkhollen.com

Subject: Ground fishery DEIS--Comments 2005
From: Gary Lane <gmlane@juno.com>
Date: Tue, 10 May 2005 11:42:32 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: smurray@audubonportland.org

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service

Dear Mr. Lohn:

I am writing to express my concern that Pacific Coast fish habitats be protected from fishing practices that are unnecessarily destructive of marine bottom life and sensitive species such as corals, sponges and kelps. As you should know a diverse ecosystem must be maintained to insure a sustainable population of food fish. Thus, any management plan adopted should insure survival of representative habitat types and should protect the overall long term health of the marine environment. To accomplish this goal, a network of marine reserves should be established as benchmarks against which fishing impacts can be measured. Where insufficient information exists to make a decision impacting the marine environment, the principle of "precautionary management" should be applied. Also, fisherman should be required to adopt fishing methods and equipment that are the least destructive. Fishing equipment must be labeled in an indelible manner so that discarded equipment that poses a hazard to marine life can be traced to the individuals discarding the equipment. Appropriate enforcement action should then be taken against such hazardous dumping.

Thank you for considering my comments on these important fishery issues.

Subject: [Fwd: Offshore Habitat]
From: PFMC Comments <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:30:55 -0700
To: Jim Seger <Jim.Seger@noaa.gov>

-------- Original Message --------
Subject: Offshore Habitat
Date: Tue, 10 May 2005 08:05:19 -0700
From: DaveandCarole Needham <needham@casco.net>
To:<GrounfishEFHDEIS.nwr@noaa.gov>
CC:<pfmc.comments@noaa.gov>

Dear Mr. Lohn,

When I was a child living here in Seal Rock, Oregon, I was a member of a group named, "Coast Watch." At that time, we were observing and recording the activity of aircraft over the area. Now, as a dedicated member of Oregon Shores CoastWatch and a life-long resident of the central Oregon coast, I urge you to do all in your power to protect the marine habitat that is so critical in the recovery of natural marine ecosystems.

Being a life-long resident also means I realize the importance of fishing to this community. However, I am also aware that no single species can be lost without contributing to the loss of another, eventually impacting the very quality of human life that we are all eager to maintain.

That said, please do all you can to:

1. Increase protection for sensitive habitat types that are essential to groundfish productivity.
2. Assist fishermen in changing to less destructive gear.
3. Protect a representative sample of unique habitat types from all types of fishing impacts.
4. Create a network of reference reserves, in order to aid undertanding of fishery impacts on all types of habitat.
5. Develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.
6. Prepare and apply some precautionary management principles, in cases where information needed for decision making is unavailable.

Sincerely Yours, Carole Needham

Pacific Fishery Management Council

Subject: Fishing Stocks
From: LJHilton1@aol.com
Date: Wed, 11 May 2005 11:21:28 EDT
To: GroundfishEFHDEIS.nwr@noaa.gov

Please protect our fish stock. If you don't your children are going to want to know why you were so selfish and left them so little.
Larry Hilton

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: jeffrey hastings <beed8@cox.net>
Date: Wed, 11 May 2005 15:39:32 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 11, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

this is where all life leads. its strange that the ocean and our bodies have the same percentage of salt and water. kill the ocean and the species on earth will follow.
lets get serious.

Sincerely,

Mr. jeffrey hastings
3582 Colonial Ave
Los Angeles, CA 90066-2709

Subject: Comment on Pacific coast groundfish EFH DEIS
From: "Valerie Franck" <vfranck@hpu.edu>
Date: Tue, 12 Apr 2005 02:12:01 -0400
To: "GroundfishEFHDEIS.nwr@noaa.gov" <GroundfishEFHDEIS.nwr@noaa.gov>

April 12, 2005

D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Administrator Lohn,

I obtained my PhD in marine science from the University of California Santa Barbara and am now an Assistant Professor of Biology and Marine Biology at Hawaii Pacific University.

As a marine biologist and former California resident, I am deeply concerned with the harmful effect of bottom drawling on California's deep-ocean ecosystems, including deep-water corals. Overfishing in general is an alarming cause for concern, but coupled with the complete habitat destruction that results from bottom trawling methods it is perhaps the single worst environmental atrocity occuring in the ocean today.

Please help protect East Pacific deep-water ecosystems as well as groundfish fisheries. How can we have sustainable groundfish fisheries without groundfish habitat?! Please encourage fishermen to develop more ecologically-sound methods of fishing by reducing bottomfish quotas and phasing out current methods of bottom trawling. Quotas and better fishing techniques has helped sustain Alaska's salmon fishery and can help sustain California's groundfish fisheries as well.

Sincerely,

Valerie Franck
Hawaii Pacific University
45-045 Kamehameha Hwy
Kaneohe, HI 96744
USA
vfranck@hpu.edu

Subject: [Fwd: Comments on 2005 Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:29:26 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comments on 2005 Groundfish DEIS
Date: Tue, 10 May 2005 13:59:21 -0400
From: George Alderson <george7096@comcast.net>
To:<GroundfishEFHDEIS.nwr@noaa.gov>
CC:<pfmc.comments@noaa.gov>

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

Please consider our comments which follow in reaching decisions on the 2005 groundfish DEIS. I (George) grew up in Oregon, and my sister's family still lives there. Here in Maryland we consume fish from the Northwest that arrive through commercial channels.

We ask NMFS to adopt a top priority of assuring a sustainable, natural fishery resource. We would like to see increased protection for sensitive habitat such as kelp, sponges and corals, essential factors to support groundfish populations. We ask NMFS to adopt policies that will encourage fishing operators to adopt fishing gear that is less destructive to the habitat and to non-target species of fish and invertebrates.

NMFS should identify examples of the main habitat types and protect reserved areas to serve as ecological benchmarks, somewhat like using exclosures and research natural areas in terrestrial habitat management. Reference reserves should be established to give researchers a basis for identifying the impacts of fisheries on all the habitat types in the region.

At any time when essential information for decisionmaking is lacking, "precautionary management principles" should be used.

NMFS should adopt a management plan based on the natural ecosystems. This is an essential foundation for managing fisheries over the long term, so we will have a productive marine fishery in the future.

Thank you for considering our views.

Sincerely,
George & Frances Alderson
112 Hilton Ave.
Baltimore, MD 21228-5727
Tel. 410-788-7096
Email: george7096@comcast.net

Pacific Fishery Management Council

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Subject: [Fwd: Comments 2005 Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:26:13 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comments 2005 Groundfish DEIS
Date: Tue, 10 May 2005 17:07:48 -0700
From: Frank Quinn <marfran@harborside.com>
To: <pfmc.comments@noaa.gov>

Mr. Robert D. Lohn, Regional Administrator

National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

In developing policy for protecting marine habitats and managing offshore fishing within federal waters, surely two of the primary concerns of the Pacific Fisheries Management Council will be how to promote sustainable fishing to meet the needs of our growing population, and how to advise and assist fishermen to develop practices that assure a viable future for the industry.

In our area, where groundfish are particularly important, the fishing industry is already hurting and has been in serious decline for years. Overfishing and the use of bottom trawl nets and other heavy fishing gear have depleted fish stocks and caused much damage to the marine habitats the fish depend on for sustenance. Effective measures to protect those critical habitats and to regenerate and restore fish populations are essential if commercial fishing is to have a future here along the Pacific Coast.

We urge strongly that the Council adopt policies that will increase protection of sensitive habitats needed for the replenishment of groundfish stocks, and that representative sample habitat areas be reserved and protected from all types of fishing impacts for future study and as a source for regenerating fish populations. We hope the Council will be able to assist fishermen to develop and employ fishing gear and techniques that are less destructive than those that have caused so much damage in the recent past.

Lastly, we believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.

Sincerely,

Francis E. Quinn and Marjorie Feldman

425 Bandon Ave., SW

Bandon, OR 97411

Pacific Fishery Management Council

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Subject: [Fwd: "Comments 2005 Groundfish DEIS"]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:25:41 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: "Comments 2005 Groundfish DEIS"
Date: Tue, 10 May 2005 19:48:04 -0700
From: Karen Meyer <karen@greenfireproductions.org>
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: pfmc.comments@noaa.gov, Hal.Weeks@state.or.us

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest
Region ; 7600 Sand
Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn:

I attended the recent Essential Fish Habitat meeting in Newport, Oregon at the end of April and wanted to submit the following comments for your consideration for decisions that will be made on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS).

Because the DEIS is so complex, the alternatives quite numerous, and the fact that I do not feel qualified to comment on specific alternatives, I will make more general comments and suggestions to the Pacific Fishery Management Council.

Based on the meeting in Newport, I am concerned that the specific needs of fishermen will carry more weight than the scientific knowledge about the state of groundfish and their potential habitat protection needs. I encourage you to strongly consider the scientific recommendations.

In general, I feel it is imperative for the PFMC to take a precautionary approach to management of Pacific groundfish, while we improve our limited understanding of the impacts of fishing on diverse habitats and the ability of habitats to recover from fishing impacts. In fact, the Oregon State of the Environment Report 2000 states, "the most significant risk to marine fisheries Š is our insufficient understanding of the complex interactions of natural and human caused changes in stock health." It is crucial, therefore, that the PFMC err on the side of caution in protecting and restoring Pacific groundfish and habitat.

I strongly encourage the PFMC to consider the need for connectivity between habitats, so that these habitat reserves can provide the added benefit of enhancing groundfish populations. I encourage you to include a network of research reserves in PFMC's effort to designate, protect and understand present and future EFH. By monitoring and analyzing impacts and effectiveness in these reference sites, the PFMC can glean new knowledge, engage in adaptive management and move forward more confidently with fishery management, basing its decisions on sound science.

Utilizing the principles of ecosystem-based management, the PFMC should develop an ecologically based management plan that considers the entire ecosystem, including humans, and protects the long-term health of the marine environment. This plan should think beyond protection of single species, and consider the inherently interrelated nature of all marine species and habitat types, as well as potential past, present, future and cumulative human impacts on these environments.
I feel it is important that all possible EFH protection measures be adopted in the near-term, rather than deferring measures for future understanding. This precautionary implementation should then be modified accordingly, based on the principles of adaptive management, as new information is gathered, during the mandatory five-year review process.

Overall, I believe it is important to:
* manage and make these decisions on a precautionary principle,
*increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* include connectivity as a criteria for designating EFH - so that the habitat reserves have the potential to replenish groundfish stocks,
* make it easier for fishermen to change to less destructive gear,
* establish a network reference reserves in order to better understand fishery impacts on all habitat types.

Thank you for your efforts to protect essential fish habitat for Pacific groundfish.

Karen Anspacher-Meyer

--

Karen Anspacher-Meyer
Executive Director
Green Fire Productions
karen@greenfireproductions.org
www.greenfireproductions.org
541-486-4070 fax 541-486-4010
P.O. Box 14906, Portland, OR 97293

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Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: shelly hansen <graphicshelly@yahoo.com>
Date: Wed, 13 Apr 2005 14:35:36 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
don't kill the oceans or blame others for what you didn't do to protect them.
shelly hansen
230 Rice Creek Blvd

fridley, MN 55432

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Jennifer Foster <jafix@yahoo.com>
Date: Wed, 13 Apr 2005 11:55:04 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
It's like clear-cutting on the ocean floor. If this was happening to the giant redwoods in California there would be hell to pay.
Jennifer Foster
6633 Glenwood Rd.

Omaha, NE 68132

Subject: [Fwd: Comments 2005 Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:24:55 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comments 2005 Groundfish DEIS
Date: Tue, 10 May 2005 20:41:01 -0700
From: Ann Littlewood <alittlew@europa.com>
To:<GroundfishEFHDEIS.nwr@noaa.gov>
CC:<pfmc.comments@noaa.gov>

Oregon needs a sustainable fishery.

When you develop the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS), please use the following strategies:

Increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
Protect a representative sample of unique habitat types from all types of fishing impacts,
Make it as easy as possible for fishermen to change to less destructive gear,
Establish a network of reserves
Create an ecosystem-based management plan that truly protects the long-term health of the marine environment
Use precautionary management principles where information needed for decision making is unavailable.

I am reading a lot of very dire news about the state of the world's oceans. The US should be a leader in protecting and restoring them. Act while we can make a difference.

Ann Littlewood
Portland, OR

Pacific Fishery Management Council

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Subject: [Fwd: EFH Comments]
From: "PFMC Comments"
Date: Thu, 12 May 2005 09:19:24 -0700
To: John DeVore
CC: Kit Dahl

-------- Original Message --------
Subject:EFH Comments
Date: Wed, 11 May 2005 13:50:24 -0500
From:KELLEY RETHERFORD <excalibur@carrollsweb.com>
Reply-To:<excalibur@carrollsweb.com>
To:<groundfishefhdeis.nwr@noaa.gov>
CC:<Pfmc.comments@noaa.gov>, <Hal.weeks@state.or.us>

Michael Retherford
880 NE Sturdevant Rd.
Toledo, OR 97391

May 10, 2005

Mr. Jim Lohn
National Marine Fisheries Service
7600 Sandpoint WY NE
Seattle, WA 98115.

Dear Mr. Lohn,

I am and owner/operator of a 65' trawler/crabber fishing out of Newport, Oregon. I have been in the west coast fisheries since the mid 1980s and have observed the increasing complexity of management regulations that have been imposed on the fishing industry by legislation and litigation. I hope NMFS and the PFMC continues to support the current efforts toward development of IQs, as this is likely the only way we will stabilize and improve the wealth of the resource and the health of the coastal fishing industry. I do not feel that the current "habitat" related amendments will do much enhance fisheries management. Nearly all of the proposed measures require greater amounts of funding and manpower than that which is currently available. The history of management has shown that there is little enthusiasm for funding initiatives such as those proposed by government, so the onus of funding falls to the user.

Essential fish habitat is a difficult subject to define precisely, but if the intent is to define an area that habitat alteration effects on fish be considered then the PFMC alternative A.3 would be the most logical alternative.

I concur with the PFMC's proposal B2 to establish estuary areas as HAPCs. Research has shown that these are the areas that are very productive for most of our fished species and critical for the early life of crab and shrimp. I am not in favor of additional closures on the continental shelf and slope. Many of these areas have already been closed to fishing, some for up to 6 years. During that time there have been no efforts to evaluate if these closures were beneficial, detrimental, or neutral for fish production. I would hope that NMFS and the PFMC refrain from sequestering additional grounds without adequate scientific study. Without any supporting evaluation of the effects of fishing on offshore rocky reefs there is no basis for this option. There are already tools in place to control fishing in these habitats and additional regulations will only be redundant and add additional unnecessary expenses to fishermen.

The alternatives presented for item C are all problematic in that it is not clear how these measures will mitigate fishing effects. The base years of 2000-2002 are questionable measures of fishing. One must remember that the fishery in those years was already significantly impacted by trip limits and area closures. In fact the entire west coast trawl fishery is much different today than in the past. Since 1994 75% of trawl effort has been removed by limited entry permit retirement, vessel buyback program and migration of part of the fleet to Alaska. This along with changes in fishing practices has significantly reduced fishing effects. An ODFW study of fishing effort showed less than 10% of the grounds are actively fished. This result is in line with other studies that show trawl fisheries in general only trawl 10-15% of available habitat.

I have also actively participated in NMFS West coast trawl surveys and habitat mapping projects. I can attest that observations of many untrawled areas show barren bottom strewn with bare cobbles and stones, while trawled areas have rich bottom fauna.

My concern for selection of any of the items in item C has impacts on all bottom gear including crab traps. Again, without research there is no data to evaluate the effects of these permanent changes. Given that there already have been major reductions in trawl impacts and that we lack objective data to base decisions on it would be prudent to take an incremental approach to develop meaningful regulatory measures. All of the needed action can be taken within the normal regulatory process and does not require a separate program.

Alternative D.1 is the appropriate alternative for research and monitoring. All of the proposed alternatives are added regulations on fishermen; however, it is not clear how these will further EFH objectives. Logbooks and VMS should be addressed in the normal regulatory process, since all of the alternatives, except research reserves, relate to management of catch and effort. In the case of research reserve,s it is premature for the Council to establish a "reserve system" without consideration of the effectiveness of this system and its affect on fishing. NMFS has a scientific study group working on developing an approach to studying reserves. The PFMC should wait until these studies are prepared before considering reserves. However, there is a pressing need to quantify fishing effects on habitat if, in fact, there are any significant fishing effects to habitats currently fished.

Sincerely yours,

Michael Retherford
Captain, F.V. Excalibur

Cc: PFMC
Hal Weeks, ODFW

Sent via the WebMail system at carrollsweb.com

Subject: [Fwd: Comment on 2005 Pacific Coast Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:18:07 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comment on 2005 Pacific Coast Groundfish DEIS
Date: Wed, 11 May 2005 14:19:08 -0700
From: Leesa <poort@carrollsweb.com>
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: Hal Weeks <Hal.Weeks@state.or.us>, pfmc.comments@noaa.gov

Comment on 2005 Pacific Coast Groundfish DEIS
The following comment is submitted for the record.

I support the Council taking action to protect essential fish habitat. "No action" should not be an option.

I support Alternative C.12. I believe it is important that the Council move quickly to protect EFH before further damage is done by trawl gear. I encourage the Council to review the areas proposed carefully, to ensure they are large enough and encompass all of the EFH that could be damaged by trawl gear.

I belive an appropriate habitat protection measure that encompasses several of the alternatives would be to close all state territorial sea (state waters) to trawl gear to protect essential fish habitat.

I do not support C.11 as written because I believe sablefish must be included in this alternative. Sablefish habitat should be protected from damaging gear. This list of alternatives is about protecting the fish, not the economic benefits one gear group holds over another.

Thank you for the opportunity to comment.

Leesa Cobb
Communication Coordinator
Port Orford Ocean Resource Team
PO Box 679
Port Orford, OR 97465
541-332-0627
poort@carrollsweb.com

Pacific Fishery Management Council

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Subject: [Fwd: Comments 2005 Groundfish DEIS]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:18:41 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Comments 2005 Groundfish DEIS
Date: Wed, 11 May 2005 13:49:17 -0700
From: Jana Fussell <JANAFUSSELL@msn.com>
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Please accept the following comments:

I feel that it is important that the Pacific Fisheries Management Council take action to:
* increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* make it easier for fishermen to change to less destructive gear,
* establish a network reference reserves in order to better understand fishery impacts on all habitat types,
* develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

I favor these goals and strongly urge application of "precautionary management principles" in all cases where information needed for decision making is unavailable.

Thank you for considering these comments.

Jana Fussell
924 Cumberland Road
Lake Oswego, Oregon 97034

Pacific Fishery Management Council

15

Subject: [Fwd: groundfish regulations]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 12 May 2005 09:21:17 -0700
To: John DeVore <John.DeVore@noaa.gov>
CC: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: groundfish regulations
Date: Wed, 11 May 2005 07:08:47 -0700
From: peter frank <pfrank@darkwing.uoregon.edu>
To: pfmc.comments@noaa.gov
CC: pfmc.comments@noaa.gov

As a retired marine ecologist, I'm aware that, for decades, protection, even when intended. has fallen victim to more immediate economic pleas from fisherman. Please do protect the habitat of groundfish and manage the resource for the long run. If that means protected areas, that has proven useful where it's been tried-- not very often. Sincerely yours,

Peter Frank
Prof of Biology Emeritus
Univ. of Oregon
2009 Elk
Eugene, OR 97403

Pacific Fishery Management Council

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PORTS seafood
The Fresh Fish Company

D. Robert Lohn, Regional Administrator
C/O Maryann Nickerson
NMFS, 7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA 98115-0070

May 2, 2005

Dear Mr. Lohn,

I am a seafood wholesale/distributor located in San Francisco. I am and always have been a firm supporter of sustainable fisheries, and support and understand the need to protect essential fisheries habitat (EFH). However, I strongly believe that there is a need to differentiate fishing gear which impacts EFH from gear that does not. There are many fishermen who attempt to fish for species which do not catch or impact other fish and who use non-destructive fishing gear, and they are losing their livelihood as a result of being grouped with other more destructive fishing methods. These fishermen lack a cohesive voice.

The Scottish Seine is one such method that does not impact an EFH. It is a very light and easily damaged encircling gear, which can only be used over soft bottom. Even the presence of a small anomaly on the bottom damages and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that can fish and damage a hard bottom, Scottish Seines do not actively tow. Instead, the net is slowly gathered and reeled in hydraulically greatly reducing and often eliminating the possible impact to an EFH.

At this time, I believe that the Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. This action would prohibit Scottish Seine fishing because of the improper inclusion in the trawl category.

When determining the final EFH please exclude the Scottish Seine from any fishing prohibition designed to protect fish from trawling. It is important to protect an EFH, but it is equally important for NMFS to encourage methods of fishing that do not impact the ocean bottom and the goals of EFH. I feel that a Scottish Seine exclusion is in the spirit of EFH.

Thank you for your consideration.

Sincerely,

Timothy Ports

1440 BANCROFT AVENUE SAN FRANCISCO, CA 94124-3603 (415) 593-8080 FAX (415) 593-9393

Monterey Fish Market

MFM Seafood Inc.

★ Wholesale
Pier 33
San Francisco,CA 94111
Ph: 415-956-1985/86
Fax: 415-956-5851
★ Retail Market
1582 Hopkins St.
Berkeley, CA 94707
Ph: 510-525-5600
★ Office
1620 Hopkins St.
Berkeley, CA 94707
Ph: 510-525-0999
Fax: 510-525-4109

D. Robert Lohn, Regional Administrator
C/o Maryann Nickerson
NMFS, 7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA. 98115-0070

Mr. Lohn;

i.e. 2005 Pacific Coast Ground fish EFH DEIS

I am a seafood wholesaler and retailer in San Francisco. A firm supporter of sustainable fisheries, and the need to protect essential fisheries habitat (EFH). I also support fishermen who attempt to fish for species which do not catch or impact other fish and who use non destructive fishing methods. There is a need to differentiate fishing gear which impacts EFH from fishing gear that dose not.

The Scottish Seine is a gear which will not impact an EFH. It is a very light and easily damaged encircling gear which can only be used over soft bottom. Even the presence of a small anomaly in the bottom damages and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that can fish and damage the hard bottom, Scottish Seines do not actively tow. Rather, the net is slowly gathered and reeled in hydraulically greatly reducing and often eliminating the possible impact to an EFH.

At this time I believe that Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. This prohibits Scottish Seine fishing because of this improper inclusion in the trawl category.

When determining the final EFH please exclude Scottish seine from any fishing prohibition designed to protect fish from trawling. It is important to protect an EFH, but at the same time, I feel it is also important for NMFS to encourage methods of fishing, such as the Scottish Seine that dose not impact the bottom and the goals of the EFH.

Thank you for your consideration;

Paul Johnson

Tom Worthington

May 4, 2005
Mr. D. Lohn
Regional Administrator. NMFS
C/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C15700
Seattle, WA 98115-0070

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PFMC

Comment on 2005 Pacific Coast GroundfishDEIS

Dear Administrator,

I am a member of the Recreational Fishing Alliance and also an avid fisherman paying taxes in both Oregon and Washington and am opposed to regulators closing vast areas of the coastal zones to the new EIS regulations. I respectfully recommend that your office consider the economic disaster of imposing these new unproven regulations on the coastal communities that thrive on tourists visiting and recreating in these public areas. These is no justifiable rationale or studies that prove these area need to be closed to the public harvesting species within these areas. It is an unreasonable program developed without sufficient analysis and is not justifiable, regardless of any support the plan may have. I believe the National Marine Fisheries Service needs to better evaluate the impacts of these proposals and preserve fishing opportunities for future generations of anglers. I also believe that this plan is an economic disaster waiting to happen to the already economically depressed coastal communities.

The National Marine Fisheries Service has not fully analyzed the potential impacts on the anglers who harvest and recreate these areas. I for one will review my monies spent on the Oregon Coast and all the clients that I draw to the coast to fish the waters off Oregon and Washington. I will better manage my assets and tax dollars and reinvest in areas that Are not impacted by these inappropriate regulations.

Sincerely,
Tom Merriman

Tom Merriman

cc. PFMC, ODFW Marine Resources Program

Southern California Trawlers Association

6 Harbor Way, Box 101, Santa Barbara, CA 93109

May 16, 2005

RECEIVED
MAY 2 0 2005
PFMC

RE: ERROR CORRECTION, COMMENT LETTER ON EFH DEIS

To whom it may concern:

On May 4, 2005, our Association sent a letter to Dr. Robert Lohn regarding our comments on the Draft EIS on Essential Fish Habitat currently under review. Unfortunately, due to the large volume of information we had to review in a very short time frame, we inaccurately described one of the alternatives to minimize fishing impacts on EFH.

Alternative C.10, described in Chapter 2 of the DEIS, involves the Nature Conservancy's alternative to work with fishermen to come up with areas closed to trawling in the central coast. Figure 2-27 illustrates an area from above Monterey Bay to Pt. Conception and out to at least 200 meter depth. The figure was captioned "no-trawl zones" and the text was not specific in detail other than to say that the Conservancy would work with fishermen to come up with no-trawl zones.

We erroneously concluded that the entire area, including all of Monterey Bay, was proposed to be closed to trawling, due to our reading of the text and figure. We understand now that that is not the stated intent of the Nature Conservancy proposal represented by Alternative C.10.

Please strike the words "...and the Nature Conservancy Alternative both..." from line 2 of the paragraph on page 4 of our letter that is headed "Monterey Bay." Thank you for making this correction to our comments on the EFH DEIS.

Sincerely,

Mike McCorkle

Mike McCorkle,
President

Agenda Item C.3.d
Supplemental Public Comment 3
June 2005

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Oceanic and Atmospheric Administration
7600 Sand Point Way, NE, Building 1
Seattle WA 98115-0700

Re: Comments on 2005 Draft EIS for Pacific Coast Groundfish Essential Fish Habitat

Dear Mr. Lohn:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Essential Fish Habitat Designation for the Pacific Coast Groundfish Fishery Management Plan. This letter contains comments on the DEIS from the California Artificial Reef Enhancement Program (CARE). CARE is a nonprofit organization which, through public education and scientific research, promotes awareness and understanding of the potential value to be derived from artificial reef ecosystems in offshore California, and supports the preservation and enhancement of artificial reefs when recognized as beneficial to the marine environment.

As stated in our comments submitted on October 5, 2004, CARE supports the designation of the oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" (HAPC) under the Magnuson-Stevens Fishery Conservation and Management Act. For the reasons stated in our previous comments and in these comments, we believe that Alternative B.8 in the DEIS, which would designate the oil and gas platforms off of the California coast as Habitat Areas of Particular Concern (HAPC), should be adopted as part of the comprehensive strategy to conserve and enhance essential fish habitat for fish species managed under the Pacific Coast Groundfish Fishery Management Plan. With these comments, we are providing additional scientific information that should be included and evaluated in the Final EIS for the purpose of selecting the final preferred alternative. Please contact me at (805) 320-8456 if you have any questions or would like any further information that CARE may be able to provide.

Sincerely,

George Steinbach

George Steinbach
Executive Director

May 11, 2005

Comments of CARE on the February 2005 Draft EIS for Pacific Coast Groundfish EFH

General Comments:

General Comment 1:

CARE supports Alternative B.8 in the Draft Environmental Impact Statement ("DEIS"), the designation of oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" ("HAPC") under the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act"). The information submitted with these comments and with our comments dated October 5, 2004 strongly supports this designation.

General Comment 2:

In these comments, we use the term "platform reefs" to refer to the valuable groundfish habitat that oil and gas platforms provide. This term is meant to emphasize that scientific research demonstrates that the underwater portions of oil and gas platforms serve as de facto reef habitat. In addition, the term emphasizes that only the underwater portion of the platform is relevant to the discussion of groundfish Essential Fish Habitat ("EFH") and HAPC. We use "platform reefs" to emphasize the need for decision-makers to consider the habitat value of the underwater portion of the platform structure, and that both future groundfish fishery management and platform decommissioning decisions should consider their potential impact on the habitat that the platform reefs provide.

General Comment 3:

As the DEIS notes (p. 4-12), designation of HAPC "may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPCs." With respect to Alternative B.8, the DEIS (p. 4-13) acknowledges that: "Designation of the areas surrounding oil platforms would enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed" on decommissioning. For these reasons, a careful, thorough and balanced analysis of potential positive and negative consequences associated with this alternative is essential to enable decision-makers to make informed decisions among the alternatives. However, the DEIS does not contain such an analysis. The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8 based on the information discussed in these comments.

General Comment 4:

The discussion of environmental consequences for the proposed preferred alternative and other alternatives addresses the protection of habitat for groundfish species and includes conservative assumptions that habitat used by groundfish has positive value.[1] By contrast, the analysis of Alternative B.8 on p. 4-13 states only that: "One view holds that scientific research indicating an abundance of fish species located near oil rig platforms is a benefit to the ecosystem." No citations are given and the unidentified "scientific research" is not described at all beyond that single summary sentence. The remainder of the discussion consists of arguments against the designation of platform reefs as HAPC, based on one outdated citation and unsupported speculation cited as "personal communications" (as discussed in specific comments below). We are very disappointed with the lack of attention in the "Environmental Consequences" analysis to the scientific evidence supporting the important ecological role of platform reefs and the need for their protection. This one-sided presentation does not provide decision-makers or the public with the information necessary to make an informed comparison among alternatives. The Final EIS must be revised to take into account the information presented in our prior comments and in these comments in order to present an unbiased basis for decision-making.

General Comment 5:

Some information on groundfish populations at platform reefs is described under the heading of "Alternatives" (DEIS, p. 2-10) and "Affected Environment" (DEIS, pp. 3-8 – 3-10). However, this information is disregarded — and is not even cross-referenced — in the "Environmental Consequences" analysis (DEIS, p. 4-13). With all respect to those who read this large document and attempt to digest and utilize the massive amount of information it contains, inclusion of this material in the "Alternatives" and "Affected Environment" sections is not an adequate substitute for full and fair consideration of this information in the evaluation of environmental consequences as required by the National Environmental Policy Act ("NEPA").

General Comment 6:

EFH decisions must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). On that point, it is critical to note that ***the designation of platform reefs as HAPC will not have any adverse environmental consequences***. Rather, as the DEIS itself acknowledges, this designation would "enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed." (DEIS, p. 4-13) Whatever scientific uncertainties may yet remain can be considered when NMFS consults regarding decommissioning plans for particular platforms. CARE believes that the increasing accumulation of evidence clearly supports the benefits of platform reefs. Nevertheless, should substantive scientific evidence be presented to document the speculative suggestions raised in the DEIS (*id.*), that evidence can be taken into account in the EFH consultation process. The HAPC designation itself would not prevent NMFS from conducting a thorough evaluation of each decommissioning proposal in order to minimize any adverse consequences. On the other hand, once the structures are removed, NMFS will have no opportunity for further evaluation because the platform reef habitat and thriving ecological communities will be destroyed. Moreover, since the removal of oil and gas platforms is typically

[1] For example, see DEIS pp 4-3 ("Each alternative is analyzed for the extent to which it protects habitat for individual species/life stages of groundfish") and 4-4 ("in the absence of definitive research, the analysis concludes that it is beneficial to protect some portion of each habitat type. . .") .

carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000.) As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003.) Yet the DEIS entirely ignores this issue. The cursory analysis presented of environmental consequences on p. 4-13 is wholly inadequate in failing to take into account the "one-way" nature of those consequences: If HAPC designation indirectly leads to any adverse consequences from the presence of the platform reefs, those consequences can be addressed in future decisions. If lack of HAPC designation indirectly leads to adverse consequences from elimination of the platform reefs, they and their existing groundfish populations cannot be restored.

General Comment 7:

In addition, the information submitted with our prior comments and these comments supports the decision not to select Alternative A.6, the most geographically restricted EFH designation, as the final preferred alternative. Were Alternative A.6 to be adopted, some platform reefs would be excluded from the area designated as EFH. In that event, the substantial existing groundfish populations at those platform reefs would be deprived of the benefits of the overall EFH conservation strategy, as well as the protection of the EFH consultation process in future decisions regarding the decommissioning of the platforms. In addition, such exclusion would necessarily preclude designating excluded platform reefs as HAPC. The Final EIS should acknowledge and evaluate these environmental consequences of Alternative A.6. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain EFH status for platform reefs that are outside the current range of Alternative A.6.

Specific Comments

1. DEIS, pp. i, 1-3

The DEIS states that: "*The purpose of the proposed action* is: first, to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions; ..." In order to fulfill this purpose, the DEIS must provide the Pacific Fisheries Management Council ("Council") and National Marine Fisheries Service ("NMFS") with all of the available scientific information regarding the habitat value of platform reefs. The duty to consider all available scientific information is enshrined in NEPA and in the Magnuson-Stevens Act. An EIS must "provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 CFR § 1502.1. Fishery Management Plans ("FMPs") must demonstrate that "the best available scientific information was used in the description and identification of EFH." 50 CFR § 600.815(a)(1)(ii). In addition, Fishery Management Councils are directed to "interpret this information in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." *Id.* at § 600.815(a)(1)(iv). The one-sided discussion on DEIS p. 4-13 fails to achieve this purpose.

2. DEIS, pp. i to ii, 1-3

The DEIS states that "the Council and NMFS have not had the tools to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decisionmaking. . . . *An overriding problem has been the challenge of managing fisheries with limited scientific data.* This increases the risk that decisions exacerbate the kinds of fishery- and stock-related problems just identified" (emphasis added). Thus, the DEIS recognizes the risk inherent in managing the Pacific groundfish fishery with limited data, and relies on conservative assumptions throughout the document to address this uncertainty. This approach is consistent with the requirement that identification of EFH must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and that this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). The document fails to take this approach in only one case – the analysis of alternative B.8. In that case alone, the "lack of conclusive research" is cited as an objection to HAPC designation (DEIS, p. 4-13). On the contrary, under the risk-averse analytical approach used in the rest of the document and required by EFH regulations, any scientific uncertainties should be a basis for conservative assumptions in favor of protecting platform reefs that provide existing habitat utilized by groundfish species.

3. DEIS, p. 2-1

The DEIS states that:

> In order to satisfy this requirement [to identify a preferred alternative or alternatives] in a way that fosters public input and informed decisionmaking, the Council chose preliminary preferred alternatives for EFH identification and description, HAPCs, and fishing impact minimization measures at their November 2004 meeting. They explicitly construed this choice as preliminary—they intend to revisit their decision at the June 2005 meeting, after the public comment on the DEIS has been received, to further refine their choice of a comprehensive preferred alternative. After the June 2005 Council meeting, NMFS will publish a final EIS (FEIS), which will identify these final preferred alternatives.

The DEIS does not explain why certain alternatives were designated as preferred. The Final EIS must describe the criteria used to identify preferred alternatives and must explain how the final preferred alternatives meet the criteria, as well as why rejected alternatives are rejected As noted above, one criterion that should be used to identify preferred alternatives is to interpret the best scientific available information "in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." 50 CFR § 600.815(a)(1)(iv).

4. DEIS, p. 2-1

During the November 2004 Council meeting, Council members raised some concerns which appeared to bear on the decision whether to designate Alternative B.8 as a preferred alternative. To the extent that those concerns may be considered in evaluating the alternative, they should be disclosed to the public readers of the EIS and addressed in its analysis. First, a concern was raised by one Council member about the "questionable motives" of those who advocate designating platform reefs as HAPC. It is unclear what motives the Council member was referring to. As a general matter, however, the Magnuson-Stevens Act balances a variety of interests, including commercial, recreational and environmental interests, in the management of U.S. fisheries. Commenters are entitled to present their views in order to inform fisheries management decisions and the analysis of environmental consequences. Moreover, under NEPA, the "motives" of any commenter on an EIS are irrelevant. The only relevant issue is whether a suggested course of action conserves and enhances EFH and assists in the recovery of fish populations.

5. DEIS, p. 2-1

Second, concerns were raised during the Council meeting that designating platform reefs as HAPC would set a precedent that would allow discarded articles, such as furniture, oil cans and sunken boats to be left in the ocean as artificial reefs. This is not the case. In the past, some artificial reef projects may have been used to justify solid waste disposal with harmful environmental consequences. However, such actions would not be permissible today under the extensive laws and regulations that govern the construction, siting and placement of artificial reefs. Congress passed the National Fishing Enhancement Act ("NFEA") (33 U.S.C. §§ 2101 *et seq.*) in 1984. The NFEA established national standards for artificial reef development, one of which is to "minimize environmental risks and risks to personal health and property." *Id.* at § 2102(4). The NFEA directed NOAA to create a National Artificial Reef Plan ("NARP") (*id.* at § 2103) and authorized the U.S. Army Corps of Engineers ("Corps") to issue permits for artificial reefs (*id.* at § 2104; *see also* 33 CFR § 322.5(b)). The NARP and the Corps' regulations establish guidelines for siting, materials, design, construction, management and liability, among others. In particular, the NARP provides that materials proposed for artificial reefs must be of proven stable design. Furthermore, the proposed revision of the NARP (Feb. 2002) states that secondary use materials that have generally been found to be unsuitable artificial reef materials include light vehicle bodies, fiberglass boats and boat molds and light gauge metal items such as refrigerators, washing machines, and clothes dryers. Both of these guidelines would prohibit designating discarded junk as artificial reefs. Moreover, state and federal natural resource agencies, the Council, NMFS, and the public all participate in the artificial reef permitting process, which ensures that only appropriate materials will be utilized. Finally, artificial reef permits issued by the Corps are subject to environmental review under NEPA, which further ensures that the concerns about the suitability of a particular material will be addressed.[2]

---

[2] California also has an artificial reef program. Cal. Fish & Game Code §§ 6420-6425. Under California's program, the Department of Fish and Game has authority over the design, placement and monitoring of artificial reefs within state waters. Approximately 34 artificial reefs have been constructed along the California coast under

6. DEIS, p. 2-1

A third concern raised during the Council's consideration of Alternative B.8 was whether "man-made" habitat should be preferred over "natural" habitat in EFH and HAPC designations. The EFH regulations do not draw this distinction. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 50 CFR § 600.10. Substrate "includes sediment, hard bottom, **structures underlying the waters**, and associated biological communities." *Id.* (emphasis added). "Structures underlying the waters" means artificial (i.e., man-made) structures. NMFS added artificial structures to the definition of substrate in 1997. *See* Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 62 Fed. Reg. 66531 (Dec. 19, 1997) (interim final rule). In response to commenters that objected to the inclusion of artificial structures in the definition of substrate, NMFS stated that it:

> included "structures underlying the waters" in its interpretation of substrate to clarify that structures such as artificial reefs, jetties and shipwrecks may be considered EFH if they provide essential habitat for a managed species.

Id. at 66534. In 2002, when NMFS revised the EFH regulations, similar objections regarding the inclusion of artificial structures in the definition of EFH were raised, to which NMFS responded that it was "not modifying the interpretation of 'substrate' to exclude human made structures, because in some cases such structures can provide valuable habitat for managed species." Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 67 Fed. Reg. 2343, 2347 (Jan. 17, 2002) (preamble to final rule). Accordingly, NMFS has made it clear that artificial structures qualify as EFH. Nothing in the definition of HAPC is to the contrary. To the extent that the habitat characteristics of platform reefs qualify them as HAPC, the fact that they are artificial in origin must be considered irrelevant. Conversely, to reject platform reefs as HAPC for the reason that they are artificial would be inconsistent with the EFH regulations and the purposes of the Magnuson-Stevens Act. If the Council finds it necessary to prioritize, it should place the highest priority on those alternatives with the highest probability of achieving the fisheries management goals of the Act.

7. DEIS, p. iv, 2-6

It appears, based on Figure 2-6, that Alternative A.6, which would identify EFH as the upper 30 percent of the area where the Habitat Suitability Probability ("HSP") is greater than zero for all species, would exclude some of the 27 platform reefs off the California coast from the EFH area. However, there is not enough information in the text of the DEIS or in Figure 2-6 to determine whether or which platform reefs may be excluded from the area identified as EFH under Alternative A.6. In order to fully inform the decisionmakers and the public of the alternatives being considered, the DEIS should clearly state which platform reefs would be included in and excluded from the area identified as EFH under Alternative A.6. If the result of Alternative A.6 would be to eliminate some platform reefs from the EFH category – some of which support dense populations of groundfish as even the DEIS acknowledges (pp. 2-10, 3-8 to 3-10) – this

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the state program. Some of these artificial reefs were built before the NARP was adopted, however the recently constructed artificial reefs were built in accordance with NARP guidelines.

consequence should be recognized in the DEIS analysis as an adverse environmental consequence of Alternative A.6.

For this reason, as noted above, CARE urges that Alternative A.6 should not be adopted in its present form. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain platform reefs as EFH that are outside the current range of Alternative A.6.

8. DEIS, p. 2-10.

In the description of Alternative B.8, the DEIS notes that: "High concentrations of groundfish have been observed in association with many of the platforms off the California coast, including overfished species such as bocaccio and cowcod." For this reason, and as discussed below, identifying platform reefs as EFH and designating them as HAPC should be part of the comprehensive strategy to conserve and enhance EFH.

9. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS states that: "In addition to providing suitable habitat, most of these structures are not fished and act as de facto reserves." The scientific literature cited in Chapter 3 of the DEIS that supports this statement has been confirmed by more recent research. Love et al. (2003) (Exhibit 1) found that fishing pressure around most platforms has been minimal, in part due to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. The same fact is documented by the U.S. Environmental Protection Agency ("USEPA") Essential Fish Habitat Assessment for NPDES Permit No. CA 2800000 (2000, pp. 5-2 to 5-3) (Exhibit 2). Further, the physical structure of oil platforms significantly restricts the use of both commercial and recreational gear to fish the resident fish populations.

10. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS briefly acknowledges that: "The platforms rise steeply from the bottom and provide unique high relief habitat." The "uniqueness" of the platform reef habitat should be emphasized, given that "rarity of the habitat type" is one of the factors to be considered in designating HAPC. 50 CFR § 600.815(a)(8)(iv). As the DEIS acknowledges, the latticework of footers and crossbars that comprise the underwater features of platform reefs provide unique high relief habitat. Pinnacle reefs are the only natural formations that provide a similar type of high relief habitat. However, natural pinnacle reefs are very rare off of the California coast, with only one such reef located in the Santa Barbara Channel (Love, personal communication). The DEIS (p. 3-9) also notes that pinnacles are only found on the outer continental shelf, well away from the mainland. Consequently, the majority of this rare type of habitat is provided by platform reefs. In addition, as discussed in these comments, platform reefs provide hard bottom habitat that is rare in the areas in which the platform reefs are located. These facts must be considered in evaluating the environmental consequences of designating platform reefs as HAPC and provide support for the environmental benefits of Alternative B.8.

11. DEIS, p. 2-10

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(i), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(i) provides that one criterion for designating HAPC is the importance of the ecological function provided by the habitat. The DEIS correctly notes on page 2-10 that high concentrations of groundfish species, including overfished bocaccio and cowcod, have been observed associated with many platform reefs. However, this brief statement fails to adequately address and inform the reader of the variety and importance of the ecological functions that platform reefs provide. As discussed in section 3.2.2.2.4 of the DEIS (pp. 3-8 to 3-10) and in the additional scientific information discussed and cited in these comments:

(i) platform reefs provide habitat for different life stages of rockfish (i.e., larvae, juveniles, adults) (Love 2000) (Exhibit 3), (Love 2001) (Exhibit 4), (Love 2003), (Love 2005) (Exhibit 5);
(ii) different life stages of the same species inhabit different depths along the platform reef (i.e., adults inhabit the deep waters and juveniles inhabit the midwaters), thereby reducing predation by adults on juveniles (Love 2003);
(iii) platform reefs create hard bottom habitat (via the lattice-work of legs and cross members) in areas that are primarily soft bottom habitat (Love 2003);
(iv) each platform reef creates a variety of habitat (again, via the lattice-work of legs and cross members) (Love 2003);
(v) because platform reefs have more adults in higher densities than natural reefs, they produce a disproportionate share of larvae in the region (Love 2003; Love 2005);
(vi) platform reefs recruit larval fish, which grow into juveniles that live in the midwaters and are found in greater densities than at natural reefs (Love 2003; Love 2005);
(vii) platform reefs recruit larval fish that would otherwise have perished in the absence of the platform reef (Love 2005);
(viii) juveniles living at platform reefs may grow to adulthood and remain there throughout their lives (Love 2003); and
(ix) a survey of six platform reefs revealed that approximately 20 percent of all bocaccio young-of-the-year in the Pacific Coast Groundfish fishery are found there (Love 2005).

Clearly, the platform reefs provide important ecological functions that must be addressed in the environmental consequences analysis of the Final EIS, and provide support for the environmental benefits of Alternative B.8.

12. DEIS, p. 2-10.

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(iii), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(iii) provides that another criterion for designating HAPC is whether and to what extent development activities are, or will be, stressing the habitat type. The brief discussion on page 2-10 of the DEIS does not mention the fact that the current platform decommissioning regulations require complete removal of the platforms. However, as the DEIS correctly notes in section 4.3.3 (p. 4-13), "Oil platforms are subject to removal from the ocean as they are decommissioned." In fact, Gebauer et al. (2004) (Exhibit 6) estimates that removal of the oil platforms located in federal waters along the California coast will begin in 2010 and be completed by 2025. Complete removal of the oil and gas platforms will eliminate the groundfish habitat that the underwater platform reef portions provide. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(iii).

13. DEIS, p. 2-10

The Final EIS should also explain that Alternative B.8 is consistent with the HAPC criterion in 50 CFR § 600.815(a)(8)(ii) ("The extent to which the habitat is sensitive to human-induced environmental degradation"). The habitat created by the platform reefs off of the coast of California is dependent on the platforms' presence and subject to elimination if they are removed under platform decommissioning regulations. As such, the platform reefs are sensitive to human-induced environmental degradation by removal of the structures. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(ii).

14. DEIS, p. 3-8

The DEIS states that: "Managed species known to use offshore artificial structures include black rockfish, black-and-yellow rockfish, blue rockfish, bocaccio, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, copper rockfish, cowcod, darkblotched rockfish, flag rockfish, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, kelp rockfish, leopard shark, Mexican rockfish, olive rockfish, quillback rockfish, rosy rockfish, sharpchin rockfish, starry rockfish, stripetail rockfish, treefish, vermilion rockfish, yelloweye rockfish, and yellowtail rockfish."

This list of 31 managed species understates the number of rockfish that use platform reefs as habitat. Based on annual surveys dating back to 1995, 42 species of rockfish have been identified as living around platform reefs. (Love et al. 2003; M. Love, personal communication.) The DEIS's understatement of the number of managed species that utilize platform reefs as habitat reflects the failure to rely on the best available scientific information on the habitat value of platform reefs.

15. DEIS, p. 3-8

The DEIS's discussion of the habitat value of platform reefs is based exclusively on *The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California* (OCS Study MMS 99-0015) ("1999 MMS Report").[3] Several important scientific studies of the habitat value provided by platform reefs located off of California have

[3] The 1999 MMS Report is not listed as a reference in Chapter 10, "Literature Cited." It should be added.

been published since the 1999 MMS Report, including: Love et al. (1999) (Exhibit 7); Love et al. (2000); Love et al. (2001); Love et al. (2003). In addition, Love (2005) summarizes several articles that are based on his latest research, which have been submitted for publication in scientific journals.

In particular, in September 2004, Love (2005) surveyed the largest number of platform reefs since 1999. Love conducted complete surveys of platforms Irene, Hidalgo, Harvest, Hermosa, Hondo (first time), Heritage (first time), Holly, Gail, Grace, and Gilda. In addition, Love conducted midwater surveys at platforms C, B, A, Hillhouse, Henry, and Habitat (complete surveys were hindered due to poor water visibility). Love also surveyed a number of natural reefs (some first mapped in spring 2004) in the Santa Barbara Channel and around the northern Channel Islands. Love's research confirms that many platform reefs harbor higher densities of both juvenile and adult fishes than do most natural reefs. Moreover, new seafloor maps produced in 2004 by the U.S. Geological Survey demonstrate that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. These studies corroborate the 1999 MMS Study and provide important additional evidence that platform reefs provide EFH for rockfish, and that platform reefs should be designated as HAPC. Love's research continues to demonstrate the importance of the Santa Barbara Channel platform reefs as providers of habitat for reef fishes. The DEIS again fails to present the best available scientific information on pp. 3-8 to 3-10, and disregards the breadth and depth of this research in concluding that there is a "lack of conclusive research regarding these issues specifically for the West Coast. . ." (p. 4-13).

16. DEIS, p. 4-13

The DEIS states that:

> One view holds that scientific research indicating an abundance of fish species located at oil rig platforms is a benefit to the ecosystem. Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications).

The citation of Holbrook et al. (2000) is out of date. More recent research has addressed a number of the uncertainties that existed at the time that the Holbrook paper was written. The Final EIS must present a more up-to-date and accurate picture of the available scientific evidence. Moreover, the manner in which the DEIS frames the issue — i.e., platform reefs either increase fish productivity **<u>or</u>** attract fish populations away from natural reef systems — misleads the public and decisionmakers. Current research (summarized in the following comment) demonstrates that platform reefs have both effects — i.e., that platform reefs are important habitat for rockfish and function just as natural reefs do, in that they both produce and attract fish depending on species, site, season and ocean conditions. The DEIS, relying on the outdated reference to Holbrook et al., wholly fails to take into account these crucial findings in discussing the environmental consequences of Alternative B.8.

17. DEIS, p. 4-13

The Final EIS must consider the following current research results:

17(a). Love et al. (2003) found young-of-the-year rockfishes around platform reefs and around natural outcrops. His research indicated that the recruitment of juvenile fishes to platform reefs that are far from shore or in deep waters, such as Platforms Gail and Grace, is from maternal sources rather than attraction from natural outcrops. Platform reefs located nearer to shore or in shallow waters may attract juveniles from natural habitats because these platform reefs are located in areas in which it is relatively easier for juveniles to move between habitats. However, the converse is also true: juveniles may be attracted from platform reefs to natural habitats. One important difference, however, is the higher densities of young-of-the-year rockfishes found at platform reefs. Love et al. (2003) concluded that platform reefs provide a more optimal habitat than found on natural outcrops, making platform reefs functionally more important as nurseries.

17(b). Love et al. (2003) also found adult rockfishes around platform reefs and around natural outcrops. As with juveniles, adult rockfish found at platform reefs located far offshore or in deep waters likely arrived through recruitment rather than attraction. This research suggests that rockfishes may live their entire benthic lives around a single platform reef. Thus, the adult rockfishes at platform reefs result from maturation of resident fish rather than through the attraction of adults from natural outcrops. One important difference, however, is the higher densities of adult rockfishes found at platform reefs. The difference is so pronounced that, in some locations, platform reefs provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production. (Love et al., 2003).

17(c). More recent research on the growth rate of young blue rockfish living around platform reefs demonstrates that they grow faster than fishes living around natural reefs in the same area (Love, 2005). Related research by Love (2005) indicates that platform reefs are more important producers of bocaccio and cowcod larva than natural habitat. Love's research demonstrates that mean densities for both species are higher at platform reefs than at natural reefs, and in some cases, the adult fishes at platform reefs are larger than those found at natural reefs. In particular, Platform Gail had the highest densities of mature bocaccio and cowcod of any natural or man-made habitat surveyed. Thus, the potential larval production at Platform Gail was much higher than any other site surveyed. Love estimated that for bocaccio one hectare of sea floor at that platform reef was equivalent to 68 hectares at an average natural reef, and for cowcod one platform reef hectare was equivalent to 26 hectares at an average natural reef.

17(d). Love (2005) also found that the number of juvenile bocaccio found around six platforms in the Santa Barbara Channel constituted 20 percent of the average number of juvenile bocaccio that survive in a year for the species' entire range. He determined that, when adults, these bocaccio will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. His research demonstrates that, although platform reefs provide a relatively small amount of habitat area, this habitat can be crucial for rebuilding an overfished species.

17(e). Furthermore, recent research by Love (2005) indicates that platform reefs recruit larva that would not have survived were the platform reefs not there. By simulating surface currents in 1999 and 2002 originating at Platform Irene to model juvenile bocaccio distribution patterns, Love estimated the proportion of fish recruited to a platform reef that would have arrived at natural juvenile fish habitat in the absence of the platform. Love's results indicated that that seven percent and 23 percent, respectively, of young bocaccio would have survived to reach natural nursery habitat. In other words, the vast majority of young bocaccio would not have survived if they had been unable to settle on the platform reef during the recruitment season.

17(f). The research discussed above demonstrates that platform reefs perform much like natural outcrops, in that both produce and attract rockfishes. However, there is a difference in scale favoring platform reefs, which indicates that some platform reefs are important to regional rockfish production. (Love et al., 2003; Love, 2005.) This ecological role is of significant value especially to the recovery of the many overfished rockfish species that populate the platform reefs, such as bocaccio and cowcod.

17(g) Removal of oil and gas platforms is typically carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000) (Exhibit 8). As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003; Love 2005.)

In sum, the uncertainty as to the habitat value of platform reefs discussed in Holbrook (2000) has been rebutted by more recent research. Given the directive by the EFH regulations to interpret the best available scientific information in a risk-averse manner (50 CFR § 600.815(a)(1)(i) & (iv)), the Final EIS should rely on the most up-to-date research in order to evaluate environmental consequences, and should consider each of the above findings.

18. DEIS, p. 4-13

The DEIS states that: "Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications)." The sources of these personal communications are identified in the "Literature Cited" section (DEIS p. 10-3) as Warner Chabot, affiliated with the Ocean Conservancy, and Richard Charter, affiliated with Environmental Defense. It appears that these personal communications relied solely on Holbrook (2000) which, as explained above, is out of date, to support their assertions. To the extent that the Final EIS relies on these personal communications, it should explain the qualifications of the persons cited and identify any supporting evidence for their statements.

19. DEIS, p. 4-13

The DEIS states that: "Other noted drawbacks to oil platforms HAPC designation include avoidance of returning the area under and around the platform to natural habitat that provide hiding places for rockfish, the potential for these sites to attract increased effort by fishermen and increased predators resulting in increased net mortality, and the potential for the oil platforms to be a hazard to navigation (Charter 2004, personal communication). No scientific evidence is cited as a basis for these assertions, which appear to be unsupported speculations. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement.

20. DEIS, p. 4-13

The speculation that HAPC designation would prevent the restoration of soft-bottom hiding places for rockfish is contradicted by the best available scientific evidence. The soft-bottom habitat under and around the platform reefs is virtually devoid of hiding places. (Love 2005.) The only hiding places that exist are provided by the latticework of beams and cross members that make up the platform reef structure. Moreover, returning the area under and around platform reefs to soft-bottom habitat will require the destruction of existing hiding places and thriving habitat and kill large numbers of the resident fish. (Gitschlag et al., 2000.) The alternative that would enhance hiding places for rockfish is designating platform reefs as HAPC.

21. DEIS, p. 4-13

Regarding the claim that platform reefs could "attract increased effort by fishermen. . . resulting in increased net mortality (DEIS, p. 4-13): As the DEIS acknowledges, and as corroborated by Love (2003) and USEPA (2000), platform reefs are not currently heavily fished and, in fact, act as de facto marine refuges. This is due in part to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. In addition, the physical structure significantly restricts the use of both commercial and recreational fishing gear to fish the resident species. Designation of platform reefs as HAPC will not change the Coast Guard's regulation of navigation near the platform reefs nor will the designation alter the physical structure of platform reefs (i.e., large fishing boats will still find it difficult to navigate near them). Accordingly, designation of platform reefs as HAPC will not result in increased effort by fishermen.

22. DEIS, p. 4-13

Regarding the claim that platform reefs could attract "increased predators resulting in increased net mortality" (DEIS, p. 4-13), available scientific evidence suggests that the predation of young fishes on platform reefs is probably lower than that on natural outcrops. This is due to the fact that platform reefs occupy the entire water column and that the fish assemblages are distributed differently than on most natural outcrops. Natural outcrops in the area of platform reefs are typically 5 to 15 feet in height, putting all fish, both young and adults in close proximity. Adults prey on young fish. On platform reefs, the adult fishes are found near the bottom while young fishes occupy the midwaters. This separation implies lower mortality rates for young fishes residing at platform reefs. (Love 2003.) Further, other natural predators, such as pinnipeds, do not appear to be attracted to platform reefs. (Love 2005, personal communication.) The DEIS identifies no evidence to the contradict these observations.

23. DEIS, p. 4-13

Finally, regarding the claim that platform reefs have "the potential to be a hazard to navigation" (DEIS, p. 4-13), the U.S. Coast Guard is responsible for maritime safety in the navigable waters of the U.S. where the platform reefs are located. It has established requirements for all oil and gas platforms regarding the operation and maintenance of aids to navigation and other measures to insure marine safety. No vessel operator has lodged a formal complaint that any oil and gas platforms off of California created a navigation hazard (Boyes, personal communication). Similarly, no hazard complaints have been lodged by vessel operators regarding oil and gas platforms or artificial reefs in the Gulf of Mexico, where many platforms have been turned into artificial reefs. (Kasprzak 2005, personal communication; Boyes 2005, personal communication.) Mr. Kasprzak (Artificial Reef Coordinator, Louisiana Department of Fish and Wildlife, Baton Rouge, Louisiana) and Mr. Boyes (Waterways Management Officer, U.S. Coast Guard, District Eleven) are well-qualified to attest to these facts. The U.S. Coast Guard's regulatory oversight will not be affected by the designation of these platform reefs as HAPC. Thus, there is no basis to the claim that HAPC designation will cause the platform reefs to become a hazard to navigation or adversely affect marine safety.

24. DEIS, p. 4-13

The DEIS states that:

> Another potential drawback that has been of particular concern in the Gulf of Mexico is the relatively high levels of mercury contamination around oil platforms. The disposal of drilling fluids containing mercury from operational oil rigs has resulted in concerns that mercury levels in fish caught near oil platforms, even years after the oil rig is no longer operational, are substantially higher than those caught elsewhere and could be a hazard to humans (Charter 2004, personal communication).

No scientific evidence is cited as a basis for these assertions. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement. The Department of the Interior, Minerals Management Service ("MMS"), has studied the issue of mercury contamination from drilling muds in the Gulf of Mexico and reached the opposite conclusion. As the MMS states on its website: "While the issue of mercury in seafood in the Gulf of Mexico is the subject of an increasing amount of research particularly because of global and regional inputs, the results of research to date generally supports the conclusion that oil and gas platforms do not play a significant role in elevating levels of mercury in fish and other seafood." (See:

http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html). The MMS bases its conclusion, in part, on the following studies:

24(a). In 1995, a study of three OCS oil and gas platforms included the analyses of over 700 sediment samples and over 800 tissue samples from shrimp, crabs, marine worms, clams, fish livers, and fish stomach contents. Results of the analyses documented that total mercury is not concentrated to any greater extent in organisms living near the oil and gas platforms (less than 100 meters away) when compared to those living far away from the oil and gas platforms (over 3000 meters). From these results the scientists concluded that oil and gas platforms do not contribute to higher mercury levels in marine organisms. (Kennicutt, 1996) (Exhibit 9).

24(b). In 2002, a total of 196 sediment samples were taken from six drilling sites in the Gulf of Mexico and analyzed to determine if methyl mercury (MeHg) was being produced in the sediment around drilling platforms. The results showed that concentrations of MeHg in sediments around drilling platforms do not vary significantly with concentrations found at sites that were far from drilling. The report concluded that elevated levels of MeHg around oil and gas platforms are not a widespread phenomenon in the Gulf of Mexico. (Trefry, 2002) (Exhibit 10).

24(c). The MMS Subcommittee on Mercury in the Gulf of Mexico ("MMS Subcommittee") corroborated these findings. (Creselius et al., 2002) (Exhibit 11). The MMS Subcommittee was established to independently evaluate existing scientific literature on whether OCS oil and gas activities were causing mercury pollution in the Gulf, and provide guidance as to what actions MMS should take. The MMS Subcommittee determined that high levels of total mercury around oil and gas drilling sites was directly correlated with the drilling mud weighting agent barite. However, the increase in sediment concentrations of MeHg at or adjacent to OCS oil and gas drilling sites is not directly attributable to mercury introduced with barite. Further, the MMS Subcommittee determined that the discharges at OCS oil and gas drilling sites do not create conditions that enhance the conversion of mercury to MeHg.

24(d). An additional study is currently being conducted by the Battelle Marine Sciences Laboratory to determine if barite (the source of mercury in drilling muds) is soluble in the stomach of marine animals and if trace metals are released. Preliminary results indicate that barite is only minimally soluble and that mercury is not bioavailable to marine animals. (Cimato 2005, personal communication.)

Accordingly, the available scientific evidence does not support a high level of concern regarding mercury levels. In order to provide complete and accurate information to the public and decision-makers, each of these studies should be considered in the discussion of mercury issue in the Final EIS.

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Because the exhibits attached to this document are for the most part available as published documents they have not been included in the briefing materials. The exception is **Exhibit 5**:

Love, M.S. 2005. The ecological role of natural reefs and oil and gas production platforms on rocky reef fishes in southern California. Summary of research and project proposal. Santa Barbara, California.

PROJECT TITLE: The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California

START DATE: 06/01/05 **END DATE**: 12/31/06

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1. PROJECT DESCRIPTION

In 1995, the USGS/BRD initiated cooperative research with the University of California at Santa Barbara (UCSB) to conduct research to address a critical marine resource management issue defined by the Minerals Management Service (MMS). MMS requested that the DOI's National Biological Survey (now U. S. Geological Survey/Biological Resources Division, USGS/BRD) conduct a study to address the need to understand how offshore oil/gas platforms contributed to the fish populations and fishery productivity in the Santa Maria Basin and Santa Barbara Channel. In 2000, the California Artificial Reef Enhancement (CARE) program began to contribute a substantial portion of the research funds devoted to this project.

The on-going research has involved broad scale sampling at numerous oil/gas platforms and natural reefs. The research has been coordinated with researchers and managers of the National Oceanic and Atmospheric Administration's National Ocean Service (Channel Island Marine Sanctuary), National Marine Fisheries Service, California Sea Grant Program, California Department of Fish and Game, and various other state agencies involved in fisheries management and conservation biology.

During the course of this study, much of our research has focused on: 1) characterizing the fish assemblages around platforms and natural reefs; 2) examining how oceanography affects patterns of recruitment and community structure of reef fishes; 3) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types (e. g., platforms and natural reefs).

From these studies, it is clear that platforms harbor a wide range of fishes and fish assemblages. However, as noted in "Ecological Issues Related to Decommissioning of California's Offshore Production Platforms" (Holbrook et al. 2000) "to best evaluate decommissioning alternatives one would need several other types of information that address (1) spatial and temporal patterns of distribution and abundance of reef-associated species in different parts of the Southern California Bight, including on natural reefs and associated with platforms, (2) distribution, abundance and quality of natural hard substrate in the area, and (3) physical oceanographic data to identify patterns of water circulation off the coast of California, coupled with estimates of populations connectivity for species of interest."

Beginning in 2003, we have integrated this report's recommendations, along with the needs expressed by both BRD and MMS, into our research plans. This year's research, described in Sections 4 and 5, will compliment and build upon our previous studies.

2. ACHIEVEMENTS IN 2004

A. Scientific Research

1) Platform and Natural Reef Surveys – In September 2004, with funding from MMS and CARE, we were able to survey the largest number of platforms since 1999. Complete surveys, including mussel mounds, were conducted at platforms Irene, Hidalgo, Harvest, Hermosa, Hondo (first time), Heritage (first time), Holly, Gail, Grace, and Gilda. Due to poor water visibility, only midwater surveys were conducted at platforms C, B, A, Hillhouse, Henry, and Habitat. In addition, we surveyed a number of natural reefs (some first mapped in spring 2004) in the Santa Barbara Channel and (with additional funding from the Channel Islands National Marine Sanctuary) around the northern Channel Islands.

Once again, we have found that many platforms harbor higher densities of both juvenile and adult fishes than do most natural reefs. In particular, the new seafloor maps produced by the USGS (see 3A) and partially ground-truthed by us demonstrated that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. Thus, our research continues to demonstrate the importance of the Santa Barbara Channel platforms as providers of habitat for reef fishes.

2) Research on Recruitment of Young-of-the-Year Rockfishes to Platforms – In the spring and summer of 2004 (funded by MMS and CARE), we conducted intensive diver surveys of platforms Gail and Gilda, documenting the young fishes that recruited out of the plankton to these structures. At the same time, we determined both surface and midwater current patterns, to determine the current patterns that lead to the large numbers of young rockfishes we saw. In this way, we are attempting to understand why platforms are often so heavily populated by young rockfishes.

B. Scientific Publications Submitted, In Press, Or In Preparation

1) *The Unexpected Utility of Offshore Marine Structures in Rebuilding an Overfished Species*

The bocaccio (*Sebastes paucispinis*) is an historically important rockfish species, found on the West Coast of North America, that through overfishing has been reduced to about 7.4% of its unfished population. Based on our surveys, we estimated that there was a minimum of 433,682 juvenile bocaccio around the six platforms we surveyed in the Santa Barbara Channel. With assistance from NOAA Fisheries, we determined that this number of juvenile bocaccio is about 20% of the average number of juvenile bocaccio that survive in a year for the species' entire range (over 4,000 km of North American coastline) and, when adults, will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. This research demonstrates, for the first time, that a small amount of artificial nursery habitat placed in the ocean may be quite valuable in rebuilding an overfished species.

Status: We submitted this important research to the biological journal Canadian Journal of Fisheries and Aquatic Sciences. The findings in this paper were sufficiently surprising that we been asked to rewrite the paper, adding additional data to bolster our case. This paper is being revised and will be resubmitted to that journal.

2) *Comparing Potential Larval Production of Bocaccio* (Sebastes paucispinis*) and Cowcod* (Sebastes levis*) around Oil Platforms and Natural Outcrops off California*

There is increasing evidence that some central and southern California oil platforms form important habitats for a number of economically important fishes. Given the overfished status of several of these species, we asked to what extent might platforms be important as producers of larvae of these species on a local, or even regional, basis. We conducted a pilot study that focused on bocaccio (*Sebastes paucispinis* Ayres, 1854) and cowcod (*S. levis* Eigenmann and Eigenmann, 1889), two overfished species, comparing adult densities and potential larval export of these species at platforms and natural outcrops in central and southern California. Densities of mature bocaccio and cowcod were highly variable among survey sites, but were generally very low at both natural reefs and platform habitats. However, the mean densities for both species around platforms were higher than at natural reefs. In addition, two of the three platforms (Gail and Hidalgo) that harbored mature bocaccio had larger mature individuals than did any natural reef. Platform Gail had by far the highest densities of both mature bocaccio and cowcod of any natural or human-made habitat. Because of these very high densities, the potential larval production of both species at Platform Gail was much higher than at any other site surveyed. We estimated that for bocaccio one hectare of sea floor at that platform was equivalent to 68 hectares at an average natural reef and for cowcod one platform hectare was equivalent to 26 at the average natural reef.

Status: Submitted to Bulletin of Marine Science

3) *A comparison of the Fish Assemblages Associated with an Oil/Gas Pipeline and Adjacent Seafloor in the Santa Barbara Channel, Southern California Bight.*

This paper summarizes our comparisons of the fishes that live on the platform Gail-Grace pipeline and the surrounding seafloor. Based on differences in fish assemblages, we found there were four habitats (shallow and deep pipeline and shallow and deep seafloor). Fish densities along the shallow portion of the pipeline were about seven times higher than on the adjacent seafloor and densities along the deep pipeline portion were nearly six times that of the deeper seafloor. Along the pipeline, rockfishes comprised 84% of the fishes and included 22 species. Unidentified sanddabs (probably most or all *Citharichthys sordidus*), forming 33.2%, and combfishes (*Zaniolepis frenata* and *Z. latipinnis*), comprising 19% of the total, were most often observed on the seafloor. Most of the fishes living on the pipeline were either juveniles of such larger species, such as blackgill, flag, and vermilion rockfishes, cowcod, and lingcod or dwarf species such as halfbanded and stripetail rockfishes, combfishes, and poachers (Family Agonidae), Of particular interest were the relatively high densities of juvenile cowcod along the deeper parts of the pipeline, densities that were far higher than any seen at over 80 natural outcrops and at ten platforms.

Status: Bulletin of Marine Science, in press.

4) *Do Oil and Gas Platforms off California Affect the Fate of Recruiting Bocaccio* (Sebastes paucispinis)*? An Analysis Based On High Frequency Radar Derived Surface Trajectories.*

Among some environmentalists, there is a concern that recruitment of high densities of many species of juvenile rockfishes (*Sebastes* spp.) from the plankton to some oil and gas platforms off southern and central California may reduce recruitment at natural nursery habitat. To investigate the likelihood of a platform interfering with the transport of recruiting pelagic juvenile fishes to natural nursery habitat, we estimated the proportion of fish recruiting to a platform that would arrive at natural juvenile habitat in the absence of that platform. In this study, we simulated the surface current movements originating at Platform Irene, located west of Point Conception, during the bocaccio (*Sebastes paucispinis*) recruiting seasons, May through August, of 1999 and 2002 using high frequency radar current measurements. Our results from 1999 and 2002 indicate that 7% and 23%, respectively, of the young fishes would have survived to shallow water natural nursery habitat. Thus, we predict that the vast majority of the juvenile bocaccio settling on the platform during the recruitment season would have perished if that structure did not exist. If this is correct, the platform helped produce bocaccio.

Status: Submitted to Fishery Bulletin

5) *The Role of Bottom Crossbeam Complexity in Influencing the Fish Assemblages at California Oil and Gas Platforms*

In this paper, we documented that many of the overfished and economically important fishes that live around oil platforms, such as bocaccio, cowcod, copper, greenblotched and vermilion rockfishes, were found most often where the bottom-most crossbeam (located at the seafloor) was present. In particular, a group of fishes (e. g., bocaccio, cowcod, blue and vermilion rockfishes) lived primarily where the crossbeam was undercut and formed a long crevice. This research suggests that enhancing the seafloor in and around decommissioned platforms with materials such as quarry rock or concrete will likely lead to higher densities of many economically important species.

Status: Submitted to Fishery Bulletin

6) *Growth Rates of Blue Rockfish at Three Platforms and Three Natural Reefs off California*

One of the issues confronting decommissioning authorities is the question of the "ecological performance" of the fishes living at platforms compared to the same species living on natural reefs. In other words, how "healthy" are fishes living at these human-made structures? In this study, we compared the daily growth rates of young blue rockfish (*Sebastes mystinus*) living around three platforms (Irene, Holly, and Gilda) and at three natural reefs in the same areas. In all instances, the fishes at the platforms grew faster than the fishes at the paired reefs.

Status: Report being prepared.

C. Presentations Regarding Platform Fish Ecology

Between March 2004 and January 2005, we gave presentations on fishes and platforms at the following meetings and to the following organizations: Centro de Investigacion Cientifica y de Educacion Superior Ensenada (CICESE), Ensenada, Mexico; Friends of Moss Landing, Moss Landing, California; University of Alaska, Juneau; Plains Oil Company.

3. CONCURRENT PLATFORM RESEARCH in 2004

Along with MMS and CARE-sponsored fish assemblage characterizations, we participated in the following platform-related research.

A. Sea floor mapping and characterization of the Santa Barbara Channel and Santa Maria Basin by USGS (MMS-Sponsored)

In 2004, Guy Cochrane of the U. S. Geological Survey conducted sea floor mapping of previously uncharacterized areas in the eastern Santa Barbara Channel. This research established that much of the sea floor in the Santa Barbara Channel is composed of soft sediments and bolsters the contention that platforms provide some of the only reef structure in the area.

B. Ecological Performance of OCS Platforms as Fish Habitat off California (MMS-Sponsored).

This MMS-funded program included the following tasks. 1) Estimating the potential annual production of larvae from reproductively mature cowcod and bocaccio at Platform Gail versus natural reefs (see paper #2 above). 2) Determining the growth rate of YOY rockfish that settle at platforms versus nearby natural reefs. 3) Estimating the survival and mortality rates of juvenile rockfish at platforms versus natural reefs.

C. Residence Time At Oil and Gas Offshore Platforms by Characteristic Fish Species (CARE and MMS-Sponsored)

This research, funded by MMS and CARE, will build on a pilot program conducted in 2002-2003. Dr. Chris Lowe, of Long Beach State University, will tag fishes with acoustic tags around Platform Gail and monitor their movements.

D. Fish Recruitment Processes at Platforms (MMS and CARE-sponsored)

In this study, funded by both MMS and CARE, we explored the processes that lead to successful settlement of rockfishes on platforms Gail and Gilda (see 2A2).

4. CONCURRENT PLATFORM RESEARCH 2005-2007

In addition to the CARE and MMS-sponsored surveys, the following platform-related research will occur in 2005.

A. Sea floor mapping and characterization of the Santa Barbara Channel and Santa Maria Basin (MMS-Sponsored)

In 2005, Guy Cochrane of the U. S. Geological Survey will continue to conduct sea floor mapping of previously uncharacterized areas in the eastern Santa Barbara Channel.

B. Investigation of Otolith Microchemical Signatures Specific to Fishes at Platforms (MMS-Sponsored).

This research, to be conducted between 2005 and 2007, will examine whether fishes living around platforms have a characteristic elemental "signature" in their ear bones. If a platform-dwelling fish does have this signature, it would remain in place even if that fish moved away from the platform to a natural reef. In essence, part of that fish's ear bone would have a permanent "tag", allowing researchers to trace the fish back to living around the platform.

C. Pollutant Body Burden of Fishes at Platforms and Natural Habitats (MMS-Sponsored)

A concern in the decommissioning process is the question of whether fishes living around platforms have higher levels of pollutants than those living in natural habitats. This research, to be conducted between 2005 and 2007, is intended to compare pollutant levels in fishes living around platforms and both over natural reefs and on soft sea floors.

D. Residence Time At Oil and Gas Offshore Platforms by Characteristic Fish Species

This research, funded by MMS and CARE, continues research begun in 2004. Dr. Chris Lowe, of Long Beach State University, intends to tag fishes with acoustic tags around platforms Grace and Gilda, monitor their movements and transfer some tagged fishes to natural reefs.

5. PROPOSED CARE-FUNDED RESEARCH FOR 2004-2005

This year, some of our most important platform-related work will center on several questions of direct importance to the issue of decommissioning.

A. What is the Relative Contribution of Platforms in Supplying Hard Substrate and Fishes to Regional Fish Populations?

Clearly, platforms harbor large numbers of both adults and juvenile fishes. But what is the relative importance of these platform fish communities in the context of their regions?

The most accurate way to gauge this contribution is to understand 1) the quantity of natural hard features and 2) the fish assemblages on these features, in the region around a platform. To accurately assess this, we have to have a good understanding of the amount of natural reefs in our area and, until 2004, this information was mostly lacking. However, as noted previously, in 2004 and continuing into 2005, Dr. Guy Cochrane of the USGS will map and characterize the sea floor habitat of much of the Santa Barbara Channel.

We will use this data to pinpoint new reefs for our fish surveys. These techniques will allow us to more accurately understand the contribution of a platform to the overall amount of rocky outcrops in the vicinity of the platform. In addition, this data will allow us to vastly expand our estimates of the contributions of platforms to the reproductive capacity of fishes in the region.

B. What is the fate of the 1999 rockfish year class at platforms and natural reefs in the Santa Barbara Channel and Santa Maria Basin using the *Delta* submersible?

In central and southern California, the La Nina conditions of 1999 lead to good survival of the larvae and young juveniles of a number of rockfish species. Specifically, using the *Delta* submersible, we saw large numbers of young bocaccio, flag, blue, olive, and widow rockfishes at some platforms. Densities of these rockfishes, particularly bocaccio and flag and widow rockfishes, were higher at some platforms than at any natural reef surveyed. From 2000 through 2003, we have revisited these platforms and observed high densities of 1999 year class fishes of the same species. Clearly, many of those rockfishes settling on the platforms in 1999 survived and were present through 2002. Some, such as bocaccio, have now spent all of their juvenile and parts of their adult lives around platforms, a good indication that some platforms are producing fish, rather than only attracting them.

By continuing our platform and natural reef surveys, we will learn more about the fate of these fishes. Will they remain around the platforms, ultimately maturing and reproducing? Will they move onto adjacent reefs? If either occurs, this will provide additional evidence that platforms produce fishes.

The Minerals Management Service is providing some funds for this research. However, as we have noted in the past, this is complex research and requires a considerable amount of data to arrive at defensible answers. In particular, it requires a relatively large number of surveys and, hence, a large number of submersible dive days. The MMS funding, while extremely useful, will not provide adequate funding for the needed dive days and personnel time. Thus, we are requesting funding from CARE to help us with these efforts.

6. BUDGET FY 2005-2006

A detailed budget is attached.

OCEANA | Protecting The World's Oceans

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June 3, 2005

Mr. D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0700

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. Lohn and Mr. Hansen:

As indicated by the tens of thousands of comments that inundated NOAA Fisheries supporting protection of living seafloor from bottom trawling, the eyes of the nation are on the Pacific Fishery Management Council as they deliberate the Pacific Groundfish Essential Fish Habitat Environmental Impact Statement (EFH EIS) decision that will determine the fate of the Pacific seafloor for the next decade or more.

As you know, Oceana has been actively engaged in the Pacific Groundfish EFH EIS process from the beginning. Using the law for direction, we used the best available science to design a practicable management alternative—Alternative C.12—that protects essential fish habitat while maintaining vibrant fisheries.

While we are encouraged by the amount of attention and discussion being generated by Alternative C.12, we are concerned that the basic premise of law and science used to develop this Oceana Approach is being lost in the mix. Specifically, the law requires that NOAA "minimize to the extent practicable the adverse effects of fishing on essential fish habitat." The court order requiring NOAA to prepare the Environmental Impact Statement at issue and fulfill this legal mandate noted: "There is no substantive discussion of how fishing practices and gear may damage corals, disrupt fish habitat, and destroy benthic life that helps support healthy fish populations." (District Court order at 41). The Council now has the opportunity—and the obligation—to satisfy these requirements.

During the period when this process has been unfolding, scientists from around the world, including the US National Academy of Sciences, have documented the importance of benthic habitat, including corals, sponges, and other living species, to healthy ocean ecosystems. They have also documented the threats bottom trawling poses for this living benthic habitat. Oceana submitted a detailed bibliography with hundreds of references as part of our public comments. Most recently, Collie et al (in press) state quite clearly "The direct effects of fishing on benthic habitats are generally well understood (NRC 2002). The main effect is the physical disturbance of benthic communities by trawls and dredges."

During this EFH EIS process, some in NOAA and others have chosen to emphasize gaps in empirical data and incomplete research. Some have even suggested that such gaps provide an argument for taking no action. A failure to act until every conceivable question has been answered would be a completely inappropriate response to incomplete information.

This question was explicitly addressed by a panel of scientists convened by the Center for Independent Experts, who evaluated similar issues faced by the North Pacific Fishery Management Council. They concluded that precaution is paramount—particularly when long-lived, slow-growing, fragile seafloor habitat is threatened with irreversible damage from bottom trawling. In their review, the Center for Independent Experts panel stated, "A **precautionary approach** needs to be applied to the evaluation of fishing effects on EFH. This is especially important given that many of the stock collapses or severe declines around the world could have been avoided or lessened by following a precautionary approach." (Summary Report, p. 21, emphasis added). This perspective was also endorsed in a letter signed by over 1,100 marine scientists from all over the world.

It is possible to have an EFH EIS management alternative that is precautionary, meets the concerns and recommendations of scientists from around the world, and results in little or no loss to the commercial fishing industry. Alternative C.12 fits all three of these criteria.

The Council's Scientific and Statistical Committee has called for more research and monitoring to be done to obtain more and better information for management. We could not agree more. All decisions should be based on the best scientific information currently available; collecting improved information allows the refinements that are the very heart of adaptive management. However, it does not preclude the responsibility to take immediate action given the information we have today.

A recent Scientific Consensus Statement on Marine Ecosystem-Based Management signed by over 200 US scientists and policy experts concluded: "Ecosystems can recover from many kinds of disturbance, but they are not infinitely resilient. There is often a threshold beyond which an altered ecosystem may not return to its previous state. The tipping point for these irreversible changes may be impossible to predict. Thus, increased levels of precaution are prudent as ecosystems are pushed further from the pre-existing states." (http://compassonline.org/?q=EBM) There can be no question that the Pacific ecosystem is far from a healthy state.

Marine habitats are valuable natural capital and are the foundation of healthy fisheries and marine ecosystems. Based on current scientific knowledge and the mandate of the Magnuson-Stevens Act, there are significant areas off the West Coast where destructive fishing gears should not be allowed. We can no longer make management decisions focusing only on a limited short-term view of economic efficiency. The long-term consequences to fishermen, the planet, and future generations must be a part of today's management.

NOAA and the Council have in front of them today a precautionary management approach that provides habitat protection, maintains vibrant fisheries, and allows for adaptive management. It would be irresponsible, if not illegal, to take no action to mitigate the destruction of bottom trawling on living seafloor habitat. The stakes are simply too high on the Pacific Coast to further delay responsible action to protect Essential Fish Habitat.

Very truly yours,

Michael F. Hirshfield, Ph.D.
Vice President, North America, and Chief Scientist

Jim Ayers
Director, Pacific Office

Daniel Pauly, Ph.D.
Member, Board of Directors
Chair, Science Advisory Board

SPORTFISHING ASSOCIATION OF CALIFORNIA

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ROBERT C. FLETCHER
PRESIDENT

W. A. NOTT
PRESIDENT-EMERITUS

June 1, 2005

RECEIVED
JUN 06 2005
PFMC

Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Subject: SAC comments on PFMC June meeting agenda item C3.

Dear Chairman Hansen:

The Sportfishing Association of California (SAC) thanks you for the opportunity to comment on the adoption of the final preferred alternative for the EIS for EFH Designation for the Groundfish FMP. SAC represents close to 175 commercial passenger fishing vessels (CPFVs) operating in southern California. SAC supports prudent and rational management to conserve and enhance EFH for groundfish, as long as it is supported by valid scientific evidence.

SAC urges the Council to adopt Alternative B. 8, the designation of the oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" (HAPC) under the M-SFCMA, as the final preferred alternative for purposes of the Final EIS. We believe that the best available scientific information indicates that the platforms play a vital role in the production of rockfish in the southern California region. The removal of these platforms during decommissioning would eliminate this important source of productive capacity and would slow the recovery of the overfished species of bocaccio and cowcod rockfish. In addition, the loss of this prime habitat could extend the life of the current restrictive regulations on rockfish, an action that would have a very negative economic impact on the sportfishing industry in California.

The current available scientific literature concludes that the platforms are important recruitment sites for juvenile rockfish of many species. The platforms also harbor high densities of adult rockfish of reproductive age. The data suggest that the existence of the platforms is beneficial to the sebastes complex stocks in the region. It just makes sense to apply protections to these platforms so that they are not removed without a serious examination of the impact of such action on rockfish populations. Therefore, SAC supports the designation of the platforms as HAPC, as part of a comprehensive strategy to conserve and enhance EFH for species managed under the Groundfish FMP.

Sincerely,

Bob Fletcher

Bob Fletcher, President

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Agenda Item: EFH, C.3.d

June 6, 2005

Members of the Council:

We are writing to provide our perspective on the newly formed Fishing Heritage Group, in the context of your deliberations concerning EFH.

As TNC and Environmental Defense proceeded with the initial scoping of our EFH project, many Council members pointed out that we should discuss the buyout project with processors in the communities that could be impacted by the project. We followed up on this good advice by talking not only to processors, but also to harbormasters from Morro Bay, Port San Luis, Santa Cruz, Moss Landing, Monterey, and Half Moon Bay. After our first meeting as a group, we found enough common ground to form the Fishing Heritage Group in order to continue our productive dialogue, generate ideas, and pursue solutions together.

The Fishing Heritage Group (FHG) includes fishermen, harbormasters, TNC, Environmental Defense, and the Monterey Bay Aquarium's Center for the Future of the Oceans. The FHG is dedicated to finding ways to maintain working wharfs, increase economic viability, protect ocean habitats, and preserve the proud fishing heritage of California's coastal towns.

The fishing heritage of central California's harbors is iconic, inextricably woven into the state's history and culture. Moreover, this heritage is alive today -- commercial fishing and working harbors provide significant benefits to society, including fresh seafood, tax revenue, tourist attractions, economic benefits that ripple through coastal communities, and a strong voice for conservation (e.g., opposition to pollution). Commercial fishing in this region has a long and colorful history and creates a culture worth sustaining for its own sake. Some communities have been almost entirely dependent on fishing for generations. But California's fishing heritage is at risk.

Starting in the early 1990's, fishing opportunities for west coast groundfish (e.g., halibut, black cod (sablefish) rockfish (snapper), and flatfish) have become increasingly constrained as a result of reductions in total allowable catch. Efforts to keep the fishery open year-round resulted in smaller and smaller trip limits, making it difficult for fishermen to make a living, and for ports to maintain revenues. The establishment of very large areas closed to rockfishing resulted in further economic distress. As a result, the working harbors of the central California coast have become fragile – their health linked to declining fish landings and revenues.

The goals of the Fishing Heritage Group are:

- Preserve and enhance the fishing heritage and economic viability of central California harbors, docks and wharves
- Encourage cleaner, more profitable fisheries
- Re-connect the Central Coast fisheries to local communities
- Achieve community-based fisheries management in which the fishermen and their communities exercise primary responsibility for stewardship and management, including taking part in decision-making on all aspects of management, such as harvesting, access, compliance, research, and marketing and selling products.
- Select, design and implement one or two joint demonstration projects at Central Coast harbor(s)/wharf that will enhance the fishing heritage and economic viability of Central Coast harbors, docks and wharves, while improving marine resource sustainability.
- Replicate successful projects in other ports

We have seen that the constructive dialogue taking place within the Fishing Heritage Group has lead to a new spirit of collaboration, starting with the consensus map of no-trawl zones from Point Sur to Point Conception that will be presented to you during your June meeting. It is our sincere hope that this will lead to more collaborative efforts, including the securing of funds to plan and finance economic development and conservation projects in these communities aimed at achieving our common goals.

Sincerely,

Rod Fujita, Ph.D – Marine Ecologist, Senior Scientist, Environmental Defense
Rick Algert – City of Morro Bay Harbor Director
Stephen B. Scheiblauer – Harbormaster, City of Monterey

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

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nature.org

RE: Draft Environmental Impact Statement: Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts - A Supplemental Alternative

RECEIVED
JUN - 7 2005
PFMC

June 7, 2005

Dear Mr. Dahl,

Attached to this letter please find a proposal/map from the Morro Bay Commercial Fisherman's Organization, The Nature Conservancy and Environmental Defense recommending certain areas as Essential Fish Habitat for ground fish and the closure of these areas to bottom trawling. The area of concern for our Supplemental Alternative is situated in California's central coast region and lies between Point Conception and Point Sur. For over a year now, our three organizations have been working closely with the Fishing Heritage Group to find common ground on issues related to preserving fishing heritage and culture, maintaining economic viability of working docks, protecting marine and fish habitats and enhancing robust and resilient fisheries in the region. We have come to the conclusion that by working together in a spirit of collaboration, we have a better prospect for enhancing ocean resources and better managing them for society's benefit.

This proposal and map represents a consensus and a common ground we have found over the last year and we believe it will contribute significantly to protecting essential fish habitat and the rebuilding of west coast ground fish stocks over the coming years. We encourage the PFMC, NOAA Fisheries and California DFG to give this proposal serious consideration and adopt it as the Preferred Alternative for our region of the central coast of California. Many thanks in advance for your consideration.

If you have any questions about this proposal feel free to call me at 805-646-8820

Sincerely,

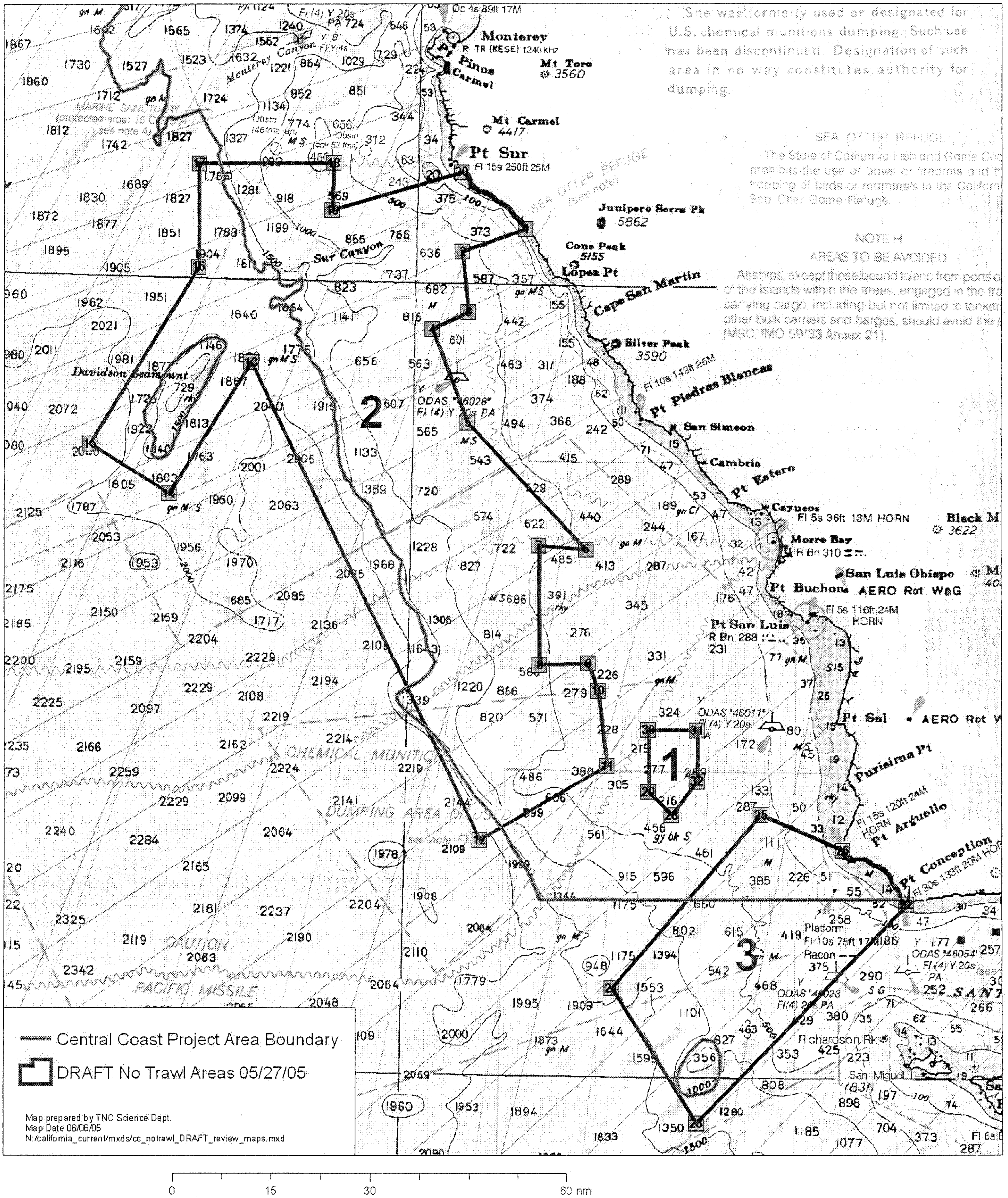
Chuck Cook

Chuck Cook
Director, Coastal and Marine Program
The Nature Conservancy – California

cc: Jeremiah O'Brien, President, Morro Bay Commercial Fisherman's Organization
Rod Fujita, Environmental Defense

Central Coast Project Area

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH



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2	2	7	-121 35 50	35 20 32
2	2	8	-121 35 20	35 2 29
2	2	9	-121 26 17	35 2 47
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Agenda Item C.3.d
Public Comment
June 2005

Environmental Defense Testimony
On
Essential Fish Habitat
Rod Fujita, Ph.D – Marine Ecologist

The designation and protection of Essential Fish Habitat has become quite complex recently, as various groups have strived to come up with proposals to create no-trawl zones. Having reviewed all of the preferred options in the DEIS, and considering the Oceana revised alternative, the FMA option, and the revised TNC/Environmental Defense alternative, Environmental Defense makes the following recommendations:

EFH Designation

Because the designation of EFH does not necessarily mean the restriction of fishing, but does increase the Council's ability to reduce non-fishing threats to EFH, we recommend that the Council adopt alternative A.2. However, this alternative extends landward only to the upriver extent of salt water, omitting salmon spawning and rearing habitat. Therefore, we recommend that the Council consider extending EFH to salmon spawning habitats.

HAPC Designation

The identification of habitats of particular concern does not necessarily mean the restriction of fishing either, but (like EFH), it may increase the Council's influence over non-fishing threats through the EFH consultation process. In addition, none of the HAPC alternatives is comprehensive. Therefore, we recommend bundling B2 (estuaries), B3 (kelp canopy), B4 (seagrass), B6 (rocky reefs), and B9 (process for new HPAC designations).

All of these are preferred alternatives except B9 (process for new HAPC designation). B9 provides a process for responding to new knowledge concerning habitat, an essential component of adaptive management and of benefiting from new understanding.

B5 (core habitat) takes advantage of the significant advance in knowledge represented by HSP modeling. While some of the data are incorrect at the present time, the option to designate HAPC that more accurately reflects the important habitats of juveniles and adults of overfished and precautionary zone groundfish species should not be foreclosed. This is the kind of knowledge that, when refined and corrected, could lead to improved HAPC designation.

Research and Monitoring

Environmental Defense supports D2 (expanded logbook program) to generate the data necessary for managing other gear sectors. Similarly, an expanded VMS system will be necessary to ensure compliance and enforcement with no-trawl zones and other spatial management measures; we therefore support D3. Finally, Environmental Defense supports the creation of a research reserve system (D4) to facilitate research aimed at better understanding fish habitat and the impacts of fishing. The research reserve system would provide information on baseline or reference conditions in representative habitat types that will be essential for the protection of habitat quality, productivity, and healthy fish populations.

EFH Mitigation

Environmental Defense supports the freezing of the trawl footprint, thereby proactively protecting presently untrawled areas. We also support the creation of a network of no-trawl zones and research reserves to protect ecologically important areas, while minimizing adverse social and economic impacts. The FMA option represents a laudable attempt by the industry to come up with a set of substantial no-trawl zones, many of which would protect ecologically valuable areas. Oceana has put a lot of effort into identifying areas of high conservation value while attempting to site no-trawl zones in a way that reduces economic dislocations. We believe that participatory processes can help bridge gaps in trust and knowledge, bringing diverse interests together onto common ground.

While Environmental Defense and the Nature Conservancy did not have sufficient time to engage in a participatory process for identifying no-trawl zones for the entire Alternative C10 project area (Pt Conception to Davenport), we were able to accomplish a lot in the southern region of this area (Pt Conception to Pt Sur). This process resulted in a consensus map of no-trawl zones that would protect the high priority areas identified by TNC and ED for conservation while leaving productive fishing grounds open. We urge the Council to adopt this map as a substitute for no-trawl zones identified by Oceana and FMA in this area.

We recommend that the Council preserve the option to pursue a participatory process for protecting EFH in the northern region of the Alternative C10 project area (from Pt. Sur to Davenport) by adopting language for the groundfish FMP along the following lines:

"In certain areas, fishing effort reduction combined with conservation measures can help protect Essential Fish Habitat from the adverse impacts of fishing. Public/private partnerships that employ effort reduction, participatory processes, and other tools to facilitate conservation while minimizing economic dislocation should remain an option for use in appropriate areas. When dealing with new tools and scientific uncertainty, adaptive management principles should apply."

MOTION TO THE GROUNDFISH ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT– FINAL PREFERRED ALTERNATIVE

1. Draft the Groundfish Fishery Management Plan (FMP) Amendment to include language for implementation of an Essential Fish Habitat (EFH) Review Committee and an adaptive management process. The Council should consider using the existing Ad Hoc Groundfish Habitat Technical Review Committee, with any necessary changes in membership, for this purpose. The Committee would meet as appropriate:

- to review specific areas included as habitat areas of particular concern (HAPCs);
- to review the scientific basis of any area designated as a non-bottom trawl area; and
- to consider additional HAPCs or other protective measures.

2. If this Committee determines an area designated as a non-bottom trawl area is not supported by scientific data, the Committee, by majority vote, may recommend the Council modify, move, or eliminate that area.

3. The Council may initiate an action through a framework process to be included in the fishery management plan amendment to modify management measures through a rulemaking.

PFMC
06/15/05

PLEASE SEE THE FINAL VOTING LOG AND FINAL MINUTES for June 2005. This motion may or may not have had amendments.

Agenda Item C.3.e
Tribal Motion
June 2005

Mr. Chairman,
I move that no closure be established in any tribal U&A area without consultation and agreement by the affected tribe(s) pursuant to Executive Order 13175 and that assessment and monitoring programs be developed by NOAA in conjunction with the tribes to measure the appropriateness and effectiveness of habitat protections within U&A areas.

PLEASE SEE THE FINAL VOTING LOG AND FINAL MINUTES for June 2005. This motion may or may not have had amendments.

GROUNDFISH ESSENTIAL FISH HABITAT (EFH) ENVIRONMENTAL IMPACT STATEMENT (EIS) – FINAL PREFERRED ALTERNATIVE

At the November 2005 Council meeting, the Council identified a range of alternatives to be included in the Pacific Groundfish Fishery Management Plan (FMP) Essential Fish Habitat (EFH) Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS). They also identified preliminary preferred alternatives to be identified in the EFH DEIS. National Marine Fisheries Service (NMFS) prepared the EFH DEIS pursuant to a settlement agreement in AOC v. Daley, which established a timeline for completing the EIS process and finalizing any FMP amendment and regulations necessary to implement the preferred alternative. In accordance with this timeline NMFS released the DEIS on February 11, 2005, triggering a public comment period that ended on May 11, 2005.

Attachment 1 provides a summary of the alternatives included in the DEIS, noting by check mark those the Council preliminarily chose as preferred. The alternatives are grouped in four categories: alternatives to (1) designate EFH, (2) designate habitat areas of particular concern (HAPC), (3) mitigate fishing impacts to EFH, and (4) implement habitat-related research and monitoring initiatives.

At this meeting the Council needs to choose a comprehensive final preferred alternative. The final preferred alternative will be included in the final EIS, which according to the schedule referenced above, must be released by December 9, 2005. In order to select a final preferred alternative, the Council, at a minimum, needs to choose one alternative from each of the four categories just described. (Consistent with the National Environmental Policy Act [NEPA], a No Action Alternative is included in each of the four categories of alternatives. Choosing no action would keep the current definitions, designations, and mitigation measures in place.)

Selection of a Final Preferred Alternative

Under the first category, alternatives to designate EFH, the Council chose two preliminary preferred alternatives; it is noteworthy that these alternatives are mutually exclusive. In the second category, alternatives to designate HAPC, the Council chose four preliminary preferred alternatives. These alternatives are not mutually exclusive and any combination of alternatives could be chosen for the final preferred alternative. In the third category, measures to mitigate adverse impacts, the Council chose 15 preliminary preferred alternatives. Two of these are sub-options—C.4.1 and C.4.2—which are mutually exclusive because they apply the same measures to different gear categories. Furthermore, Alternatives C.12, C.13, and C.14 identify the same set of geographic areas, which would be closed to different gear categories. Taken in their entirety, these alternatives are mutually exclusive; however the Council could combine elements of these alternatives—for example, by identifying specific areas to be closed to different gear categories—in crafting their final preferred alternative. The other preliminary preferred alternatives are not mutually exclusive. In the fourth category, research and monitoring, the Council did not identify preliminary preferred alternatives.

In choosing final preferred alternatives in each category, the Council first may need to consider the relationship among the categories of alternatives. HAPC must occur within designated EFH, and mitigation measures are primarily directed at areas designated EFH. For example, if the Council chose Alternative A.2, defining EFH as waters in depths ≤3,500, this would preclude designating HAPC occurring at greater depths (see Habitat Table 4-4 in the DEIS). If necessary, a practical solution would be to modify the EFH designation component of the preferred alternative so that any HAPC areas not part of EFH are simultaneously designated EFH. By the same token, components of the impacts mitigation measures alternatives fall outside of the area that would be designated EFH under all the alternatives except for Alternative A.1, no action (see Habitat Table 4-5 in the DEIS). In formulating a final preferred alternative the Council may wish to request guidance on whether the EFH guidelines established by NMFS allow mitigation measures to be applied to the part of the Exclusive Economic Zone outside of the area designated EFH.

There are two other issues the Council should consider when formulating the final preferred alternative. The first issue is the latitude the Council has in choosing alternatives other than the preliminary preferred alternative as part of the final preferred alternatives. The preliminary preferred alternative concept is derived from the approached used by the North Pacific Fishery Management Council in their groundfish EFH EIS. It is clear the Pacific Council can reaffirm the preliminary preferred alternatives as the preferred alternatives or select different preferred alternatives. The second issue is the Council's ability to modify and/or combine alternatives found in the DEIS to develop their final preferred alternative. This may be done as long as the resulting alternative is reasonably similar to the alternatives in the DEIS such that the predicted impacts of the final preferred alternative falls within the range of impacts predicted for the alternatives found in the DEIS. One example would be to choose one of the preliminary preferred EFH designation alternatives but modify it to identify additional area as EFH. Another example, alluded to above, would be to combine elements in the impact mitigation alternatives, such as the number, configuration, and applicability of closed areas.

Agency Reports and Public Comment

The Washington Department of Fish and Wildlife also included a report for inclusion the briefing materials (Agenda Item C.3.b, WDFW Report), which summarizes their analysis of Alternative C.12 using trawl logbook set point data. It also proposes including Washington State waters, which are currently closed to bottom trawl and groundfish-directed fixed gear, as an HAPC designation under the final preferred alternative. The Environmental Protection Agency (EPA) also submitted comments on the DEIS, as mandated under NEPA and Section 309 of the Clean Air Act. These are included under Agenda Item C.3.b, USEPA Comments. A letter from the NOAA National Marine Sanctuary Program makes recommendations on the adoption of alternatives that would also further sanctuary program goals, noting the need for a modification of Alternative A.2, the EFH designation alternative they recommend the Council adopt.

NMFS and the Council received a large volume of public comment on the DEIS. The great majority of this, 39,637 messages, was emails or postcards sent to NMFS with substantively identical comments. Representative examples of these comments have been included in the briefing materials.

The public comments are divided into two sections. Public Comment 1 contains comments submitted by organizations. This includes a description of Revised Alternative C.12 submitted by Oceana. Alternative C.12 was originally submitted by Oceana for Council consideration under the terms of the settlement agreement referenced above. The Revised Alternative C.12 contains reconfigurations of the closed areas described in the DEIS for this alternative. The

Scientific and Statistical Committee was asked to review the methodology used by Oceana to identify areas of biogenic habitat included in Alternative C.12 and Revised Alternative C.12 and their report is attached (see Agenda Item C.3.c, SSC Report). Another public comment, submitted by the Fishermen's Marketing Association, contains a proposal that is a variation on the closed areas proposed under Alternative C.12. The Association terms this the Trawl Industry Proposal, based on consultations with industry representatives.

Public Comment 2 contains comments submitted by individuals. These comments represent a diversity of views ranging from general support or opposition to the implementation of EFH measures to specific recommendations on which alternatives to choose or modifications to those alternatives.

Council Action: Adopt a Final Preferred Alternative.

Reference Materials:

1. Agenda Item C.3.a, Attachment 1: Summary of the Alternatives in the Groundfish Essential Fish Habitat DEIS.
2. Agenda Item C.3.b, WDFW Report: Washington Department of Fish and Wildlife Summary Analysis of Trawler-Proposed and Oceana-Proposed Bottom Trawl Closed Areas Using 2003 West Coast Trawl Logbook Data.
3. Agenda Item C.3.b, USEPA Comments.
4. Agenda Item C.3.b, National Marine Sanctuary Letter.
5. Agenda Item C.3.c, SSC Report: Scientific and Statistical Committee Report on Groundfish Essential Fish Habitat Environmental Impact Statement – Final Preferred Alternative.
6. Agenda Item C.3.c, HC Report: Habitat Committee Report on the Groundfish Essential Fish Habitat Environmental Impact Statement.
7. Agenda Item C.3.c, GMT Report: Groundfish Management Team Report on Essential Fish Habitat Environmental Impact Statement.
8. Agenda Item C.3.d, Public Comment 1: Public Comment Received From Organizations.
9. Agenda Item C.3.d, Public Comment 2: Public Comment Received From Individuals.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Agency and Tribal Comments
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt a Final Preferred Alternative

PFMC
05/26/05

National Marine Fisheries Service, Northwest Region
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PUBLIC NOTICE

For Information Contact:
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NMFS-SEA-05-03
FOR IMMEDIATE RELEASE
May 3, 2005

PACIFIC COAST GROUNDFISH FISHERY
Emergency Rule to Set Bycatch Limits for Directed Open Access Fishery

On May 2, 2005, NMFS implemented an emergency rule to set canary and yelloweye bycatch limits for the directed open access fishery. This rule is scheduled to publish in the *Federal Register* on May 5, 2005.

A new and unanticipated entrant to the directed open access fishery has required NMFS to reconsider the effect of that fishery on the harvest of canary and yelloweye rockfish. Therefore, NMFS has implemented bycatch limits of 1.0 mt of canary rockfish and 0.6 mt of yelloweye rockfish for the directed open access fishery. If either of these bycatch limits is reached, the open access groundfish fishery would be constrained to incidental landings levels, such that fishery participants would be subject to a trip limit of 200 lb per month for all groundfish species, except Pacific whiting, per month.

Open access fishery participants are cautioned that, if these bycatch limits are reached, directed fishing opportunities will be swiftly curtailed. NMFS will distribute public notification of any reduced trip limits as broadly and quickly as possible.

Background

In mid-April 2005, a representative of a Seattle-based fishing company contacted NMFS's Northwest Region about the possibility of using its 124.5 ft freezer-longliner vessel to operate off Washington State in the West Coast open access fishery for spiny dogfish, *Squalus acanthias*. Vessel operators were intending to both catch and process dogfish and other groundfish species at sea in May-June 2005. The West Coast open access groundfish fishery is open to any vessel that is otherwise authorized to fish under U.S. Coast Guard safety, registration, and other requirements.

Under the 2005-2006 groundfish fishery specifications and management measures, dogfish is part of the "other fish" complex. There is no limit on the amount of dogfish that may be taken in either the limited entry or open access fisheries (69 FR 77012, December 23,

Visit the NMFS Northwest Region website for current groundfish management regulations, VMS information, and RCA boundary coordinates and maps.

www.nwr.noaa.gov/1sustfsh/gdfsh01.htm

Join our email list to receive public notices electronically by sending an email to: westcoastgroundfish@noaa.gov

2004.) Longline dogfish fisheries off the northern West Coast are known to incidentally take canary and yelloweye rockfish. NMFS's normal preference would be to coordinate with the Pacific Fishery Management Council (Council) on how to accommodate this new entrant into the West Coast groundfish fisheries while also protecting overfished species. Because the Council does not meet again until June 13-17, 2005, NMFS believes that it must take action to protect overfished species in advance of the June Council meeting.

Under Federal groundfish regulations at 50 CFR 660.314(c), an at-sea catcher-processor shorter than 125 ft in length must carry one NMFS-certified observer for each day that the vessel is used to take, retain, receive, land, process, or transport groundfish. NMFS may also require such vessels to carry additional NMFS staff observers. The new freezer-longliner intending to fish in the open access fishery has made plans to carry and pay for one observer pursuant to § 660.314(c) and has been cooperating with NMFS in its request that the vessel carry an additional West Coast Groundfish Observer Program staff observer. These observers will allow NMFS to monitor the fishing and processing activities of this vessel on a daily basis, providing valuable catch data on this fishery.

The swift availability of observer data from this freezer-longliner allows NMFS to implement canary and yelloweye rockfish bycatch limits for the directed open access fishery. These limits are intended to protect the canary and yelloweye rockfish OYs from being exceeded and to protect participants in other fisheries from being affected by canary and yelloweye bycatch in the directed open access fishery.

In developing the 2005 harvest specifications and management measures, the Council anticipated 1.0 mt of canary rockfish and 0.6 mt of yelloweye rockfish being taken in the directed open access fisheries. An additional 1.8 mt of canary rockfish and 0.8 mt of yelloweye rockfish are expected to be taken in the 2005 incidental open access fisheries, those fisheries that do not target groundfish but which may take groundfish incidentally. In order to quickly implement protections for canary and yelloweye rockfish, NMFS needed to use the Council's anticipated incidental take amounts of canary and yelloweye rockfish to set open access bycatch limits for those species.

In developing this emergency rule, NMFS consulted with representatives from the three West Coast states and the Council chair and staff. NMFS hopes to discuss this emergency rule, plus any further protections needed for overfished species taken in the directed open access fisheries, with the Council and the public at the Council's June 2005 meeting in Foster City, California. For further information on that meeting, please see www.pcouncil.org, or contact the Council at 503-820-2280.

For more information contact: NMFS Northwest Region at 206-526-6140 or visit our website at www.nwr.noaa.gov, click on "Pacific Coast Groundfish;" NMFS Southwest Region at 562-980-4000; Washington Department of Fish and Wildlife at 360-249-4628; Oregon Department of Fish and Wildlife at 541-867-4741; or the California Department of Fish and Game at 707-441-5797 (Eureka), 510-581-7358 (Belmont), 562-342-7184 (Los Alamitos), 858-546-7167 (La Jolla).

Any discrepancies between this public notice and the *Federal Register* will be resolved in favor of the *Federal Register*.

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON STATUS OF 2005 GROUNDFISH FISHERIES AND CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) met with the Groundfish Management Team (GMT) to discuss inseason adjustments for the groundfish fishery. The GAP makes the following recommendations.

Limited Entry Trawl

The GAP supports the GMT option that would move the seaward boundary of the Rockfish Conservation Area to 180 fathoms north of 40E10', with accompanying changes in cumulative limits and establishment of a trigger mechanism based on landed catch of darkblotched rockfish and slope rockfish. Movement of the seaward boundary will allow vessels to target available fish along the 200 fathom curve, while the trigger mechanism will ensure harvest of sensitive species does not reach excessive levels as occurred last year.

The GAP also supports the increase in slope rockfish limits in the area between 38E and 40E10', again accompanied with a trigger mechanism based on landings of darkblotched and slope rockfish. The increase in this area tracks with the Council decision in April to provide a staged increase in slope rockfish.

The GAP does not support a reduction in the yellowtail rockfish limits available to selective flatfish trawl fishermen north of 40E10'. Yellowtail are highly abundant, and decreasing the trip limit will only result in catch being converted to discards. The existing 2,000 pound bi-monthly limit is not going to lead to targeting, especially using a selective flatfish trawl. No data has been provided to show that canary impacts are increasing above projected levels under the existing cumulative limits. The GAP believes this is a precautionary adjustment that is not needed.

Limited entry fixed gear

The GAP supports the recommendations to increase the limit on minor nearshore rockfish to 6,000 pounds/two months between 40E10' and 42E and to increase shelf rockfish limits to 3,000 pounds/two months. south of 34E27'. Both of these fisheries are well below attainment levels. Given the sparsity of data in the southern area, the GAP urges NMFS - if possible - to increase observer coverage on vessels fishing for shelf rockfish in this area.

Open access gear

The GAP supports GMT recommendations to increase minor nearshore rockfish limits to 6,000 pounds/two months. between 40E10' and 42E, and shelf rockfish limits to 750 pounds/two months south of 34E27'.

PFMC
06/15/05

GROUNDFISH MANAGEMENT TEAM REPORT ON STATUS OF 2005 GROUNDFISH FISHERIES AND CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) reviewed updated commercial and recreational landings information and considered options for inseason adjustments.

LIMITED ENTRY TRAWL

The GMT reviewed inseason estimates of landed catch and total mortality through period 2 and compared those estimates to trawl bycatch model projections. The estimated total mortality of overfished species in the bottom trawl fishery does not appear to be a concern based on PacFIN's Quota Species Monitoring (QSM) data and trawl model projections. The trawl bycatch model was predicting catch levels within 10% of reported landed catch for sablefish, Dover sole, and petrale sole, while trawl caught shortspine thornyhead was 11.4% below trawl model projections, and longspine thornyhead was less than half of projected landings.

QSM and Model Estimates of Landed Catch through Period 2

	QSM	Model	% difference
Longspine	141	345	-59.1%
TWL Shortspine N CP	129	146	-11.4%
TWL Sablefish N CP	477	446	7.0%
Dover sole	2,706	2,926	-7.5%
Petrale Sole	1,341	1,372	-2.3%
English Sole	257	299	-14.1%
Arrowtooth Flounder	605	535	13.1%
Remaining Flatfish	296	500	-40.8%
Slope Rock	93	57	63.0%

If current limited entry trawl cumulative limits and Rockfish Conservation Area (RCA) boundaries remain unchanged, it is predicted that the catch of thornyhead, sablefish, and slope rockfish will be less than the respective optimum yields (OYs) or harvest guidelines (HGs) for the year. Therefore, the GMT discussed liberalizing limited entry trawl cumulative limits and decreasing the size of the trawl RCA so that fisheries for slope rockfish, sablefish, and thornyheads can be prosecuted more effectively. In order to encourage attainment of the slope rockfish, sablefish, and thornyhead limits, the GMT analyzed the following measures:

North of 40º10'

- Increase longspine thornyhead cumulative limits for selective flatfish trawl (SFFT) gear north of 40º10' for the remainder of the year
- Move the seaward trawl RCA boundary from 200 fm to 180 fm during period 4.

Between 38º and 40º10'

- Increase slope rockfish and splitnose limits from 8,000 pounds per two months to 20,000 pounds per two months between 38º and 40º10' for the remainder of the year

Coastwide

- Increase sablefish and shortspine thornyhead cumulative limits coastwide for the remainder of the year

The GMT believes there are risks associated with moving the seaward trawl RCA boundary from 200 fm to 180 fm. To address concerns over possible and unintended catch of darkblotched rockfish, the GMT recommends the Council give NMFS the authority to constrain the fishery outside the Council process if a trigger is met. The GMT recommends that the change in the trawl RCA boundary north of 40º10' to 180 fm and the increase in slope rockfish and splitnose cumulative limits between 38º and 40º10' be accompanied by an inseason trigger mechanism to constrain the fishery if higher than anticipated catches of slope rockfish or darkblotched rockfish occur in any period. The GMT recommends that the triggers be constructed in the following manner:

- Between 38º and 40º10': if landings of slope rockfish exceed 40 mt or landings of darkblotched exceed 9 mt during a cumulative limit period in that area, decrease slope rockfish and splitnose cumulative limits from 20,000 pounds to 8,000 pounds in the next period.
- North of 40º10': if more than 20 mt of slope rockfish other than darkblotched or more than 22 mt of darkblotched is landed in that period, restore the previously scheduled size of the trawl RCA by moving the western boundary from 180 fm to 200 fm in the next month or period.

Yellowtail in the Limited Entry Trawl Fishery

Landings data from early 2005 show that a small number of vessels have been approaching (or reaching) yellowtail rockfish cumulative limits using the selective flatfish trawl. These landings have often been associated with minor catches of canary rockfish, which is consistent with a known association of these two species. The GMT is concerned with the potential risk of higher than anticipated catch of canary rockfish if targeting of yellowtail were to occur, and believes this warrants consideration of a reduction in the yellowtail trip limits for selective flatfish trawl gear. The GMT also notes that the yellowtail bycatch rates associated with the exempted fishing permit (EFP) fishery during selective flatfish trawl gear development were considerably lower than the bycatch rates allowed by the current selective flatfish trawl cumulative limit of 2,000 pounds per two months. The GMT recommends that the Council consider lowering the yellowtail rockfish cumulative trip limits in the selective flatfish trawl from 2,000 pounds per two months to 1,000 pounds per two months.

The GMT notes that the proposed inseason trip limit changes reduce the incentive for vessels to specialize in fishing strategies prosecuted solely seaward of the RCA. Therefore, there will be new uncertainty introduced into the catch projection model based upon historical vessel participation resulting from these vessels fishing both deep-water and shallow-water strategies within a single cumulative period. The GMT will closely monitor progress toward OYs for both slope and shelf species as catch information from this mixed-depth strategy is accumulated in the catch projection model.

The GMT further notes that the decreased incentive for trawl vessels to fish under a pure slope strategy in the north may result in vessels using both large footrope and selective flatfish gear during the same trip or period, and these vessels are likely to have both gears on board at the same time. Allowing vessels to have both gear types on their net reels makes it difficult to enforce the use of selective flatfish trawl gear in the shoreward areas, and the potential exists for vessels to use large footrope gear in the shoreward areas. The GMT recognizes we may need future regulations that require only one gear to be on board during the trip or period, or that large footrope may need to be stored while transiting the RCA and areas shoreward of the RCA. However, the GMT understands that implementing such regulations would require a two-meeting process and notice and comment rule-making.

The GMT received concerns from one segment of the trawl industry that pursuing the current sablefish limit was resulting in increased levels of Dover sole discard. However, trawlers from other areas reported an almost opposite phenomenon, citing a need for increased sablefish limits to accommodate the catches they were encountering. This example is illustrative of the difficulty the GMT encounters in trying to react to anecdotal information on changing discard issues or other anomalous conditions reported by industry. For that matter, total catch impacts resulting from management changes can't be fully evaluated until a year after they've been implemented. More real time observer information would address both of these situations. Further, if the GMT had access to raw observer data, we would be more able to identify species associations in the actual catch and structure trip limits to better balance bycatch reduction with attainment of OYs.

LIMITED ENTRY FIXED GEAR SOUTH OF 34º27'

The GMT discussed a request to increase shelf rockfish limits to 5,000 pounds per two months. The GMT is concerned with potential cowcod catch between 40 fm and 60 fm and the little amount of observer data in that area. Therefore, the GMT recommends increasing shelf rockfish limits from 2,000 pounds per two months to 3,000 pounds per two months.

OPEN ACCESS SOUTH OF 34º27'

The GMT considered increasing shelf rockfish limits for the open access fishery in this area, and it was generally agreed that an increase in period limits from 500 pounds per two months to 750 pounds per two months (a similar percentage increase as for limited entry) was not likely to result in a conservation concern. However given the high value of the nearshore species, small changes in trip limits could result in unanticipated changes in effort. Consequently, the inability to predict the behavior of the open access fleet constrains our ability to fully evaluate the potential consequences of this action.

OPEN ACCESS NORTH OF 40º10'

Due to low catches of black rockfish, the GMT recommends an increase in minor nearshore rockfish from 5,000 pounds per two months, no more than 1,200 pounds of which may be species other than black or blue rockfish to 6,000 pounds per two months, no more than 1,200 pounds of which may be species other than black or blue rockfish.

RECREATIONAL FISHERIES

California reported that higher than expected take of canary rockfish was observed when the recreational fishing season for groundfish and associated species opened in San Luis Obispo County in May 2005. Observations from other areas already open in California indicated that this take of canary was an unusual and localized event. California presented an estimate of canary take for all of California through May 2005 (0.54 mt) and indicated that this take was not expected to impact the groundfish seasons for other regions of California. California also provided a report detailing their education and catch reduction efforts in the San Luis Obispo area. Anecdotal evidence corroborated by the California Recreational Fisheries Survey sample data showed that landings significantly decreased in the San Luis Obispo area since these outreach efforts were implemented.

The GMT also reviewed the status of state recreational fisheries in Washington and Oregon. Based on data from the three states, the GMT does not recommend any recreational inseason management actions at this time.

FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

On Friday, the GMT will provide the Council with an updated bycatch score card and updated trip limit tables.

GMT RECOMMENDATIONS

1. Increase cumulative limits in the limited entry trawl fishery for longspine, shortspine, sablefish, and slope rockfish as indicated in the attached tables.
2. Reduce limited entry trawl cumulative limits for yellowtail rockfish to 1,000 pounds for selective flatfish trawl gear for the remainder of the year.
3. Increase shelf rockfish limits for open access non-trawl gear south of 34º27’ to 750 pounds per two months for the remainder of the year.
4. Increase shelf rockfish limits for limited entry fixed gear south of 34º27’ to 3,000 pounds per two months for the remainder of the year.
5. Increase cumulative limited entry fixed gear and open access limits for minor nearshore rockfish and black rockfish from 5,000 pounds per two months, no more than 1,200 pounds of which may be species other than black or blue rockfish to 6,000 pounds per two months, no more than 1,200 pounds may be species other than black or blue rockfish between 40º10’ and 34º27’ for the remainder of the year.
6. Consider moving the seaward boundary of the trawl RCA north of 40º10’ to 180 fm during period 4.
7. Give NMFS the authority to reduce slope rockfish limits and shift the trawl RCA boundary outside the Council process if triggers are met as described above.

LE Bottom Trawl Cumulative Limit and RCA Configurations

Option A: 180 fathom outline in period 4 in North

		RCA Boundaries		Cumulative Limits							
SUBAREA	Period	INLINE	OUTLINE	Sablefish	Longspine	Shortspine	Dover	Other Flat	Petrale	Arrowtooth	Slope Rock and Splitnose
N 40 10	1	75	150	9,500	15,000	3,500	69,000	110,000	No Limit	No Limit	4,000
	2	100	200	9,500	15,000	3,500	69,000	110,000	42,000	150,000	4,000
	3	100	200	17,000	23,000	4,900	30,000	110,000	40,000	150,000	4,000
	4	100	180	18,000	23,000	5,200	30,000	110,000	40,000	150,000	4,000
	5	100	200	18,000	23,000	5,200	30,000	110,000	40,000	150,000	4,000
	6	75	150	13,000	15,000	3,700	22,000	80,000	60,000	80,000	4,000
North SFFT Limit	1	75	150	1,500	1,000	1,000	20,000	100,000	25,000	70,000	4,000
	2	100	200	10,000	1,000	1,000	35,000	100,000	35,000	70,000	4,000
	3	100	200	10,000	1,000	3,000	30,000	90,000	35,000	70,000	4,000
	4	100	180	15,000	8,000	4,000	30,000	90,000	35,000	70,000	4,000
	5	100	200	15,000	8,000	4,000	30,000	90,000	35,000	70,000	4,000
	6	75	150	10,000	2,000	2,000	8,000	75,000	15,000	70,000	4,000
38 - 40 10	1	75	150	14,000	19,000	4,200	50,000	110,000	No Limit	No Limit	4,000
	2	100	200	14,000	19,000	4,200	50,000	110,000	42,000	10,000	4,000
	3	100	150	14,000	19,000	4,200	40,000	110,000	42,000	10,000	8,000
	4	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	20,000
	5	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	20,000
	6	75	150	16,000	19,000	4,600	35,000	110,000	100,000	20,000	20,000
S 38	1	75	150	14,000	19,000	4,200	50,000	110,000	No Limit	No Limit	40,000
	2	100	150	14,000	19,000	4,200	50,000	110,000	42,000	10,000	40,000
	3	100	150	14,000	19,000	4,200	40,000	110,000	42,000	10,000	40,000
	4	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	40,000
	5	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	40,000
	6	75	150	16,000	19,000	4,600	35,000	110,000	100,000	20,000	40,000

LE Bottom Trawl Cumulative Limit and RCA Configurations

Option B: 200 fathom outline in the North

		RCA Boundaries		Cumulative Limits							
SUBAREA	Period	INLINE	OUTLINE	Sablefish	Longspine	Shortspine	Dover	Other Flat	Petrale	Arrowtooth	Slope Rock and Splitnose
N 40 10	1	75	150	9,500	15,000	3,500	69,000	110,000	No Limit	No Limit	4,000
	2	100	200	9,500	15,000	3,500	69,000	110,000	42,000	150,000	4,000
	3	100	200	17,000	23,000	4,900	30,000	110,000	40,000	150,000	4,000
	4	100	200	18,000	23,000	5,200	30,000	110,000	40,000	150,000	4,000
	5	100	200	18,000	23,000	5,200	30,000	110,000	40,000	150,000	4,000
	6	75	150	13,000	15,000	3,700	22,000	80,000	60,000	80,000	4,000
North SFFT Limit	1	75	150	1,500	1,000	1,000	20,000	100,000	25,000	70,000	4,000
	2	100	200	10,000	1,000	1,000	35,000	100,000	35,000	70,000	4,000
	3	100	200	10,000	1,000	3,000	30,000	90,000	35,000	70,000	4,000
	4	100	200	15,000	8,000	4,000	30,000	90,000	35,000	70,000	4,000
	5	100	200	15,000	8,000	4,000	30,000	90,000	35,000	70,000	4,000
	6	75	150	10,000	2,000	2,000	8,000	75,000	15,000	70,000	4,000
38 - 40 10	1	75	150	14,000	19,000	4,200	50,000	110,000	No Limit	No Limit	4,000
	2	100	200	14,000	19,000	4,200	50,000	110,000	42,000	10,000	4,000
	3	100	150	14,000	19,000	4,200	40,000	110,000	42,000	10,000	8,000
	4	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	20,000
	5	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	20,000
	6	75	150	16,000	19,000	4,600	35,000	110,000	100,000	20,000	20,000
S 38	1	75	150	14,000	19,000	4,200	50,000	110,000	No Limit	No Limit	40,000
	2	100	150	14,000	19,000	4,200	50,000	110,000	42,000	10,000	40,000
	3	100	150	14,000	19,000	4,200	40,000	110,000	42,000	10,000	40,000
	4	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	40,000
	5	100	150	16,000	19,000	4,600	40,000	110,000	42,000	10,000	40,000
	6	75	150	16,000	19,000	4,600	35,000	110,000	100,000	20,000	40,000

Estimated Bottom Trawl Total Catch vs. April Scorecard and Harvest Guidelines

Option A: 180 fathom outline in period 4 in North

		Proj Catch	April Scorecard	HG
Rebuilding Species	Lingcod	152.0	152.0	
	Canary	5.8	8.0	
	POP	71.1	67.3	
	Darkblotche	157.4	157.5	
	Widow	1.3	1.3	
	Bocaccio	52.0	58.2	
	Yelloweye	0.3	0.3	
	Cowcod	0.9	1.1	
Target Species	Sablefish	2,652		3,505.0
	Longspine	1,086		2,450.0
	Shortspine	724		995.0
	Dover	6,979		7,445.0
	Arrowtooth	3,319		5,800.0
	Petrale	2,547		2,762.0
	O Flat	2,166		4,909.0
	Sl Rock N	140		1,160.0
	Sl Rock S	394.0		639.0

Option B: 200 fathom outline in the North

		Proj Catch	April Scorecard	HG
Rebuilding Species	Lingcod	151.7	152.0	
	Canary	5.7	8.0	
	POP	69.3	67.3	
	Darkblotche	157.3	157.5	
	Widow	1.3	1.3	
	Bocaccio	51.6	58.2	
	Yelloweye	0.3	0.3	
	Cowcod	0.9	1.1	
Target Species	Sablefish	2,644.3		3,505.0
	Longspine	1,085.8		2,450.0
	Shortspine	722.1		995.0
	Dover	6,969.7		7,445.0
	Arrowtooth	3,314.7		5,800.0
	Petrale	2,545.7		2,762.0
	O Flat	2,159.9		4,909.0
	Sl Rock N	133.4		1,160.0
	Sl Rock S	394.5		639.0

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON STATUS OF 2005 GROUNDFISH FISHERIES AND CONSIDERATION OF INSEASON ADJUSTMENT

Dr. Jim Hastie presented the Northwest Fisheries Science Center (NWFSC) West Coast Observer Program Data Report and Summary Analyses of Open Access Fixed-Gear Fisheries in Waters Less Than 50 Fathoms, and discussed the Groundfish Management Team (GMT) Report on Modeling Discard Mortality in the Open-Access Nearshore Fishery. Instead of continuing to assume a uniform discard rate for all species in the open-access nearshore fishery, the GMT prefers using discard rates based on observer data. The SSC endorses the GMT's preferred approach and encourages the development of discard mortality information for all fisheries that affect groundfish. Improved coordination between observer records and fishtickets would be extremely useful in accounting for retained catch in open access nearshore fisheries. In addition, establishment of logbook programs for open access nearshore fisheries, such as the voluntary program being implemented in California, is another mechanism to improve accounting of catch.

PFMC
06/15/05

Agenda Item C.4.d
Public Comment
June 2005

COUNTY OF DEL NORTE
Board of Supervisors

981 "H" Street, Suite 200
Crescent City, California 95531

Phone
(707) 464-7204

Fax
(707) 464-1165

April 29, 2005

Pacific Fisheries Management Council (PFMC)
John DeVore, Ground Fishery Management Coordinator
77000 NE Ambassador Place
Portland, OR 97220-1384

RECE...
MAY 0 5 200_
PFMC

RE: Near-Shore sport fishery cutback and economic damage.

Dear Mr. DeVore,

The Del Norte County Board of Supervisors (BOS) has been approached by the near-shore sport fishing community concerning shortened sport fishing seasons ordered by the PFMC. The public expressed frustration and concern regarding the impacts associated with shortened seasons, and more importantly the arbitrary and non-scientific decision to shorten the near-shore sport fishing season. Although the Del Norte County BOS understands the season has been extended, this Board continues to take issue with the process that resulted in the decision to shorten the season. The Del Norte County BOS would like to express it's support for decisions based on scientific research based on industry standards rather than projections. As a result, the Del Norte County BOS requests to be included in the decision making process as early as possible, so as to avoid the current problem of identifying issues of importance after decisions have been made. The BOS feels there is information available that indicates there are solutions to the issues, and wishes to be part of the decision making process.

Sincerely,

Martha McClure

Martha McClure,
Chair

CC. Honorable Mike Thompson, Congressman
California Fish and Game Commission, Robert Treanor, Commissioner

FISHING VESSEL OWNERS' ASSOCIATION
INCOPORATED

ROOM 232, WEST WALL BUILDING • 4005 20TH AVE. W.
SEATTLE, WASHINGTON 98199-1290
PHONE (206) 284-4720 • FAX (206) 283-3341

SINCE 1914

April 18, 2005

RECEIVED
APR 2 0 2005
PFMC

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 N.E. Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: **Spiny Dogfish and Open Access Related Concerns**

Dear Chairman Hansen:

After returning from the April Council meeting, I felt we had not finished the job on the dogfish cut-off date. I thought that it should have been given a date for consideration for June or September. I know several Council members were unsupportive of the action and I suspect the majority just did not want to push the issue during the discussion of staff tasking for future Council action.

It has come to my attention that at least one of the 32 freezer longline vessels that participate in the Bering Sea Pacific codfish fishery will likely try their luck between now and June targeting on spiny dogfish off of Washington. I talked to the principles about the sensitivity of the various overfished species and I know they have been in contact with NMFS. I am sure the operation will attempt to avoid critical species. This vessel, or any other vessel using longline gear, can participate off our lower coast under the open access provisions of the Pacific Council. Since we have no OY for dogfish, the catch and potential bycatch of overfished species is not limited.

The Council could be facing an uncontrolled catch of dogfish. The Council may similarly be looking at catches of Yellow-eye and Canary, not originally discussed on the score card for overfished stocks. I believe we need to have a June agenda item to discuss this recent development and examine options for controlling the problems associated with this fishery.

Sincerely,

Robert D. Alverson
Manager

RDA:cmb

LATITUDE: 47° 39' 36" NORTH
LONGITUDE: 120° 22' 58" WEST

WEB PAGE
WWW.FVOA.ORG

Josh Churchman
5 Ocean Parkway
Bolinas, California 94924

May 11, 2005

John DeVore
Pacific Fishery Management Council
7700 NE Ambassador Place, Ste. 200
Portland, Oregon 97220-1384

RECEIVED
MAY 19 2005
PFMC

Re: Groundfish Allocation and Management
Central California Region

Dear Mr. DeVore:

I have been a commercial fisherman in Marin County for over 30 years, and I possess a Limited Entry Fixed Gear permit, i.e. I catch fish by the hook-and-line method. Over the last several years most of the hook and line fishermen have gone out of business because restrictive regulations have made fishing in this manner economically unrealistic. During that same period of time, the regulations have actually been less restrictive to trawlers. I believe that at the present time I am one of the very few, if not the only, commercial fisherman in the Central California region still fishing by hook and line.

I recently received a chart showing all landings for thirty years in the Central California region, (San Francisco, Halfmoon Bay, Bodega Bay). The chart showed the number of pounds landed each year for Squid, Salmon, Groundfish trawl, Groundfish hook & line, and Crab.

All these fisheries have had good years and bad years, but one of them, the groundfish hook and line landings, vanished off the chart in the year 2000. The hook and line boats never caught as many pounds as the trawl fleet but we got three times the value because fish caught by this method are favored by restaurants because of their superior quality. We were not an "insignificant" fishery. Why were we targeted for extinction in the central California region?

In thirty years of fishing rockfish, I never "discarded" a single fish until the year 2000. Discard is a by-product of trawling, not hook and line fishing. Total retention would be bringing back the "historic" method for hook and line as well as restoring good science and morality to a sad fishery that was once proud of itself. Hook and line should be the new sustainable, habitat friendly, fishery of the future.

We need access to waters less than 150 fathoms if we are realistically going to catch chili pepper rockfish. We need a total retention allocation rather than a "discard mandate." We need to be allowed to modify and experiment with hook and line gear the way the trawl fleet has been allowed to be innovative and creative. Vertical hook and line is the most habitate friendly and it is only allowed for open access vessels. Why?

Although I have been designated as someone who is to have an observer on board to assist in gathering data on fixed gear by-catch, there is no opportunity to utilize the observer's services because the current restrictive regulations are economically prohibitive. Since one of the mandates of the Magnusson Act is to preserve the economic stability of the industry, I urge you to formulate groundfish regulations which are realistic in providing me, and other fixed gear fishermen, with a meaningful opportunity to engage in our method of fishing.

I would be happy to share my views with you further on this subject, but I am unable to attend your meeting later this month in Portland. Nevertheless, please let me know what additional information you might require in order to draft fixed gear regulations which are economically realistic as well as environmentally sound. Otherwise, please provide me with a draft of your new regulations which respond to the concerns I have expressed, by increasing access to shelf rockfish in the Central California Region for hook and line fishermen. Thank you.

Sincerely,

Josh Churchman

cc: Pacific States Marine
Fisheries Commission
Michele Longo Eder
Golden Gate Restaurant Association
Senator Dianne Feinstein
Senator Barbara Boxer
Congresswoman Lynn Woolsey

STATUS OF 2005 GROUNDFISH FISHERIES AND CONSIDERATION OF INSEASON ADJUSTMENTS

The Council set optimum yield (OY) levels and various management measures for the 2005 groundfish management season with the understanding these management measures will likely need to be adjusted periodically through the year with the goal of attaining, but not exceeding, the OYs. The Groundfish Management Team (GMT) and the Groundfish Advisory Subpanel (GAP) will meet on Sunday and Monday (see Ancillary A and Ancillary B agendas) to discuss and recommend inseason adjustments to ongoing 2005 groundfish fisheries.

The May 2 public notice of an emergency rule implemented by National Marine Fisheries Service (NMFS) setting bycatch limits in the open access fishery is included in this agenda item (Agenda Item C.4.a, Attachment 1) for discussion and potential Council action.

Under this Agenda Item, the Council is to consider advisory body advice and public comment on the status of ongoing fisheries and recommended inseason adjustments prior to adopting final changes as necessary. The Council may provide guidance to the GMT and GAP prior to making final inseason adjustments under Agenda Item C.7 on Friday, or make final inseason adjustments under this agenda item. If the latter course is chosen, there will be opportunity to confirm or clarify the Council decision under Agenda Item C.7.

Council Action:

1. **Consider information on the status of ongoing fisheries.**
2. **Consider and adopt inseason adjustments as necessary.**

Reference Materials:

1. Agenda Item C.4.a, Attachment 1: NMFS Public Notice of an Emergency Rule to Set Bycatch Limits for Directed Open Access Fishery.
2. Agenda Item C.4.d, Public Comment: Public Comments received by the Briefing Book Deadline.

Agenda Order:

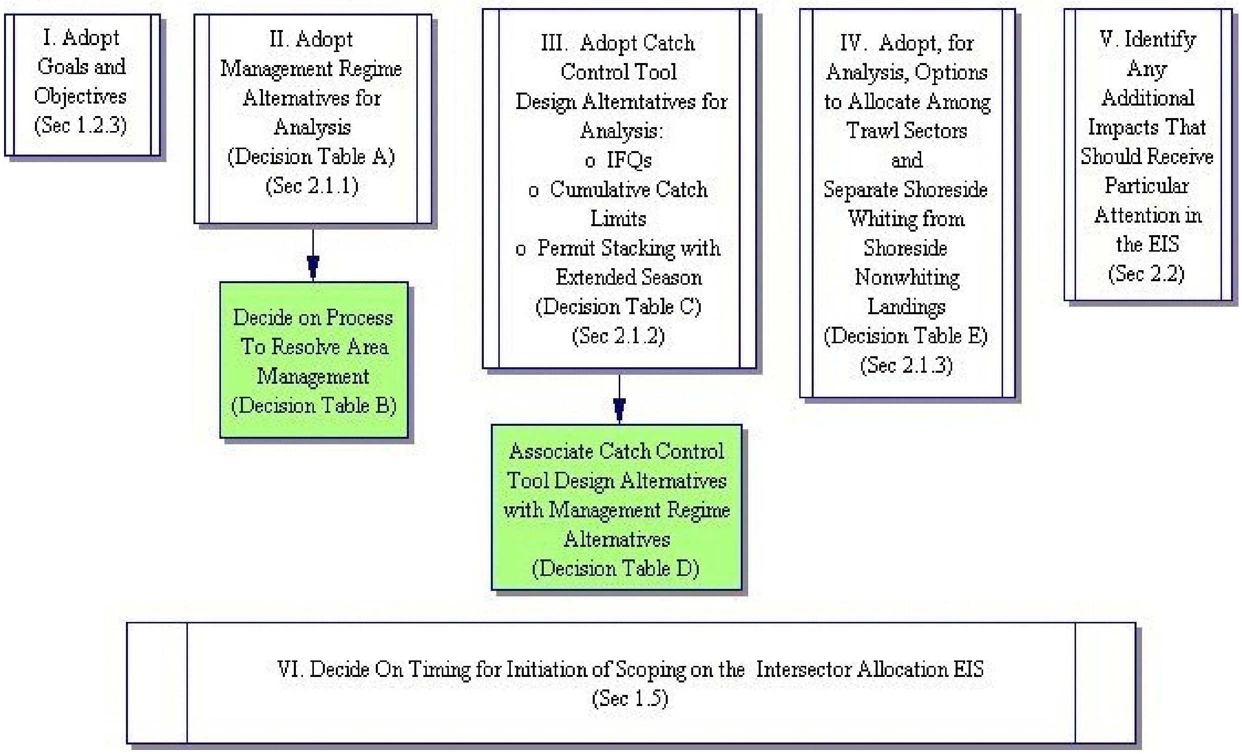
a. Agenda Item Overview — John DeVore
b. Report of the Groundfish Management Team — Susan Ashcraft
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt Preliminary or Final Inseason Adjustments for the 2005 Groundfish Fishery

PFMC
05/27/05

GUIDE TO COUNCIL DECISION PROCESS FOR TRAWL IFQS (JUNE 2005 MEETING)

This document is to be used as a guide to the issues and questions which the Council must consider in completing its action on an IFQ Program for this agenda item. The guide follows the organization of the scoping document (Agenda Item C.5.a, Attachment 3), distills the decision choices provided there, and provides references to the pertinent sections of Attachment 3, if more detailed information is desired. The decision steps the Council may choose to follow are provided as tasks in Figure 1.

Figure 1. Decision tasks (June 2005).



Goals and Objectives (Section 1.2.3 of Attachment 2)

The following list of "goals, objectives, and constraints and guiding principles" provides the draft purpose of the proposed action. This list is based on recommendations of the Ad Hoc Independent Experts Panel (IEP), as modified by the Ad Hoc Trawl Individual Quota Committee (TIQC) and Council. The Council has not explicitly adopted these goals and objectives and may consider revising them before ultimately moving forward with a IFQ program for the trawl fishery. In Attachment 3, Table 1.2-1 provides the TIQC's original goals and objectives in the left-hand column, the IEP's recommended goals and objectives in the right-hand column, and the TIQCs response to the IEP's recommendations and Council actions from November 2004, at the bottom of the table.

Goals

1. Increase regional and national net benefits including improvements in economic, social, environmental and fishery management objectives.
2. Achieve capacity rationalization through market forces and create an environment for decision making that can rapidly and efficiently adjust to changing conditions.

Objectives

1. Provide for a viable, profitable and efficient groundfish fishery.
2. Minimize negative ecological impact while taking the available harvest.
3. Reduce bycatch and discard mortality.
4. Promote individual accountability - responsibility for catch (landed catch and discards).
5. Increase stability for business planning.
6. Increase operational flexibility.
7. Minimize adverse effects from IFQs on fishing communities to the extent practical.
8. Promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry.

Constraints and Guiding Principles

1. Taking into account the biological structure of the stocks including such factors as populations and genetics.
2. Taking into account the need to ensure that the total OYs and ABC for the trawl and all other sectors are not exceeded.
3. Accounting for total groundfish mortality.
4. Avoiding provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors.
5. Avoiding excessive quota concentration.
6. Providing efficient and effective monitoring and enforcement.
7. Designing a responsive review evaluation and modification mechanism.

Decision Table A - Overview

There are seven management regime alternatives in Decision Table A, which starts on the following page. Changes recommended in the final TIQC report are noted in the table. The following is the general structure of management regime alternatives with respect to catch control tools employed.

Overview of Management Regime Alternatives

Primary Catch Control Tool Alternatives	Alt 1 Status Quo	Alt 2 IFQ for Trawl Target Species	Alt 3 IFQ for Groundfish (Except “Other Fish”)	Alt 4 IFQ for All Groundfish	Alt 5 Cumulative Catch Limits	Alt 6 Cumulative Catch Limits & Stacking	Alt 7 Cumulative Catch Limits, Stacking & Extended Cumulatve Limit Periods
Cumulative Landing Limits	Included	-	-	-	-	-	-
Season Closures [a/]	Included	*	*	*	Included	Included	Included
IFQ Program	-	Included	Included	Included	-	-	-
Cumulative Catch Limits	-	Included	Included (for low OY conditions)	-	Included	Included	Included
Permit Stacking	-	-	-	-	-	Included	Included
Extended Cumulative Limit Periods	-	-	-	-	-	-	Included

a/ Season closures are the primary tool used to control catch in the whiting fishery. While season closures sometimes occur for some species in the nonwhiting fishery, it is the Council’s general policy to use cumulative limits to try to maintain year round opportunities in the nonwhiting groundfish fisheries.

* In order to limit impacts on ESA listed salmon stocks there may be seasons for whiting, but season closures would not be the primary whiting catch control tool under an IFQ program.

Definitions

Cumulative Catch Limits: Limits on catch per time period; for example: no more than 1000 pounds of canary landed or discarded per two month period south of Cape Mendocino.
Cumulative Landing Limits: The same as cumulative catch limits except the limit applies to amounts landed (does not apply to discards).
Extended Period Length: The cumulative limit periods would be longer than the typical 2 month periods currently used; for example, a vessel might have 6 months to catch its canary limit and the canary limit would be substantially larger than for the 2 month period (e.g. 4,000 pounds per permit).
Permit Stacking: Vessels with more than one groundfish trawl LE permit may catch additional cumulative limits for each permit registered for the vessel; for example, a vessel with 3 permits might receive a cumulative limit of 1,000 pounds of canary for each of its permits for a total of 3,000 pounds during a two month cumulative limit period.

These alternatives are displayed in Decision Table A as follows.

Alternative 1 is status quo (column 2 of Decision Table A)
Alternatives 2 through 4 are IFQ program alternatives (columns 3-5 of Decision Table A)
Alternatives 5 through 7 are nonIFQ alternatives (shown at the bottom of Decision Table A)

Note that in Decision Table A, at the time of final recommendations provisions can be mixed and matched between alternatives as long as the alternatives remain internally consistent and within the scope of the analysis.

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 1 of 4)				
	Species Groups and Management Tools			
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
	NonWhiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)			
Primary Management Tools	-	Manage with IFQ for target species and species for which there is a trawl allocation	Mange with IFQ for all groundfish except the "Other Fish" category of groundfish and except in situations in which the OY for the species is very low (see below).	Manage with IFQ for all groundfish [b/]
	Cumulative landing limits for nonwhiting species/species groups.	Transferable cumulative catch limits for other groundfish species managed with cumulative landing limits under status quo[c/]	-	-
	Monitoring only for other species	Monitoring only for other species	Monitoring only for other species	-
Adjustments for Low Harvest Levels	The Council may suspend intersector allocations when a species is overfished	Low OY Management: Same as status quo plus For IFQ [illegible] change [illegible] If the OY for a nonIFQ species becomes extremely low (such as for a rebuilding species) manage with nontransferable cumulative catch limits.[d/e/f/] Low OY Threshold: Establish a threshold at which point a species would switch from incidental catch management to "Low OY management." (e.g., $B_{25\%}$)	Low OY Management: Same as status quo plus [illegible] extreme[illegible] lo[illegible] species [illegible]nd [illegible] allocati[illegible] as [illegible] nontransferable cumulative catch limits to control catch.[g/f/] Decide on whether or not to use "Low OY management" as part of the bienniel specifications process.	Same as status quo
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only except IBQ for Pacific halibut or sector caps. Suboptions - Pacific halibut retention: 1: none
	The TIQC has recommended elimination of the following halibut retention suboptions, previously listed as part of Alternative 4: Pacific halibut retention allowed 2: when LE TWL vessel use longline & IBQ 3: when any vessel uses longline & IBQ (acquired from LE TWL) 4: when LE TWL vessel uses groundfish trawl			

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 2 of 4)

	Species Groups and Management Tools			
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
	Whiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)			
Primary Management Tools	No IFQ	IFQ for whiting	IFQ for whiting and all incidentally caught groundfish except the "Other Fish" category of groundfish	IFQ for whiting and **all** incidentally caught groundfish species [b/]
	Sector allocation with catch limited by season closure	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks
	Possible season constraints to protect overfished species.	Sector catch caps for other incidentally caught nonwhiting groundfish species for which allocations have been established. No cumulative catch limits. Season closes when fleet catch cap is reached.	-	-
	Other species managed with monitoring only	Monitoring only for other species	Monitoring only for other species	-
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only except IBQ for Pacific halibut or sector caps. Suboptions - Pacific halibut retention: 1: none

The TIQC has recommended elimination of the following halibut retention suboptions, previously listed as part of Alternative 4:

Pacific halibut retention allowed
2: when LE TWL vessel use longline & IBQ
3: when any vessel uses longline & IBQ (acquired from LE TWL)
4: when LE TWL vessel uses groundfish trawl

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 3 of 4)

	Species Groups and Management Tools			
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
		Trawl Sectors and Intersector Transfers (Section 2.1.1.4)		
Sectors	Three Sectors • shoreside deliveries • mothership deliveries and • catcher-processor deliveries	Four Sectors: • shoreside whiting deliveries, • shoreside nonwhiting deliveries, • mothership deliveries and • catcher-processor deliveries (FROM 2.1.1.4 Option 3)	Three Sectors: • shoreside deliveries, • mothership deliveries and • catcher-processor deliveries (FROM 2.1.1.4 Option 2)	One Sector (FROM 2.1.1.4 Option 1)
Intersector Transfer/ Trading	***Whiting***: Sector allocations fixed by formula with procedure for midseason transfer of unused allocation. ***Nonwhiting species***: There is no inseason transfer of catch opportunity between trawl sectors except through Council inseason management.	***Whiting*** Option 1: IFQ nontransferable between trawl sectors. Option 2: IFQ nontransferable between trawl sectors with procedure for midseason rollover of unused IFQ to another sector. ***Nonwhiting species***: Sector catch cap roll-over: Roll-over any unused incidental catch from one whiting sector to the next as the year progresses.[h/] Allow purchase of nonwhiting species IFQ from the nonwhiting sector. Such IFQ would be placed in the pool for vessels operating in the whiting sector.	***Whiting*** IFQ nontransferable between trawl sectors. ***Nonwhiting species***: Do not allow transfer of nonwhiting IFQ from one trawl sector to another.	No subdivision of whiting sectors (there may or may not be a subdivision for purposes of initial allocation)

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 4 of 4)

	Species Groups and Management Tools			
	Alt 1 - Status Quo	Al[illegible] Groundfish	Alt 3 - IFQs for All [illegible] Except “Other Fish”[a/]	Alt 4 - IFQs for All Groundfish[b/]
	Groundfish Catch of Limited Entry Trawl Vessels Using Gears Other Than Groundfish Trawl (Section 2.1.1.5) **(Options are Relevant for IFQ Catch Control Only)**			
Trawl Vessel Exempted Gear Quota Accounting and Catch Control (Includes Exempted Trawl and Exempted Nontrawl Gears)	**Exempted gea**r catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits. *With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.	**Exempted gear** - IFQ is **not** required. Catch counts against the OA allocation and is managed as part of the OA fishery. Some catch will be allocated from the LE trawl to OA fishery. (F[illegible]) The TIQC has recommended elimination of the following options which might otherwise be included as part of Alternative 2: IFQ is not required. Catch counts against . . . . . . a subquota of the LE trawl allocation,managed without IFQ (FROM 2.1.1.5 Opt 2A) OR . . . the OA allocation and is managed as part of the OA fishery. (FROM 2.1.1.5 Opt 2B)	**Exempted gear -** IFQ required. Catch counts against LE Trawl. Open access catch control regulations apply (FROM 2.1.1.5 Option 1A)	**Exempted gear -** IFQ required. Catch counts against LE Trawl. Open access trip limits **do not** apply (FROM 2.1.1.5 Option 1B)
Trawl Vessel Longline and Fish Pot Without LE Endorsement (Fixed Gear Gear Quota Accounting and Catch Control)	**Longline and fishpot** catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits. *With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed gear catch control regulations apply. (FROM 2.1.1.5 Option 1A) The TIQC has recommended elimination of the following options which might otherwise be included under an alternative: . . . IFQ is **not** required. Catch counts against . . . . . . a subquota of the LE trawl allocation, managed without IFQ (FROM 2.1.1.5 Opt 2A) . . . an LE fixed gear allocation and is managed as part of the LE fixed gear fishery. (FROM 2.1.1.5 Opt 2B) . . . [same as 2B except some catch will be allocated from the LE trawl to the LE fixed gear fishery]. (FROM 2.1.1.5 Opt 2C)	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed catch control regulations **do not** apply. (FROM 2.1.1.5 Option 1B)	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed catch control regulations **do not** apply. (FROM 2.1.1.5 Option 1B)

Alternative 5: **Cumulative Catch Limits** - same as status quo except replace cumulative landing limits with cumulative catch limits. Continue season management for whiting and incidental catch species. (TIQC recommends Alt 5 be eliminated).

Alternative 6: **Cumulative Catch Limits and Permit Stacking** - same as Alternative 5 but add permit stacking. (TIQC recommends Alt 6 be eliminated).

Alternative 7: **Cumulative Catch Limits, Permit Stacking and Extended Periods** - same as Alternative 5, but add permit stacking and extend the cumulative limit period.

a/ "Other Fish" is a groundfish category that includes sharks, skates, rays, ratfish, morids, genadiers, kelp greenling, and Pacific cod.

b/ The TIQC final recommendations would not use IFQs to manage the "Other Fish" groundfish category but would use IBQs or sector caps to manage Pacific halibut.

c/ NonIFQ Species - Trawl share based on biennial Council decision. 1. Transferable cumulative catch limit between vessels within period (full or partial limit transfers, depending on length of limit period). 2. Any transfers between vessels are temporary.

d/ Eliminate the transferability of cumulative catch limits and implement season closure for the affected species on reaching the fleet limit for that species.

e/ Retention allowances within the catch limits may vary based on annual management measure decisions.

f/ Other measures to keep bycatch rates low may stay in place (e.g., RCAs).

g/ Implement season closure for the affected species on reaching the fleet limit for that species.

h/ There would not be a rollover from the nonwhiting to whiting sector.

Decision Table B: Decide on a process for addressing regional management area issues .

Process Option 1	Plan to establish additional regional management areas as needed at a later time. *(TIQC recommendation: Area restrictions should be based solely on the need to address stock conservation concerns.)*
Process Option 2	**Task a group to immediately** begin considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future.
Process Option 3	**If an IFQ Program is adopted, task a group** with considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future.

Decision Table C - Adopt catch control tool design element alternatives for analysis (Section 2.1.2)

Status Quo - Cumulative Landing Limits and Season Closures (Section 2.1.2.1)

No decisions needed

Trawl Individual Quotas (Section 2.1.2.2) -
Table of options provided starting on page 11 of this document
(Options Table C-1).

A narrative of the IFQ program design elements is provided starting on page 2 of Attachment 2, and is followed by a complete list of options, elements,[a/] **and pubic comment.**

The Council should:

adopt trawl IFQ programs to be included for full analysis in the EIS (Option Table C-1) and
make adjustments to the programs, as it deems appropriate.

Cumulative Catch Limits (Section 2.1.2.3) -
Table of options provided on page 16 of this document
(Options Table C-2).

The Council should:

adopt cumulative catch limit design alternatives to be included for full analysis in the EIS (Option Table C-2) and
make adjustments to the alternatives, as it deems appropriate,
(if cumulative catch limit alternatives were included as part of decision made on Decision Table A).

Permit Stacking and Extended Limit Periods (Section 2.1.2.4) -
Table of options provided on page 16 of this document.
(Options Table C-3).

The Council should:

adopt permit stacking and extended limit period design alternatives to be included for full analysis in the EIS (Option Table C-3) and
make adjustments to the alternatives as it deems appropriate,
(if permit stacking alternatives were included as part of decisions made on Decision Table A).

a/ The term "element" is used for design provisions that are not mutually exclusive (several elements from a list may be adopted). The term "option" is used when a choice must be made between design elements.

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 1 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.0 IFQ Allocation			
B.1.1 Eligible Groups	*Allocate 50% of quota shares to current permit owners and 50% to processors (Option 3b)*	*Allocate 100% of quota shares to current permit owners (Option 1)*	*Allocate 75% of quota shares to current permit owners and 25% to processors (Option 3a)*
Processor Definition:	*Use special IQ Program definition (processors: receive and process unprocessed fish; or catch and process) (Option 1)*	*Use FMP Definition (Option 2)*	*Same as Program A*
B.1.2 Qualifying Criteria: Recent Participation	***Harvesters (including catcher-processors):*** *1998-2003 participation required in order to qualify for an initial allocation of quota shares (number of trips or years to be specified) (Option 2)* ***For shoreside processors and motherships:*** *1999-2004 recent participation requirement (number of trips or years to be specified). (Option 4)*	*All Members of Eligible Groups: No recent participation required in order to qualify for an initial allocation of quota shares (Option 1)* *OR* *All Members of Eligible Groups: 1998-2003 participation required (one trawl groundfish landing/delivery of any groundfish species) in order to qualify for an initial allocation of quota shares (Option 2)*	*Same as Program A*
B.1.3 Elements of the Allocation "Formula"			
Vessel/Permit Related Allocation	*Catcher vessel permit owners will receive quota shares based on their permit history plus an equal division of the quota that could be attributed to permit history of bought-back permits (catcher-processors permit owners will not receive a portion of the quota shares distributed on an equal sharing basis) (Option 2)* *Suboptions for incidentally caught overfished species, either: (a) same as for other species OR (b) equally divide quota for incidentally caught overfished species.* *For catcher-processors permit owners, use an allocation schedule developed by unanimous consent of that sector (to be provided).*	*Same as Program A, except no special catcher-processor schedule.*	*Same as Program A*
Processor Allocation	*Processors are allocated quota shares based entirely on the processing of groundfish trawl landings received unprocessed. (Option 1)*	*No Allocation*	*Same as Program A*

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 2 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
B.1.4 History: Species/Species Groups to Be Used for Allocation	*Allocate Quota Shares Based on Individual Species/Species Groups: Allocate quota shares for each species/species group based on relative amounts of each respective species/species group caught/landed or processed - for permits applies to permit history; for processors applies to amounts processed (Option 2).*	*Same as Program A, except applies only to permit catch/landings history (i.e. there is no processor allocation).*	*Same as Program A*
B.1.5 History: Allocation Periods			
Periods/Years to Drop:	***Vessels:*** *1994-2003* *Drop 2 years for whiting sector fishing (applies to incidental harvest and whiting)* *Drop 3 years* ***for nonwhiting sector fishing*** *(Option 1, Suboption B)* ***Shore Processors:*** *1999-2004* *Drop 2 years* *(Option 5, Suboption B)* ***Motherships:*** *1998-2003.* *No opportunity to drop worst year.* *(Option 4, Suboption A)*	*Same as Program A for vessels but no allocations for shore processors or motherships.*	*Same as Program A*
Weighting Among Years:	*Absolute pounds - no weighting between years (Suboption (i))*	*Relative pounds (calculate history based on the entity's percent share of each year's total) (Suboption (ii))*	*Same as Program B*
B.1.6 History: Combined Permits and Other Exceptional Situations			
Combined permits:	*All Permits Count (Option 1)*	*Same as Program A*	*Same as Program A*
Illegal landings/catch:	*Don't count*	*Same as Program A*	*Same as Program A*
Landings in excess of trip limits, as authorized under an EFP	*Don't count landings in excess of the cumulative limit in place for the nonEFP fishery*	*Same as Program A*	*Same as Program A*
Compensation fish:	*Don't count*	*Same as Program A*	*Same as Program A*
B.1.7 Initial Issuance Appeals Process	*Only one provision has been identified: Appeals would occur through processes consistent with the Administrative Procedures Act, and any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions.*		

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 3 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.8 Creating New IFQ Species/Species Groups After initial Implementation	*Only one practical option has been identified: When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided.* *If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.*		
B.2.0 IFQ/Permit Holding Requirements and IFQ Acquisition (After Initial Allocation)			
B.2.1 IFQ and LE Permit Holding Requirements	Catch must be covered with quota pounds within 30 days of the landing (Option 3). Only LE trawl vessels would be allowed to participate in the IFQ fishery. For any vessel with an overage (landings not covered by quota) there would be no more fishing by the vessel until the overage is covered. Additionally, for vessels with an overage, the limited entry permit cannot be sold or transferred until the deficit is cleared. A possible suboption would require some amount of quota pounds be held prior to departure from port (to be analyzed).	Same as Program A	Same as Program A
B.2.2 Annual IFQ Issuance			
B.2.2.1 Start-of-Year Quota Pound Issuance	Only one practical option has been identified: Quota pounds are issued annually to share holders based on the amount of quota shares they held. (Quota shares are issued at the time of initial IFQ allocation).		
B.2.2.2 Rollover (Carryover) of Quota Pounds to a Following Year			
Nonoverfished	10% rollover for nonoverfished (Option 3)	30% rollover for nonoverfished (Option 5)	5% rollover for nonoverfished species (Option 2)
Overfished	5% rollover for overfished species (Option 3)	Full (30%) rollover allowance for overfished species (Option 5)	No rollover allowance for overfished species (Option 2)
B.2.2.3 Quota Share Use-or-Lose Provisions	Include use-or-lose option (require use at least once every three years). (Option 1)	Do not include a use-or-lose provision but evaluate need as part of future program reviews (Option 3).	Same as Program B
B.2.2.4 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options	No special provisions.	No special provisions.	Provide new entrants an opportunity to qualify for revoked shares and shares lost due to non-use (if such non-use provisions are created) (Element 2)

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 4 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
B.2.2.5 Community Stability Hold Back	No special provisions.	No special provisions.	Set aside up to 25% of the nonwhiting shoreside trawl sector allocation each year and allocate that share as quota pounds for joint fishermen/processor venture proposals, ranked on the basis of objective criteria that evaluate benefits to local communities.
B.2.3 Transfer Rules			
B.2.3.1 Eligible Owners/Holders (Who May Own/Hold)	Any entity eligible to own or operate a US documented fishing vessel. (Option 2) TIQC intent: preserve opportunity for existing participants)	Same as Program A	Same as Program A
B.2.3.2 Duration of Transfer - Leasing and Sale	Permanent transfers and leasing of quota shares and quota pounds allowed. (Option 2)	Permanent quota share transfers only--leasing prohibited. Permanent transfers and leasing of quota pounds allowed. (Option 1)	Same as Program A
B.2.3.3 Limits on Time of Transfer			
Time of Year	Allow transfers of quota shares any time during year (Option 1).	Same as Program A	Same as Program A
~~**Embargo When in Deficit**~~	Provisions prohibiting transfer of quota shares when a vessel makes a landing not covered by quota pounds were eliminated as not being practical due to the difficulty of tracing quota pounds back to quota shares, the ownership of which may not be associated with the vessel. The quota share embargo was replaced with a limit on permit transfers when deficits occur (see Section B.2.1).		
B.2.3.4 Divisibility	Only one practical option has been identified: Quota Shares: nearly unrestricted divisibility - "many decimal points." Quota Pounds: divisible to the single pound		
B.2.3.5 Liens	No options have been proposed to restrict liens. Liens can and should be facilitated through a central lien registry. Options for the central lien registry are covered in Section B.3.1.		
B.2.3.6 Accumulation Limits	50% or No Limits (Option 5).	Consider all limits as suboptions	Most restrictive limits(1% or 5% Intermediate level limits (10% or 25%)
B.2.3.7 Vertical Integration Limit	Only one option has been identified: No additional limits on vertical integration beyond those already provided through accumulation limits.		

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 5 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
B.3.0 Program Administration			
B.3.1 Tracking IFQ, Monitoring Landings, and Enforcement (see Table B.3-1)	Enforcement Program 2 100% at-sea monitors Discards allowed Upgraded bycatch reporting system needed Electronic landings tracking Shoreside monitoring opportunity Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS	Enforcement Program 1 100% at-sea monitors Full retention required No upgraded bycatch reporting system needed Electronic landings tracking 100% shoreside monitoring Advance notice of landing Limited ports of landing Electronic IFQ reporting Limited landing hours VMS	Enforcement Program 3 100% at-sea monitors or cameras Discards allowed if at-sea monitor is present (otherwise full retention) Upgraded bycatch reporting sys needed Parallel federal electronic landings tracking Shoreside monitoring opportunity* Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS ***With 100% shoreside monitoring**
Quota Share Tracking	Create a central lien registry but exclude all but essential ownership information(Option 2).	Create a central lien registry including all related ownership information (Option 1).	Same as Program B.
B.3.2 Cost Recovery/Sharing and Rent Extraction The TIQC has not developed options for this issue; however, it has discussed the following elements of a cost recovery/sharing and rent extraction program: Privatization of Elements of the Management System, for example: • Monitoring IFQ Landings (e.g., industry pays for their own compliance monitors) • Fishtickets (industry payment for Trawl IQ program landings information to be fed into a Federal electronic system)	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Landings fee plus privatization of elements of the management system. In particular, monitoring of IFQ landings (e.g., industry pays for their own compliance monitors).Stock assessments should not be privatized and the electronic fish ticket system should not be privatized.
B.3.3 Program Duration and Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))	A four year review process is specified along with review criteria. Among other factors, the review would include evaluation of whether or not there are localized depletion problems and whether or not quota shares are being utilized. Standard fishery management plan and regulatory amendment procedures will be used to modify the program.		
B.3.4 Data Collection	Expanded voluntary submission of economic data (Option 2).	Expanded mandatory submission of economic data (Option 1).	Expanded mandatory submission of economic data (Option 1).

Option Table C-2. Cumulative catch limit design alternatives (Section 2.1.2.3)		
CC Alt 1: Nontransferable Cumulative Catch Limits	**CC Alt 2:** Transferable Cumulative Catch Limits	**CC Alt 3:** Transferable and Divisible Cumulative Catch Limits
Cumulative limits may not be transferred from one permit to another and permit transfers are only effective at the end of a cumulative limit period.	Temporary transfers between permits are allowed. Cumulative catch limits are period specific. Partial transfers **are not** allowed.	Same as CC Alt 2 except Partial transfers **are** allowed
Cumulative limit periods will remain two months long	Cumulative limit periods will remain two months long	Cumulative limit periods will be four or six months long
Full retention and at-sea video camera	At-sea compliance monitors (100%)	Same as CC Alt 2
Spot dockside enforcement presence and plant audits	Dockside compliance monitors (100%)	Same as CC Alt 2
No change to system for reporting at-sea catch data.	Upgrade at-sea catch data reporting system such that catch data is complete and available at the vessel level in a time frame similar to that for dock receipts and fish tickets	Same as CC Alt 2

Note: Provisions below the dashed line may be mixed and matched between alternatives.

Option Table C-3. Cumulative catch limits with permit stacking and extended period design alternatives (Section 2.1.2.4)	
PS Alt 1. Stacking With **Whole** Cumulative Catch Limits for Additional Permits and **Status Quo Period Lengths**	**PS Alt 2.** Stacking With **Fractional** Cumulative Catch Limit for Additional Permits and **Extended Period Lengths**
A vessel would receive a full cumulative limit for each trawl endorsed permit stacked (increased utilization of cumulative limits would be expected and would reduce the amount of the cumulative limit associated with each permit).	A vessel would receive a full cumulative limit for its "base" permit and a part of an additional cumulative limit for each stacked trawl endorsed permit. The percentage of an additional limit allowed could be a fixed amount or depend on permit length or recent catch history.
Length Endorsement: The vessel would need to have only one permit with the appropriate length endorsement. Trawl permits with other size length endorsements could be stacked without penalty.	Length Endorsement: Same as PS Alt 1
Period Length: status quo, 2-month cumulative limit periods	Period Length: 4-month cumulative limit periods
A maximum of 3 permits could be stacked	No limit on the number of permits stacked
Monitoring and enforcement measure such as those under the cumulative catch limit alternatives (Option Table C-2) would be includes as part of the permit stacking alternatives..	

Note: Provisions below the dashed line may be mixed and matched between alternatives.

Decision Table D - Create main analytical alternatives for the EIS by associating the catch control tool design alternatives from Decision Table C with the management alternatives from Decision Table A.

<u>This table is provided as an example and work sheet.</u> Note that in Decision Table A, the differences in IFQ program species coverage between Alternatives 2 and 4 are likely to swamp any differences between the IFQ program design alternatives (from Decision Table C). Therefore, in this example it is suggested that one management regime alternative be selected (Alternative 3) and matched with each IFQ program design alternative, such that differences between the IFQ program design elements can be more readily illustrated. Also, this example contains only one cumulative catch limit design alternative (CC Alternative 1). This was done in order to limit the number of alternatives. Other cumulative catch limit design alternatives are on a continuum between cumulative catch limits and a full IFQ program and can be discussed as part of the analysis. The Council may also choose to deviate substantially from this example. **The TIQC report recommends modification of Alternative 4 such that it covers "IFQ for Groundfish Except 'Other Fish' and IBQ for Pacific Halibut"and elimination of Alternatives 5 and 6 and**

	Management Regime Alternatives from Decision Table A								
Catch Control Tool Alternatives (From Decision Table C)	**Alt 1** Status Quo	**Alt 2** IFQ for Targets Spp	**Alt 3-A** IFQ for Groundfish Except "Other Fish"	**Alt 3-B**	**Alt 3**-C	Alt 4 IFQ for All Groundfish	Alt 5 Cumulative Catch Limits	Alt 6 Cumulative Catch Limits & Stacking	Alt 7 Cumulative Catch Limits, Stacking & Extend Periods
Cumulative Landing Limits	Included	-	-	-	-	-	-	-	-
Season Closures [a/]	Included	*	*	*	*	*	Included	Included	Included
IFQ Program A Program B Program C	-	Program C	Program A	Program B	Program C	Program C	-	-	-
Cumulative Catch Limits (CC - Alt 1)	-	Included	Included (low OYs)	Included (low OYs)	Included (low OYs)	-	Included	Included	Included
Cumulative Catch Limits (CC - Alt 2)	-	-	-	-	-	-	-	-	-
Cumulative Catch Limits (CC - Alt 3)	-	-	-	-	-	-	-	-	-
Permit Stacking (PS - Alt 1)	-	-	-	-	-	-	-	Included	-
Permit Stacking & Extended Cumulative Limit Periods (PS - Alt 2)	-	-	-	-	-	-	-	-	Included

* In order to limit impacts on ESA listed salmon stocks there may be seasons for whiting , but season closures would not be the primary whiting catch control tool under an IFQ program.

a/ Season closures are the primary tool used to control catch in the whiting fishery. While season closures sometimes occur for some species in the nonwhiting fishery, it is the Council's general policy to use cumulative limits to try to maintain year round opportunities in the nonwhiting groundfish fisheries.

Decision Table E - Within Trawl Allocations (Section 2.1.3)
For analysis, adopt options to allocate groundfish between divisions of the trawl sector.

Options: For whatever subdivisions of the trawl sector are established (see Decision Table A: Trawl Sectors and Intersector Transfers–Section 2.1.1.4) ,

establish the subdivision of the trawl sector allocation based on the relative shares for each sector during the time period used for the initial IFQ allocation.

Options: Options will be the same as for the allocation periods considered for the trawl IFQ program (Section B.1.5).

If different periods are used to allocate to different trawl sectors, either use the shortest period common to the allocation of IFQ for all sectors or calculate a sector share of catch based on the IFQ period and adjust the shares proportionally such that they sum to 100%.

When calculating fleet history based on permit history of the individual vessels, a permit formed from the combination of several permits would include the catch history of all of the combined permits.

Suboption a: **A recency requirement would be applied** and the catch history of permits not meeting the recency requirement would not be included as part of the calculation of the relative sector shares. The recency requirement would be the same as that used for the IFQ program.

Suboption b: **No recency requirement.**

For analysis, adopt options to separate shoreside nonwhiting landings from shoreside whiting landings			
	Criteria for a Whiting Trip		
Classification Option 1	>50% whiting	AND	>10,000 pounds of whiting
Classification Option 2	>50% whiting	OR	>10,000 pounds of whiting
Classification Option 3	>50% whiting		

The TIQC recommends classification Options 2 or 3, but has requested additional data on the issue.

Types of Environmental Impacts for Consideration

The following categories of impacts were identified during previous Council meetings and the public scoping period. The Council's task at this meeting is to review this list and make any additions for issues of Council concern not already covered.

Habitat and Ecosystem

- Changing impact on habitat due to gear changes
- Potential changes in ecosystem dynamics if regional or localized depletion occurs.
- Potential changes in the mix of species harvested with changes in fishing tactics, seasonality or gear types used
- Environmental impacts due to economic, community, and resource management changes

Fishery Resources

Changes in accuracy of total mortality estimates

- Incentives for unreported highgrading
- Incentives to underreport landings
- Improved monitoring

Changes in total mortality

- Incentives to minimize take of incidental catch species to avoid IFQ costs
- Changes in size and maturity of fish taken
- Direct and indirect impacts on fisheries prosecuted by other gear sectors, including sport

Socioeconomic Environment

Production Value - Harvesters and Processors

- Mix of species and products
- Product quality
- Market timing (special orders)
- Allowable catch (reduced uncertainty about discards with proper monitoring)

Production Costs - Harvesters

- Harvest flexibility (opportunity to better scale harvest activities to improve operational efficiency)
- Gear flexibility
- Timing flexibility
- Opportunity for more efficient investment in capital
- Asset values (permit and vessel)

Production Costs - Buyers and Processors

- Product recovery rates
- Operational planning
- Storage costs
- Opportunity for more efficient investment in capital
- Asset values (facilities)
- Consolidation impacts, loss of infrastructure, and indirect impacts on the businesses (e.g., shifts impacting the operation of existing businesses and their competitiveness)

Safety and Personal Security

- Vessel maintenance, repair and replacement
- Avoidance of bad weather
- Personal financial and employment security

Community Impacts

- Local income
- Employment
- Tax base and municipal revenues
- Cost recovery for fishery related public works projects
- Cultural heritage
- Business and infrastructure impacts

Fairness and Equity

- Effects on groups involved and dependent on the fishery (income and employment) for crew, skippers, vessel owners, processor labor and management, support industries
- Effects on small entities (businesses (including family businesses) local governments, organizations)
- Effects on low income and minority populations
- Effects on asset value (quotas, permits, vessels)
- Effects on adjacent fisheries (geographically adjacent fisheries, for example Alaskan fisheries)
- Effects on nontrawl gear fisheries on the West Coast including sport fisheries

Nonconsumptive Values

- Nonconsumptive Use
- Existence Value

Initial Program Development and Implementation Costs

Ongoing Administrative Costs

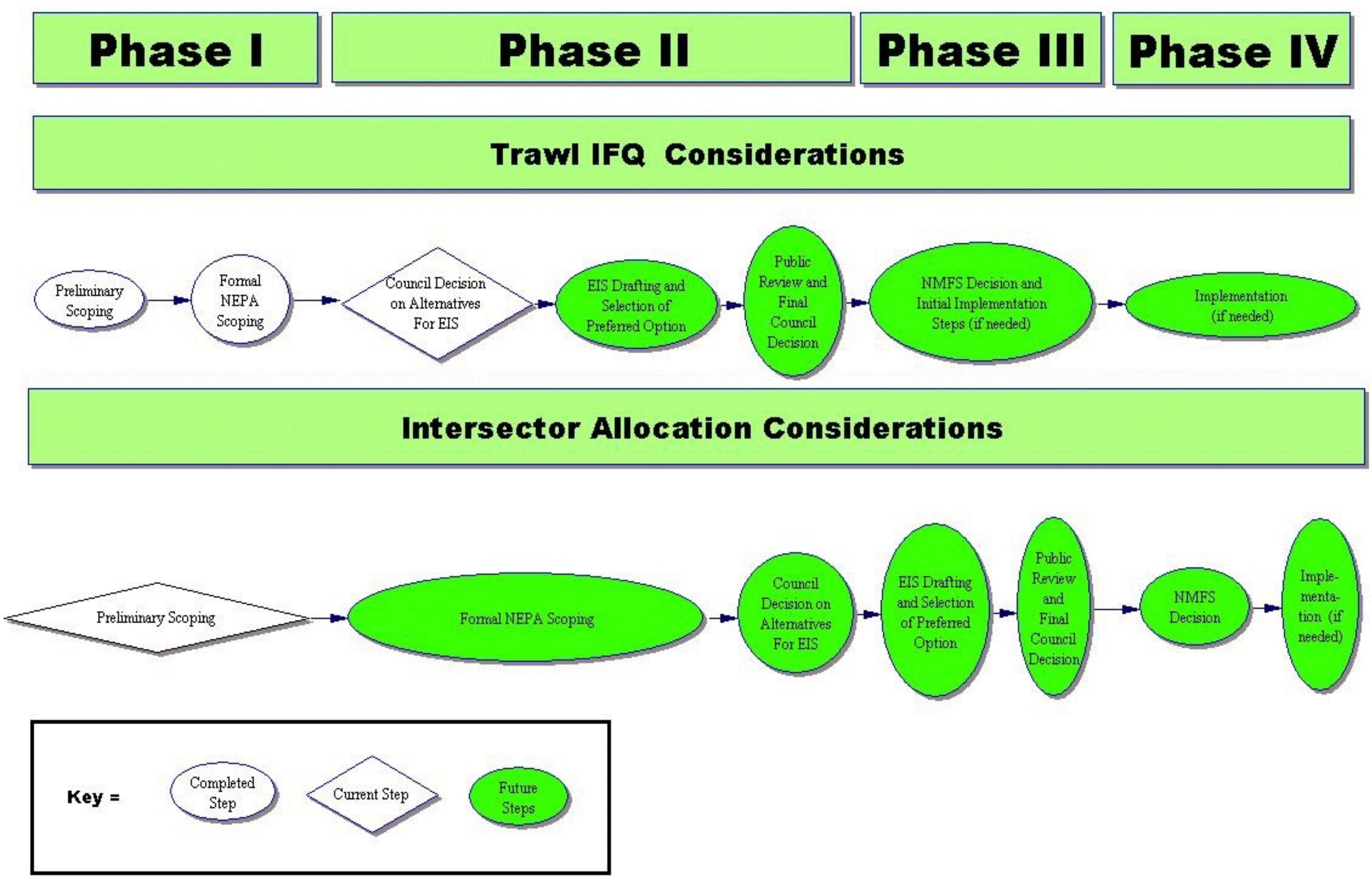
Enforcement and Compliance Monitoring Costs

Research and Performance Monitoring Costs

Initiation of Scoping on the Intersector Allocation EIS

With action to adopt alternatives for analysis in an IFQ EIS, the Council will have moved into Phase II of its consideration of an IFQ program. Preliminary scoping has been conducted on intersector allocation issues. The question before the Council is when to formally announce its intent to prepare an intersector allocation EIS and formally open a public scoping period, thereby moving into Phase II of the intersector allocation EIS process.

Figure 2. Trawl IFQ and Intersector Allocation Processes



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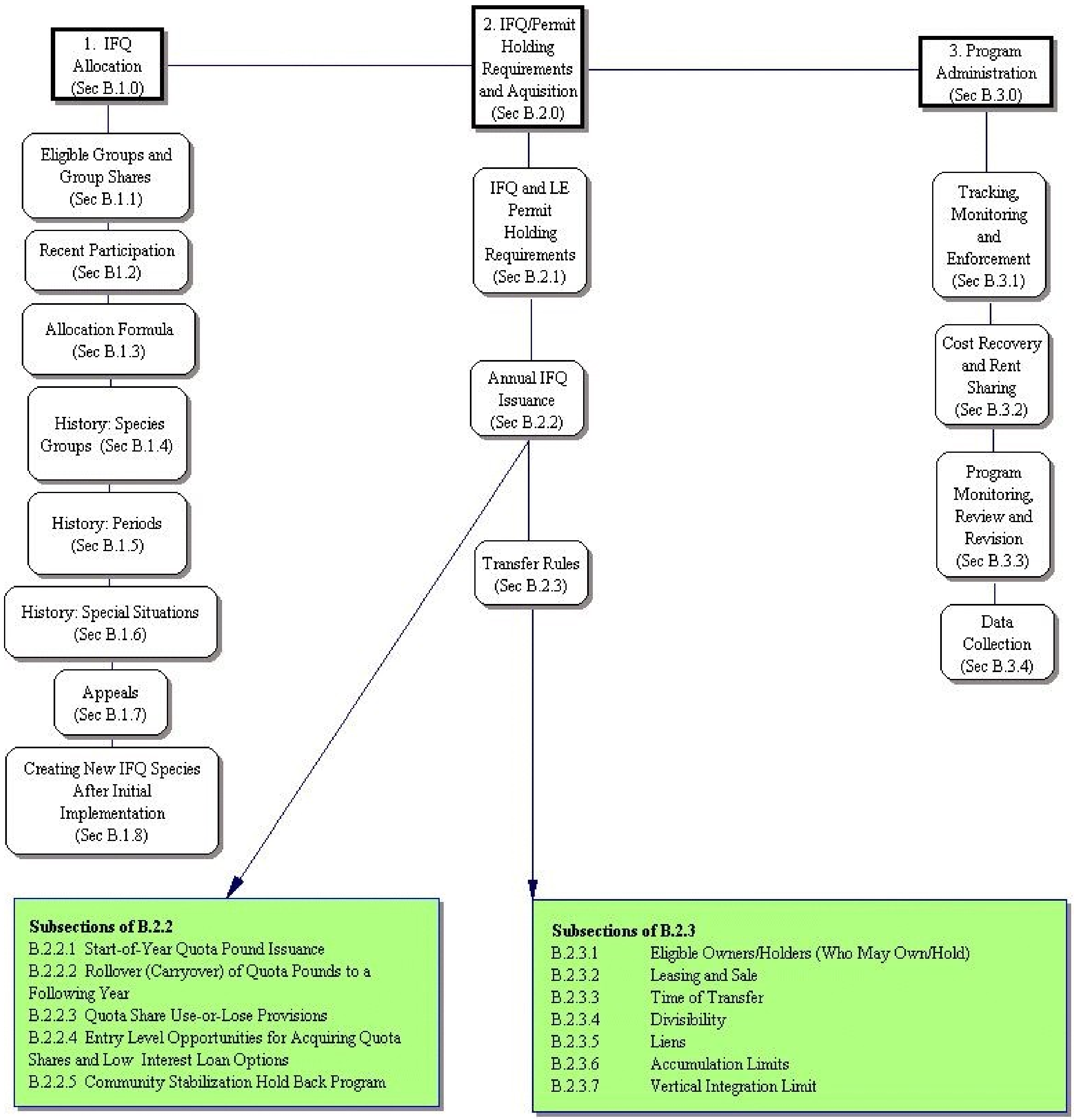
Overview of IFQ Program
Design Elements
(Appendix B)



General Description of the IFQ Program

IFQ Allocation (Section B.1.0 in Appendix B)

IFQ would be allocated to the following groups in the following proportions: . . . **[e.g., groundfish trawl permit holders (xx%), groundfish trawl vessel owners (xx%), processors (xx%)**]. Processors would be defined as . . . [FMP definition/alternative definition]. *(Section B.1.1)*

In order to qualify for an initial allocation the applicant would . . . **[have to/not have to] . . .** demonstrate recent participation. If recent participation is required, the recent participation requirement for each group would be as follows: make/receive at least . . . **[X deliveries – number of deliveries to be determined]** . . . of trawl caught groundfish from . . . **[1998-2003, or 2000-2003]**. *(Section B.1.2)*

Those eligible for an initial allocation will be allocated quota shares based on the following formula:
[0-100%] of the quota share issued for the group would be issued based on history of catch/landings/processing;
[0-100%] of the quota share issued for the group would be issued based on equal sharing.
[0-100%] of the quota share issued for the group would be allocated through an auction;
(Formula's may vary among groups, *Section B.1.3*)

For IFQ allocated based on delivery history, the applicant's . . . **[total groundfish; total for each IFQ species or species group; or total for each species, species group, or proxy species]** . . . **[caught; landed; or processed]** *(Section B.1.4)* . . . will be calculated for . . **[1994-2003, 1994-1999, 2000-2003, 1998-2003, or 1999-2004]** . . . , less . . . **[0, 1, 2 or 3]** . . . of the applicant's worst years. The calculation will be based on the applicant's . . . **[pounds, percent of total]** . . . for the relevant species/species group in each year. *(Section B.1.5)*

Permit history for combined permits would include the history . . . **[for all the permits that have been combined; for the permit originally associated with the permit number of the combined permit]**. Illegal deliveries would not count toward history. Catch in excess of trip limits, as authorized under an EFP and compensation fish . . . **[would/would not]** . . . count toward history. *(Section B.1.6)*

There would be no appeals process on the initial issuance of IFQ, other than that provided under the Administrative Procedures Act. Any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions. *(Section B.1.7)*

When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided. If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation. *(Section 1.8)*

Holding Requirements and Acquisition (Section B.2.0 in Appendix B)

In order to be used, IFQ representing quota pounds would need to be registered for use with a particular vessel (deposited to the vessel's quota pound account). Only LE trawl vessels would be allowed to participate in the IFQ fishery. A vessel would need to acquire quota pounds to cover a particular landing. . . **[by the time of the landing, no more than 24 hours after the landing, no more than 30 days after the landing].** A vessel . . . **[would not need to hold quota pounds; would need to hold at least xxx quota pounds]** . . . before leaving port on a fishing trip. An LE permit may not be transferred from any vessel for which there is deficit in the vessel's quota pound account for any species or species group (i.e. if the vessel has caught IFQ species not covered by quota pounds). *(Section B.2.1)*

Each year quota pounds would be issued to quota share holders based on the amounts of quota shares they hold. *(Section B.2.2.1).* For species that are not overfished, a vessel . . . **[would/would not]**. . . be able to roll-over . . . **[up to . . . 5%, 10%, 20%, 30% . . . of its]** . . . unused quota pounds or cover an overage . . . **[of . . . 5%, 10%, 20%, 30%]** . . . with quota pounds from the following year. For overfished species, . . . **[a full; a partial; no]** . . . rollover allowance would be provided. *(Section B.2.2.2)*

Quota share use would be monitored as part of the TIQ program review process. **[Quota shares not used in at least one of three years would be revoked . . . OR . . . During program review processes, if it is determined that significant portions of the available quotas shares are not being used (catch is not being recorded against quota pounds issued for those shares), use-or-lose or other provisions will be considered to encourage more complete utilization]**. *(Section 2.2.3)*

There are many program features that would facilitate new entry and participation by small fishing operations (e.g. highly divisible access privileges as compared to limited entry licenses). Additional provisions for such purposes could include . . . **[none; a low interest loan program; provisions for new entrants to qualify for revoked shares being reissued (the latter two options are not mutually exclusive)]**. *(Section B.2.2.4)*

A percentage of the quota pounds each year . . . **[would/would not]** . . . be held back from that allocated to quota share holders (0-25%, based on analysis) would be awarded to proposals from fishermen and processors working together to benefit the local community. *(Section 2.2.5)*

[Anyone eligible to own a US documented fishing vessel; Anyone eligible to own or operate a US documented fishing vessel; Stakeholders] . . . would be eligible to own or otherwise control IFQ (quota shares or quota pounds) *(Section B.2.3.1).* Leasing . . . **[would/would not]** . . . be allowed *(Section B.2.3.2).* Quota pounds could be transferred any time during the year. Quota shares would be transferrable . . . **[any time during the year/only at the end of the year]** *(Section B.2.3.3).* There would be no limit on the divisibility of quota shares for purpose of transfer. Quota pounds could be transferred in as little as single pound units *(Section B.2.3.4).* Liens on IFQ are a matter of private contract and would not be specifically limited by this program. A central registry might be created as part of the program administration *(Section B.2.3.5).* There . . . **[would/would not]** . . . be accumulation limits on the amounts of quota shares or pounds used on a vessel, owned, or controlled. The definition of control may extend beyond ownership and leasing. The range of limits being considered **varies from 1% to 50% to no cap.** The limits may **vary by species, segment of the fleet, or type of entity (e.g. vessel owner, permit owner, processor).** Accumulation limits for groundfish in aggregate may also be different than limits for individual species *(Section B.2.3.6)*. There would be no direct limits on vertical integration *(Section B.2.3.7)*.

Program Administration (Section B.3.0 in Appendix B)

Enforcement for the IFQ program may include one or more of the following elements:

- onboard compliance monitors;
- dockside compliance monitors (20%-100%);
- hailing requirements, small vessel exemptions for onboard compliance monitors;
- video monitoring systems;
- full retention requirements;
- a vessel-specific bycatch reporting system;
- electronic landings tracking system;
- limited delivery ports;
- limited delivery sites;
- electronic IFQ tracking systems, and
- VMS.

These measures have been arrayed into the enforcement and monitoring programs provided in Table B.3-1. While some likely specifics are identified to facilitate program design and impact analysis, the FMP amendment language on this issue may be general, specifying that the Secretary will promulgate regulations to establish an adequate monitoring and enforcement regime. Strong sanctions may be recommended along with provisions specifying that illegal overages be forfeited and debited against the vessel's account. Fishing by the vessel would be suspended until the overage is covered. *(Section B.3.1)*. A part of the program administration, a centralized publicly accessible registry for liens against quota shares would be requested with . . . **[all related ownership information/essential ownership information].** (*Section B.3.1*, also see Section B.3.4, Data Collection).

Landings fees would be charged to cover program costs and, over time, some elements of the program may be privatized, as appropriate. *(Section B.3.2)*

The IFQ program would not have a built-in sunset provision nor would quota shares be issued for fixed terms (i.e., IFQs would not expire after a certain number of years). The program would be revised as necessary through standard FMP and regulatory amendment processes. Information on certain aspects of program performance would be compiled annually and a program review would be conducted every 4 years. *(Section B.3.3)*

The data collection program . . . **[would/would not]** . . . be augmented to include the . . . **[expanded and mandatory; expanded voluntary]** . . . provision of economic data from the harvesting and processing industry. All data collected would be maintained in a confidential manner. Aspects of these provisions would require modification of the MSA. A central registry of IFQ shareholders and transactions would be maintained and include market value information. Government costs would also be tracked. *(Section B.3.4)*

List of Options from Appendix B,
TIQC Recommendations and Public Comment

Options with bolded titles (e.g., "**Option 1**") are those which the TIQC has included among the IFQ programs it is recommending (Option Table C-1 of Agenda Item C.5.a, Attachment 1). Other options are also provided, for possible discussion in the analysis.

Each set of public comments is provided in a text table for which the source of the comment is noted to the right. Organization acronyms used are as follows:

BSCC .... Bandon Submarine Cable Committee
CBTA .... Coos Bay Trawlers Association
CJC .... Coastal Jobs Coalition
ED .... Environmental Defense
FMA .... Fishermen's Marketing Association
IPHC .... International Pacific Halibut Commission
MTC .... Midwater Trawlers Cooperative
PCFFA .... Pacific Coast Federation of Fishermens Associations
PMCC .... Pacific Marine Conservation Council
POORT .... Port Orford Ocean Resource Team
Survey (ED) .... Results from survey work done by Environmental Defense
UASC .... United Anglers of Southern California
WCSPA .... West Coast Seafood Processors Association

B.1.0 IFQ Allocation

Public Comment:

Comment	Source
Establish a control date for processors.	1 individual
Don't make the shares so small that opportunity is reduced below current levels	1 individual

B.1.1 Eligible Groups and Group Shares

In order to qualify for quota share, an entity would have to be a member of an eligible group.

Groups Eligible for an Initial Allocation	
Option 1	Allocate IFQ to Current Permit Owners.
Option 2	Allocate IFQ to Vessel Owners.
Option 3 (see following table for Options 3a and 3b)	Allocate IFQs to Permit-Owners/Vessel-Owners/Processors (consider all combinations and allocate to ownership of the vessel or facility at the time of initial allocation, where relevant). Processor Percentages: 0%, 25%, 50%
Option 4	Allocate to High Bidder in Auction (eligibility rules for participation to be developed)–not legal under the current Magnuson-Stevens Act.

The TIQC recommended that Options 1 and 3 be maintained for the EIS. A minority supported maintaining Option 4 for purpose of analysis. The TIQC recommends against allocation to vessel owners rather than permit owners, because once the limited entry fishery was established most of the value of the fishery was capitalized into the value of the permit. The TIQC program recommendations contain the following three options.

Groups Eligible for an Initial Allocation: Options Included In TIQC IFQ Program Recommendations:			
Group	***Option 1***	***Option 3a***	***Option 3b***
Permit Owners	*100%*	*75%*	*50%*
Vessel Owners	-	-	-
Processors	-	*25%*	*50%*
High Bidder	-	-	-

There was no TIQC consensus with respect to the definition of processors. Both of the following options were maintained in the TIQC program recommendations.

Definition of Processor	
Option 1	Limit Group Using Special IQ Program Definition: The processor is the entity which - 1. after processing, sells his or her own LE-trawl-vessel caught groundfish directly to a wholesale or retail market; OR 2. buys unprocessed trawl-caught groundfish, processes it, and sells it to the wholesale or retail market. The entity is defined as Suboption 1(a) the processing facility, and allocation goes to the current owner, unless leased, in which case it would go to the current lessee (Suboption 1(a)(i)) OR the current owner (Suboption 1(a)(ii)) Suboption 1(b) the person processing (individual, partnership, corporation or other entity).
Option 2	FMP Definition "person, vessel, or facility that engages in processing; or receives live groundfish directly from a fishing vessel for retail sale without further processing." Same suboptions for definition of entities as in Option 1.

Processors should only receive credit toward the allocation formulas for fish they process (fish passed through to another processor without processing should not be counted). Information beyond what is on fishtickets will be needed to substantiate processing activities (fishtickets do not indicate whether or not the entity receiving the fish processed it).

Public Comment:

Comment	Source
Allocate to processors that are NOT vertically integrated (do not own fishing operations)	1 individual
Allocate 50% to permit owners and 50% to primary processors.	CJC
Allocate to permits, processors (company or facility, to be decided) and communities handling more than 1% of the annual landings	WCSPA
Allocate to permit owners, processors and communities.	CJC
Allocate to skippers who can demonstrate dependence	ED and two individuals
Allocate to crew members	Survey (ED)
Allocate to communities	Survey (ED)
Allocate to processors	Survey (ED)
Do NOT allocate to processors	Survey (ED)

B.1.2 Qualifying Criteria: Recent Participation

Recent participation might be required to qualify for an initial allocation of quota shares.

Qualification Criteria: Recent Participation	
Option 1.	No recent participation requirement
Option 2.	Recent participation (1998-2003) required to be eligible for an initial allocation (one groundfish trawl landing/delivery of any groundfish species, or a minimum number of trips and/or number of yrs to be specified).
Option 3.	Same as Option 2 but the years would be 2000-2003.
Option 4. (This option applies only to shorebased processors and motherships. Option 1, 2 or 3 could be applied to vessels or processors.)	Same as Option 2 but the years would be 1999-2004.

The TIQC previously recommended that all options be maintained for the EIS. The TIQC program recommendations include only Options 1, 2, and 4.

Public Comment:

Comment	Source
Have a continuing recent participation requirement so that if IFQ are issued they do not go to individuals who have left the fishery.	1 individual

B.1.3 Elements of the Allocation "Formula"

Formulas would be used to allocate quota shares among members of eligible groups who meet the recent participation requirement (if any).

Vessel/Permit Related Allocation

Allocation Formula Options for Qualified Permits/Vessels

Allocation Basis	Option 1	**Option 2**	Option 3	Option 4
Permit History	100%	Use permit catch/landings history for permits not bought back.	-	-
Augmented History (Catch/Landings History and/or Bycatch Estimate Based on Target Species)[a/]	-	-	100%	-
Equal Sharing	-	Catcher vessel permit owners: Equally split proportion of quota that could be attributed to bought back permits/vessels[b/] Incidentally harvested overfished species suboptions, either: (a) same as for other species OR (b) equally divide overfished species quota shares.	-	-
Auction	-	-	-	100%
Other	-	For catcher-processor permit owners, use an allocation schedule developed by unanimous consent of that sector (to be provided).	-	-

a/ In some cases, history of target species, rather than bycatch or incidental catch, might be used to avoid rewarding those with high incidental catch rates.

b/ Earlier versions of the equal sharing option included a statement that only those with catch history for a particular species would qualify for the equal share portion for that species (for example, a vessel that fished only south of Cape Mendocino would not qualify for quota shares for a management unit north of Cape Mendocino).

The TIQC previously recommended developing a suite of options covering the range of Options 1 through 4 for purpose of analysis. The majority of the TIQC voted to eliminate the auction option from detailed analysis and a minority supported maintaining it. The TIQC program recommendations contain only Option 2.

Processor Allocation

Allocation Formula Options for Qualified Processors

Allocation Basis	**Option 1**	Option 2
Processing history of trawl groundfish landings received unprocessed	100%	-
Auction	-	100%

The majority of the TIQC voted to eliminate the auction option from detailed analysis and a minority supported maintaining it. The TIQC program recommendations contain only Option 1.

Public Comment:

Comment	Source
Measure landings history by value of product rather than weight of catch	Survey (ED)
Allocate based on an auction	CJC, WCSPA
Allocate based on an auction tiered for different types of operations	ED
Do NOT allocate based on an auction	1 individual

B.1.4 History: Species/Species Groups to Be Used for Allocation

Quota shares for a particular species or species group might be allocated based on an entity's history catching/landing/processing that species or species group or their history catching/landing/processing some other species or species group. For the latter case, examples include use of a permit's history of landings of all groundfish in aggregate to allocate quota shares of sablefish (Option 1), or use of a permit's history of landing whiting as a proxy for allocating darkblotched (Option 3).

Landings History: Species/Species Group Options	
Option 1.	Allocate Quota Shares Base on Nonwhiting Groundfish (In Aggregate) and Whiting: Allocate quota shares for each species/species group based on relative amounts of total groundfish caught/landed or processed, except whiting. Use whiting history to allocate whiting IFQ. For permits applies to permit history; for processors applies to amounts processed.
Option 2.	Allocate Quota Shares Based on Individual Species/Species Groups: Allocate quota shares for each species/species group based on relative amounts of each respective species/species group caught/landed or processed - for permits applies to permit history; for processors applies to amounts processed (Option 2).
Option 3.	Individual Species/Species Groups Plus Proxies for Special Cases: Allocate IFQ for each species/species group based on relative amounts of each species/species group caught/landed or processed, except for each of the following species use the indicated proxy: Species/Species Group — Proxy Species/Species Group xxxxx — xxxxxxxxxxxxxx xxxxx — xxxxxxxxxxxxxx xxxxx — xxxxxxxxxxxxxx For permits applies to permit history; for processors applies to amounts processed.

The TIQC previously recommended maintaining Options 1 and 2 for analysis. Option 3 is presented to provide consistency with Option 3 of Section B.1.3. The TIQC program recommendations contain only Option 2.

Public Comments: None.

B.1.5 History: Allocation Periods

For the portion of the quota share allocation to be based on catch/landing/processing history, a period needs to be designated over which history will be evaluated. Options include the opportunity to drop a worst year as a way of taking into account potential hardships without creating a special appeals process. Different periods may be used for different groups.

History: Allocation Period Options

Allocation Period Option	Number of Years in Allocation Period	SubOptions: Number of Worst Years to Drop from History	
		Suboption A	Suboption B
Option 1. 1994-2003	10	None	**2 for whiting fishery history 3 for nonwhiting fishery history**
Option 2. 1994-1999	6	None	1
Option 3. 2000-2003	4	None	None
Option 4. 1998-2003	6	**None**	1
Option 5. 1999-2004 (This option applies only to processors. Option 1-4 would be applied to vessels or processors).	6	None	**2**

Previous to its last meeting, the TIQC recommended Options 1-4 for analysis. Option 5 was added at their May 2005 meeting, along with the option to drop three years as part of Option 1 Suboption B. The IFQ programs recommended by the TIQC include Option 1 Suboption B, Option 4 Suboption A, and Option 5 Suboption B.

The allocation formula can be constructed by summing all pounds across the allocation period or by weighting between years to take into account the relative opportunity available in each year. By weighting between years, a given number of pounds caught/landed or processed in years in which the aggregate catch was lower may entitle the applicant to more quota share than the same amount of pounds caught/landed or processed in a year in which the aggregate catch was higher.

Allocation Formula: Weighting Suboptions	
Suboption (i)	Absolute Pounds: Base allocation on a calculation using total pounds across all years (e.g. if total fleet landings were greater in 1994 than in 2003, a pound landed in 1994 will qualify an individual for the same amount of quota share as a pound landed in 2003)
Suboption (ii)	Relative Pounds: Base allocation on a calculation using the percent of the total for each species in each year (e.g. if total fleet landings were greater in 1994 than in 2003, landing 0.005% of the fish in 1994 would qualify an individual for the same amount of quota share as landing 0.005% of the fish in 2003).

The TIQC has recommended both weighting suboptions for analysis, and both options are contained in the TIQC IFQ program recommendations.

Public Comments: None.

B.1.6 History: Combined Permits and Other Exceptional Situations

Other categories of landings/catch to be considered for inclusion or exclusion as part of the landings history for purposes of allocation are provided in the following table.

History: Combined Permits and Other Exceptional Situations		
Exceptional Situation	**Option 1**	Option 2
Combined permits:	All Permits Count: Consider all landings history of the permits that have been combined to be part of the landings history of the permit resulting from the combination.	Only the Base Permit Counts: The combined permit would have only the landings history associated with its permit number (landings history of other permits with which it has been combined would not accrue to the combined permit).
Illegal landings/catch:	Don't count illegal landings/catch.	[not a reasonable option]
Landings in excess of trip limits, as authorized under an EFP	Do not count landings in excess of cumulative limits in place for the nonEFP fisheries.	Count all landings authorized under the EFP, including those in excess of the cumulative limits in place for the nonEFP fishery.
Compensation fish (fish taken as payment by vessels assisting in research)	Don't count compensation fish	Count such landings

The TIQC recommended IFQ programs include only Option 1 under each of the above exceptional situations. No serious consideration was given to counting illegal landings/catch.

Public Comments: None.

B.1.7 Initial Issuance Appeals Process

An appeals process will be needed to address disputes between permit applicants and the NMFS Limited Entry Permits office over landings records or other qualification criteria.

Only one provision identified thus far: Appeals would occur through processes consistent with the Administrative Procedures Act and any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions.

Public Comments: None.

B.1.8 Creating New IFQ Species/Species Groups After initial Implementation

When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided. *(No other reasonable options have been identified.)*

If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.

Public Comments: None.

B.2.0 IFQ/Permit Holding Requirements and IFQ Acquisition (After Initial Allocation)

B.2.1 IFQ and LE Permit Holding Requirements

Currently, a trawl vessel must hold an LE permit in order to participate in the fishery. It is recommended here that this requirement be maintained with implementation of an IFQ program. Additionally, a determination is needed on when a vessel must hold the IFQ necessary to cover a particular catch.

IFQ and LE Permit Holding Requirement Options	
Option 1	**Time of Landing:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) at the time of landing.
Option 2	**Within 24 Hours:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) within 24 hours of the time of landing.
Option 3	**Within 30 Days:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) within 30 days of landing.

Note: For all options, only vessels with LE trawl permits would be allowed to participate in the IFQ fishery. For any vessel with an overage (catch not covered by quota) there would be no more fishing until the overage is covered. Additionally, for vessels with an overage, the limited entry permit cannot be sold or transferred until the deficit is cleared.

SUBOPTION: The above options may be combined with a suboption that requires that some threshold amount of unused IFQ be held at the time a vessel departs from port.

The TIQC IFQ program recommendations include only Option 3, however, all three options and the suboption should be considered as part of the analysis.

Public Comment: None.

B.2.2 Annual IFQ Issuance

B.2.2.1 Start-of-Year Quota Pound Issuance

Quota pounds are issued annually to quota share holders based on the amount of quota shares held. Quota shares are issued at the time of initial allocation. *(No other reasonable options have been identified.)*

Public Comment: None.

B.2.2.2 Rollover (Carryover) of Quota Pounds to a Following Year

A rollover provision allows unused quota pounds to be carried from one year to the next or an overage in one year to be covered by quota pounds from the following year. The rollover would not allow a vessel to use quota pounds from a following year to avoid penalty unless the overage occurs at the end of the year and a grace period is provided (e.g., 30 days, Option 3, Section B.2.1).

Provisions for nonoverfished and overfished species may be mixed-and-matched.

Rollover (Carryover) Options		
	Non-overfished Species	Overfished Species
Option 1	No rollover.	No rollover
Option 2	5% rollover	No rollover
Option 3	10% rollover	5% rollover
Option 4	20% rollover	5% rollover
Option 5	30% rollover	Full rollover (30% rollover under Option 5, 20% when matched with Option 4, etc.)

The TIQC IFQ program recommendations include Options 2, 3, and 5, however, all options should be considered in the analysis.

Public Comment: None.

B.2.2.3 Quota Share Use-or-Lose Provisions

A use-or-lose provision would be intended to ensure that communities and consumers benefit from available harvest opportunities.

Quota Share Use-or-Lose Options	
Option 1	Include use-or-lose provisions (e.g. must be used at least 1 year in 3).
Option 2	Do not include use-or-lose provisions.
Option 3	Do not include use-or-lose provisions but evaluate program performance: Identify the potential nonuse of IFQ as an issue to be evaluated in the program review process. Indicate that, depending on the findings of the evaluation, the program may be modified in the future to create use-or-lose or other provisions to address any concerns.

The TIQC IFQ program recommendations include Option 1 and 3, however, all three options should be considered as part of the analysis.

Public Comment: None.

B.2.2.4 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options

Section 303(d)(5)(c) of the Magnuson-Stevens Act requires that any new program "considers the allocation of a portion of the annual harvest in the fishery for entry-level fishermen, small vessel owners, and crew members who do not hold or qualify for individual fishing quotas." There are also provisions in the Magnuson-Stevens Act that allow for the creation of loan programs to finance small boat and entry level participation. Pursuant to consideration of these issues, the TIQC identified the following potential program elements.

Entry Level Opportunity Elements (NOT MUTUALLY EXCLUSIVE)	
Element 1	Provide a low interest loan program (qualification factors to be determined).
Element 2	Provide an opportunity for new entrants to qualify for shares revoked for program violations or, if there is a use-or-lose provision, non-use (qualification factors to be determined).

The TIQC recommendations for IFQ Program C include Element 2, and the other two programs (A and B) recommend that neither element be included. There was no support for Element 1 but it has been provided in order to ensure that all reasonable options are discussed.

Public Comment:

Comment	Source
Provide low interest loans for community nonprofit organizations to purchase IFQ	ED
Provide low interest loans for new entrants and younger fishermen to purchase IFQ	Survey (ED)
Allocate to new entrants or provide IFQ for purchase from: IFQ reclaimed from IFQ already distributed, IFQ created from increasing TAC, forced sale in an auction (each year existing IFQ holders would provide a portion of their IFQ for annual auction).	Survey (ED)
Provide low interest loans to assist "lease-dependent" fishermen	Survey (ED)

B.2.2.5 Community Stability Holdback

The TIQC discussed the issue of community needs with respect to IFQ program. The following proposal has been put forward and is included as part of Program C.

> Set aside up to 25% of the nonwhiting shoreside trawl sector allocation each year and allocate that amount as quota pounds for joint fishermen/processor venture proposals, ranked on the basis of objective criteria that evaluate benefits to local communities. Criteria for these proposals would have to be developed but would include reference to the TIQ goals and objectives and encourage other community groups (Port, Chamber, etc.) to lend their support to the proposals being submitted. The program should be designed with simplicity, adaptability, fairness and potential revenue production as core elements.

Additional details on this proposal are provided in the TIQC report (June 2005).

Public Comment: None.

B.2.3 Transfer Rules

B.2.3.1 Eligible Owners/Holders (Who May Own/Hold)

The issue here is not who receives an initial allocation but rather who is eligible to acquire IFQ after the initial allocation. Similarly, in the options below the criteria for Options 1 and 2 are not whether an entity actually owns or operates a US documented fishing vessel, but rather whether or not they are eligible to do so.

Options for Eligible Owners/Holders	
Option 1	Any entity eligible to own a US documented fishery vessel.
Option 2	Any entity eligible to own or operate a US documented fishing vessel.
Option 3	Stakeholders: include owners and lessees of LE permits or vessels, skippers/crew, processors, buyers, communities. *(NOTE: If ownership is restricted to certain classes, criteria will need to be established to define membership in these classes.)*

The TIQC's main concern is that anyone currently participating in the fishery should be allowed to continue to do so and to acquire IFQ. It is the TIQC's understanding that certain provisions of the AFA are currently allowing participation by a limited number of entities that would otherwise not be eligible to own a US documented fishing vessel. It is the TIQC's understanding that Option 2 would accommodate those entities but Option 1 may not. On this basis, the TIQC has included only Option 2 in its recommended IFQ programs. However, the other options shown here should be considered in the analysis.

Public Comment:

Comment	Source
Allow communities to form nonprofit organizations and acquire IFQs	ED

B.2.3.2 Leasing and Sale

Various programs around the world have included permanent or temporary restrictions on sale or leasing of quota shares for various reasons. Concerns with leasing relate to avoiding situations of absentee ownership.

Duration of Transfer - Quota Share Leasing and Sale Prohibition Options	
Option 1	Permanent quota share transfers only - leasing prohibited. Permanent transfers and leasing of quota pounds is allowed. (Note: Quota pounds are valid only for one year and expire at the end of the year (unless there is a rollover provision, see Section B.2.2.2); quota pound transfers do not affect ownership of the quota shares).
Option 2	Permanent transfers and leasing of quota shares and quota pounds allowed.
SubOption	Suboption: Prohibit all permanent transfers (leasing only) during the first year of the program.

The TIQC recommended IFQ programs include both Options1 and 2 but not the suboption. However, the suboption is included for consideration in the analysis.

Public Comment:

Comment	Source
Compel quota holders who have historically leased their permits to others to continue to lease their IFQ to those individuals.	Survey (ED)

B.2.3.3 Limits on Time of Transfer

It may be necessary to prohibit the transfer of quota shares at certain times of year in order to facilitate administration of the program. A determination on this has not yet been made for the IFQ programs developed by the TIQC. Even if the transfer of quota shares is limited to certain times of year, quota pounds could be transferred at any time during the year. The following options have been specified.

Time of Year for Quota Share Transfer Options	
Option 1	Allow transfers of quota shares any time during year.
Option 2	Allow transfers of quota shares only at the end of year.

The TIQC IFQ program recommendations include only Option 1. The other option is maintained for purpose of analysis and possible need with respect to administration of the IFQ program.

On a related topic, an embargo on transfer of quota shares was considered for situations in which a vessel had catch not covered by quota pounds. However, because the quota shares underlying a vessel's quota pounds may be held by someone not directly associated with the vessel these options were eliminated as not reasonable.[1/] They were replaced with a limit on transfer of permits (see Section B.2.1).

Public Comment: None.

B.2.3.4 Divisibility

The following is a current list of design elements for quota share and quota pounds divisibility, as identified by the TIQC through the scoping process. Options have not been developed and the design elements are not mutually exclusive.

Elements of Divisibility Provisions	
Element 1.	Quota Shares: quota would be issued as a percentage of total available harvest; shares would be nearly unrestricted in their divisibility - "many decimal points."
Element 2.	Quota Pounds: annual quota would be issued in weight units (pounds); and would be divisible down to a single pound of fish

Both elements are included as part of the TIQC's IFQ program recommendations.

Public Comments:

Comment	Source
Consider blocked quota shares	ED-Survey

B.2.3.5 Liens

Liens are a matter of private contractual arrangements. The TIQC believes that placement of liens should not be restricted and that liens can and should be facilitated through a central lien registry. Options for the central lien registry are covered in Section B.3.1.

Public Comment: None.

B.2.3.6 Accumulation Limits

The TIQC developed the following options for ownership, control and use. Note that different options can be selected for ownership, control or use limits and for different entities (permit holders, vessels, processors) and groundfish species, as well as for nonwhiting and whiting sectors. Limits for groundfish in aggregate may also be different than limits for individual species (for example, the aggregate groundfish limits (%) might be smaller than the individual species limits).

1/ The TIQC has recommended elimination of the transfer embargo options.

Transfer Embargo Options	
Option 1	Quota shares may not be transferred from any account for which there is a deficit of quota pounds (i.e., any account for which catch exceed quota pounds for at least one species.
Option 2	Quota share pounds may be transferred from an account even if it is deficit for some species.

Options for IFQ Concentration Limits						
	Non-Whiting Groundfish			Whiting Fishery **(Separate Matrix for Each Sector Specified in the Options Selected in Section 2.1.1.4)**		
	Ownership	Control	Use by a Vessel	Ownership	Control	Use by a Vessel
Option 1	1%	1%	1%	5%	5%	5%
Option 2	5%	5%	5%	10%	10%	10%
Option 3	10%	10%	10%	25%	25%	25%
Option 4	50%	50%	50%	50%	50%	50%
Option 5	No Cap	No Cap	No Cap	No Cap	No Cap	No Cap

Due to the unavailability of summary data, the limits included in the TIQC IFQ program recommendations are broad and not specific with respect to the various species or groups to which they might be applied. Once the needed summary data is available, it may be possible to craft more specific options for consideration. The TIQC recommends analysis of a broad the definition of control so as to cover more than just the leasing and buying of permits.

Public Comment:

	Source
Include a no-cap option	WCSPA
Consider different caps for different types of owners (e.g., vessels, buyers, communities)	WCSPA
Apply the same caps to all types of owners	1 individual
Caps for processors should take into account any IPQ held (NOTE: applies only if there is IPQ)	1 individual

B.2.3.7 Vertical Integration Limit

The TIQC recommended no additional limits on vertical integration other than what is provided through the accumulation limits.

Public Comment: None

B.3.0 Program Administration

B.3.1 Tracking IFQ, Monitoring Landings, and Enforcement

The following are possible elements for a tracking, monitoring and enforcement system.

Elements of Tracking Monitoring and Enforcement System	
Element 1.	Onboard compliance monitors (20%-100%)
Element 2.	Dockside compliance monitors (20%-100%)
Element 3.	Hailing requirements
Element 4.	Small vessel exemptions for onboard compliance observers
Element 5.	Video monitoring system
Element 6.	Full retention requirement
Element 7.	Upgraded bycatch reporting system
Element 8.	Electronic landings tracking system
Element 9.	Limited delivery ports
Element 10.	Limited delivery sites
Element 11.	Electronic IFQ tracking systems
Element 12.	Vessel monitoring system (VMS)

These elements have been tentatively arrayed into enforcement program options in Table B.3-1. Only Enforcement Programs 1, 2, and 3 are considered reasonably viable without reducing harvest to compensate for noncompliance risk. Those three programs have been included in TIQC recommended IFQ programs.

The following are elements related to penalties for overages. Options have not been identified.

Elements of Provisions Related to Penalties	
Element 1.	Strong sanctions for violators.
Element 2.	Forfeiture and suspension until overage is covered. Illegal should **be** forfeited on landing and debited against the vessel's account. Additional enforcement action should be taken, as appropriate. Fishing would be suspended until quota ponds have been acquired to cover the overage.

Element 2 was developed by the TIQ Enforcement Group. The TIQC was highly supportive of strong sanctions for violators.

A lien registry might also be created as part of a quota share tracking system.

Lien Registry Options	
Option 1.	Create a central lien registry including all related ownership information.
Option 2.	Create a central lien registry but exclude all but essential ownership information.

Both lien registry options are included in the TIQC's IFQ program recommendations.

Public Comment:

Comment	Source
Require VMS and 100% observer coverage - shoreside and at-sea	ED
Analyze limits on number of ports to which deliveries are allowed	WCSPA

B.3.2 Cost Recovery/Sharing and Rent Extraction

Landings fees would be charged to cover program costs and, over time, some elements of the program may be privatized, as appropriate.

Elements of Cost Recovery/Sharing Rent Extraction Provisions	
Element 1.	Landings Fee (max of three percent under current Magnuson-Stevens Act).
Element 2.	Privatization of Elements of the Management System, for example: Monitoring IFQ Landings (e.g., industry pays for their own compliance monitors) Fishtickets (industry payment for Trawl IQ program landings information to be fed into a Federal electronic system)

Recommended IFQ Programs A and B state that "cost recovery should be only for management (not enforcement or science) and should be limited to 3% of exvessel value." Recommended IFQ Program C states "Landings fee plus privatization of elements of the management system. In particular, monitoring of IFQ landings (e.g., industry pays for their own compliance monitors).Stock assessments should not be privatized and the electronic fish ticket system should not be privatized."

Public Comment:

Comment	Source
An IFQ Program should have discrete and secure funding.	UASC
Include cost recovery provisions with a sliding scale for those that may be disadvantaged by such provisions	ED
Split all or a portion of observer costs evenly between quota holders.	Survey (ED)

B.3.3 Program Duration and Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))

Section 303(d)(5)(A) of the Magnuson-Stevens Act requires that any new program "establishes procedures and requirements for the review and revision of the terms of any .. .[program], (including any revisions that may be necessary once a national policy with respect to individual fishing quota programs is implemented), and, if appropriate, for the renewal, reallocation, or reissuance of individual fishing quotas."

Elements of Provisions Related to Performance Monitoring, Review and Revision		
Element 1	Revision Process	Standard for FMP and regulatory amendments
Element 2	Sunset Provisions and Fixed Term Entitlements	None (Sunset provisions and fixed term entitlements (i.e. IFQs that expire after a certain number of years) were considered and rejected from further analysis.
Element 3	Response to Forthcoming National Policy	Standard FMP and regulatory revision processes, clear public notice that the IFQ may be revoked and/or reissued and that the program may be modified or cancelled without compensation.
Element 4	Monitoring	Annual reports
Element 5	Review	Every four years

No options have been developed. All elements are included in all of the TIQC recommended IFQ programs. Among other factors, the review would include evaluation of whether or not there are localized depletion problems and whether or not quota shares are being utilized.

Public Comment:

Comment	Source
Consider a range of automatic sunset provisions (1-10 years)	PMCC
Consider sunset provisions with disposal of the quota in a manner that satisfies the public trust.	UASC
Include performance reviews	PMCC

B.3.4 Data Collection

Program review and monitoring will require adequate data collection.

Data Collection Options

	Option 1: Expanded Mandatory	Option 2: Expanded Voluntary	Option 3: Status Quo
Limited Entry Trawl Industry (including processors)	Mandatory submission of economic data (expanded efforts compared to status quo)	Voluntary submission of economic data (expanded efforts compared to status quo)	Voluntary submission of economic data (status quo efforts)
Other Affected Sectors of the Fishing Industry	Voluntary submission of economic data	Voluntary submission of economic data	Voluntary submission of economic data
Central Ownership and Transaction Value Registry	Yes	Yes	No
Government Costs	Formal Monitoring	Formal Monitoring	Ad hoc Assessment

Options 1 and 2 are included in the TIQCs recommended IFQ programs. Option 3 should also be considered as part of the analysis. Option 1 would require a changes to the Magnuson-Stevens Act.

Public Comment: None.

Table B.3-1. TIQ Enforcement Group preliminary scoping of possible enforcement programs.

	Program 1 100% at-sea No Discards Elect. State FT 100% shore Limited hours Limited ports	Program 2 100% at-sea Discard+Bycatch Rep Sys Elect. State FT Partial shore Unlimited hours Limited sites	Program 3 100% at-sea (camera opt) Discard+Bycatch Rep Sys Elect. Fed Landings Sys Partial shore Unlimited hours Limited sites	Program 4	Program 5
At-Sea Monitoring	100% (Compliance Monitors)	100% (Compliance Monitors)	100% (Compliance Monitors or Camera)	Partial Compliance Monitor Coverage	None
Retention Requirement	Full Retention	Discards Allowed	Full if Camera, Discards Allowed if Compliance Monitor Present (see NOTE)	Discards Allowed if Compliance Monitors Present	Full Retention
Bycatch Reporting System Comparable to Landing Tracking System	Not needed	System Needed (electronic)	System Needed (electronic)	System Needed (electronic)	Not needed
Landing Tracking System	Electronic	Electronic	Parallel Electronic Federal System (maintain paper fishtickets)	Parallel Electronic Federal System (maintain paper fishtickets)	Paper Fishticket
Shorebased Monitoring	100%	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)
Vessel Provides Advance Notice of Landing	Yes	Yes	Yes	Yes	Yes
Limited Landing Locations	Specified Ports	Site Licenses	Site Licenses	Specified Ports	Specified Ports
Electronic IFQ Reporting	Yes	Yes	Yes	Yes	Yes
Limited Landing Hours	Yes	No	No	Yes	No
Overall Assessment of Program Effectiveness	Programs provide adequate control with different degrees of cost and flexibility for the vessels.			Control inadequate. Compensation required through a reduction in the OY in anticipation of unreported landings.	
VMS is an assumed component of the enforcement environment.					
Small vessel provision: small vessels may apply for an exemption and carry a camera instead of an compliance monitors.					

NOTE: For systems relying on cameras and a "no discard" rule, there may be a problem with not being able to discard prohibited species.

Agenda Item C.5.a
Attachment 3
June 2005

NATIONAL ENVIRONMENTAL POLICY ACT SCOPING RESULTS DOCUMENT

INDIVIDUAL FISHING QUOTAS (A KIND OF DEDICATED ACCESS PRIVILEGE) AND OTHER CATCH CONTROL TOOLS FOR THE PACIFIC COAST LIMITED ENTRY TRAWL GROUNDFISH FISHERY

Lead Agency	Pacific Fishery Management Council 7700 NE Ambassador Place, Suite 200 Portland, OR 97220-1384 http://www.pcouncil.org
For Further Information Contact	Jim Seger (503) 820-2280, or (866) 806-7204, toll free

Abstract: The purpose of this document is to: describe the work and discussion results of the Pacific Fishery Management Council and its advisory bodies on individual fishing quotas (IFQ) and other catch control tools for the groundfish trawl fishery, to summarize public comments received during the scoping period, and to provide initial analysis of draft alternatives. At its June 2005 meeting, the Council will weigh comments received from the public and its advisory bodies, and review draft alternatives. It will make an initial decision at its June 2005 meeting on structuring program alternatives for future analysis in an IFQ Environmental Impact Statement (EIS) for public review, revising the draft alternatives as appropriate. The Council will also consider whether or not to formally announce scoping for an intersector allocation EIS to support the IFQ program and implementation of the programmatic bycatch EIS.

Implementing regulations for the National Environmental Policy Act (NEPA) at 40 CFR 1501.7 require that federal entities conduct “an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping.” On May 24, 2004, the Council announced its intent to prepare an EIS to analyze proposals that would provide dedicated access fishing privileges (DAP) for participants in the non-tribal Pacific Coast groundfish trawl fishery (69 FR 29482). In the notice the Council identified IFQs as the main type of DAP alternative under consideration but invited comment on other types of DAP programs and management alternatives that would not be considered DAP programs. The Council had begun public scoping on this EIS at its September 2003 meeting. The announcement of the Council’s intent to prepare an EIS also announced that the Council would receive comments on NEPA scoping for the EIS until August 2, 2004.

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Terminology and Acronyms

Buyer/Processor -	All references to buyers or processors are references to the first receiver of a vessel's catch, unless otherwise indicated.
DAP -	Dedicated Access Privileges - a form of output control whereby an individual fisherman, community, or other entity is granted the privilege to catch a specified portion of the total allowable catch
ICA - Incidental Catch Allowance	an amount of catch available to a harvesting sector to cover incidental catch, not allocated individually
IQ - Individual Quota	IQ for fishing or processing
IBQ - Individual Bycatch Quota	IQ for fishing, must be held for the catch of certain species for which discard is <u>required</u>
IFQ - Individual Fishing Quota	IQ for fishing. Under the IFQ alternatives proposed in this document, IFQ must be held for catch. Catch may be retained or discarded at the fisher's discretion but once caught it counts against the IFQ regardless of its final disposition
IPQ - Individual Processing Quota	IQ for processing. Implementation of IPQ programs is currently prohibited
QS - Quotas Shares	IQ held as percent of total quota allocated to an individual
Quota Pounds - Annual IQ	IQ held as pounds allocated annually based on the quota share held

Chapter 1.0 PROCESS, PURPOSE, AND NEED

1.1 Introduction

Overview

The scoping process supported by this document is intended to help determine whether dedicated access privileges (DAP) or some other type of total catch control tool should be used to limit harvest of the Pacific Coast groundfish limited entry trawl fishery. Under status quo management, total catch is limited by vessel landing limits and seasons, adjusted to take into account estimated discards. DAPs are a "form of output control whereby an individual fisherman, community, or other entity is granted the privilege to catch a specified portion of the total allowable catch"(Commission on Ocean Policy, 2004). The primary type of dedicated access privilege proposed thus far is individual fishing quotas (IFQ). IFQs were part of the preferred alternative adopted under the Pacific Fishery Management Council's (Council) programmatic bycatch EIS.

The National Environmental Policy Act and public scoping: NEPA is a law that requires Federal agencies and partners to analyze the effects of their proposed actions on the human environment before making a decision on whether to take a particular action. Implementing regulations for NEPA at 40 CFR 1501.7 require that federal entities conduct "an early and open process

Council scoping on this issue began September 2003. The publicly announced NEPA scoping period ran from May 24, 2004 through August 2, 2004. Hearings were held June 13, 2004 in Foster City, California; July 20, 2004 in Seattle, Washington; and July 27, 2004 in Newport, Oregon.

This document contains:

- information that was provided in the scoping information document during the NEPA scoping process,
- summaries by topic of public comments received through the September 2004 Council meeting, and
- some initial analysis in Appendices A and B.

Two Decision Stages

If an IFQ program is to be recommended and implemented, Council work will be separated into two large-scale decisions. The first issue is how a trawl IFQ program would be designed, including all of the details on allocating harvest privileges between participants, developing an associated enforcement and monitoring program, and implementing the program through NMFS. The Council has been scoping this issue through the solicitation of public comment and work of the TIQC and other advisory bodies. The second issue, which will affect all of the directed and incidental commercial and recreational groundfish fleets is the establishment of allocations of groundfish between the limited entry trawl and other groundfish sectors (Figure 1.1-1). The Council's Ad Hoc

Allocation Committee has been considering intersector allocation both as a mechanism to support the development of an IFQ program for the trawl fishery, and to implement bycatch mitigation tools under consideration in draft Amendment 18 to the FMP.

Organization of This Document

IFQs, a type of DAP, are one of the primary tools being proposed to address the purpose and need for action presented in Section 1.2. Major decisions scheduled for the June 2005 Council meeting are summarized in Section 1.5. Alternatives currently being considered are provided in Section 2.1. Section 2.2 lists types of impacts that would be considered in an EIS. Detailed analysis of design choices imbedded in the major alternatives are provided in related appendices. Design elements related to the overall management regime are provided in Appendix A. Detailed design elements identified for an IFQ program are provided in Appendix B. Recommendations and comments from the public, Trawl Individual Quota Committee (TIQC), TIQ Independent Experts Panel and TIQ Enforcement Group are summarized and provided in the relevant sections of Chapters 1 and 2 and Appendix A and B. Public comments pertaining to alternatives and impacts have also been recorded, summarized, presented separately (November 2004, Exhibit C.6.e, Attachment 6 - Public Scoping Comments), and provided here as Appendix I.

Policy Background

In 2000, the Council adopted a Strategic Plan for its management efforts for the Pacific Coast groundfish fisheries. The intent of this plan, entitled "Transition to Sustainability," was to chart a course for management that would lead to a future with, among other goals:

- healthy, resilient groundfish stocks that are harvested at levels sustainable over the long-term
- a fishing industry that is reduced and limited in numbers of participants and harvest capacity to levels consistent with the productivity of the groundfish resource
- a fishing industry with a diverse, stable, and market-driven operating environment
- fishery management that creates incentives for fishery participants to operate their businesses in manners compatible with management goals
- resolution of allocation disputes, whether over directed or incidental catch
- minimization and quantification of discarded incidental catch (bycatch) by all gear groups
- less complex and more easily enforced fishery regulations
- protection for essential groundfish habitat
- improved operating conditions and fishery profitability such that participants remaining in the fishery will be capable of bearing responsibility for a portion of the cost of effective science and management needed to support the fishery (PFMC, 2000)

> ". . . . '**excess capacity**' compares a vessel/fleet's harvesting capacity and its actual catches; and
>
> '**overcapacity**' exists when a vessel/fleet's harvesting capacity exceeds a management target. "
>
> (National Marine Fisheries Service, August 2004).

Achievement of many of the Strategic Plan's goals depended on the Council being able to develop and recommend fishery capacity reduction programs. Participation in much of the directed groundfish fisheries was restricted via the 1994 limited entry program, Amendment 6 to the Fishery Management Plan (FMP). By 2000, the Council had a sense that the fisheries remained overcapitalized in spite of fleet size caps effected by Amendment 6. To prepare for developing the Strategic Plan's harvest capacity goals, the Council asked its Scientific and Statistical Committee (SSC) to review overcapacity in the limited entry and open access groundfish fleets. The SSC's review showed all of the commercial groundfish fleets to be overcapitalized when considering the harvest capacity of participating vessels against available groundfish harvest levels in 2000.

To reduce harvest capacity in the limited entry trawl fleet, the Strategic Plan recommended a permit stacking program and a permit/vessel buyback program in the near term, and an IFQ program over the longer term. In December 2003, NMFS implemented a vessel/permit buyback program for the limited entry trawl fleet that bought 91 vessels, plus their associated Federal and state permits out of the trawl fleet. This buyback reduced the number of limited entry trawl permits and potential participating vessel by 35%.

Since the adoption of its Strategic Plan in 2000, the Council has had to focus its groundfish management efforts on large-scale projects to implement fishery management requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). A series of lawsuit losses and subsequent court orders led the Council to: redevelop and adopt rebuilding plans for the eight overfished West Coast groundfish species via Amendments 16-1, 16-2, and 16-3 to its FMP; revamp its harvest specifications and management measures process to allow for greater public notice and comment through a biennial management process via Amendment 17 to the FMP; reanalyze its bycatch mitigation program for West Coast groundfish fisheries through a programmatic EIS, finalized in September 2004 and leading to the generation of draft Amendment 18 to the FMP; and, reanalyze its essential fish habitat (EFH) designation and protection provisions through another broad-scale EIS, scheduled to be finalized in late 2005.

For the final EIS on a groundfish fisheries bycatch mitigation program (the programmatic bycatch EIS), the Council chose a preferred alternative that, in part, supported the future use of IFQs as a management tool to both reduce overall harvest capacity and minimize bycatch. The Council is drafting Amendment 18 to the FMP to implement its preferred alternative from the bycatch mitigation program final EIS (NMFS, 2004). Amendment 18 would tie the Council's capacity reduction activities back to the Strategic Plan by including the Strategic Plan's harvest capacity objective as one of the FMP's objectives:

"Achieve a level of harvest capacity in the fishery that is appropriate for a sustainable harvest and low discard rates, and which results in a fishery that is diverse, stable, and profitable. This reduced capacity should lead to more effective management for many other fishery problems. . . ."

In late 2003, with the draft bycatch EIS underway and the trawl buyback program nearing completion, the trawl industry approached the Council about the possibility of beginning discussions on developing an IFQ program for the limited entry trawl fishery. At its September 2003 meeting, the Council agreed to consider an individual quota (IQ) program for the trawl fishery. IQs are a type dedicated access privilege program as defined by the U.S. Commission on Ocean Policy (see box). The term "Individual quota" includes a set of programs broader than IFQs. For example, individual processing quota (IPQ) would be a type of individual quota. The Council authorized its Chair to appoint an Ad Hoc Trawl Individual Quota Committee (TIQC) to explore development of such a program. This decision began a preliminary scoping process on a DAP program for the Pacific Coast groundfish limited entry trawl fleet. This preliminary scoping process is analogous to internal scoping, which occurs in most agencies prior to the formal public announcement of the intent to prepare an EIS and conduct a NEPA scoping process (see Section 1.4). This document summarizes public comments received and analyses conducted during and subsequent to the public scoping period; it will be used by the Council at its June 2005 meeting to chart its course for future consideration of IFQ and other harvest control measures for the trawl fishery.

"Dedicated access privileges"

The Magnuson-Stevens Act, the nation's lead marine fisheries law, refers to the term "individual fishing quota" as meaning "a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person. Such term does not include community development quotas as described in section 305(i)."

Over 2001-2004, the U.S. Commission on Ocean Policy contemplated a broad range of ocean resource management issues, including those associated with fishing privileges and access to fishery resources. In its final report, the Ocean Commission stated that it favored the use of the term "dedicated access privileges" as a broad term for fishery management programs that restrict fishing access to particular stocks of fish. The Ocean Commission defined dedicated access privileges as "a novel form of output control whereby an individual fisherman, community, or other entity is granted the privilege to catch a specified portion of the total allowable catch."

In deliberating over the use of this term,

1.2 Purpose and Need for the Proposed Action

1.2.1 The Proposed Action

The Council is considering developing an IFQ program that would change the primary management tool used for control of the West Coast groundfish trawl catch from a system of two-month cumulative landing limits to a catch based IFQ system where each IFQ pound could be caught at any time during an open season. While the alternatives are focused on consideration of an IFQ program, they may also include other types of DAP programs and other reasonable harvest control alternatives that may be proposed to address issues identified in the problem statement. The status quo alternative (no action) will also be considered. This scoping process and subsequent Council action will result in the identification of a set of alternatives that may be analyzed in a draft EIS. From that set of alternatives, for the purpose of the draft EIS the Council may designate one as its preferred alternative: "the proposed action."

Public comments:

Comment	Source
Include recreational fisheries and allow cross sector transfers. A hard allocation guaranteeing catch for one sector is unfair.	UCSC

1.2.2 Need for Action

Despite the recently completed buyback program, management of the West Coast groundfish trawl fishery is still marked by serious biological, social, and economic concerns; and by discord between fishermen and managers and discord between different sectors of the fishery, similar to those cited in the U.S. Commission on Ocean Policy's 2004 report. The trawl fishery is viewed as economically unsustainable given the current status of the stocks and the various measures to protect these stocks. One major source of discord and concern stems from the management of bycatch, particularly of overfished species as described in the programmatic bycatch DEIS. As described in Section 1.1, the Council groundfish management efforts over the past several years have been focused largely on drafting overfished species rebuilding plans and developing management schemes for minimizing both overall bycatch and overfished species bycatch in particular. Through the bycatch mitigation program final EIS and draft Amendment 18, the Council has indicated its support for future use of IFQ programs to manage the non-tribal commercial groundfish fisheries so that individual fishery participants have both more flexibility in how they choose to participate in the fishery and more accountability for how their individual actions affect the bycatch of overfished species in the groundfish fishery. Upon the recommendations of its TIQC, the Council sent the following problem statement out for public review during the public scoping period:

> *As a result of the legal requirement to minimize bycatch of overfished species , considerable harvest opportunity is being forgone in an economically stressed fishery. The trawl groundfish fishery is a multispecies fishery in which fishermen exert varying and limited control of the mix of species in their catch. The optimum yields (OYs) for many overfished species have been set at low levels that place a major constraint on the industry's ability to fully harvest the available OYs of the more abundant target species that co-occur with the overfished species, wasting economic opportunity. Average discard rates for the fleet are applied to projected bycatch of overfished species. These discard rates determine the degree to which managers must constrain the harvest of targeted species that co-occur with overfished species. These discard rates are developed over a long period of time and do not rapidly respond to changes in fishing behavior by individual vessels or for the fleet as a whole. Under this system, there is little direct incentive for individual vessels to do everything possible to avoid take of species for which there are conservation concerns, such as overfished species. In an economically stressed environment, uncertainties about average bycatch rates become highly controversial. As a consequence, members of fishing fleets tend to place pressure on managers to be less conservative in their estimates of bycatch. Given all of these factors, , in the current system there are uncertainties about the accuracy of bycatch estimation , few incentives for the individual to reduce personal*

bycatch rates, and an associated loss of economic opportunity related to the harvest of target species.

The current management regime is not responsive to the wide variety of fishing business strategies and operational concerns. For example, historically the Pacific Council has tried to maintain a year-round groundfish fishery. Such a pattern works well for some business strategies in the industry, but there has been substantial comment from fishermen who would prefer being able to pursue a more seasonal groundfish fishing strategy. The current management system does not have the flexibility to accommodate these disparate interests. Nor does it have the sophistication, information, and ability to make timely responses necessary to react to changes in market, weather, and harvest conditions that occur during the fishing year. The ability to react to changing conditions is key to conducting an efficient fishery in a manner that is safe for the participants.

Fishery stock depletion and economic deterioration of the fishery are concerns for fishing communities. Communities have a vital interest in the short-term and long-term economic viability of the industry, the income and employment opportunities it provides, and the safety of participants in the fishery.

In summary, management of the fishery is challenged with the competing goals of: minimizing bycatch, taking advantage of the available allowable harvests of more abundant stocks (including conducting safe and efficient harvest activities in a manner that optimizes net benefits over the short-term and long-term), increasing management efficiency, and responding to community interest.

1.2.3 Purpose of the Proposed Action

TASK I. Adopt goals and objectives.

When the Council formed the TIQC, it charged the committee with providing assistance to the Council in identifying provisions for a trawl IQ program, and with scoping alternatives and potential impacts of those alternatives in support of the requirements of the Magnuson-Stevens Act and NEPA. At its first meeting in October 2003, the TIQC drafted a set of goals and objectives, which were later reviewed by the Council and an appointed Independent Experts Panel (IEP). The IEP recommended an modified set of goals and objectives, to which the TIQC recommended further modifications in October 2004. Table 1.2-1 provides the TIQC's original goals and objectives in the left-hand column, the IEP's recommended goals and objectives in the right-hand column, and the TIQCs response to the IEP's recommendations, at the bottom of the table. The participation of the TIQC, the IEP, and other entities in the scoping process for this action is more fully described below in section 1.4.

The following list of "goals, objectives, and constraints and guiding principles" provides the draft purpose of the proposed action. This list is based on recommendations of the IEP, as modified by the TIQC and Council. The Council has not explicitly adopted these goals and objectives and may consider revising them before ultimately moving forward with a IFQ program for the trawl fishery.

Goals

1. Increase regional and national net benefits including improvements in economic, social, environmental and fishery management objectives.

2. Achieve capacity rationalization through market forces and create an environment for decision making that can rapidly and efficiently adjust to changing conditions.

In *Sharing the Fish: Towards a National Policy on Individual Fishing Quotas*, the National Research Council (NRC) stated that "Goals and objectives are central to IFQ program design." NRC further recommended that "The biologic, social, and economic objectives of each fishery management plan (and how a limited entry or access program, including IFQs, will achieve the objectives) should be specified clearly through a process that invites broad participation by

Objectives

1. Provide for a viable, profitable and efficient groundfish fishery.
2. Minimize negative ecological impact while taking the available harvest.
3. Reduce bycatch and discard mortality.
4. Promote individual accountability - responsibility for catch (landed catch and discards).
5. Increase stability for business planning.
6. Increase operational flexibility.
7. Minimize adverse effects from IFQs on fishing communities to the extent practical.
8. Promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry.

Constraints and Guiding Principles

1. Taking into account the biological structure of the stocks including such factors as populations and genetics.
2. Taking into account the need to ensure that the total OYs and ABC for the trawl and all other sectors are not exceeded.
3. Accounting for total groundfish mortality.
4. Avoiding provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors.
5. Avoiding excessive quota concentration.
6. Providing efficient and effective monitoring and enforcement.
7. Designing a responsive review evaluation and modification mechanism.

1.3 Background to the Purpose and Need

The Council has been considering and developing management programs to restrict or reduce capacity in the groundfish fisheries since the mid-1980s. In 1987, the Council appointed an ad hoc Limited Entry Committee to design a West Coast groundfish fisheries license limitation program. In 1991, the Council adopted Amendment 6 to the FMP, a groundfish license limitation program that led to the creation of Federal limited entry permits. When it adopted Amendment 6, the Council acknowledged that the license limitation program was expected to limit the growth of groundfish harvesting capacity but would not resolve the overcapacity problem. The other major alternative considered along with the license limitation program was an IFQ program. However, at that time opposition to IFQs ran at about 80% across all sectors of industry (vessel owners, operators, crew, processors, and support industries). The license limitation program was seen as a first step toward rationalization of the fleet with further capacity reduction measures to

National Plan of Action for Managing Fishing Capacity: In August 2004, NMFS issued an action plan on managing fishing capacity that identified the non-whiting groundfish fishery as a fishery with qualitative indicators of overcapacity. The plan used the following indicators for overcapacity:

(1) the biological status of the fishery (Is it overfished?),
(2) management category (Is the fishery open access, limited access, or rights-based?),
(3) harvest-TAC relationship (Do catches exceed the quotas?),
(4) TAC-season length (Is the fishing season increasing or decreasing?),
(5) total catch levels and their allocations (How contentious is the quota-setting process?)
(6) latent permits (What is the ratio of active to total permits?), and
(7)catch-per-unit-of-effort in commercial fisheries (Are catch rates increasing or declining?)

The Council and National Policies on IFQ Programs

1988 – The Council included IFQs among the main alternatives it considered in its deliberations on what became the Amendment 6 groundfish license limitation program (fully implemented in 1994).

1991 – The Council begins drafting Amendment 8 to the FMP, an IFQ program for the limited entry fixed gear sablefish fisheries.

1994 – Council sets aside draft Amendment 8 in response to controversy and a Congressional request that it stop work on any IFQ programs.

1996 – Sustainable Fisheries Act finalized, amending and renaming Magnuson-Stevens Act, including a nationwide moratorium on the creation of any new IFQ programs until October 1, 2000.

1999 – National Research Council issues “Sharing the Fish,” a national study of IFQ programs conducted at the request of Congress.

2000 – Congress uses a budget bill (PL 106-553) to extend the moratorium until October 1, 2002, but exempts a Pacific Council program for limited entry fixed gear sablefish endorsed permit stacking from the moratorium.

2000 – The Council completes its Strategic Plan, recommending future implementation of IFQ programs for capacity reduction in the groundfish fisheries.

2001 – NMFS implements Amendment 14 to the FMP, a permit stacking program for limited entry permits with sablefish endorsements.

2002 – IFQ moratorium expires on October 1.

2003 – Trawl industry representatives approach the Council about developing a trawl IFQ program.

2004 – Bycatch mitigation program EIS finalized, Council preferred alternative recommends implementing IFQ programs for commercial groundfish fisheries to both reduce harvest capacity and minimize bycatch.

follow. NMFS implemented Amendment 6 in 1993, issuing 388 initial limited entry permits with trawl endorsements, in addition to the permits issued with either longline and/or pot gear endorsements. Gear endorsements were used to constrain the universe of limited entry fishery participants using a particular gear type in the groundfish fishery. As of January 1, 1994, vessels were required to have permits to participate in the limited entry segment of the fishery.

Limited entry permits were also issued with length endorsements that matched the length of the vessel that originally qualified for the permit. In 1994, at the recommendation of the Council, NMFS issued a final rule allowing permit owners to combine two or more permits to get a permit with a longer length endorsement than any of the original permits. Because a vessel's harvest capacity increases geometrically with an increase in vessel length, NMFS implemented a length-conversion formula for permit combinations that assigned a certain number of capacity rating points per foot of vessel length. Under this point system, a vessel owner wishing to register his permit to a longer vessel is required to buy capacity points out of the fishery by purchasing and combining enough permits to create a combined permit with capacity points sufficient for the length of his vessel (See 59 CFR17726, April 14, 1994, for further explanation.) By 2003, this capacity restricting permit combination requirement had resulted in permit owners buying 114 trawl permits out of the fishery. Of the 388 trawl permits originally issued, 274 remained prior to the 2003 buyback program.

In 1996, Congress passed the Sustainable Fisheries Act, which significantly amended and renamed the Magnuson-Stevens Act. One of the notable revisions to the act was a requirement that NMFS report to Congress on whether any managed species was considered to be overfished or approaching a condition of being overfished. If a fish stock were determined to be overfished, the Council was required to prepare a plan to rebuild that stock. The Council developed Amendments 11, 12, and 13 to the FMP to implement this and other new provisions of the Magnuson-Stevens Act. Following the Council's 1998 completion of Amendment 11, NMFS declared bocaccio, lingcod, and Pacific ocean perch to be overfished. NMFS declared six subsequent species to be overfished: canary rockfish and cowcod in 2000, darkblotched and widow rockfish in 2001, and yelloweye rockfish and Pacific whiting in 2002. Pacific whiting we declared rebuilt in 2004. Since the 1999 declaration of the first three species as overfished, the Council's groundfish management efforts have largely focused on developing management measures to reduce directed and incidental take of those species.

All of the overfished species, to varying degrees, co-occur with more healthy and abundant stocks. One of the Council's primary strategies for reducing incidental catch of overfished species has been to limit access to healthy co-occurring stocks. In response to the severe reductions in available catch of both overfished and healthy stocks, the Secretary of Commerce declared the groundfish fishery to be a commercial fishery failure in January 2000. This declaration freed disaster relief funds for the three West Coast states, and pushed the Council to complete its Strategic Plan on managing the groundfish fisheries. As discussed the Section 1.1 introduction to this document, one of the SSC's contributions to the Strategic Plan was to evaluate overcapacity in the commercial groundfish fleets by comparing the potential harvest capacity of participating vessels with the amount of fish actually available for harvest. For the non-whiting groundfish trawl fishery, the SSC calculated that 26-40% of the vessels then participating in the fishery were capable of taking all of the groundfish available to that fleet for harvest. Based on the SSC's calculations, the Strategic Plan concluded:

"It is clear from the [SSC figures] that we need a fleet reduction goal of at least 50% of the current number of vessels. Depending on the reduction methods used, it may not be possible to get a full 50% reduction. In addition, eliminating 50% of lower producing vessels may not sufficiently reduce fleet capacity. This should not discourage the Council from moving forward with capacity reduction, as any capacity reduction is better for the fishery than none at all. However, capacity reduction will not be deemed fully successful until capacity has been reduced to a level that is in balance with the economic value of the resource and those remaining in the fishery are able to operate profitably and flexibly."

For the trawl fishery, the Strategic Plan recommended a trawl vessel buyback program as a short to intermediate term objective, and a trawl IQ or mandatory permit stacking program[1/] as an intermediate to long-term objective. IQs for trawlers have been on the Council's official workload list since just after the October 2000 adoption of the Strategic Plan. In June 2001, the Council created an Ad Hoc Trawl Permit Stacking Work Group. That group met February 26, 2002, but its activities were suspended while the Council addressed other workload priorities, and in hope that the Council would be able to complete a buyback program before working on permit stacking.

In a 2003 budget bill (PL 108-7,) Congress instructed NMFS to implement a fishing capacity reduction program for the non-tribal West Coast groundfish fleet excluding Pacific whiting catcher-processors. This bill funded the buyback program with a $10 million appropriation and a $36 million buyback loan approved in an industry referendum. The loan will be paid back by members of the participating fleets (limited entry groundfish trawl, Dungeness crab pot, and Pink shrimp trawl fleets) through landings fees to be paid over the course of 30 years. These fleets have not yet begun to repay the loan. On November 16, 2004, NMFS issued a proposed rule to implement an industry fee system to repay the buyback loan. As of this writing, NMFS has not yet finalized this repayment rule##.

On December 4, 2003, under the buyback program, NMFS retired 91 trawl vessels and their associated state and Federal fishing permits, including their limited entry trawl permits. The buyback program reduced the available pool of limited entry permits for vessels that deliver to shore plants and motherships to 172 permits, excluding the ten permits associated with the whiting catcher-processor fleet. (Since December 2003, two additional trawl permits have been retired through permit combination, leaving 180 permits remaining in the fishery, including those held by catcher-processors.) In terms of 2002 groundfish ex-vessel revenues, buyback program vessels accounted for 40% of the $32 million delivered by all groundfish trawlers, either on shore or to non-tribal motherships.

Following the completion of the buyback program, NMFS analyzed permit latency in the limited entry trawl fleet to determine whether there was a significant number of unused or infrequently used permits in the fishery. The agency's concern the latent capacity stemmed from comments from the public that permit/vessel owners who had been bought out of the fishery could rejoin the fishery by purchasing a new permit and vessel. The Council found no need to take remedial action given the relatively low degree of fleet latency represented by the highly latent permits and the lack of concern

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1/ Mandatory permit stacking reduces capacity in the fishery by requiring permit holders to acquire an additional permit to continue fishing.

among industry members bearing the responsibility for repaying the industry loan that largely funded the buyback program. Further, the Council stated that moving forward with the IFQ project was a better solution to the permit latency and overcapacity issues. Such an IFQ program would obviate the need to address any remaining concerns with latent permit issues.

At the June 2003 Council meeting, members of the groundfish trawl industry approached the Council, requesting that the Council put consideration of a trawl IFQ program on the September 2003 Council agenda. At its September 2003 meeting, the Council chair authorized its Chair to appoint the TIQC. The Council heard at its November 2003 meeting that IQ programs have been identified as a management tool that could potentially do more than any other management tool to permanently resolve various problems in the trawl fishery, including bycatch and other conservation concerns, safety, and industry economic viability. The Council concurred and:

- Recommended November 6, 2003 be published as a control date for IFQ and individual processing quota (IPQ) programs (Appendix F).
- Identified that additional resources would be required for consideration of a trawl IQ program.
- Tasked the staff with preparing a detailed draft plan for IQ program development, identifying the necessary budget, and pursing funding options.

NMFS published November 6, 2003 as a DAP control date notice for IFQ on January 9, 2004 (69 FR 1563.) In that notice, NMFS indicated a broad range of persons or entities who could be eligible for future ownership of any quota shares that might be issued under an IFQ program. The agency did not, however, publish a notice of control date for an IPQ program. In its letter to the Council Chair explaining this omission, NMFS indicated that it had "removed all references to processor quotas in the *Federal Register* notice on the control date because the Magnuson-Stevens Act does not authorize or address the use of IPQs. Further, section 804 of the Consolidated Appropriations Act of 2004 (PL 108-199,) passed on January 23, 2004, states that 'A Council or Secretary may not consider or establish any program to allocate or issue an individual processing quota or processor share in any fishery of the United States other than the crab fisheries of the Bering Sea and Aleutian Islands.' Although this provision had not been enacted in the appropriations language at the time the ANPR [*Federal Register* notice] was published, it had been adopted by the House of Representatives and in conference, and it was anticipated that it would be included if any appropriations Bill were enacted in January . . . However, the ANPR and control date notice does not preclude the Council from developing an IQ program that allows processors to own quota or includes other provisions that take into account the needs of fishing communities, including processors."

1.4 Public Scoping and the Environmental Review Process

Although formally announced public scoping on a potential trawl IFQ EIS did not begin until May 24, 2004, the Council has been conducting scoping on the issue of reducing harvest capacity and bycatch in the trawl fisheries since September 2003. The fishery management council process, under the Magnuson-Stevens Act, is somewhat unusual in that most Federal agencies do not have advisory bodies composed of mixed state, tribe and public representatives who meet in a public forum to develop policy recommendations for the agency. To prepare for and participate in the NEPA process, most Federal agencies have both an internal scoping period when they are developing proposals for public review and an external public scoping period during which time those proposals are sent out for public review and discussed in public fora. In the fishery management council process, these internal and external scoping exercises are combined and public. As discussed above in Section 1.3, Background to the Purpose and Need, the Council's most recent formal consideration of IQ programs for the groundfish trawl sector began at its September and November 2003 meetings.[2/] Following the September meeting, the Council Chair appointed the TIQC from a broad range of constituencies following the September 2003 Council meeting. The names of TIQC members and their affiliations are provided in Appendix E.

The TIQC has essentially served as the Council's initial scoping vehicle, where that committee has looked at the question of what elements it would like to see in a trawl IQ program, if such a program were implemented. It is the Council's role to consider the advice of the TIQC, its other advisory bodies, and the public, to determine whether to proceed with developing a trawl IQ or some other DAP or catch control program and, if so, what alternatives to analyze for public review. In its role as a body for initial scoping on trawl catch control alternatives, the TIQC has met to discuss and develop proposed alternatives on: October 28-29, 2003; March 17-18, 2004; October 26-27, 2004; February 23-24, 2005, and; May 10-11, 2005.

Independent Experts Panel (IEP): During the analysis development process, Council staff was approached by academic economists who had long been associated with the Council and its SSC about how they might be helpful to the program and analysis development process. To take advantage of their offer, the Council formed the IEP. The IEP met jointly with the Analytical Team June 8-9, 2004 and on their own September 22-23, 2004. Additional, review and comment has been provided via e-mail. IEP members are: Christopher DeWees California SeaGrant; Robert Francis, University of Washington; Susan Hanna, Oregon State University; Daniel Huppert, University of Washington; Gilbert Sylvia, Oregon State University.

The Council staff identified the need for a number of committees to support this process and included those committees in its work plan. In addition to the TIQC, the Council has appointed several other ad hoc groups: the Enforcement Group, Analytical Team, and Independent Experts Panel. The Enforcement Group developed enforcement program alternatives during meetings on May 25-26, 2004, and September 28, 2004. Analytical Team members from NMFS, California Department of Fish and Game staff, supported by Council staff, have worked with private contractors to support the analytical needs of the Council and its advisory bodies through the scoping period. They met June 8-9, 2004; July 1-2, 2004; September 7-8, 2004; and November 16-17, 2004.

In addition to the meetings of the TIQC and the Enforcement Group, trawl IFQ program issues were discussed by the Council's Allocation Committee at several of its public meetings between September 2003 and June 2005. The Allocation Committee is particularly interested this issue because implementing a IFQ program for the trawl fleet would require the Council to allocate catch of various groundfish species and species complexes between the limited entry trawl fleet and other directed and non-directed groundfish fishing fleets.

2/ IFQs were also an alternative under the 1991 Amendment 6 groundfish license limitation program and have been an management alternative raised in Council discussions before and since that time.

Meetings of the TIQC, Enforcement Group, Analytical Team, Independent Experts Panel, Allocation Committee, and the Council have served as vehicles for internal yet public NEPA scoping for the proposed action. These meetings were held in preparation for and response to the formally announced NEPA scoping period. NMFS published a notice of intent to develop an EIS and formally initiate scoping on May 24, 2004 (69 FR 29482, Appendix G). The Council's formally announced NEPA public scoping period ran from May 24, 2004 through August 2, 2004. The Council held scoping hearings: June 13, 2004 in Foster City, California; July 20, 2004 in Seattle, Washington, and; July 27, 2004 in Newport, Oregon. Council staff provided a summary of verbal public scoping comments received, plus copies of written public scoping comments received, to the public at the September and November 2004 Council meetings, (November Meeting agenda item E.6.a, Attachment 6). These comments are provided as Appendix I to this scoping summary document.

1.5 Summary of Decisions to be Made

TASK I. Adopt goals and objectives.

A list of goals and objectives is provided in Section 1.2.3, compiled from previous committee reports and Council guidance on a few of the objectives. The compilation in Section 1.2.3 assumes Council acceptance of all previous committee reports. However, the Council has not formally adopted those reports. The recommendations from previous committee reports and Council guidance from its November 2004 meeting are provided in Table 1.2-1.

Tasks II-V.	See Chapter 2 - adopt alternatives for analysis and identify issues of Council concern to be covered in analysis.

At its June 2005 meeting, the Council will weigh comments received from the public and its advisory bodies to decide on moving forward with development of a trawl IFQ program and other reasonable alternatives. It will make an initial decision at its June 2005 meeting on how to structure program alternatives and which should be included for future analysis and public review (Figure 1.5-1).

Task VI. Decide on the timing for initiation of scoping on the intersector allocation EIS.

After considering alternatives for the IFQ EIS, the Council will consider whether or not to formally announce its intent to prepare an EIS on intersector allocation. Intersector allocations are needed not only to support an IFQ program but also to support the Council's preferred alternative from the bycatch mitigation program EIS and the biannual specification process. The preferred alternative from the programmatic bycatch EIS, which supports draft Amendment 18 to the FMP, included future implementation of sector total catch accountability programs such as sector bycatch limits, IFQs, and full retention programs. While IFQ scoping was conducted and alternative IFQ programs were being developed, the Council's Allocation Committee held initial discussions on the need for intersector allocations to support an IFQ program and conducted some preliminary scoping on this issue. Preliminary comments on the between sector allocation issue were also solicited as part of the announcement soliciting NEPA comments on the IFQ EIS (comments were to be directed to the Council office or e-mailed to pfmc.comments@noaa.gov (enter "Intersector Groundfish Allocation" in the subject line)). Public scoping for an EIS on between-sector allocations is scheduled to begin after the Council has moved forward with alternatives for a draft trawl IFQ EIS (Figure 1.1-1).

1.6 References

Commission on Ocean Policy. 2004. "An Ocean Blueprint for the 21st Century: Final Report of the U.S. Commission on Ocean Policy," Chapter 19, "Achieving Sustainable Fisheries."

National Marine Fisheries Service. August 2004. United States Plan of Action for Management of Fishing Capacity. http://www.nmfs.noaa.gov/sfa/reg_svcs/npoa.capacity.8.4.04.pdf

National Marine Fisheries Service. September 2004. Bycatch Mitigation Program FEIS. http://www.nwr.noaa.gov/1sustfsh/groundfish/eis_efh/pseis/

Pacific Fishery Management Council. October 2000. Pacific Fishery Management Council Groundfish Fishery Strategic Plan: Transition to Sustainability.

Table 1.2-1. Goals and objectives from November 2003 and changes recommended by the IEP.

As Stated October 2004	***IEP Recommended Revision***
Goals 1. Provide for a well managed system for protection and conservation of groundfish resources. 2. Provide for a viable and efficient groundfish industry. 3. Increase net benefits that arise from the fishery. 4. Provide for a fair and equitable distribution of fishery benefits. 5. Provide for a safe fishery. 6. Capacity rationalization through market forces.	**Goals** 1. Increase regional and national net benefits including improvements in economic, social, environmental and fishery management objectives. *This goal subsumes the previous very general goal of “providing for a well managed system” and other broad goals (goals 2, 3 4 and 5 from October 2004).* *Most of these more specific goals are reflected in Magnuson-Stevens Act national standards and other guiding legislation and executive orders. More specific interpretation and statement of this goal is also provided through the associated objectives. Improved conditions should be considered to include conditions for harvesters, processors, crew, support industries and communities (i.e. all of those with a stake in the industry) as well as the nation as a whole (improved net social benefits).* 2. Achieve capacity rationalization through market forces and create an environment for decision making that can rapidly and efficiently adjust to changing conditions. *This goal is intended to address both private and public decision making.*
Objectives 1. Takes into account structure of the stocks. 2. Minimize ecological impacts while taking the available harvest. 3. Reduce bycatch and discard. 4. Encourage sustainable fishing practices. 5. Account for total groundfish mortality. 6. Promote individual accountability - responsibility for landed catch and bycatch. 7. Avoid provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors. 8. Avoid excessive quota concentration. 9. Provide certainty/stability for economic planning. 10. Provide operational flexibility. 11. Minimize adverse effects on fishing communities to the extent practical. 12. Promote economic and employment benefits through the seafood catching, processing, and distribution elements of the industry. 13. Provide efficient and effective monitoring and enforcement. 14. Design a responsive review and modification mechanism.	**Objectives** 1 Provide for a viable, profitable and efficient groundfish fishery (previously Goal 2, with addition of the word of “profitable”) 2 Minimize negative ecological impact (previously Obj 2) *(The panel’s perspective is that the clause “while taking the available harvest” can be assumed.)* 3. Reduce discard mortality (previously Obj 3) *(Under the M-S Act bycatch is discarded catch so the terms are redundant. Additionally, through this recommended change in wording the panel is suggesting that perhaps the issue of greatest concern is discards that die rather than total discards)* 4. (previously Obj 4) *This objective seemed vague and is addressed under mandates of the Magnuson Stevens Act and other law.* 5. Promote individual accountability - responsibility for catch (landed catch and discards). (previously Obj 6) 6. Increase stability for business planning (previously Obj 9) 7. Increase operational flexibility. (previously Obj 10) 8. Minimize adverse effects from IFQs on fishing communities to the extent practical. (previously Obj 11) 9. (previously Obj 12) *Remove as an objective and address as narrative under the goal.* ***Constraints and Guiding Principles*** 1. Taking into account the biological structure of the stocks including such factors as populations and genetics (expansion of Obj 1) 2. Taking into account the needs to ensure that the total OYs and ABC for the trawl and all other sectors are not exceeded (expansion of Obj 1). 3. Accounting for total groundfish mortality. (previously Obj 5) 4. Avoiding provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors. (previously Obj 7) 5. Avoiding excessive quota concentration. (previously Obj 8) 6. Providing efficient and effective monitoring and enforcement. (previously Obj 13) 7. Designing a responsive review evaluation and modification mechanism. (previously Obj 14)
The TIQC recommended accepting the IEP recommendations with the following changes: Restore the deleted clause in Objective 2 “while taking the available harvest.” Restore Objective 9 (previously Objective 12) with the following changes: change “catching” to “harvesting,” insert “measurable” as the second word in the sentence, and add “support sectors” to the list of sectors covered by the objective.	
Council Action from November 2004: Change Objective 3 to read: “Reduce bycatch and discard mortality”.	

Figure 1.1-1. Trawl IFQ and Intersector Allocation Processes

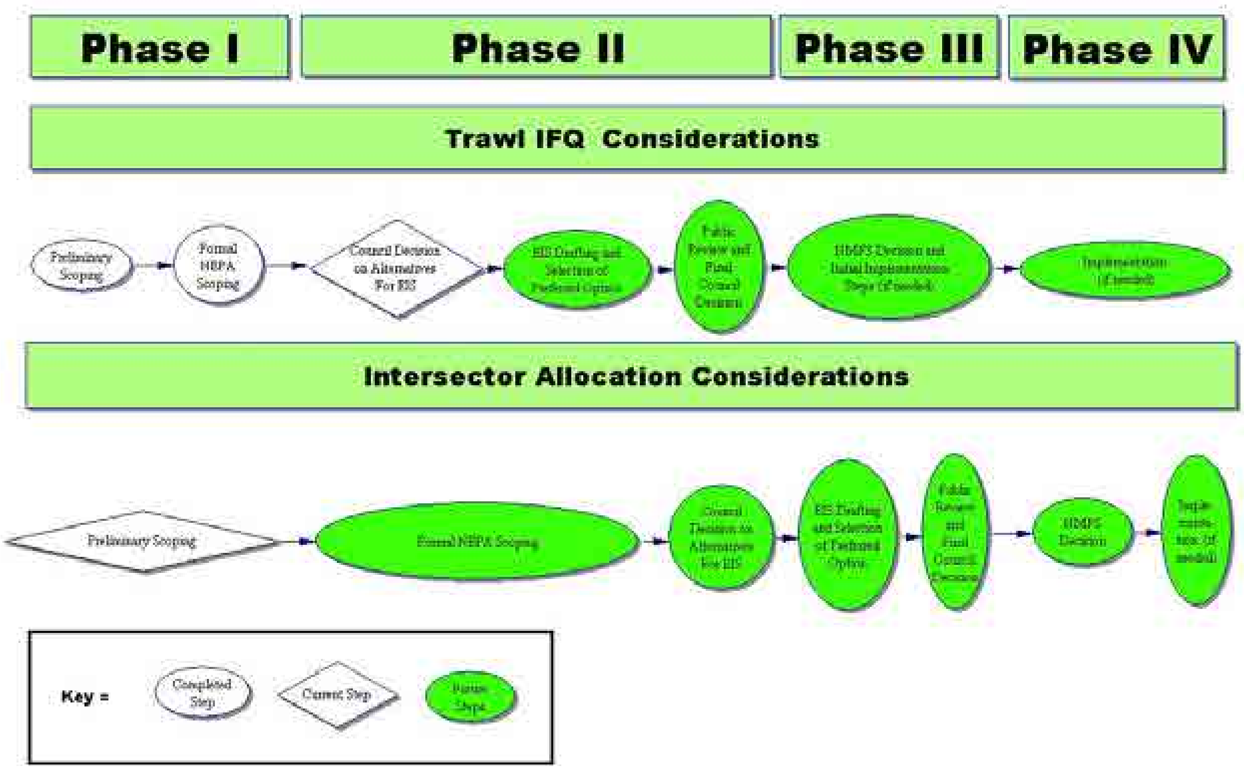
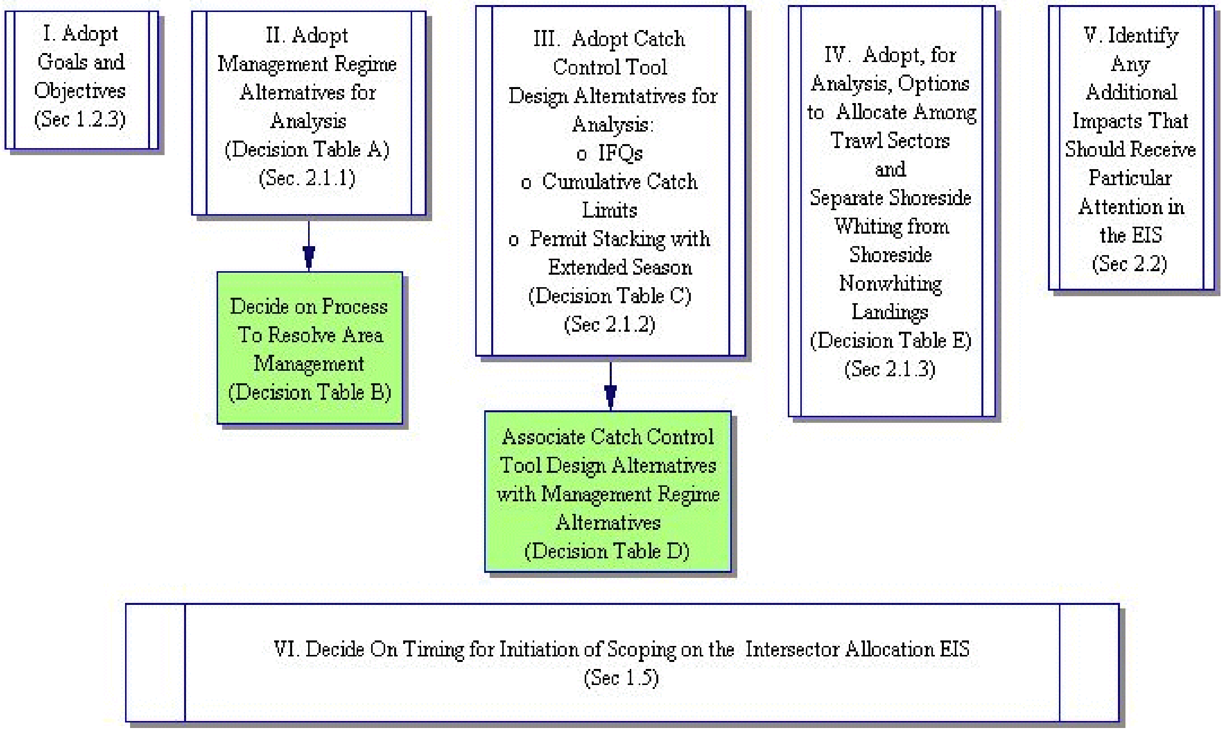


Figure 1.5-1. Decision tasks (June 2005).



2.0 POST SCOPING ALTERNATIVES AND IMPACTS

The primary subject of this scoping process is whether or not to alter the current groundfish limited entry trawl fishery management regime by changing the tools used to control total catch. Section 1.4 discusses both the formally announced public scoping period and the work of the TIQC and other Council advisory bodies on scoping this issue. Based on the goals and objectives, a determination will be made as to whether status quo, IFQs or some other management tools provide the best means to control total catch.

Chapter 2 of this scoping summary report is intended to aid the Council in identifying a set of alternatives for the EIS and to help focus the analysis. Section 2.1 describes alternatives for each of three issues related to development of a trawl IFQ program (Tasks II, III, and IV for the June 2005 Council meeting):

Section 2.1.1 Specify the structure of the catch control management regime (Task II).
Section 2.1.2 Specify the design of each tool to be employed (Task III).
Section 2.1.3 Resolve allocation issues among trawl sectors (Task IV).

Note: Initial IFQ allocations are addressed as part of the design issues of Section 2.1.2, allocations among trawl sectors are addressed in Section 2.1.3, and allocation between trawl and other sectors would be addressed as part of a separate but related intersector allocation process. Regardless of the need for intersector allocations to support an IFQ program, some intersector allocation decisions will likely be needed to implement the bycatch amendment to the FMP (Amendment 18) and to facilitate the biennial specification of fishery management measures.

Section 2.2 discusses the types of environmental impacts that would be evaluated in an EIS for the proposed action (Task V for the June 2005 Council meeting).

2.1 Description of the Alternatives

2.1.1 Management Regime Decisions

Task II (see Section 1.2.3 for Task I)

- Adopt management regime alternatives for analysis in the draft IFQ EIS. ***Decision Table A (page 2-6 ,*** see following page for a summary of the table).
- Decide on a process for considering area subdivisions for some species or species groups. ***Decision Table B (page 2-13)***

In this section the management regime is considered at a general level so that preliminary decisions can be made on its structure. Two management regime decision tables (A and B) are provided for consideration before addressing the catch control tool design elements covered in Section 2.1.2.

There are seven management regime alternatives in Decision Table A (which starts on page 2-6). Changes recommended in the final TIQC report are noted in the table. The following is the general structure of the management regime alternatives covered in Decision Table A, with respect to the catch control tools employed. For each alternative, the primary catch control tools included in the alternative are noted.

Overview of Management Regime Alternatives

Primary Catch Control Tool Alternatives	**Alt 1** Status Quo	**Alt 2** IFQ for Trawl Target Species	**Alt 3** IFQ for Groundfish (Except "Other Fish")	**Alt 4** IFQ for All Groundfish	**Alt 5** Cumulative Catch Limits	**Alt 6** Cumulative Catch Limits & Stacking	**Alt 7** Cumulative Catch Limits, Stacking & Extended Cumulatve Limit Periods
Cumulative Landing Limits	Included	-	-	-	-	-	-
Season Closures [a/]	Included	*	*	*	Included	Included	Included
IFQ Program	-	Included	Included	Included	-	-	-
Cumulative Catch Limits	-	Included	Included (for low OY conditions)	-	Included	Included	Included
Permit Stacking	-	-	-	-	-	Included	Included
Extended Cumulative Limit Periods	-	-	-	-	-	-	Included

a/ Season closures are the primary tool used to control catch in the whiting fishery. While season closures sometimes occur for some species in the nonwhiting fishery, it is the Council's general policy to use cumulative limits to try to maintain year round opportunities in the nonwhiting groundfish fisheries.

* In order to limit impacts on ESA listed salmon stocks there may be seasons for whiting, but season closures would not be the primary whiting catch control tool under an IFQ program.

The above alternatives are displayed in Decision Table A as follows:

- Alternative 1 is status quo (column 2 of Decision Table A)
- Alternatives 2 through 4 are IFQ program alternatives (columns 3-5 of Decision Table A)
- Alternatives 5 through 7 are nonIFQ alternatives (shown at the bottom of Decision Table A)

The following is a brief summary of the likely effects of each of the seven management regime alternatives. Some current management programs and needs could be anticipated to continue under any of the alternatives: overfished species rebuilding requirements, including depth-based and gear-restrictive management; prohibition of retention of endangered salmon species and whiting time/area closures intended to protect salmon; any areas closed for habitat protection that may arise out of the EFH EIS and its implementing regulations. The current management regime is complex to develop, manage, and enforce, and all of the alternatives below are likely to increase that level of complexity.

Alternative 1 (status quo): Under Alternative 1, status quo, the limited entry trawl fishery would continue to be managed with two-month cumulative trip limits for all species and species groups except Pacific whiting. Sablefish is the only species currently allocated between the limited entry trawl and fixed gear sectors. Future commercial sector or commercial-recreational allocations under consideration by the Council's Allocation Committee could occur under any of the alternatives in this document, including status quo. Under this alternative, trawl fishery participants would continue to benefit from the capacity reduction achieved through the buyback program, but would likely not see further reductions in capacity levels. This fishery is not currently under the race for fish situation that would occur if it were completely open access; however, participants have less flexibility in when and where they fish and market their catch under a cumulative trip limit system than under an IQ system. A cumulative trip limit regime in a multi-species fishery may encourage vessels to make regulatory discards, which are discards of fish in excess of the allowed trip limit. Thus, under Alternative 1, regulatory discards of target and non-target species are more likely than under an alternative that gives fishery participants more flexibility in when and where they fish. This alternative may have greater impacts on fish habitat than other alternatives, depending on whether other alternatives are effective at reducing the total number of fleet trawl hours in sensitive habitat areas coastwide.

Alternative 2 (IFQs for trawl target species): Under this alternative, limited entry trawl fishery participants would operate under IQs for traditional trawl target species, under cumulative catch limits for overfished species, and under cumulative trip limits for more abundant non-target groundfish species. Alternative 2 also includes a complex set of rules for how overfished species would be handled, depending on their biomass levels relative to B_{MSY} (see Decision Table A). All IQ species would be allocated between commercial and recreational fisheries and between trawl and non-trawl gears within the commercial fisheries. Under Alternative 2, capacity would likely be reduced from status quo by vessels accumulating IQs to allow per vessel harvest greater than is allowed under the current cumulative trip limit system. If these vessel owners use their higher catch rates to pay for vessel improvements, per vessel capacity in the fleet may increase while vessel numbers and total trawl hours in the fleet decrease. Fishery participants would have more flexibility in when and where they fish for target species, but their activities would still be constrained by non-tradable cumulative catch limits for overfished species. Under Alternative 2, regulatory discards of target species would decrease because of increased operational flexibility. Economic discards, those discards that occur because a vessel has caught more of a particular species or an undesirable size of a species, would not likely be affected by this alternative. If this alternative results in a reduction in total fleet trawl hours in sensitive habitat areas, it could be more beneficial to habitat than Alternatives 1 or 5.

Alternative 3 (IFQs for all groundfish except *other fish*): Under this alternative, limited entry trawl fishery participants would operate under IQs for all groundfish species except those in the *other fish* category, which currently includes sharks, skates, rays, ratfish, grenadiers, morids, and kelp greenling. Fish in the *other fish* category would continue to be managed via cumulative trip limits. Alternative 3 could also include the same complex set of rules provided in Alternative 2 for how overfished species would be handled, depending on their biomass levels relative to B_{MSY} (see Decision Table A). All IQ species would be allocated between commercial and recreational fisheries and between trawl and non-trawl gears within the commercial fisheries. Like Alternative 2, capacity under Alternative 3 would likely be reduced from status quo by vessels accumulating IQs to allow per vessel harvest greater than is allowed under the current cumulative trip limit system. If these vessel owners use their higher catch rates to pay for vessel improvements, per vessel capacity in the fleet may increase while vessel numbers and total trawl hours in the fleet decrease. Fishery participants would have increased flexibility over Alternative 2 in when and where they fish for target species. Under Alternative 3, regulatory discards of target species would decrease because of increased operational flexibility. Economic discards, those discards that occur because a vessel has caught more of a particular species or an undesirable size of a species, would not likely be affected by this alternative. If this alternative results in a reduction in total fleet trawl hours in sensitive habitat areas, it could be more beneficial to habitat than Alternatives 1 or 5.

Alternative 4 (IFQs for all groundfish): This alternative is essentially the same as Alternative 3, except that it would include IQs for fish species or species groups in the *other fish* category. The harvest of species in the *other fish* category does not usually constrain trawl fleet activities, so the effects of this alternative are unlikely to be different than those of Alternatives 3. This alternative, however, does not include the complex set of rules provided in Alternatives 2 and 3 for varying how overfished species harvest allocations are addressed depending on their biomass levels relative to B_{MSY}.

Alternative 5 (cumulative catch limits): Under this alternative, limited entry trawl fishery participants would be subject to cumulative catch limits for all species except Pacific whiting, as opposed to the cumulative landings limits regime under Alternative 1. Depending on whether catch limits are tradable, this alternative may or may not require groundfish allocation between commercial and recreational fisheries and between trawl and non-trawl gears within the commercial fisheries. Under Alternative 5, capacity would likely remain level with status quo. Unlike Alternatives 6 or 7, catch limits would not be stackable; therefore, there would be little opportunity or incentive for fishery participants to exit the fishery through trading catch limits. Fishery participants would have essentially the same level of flexibility in when and where they fish for target species as under status quo. Under Alternative 5, regulatory and economic discards would decrease because they would be prohibited. This alternative may result in some reduction of total fleet trawl hours, simply because vessels would be required to cease fishing once their cumulative catch limits for a particular species had been reached, thus it may be more beneficial to habitat than Alternative 1, but probably less beneficial to habitat than either Alternatives 2-4 or 6-7.

Alternative 6 (cumulative catch limits plus permit stacking): Similar to Alternative 5, under this alternative limited entry trawl fishery participants would be subject to cumulative catch limits for all species except Pacific whiting. This alternative differs from Alternative 5 in that cumulative catch limits would be tradable and stackable. Capacity under Alternative 6 would likely be reduced from status quo by vessels stacking cumulative catch limits to pursue those limits within the traditional six two-month cumulative limit periods. If these vessel owners use their higher catch rates to pay for vessel improvements, per vessel capacity in the fleet may increase while vessel numbers and total trawl hours in the fleet decrease. Fishery participants would have increased flexibility over status quo in when and where they fish for target species and a different type of flexibility than provided under Alternative 2 – more flexibility within each cumulative limit period, but less flexibility over the course of the year. Regulatory discards of target species would decrease because of increased operational flexibility, but economic discards would not likely be affected by this alternative. If this alternative results in a reduction in total fleet trawl hours in sensitive habitat areas, it could be more beneficial to habitat than Alternatives 1 or 5.

Alternative 7 (cumulative catch limits plus permit stacking and extended fishing periods): This alternative is essentially a more time-flexible version of Alternative 6. Because of the increased flexibility in this alternative, it would likely be more effective at reducing capacity and limiting bycatch and habitat effects than Alternatives 5-6, which are also cumulative catch limit alternatives. It would be less flexible than Alternatives 2-4 in terms of the quantities of fish that could be traded, because it would require large blocks of fish pounds to be traded, rather than the small trading quantities envisioned under an IQ program. It would be more flexible than Alternative 2 and possibly Alternative 3 because it would allow limits for all species to be traded, rather than allowing either only trawl target species or just all species except those in the *other fish* category.

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 1 of 4)

	Species Groups and Management Tools			
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
NonWhiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)				
Primary Management Tools	-	Manage with IFQ for target species and species for which there is a trawl allocation	Mange with IFQ for all groundfish except the "Other Fish" category of groundfish and except in situations in which the OY for the species is very low (see below).	Manage with IFQ for all groundfish [b/]
	Cumulative landing limits for nonwhiting species/species groups.	Transferable cumulative catch limits for other groundfish species managed with cumulative landing limits under status quo[c/]	-	-
	Monitoring only for other species	Monitoring only for other species	Monitoring only for other species	-
Adjustments for Low Harvest Levels	The Council may suspend intersector allocations when a species is overfished	Low OY Management: Same as status quo plus For IFQ species, management does not change with low OYs. If the OY for a nonIFQ species becomes extremely low (such as for a rebuilding species) manage with nontransferable cumulative catch limits.[d/e/f/] Low OY Threshold: Establish a threshold at which point a species would switch from incidental catch management to "Low OY management." (e.g., $B_{25\%}$)	Low OY Management: Same as status quo plus If the OY for any species becomes extremely low, switch from IFQs for that species and instead manage the sector allocation as a pool using nontransferable cumulative catch limits to control catch.[g/f/] Decide on whether or not to use "Low OY management" as part of the bienniel specifications process.	Same as status quo
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only except IBQ for Pacific halibut or sector caps. Suboptions - Pacific halibut retention: 1: none

The TIQC has recommended elimination of the following halibut retention suboptions, previously listed as part of Alternative 4:
Pacific halibut retention allowed
2: when LE TWL vessel use longline & IBQ
3: when any vessel uses longline & IBQ (acquired from LE TWL)
4: when LE TWL vessel uses groundfish trawl

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 2 of 4)

	Species Groups and Management Tools			
	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
Whiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)				
Primary Management Tools	No IFQ	IFQ for whiting	IFQ for whiting and all incidentally caught groundfish except the "Other Fish" category of groundfish	IFQ for whiting and **all** incidentally caught groundfish species [b/]
	Sector allocation with catch limited by season closure	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks
	Possible season constraints to protect overfished species.	Sector catch caps for other incidentally caught nonwhiting groundfish species for which allocations have been established. No cumulative catch limits. Season closes when fleet catch cap is reached.	-	-
	Other species managed with monitoring only	Monitoring only for other species	Monitoring only for other species	-
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only except IBQ for Pacific halibut or sector caps. Suboptions - Pacific halibut retention: 1: none
		The TIQC has recommended elimination of the following halibut retention suboptions, previously listed as part of Alternative 4: Pacific halibut retention allowed	2: when LE TWL vessel use longline & IBQ 3: when any vessel uses longline & IBQ (acquired from LE TWL) 4: when LE TWL vessel uses groundfish trawl	

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 3 of 4)

	Alt 1 - Status Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish[b/]
		Species Groups and Management Tools		
		Trawl Sectors and Intersector Transfers (Section 2.1.1.4)		
Sectors	Three Sectors • shoreside deliveries • mothership deliveries and • catcher-processor deliveries	Four Sectors: • shoreside whiting deliveries, • shoreside nonwhiting deliveries, • mothership deliveries and • catcher-processor deliveries (FROM 2.1.1.4 Option 3)	Three Sectors: • shoreside deliveries, • mothership deliveries and • catcher-processor deliveries (FROM 2.1.1.4 Option 2)	One Sector (FROM 2.1.1.4 Option 1)
Intersector Transfer/ Trading	***Whiting***: Sector allocations fixed by formula with procedure for midseason transfer of unused allocation. ***Nonwhiting species***: There is no inseason transfer of catch opportunity between trawl sectors except through Council inseason management.	***Whiting*** Option 1: IFQ nontransferable between trawl sectors. Option 2: IFQ nontransferable between trawl sectors with procedure for midseason rollover of unused IFQ to another sector. ***Nonwhiting species***: Sector catch cap roll-over: Roll-over any unused incidental catch from one whiting sector to the next as the year progresses.[h/] Allow purchase of nonwhiting species IFQ from the nonwhiting sector. Such IFQ would be placed in the pool for vessels operating in the whiting sector.	***Whiting*** IFQ nontransferable between trawl sectors. ***Nonwhiting species***: Do not allow transfer of nonwhiting IFQ from one trawl sector to another.	No subdivision of whiting sectors (there may or may not be a subdivision for purposes of initial allocation)

Decision Table A: Accept or modify the following seven management regimes, see end of table for Alternatives 5-7 (Section 2.1.1). (Page 4 of 4)

<table>
<tr><th></th><th colspan="4">Species Groups and Management Tools</th></tr>
<tr><th></th><th>Alt 1 - Status Quo</th><th>Alt 2 - IFQs for Trawl Target Groundfish</th><th>Alt 3 - IFQs for All Groundfish Except “Other Fish”[a/]</th><th>Alt 4 - IFQs for All Groundfish[b/]</th></tr>
<tr><td></td><td colspan="4">Groundfish Catch of Limited Entry Trawl Vessels Using Gears Other Than Groundfish Trawl (Section 2.1.1.5)
(Options are Relevant for IFQ Catch Control Only)</td></tr>
<tr><td rowspan="2">Trawl Vessel Exempted Gear Quota Accounting and Catch Control (Includes Exempted Trawl and Exempted Nontrawl Gears)</td><td rowspan="2"><u>Exempted gea</u>r catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits.

*With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.</td><td><u>Exempted gear</u> -
IFQ is not required.

Catch counts against the OA allocation and is managed as part of the OA fishery. Some catch will be allocated from the LE trawl to OA fishery

(FROM 2.1.1.5 Opt 2C)</td><td><u>Exempted gear</u> -
IFQ required.

Catch counts against LE Trawl.
Open access catch control regulations apply

(FROM 2.1.1.5 Option 1A)</td><td><u>Exempted gear</u> -
IFQ required.

Catch counts against LE Trawl.
Open access trip limits do not apply

(FROM 2.1.1.5 Option 1B)</td></tr>
<tr><td colspan="3">The TIQC has recommended elimination of the following options which might otherwise be included as part of Alternative 2:
IFQ is not required.
Catch counts against . . .
. . . a subquota of the LE trawl allocation,managed without IFQ (FROM 2.1.1.5 Opt 2A)
OR
. . . the OA allocation and is managed as part of the OA fishery. (FROM 2.1.1.5 Opt 2B)</td></tr>
<tr><td rowspan="2">Trawl Vessel Longline and Fish Pot Without LE Endorsement (Fixed Gear Gear Quota Accounting and Catch Control)</td><td rowspan="2"><u>Longline and fishpot</u> catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits.

*With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.</td><td><u>Longline and fishpot</u> -
IFQ required.

Catch counts against LE Trawl.
LE fixed gear catch control regulations apply.
(FROM 2.1.1.5 Option 1A)</td><td><u>Longline and fishpot</u> -
IFQ required.

Catch counts against LE Trawl.
LE fixed catch control regulations do not apply.
(FROM 2.1.1.5 Option 1B)</td><td><u>Longline and fishpot</u> -
IFQ required.

Catch counts against LE Trawl.
LE fixed catch control regulations do not apply.
(FROM 2.1.1.5 Option 1B)</td></tr>
<tr><td colspan="3">The TIQC has recommended elimination of the following options which might otherwise be included under an alternative: . . .
IFQ is not required.
Catch counts against . . .

. . . a subquota of the LE trawl allocation, managed without IFQ (FROM 2.1.1.5 Opt 2A)

. . . an LE fixed gear allocation and is managed as part of the LE fixed gear fishery. (FROM 2.1.1.5 Opt 2B)

. . . [same as 2B except some catch will be allocated from the LE trawl to the LE fixed gear fishery]. (FROM 2.1.1.5 Opt 2C)</td></tr>
</table>

Alternative 5: **Cumulative Catch Limits** - same as status quo except replace cumulative landing limits with cumulative catch limits. Continue season management for whiting and incidental catch species. (TIQC recommends Alt 5 be eliminated).

Alternative 6: **Cumulative Catch Limits and Permit Stacking** - same as Alternative 5, but add permit stacking. (TIQC recommends Alt 6 be eliminated).

Alternative 7: **Cumulative Catch Limits, Permit Stacking and Extended Periods** - same as Alternative 5, but add permit stacking and extend the cumulative limit period.

a/ “Other Fish” is a groundfish category that includes sharks, skates, rays, ratfish, morids, genadiers, kelp greenling, and Pacific cod.
b/ The TIQC final recommendations would not use IFQs to manage the “Other Fish” groundfish category but would use IBQs or sector caps to manage Pacific halibut.
c/ NonIFQ Species - Trawl share based on biennial Council decision. 1. Transferable cumulative catch limit between vessels within period (full or partial limit transfers, depending on length of limit period). 2. Any transfers between vessels are temporary.
d/ Eliminate the transferability of cumulative catch limits and implement season closure for the affected species on reaching the fleet limit for that species.
e/ Retention allowances within the catch limits may vary based on annual management measure decisions.
f/ Other measures to keep bycatch rates low may stay in place (e.g., RCAs).
g/ Implement season closure for the affected species on reaching the fleet limit for that species.
h/ There would not be a rollover from the nonwhiting to whiting sector.

The general structure of Decision Table A is described in more detail in Section 2.1.1.1. The following specific elements of the table are described in more detail in the corresponding subsection.

- the catch control tools (IFQ and others) . . . . Sec 2.1.1.2
- species and species groups with to be covered with IFQs and sector allocations . . Sec 2.1.1.3
- subdivision within the trawl sector . . . . Sec 2.1.1.4
- trawl vessel groundfish catch taken with nontrawl gear and retention of prohibited species catch . . . . Sec 2.1.1.5

West Coast groundfish fishery managers, under the measures specified for the alternatives of Decision Table A, would continue to have other FMP management tools available to address the FMP's broad goals. For example, whiting fisheries managed under an IFQ program might continued to operate within a spring-summer season in order to reduce incidental catch of Pacific salmon.

Consideration of IFQs brings up one issue not currently reflected in Decision Table A: ***whether or not there is a need for additional area subdivisions of regional management area units to mitigate potential biological and socioeconomic impacts.*** The Council has historically managed several groundfish species or species groups by fishery management area. For most of these, the area divisions are 40° 10' N. lat, or near the northern boarder of the Conception management area. Additional regional management area divisions may be warranted if analysis determines that new catch control tools, such as IFQs, might result in geographic shifts in harvest that have adverse biological or socio-economic effects. This issue is addressed in Section A.1 of Appendix A.

Regional management area provisions will likely be implemented first as modifications to the OY table adopted as part of the annual specifications (e.g. Table 2.1-1). When such adjustments are made, corresponding changes would be required for the IFQ issued (see Section B.1.8). The management decisions made here will not preclude future development of new regional management areas, though such specifications may become more complex once an IFQ program is implemented. The following are the regional management area process options for Council consideration at this time:

Decision Table B: Decide on a process for addressing regional management area issues .	
Process Option 1	Plan to establish additional regional management areas as needed at a later time. *(TIQC recommendation: Area restrictions should be based solely on the need to address stock conservation concerns.)*
Process Option 2	**Task a group to immediately** begin considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future.
Process Option 3	**If an IFQ Program is adopted, task a group** with considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future.

Summary of Comments Received on Management Regime Decisions

During the May 24 through August 2, 2004 formally announced public scoping period, the Council received the following comments from the public on management regime alternatives:

Management regime comments received during public scoping period.	
Comments received on management tools	Source of comment
Community Development Quotas (CDQs)	
Supported	CJC, POORT, ED, Survey (ED)
Opposed	Individual (1)
Individual Processor Quotas (IPQs)	
Opposed	Individual (1)
Vessel Cumulative Limits with Extended Periods (3, 4, or 6 months)	PMCC
Reduce Season Length	Individual (1)
Consider Marine Reserves and Reduce Quotas (50% in first year and 10% in each year thereafter)	Individual (1)
Bycatch caps for overfished species	ED, PMCC
IFQ for All species	WCSPA
Comments received on bycatch cap design elements The following comments are likely using the term "bycatch" to refer to incidental catch, rather than only discards (bycatch as defined under the Magnuson-Stevens Act.)	
Sector Bycatch Caps for Overfished Species • Caps for the trawl fleet or possibly subdivisions of the trawl fleet (explicit allocation of an amount of overfished species) • Sector stops fishing on attainment of the cap. • Adequate monitoring (not necessarily 100% monitoring) • No action recommended with respect to nonoverfished species.	PMCC
Sector Bycatch Caps - Nontransferable	PMCC
Sector Bycatch Caps - Transferable	ED

2.1.1.1 Catch Control Management Regime Alternatives - Description and Rationale

The following general specifications are included as part of Decision Table A.

Alternative 1: **Status Quo -** All species are managed under one of the following: cumulative limits, season closures (Pacific whiting), catch monitoring only (no regulatory constraints).

Alternative 2: **IFQ for Trawl Targets -** IFQ for groundfish species that are primarily trawl targets with minimal harvest by other sectors (DTS, slope rockfish, nearshore flatfish, whiting split by sector) and target species that already have a trawl allocation, i.e., sablefish (with separate types of IFQ for each trawl sector). Transferable cumulative catch limit management or monitoring only for all other groundfish, and status quo management for prohibited species.

Alternative 3: **IFQ for All Groundfish Except "Other Fish"** - IFQ for all groundfish species except "Other Fish" (with separate types of IFQ for each trawl sector). Monitoring only for non-OY species, and status quo management for prohibited species.

Alternative 4: **IFQ for All Groundfish -** All groundfish species would be covered by an IFQ, in some cases IFQ would be aggregated, particularly for species that are currently not managed with cumulative limits (with no division of the trawl sectors). IBQ for halibut.

Alternative 5: **Cumulative Catch Limits** - cumulative catch limits for all species currently managed with cumulative landing limits (season management for whiting and incidental catch species).

Alternative 6: **Cumulative Catch Limits and Permit Stacking** - same as Alternative 5 but add permit stacking.

Alternative 7: **Cumulative Catch Limits, Permit Stacking and Extended Periods** - same as Alternative 5, but add permit stacking and extend the cumulative limit period.

The TIQC initially recommended some other design elements for the management regime under these alternatives, also shown in Decision Table A:

- when OYs are set very low due to rebuilding schedules, a provision to switch from IFQs to sector caps with catch rates controlled by nontransferable cumulative catch limits (Alternative 2 and 3), and
- use of sector caps for bycatch species in the whiting fishery (Alternative 2).

Options for trawl sector division, the management of trawl vessel catch taken with nontrawl gear, and retention of prohibited species are also incorporated into the IFQ management regime alternatives in Decision Table A (Alternatives 2, 3 and 4). These options are described in more detail in Section 2.1.1.4 and 2.1.1.5.

The alternatives listed above describe the general rules for determining the species and management tools to which different measures would be applied. Table 2.1-1 lists the species and species groups for which the Council currently sets OYs and controls harvest (in 2004), along with three prohibited species groups (Pacific halibut, Pacific salmon, and Dungeness crab). Individual quotas for prohibited species are termed individual bycatch quotas (IBQ). Each column in Table 2.1-1 specifies the implementation of an alternative from Decision Table A by indicating the management approach that would be used for the species listed in a row, based on the above guidelines. There are multiple rows for species or species groups that either have regional management areas or for which harvest is divided among trawl sectors (e.g., Pacific whiting). During each management cycle, adjustments might be made to the rows in Table 2.1-1 as a result, for example, of first-time stock assessments, newly created regional management areas or new sector allocations. If such adjustments result in the subdivision of a species already managed under IFQs, the process for adjustments are described in Section B.1.8.

The TIQC spent an extensive amount of time discussing a system under which some species would be managed using IFQ and others would be managed with more traditional management measures. The primary concern was the control of harvest of the non-IFQ species. In discussing the non IFQ management measures to be used, it was agreed the principle of individual accountability and responsibility should guide the design of management measures. On this basis, the TIQC found it appropriate to support a regime that focuses on catch limits rather than landing limits, such that individuals are held accountable for their landings and discards, for example, vessel cumulative landing limits.

Managing catch of nonIFQ species with vessel cumulative catch limits could lead to difficult situations for some vessels, therefore consideration of transferable cumulative catch limits is recommended by the TIQC. Concern was expressed over the effect of “disaster tows.” Cumulative catch limits would likely be based on incidental catch rates that are derived from averages reflecting fleet performance. However, individual vessel performance is likely to vary from the average, to some degree on the basis of skill but also on the basis of chance. Under vessel catch limits, vessels unlucky enough to experience a high bycatch tow could be forced to stop fishing (under the current landing limits system, vessels continue to fish but discard catch in excess of landing limits). Transferability of catch opportunity (cumulative catch limits) might allow a vessel to acquire and additional limit and continue fishing while still limiting catch of the entire fleet to the desired level.

For the whiting fishery, the potential for a disaster tow led to consideration of management of nonwhiting species with sector caps controlled through season closures. The concern was that a vessel may have a disaster tow and be forced to stop fishing as other vessels may be unwilling to sell IFQ or transfer cumulative limits until sure they could take their quota of target species without encountering a disaster tow of their own. As a possible means of addressing this concern, the TIQC recommended including an option under which incidental catch species would not be managed with IFQs but would be managed under a sector cap with season closures. Alternatively, under an IFQ program that covers incidental catch species, there would be an opportunity for vessels to privately form a cooperative insurance pool to which they would turn over their IFQ for incidental catch species.

2.1.1.2 Catch control tools

The potential catch control tools being considered for use in the catch control management regime alternatives include:

- vessel cumulative landing limits (this is the primary status quo catch control tool for nonwhiting species),
- season closures (this is the primary status quo catch control tool for whiting),
- trawl individual quotas (TIQs),
- vessel cumulative catch limits, and
- permit stacking and extended cumulative limit periods.

Note: Changes in the tools currently used to influence the mix of species, size or age composition of the catch (e.g., conservation areas and mesh size restrictions) are not being considered at this time.

In earlier versions of this document, sector catch caps were identified as an alternative catch control tool. In this version, sector catch caps are identified as a possible way of *specifying* the fleet's catch limit rather than as a tool for keeping the fleet's catch within the limit. Catch control tools such as those identified above, are used to keep the fleet within catch targets. Most of the catch control tools being considered do not necessarily require a sector allocation. The exception is trawl-specific IFQs, the implementation of which requires the prior development of sector specific caps.

The alternatives to the status quo management focus on control of total catch, not just on landed catch. As described in Section 1.1, the Council adopted a preferred alternative for an FEIS on a groundfish bycatch mitigation program in September 2004. The Council is now using the guidance it provided through that preferred alternative to develop Amendment 18 to the FMP. Draft Amendment 18 reaffirms the Council's policy of managing the fisheries to total catch mortality, such that management measures are intended to constrain both landed groundfish catch and discard within groundfish OYs. The TIQC also supports management regime that focuses on catch limits rather than landing limits, such that individuals are held accountable for their discards. The TIQC agreed that the principle of individual accountability and responsibility should guide the design of management measures, regardless of whether a species is managed with quota shares or other more traditional management measures.

Cumulative Landing Limits (Primary Status Quo Catch Control Tool for the Nonwhiting Fishery)

Cumulative Landing Limits: Limits on landings per time period; for example: no more than 1000 pounds of canary landed per two month period south of Cape Mendocino (no limit on discards).

Vessel cumulative landing limits directly control amounts landed and indirectly control catch. To be effective as a catch management tool, cumulative landing limits must be combined with accurate estimates of bycatch. These bycatch estimates are used to set fleet landings targets such that landings plus estimated bycatch do not exceed the fleet's catch limit. Vessel landing limits are then set and adjusted as necessary inseason to ensure that fleet landings do not exceed target levels.

Season Closures (The Primary Status Quo Catch Control Tool for the Whiting Fishery)

Managing total catch with season closures requires either complete observer coverage or the use of estimated bycatch to derive total catch estimates. Using either method, seasons can be closed when it is estimated that total catch limits are reached. The whiting fishery has generally been controlled using season closures with trip limits in place outside the each sector's main whiting seasons. Prior to 2004, whiting fishery season closures were based on controlling whiting catch. In 2004, for the first time, the whiting season was constrained by the need to control catch of nonwhiting species. While season closures sometimes occur for species in the nonwhiting fishery, it is the Council's general policy to use cumulative limits to try to maintain year round opportunities in the nonwhiting groundfish fisheries.

Trawl Individual Quotas

> Individual Fishing Quotas: a portion of the available catch exclusively allocated as a privilege for use by an individual fisherman, community, or other entity.

There are many types of individual quota tools, and individual quotas, in turn, are one of a variety of different types of DAP systems. At present the Council is focusing on individual fishing quotas (IFQ). In this section, a general description is provided of the type of IFQ program being considered. Specific design elements for an IFQ program are addressed in Section 2.1.2 and Appendix B.

Under IFQs, total harvest is controlled by assigning an amount of quota to individual fishermen and holding those individuals responsible for ensuring that their harvest does not exceed the amount they are assigned. The Magnuson-Stevens Act defines IFQs as "a Federal permit under a limited access system to harvest a quantity of fish expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person." [Sec 3(21)]. IFQs differ from cumulative limits in that, in general, they may not be infringed upon by the harvest of others participants in the IFQ system. In contrast, with cumulative limits or season closures, increased participation by other fishermen can cause reduction in the cumulative limits or reduction in the season length. Typically IFQs also allow fishermen the greatest flexibility in determining (1) the time and area of harvest, and, (2) where IFQs are transferable, the scale of their harvest operation.

For the purpose of the program being considered by the Council, the "harvest" controlled by IFQs is defined as catch (independent of whether or not the catch is discarded). In contrast, the trawl fishery IFQ program in British Columbia is based on harvest mortality (some discarded fish are assumed to survive and IFQ need not be used to cover those discarded fish that survive). Other systems around the world use IFQ to control a vessel's landings (independent of the amount of discards). Because this Council's IFQ program is being developed within the context of the programmatic bycatch EIS, control of total catch is the focus, and therefore the IFQ program design elements in Section 2.1.2 focus on catch.

Two other key characteristics of the type of IFQ program being considered by the Council are transferability and divisibility. Transferable and divisible IFQs are being considered as a means of facilitating more complete harvest of the fish available under catch limits and enhance efficiency. A vessel reaching its limit for one species may continue to fish if it can acquire IFQ from another IFQ holder. The opportunity for adjustment provided by transferability also reduces the incentive for cheating and, importantly, may enhance economic efficiency.

The term IFQ is generally used to refer to the management of species that may be caught and legally retained. Another term, individual bycatch quotas (IBQ), is sometimes used for individual quotas covering the catch of species that cannot be retained. For example, Pacific halibut, a trawl prohibited species, is one for which IBQ might be specified. Under IBQs, vessels may still be required to discard prohibited species caught while using trawl gear, but would have to stop fishing if they did not have IBQ to cover their bycatch. Suboptions are being considered that would provide some retention options for Pacific halibut catch covered by IBQ but these suboptions are not part of the TIQC's final recommendations (see Section 2.1.1.5 for discussion).

Other types of DAP systems that might be considered include individual processing quota (IPQ) and community quotas. The Council began work on an IPQ program but discontinued that effort when a moratorium on such considerations was included in a Congressional spending bill. Community quotas have been identified during the public scoping process as a possible tool.

Cumulative Catch Limits

> Cumulative Catch Limits: Limits on catch per time period; for example: no more than 1000 pounds of canary landed or discarded per two month period south of Cape Mendocino.

Cumulative catch limits apply to the vessel and are like cumulative landing limits, except they apply to catch (landings plus discards) rather than only landings. When the cumulative catch limit for a particular species is reached, a vessel would have to cease operations in those segments of the fishery where that species is caught. This differs from vessel landing limits, under which vessels are allowed to keep fishing but must discard fish caught in excess of the landing limit. Cumulative catch limits might or might not be temporarily transferable between vessels within the designated period to which they apply. It is also proposed that if the cumulative catch limit period is extended beyond 2 months, consideration should be given to allowing partial transfer of cumulative catch limits.

Permit Stacking and Extended Cumulative Limit Periods

> Permit Stacking: Vessels with more than one groundfish trawl LE permit catch additional cumulative limits for each permit registered for the vessel; for example, a vessel with 3 permits might receive a cumulative limit of 1,000 pounds of canary for each of its permits for a total of 3,000 pounds during a two month cumulative limit period.
>
> Extended Period Length: The cumulative limit periods would be longer than the typical 2 month periods currently used; for example, a vessel might have 6 months to catch its canary limit and the canary limit would be substantially larger than for the 2 month period (e.g. 4,000 pounds per permit).

Permit stacking is the practice of registering multiple groundfish limited entry permits for a single vessel. Vessels that stack permits would be allowed some portion of an additional cumulative limit for each trawl endorsed permit that is stacked. Cumulative limits are generally set at levels which anticipate that many vessels will not catch their available limit. If a full cumulative limit were allowed for each permit stacked, it is likely that a greater percentage of the cumulative limits would be fully caught. Therefore, cumulative limits per permit would need to be reduced, and vessels not stacking permits could see their limits decline. If vessels with stacked permits were only given a partial cumulative limit for each stacked permits, then the stacking of permits might not change the basic cumulative limit for vessels with only a single permit.

The second part of this proposal would extend the cumulative limit period from the current duration of two months to a duration of up to 12 months. A 12 month cumulative limit would either be an annual vessel quota, or, if cumulative limits were set such that if every vessel takes its limit the fleet catch targets would be exceeded, the fishery would be managed as a derby or Olympic fishery (i.e., vessels would race to take their allotted catch before the fishery is closed due to attainment of the fleet's aggregate catch limit).

2.1.1.3 Species and Species Groups to be Covered by IFQs and Sector Allocations

An IFQ can only be established for species or species groups for which a trawl harvest target/limit/cap[3/] is established. The following reflects the need for intersector allocations under each IFQ alternative ***(these alternatives are included as part of Decision Table A)***.

Alt 2: Trawl Target IFQs -	Whether an IFQ is used to control harvest would be based on whether or not there is more than incidental harvest by sectors other than the trawl sector and, if so, whether a trawl allocation has been established. If there is competition between sectors and no trawl allocation has been established, there is no mandate to establish one. Trawl allocations could be established over the long-term or as part of an annual allocation process.
Alt 3: All Groundfish Species Except "Other Fish" -	A trawl allocation would have to be established for every groundfish species for which there is more than a small amount of incidental trawl harvest except "Other Fish" and for which there is competition between the trawl and other sectors.
Alt 4: All Species IFQs -	Trawl targets or limits would be established even for species for which there is no OY and IFQ used to ensure that limits are not exceeded.

If for a particular species a trawl allocation is not established, cumulative catch limits and season closures would be considered for use to keep the trawl fishery within levels anticipated in the preseason planning process (cumulative catch limits might possibly be combined with permit stacking and extended cumulative limit periods). If the trawl sector appeared to be on a trajectory that would result in catch in excess of the level planned for it during the preseason process, under a fishery-wide cap, the Council would make an inseason decision as to whether to further constrain the trawl sector, other sectors, or make no changes (if some fisheries were catching less than expected). On the other hand, if another fishery were over its limit the Council might choose to apply an inseason constraint to the trawl fishery to ensure that the fishery-wide cap is not exceeded.

Trawl sector catch caps, whether managed with IFQs or any other catch control tool, would not necessarily preclude the possible constraint of the trawl fishery as a result of an overage in another sector. The effect of an overage by one sector on the harvest opportunity of another needs to evaluated in the context of the structure of management of the entire fishery and practical implications. Exceeding the ABC constitutes overfishing. The OY is generally a catch mortality target which we are trying to achieve over the long-term. The status of overages and response to them may vary depending on whether the OY is set at or below ABC, and whether the stock is under a rebuilding plan. Overfishing (exceeding ABC) is based on a one year criteria, not a long-term average. Therefore, the management system should not allow harvest in excess of the ABC in any

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3/ Various names have been applied to the type of sector catch caps including pooled species caps and incidental catch allowances (ICAs). All are sector level catch limits. Sector caps differ from sector landings quotas in that they apply to catch rather than landings.

one year. If OY is set at ABC there may be little opportunity to allow a sector to exceed its cap. For healthy stocks for which OY is set below ABC, there may be more ability to allow overages for a sector so long as the system is designed to achieve the OY on average over the long-term. However, for stocks that are being rebuilt, the OY may be considered a harder cap than for healthy stocks. For rebuilding stocks any provisions that might allow harvest to exceed OY in a given year, but achieve it on average, would need to be accounted for as part of the rebuilding plan. It may be possible to set up a system under which each sector has its own amount of fish to harvest and the overharvest by one sector would not affect the other, however, the process would have to show that the system would not adversely affect stock rebuilding plans, result in overfishing or lead to a stock being classified as overfished.

2.1.1.4 Subdivision Within the Trawl Sector

The following options for potential subdivision of the trawl sector were developed by the TIQC and have been incorporated into Decision Table A:

	Division of Trawl Sectors **(Incorporated in Decision Table A)**			
Option 1:	One Trawl Sector			
Option 2:	Shoreside Deliveries		Mothership Deliveries	Catcher-Processor Deliveries
Option 3:	Shoreside Nonwhiting Deliveries	Shoreside Whiting Deliveries	Mothership Deliveries	Catcher-Processor Deliveries

(Note: the same divisions need not apply to all species)

For the purpose of defining the at-sea processing sector (motherships and catcher-processors) fish dressed and iced at-sea would **not** be considered processed at-sea, and fish frozen at-sea would be considered processed at-sea.

Division of the trawl sector under Options 2 or 3 implies that transfers of IFQ between subdivisions would be limited or prohibited. Currently, only whiting is explicitly allocated between catcher-processors, vessels delivering shoreside, and vessels delivering to motherships. Under Options 2 or 3, it may be necessary to make additional explicit allocations among these sectors for groundfish species other than whiting[4/] (Section 2.1.3). Under Option 3, an allocation of whiting between shoreside-whiting and shoreside-nonwhiting vessels would be needed. Subdivision of the trawl sector is discussed in more depth in Section A.2.

The trawl sector divisions specified in Options 2 and 3 do not distinguish between fish needed to prosecute the whiting fishery for delivery at-sea and fish for nonwhiting fisheries. It would likely prevent the development of at-sea processing for fisheries targeted on nonwhiting groundfish species, thereby maintaining shoreside processing for all or nearly all processing activities for nonwhiting trawl fisheries (i.e. status quo).

4/   An allocation for whiting already exists.

2.1.1.5 Trawl Vessel Groundfish Catch Taken with Other Than Groundfish Trawl Gear and Retention of Prohibited Species Catch

This item concerns both groundfish and other species caught by groundfish trawl vessels. Additional discussion and analysis is provided in Section A.3.

Trawl Vessel Catch of Groundfish with Gears Other than Groundfish Trawl:

Gears other than groundfish trawl include open access gears and limited entry fixed gear. Both of these categories include longline and fishpot gear. Vessels with limited entry permits endorsed for longline and fishpot gear use those gears in the limited entry fishery and have access to larger amounts of groundfish. Vessels without such permits may use longline and fishpot gears in the open access fishery. Thus the open access fishery is composed of vessels using exempted gears (gears other than groundfish trawl, longline or fishpot) and vessels using longline or fishpot gear without an endorsement for those gears.

Trawl vessels may use any open access gear. If an IFQ system is established for the LE trawl fleet, should IFQ be required when a limited entry trawl vessel uses open access gear to take groundifsh? If not, how will open access gear catch by limited entry trawl vessels be managed? The Amendment 6 license limitation program is the status quo with respect to permits required to use certain gears and the allocations against which the catch of permitted vessels counts. Under the Amendment 6 license limitation program, all groundfish caught by limited entry trawl vessels counts against the harvest of the limited entry fleet (limited entry trawl, longline and fishpot vessels) regardless of the gear used. The limited entry allocation of sablefish has been subdivided such that sablefish catch counts against a limited entry trawl allocation, separate from the limited entry fixed gear sablefish allocation. The following options have been identified for addressing trawl vessel use of nontrawl gear. A separate table is provided for exempted gear and fishpot and longline gear. Differences between the tables are highlighted.

EXEMPTED GEAR OPTIONS: Application of IFQs to Limited Entry Trawl Vessels Using **Exempted** Gear **(e.g., vertical hook-and-line, shrimp trawl, California halibut trawl, salmon troll gear).** ***(Incorporated in Decision Table A)***	
Option 1: Require IFQ for Catch by Limited Entry Trawl Vessels Using **Exempted Gear**: IFQ tracking and monitoring rules would apply to limited entry trawl vessels even when using **an exempted gear.**	
SubOption 1A	Catch would be required to comply with **open access** fishery catch control regulations.
SubOption 1B	Catch would be allowed in excess of **open access** fishery catch control regulations, so long as landings are completely covered by trawl IFQ.
Option 2: Require IFQ Only for Groundfish Trawl Catch by Limited Entry Trawl Vessels	
SubOption 2A	• Split the trawl groundfish allocation between IFQ and non-IFQ harvest • Maintain the Amendment 6 accounting system and use nonIFQ management measures to control catch taken by trawl vessels with **exempted gears**.
SubOption 2B	• Maintain the same limited entry allocation • Change the accounting system such that catch of limited entry trawl vessel's using **exempted gears** counts against **the open access** allocation and apply **open access** catch control regulations.
SubOption 2C	• Reallocate a portion of the limited entry allocation to the open access sector • Change the accounting system such that catch of limited entry trawl vessel's using **exempted gears** counts against **the open access** allocation and apply **open access** catch control regulations.

LONGLINE AND FISHPOT OPTIONS: Application of IFQs to Limited Entry Trawl Vessels Using **Longline and Fishpot (Fixed Gears) Without a Fixed Gear Endorsement.** ***(Incorporated in Decision Table A)***	
Option 1: Require IFQ for Catch by Limited Entry Trawl Vessels Using **Longline or Fishpot Gear Without a Fixed Gear Endorsement**: IFQ tracking and monitoring rules would apply to limited entry trawl vessels even when using **longline or fishpot gear without an endorsement.**	
SubOption 1A	Catch would be required to comply with **limited entry fixed gear** fishery catch control regulations.
SubOption 1B	Catch would be allowed in excess of **limited entry fixed gear** fishery catch control regulations, so long as landings are completely covered by trawl IFQ.
Option 2: Require IFQ Only for Groundfish Trawl Catch by Limited Entry Trawl Vessels	
SubOption 2A	• Split the trawl groundfish allocation between IFQ and non-IFQ harvest • Maintain the Amendment 6 accounting system and use nonIFQ management measures to control catch trawl vessel catch taken with **longline or fishpot gears but no fixed gear endorsement**.
SubOption 2B	• Maintain the same limited entry allocation • Change the accounting system such that catch of limited entry trawl vessel's using **fixed gears without a fixed gear endorsement** counts against **a limited entry fixed gear** allocation and apply **limited entry fixed gear** catch control regulations.
SubOption 2C	• Reallocate a portion of the limited entry **trawl sablefish** allocation to the **limited entry fixed gear** sector and **take into account trawl vessel harvest with fixed gear when establishing limited entry trawl/fixed gear allocations** • Change the accounting system such that catch of limited entry trawl vessel's using **fixed gears without a fixed gear endorsement** counts against **an limited entry fixed gear** allocation and apply **limited entry fixed gear** catch control regulations.

Because some vessels are combination limited entry trawl and limited entry fixed gear vessels, a determination may be needed as to how catch by such combination vessels would be managed. One options would be to apply the same rules for trawl vessel catch using exempted gear and unendorsed longline or fishpot gear catch that would apply to limited entry trawl vessels that do not hold multiple gear endorsements.

Trawl Vessel Catch of Trawl Prohibited Species Using Nontrawl Gear:

In Decision Table A, options are provided for the management of halibut bycatch with IBQ (options for management of salmon and Dungeness crab bycatch with IBQ have tentatively been set aside as outside the range of reasonable alternatives, see Appendix A). Suboptions are being considered which would provide some Pacific halibut retention opportunity when a limited entry trawl vessels uses gear legal for the species and the landing is covered by IBQ. Additionally, there is an option that would allow retention of halibut caught with trawl gear. Retention opportunities do not necessarily mean the Pacific halibut would be sold. The retained prohibited species might be contributed to food banks.

The following IBQ options are being considered:

IBQ Retention Options for Pacific Halibut	
IBQ Retention SubOption 1	No change in the retention rules.
IBQ Retention SubOption 2	Allow LE trawl vessels to retain Pacific halibut when covered by trawl IBQ for Pacific halibut **and caught with longline or other legal gear**. Adjust trawl Pacific halibut IBQ to account for 100% mortality.
IBQ Retention SubOption 3	Same as Option 2 plus, allow trawl IBQ for Pacific halibut to be transferred to vessels outside the LE Trawl fleet. (These nontrawl vessels would be allowed to retain Pacific halibut when covered by trawl IBQ for Pacific halibut and caught with legal halibut gear. Adjust trawl Pacific halibut IBQ to account for 100% mortality.)
IBQ Retention SubOption 4	Allow trawl vessels the opportunity to retain Pacific halibut caught with trawl gear and covered by trawl IBQ for Pacific halibut. Adjust trawl Pacific halibut IBQ to account for 100% mortality.)

In options 2 and 3, the retention would be in addition to that allowed while a vessel fished in common with other vessels using legal gear during Pacific halibut openings. A determination would be needed as to how that additional opportunity would be provided (through higher vessel limits or through retention opportunities outside the Pacific halibut openings.)

2.1.2 Catch Control Tool Design Elements

TASK III:

- Adopt catch control tool design alternatives for IFQs, cumulative catch limits and permit stacking with extended cumulative limit periods ***(Decision Table C)***.
- Associate catch control tool design alternatives with management regime alternatives from Decision Table A ***(Decision Table D, Page 2-26)***.

The catch control tools being considered are those that place a direct limit on the amount of catch a vessel or the fleet may take (including season closures that limit harvest to zero). Changes to tools that influence the mix of species or size and age composition of the catch are not being considered. Such tools include mesh size regulations and area or depth restrictions.

Section 2.1.1.2 provided a list and brief description of each of the catch control tools that are being considered. More detailed information is provided in this section and, as appropriate, options are provided for choosing the design elements for each tool.

The choices before the Council pertaining to catch control tool design are summarized in the following decision table.

Decision Table C - Adopt catch control tool design element alternatives for analysis (Section 2.1.2)
Status Quo - Cumulative Landing Limits and Season Closures (Section 2.1.2.1)
No decisions needed
Trawl Individual Quotas (Section 2.1.2.2) - Table of options provided starting on page 32 of this document (Options Table C-1).
A narrative of the IFQ program design elements is provided starting on page 2 of Attachment 2, and is followed by a complete list of options, elements,[a/] **and pubic comment.** The Council should: adopt trawl IFQ programs to be included for full analysis in the EIS (Option Table C-1) and make adjustments to the programs, as it deems appropriate.
Cumulative Catch Limits (Section 2.1.2.3) - Table of options provided on page 37 of this document (Options Table C-2).
The Council should: adopt cumulative catch limit design alternatives to be included for full analysis in the EIS (Option Table C-2) and make adjustments to the alternatives, as it deems appropriate, **(if cumulative catch limit alternatives were included as part of decision made on Decision Table A).**
Permit Stacking and Extended Limit Periods (Section 2.1.2.4) - Table of options provided on page 39 of this document. (Options Table C-3).
The Council should: adopt permit stacking and extended limit period design alternatives to be included for full analysis in the EIS (Option Table C-3) and make adjustments to the alternatives as it deems appropriate, **(if permit stacking alternatives were included as part of decisions made on Decision Table A).**

a/ The term “element” is used for design provisions that are not mutually exclusive (several elements from a list may be adopted). The term “option” is used when a choice must be made between design elements.

For IFQs there are numerous design elements and options for the Council to consider. Details and analysis of these are provided in Appendix B.

Decision Table D - Create main analytical alternatives for the EIS by associating the catch control tool design alternatives from Decision Table C with the management alternatives from Decision Table A.

<u>This table is provided as an example and work sheet.</u> Note that in Decision Table A, the differences in IFQ program species coverage between Alternatives 2 and 4 are likely to swamp any differences between the IFQ program design alternatives (from Decision Table C). Therefore, in this example it is suggested that one management regime alternative be selected (Alternative 3) and matched with each IFQ program design alternative, such that differences between the IFQ program design elements can be more readily illustrated. Also, this example contains only one cumulative catch limit design alternative (CC Alternative 1). This was done in order to limit the number of alternatives. Other cumulative catch limit design alternatives are on a continuum between cumulative catch limits and a full IFQ program and can be discussed as part of the analysis. The Council may also choose to deviate substantially from this example. **The TIQC report recommends modification of Alternative 4 such that it covers "IFQ for Groundfish Except 'Other Fish' and IBQ for Pacific Halibut"and elimination of Alternatives 5 and 6 and**

	Management Regime Alternatives from Decision Table A								
			Alt 3-A	**Alt 3-B**	**Alt 3**-C				
Catch Control Tool Alternatives (From Decision Table C)	**Alt 1** Status Quo	**Alt 2** IFQ for Targets Spp	IFQ for Groundfish Except "Other Fish"			Alt 4 IFQ for All Groundfish	Alt 5 Cumulative Catch Limits	Alt 6 Cumulative Catch Limits & Stacking	Alt 7 Cumulative Catch Limits, Stacking & Extend Periods
Cumulative Landing Limits	Included	-	-	-	-	-	-	-	-
Season Closures [a/]	Included	*	*	*	*	*	Included	Included	Included
IFQ Program A Program B Program C	-	Program C	Program A	Program B	Program C	Program C	-	-	-
Cumulative Catch Limits (CC - Alt 1)	-	Included	Included (low OYs)	Included (low OYs)	Included (low OYs)	-	Included	Included	Included
Cumulative Catch Limits (CC - Alt 2)	-	-	-	-	-	-	-	-	-
Cumulative Catch Limits (CC - Alt 3)	-	-	-	-	-	-	-	-	-
Permit Stacking (PS - Alt 1)	-	-	-	-	-	-	-	Included	-
Permit Stacking & Extended Cumulative Limit Periods (PS - Alt 2)	-	-	-	-	-	-	-	-	Included

* In order to limit impacts on ESA listed salmon stocks there may be seasons for whiting , but season closures would not be the primary whiting catch control tool under an IFQ program.

a/ Season closures are the primary tool used to control catch in the whiting fishery. While season closures sometimes occur for some species in the nonwhiting fishery, it is the Council's general policy to use cumulative limits to try to maintain year round opportunities in the nonwhiting groundfish fisheries.

2.1.2.1 Status Quo Catch Control Tools

Current catch control tools for the trawl fishery are generally characterized as cumulative landing limits for the shoreside nonwhiting sector and season management for Pacific whiting. These measures are designed to utilize the species or species complex OYs set by the Council during its multiyear groundfish management process. Status quo management is discussed in more detail at the start of Section 2.2.

Status Quo Measures Remaining In Place Under All Alternatives

Certain status quo management tools that are likely to remain in place regardless of which alternatives are adopted in this decision document (Table 2.1-2). The middle of the table also lists measures likely to be implemented under the bycatch program EIS/Amendment 18 decision.[5/] The list of status quo management measures for the trawl and other fisheries that are expected to continue includes closed areas, partial observer coverage, management areas, bycatch caps in EFP fisheries, gear restrictions, VMS, and sorting requirements. It is also anticipated that the current process of setting OYs during the multiyear groundfish management process will continue.

Cumulative Landing Limits (Cumulative Limits)

Cumulative limits are a kind of trip limit. Trip limits have been a feature of groundfish management since the fall of 1982. Over time the regime has become more complex, covering a wider range of species and fishery sectors. The basic concept is to set a limit on the how much of a given species (or multi-species complex[6/]) an individual vessel may land during a fixed time period. Trip limits, as currently implemented, are retention or landing limits. Any groundfish captured beyond the specified limit are classified as bycatch (if discarded) or a violation (if retained). As long as a vessel does not retain more fish than the limit, additional fishing is allowed. Originally these were per trip limits. Later, in order to reduce the likelihood of regulatory discards, limits were set for a two-month cumulative limit period, during which vessels are allowed to make as many individual trips as desired. In general, separate limits are established for U.S. waters north and south of 40° 10' N. lat. (approximately Cape Mendocino, California). The Pacific whiting fishery is a significant exception to trip limit management.

Seasons

Most fisheries are managed to achieve a year round season. In fact, this is one of the key objectives expressed in the groundfish FMP because buyers and processors want a continuous and consistent supply of fish to maintain markets. In the last few years, managing fisheries to prevent OYs from being exceeded has become increasingly difficult because of the low OYs for some overfished species. As a result, some fisheries have been closed prior to the end of the year.

5/ Changes to the tools used to affect the mix of species or the size and age composition of the catch (e.g., conservation areas and mesh size restrictions) are not being considered at this time.

6/ Many commercially less important or less frequently caught species are combined in multi-species complexes for the purposes of management. Reported landings may not differentiate between these species, and most have not been assessed. These factors make it impossible to manage the species individually. Multi-species complexes currently used include the minor rockfish (separated into several sub-categories), other flatfish, and other fish categories.

Only one groundfish trawl fishery is currently managed primarily with a season closure, the Pacific whiting fishery. The length of the whiting season is determined by how quickly the OY is taken. A formula is used to allocate the OY between the tribal fleet, at-sea catcher/processors, catcher vessels delivering to shore-based processors, and catcher vessels delivering to motherships. Seasons for sectors of the nontribal fishery are staggered, usually beginning on April 1 for shoreside deliveries in California. Each sector's season runs until the allocation for that sector has been caught. Before and after the seasons there is also some opportunity to retain whiting under a 10,000-20,000 pound two month cumulative landing limit.

2.1.2.2 Trawl Individual Quota Management

The trawl individual fishing quota design alternatives developed by the TIQC are provided in Option Table C-1 on page 32.

The Council is considering transferable and divisible individual fishing quotas for trawl catch of groundfish (Section 2.1.1.2 provides a general description and rationale). A particularly important aspect of the specification of trawl IFQs is their application to catch rather than landings or fishing mortality. A special type of IFQ, individual bycatch quotas (IBQs) may be designated for some prohibited species.

The following is description of the IFQ program including the main design element choice points **(in bold)** within the program. There are generally a number of different ways to specify each design element. The term "design option" is being used to refer to the different ways to specify design elements (e.g., a five percent cap on ownership vs. a ten percent cap on ownership). Each design element is discussed and analyzed in detail in Appendix B. The term "alternative" is being reserved for reference to an IFQ program constructed from a set of design element options (e.g., a program composed of a five percent ownership cap, a ten percent rollover provision, a 1999-2003 qualifying period, etc.). The TIQC has arrayed the design element options into IFQ program alternatives for Council consideration (Option Table C-1). The Council may make changes as a result of public comment and the comments of other Council advisory bodies.

Initial IFQ Allocation (Appendix B, Section B.1.0)

IFQ would be allocated to the following groups in the following proportions: . . . **[e.g. groundfish trawl permit holders (xx%), groundfish trawl vessel owners (xx%), processors (xx%)**]. Processors would be defined as... [FMP definition/alternative definition]. *(Section B.1.1)*

In order to qualify for an initial allocation the applicant would . . . **[have to/not have to] . . .** demonstrate recent participation. If recent participation is required, the recent participation requirement for each group would be as follows: make/receive at least . . . **[X deliveries – number of deliveries to be determined]** . . . of trawl caught groundfish from . . . **[1998-2003, or 2000-2003]**. *(Section B.1.2)*

Those eligible for an initial allocation will be allocated quota shares based on the following formula:
[0-100%] of the quota share issued for the group would be issued based on history of catch/landings/processing;
[0-100%] of the quota share issued for the group would be issued based on equal sharing.
[0-100%] of the quota share issued for the group would be allocated through an auction;
(Formula's may vary among groups, *Section B.1.3*)

For IFQ allocated based on delivery history, the applicant's . . . **[total groundfish; total for each IFQ species or species group; or total for each species, species group, or proxy species]** . . . **[caught; landed; or processed]** *(Section B.1.4)* . . . will be calculated for . . **[1994-2003, 1994-1999, 2000-2003, 1998-2003, or 1999-2004]** . . . , less . . . **[0, 1, 2 or 3]** . . . of the applicant's worst years. The calculation will be based on the applicant's . . . **[pounds, percent of total]** . . . for the relevant species/species group in each year. *(Section B.1.5)*

Permit history for combined permits would include the history . . . **[for all the permits that have been combined; for the permit originally associated with the permit number of the combined permit]**. Illegal deliveries would not count toward history. Catch in excess of trip limits, as authorized under an EFP and compensation fish . . . **[would/would not]** . . . count toward history. *(Section B.1.6)*

There would be no appeals process on the initial issuance of IFQ, other than that provided under the Administrative Procedures Act. Any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions. *(Section B.1.7)*

When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided. If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation. *(Section 1.8)*

Holding Requirements and Acquisition Transfer (Appendix B, Section B.2.0)

In order to be used, IFQ representing quota pounds would need to be registered for use with a particular vessel (deposited to the vessel's quota pound account). Only LE trawl vessels would be allowed to participate in the IFQ fishery. A vessel would need to acquire quota pounds to cover a particular landing. . . **[by the time of the landing, no more than 24 hours after the landing, no more than 30 days after the landing].** A vessel . . . **[would not need to hold quota pounds; would need to hold at least xxx quota pounds]** . . . before leaving port on a fishing trip. An LE permit may not be transferred from any vessel for which there is deficit in the vessel's quota pound account for any species or species group (i.e. if the vessel has caught IFQ species not covered by quota pounds). *(Section B.2.1)*

Each year quota pounds would be issued to quota share holders based on the amounts of quota shares they hold. *(Section B.2.2.1)*. For species that are not overfished, a vessel . . . **[would/would not]**. . . be able to roll-over . . . **[up to . . . 5%, 10%, 20%, 30% . . . of its]** . . . unused quota pounds or cover an overage . . . **[of . . . 5%, 10%, 20%, 30%]** . . . with quota pounds from the following year. For overfished species, . . . **[a full; a partial; no]** . . . rollover allowance would be provided. *(Section B.2.2.2)*

Quota share use would be monitored as part of the TIQ program review process. **[Quota shares not used in at least one of three years would be revoked . . . OR . . . During program review processes, if it is determined that significant portions of the available quotas shares are not being used (catch is not being recorded against quota pounds issued for those shares), use-or-lose or other provisions will be considered to encourage more complete utilization]**. *(Section 2.2.3)*

There are many program features that would facilitate new entry and participation by small fishing operations (e.g., highly divisible access privileges as compared to limited entry licenses). Additional provisions for such purposes could include . . . **[none; a low interest loan program; provisions for new entrants to qualify for revoked shares being reissued (the latter two options are not mutually exclusive)]**. *(Section B.2.2.4)*

A percentage of the quota pounds each year . . . **[would/would not]** . . . be held back from that allocated to quota share holders (0-25%, based on analysis) would be awarded to proposals from fishermen and processors working together to benefit the local community. *(Section 2.2.5)*

[Anyone eligible to own a US documented fishing vessel; Anyone eligible to own or operate a US documented fishing vessel; Stakeholders] . . . would be eligible to own or otherwise control IFQ (quota shares or quota pounds) *(Section B.2.3.1)*. Leasing . . . **[would/would not]** . . . be allowed *(Section B.2.3.2)*. Quota pounds could be transferred any time during the year. Quota shares would be transferrable . . . **[any time during the year/only at the end of the year]** *(Section B.2.3.3)*. There would be no limit on the divisibility of quota shares for purpose of transfer. Quota pounds could be transferred in as little as single pound units *(Section B.2.3.4)*. Liens on IFQ are a matter of private contract and would not be specifically limited by this program. A central registry might be created as part of the program administration *(Section B.2.3.5)*. There . . . **[would/would not]** . . . be accumulation limits on the amounts of quota shares or pounds used on a vessel, owned, or controlled. The definition of control may extend beyond ownership and leasing. The range of limits being considered **varies from 1% to 50% to no cap.** The limits may **vary by species, segment of the fleet, or type of entity (e.g. vessel owner, permit owner, processor).** Accumulation limits for groundfish in aggregate may also be different than limits for individual species *(Section B.2.3.6)*. There would be no direct limits on vertical integration *(Section B.2.3.7)*.

Program Administration (Appendix B, Section B.3.0)

Enforcement for the IFQ program may include one or more of the following elements:

- onboard compliance monitors;
- dockside compliance monitors (20%-100%);
- hailing requirements, small vessel exemptions for onboard compliance monitors;
- video monitoring systems;
- full retention requirements;
- a vessel-specific bycatch reporting system;
- electronic landings tracking system;
- limited delivery ports;
- limited delivery sites;
- electronic IFQ tracking systems, and
- VMS.

These measures have been arrayed into the enforcement and monitoring programs provided in Table B.3-1. While some likely specifics are identified to facilitate program design and impact analysis, the FMP amendment language on this issue may be general, specifying that the Secretary will promulgate regulations to establish an adequate monitoring and enforcement regime. Strong sanctions may be recommended along with provisions specifying that illegal overages be forfeited and debited against the vessel's account. Fishing by the vessel would be suspended until the overage is covered. *(Section B.3.1)*. A part of the program administration, a centralized publicly accessible registry for liens against quota shares would be requested with . . . **[all related ownership information/essential ownership information].** (*Section B.3.1*, also see Section B.3.4, Data Collection).

Landings fees would be charged to cover program costs and, over time, some elements of the program may be privatized, as appropriate. *(Section B.3.2)*

The IFQ program would not have a built-in sunset provision nor would quota shares be issued for fixed terms (i.e. IFQs would not expire after a certain number of years). The program would be revised as necessary through standard FMP and regulatory amendment processes. Information on certain aspects of program performance would be compiled annually and a program review would be conducted every 4 years. *(Section B.3.3)*

The data collection program . . . **[would/would not]** . . . be augmented to include the . . . **[expanded and mandatory; expanded voluntary]** . . . provision of economic data from the harvesting and processing industry. All data collected would be maintained in a confidential manner. Aspects of these provisions would require modification of the MSA. A central registry of IFQ shareholders and transactions would be maintained and include market value information. Government costs would also be tracked. *(Section B.3.4)*

One issue that will need to be settled as part of the design of the IFQ alternatives is the date after which qualifying activities (such as landings) might not count toward an initial allocation of IFQ. To this end, a control data of November 6, 2003 has been published (Appendix F).

Another issue that comes up anytime IFQs are discussed is whether or not the IFQs constitute a property right. IFQs do not change the basic ownership of the resource. The resource is a public resource managed by the government as a public trust. Under the current management system, the government manages the resource to the public benefit by controlling catch (directly or indirectly) and allowing catch taken under the management rules to be converted to private property sometime between when it is caught and when it is sold to a fish buyer. An IFQ system would not change the current public ownership of the resource and would likely make little change in the determination of when particular catch would be considered private property. IFQs are an alternative way for the government to control and organize harvest activity. IFQs do so by creating a catch privilege. A catch privilege is different from ownership of the resource. The following Magnuson-Stevens Act language pertains to the limits on this catch privilege:

Sec. 303(d)(2) No provision of law shall be construed to limit the authority of a Council to submit and the U.S. Secretary of Commerce to approve the termination or limitation, without compensation to holders of any limited access system permits . . . or regulations that provides for a limited access system, including an individual quota program.

Sec. 303(d)(3), "An individual fishing quota...

(B) May be revoked or limited at any time in accordance with the Magnuson-Stevens Act.

(C) Shall not infer any right of compensation to the holder of such individual fishing quota, if it is revoked or limited.

(D) Shall not be construed to create, any right, title , or interest in or to any fish before the fish is harvested..."

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 1 of 5)				
		IFQ Program A	IFQ Program B	IFQ Program C
B.1.0	**IFQ Allocation**			
B.1.1	***Eligible Groups***	*Allocate 50% of quota shares to current permit owners and 50% to processors (Option 3b)*	*Allocate 100% of quota shares to current permit owners (Option 1)*	*Allocate 75% of quota shares to current permit owners and 25% to processors (Option 3a)*
	Processor Definition:	*Use special IQ Program definition (processors: receive and process unprocessed fish; or catch and process) (Option 1)*	*Use FMP Definition (Option 2)*	*Same as Program A*
B.1.2	***Qualifying Criteria: Recent Participation***	***Harvesters (including catcher-processors):*** *1998-2003 participation required in order to qualify for an initial allocation of quota shares (number of trips or years to be specified) (Option 2)* ***For shoreside processors and motherships:*** *1999-2004 recent participation requirement (number of trips or years to be specified). (Option 4)*	*All Members of Eligible Groups: No recent participation required in order to qualify for an initial allocation of quota shares (Option 1)* *OR* *All Members of Eligible Groups: 1998-2003 participation required (one trawl groundfish landing/delivery of any groundfish species) in order to qualify for an initial allocation of quota shares (Option 2)*	*Same as Program A*
B.1.3	***Elements of the Allocation "Formula"***			
	Vessel/Permit Related Allocation	*Catcher vessel permit owners will receive quota shares based on their permit history plus an equal division of the quota that could be attributed to permit history of bought-back permits (catcher-processors permit owners will not receive a portion of the quota shares distributed on an equal sharing basis) (Option 2)* *Suboptions for incidentally caught overfished species, either: (a) same as for other species OR (b) equally divide quota for incidentally caught overfished species.* *For catcher-processors permit owners, use an allocation schedule developed by unanimous consent of that sector (to be provided).*	*Same as Program A, except no special catcher-processor schedule.*	*Same as Program A*
	Processor Allocation	*Processors are allocated quota shares based entirely on the processing of groundfish trawl landings received unprocessed. (Option 1)*	*No Allocation*	*Same as Program A*
B.1.4	***History: Species/Species Groups to Be Used for Allocation***	*Allocate Quota Shares Based on Individual Species/Species Groups: Allocate quota shares for each species/species group based on relative amounts of each respective species/species group caught/landed or processed - for permits applies to permit history; for processors applies to amounts processed (Option 2).*	*Same as Program A, except applies only to permit catch/landings history (i.e. there is no processor allocation).*	*Same as Program A*
B.1.5	***History: Allocation Periods***			

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 2 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
Periods/Years to Drop:	***Vessels:*** *1994-2003* *Drop 2 years for whiting sector fishing (applies to incidental harvest and whiting)* *Drop 3 years* ***for nonwhiting sector fishing*** *(Option 1, Suboption B)* ***Shore Processors:*** *1999-2004* *Drop 2 years* *(Option 5, Suboption B)* ***Motherships:*** *1998-2003.* *No opportunity to drop worst year.* *(Option 4, Suboption A)*	*Same as Program A for vessels but no allocations for shore processors or motherships.*	*Same as Program A*
Weighting Among Years:	*Absolute pounds - no weighting between years (Suboption (i))*	*Relative pounds (calculate history based on the entity's percent share of each year's total) (Suboption (ii))*	*Same as Program B*
B.1.6 History: Combined Permits and Other Exceptional Situations			
Combined permits:	*All Permits Count (Option 1)*	*Same as Program A*	*Same as Program A*
Illegal landings/catch:	*Don't count*	*Same as Program A*	*Same as Program A*
Landings in excess of trip limits, as authorized under an EFP	*Don't count landings in excess of the cumulative limit in place for the nonEFP fishery*	*Same as Program A*	*Same as Program A*
Compensation fish:	*Don't count*	*Same as Program A*	*Same as Program A*
B.1.7 Initial Issuance Appeals Process	*Only one provision has been identified: Appeals would occur through processes consistent with the Administrative Procedures Act, and any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions.*		

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 3 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.8 Creating New IFQ Species/Species Groups After initial Implementation	*Only one practical option has been identified: When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided.* *If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.*		
B.2.0 IFQ/Permit Holding Requirements and IFQ Acquisition (After Initial Allocation)			
B.2.1 IFQ and LE Permit Holding Requirements	Catch must be covered with quota pounds within 30 days of the landing (Option 3). Only LE trawl vessels would be allowed to participate in the IFQ fishery. For any vessel with an overage (landings not covered by quota) there would be no more fishing by the vessel until the overage is covered. Additionally, for vessels with an overage, the limited entry permit cannot be sold or transferred until the deficit is cleared. A possible suboption would require some amount of quota pounds be held prior to departure from port (to be analyzed).	Same as Program A	Same as Program A
B.2.2 Annual IFQ Issuance			
B.2.2.1 Start-of-Year Quota Pound Issuance	Only one practical option has been identified: Quota pounds are issued annually to share holders based on the amount of quota shares they held. (Quota shares are issued at the time of initial IFQ allocation).		
B.2.2.2 Rollover (Carryover) of Quota Pounds to a Following Year			
Nonoverfished	10% rollover for nonoverfished (Option 3)	30% rollover for nonoverfished (Option 5)	5% rollover for nonoverfished species (Option 2)
Overfished	5% rollover for overfished species (Option 3)	Full (30%) rollover allowance for overfished species (Option 5)	No rollover allowance for overfished species (Option 2)
B.2.2.3 Quota Share Use-or-Lose Provisions	Include use-or-lose option (require use at least once every three years). (Option 1)	Do not include a use-or-lose provision but evaluate need as part of future program reviews (Option 3).	Same as Program B
B.2.2.4 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options	No special provisions.	No special provisions.	Provide new entrants an opportunity to qualify for revoked shares and shares lost due to non-use (if such non-use provisions are created) (Element 2)

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 4 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
B.2.2.5 Community Stability Hold Back	No special provisions.	No special provisions.	Set aside up to 25% of the nonwhiting shoreside trawl sector allocation each year and allocate that share as quota pounds for joint fishermen/processor venture proposals, ranked on the basis of objective criteria that evaluate benefits to local communities.
B.2.3 Transfer Rules			
B.2.3.1 Eligible Owners/Holders (Who May Own/Hold)	Any entity eligible to own or operate a US documented fishing vessel. (Option 2) TIQC intent: preserve opportunity for existing participants)	Same as Program A	Same as Program A
B.2.3.2 Duration of Transfer - Leasing and Sale	Permanent transfers and leasing of quota shares and quota pounds allowed. (Option 2)	Permanent quota share transfers only--leasing prohibited. Permanent transfers and leasing of quota pounds allowed. (Option 1)	Same as Program A
B.2.3.3 Limits on Time of Transfer			
Time of Year	Allow transfers of quota shares any time during year (Option 1).	Same as Program A	Same as Program A
~~**Embargo When in Deficit**~~	Provisions prohibiting transfer of quota shares when a vessel makes a landing not covered by quota pounds were eliminated as not being practical due to the difficulty of tracing quota pounds back to quota shares, the ownership of which may not be associated with the vessel. The quota share embargo was replaced with a limit on permit transfers when deficits occur (see Section B.2.1).		
B.2.3.4 Divisibility	Only one practical option has been identified: Quota Shares: nearly unrestricted divisibility - “many decimal points." Quota Pounds: divisible to the single pound		
B.2.3.5 Liens	No options have been proposed to restrict liens. Liens can and should be facilitated through a central lien registry. Options for the central lien registry are covered in Section B.3.1.		
B.2.3.6 Accumulation Limits	50% or No Limits (Option 5).	Consider all limits as suboptions	Most restrictive limits(1% or 5% Intermediate level limits (10% or 25%)
B.2.3.7 Vertical Integration Limit	Only one option has been identified: No additional limits on vertical integration beyond those already provided through accumulation limits.		

Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 5 of 5)			
	IFQ Program A	IFQ Program B	IFQ Program C
B.3.0 Program Administration			
B.3.1 Tracking IFQ, Monitoring Landings, and Enforcement (see Table B.3-1)	Enforcement Program 2 100% at-sea monitors Discards allowed Upgraded bycatch reporting system needed Electronic landings tracking Shoreside monitoring opportunity Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS	Enforcement Program 1 100% at-sea monitors Full retention required No upgraded bycatch reporting system needed Electronic landings tracking 100% shoreside monitoring Advance notice of landing Limited ports of landing Electronic IFQ reporting Limited landing hours VMS	Enforcement Program 3 100% at-sea monitors or cameras Discards allowed if at-sea monitor is present (otherwise full retention) Upgraded bycatch reporting sys needed Parallel federal electronic landings tracking Shoreside monitoring opportunity* Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS ***With 100% shoreside monitoring**
Quota Share Tracking	Create a central lien registry but exclude all but essential ownership information(Option 2).	Create a central lien registry including all related ownership information (Option 1).	Same as Program B.
B.3.2 Cost Recovery/Sharing and Rent Extraction The TIQC has not developed options for this issue; however, it has discussed the following elements of a cost recovery/sharing and rent extraction program: Privatization of Elements of the Management System, for example: • Monitoring IFQ Landings (e.g., industry pays for their own compliance monitors) • Fishtickets (industry payment for Trawl IQ program landings information to be fed into a Federal electronic system)	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Landings fee plus privatization of elements of the management system. In particular, monitoring of IFQ landings (e.g., industry pays for their own compliance monitors).Stock assessments should not be privatized and the electronic fish ticket system should not be privatized.
B.3.3 Program Duration and Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))	A four year review process is specified along with review criteria. Among other factors, the review would include evaluation of whether or not there are localized depletion problems and whether or not quota shares are being utilized. Standard fishery management plan and regulatory amendment procedures will be used to modify the program.		
B.3.4 Data Collection	Expanded voluntary submission of economic data (Option 2).	Expanded mandatory submission of economic data (Option 1).	Expanded mandatory submission of economic data (Option 1).

2.1.2.3 *Cumulative Catch Limits*

The following design elements have been identified for consideration with respect to use of cumulative catch limits as a catch control tool:

Option Table C-2. Cumulative catch limit design alternatives (Section 2.1.2.3)		
CC Alt 1: Nontransferable Cumulative Catch Limits	**CC Alt 2:** Transferable Cumulative Catch Limits	**CC Alt 3:** Transferable and Divisible Cumulative Catch Limits
Cumulative limits may not be transferred from one permit to another and permit transfers are only effective at the end of a cumulative limit period.	Temporary transfers between permits are allowed. Cumulative catch limits are period specific. Partial transfers **are not** allowed.	Same as CC Alt 2 except Partial transfers **are** allowed
Cumulative limit periods will remain two months long	Cumulative limit periods will remain two months long	Cumulative limit periods will be four or six months long
Full retention and at-sea video camera	At-sea compliance monitors (100%)	Same as CC Alt 2
Spot dockside enforcement presence and plant audits	Dockside compliance monitors (100%)	Same as CC Alt 2
No change to system for reporting at-sea catch data.	Upgrade at-sea catch data reporting system such that catch data is complete and available at the vessel level in a time frame similar to that for dock receipts and fish tickets	Same as CC Alt 2

Note: Provisions below the dashed line may be mixed and matched between alternatives.

Vessel catch caps (referred to here as cumulative catch limits) were adopted along with sector caps for consideration as part of the Council's final action on the programmatic bycatch EIS. The programmatic bycatch EIS focused on overfished species. Sector catch caps are to be established for overfished species and inseason monitoring (i.e., estimation techniques) is to be upgraded. One of the main tools identified to keep sectors within their catch caps was cumulative catch limits (IFQs are another). This document includes consideration of cumulative catch limits for all groundfish species taken by trawl gear (potentially expanding the application of cumulative catch limits beyond overfished species).

Whereas the traditional landing limits used to control West Coast groundfish harvest apply to landings, cumulative catch limits apply to catch rather than only landings. Vessel catch limits require 100% accounting of a vessel's catch. In the programmatic bycatch EIS it is anticipated that observers or other at-sea monitoring systems would be required to ensure compliance with vessek catch limits. Under the current landings limit system, vessels can continue to harvest fish in excess of their landings limits, but must discard all fish taken in excess of the limit. Under vessel catch limits, a vessel would stop harvesting when the limit is reached.

Cumulative catch limits might be constructed to be temporarily transferable between vessels but not be transferred between periods. The cumulative catch limits might be used to manage toward catch quotas or catch based harvest guidelines (as distinct from status quo landing quotas or harvest guidelines).

During the May 24 through August 2, 2004 formally announced public scoping period, the Council received the following comments from the public on cumulative limit design elements:

Cumulative limit design element comments received during public scoping period.	Source
Opt-out Option: Consider a management system under which vessel catch limits would be available for vessels opting out of fishing under sector caps. Vessels opting out: ○ receive a "proportionate" share of the sector cap for overfished species for their individual use. ○ must carry an at-sea compliance monitor or otherwise assure 100% accounting of catch. ○ receive higher cumulative landing limits for nonoverfished species than for other vessels in the sector ○ can continue fishing even if their sector is shut-down due to exceeding a cap ○ can pool caps with others who have opted out.	PMCC

The TIQC recommended against consideration of this "opt-out" option. Cumulative catch limit design elements suggested during public scoping were reviewed. Particular consideration was given to the idea of providing sector limits, with an opportunity for vessels willing to carry an at-sea observer to opt out of the sector limits. Vessels opting out would receive a higher cumulative landing limit for nonoverfished species than would vessels fishing under the sector limit. It was noted that under this system, if everyone opted out no one could have cumulative limits greater than what they would have had if all vessels had fished under the sector limits. If 50% of the vessels opted out of the sector limit, there would be a large incentive for the remaining vessels to do so. This would result in a system with observer costs similar to an IQ program but without much of the benefit.

2.1.2.4 Permit Stacking and Extended Trip Limit Periods

The following design elements have been identified for consideration with respect to use of permit stacking and an extended season to control catch:

Option Table C-3. Cumulative catch limits with permit stacking and extended period design alternatives (Section 2.1.2.4)	
PS Alt 1. Stacking With **Whole** Cumulative Catch Limits for Additional Permits and **Status Quo Period Lengths**	**PS Alt 2.** Stacking With **Fractional** Cumulative Catch Limit for Additional Permits and **Extended Period Lengths**
A vessel would receive a full cumulative limit for each trawl endorsed permit stacked (increased utilization of cumulative limits would be expected and would reduce the amount of the cumulative limit associated with each permit).	A vessel would receive a full cumulative limit for its "base" permit and a part of an additional cumulative limit for each stacked trawl endorsed permit. The percentage of an additional limit allowed could be a fixed amount or depend on permit length or recent catch history.
Length Endorsement: The vessel would need to have only one permit with the appropriate length endorsement. Trawl permits with other size length endorsements could be stacked without penalty.	Length Endorsement: Same as PS Alt 1
Period Length: status quo, 2-month cumulative limit periods	Period Length: 4-month cumulative limit periods
A maximum of 3 permits could be stacked	No limit on the number of permits stacked
Monitoring and enforcement measure such as those under the cumulative catch limit alternatives (Option Table C-2) would be includes as part of the permit stacking alternatives..	

Note: Provisions below the dashed line may be mixed and matched between alternatives.

Permit Stacking

A permit stacking program for the trawl limited entry sector of the groundfish fishery would allow a vessel to increase its catch limit by acquiring multiple permits for the same vessel. This voluntary program would allow fishers to acquire fishing opportunity that more closely matches their desired level of operation. Permit stacking would likely reduce the number of vessels operating with trawl limited entry permits and would provide for more catch for some vessels.

As permits are stacked, cumulative limits for a particular species or complex would decline if the cumulative limits for the permits are more completely utilized when stacked than prior to stacking. Underutilization of some of the cumulative limits for a particular permit might occur for a variety of reasons:

- a vessel was not fished full time (as a business choice, due to repairs, or other circumstances)
- a vessel was active in nongroundfish fisheries or other geographic areas for parts of the year
- a vessel participated in some segments of the groundfish fishery but not others (e.g., a whiting vessel that did not participate in the DTS fishery)
- a vessel was active in only one geographic locale (e.g., a vessel fishing north of 40°10' N latitude may not utilize some of the limits available south of 40°10 N latitude)

One concern about the stacking of permits is the potential transfer of effort from one segment of the fishery to another segment, for example, the stacking of a permit used exclusively in the whiting trawl fishery onto a permit mainly used in the DTS fishery. In this situation, the only way to prevent the erosion of the per-permit limit in the DTS fishery would be to allow no additional DTS cumulative limit for the stacked permit. If prevention of such transfers is desirable, then consideration of some kind of a species group endorsement might be appropriate.

In 2002, the Council's Trawl Permit Stacking Committee identified four major approaches for permit stacking, two of which consider a permit's size endorsement and two of which do not. These options are briefly described as follows:

Summarization of Ad Hoc Permit Stacking Committee Options from 2002

	Portion of a Cumulative Limit Provided for Each Stacked Permit	Size Endorsements for Stacked Permits Must Fit the Vessel
Option 1	Whole limit	No
Option 2	Fixed portion (e.g. 50%)	No
Option 3 [7/]	Whole limit	Yes
Option 4	Portion based on permit length	No

Note: Under all options, at least one permit must have the appropriate size endorsement.

Options providing whole limits (Options 1 and 3) are simple but with substantial participation would lead to reductions in per-permit limits. Vessels not stacking permits would experience diminishing harvest opportunities. Option 1 is used in permit stacking Alternative 1. Options 2 and 4 are both contained as variations within permit stacking Alternative 2.

Option 2 is simple but does not take into account the relative capacity of vessels of different length. However, the small cumulative limits in the fishery in recent years are generally within the harvest capacity limits of most trawl vessels on the West Coast, regardless of the vessel size.

Option 4 takes into account capacity differences represented by permits of different sizes. The most apparent means of using permit length to adjust cumulative limits would be to utilize the fishing power formula ("points" system) defined in the implementation of Amendment 6. The "points" system could be used in at least two ways to calculate the percentage of a full limit that would be stacked. An approach that could most easily be accomplished involves assigning a standard reference length for all permits with the same gear endorsement. All permits at or above that length would carry a full additional limit when stacked. The percentage of a full limit that would be assigned to a shorter permit is determined by the ratio of points for that permit to the number of points corresponding to the reference length. The following table illustrates the percentage of a full limit that would be assigned for nine different permit lengths, and four alternative reference lengths.

7/ From a regulatory standpoint, Option 3 would likely be the easiest, since limits that are currently specified on a per-vessel basis could be changed to apply per-permit, with no additional changes to the structure of the limited entry program. While a full additional limit would be provided for each stacked permit, substantial participation would likely cause per-permit limits to be reduced.

Percentage of permit combination "points", for selected lengths, relative to four reference lengths.					
Permit	Market	Percentage of "points" relative to a permit of:			
Length	"Points"	75 ft	70 ft	65 ft	60 ft
35	4	15%	18%	21%	26%
40	6	21%	25%	30%	36%
45	8	28%	33%	40%	49%
50	10	36%	43%	52%	63%
55	13	46%	55%	66%	80%
60	16	57%	68%	82%	100%
65	19	70%	83%	100%	100%
70	23	84%	100%	100%	100%
75	27	100%	100%	100%	100%

Extended Trip Limit Period

The current landings limits are for two month periods. The limit periods might be extended to up to 12 months. As the length of the management periods increase, the increased duration of the cumulative limit period will provide vessels with more flexibility to fully take their allowed limits. Increased utilization of the available cumulative limits is likely to drive down the size of per-permit cumulative limits. Additionally, as the limit periods increase, the opportunity to initiate inseason actions that are effective at the start of the subsequent cumulative limit period is reduced. The potential need for mid period correction could lead to more derby type fishing. In the extreme, with a 12 month limit period, cumulative limits either must be set such that they represent vessel quotas, or such that if every vessel took its limit, the allowable harvest would be exceeded (as is the case under the current trip limit system). In the latter case, a derby fishery would be created under which vessels would race to achieve their limit before the fishery is closed through inseason action.

2.1.3 Within Trawl and InterSector Allocations (Excluding Initial IFQ Allocation)

TASK IV:	Adopt options for allocating among trawl sectors and separating shoreside whiting from shoreside nonwhiting landings (Decision Table E).

This sections covers allocation among trawl sectors and discusses the decision process for allocation between trawl and nontrawl sectors (as may be needed depending on the management regime alternative selected).

2.1.3.1 Allocation Between and Among Trawl Sectors

Section 2.1.1.4 identifies options for subdivision of the trawl sector:

Sector Option 1: a single trawl sector,
Sector Option 2: three trawl sectors (vessels delivering shoreside, vessels delivering at-sea and catcher-processor deliveries), or
Sector Option 3: four trawl sectors (same as option 2 except split shoreside deliveries into whiting deliveries and nonwhiting deliveries).

Allocation of Nonwhiting Species: Sector Options 2 and 3 may require the allocation of nonwhiting species. It should be noted that if the amounts of nonwhiting species allocated for deliveries at-sea delivery is just sufficient to provide for the incidental catch needs of the whiting directed fishing, then it is likely that the allocations would preclude the development of a significant at-sea processing sector for species other than whiting.

Whiting Allocation: Sector Option 3 would require another split of the existing whiting allocation: a split of the shoreside allocation between whiting targeted trips and nonwhiting trips. In order to make the additional split, a decision rule will be needed for discriminating between shoreside whiting and nonwhiting landings. This decision rule will be needed in order to determine the allocation against which to count a particular shoreside landing and to assess historic landings for the newly specified division in the fleet. Sector Option 2 represents status quo with respect to whiting, whiting is already divided among the three indicated trawl sectors.

Decision Table E - Within Trawl Allocations (Section 2.1.3)

For analysis, adopt options to allocate groundfish between divisions of the trawl sector.

Options: For whatever subdivisions of the trawl sector are established (see Decision Table A: Trawl Sectors and Intersector Transfers–Section 2.1.1.4),

establish the subdivision of the trawl sector allocation based on the relative shares for each sector during the time period used for the initial IFQ allocation.

Options: Options will be the same as for the allocation periods considered for the trawl IFQ program (Section B.1.5).

If different periods are used to allocate to different trawl sectors, either use the shortest period common to the allocation of IFQ for all sectors or calculate a sector share of catch based on the IFQ period and adjust the shares proportionally such that they sum to 100%.

When calculating fleet history based on permit history of the individual vessels, a permit formed from the combination of several permits would include the catch history of all of the combined permits.

Suboption a: **A recency requirement would be applied** and the catch history of permits not meeting the recency requirement would not be included as part of the calculation of the relative sector shares. The recency requirement would be the same as that used for the IFQ program.

Suboption b: **No recency requirement.**

For analysis, adopt options to separate shoreside nonwhiting landings from shoreside whiting landings

	Criteria for a Whiting Trip		
Classification Option 1	>50% whiting	AND	>10,000 pounds of whiting
Classification Option 2	>50% whiting	OR	>10,000 pounds of whiting
Classification Option 3	>50% whiting		

The TIQC recommends classification Options 2 or 3, but has requested additional data on the issue.

2.1.3.2 Intersector Allocations to Accommodate Trawl Vessel Use of Nontrawl Gear

As a result of decisions on the management of limited entry trawl vessel use of nontrawl gears (see Decision Table A and Section 2.1.1.5) there may be need for some adjustments to allocations to the trawl and other sectors. The need for such adjustments is discussed here but the amounts of the adjustments will need to be addressed as part of the intersector allocation EIS.

Groundfish limited entry trawl vessels are allowed to use open access gears to take groundfish. Open access gears include longline and fishpot gears used by vessels without a permit for those gears and exempted gears (other legal groundfish gears). When using such gears:

- catch counts against the open access allocation
- open access trip limits restrict vessel landings

If an IFQ program is adopted, in Section 2.1.1, a decision will have been made as to whether trawl vessels are required to cover their open access gear landings with IFQ. Two sets of options are provided in Section 2.1.1.5, one set for exempted open access gear and one set for vessels using longline and fishpot gear in the open access fishery (i.e. using longline or fishpot gear without a limited entry permit endorsed for those gears). The provisions and number systems for each set of options parrallel one another. For example, Option 1A for both sets specifies that vessels would be required to hold IFQ for their nontrawl landings with that gear (exempted or open access longline/fishpot) but be subject to catch/landing limits which apply to the gear. If IFQ is not to be required for trawl vessels use of these gears (Option 2), a determination will be needed on how such catch will be managed. Either

- the trawl allocation can be subdivided to provide for trawl vessel use of nontrawl gears (Section 2.1.1.5, Options 2A) , or
- the trawl vessel catch with nontrawl gears can be counted against and managed in common with the allocations for other sectors (Section 2.1.1.5, Options 2B or 2C).

Under Option 2C, there may be a one time reallocation of groundfish from trawl to the other sector (Section 2.1.1.5). Under Option 2B there would be no such reallocation. For trawl vessel use of exempted gear, the sector with which the trawl vessel's nontrawl landings would be merged may be the open access sector. For trawl vessel use of longline and fishpot gear, the sector may be the limited entry fixed gear sector. If the trawl vessel allocation is to be subdivided for separate management (Section 2.1.1.5, Options 2A), a determination will be needed on the amount to be allocated to trawl vessel catch with nontrawl gears. Allocation between trawl and each of these sectors will be addressed as part of the intersetor allocation EIS. Additional information on this issue is provided in Section 2.1.1.5 and Appendix A.

2.2 Types of Environmental Impacts for Consideration in NEPA, E.O. 12866, and RFA Analysis of Proposed Action

TASK V:	Identify impacts that should receive particular attention in the EIS not already identified in Section 2.2.

The alternatives discussed in Section 2.1 would be analyzed within the context of various federal laws. NEPA requires the analysis of the effects of a proposed action on the human environment. Many of the management system elements to be considered would not affect either the physical or biological environment. Some elements of the program that affect only the socio-economic environment may be more appropriately analyzed under the requirements of Executive Order 12866, the Regulatory Flexibility Act (RFA) and the Magnuson Stevens Act. E.O. 12866 and the RFA together require Federal agencies to evaluate the effects of their proposed actions and subsequent regulations on small businesses and other small entities. The Magnuson-Stevens Act requires consideration of fairness and equity, consideration of the effects on communities, and a fishery impact statement, as well as evaluation of a number of other decision criteria. Regardless of the context in which alternatives are analyzed, the analyses will be conducted so that their anticipated effects are compared against the anticipated effects of continued status quo management. Status quo does not necessarily mean that conditions in the fishery remain stable. Rather it is what would happen if no additional action were taken to change the current fishery management regime. Status quo assumes continuation of existing harvest policies, implementation of prior commitments and the management measures by which those harvest policies are implemented. The definition of status quo will determine which costs and benefits will result from the actions taken under the alternatives in this document, and which costs and benefits would result even if no additional action were taken. Thus, status quo is not the fishery as it exists this year or the next, but rather the projection into the future of current trends and commitments.

For the analysis of the alternatives, the 2003 and /or 2004 fishery will be used as a baseline against which both status quo and the alternatives to status quo may be measured. Status quo management will also consider management actions that may be expected to flow from Amendment 18 and any implementing measures from the EFH EIS. For example, if the Council implements sector total catch limits, as envisioned in draft Amendment 18, it may also recommend increased monitoring for those fishery sectors with total catch limits. If this is the case, it may not be appropriate to include the all of the cost of additional bycatch monitoring (i.e., the change from current conditions) as part of the cost of a trawl IFQ program. Rather, some increase in monitoring should be included in the definition of status quo, thereby reducing the change from status quo required to implement a trawl IFQ program.

One purpose of the public scoping process is to solicit comment on environmental impacts that should be considered in a NEPA analysis of the proposed actions. The following categories of impacts were identified during the scoping period:

Habitat and Ecosystem

- Changing impact on habitat due to gear changes
- Potential changes in ecosystem dynamics if regional or localized depletion occurs.
- Potential changes in the mix of species harvested with changes in fishing tactics, seasonality or gear types used
- Environmental impacts due to economic, community, and resource management changes

Fishery Resources

Changes in accuracy of total mortality estimates

- Incentives for unreported highgrading
- Incentives to underreport landings

- Improved monitoring

Changes in total mortality
- Incentives to minimize take of incidental catch species to avoid IFQ costs
- Changes in size and maturity of fish taken
- Direct and indirect impacts on fisheries prosecuted by other gear sectors, including sport

Socioeconomic Environment
Production Value - Harvesters and Processors
- Mix of species and products
- Product quality
- Market timing (special orders)
- Allowable catch (reduced uncertainty about discards with proper monitoring)

Production Costs - Harvesters
- Harvest flexibility (opportunity to better scale harvest activities to improve operational efficiency)
- Gear flexibility
- Timing flexibility
- Opportunity for more efficient investment in capital
- Asset values (permit and vessel)

Production Costs - Buyers and Processors
- Product recovery rates
- Operational planning
- Storage costs
- Opportunity for more efficient investment in capital
- Asset values (facilities)
- Consolidation impacts, loss of infrastructure, and indirect impacts on the businesses (e.g. shifts impacting the operation of existing businesses and their competitiveness)

Safety and Personal Security
- Vessel maintenance, repair and replacement
- Avoidance of bad weather
- Personal financial and employment security

Community Impacts
- Local income
- Employment
- Tax base and municipal revenues
- Cost recovery for fishery related public works projects
- Cultural heritage
- Business and infrastructure impacts

Fairness and Equity
- Effects on groups involved and dependent on the fishery (income and employment) for crew, skippers, vessel owners, processor labor and management, support industries

- Effects on small entities (businesses (including family businesses) local governments, organizations)
- Effects on low income and minority populations
- Effects on asset value (quotas, permits, vessels)
- Effects on adjacent fisheries (geographically adjacent fisheries, for example Alaskan fisheries)
- Effects on nontrawl gear fisheries on the West Coast including sport fisheries

Nonconsumptive Values
- Nonconsumptive Use
- Existence Value

Intial Program Development and Implementation Costs

Ongoing Administrative Costs

Enforcement and Compliance Monitoring Costs

Research and Performance Monitoring Costs

References

National Research Council. 1999. "Sharing the Fish: Toward a National Policy on Individual Fishing Quotas." Ocean Studies Board, Commission on Geosciences, Environment, and Resources, National Research Council. National Academy Press. Washington, D.C.

TABLE 2.1-1. Trawl catch, management regime alternatives (INITIAL/ PRELIMINARY TIQC RECOMMENDATIONS) and acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2004. (Overfished stocks in CAPS) (Page 1 of 2).

Stock	2004 ABCs/OYs (mt)		Alternative Management Regimes				Deliveries for At-Sea Processing (NOTES 1 & 2)		
	ABC	**OY**	**Alt 1 - Status Quo**	**Alt 2**	**Alt 3**	**Alt 4**	Alt2	Alt 3	Alt 4
LINGCOD	1,385	735	CL	CL/SecCap	IFQ	IFQ			IFQ
Pacific Cod (Vanc-Col OY, Eur-Mont-Conc catch counts toward the "Other Fish" OY)	3,200	3,200	No Lim	IFQ	IFQ	IFQ			
PACIFIC WHITING (Coastwide)	188,000	250,000							
Shoreside			Season & CL	IFQ	IFQ	IFQ	IFQ	IFQ	IFQ
Mothership			Season	IFQ	IFQ	IFQ	IFQ	IFQ	IFQ
Catcherprocessor			Season	IFQ	IFQ	IFQ	IFQ	IFQ	IFQ
Sablefish (Coastwide)	8,487	7,786	CL						
North of Conception	8,185	7,510	CL	IFQ	IFQ	IFQ	SecCap	Sector Cap	IFQ
Conception area	302	276	CL	IFQ	IFQ	IFQ			
PACIFIC OCEAN PERCH	980	444	N-CL; S-CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Shortbelly Rockfish	13,900	13,900	No Lim	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
WIDOW ROCKFISH	3,460	284	Closure & CL	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
CANARY ROCKFISH	256	47	CL	CL/SecCap	IFQ	IFQ	SecCap	SecCap	IFQ
Chilipepper Rockfish	2,700	2,000	N-CLgrp; S-CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
BOCACCIO	400	250	S-Closure	CL/SecCap	IFQ	IFQ	SecCap	SecCap	IFQ
Splitnose Rockfish	615	461	S-CL	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Yellowtail Rockfish (north)	4,320	4,320	N-CL; S-CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Shortspine Thornyhead	1,030	983	CL	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Longspine Thornyhead	2,461	2,443	CL	IFQ	IFQ	IFQ			
S. of Pt. Conception	390	195	CL	IFQ	IFQ	IFQ			
COWCOD N. Concep & Monterey)	5	2.4	Closure	CL/SecCap	IFQ	IFQ			
S. Concep	19	2.4	Closure	CL/SecCap	IFQ	IFQ			
DARKBLOTCHED	240	240	N-CLgrp; S-CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
YELLOWEYE	53	22	N-CL, CLgrp; S-CLgrp	CL/SecCap	IFQ	IFQ	SecCap	SecCap	IFQ
Nearshore Species									
Black WA	540	540	N-CLgrp; S-CLgrp	CL/SecCap	IFQ	IFQ	SecCap	SecCap	IFQ
Black OR-CA	775	775	N-CLgrp; S-CLgrp	CL/SecCap	IFQ	IFQ	SecCap	SecCap	IFQ
Minor Rockfish North (for management purposes split: nearshore, shelf and slope)	4,795	2,250 (ns=122, shlf=968, slp=1,160)		ns -CL/SecCap shlf-IFQ slp-IFQ	IFQ-grp	IFQ or IFQ-grp (depending on spp)	SecCap	SecCap	IFQ-grp
Remaining Rockfish North	1,612	-							
Bocaccio	318	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Chilipepper - Eureka	32	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Redstripe	576	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			

TABLE 2.1-1. Trawl catch, management regime alternatives (PRELIMINARY TIQC RECOMMENDATIONS) and acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2003 and 2004. (Overfished stocks in CAPS) (Page 2 of 2).

Stock	2004 ABCs/OYs (mt)		Alternative Management Regimes				Deliveries for At-Sea Processing (NOTES 1 & 2)		
	ABC	**OY**	**Alt 1 - Status Quo**	**Alt 2**	**Alt 3**	**Alt 4**	Alt2	Alt 3	Alt 4
Sharpchin	307	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Silvergrey	38	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Splitnose	242	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Yellowmouth	99	-	N-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Other Rockfish North	2,068	-	N-CLgrp by depth	IFQ-grp	IFQ-grp	IFQ-grp			
Minor Rockfish South (for management purposes split: nearshore, shelf and slope)	3,506	1,968 (ns=615, shlf=714, slp=639)		ns -CL/SecCap shlf-IFQ slp-IFQ	IFQ	IFQ or IFQ-grp (depending on spp)	SecCap	SecCap	IFQ
Remaining Rockfish South	854	-							
Bank	350	-	S-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Blackgill	343	-	S-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Sharpchin	45	-	S-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Yellowtail	116	-	S-CLgrp	IFQ-grp	IFQ-grp	IFQ or IFQ-grp			
Other Rockfish South	2,558	-	S-CLgrp by depth	IFQ-grp	IFQ-grp	IFQ-grp			
Dover Sole	8,510	7,440	CL	IFQ	IFQ	IFQ			
English Sole	3,100	3,100	CLgrp	IFQ	IFQ	IFQ			
Petrale Sole	2,762	2,762	CL	IFQ	IFQ	IFQ			
Arrowtooth Flounder	5,800	5,800	CL	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Other Flatfish	7,700	7,700	CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Other Fish	14,700	14,700	No Lim	No Lim	CL/SecCap	IFQ			
Halibut NOTE3			Prohib	Prohib	Prohib	IBQ	Prohib	Prohib	IBQ
Salmon NOTE3			Prohib	Prohib	Prohib	Prohib	Prohib	Prohib	Prohib
Crab NOTE3			Prohib	Prohib	Prohib	Prohib	Prohib	Prohib	Prohib

KEY TO CODES FOR ALTERNATIVE MANAGEMENT REGIMES
SecCap=Sector Catch Cap
Prefix N or S = measures used north or south of Cape Mendocino.
CL = species specific cumulative trip limits
-grp = harvest controlled under the IFQ or cumulative limit for a species group.
Season = opening with no cumulative limits
Closure = no retention allowed (any catch must be discarded)
Prohib = prohibited species.
No Lim = harvest monitoring only, other limits have not been necessary to control harvest.

NOTE 1: Substantial dog shark are caught in the whiting fishery (2,269 mt in the at-sea portion from 1992-2002)
NOTE 2: At-sea species for management has not been discussed by the TIQC. The list of potential species provided here is based on a threshold of at-least 3 mt in the estimated at-sea deliveries for 1992-2002.
NOTE 3: TIQC has not reviewed management options for prohibited species under Alternative 4.

TABLE 2.1-2. Existing management tools, management tools adopted under the programmatic bycatch EIS, and management tools that would remain in place under IFQs.

Existing Management Tools (Status Quo) and Proposals from Programmatic Bycatch EIS	Possible Adjustment to Tools if Trawl IFQs Are Implemented
Tools Applying to Trawl And, in Some Cases, Other Fisheries	
OY specifications	No change.
Commercial Trip Limits	None for Trawl Fishery (depending on scope).
Commercial Cumulative Limits	None for Trawl Fishery (depending on scope).
Commercial and Rec Closed Areas (RCA's, CCA, YRCA)	RCAs to protect fleet and other sectors from disaster tows of overfished spp. Habitat protection.
Inseason Adjustments	Disaster tows or overage in other sectors could shut down trawl fishery.
Partial Observer Coverage (NMFS)	Observer coverage increase.
Management Areas (Latitudes)	At least preserve existing areas.
Differential Gear Requirements (exclusion area for lg footrope)	Maintain for habitat and disaster tow protection.
Differential Trip Limits (small, large, midwater)	None for Trawl Fishery (depending on scope).
Bycatch caps in EFP Fisheries (incl whiting)	Possible for Council to reserve some of the OY for EFP fisheries.
100% Observer Coverage in EFP Fisheries	No reason to change.
Full Retention in EFP Fisheries	No reason to change.
"Hotspot" Closures in EFP Fisheries	No reason to change.
Mesh Size	No reason to change.
Voluntary Areas To Be Avoided (e.g., FG, OA, whiting)	No reason to change.
Sorting requirements	Sorting requirements to IFQ categories. Spp comp info still required for IFQ spp groups.
VMS	VMS would continue.
Cameras	Might increase in use.
Commercial seasons (spawning lingcod)	Might have closures requiring discards but any mortality would still count against IFQ.
Fish/Fillet size limits	No reason to change.
Preferred Alternative Tools from Bycatch EIS	
All current tools used for bycatch management	
overfished species sector caps, including:	
monitoring standards	
full retention programs	
vessel incentives for exemption from sector caps	
IFQ program	
Tools Applying Only to Other Sectors	
Sablefish Tier Limits	No change. Possibly allow fixed gear quota to be transferred to trawl (depends on provisions adopted for analysis).
Recreational Bag Limits	No reason to change.
Recreational Seasons	No reason to change.
Tribal Full Retention Programs	No reason to change.
Tribal Time/Area Closures (Bycatch Reduction)	No reason to change.
Number of Hooks	No reason to change.
Hook Size	No reason to change.
Other Commercial and Rec Gear Restrictions	No reason to change.

Appendix A: Management Regime Design

Appendix A: Management Regime Design

This appendix elaborates on certain aspects of the management regime alternatives introduced in Section 2.1.1.

A.1.0 Area Restrictions

A.1.1 Discussion and Options

While the need for area restrictions on catch is more likely to be raised under an IFQ system, area restrictions can also be used with other catch control tools. Socio-economic or biological concerns may motivate consideration of an area-specific scheme. Maintenance of fishing opportunities and protection of local community interests and processing infrastructure could be potential socio-economic reasons for dividing OY on an area basis. Without area management of OYs, there is some potential for effort to be concentrated within some areas under an IQ program. Assigning area-specific OY may prevent regional depletion of stocks to the extent that mixing or migration of stocks between areas is not occurring. Key objectives of area management include:

- Prevent regional depletion[1/] and set catch levels for areas based on stock assessments.
- Distribute economic benefits of catch along the coast.
- Ensure that certain communities receive economic benefits.

These aims could be pursued through catch area or landing area restrictions Area OYs could be based on existing INPFC boundaries or some other area distribution scheme.

Catch area restrictions on IFQs would most precisely meet the need to prevent regional stock depletion and would likely keep landings more geographically dispersed than might be the case without geographic restrictions. Landing area restrictions would more precisely distribute harvest benefits along the coast (or in particular communities), and would likely keep ocean catch area more dispersed than might be the case without restrictions.

Catch area restrictions would most likely be implemented through the use of catch area endorsements on IFQs. Landing area restrictions might be implemented either by putting landing area endorsements on all IFQ or through a policy that allocates some IFQ to communities, similar to Alaskan CDQ programs. CDQs are a different type of DAP program, one generally designed to benefit isolated communities that are heavily dependent on fisheries as a sole or primary source of economic activity. There are not many, if any, communities on the West Coast with the level of dependence of those communities in Alaska for which CDQ programs were designed. If CDQs are to be considered by the Council, they would likely be considered as a separate management tool

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1/ The term "regional" depletion is being used here to denote broader scale depletion of a segment of a stock, and "localized" depletion is being reserved for concerns related to depletion of reefs or other relatively small geographic areas. IFQs established for INPFC management areas might prevent regional depletion but would not address localized depletion of biomass on a particular reef or in the area of a particular port.

rather than as a restriction or additional feature of an IFQ program. While there have been a few comments in support of CDQ during the public scoping process, thus far neither the Council nor any of its advisory bodies has seen need to promote the development of a management regime alternative that includes CDQs.

TIQC Recommendation: Area restrictions should be based solely on the need to address stock conservation concerns.

Minimizing restrictions, such as catch area restrictions, will increase operational flexibility and increase the value of the IFQ. Given flexibility, vessels will go to areas where they can fish the cleanest. Nothing in the current system prevents vessels from migrating between ports. The potential for geographic redistribution is a reality for market driven systems. Where fish should be landed cannot be accurately forecasted and is worked out through negotiations between vessels and processors.

Landings area endorsements should be rejected. With respect to ports of landings, the TIQC felt that there are not enough groundfish to support processing facilities in every port that has historically had such fisheries. The economics of the trawl fishery do not allow vessels to travel far from the fishing grounds to deliver their catch.

TIQ Enforcement Group Recommendations: If some IFQ are catch area specific, then all landings should occur in ports within the catch area. This implies that a vessel would not be able to fish in two catch areas on the same trip. However if the enforcement system includes VMS, compliance monitors, and full retention, it may be possible to allow vessels to fish in two areas on a single trip, and separate the catch.

Options from Public Comment Period:

Option	Source
Landing or catch area specific IFQ based on biological and socio-economic need	ED, Survey (ED)

A.1.2 Initial Analysis

The Trawl IQ Committee does not support allocation of OY by area, unless it is necessary for biological reasons. To date management of West Coast groundfish on a spatial basis has only been done on a fairly coarse scale. Alaska and British Columbia groundfish fisheries use some form of allocation by area to ensure catches are distributed in proportion to available biomass. In a few examples of West Coast groundfish and fisheries elsewhere there is evidence of regional depletion that supports the need for spatial management. Current stock assessments generally assume a large degree of homogeneity in stocks of groundfish - due in part to the problem of distribution of catch and biological data and the inability to conduct stock assessments on a finer spatial scale than coastwide. Currently, there is little documented evidence of regional depletion for most species of groundfish (lingcod being an exception, but still only known to be depleted within context of a very large spatial scale), however, there has not been sufficient analytical capacity or effort applied to determine whether it is taking place. Anecdotal information from fishermen who have been long time participants in West Coast fisheries suggests that species such as Pacific ocean perch, canary rockfish, and black rockfish, to name a few were more broadly distributed in the past than they are currently.

There is a significant amount of evidence that population structure of many species of groundfish (rockfish in particular) is complex and genetically fragile. Preservation of age class structure appears to be important as recent studies indicate older fish may produce more viable larvae. There is evidence in the literature and from stock assessments that the age structure of groundfish species has been truncated and that growth and maturity of some species has been affected (Francis 2003). To rebuild populations, rebuilding plans have been developed for species known to be overfished.. Some of the measures taken should have the effect of restoring population and age structure for these and associated species. Reducing uncertainty in stock assessments is key to ensuring reduced risk of assessment errors and thus long-term viability of fisheries. This might be accomplished through co-operative arrangements between industry and government to finance and better utilize and extend (spatially) fishery and research data used in stock assessments (Walters and Pearse 1996).

Allocation of catch by area would help protect the genetic components of rockfish - which appear to have a complex structure. A closure during spawning might ensure that all potential successful parents have the opportunity to spawn during a given year. However, they would remain vulnerable during open periods, and unless access to certain areas were restricted, the risk of excess fishing mortality on potentially successful parents would remain to the degree fishing effort was concentrated in a particular area. Reduced overall fishing mortality would help protect the age class structure. Both population and age structure could be conserved through a network of marine reserves. In order to design an effective network of marine reserves, more information is needed for various species on the effective population size, larval contribution, and recruitment patterns. Current RCAs provide some protection for both population and age structure. Removal of these, along with removal of other controls used to reduce the possibility of concentrating fishing effort, may place some groundfish stocks at increased risk.

One of the benefits of the trawl IQ program may be an increase in efficiency in taking available harvest by vessels less encumbered by many of the current regulations. Time and area restrictions could be used as input controls on harvest in combination with an IQ program (Walters and Pearse 1996). Temporal and spatial restrictions alone tend to undermine efficiency gains and may continue to do so under an IQ program if shareholders are forced to compete for local concentrations of fish within restricted windows of opportunity (Walters and Pearse 1996).

Status Quo West Coast and BC Area Management

West Coast groundfish management uses a variety of input and output controls to regulate the fishery (PFMC 2004e). Although the areas are large, these management tools imply some measure of temporal and spatial control. Some of the following controls that are currently in place may be relaxed under a trawl IQ program:

- Allocation of OY by area for certain species.
- Differential Trip Limits - Differences exist in cumulative trawl trip limits north and south of 40°10' N latitude. Cumulative limits reflect differences in opportunities due to distribution of

OY north and south and their potential to be realized. In addition, the need to protect overfished species constrains the take of co-occurring species and these constraints vary north and south.

- Current participation has been reduced by the vessel buy-back program. Processor consolidation has occurred. Thus, with fewer boats and fewer processors, the ability to catch and process fish has been concentrated among remaining fleet and ports. Under an IQ program further concentration is anticipated through rationalization and specialization of activities.
- Rockfish Conservation Areas - Tight restrictions in large areas within bathymetric ranges established to protect overfished rockfish. These may provide marine reserve-like protection to the population and age structure.
- Selective trawl designs - Recent development of more selective gear (with respect to bycatch of overfished rockfish) has allowed vessels to harvest flatfish in the northern area while minimizing the take of overfished species.

Very few of the annual OYs are subdivided by area under current management of the West Coast groundfish fishery. When OYs are subdivided for some species, the split is usually made north and south of 36° N latitude, north and south of 40°10' N latitude or by International North Pacific Fishery Commission (INPFC) area.

In contrast An area distribution of TAC was chosen for British Columbia's trawl IQ system. British Columbia's TAC is allocated by Pacific States Marine Fisheries Commission (PSMFC) areas for their groundfish fisheries, including the trawl IQ fishery. PSMFC areas are about 1/3 the size of INPFC areas. BC's area allocation of TAC was done for biological reasons as a precautionary measure to prevent excessive concentration of fishing effort, overfishing and regional depletion of fishing resources, especially near fishing ports. Stakeholders in BC were concerned that the quota trawl fishery entitlement and tradable quota shares could allow such concentration of effort. While Canada has parsed out TACs for many species on an area basis, they have not relied solely on stock assessment information to do so.

Comparisons between the Canadian system of TAC allocation by area and alternatives proposed under the West Coast Trawl IQ program should be made with caution. British Columbia's groundfish management area is geographically much different and much smaller than the Washington, Oregon, and California (WOC) management area. British Columbia has fewer ports and most are concentrated in the southern part of the management area. Considerable effort went into designing British Columbia's area allocation scheme, involving scientists, managers, and representatives of the fishing industry. At least as much effort would be required to develop such a scheme for the WOC management area.

Biological Concerns Associated with Increased Concentration of Harvest

Area management may be a useful precautionary tool for preventing overfishing within sub-areas of groundfish stocks. While data available for most West Coast groundfish species is probably not sufficient to allocate OY to finely-drawn geographic areas, area allocation of OY should be considered at least for species that have known problems of regional depletion (lingcod) or are judged to have a high potential for regional depletion.

Stock assessment scientists, fishery stakeholders, and managers should jointly evaluate whether or not area management of OYs will improve stock assessments, sustainability, and overall yield. If area management is favored, then these groups should also be instrumental in defining the management areas.

Economic and biological forces can lead to concentration of fishing effort and areas of localized depletion. These impacts are possible both under current management systems and a potential IQ system. Making an informed choice for an IQ program can be facilitated by evaluating several sources of information, including a review of other area management programs, review of stock assessment data, spatial analysis of fishery and survey data, and analysis of habitat suitability maps in the Groundfish Essential Fish Habitat EIS soon to be available from National Marine Fisheries Service.

Current stock assessments assume homogeneous distribution of the fish populations and free mixing across the region being assessed. Current models do not yet have the capability to incorporate spatial structure such as mixing, moving, and dispersal rates. Impacts of area management tools such as MPAs on stock assessments are only beginning to be evaluated (Punt and Methot 2004). Current management incorporates the use of RCAs and future management could use area allocation of OY and IQ shares. Both management approaches place limits on our ability to understand how these approaches potentially influence stock assessments.

Interviews with stock assessment scientists indicated that current management has not prevented concentrations of fishing effort. The scientists also felt it would be difficult to detect potential impacts without improvements in sampling and modeling. Some felt that designing an IQ system without area allocation of OY may not be a significant issue as effort does shift around anyway, and declining CPUE would lead to compensatory fishing behavior that would result in changes in fishing location. However, other factors also affect distribution of harvest. For example, port costs, grounds familiarity, CPUE for a complex (as distinct from that for an individual stock), exvessel prices, and social connections to a particular port.

There is evidence that pelagic and demersal groundfish distributions experience spatial and temporal changes in response to environmental drivers. A study of groundfish in the Gulf of Alaska found that the distribution of adult and juvenile groundfish was structured primarily along depth gradients, apparently related to differences in upwelling between the eastern and western Gulf of Alaska (Mueter 1999). NMFS triennial trawl surveys off the Washington, Oregon, and California (WOC) management area have been used to characterize spatial characteristics of groundfish (Gabriel and Tyler 1980; Weinberg 1994). A study of groundfish off Oregon and Washington also found persistent groundfish assemblages along depth gradients and concluded that logbook data could be used to augment triennial trawl survey data to better characterize spatial and temporal distributions of groundfish (Lee 1997).

Potential for Geographic Shifts Under an IFQ Program

The ability to divide and transfer quota shares under an IFQ system will increase the likelihood that fishing activities will be responsive to influences in the socioeconomic environment. These influences are muted under the current management system with its trip limits and indivisible permits. While the degree and direction of shift is not predictable, the likelihood of changes in the geographic distribution of fishing activity is greater under IFQs than under the current system.

The distribution of landings along the coast is the aggregate result of individual decisions on whether or not to participate in the fishery and if so at what level. Different management systems present a different suite of opportunities, incentives, and barriers for those entering or expanding their activities as well as those contracting or quitting.

Under IFQs, harvesting profits or rents tend to be higher since participants are better able to employ their capital and schedule harvests in order to maximize the value of their landings. However other factors also affect the decision of where and how to fish including social factors, and climatological changes, and economic factors beyond the control of the participants.

Geographic Shifts Observed Over Time

Except for the recent application of depth and area-specific management, the geographic distribution of groundfish fishing effort on the West Coast has not generally been constrained by regulations. It is not apparent that fishing effort necessarily follows high survey biomass or CPUE under the current management system. Maps of survey biomass for lingcod, sablefish and Dover sole show changes in concentration over time but relatively less association with latitude. Maps of historical catch exhibit variability over time with some changes over latitude, but these trends do not generally follow those indicated by the biomass surveys (see Figures 2-7 from the Groundfish Trawl Individual Quota Analytical Team Report, October 2004). Restrictive cumulative limits under the current system may be acting to smooth out the geographic distribution of harvest. Relief from these limits under a revised management program may result in a redistribution of catch. Potential relive from constraining trip limits include programs such as IFQs programs, capacity reduction and stock rebuilding.

Examples of Regional Depletion

On a large spatial scale, the collapse of the Atlantic cod (*Gadus morhua*) stocks reflected some characteristics of regional depletion. Temporal and spatial changes in abundance were noted in this fishery as stocks declined to overfished levels steadily beginning in 1962 (Hutchings and Myers 1994). The cod stocks were thought to have been significantly reduced by trawling in the 1970's. Harvest of cod offshore of Newfoundland and Labrador using gill nets began following the sharp decline in inshore gillnet landings between 1982 and 1985. Increases in gill net catches were coupled with declining catch rates. Catch rates declined both inshore and offshore, thus indicating a sequence of serial depletion. During the stock decline, technological improvements permitted the fleet to continue to locate and exploit remaining stocks at ever increasing rates of fishing mortality.

On a much smaller spatial scale, (Mason 1995) analyzed species trends in sport fisheries occurring withing the Monterey Bay area between 1959-86. Most of the fish were taken by more mobile commercial passenger fishing vessels (CPFV) and smaller more local skiff fleet. Early in Monterey Bay's fishing history, abundant species were targeted by both fleets closer to port. Mason found that as effort increased, the catch of certain nearshore rockfish species (genus *Sebastes)* taken primarily by the skiff fishery declined and species composition changed to reflect declines in populations of the most abundant species. Commercial passenger fishing vessels moved further offshore to target on more abundant deepwater species. Fishing pressure and variable recruitment were cited as reasons for a decline in blue rockfish (*Sebastes mystinus*) formerly sought inshore by the skiff fleet, and in more distant shallow reefs targeted by CPFVs. With a reduction in blue rockfish abundance, CPFVs began targeting semi-pelagic yellowtail rockfish (*Sebastes flavidus*) over deeper water reefs, then shifted to a still deeper water complex of *Sebastes* species further offshore. Mason cited rockfish life history characteristics such as residential behavior, variable recruitment, and natural longevity as sources of vulnerability to local overfishing for several species. Further, he concluded that the high site fidelity exhibited by nearshore species in particular, made them particularly vulnerable. Other studies cited by Mason indicated that many nearshore species (blue rockfish and olive rockfish (*Sebastes serranoides*) move less than a kilometer or two from reefs, while more pelagic species such as yellowtail rockfish may move more than 25 km.

Examples of Spatial Management of Groundfish Fisheries

In Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI), total allowable catches (TACs) are established for individual species and species complexes based on biomass distribution to prevent regional depletion (Witherell 1995). Flatfish TACs are typically set lower than ABC levels to protect the available bycatch for valuable trawl fisheries for pollock, Pacific cod, and rockfish. TACs may be set for specific smaller regulatory areas, particularly in the GOA, to distribute catch and effort in proportion to biomass distribution. These sub-areas are comparable in size to INPFC areas used to manage the West Coast groundfish fishery.

The Canadian government uses an area allocation scheme (DFO 2004). TAC was allocated by management area primarily for biological reasons. To the degree stock information was available, area allocation was used to prevent overfishing within these sub-areas due to possible effort concentration in the absence of an area management scheme, and to achieve yields proportional to the productivity of these areas. In addition, area allocation was prescribed as a precautionary measure in the absence of clear-cut stock information. Total allowable catch for quota species is set either coastwide, or based on sub-areas, or groupings of sub-areas (Figure A1 and Table A1). The major groundfish ports include Prince Rupert (northern mainland), Vancouver and Richmond (southern mainland), Ucluelet (West Vancouver Island), and Port Hardey (Northeast Vancouver Island). The concerns for overfishing stemmed from consideration of the IVQ system and its application to a mixed stock fishery. Without area allocation, shareholders could concentrate on highly valued species in areas close to home ports. If weaker stocks are caught incidentally with these target species, concentration of shares to enable access within these areas may lead to depletion and or serial depletion of some species.

Area allocation was designed to prevent concentration of IVQ shares and fishing effort within an area and the possibility of regional and/or serial depletion of resources. The proportion of TAC assigned by area was determined from a variety of sources including stock assessments, knowledge of stock genetics, tagging studies, physio-geography, catch and effort data, and advice from fishers with detailed knowledge of fishing grounds. In some cases, management boundaries were adjusted as a consequence of the process of review and analysis used to determine area allocations. The robust observer program Canada employs collects additional biological data on species composition, concentration, and distribution. DO continues to review biological data and determine the appropriateness of area allocations.

Biological Factors Indicating a Need to Spatially Manage West Coast Groundfish

Most groundfish stock assessments assume that the genetic structure of the assessed species is panmictic - that is the stock is fully mixed and members from all geographic regions regularly interbreed and that populations are homogenous, or if there is evidence of separate stock structure these differences are ignored as input data are typically not fine enough to conduct stock assessments on separate sub-stock components. Larval dispersal mechanisms theorized based on ocean currents tended to support this view in that passive dispersal occurs over fairly large distances. There is however, a growing body of evidence that suggests many species of groundfish have a complex and subtle stock structure that varies by geographic region within the WOC management area. (Miller and Shanks 2004) examined otolith microstructure and microchemistry of black rockfish and found evidence that larvae from different locations did not mix during ontogeny and possibly did not disperse long distances latitudinally. The authors estimated larval dispersal distances to be much shorter (<120km) than previous estimates based on models of passive dispersal. Smaller mean dispersal distances imply the need for spatial conservation of adults producing the larvae - especially if the species is overfished.

(Berkeley *et al.* 2004) reviewed stock status, population age and genetic structure, and management implications, citing examples from the West coast groundfish fishery. The authors presented evidence of stock structure on a finer scale than is typically assumed in stock assessments. They argue that truncation of age structure within rockfish populations in particular may lead to reduced larval viability and survival - older black rockfish appear to spawn earlier (Bobko and Berkeley 2004) and produce more viable larvae (Berkeley 2004). While not a West Coast groundfish, older female Atlantic cod (*Gadus morhua*) also appear to be more reproductively successful than younger females (Murawski *et al.* 2002). (Berkeley *et al.* 2004) conclude that both spatial structure and age structure are important for long term viability of a stock, and that a network of marine reserves could be used as an alternative management measure to ensure protection of these important population components.

Enforcement and Other Management Concerns

Enforcement problems related to transiting and fishing in multiple areas on a single trip must be addressed in the design of any enforcement and monitoring program that includes catch area restrictions.

There should be a method by which catch-area IFQ can be created after the program is implemented, should the biological need for such area management be established. Also, thought should be given to whether there is a reasonable probability that management lines might need to be changed in the future and, if so, how those changes would be accomplished.

Summary and Recommendations on Area Management

- There are several biological, economic, and social factors that may influence the distribution of fishing effort along the West Coast.
- Effort has shifted in the past and would probably continue to shift under an IQ program.
- While the extent of potentially adverse concentrations of effort is unknown, area management may be a useful precautionary tool to prevent overfishing within sub-areas of groundfish stocks.
- Area allocation of OY for West Coast groundfish should be considered especially for species that have known problems of regional depletion (lingcod) or may have a high potential for regional depletion.
- The suggested boundaries for OY allocation should be based on OYs outlined in the Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery (PFMC 2004).
- Understanding potential impacts of an IQ system within areas smaller than current management or assessment areas may be difficult as little information exists to evaluate past or present fishery impacts by sub-area. Changes in fishing strategies may also influence fishery-dependent data.
- Stock assessment scientists, fishery stakeholders, and managers should jointly evaluate whether or not area management will improve stock assessments, sustainability, and overall yield. If area management is found to be a preferred sub-alternative, then these participant groups should also be instrumental in defining management areas.
- As a precautionary measure, area allocation on a smaller than INPFC area basis could be considered using area distributions that are consistent with catch history, survey data, and habitat. Fishery independent and fishery dependent data sources should be incorporated into an ongoing monitoring program to evaluate the appropriateness of area allocation of OY.
- The Council should continue to support research into spatial sampling and modeling approaches for stock assessments. The degree of local overfishing is unknown - fishery and survey data and habitat information should be analyzed on a finer spatial scale to develop a better understanding of fishing and fish distribution patterns.
- Recent studies of population and age structure and recruitment dynamics raise serious biological concerns. Current management measures (RCAs, selective gears, etc.) and new tools (finer area allocation, MPAs, etc.) should be employed as a precautionary measure to ensure proper spatial management to safeguard against local overfishing, and to conserve population and age structure needed to increase the likelihood of successful recruitment events.
- Area allocation of OY for West Coast groundfish should be employed as a hedge against unpredictable spawning success. Available information on species characteristics (genetic structure, age structure, reproduction, and larval dispersal) should be used as a guide to establish boundaries and OYs for sub-areas within the WOC.

A.2.0 Division of Trawl Sectors

A.2.1 Discussion and Options

The TIQC developed the following options for potential subdivision of the trawl sector. Under a given option, transfers of IFQ between subdivisions would not be allowed.

	Division of Trawl Sectors			
Option 1:	One Trawl Sector			
Option 2:	Shoreside Deliveries		Mothership Deliveries	Catcher-Processor Deliveries
Option 3:	Shoreside Nonwhiting Deliveries	Shoreside Whiting Deliveries	Mothership Deliveries	Catcher-Processor Deliveries

(Note: the same divisions need not apply to all species)

<u>TIQC Recommendation:</u>
There is currently no consensus by the TIQC.

<u>Public Comment:</u>

Option:	Source
Include recreational fisheries and allow cross sector transfers.	UASC

A.2.2 Initial Analysis

In general, within the scope of the IFQ program (in this case the groundfish trawl fishery), the more transferability allowed among vessels the more efficient the use of the fishery resource and hence the greater the potential total economic benefits of the program. Limits on IFQ transfers among sectors, while limiting enhancement of overall economic efficiency, may be adopted to attempt to preserve certain characteristics of a fishery that may be considered desirable.

Option 1, by not differentiating between trawl sectors, would maximize potential transferability among trawl fisheries. Transferability and accompanying benefits decline with each successive option.

If IFQ is specific to individual trawl sectors and not transferable among sectors, rules will be needed for defining when a vessel is participating in a particular sector. Separating the various sectors under Option 2 (shoreside, at-sea catcher-processors, and at-sea motherships) is relatively straightforward in this regard since these subdivisions are already defined. Option 3 would require separating shoreside whiting from shoreside nonwhiting landings. Whiting is taken as incidental catch in trawl fisheries targeting other species. Prior to the primary whiting season, vessels are currently allowed to deliver up to 20,000 pounds of whiting per trip.[2/] Currently, the GMT uses 20,000 pounds of whiting as the criteria for separating shoreside whiting from shoreside nonwhiting landings. However, the development of new, higher value markets for whiting could depend on smaller landings. Therefore the 20,000 pound rule may arbitrarily restrict such market development in an IFQ based whiting fishery. Examination of recent data from the whiting fishery revealed that all landings of less than 10,000 pounds were composed of either substantially more or substantially less than 50% whiting. On this basis, *under Option 3 the Analytical Team recommends that a shoreside nonwhiting trip be defined as a shoreside delivery in which there is either less than 10,000 pounds of whiting, or less than 50% of the catch is composed of whiting.*

The potential for whiting to become an incidental catch constraint for the shoreside nonwhiting fishery is higher under Option 3. Flatfish trawl is an example of a nonwhiting fishery in which incidental whiting catch could limit access to target species. Options 1 and 2 would provide relatively more access to the market for whiting IFQ than Option 3.

If the purpose of dividing the sectors is to maintain the status quo, is there a need to create divisions for the nonwhiting fisheries? Restricting transfers of IFQ and IBQ between sectors may help to preserve the existing structure of the fishing industry and communities. It would also prevent one sector from shutting down another by buying up the total allotment of a limiting bycatch species. The need for incidental catch allowances to cover bycatch of certain limiting species is likely to fluctuate from year to year in each sector. Further subdividing incidental catch IFQ between sectors would create smaller and smaller available IFQ pools in a given sector. This would increase the likelihood that a sector may be constrained by insufficient quota for incidental catch species. The most efficient system would allow for maximum transferability of IFQ between trawl sectors.

Allowing the transfer of IFQ between sectors should encourage optimum use of the fisheries resource.

A.3.0 Use of Other Gear by Limited Entry Trawl Vessels

A.3.1 Discussion and Options

This item concerns groundfish and other species caught by groundfish trawl vessels. With respect to groundfish, the issue is whether or not groundfish caught by trawl vessels using nontrawl gear should be included under the IFQ program. With respect to nongroundfish, the issue is possible retention of trawl prohibited species such as Pacific halibut. If prohibited species IQs are included under an IQ program (i.e., IBQ are created for prohibited species as part of decisions made in Section 2.1.1.6), then the question is How should catch of prohibited species be treated if trawl vessels take these species while using gear that is legal for those species? More specifically, can a trawl vessel use IBQ to retain trawl species fish if it uses gear legal for that species?

2/ Following the primary whiting season the current limit drops to 10,000 pounds per trip.

Trawl Vessel Catch of Groundfish With Nontrawl Gear

Under the allocation accounting system of the current license limitation program, all groundfish taken by vessels with groundfish limited entry (LE) permits count against the LE groundfish quota, regardless of the gear used. LE vessels may use open access gears in fisheries that target groundfish or take groundfish incidentally while harvesting non-groundfish species. Consequently, directed groundfish catch by LE trawl vessels using longline and fishpot gear under open access regulations counts against the LE allocation. Additionally, if a vessel with an LE trawl permit participates in non-groundfish fisheries, such as pink shrimp, salmon or California halibut, and lands groundfish as incidental catch, the landed incidental groundfish catch counts against the LE allocation.

The following options have been identified with respect to use of IFQ for covering non-trawl catch:

EXEMPTED GEAR OPTIONS: Application of IFQs to Limited Entry Trawl Vessels Using **Exempted** Gear **(e.g., vertical hook-and-line, shrimp trawl, California halibut trawl, salmon troll gear).**	
Option 1: Require IFQ for Catch by Limited Entry Trawl Vessels Using **Exempted Gear**: IFQ tracking and monitoring rules would apply to limited entry trawl vessels even when using **an exempted gear.**	
SubOption 1A	Catch would be required to comply with **open access** fishery catch control regulations.
SubOption 1B	Catch would be allowed in excess of **open access** fishery catch control regulations, so long as landings are completely covered by trawl IFQ.
Option 2: Require IFQ Only for Groundfish Trawl Catch by Limited Entry Trawl Vessels	
SubOption 2A	• Split the trawl groundfish allocation between IFQ and non-IFQ harvest • Maintain the Amendment 6 accounting system and use nonIFQ management measures to control catch taken by trawl vessels with **exempted gears**.
SubOption 2B	• Maintain the same limited entry allocation • Change the accounting system such that catch of limited entry trawl vessel's using **exempted gears** counts against **the open access** allocation and apply **open access** catch control regulations.
SubOption 2C	• Reallocate a portion of the limited entry allocation to the open access sector • Change the accounting system such that catch of limited entry trawl vessel's using **exempted gears** counts against **the open access** allocation and apply **open access** catch control regulations.

The following table illustrates how each of the above options would work for an LE trawl vessel using an open access gear:

	Catch Counts Against	IFQ Must Be Held for Landing	Catch limits the apply
Suboption 1A	LE Allocation	Yes	IFQ and open access trip limits apply
Suboption 1B	LE Allocation	Yes	IFQ only
Suboption 2A	LE Allocation	No	Trip limits for LE use of open access gear apply
Suboption 2B	Open Access Allocation	No	Open access trip limits apply
Suboption 2C	Augmented Open Access Allocation	No	Open access trip limits apply

LONGLINE AND FISHPOT OPTIONS: Application of IFQs to Limited Entry Trawl Vessels Using **<u>Longline and Fishpot (Fixed Gears) Without a Fixed Gear Endorsement.</u>**		
Option 1: Require IFQ for Catch by Limited Entry Trawl Vessels Using **<u>Longline or Fishpot Gear Without a Fixed Gear Endorsement</u>**: IFQ tracking and monitoring rules would apply to limited entry trawl vessels even when using **<u>longline or fishpot gear without an endorsement.</u>**		
	SubOption 1A	Catch would be required to comply with **<u>limited entry fixed gear</u>** fishery catch control regulations.
	SubOption 1B	Catch would be allowed in excess of **<u>limited entry fixed gear</u>** fishery catch control regulations, so long as landings are completely covered by trawl IFQ.
Option 2: Require IFQ Only for Groundfish Trawl Catch by Limited Entry Trawl Vessels		
	SubOption 2A	• Split the trawl groundfish allocation between IFQ and non-IFQ harvest • Maintain the Amendment 6 accounting system and use nonIFQ management measures to control catch trawl vessel catch taken with **<u>longline or fishpot gears but no fixed gear endorsement</u>**.
	SubOption 2B	• Maintain the same limited entry allocation • Change the accounting system such that catch of limited entry trawl vessel's using **<u>fixed gears without a fixed gear endorsement</u>** counts against **<u>a limited entry fixed gear</u>** allocation and apply **<u>limited entry fixed gear</u>** catch control regulations.
	SubOption 2C	• Reallocate a portion of the limited entry **<u>trawl sablefish</u>** allocation to the **<u>limited entry fixed gear</u>** sector and **<u>take into account trawl vessel harvest with fixed gear when establishing limited entry trawl/fixed gear allocations</u>** • Change the accounting system such that catch of limited entry trawl vessel's using **<u>fixed gears without a fixed gear endorsement</u>** counts against **<u>an limited entry fixed gear</u>** allocation and apply **<u>limited entry fixed gear</u>** catch control regulations.

The following table illustrates how each of the above options would work for an LE trawl vessel using an longline or fishpot gear in the open access fishery:

	Catch Counts Against	IFQ Must Be Held for Landing	Catch limits the apply
Suboption 1A	LE Allocation	Yes	IFQ and open access trip limits apply
Suboption 1B	LE Allocation	Yes	IFQ only
Suboption 2A	LE Allocation	No	Trip limits for LE use of open access gear apply
Suboption 2B	Fixed Gear Allocation	No	LE fixed gear limits apply
Suboption 2C	Augmented Fixed Gear Allocation	No	LE fixed gear limits apply

In the preceding tables, Option 2 provides a set of logically complete approaches for a system in which IFQ is not required for groundfish catch by LE trawl vessels using open access gears. <u>To date, no one has advocated SubOption 2B</u>. Changing the accounting system for LE trawl vessels would also beg the question of considering such a change for vessels with LE fixed gear permits and vessels with LE permits for both trawl and fixed gears (third bullet of SubOption 2C).

Under current definitions, requirements under a groundfish trawl IFQ program would extend to limited entry trawl vessels using California halibut gear. However, California halibut trawl is legal groundfish trawl. When used by vessels without groundfish limited entry trawl permits, California halibut gear is considered an open access gear and IFQ would not be required under Option 2. Thus two vessel could be fishing side by side using legal groundfish trawl and one be under the IFQ program and the other not, depending on whether or an LE permit is held for the vessel.

Trawl Vessel Catch of Trawl Prohibited Species Using Nontrawl Gear (IBQ)

IBQ can be thought of as IFQ for prohibited species (species which, under status quo, cannot be retained if taken by trawl gear). IBQ might be created to control harvest-related mortality for species such as halibut.

The following IBQ options have been considered:[3/]

IBQ Retention Options for Pacific Halibut	
IBQ Retention SubOption 1	No change in the retention rules.
IBQ Retention SubOption 2	Allow LE trawl vessels to retain Pacific halibut when covered by trawl IBQ for Pacific halibut **and caught with longline or other legal gear**. Adjust trawl Pacific halibut IBQ to account for 100% mortality.
IBQ Retention SubOption 3	Same as Option 2 plus, allow trawl IBQ for Pacific halibut to be transferred to vessels outside the LE Trawl fleet. (These nontrawl vessels would be allowed to retain Pacific halibut when covered by trawl IBQ for Pacific halibut and caught with legal halibut gear. Adjust trawl Pacific halibut IBQ to account for 100% mortality.)
IBQ Retention SubOption 4	Allow trawl vessels the opportunity to retain Pacific halibut caught with trawl gear and covered by trawl IBQ for Pacific halibut. Adjust trawl Pacific halibut IBQ to account for 100% mortality.)

In options 2 and 3, the retention would be in addition to that allowed while a vessel fished in common with other vessels using legal gear during Pacific halibut openings. A determination would be needed as to how that additional opportunity would be provided (through higher vessel limits or through retention opportunities outside the Pacific halibut openings.

Under IBQ Option 1, vessels would still be required to discard prohibited species caught while using trawl gear, but would have to stop fishing if they did not have IBQ to cover their bycatch. An issue with respect to IBQ is catch taken by trawl vessels when using gear that is legal for a trawl-prohibited species. In particular, can vessels use IBQ to augment harvest opportunities for trawl prohibited species. For example, could nontrawl vessels acquire trawl IBQ and augment their halibut longlining opportunity (Option 2) or could LE trawl vessels use longline gear and retain halibut using their IBQ (Option 3)?

3/ Allowing trawlers holding IBQ to retain trawl caught prohibited species was rejected because of controversy and complexities involved in allowing the retention of a trawl prohibited species caught with trawl gear. Allowing transfer of IBQ to nontrawl vessels (IBQ Option 2) was rejected because of the costs and complexities associated with participation by an additional set of vessels.

TIQC Recommendations:

IFQ Options: The TIQC made a preliminary recommendation for open access gear Option 2C but included Options 1A and 1B the IFQ program alternatives it recommended for consideration. Option 2C would change the current system such that LE trawl vessels using open access gear would have their catch counted against the open access quota. Under the current system, all LE trawl vessel catch using open access gear counts against the LE trawl allocation. Consequently to accommodate the change in quota accounting under Option 2C there should be a reallocation of a small amount of trawl quota from the LE trawl fishery to the open access fishery.

Under Suboption c, a portion of the current LE allocation would be reallocated to the open access fishery. Thus, LE trawl vessels fishing with nontrawl gear would fish in common under regulations and quota applying to the remainder of the open access fleet. Under Option 2c all who fish with open access gear would be treated the same. Any other option or suboption would create two classes of open access fishers fishing under different regulations.

The amount to be reallocated from trawl to the open access sector could be based on the catch of LE trawl vessels using open access gear during the period used to allocate IFQ, except that for shrimp trawlers, the reallocation should be based on the period after shrimp finfish excluders were required. The TIQC requested a forecast of the amount of fish that would be needed by LE trawl vessels using open access gear.

IBQ Options: The TIQC included only IBQ Option1 in their IFQ programs recommended for analysis(and the option of status quo with respect to prohibited species management).

Options from Public Comment Period: None.

A.3.2 Initial Analysis

Use of Nontrawl Gear to Catch Groundfish

IFQ Options - Cost Issues

The coverage of the IFQ program needs to be reconciled with the current allocation accounting rules. If the current accounting rules are kept and the IFQ program covers the entire LE trawl vessel allocation (Option 1), then LE trawl vessels making groundfish landings in non-groundfish fisheries must make those landings in compliance with tracking and monitoring rules for the IFQ program including carrying an at-sea compliance monitor Requiring IFQ for OA landings made by LE trawl vessels is likely to result in greater vessel costs for such vessels than for nonLE trawl vessels making OA landings. To mitigate some of the additional tracking and reporting burden, it might be possible to set up a system in which LE trawl vessels using open access gear would be subject to somewhat different tracking and monitoring rules. However, in considering these possibilities, the effect of making exceptions on opportunities and incentives to avoiding compliance should be considered.

Option 1A could generate enforcement complexities. Under Option 1A, vessels could fish with IFQs using open access gear but open access trip limits would apply. If this option is chosen, regulations will be needed to clearly distinguish a vessel's trips using open access gear from those made using limited entry trawl gear.

Ensuring LE trawl vessel compliance with IFQ tracking and monitoring rules while fishing with open access gear would result in additional costs for vessels and the tracking and monitoring system. Therefore, the option might be considered to not require IFQs for LE trawl vessels using open access gears (Option 2). However, Option 2 is likely to result in greater management costs. These would take the form of either: (a) increased costs associated with management of a separate set of very small subquotas for LE trawl vessels using open access gear (SubOption 2A), or (b) costs of reallocating and redefining the limited entry quota accounting rules such that open access catch by these vessels is merged into the management of another sector (SubOption 2C).

Another option could be developed to separate LE trawl vessel use of directed open access gear from use of incidental open access gear. Under Option 1, LE trawl vessel use of directed open access gears might require compliance with the full monitoring provisions of the IFQ program, while use of incidental open access gears might trigger a lower level of monitoring, or application of an assumed groundfish bycatch rate. Information from the VMS and groundfish observer programs might be used to help divided the open access fleet into directed and incidental fisheries.[4/]

IFQ Options - Magnitude of Problem

Limited entry trawlers also engage in other fisheries, sometimes directly targeting groundfish species or taking groundfish as incidental catch. Data for 1998 indicate that 80 LE trawl vessels landed approximately 280,000 pounds of non-whiting groundfish using open access gear (Appendix H, Table 22). In 2003, 16 LE trawl vessels landed approximately 54,000 pounds of non-whiting groundfish using open access gear (Appendix H, Table 21).

The TIQC requested a forecast of the amount of fish that would be needed by LE trawl vessels using open access gear. However determination of "need" is not really possible in this case because nothing restricts LE trawl vessels from participating in the open access fishery at any level of intensity subject to open access trip limits. An historical snapshot will not reveal longer term needs that may arise because there is not historic information on the magnitude and types of adjustments vessels may make in response to opportunities presented under an IFQ fishery. Another complication is that historic information is based on landings whereas the emerging management system is likely to be based on catch. Depending on the amount of discard, landings information may underestimate the amount of allocation would be needed to cover catch under the emerging management system.

There is also not sufficient cost and revenue information available to attempt to make such a prediction.

4/ Currently this distinction is not always apparent from examination of landings records.

IFQ Options - Spillover

Increased participation with open access gear may result from possible spillover from the IFQ program, either because IFQ becomes consolidated on fewer vessels such that some vessels divest themselves of LE permits and enter the open access fishery (either Options 1 or 2) or because vessels are able to more efficiently schedule their fishing activities to increase their participation in open access fisheries (only under Option 2).

A related concern has been voiced about the potential for trawl vessel spillover into the LE fixed gear fishery. Trawl vessel participation in the open access portion of the fixed gear fishery could be constrained by an prohibiting trawl vessel use of fixed gear. Trawl vessels could acquire fixed gear permits (combining them if necessary to get a larger length endorsement). But under the current system, vessels accumulating fixed gear permits for species other than sablefish still only get access to a single trip limit. (The sablefish component of the fishery is already managed under an IFQ-type program.)

IFQ Options - Habitat Impacts

If LE trawl vessels are required to hold IFQ to cover their catch made with open access gear, a significant new policy area opens up, i.e. the potential to allow trawl vessels to use non trawl gear to take their IQ. Options 1A and 1B are apparently consistent with the provisions in the EFH EIS preferred alternatives, which propose to foster reduction in the use of gears with adverse habitat impacts by allowing LE vessels to catch their groundfish allocation with gears for which they do not hold endorsements.

IFQ Options - Types of Open Access Gear Used by LE Trawlers

The following table lists the open access gear types used to land groundfish in 2002 by vessels that had limited entry trawl permits. Note that gear used to land California halibut is considered groundfish trawl gear and does not appear in this list.

PacFIN Gear ID (GRID)	Description
BMT	beam trawl
CLP	crab and lobster pot
CPT	crab pot
DNT	danish/scottish seine (trawl)
DPN	dipnet
DST	shrimp trawl, double rigged
DVG	diving gear
FPT	fish pot
GLN	gillnet
LGL	longline
POL	pole
PRW	prawn trap
SHT	shrimp trawl, single or double rigged
SST	shrimp trawl, single rigged
TRL	troll
USP	unknown or unspecified gear
VHL	vertical hook and line

IFQ Options - Landed Incidental Catch in the Shrimp Fishery

The following table shows the amount of groundfish landed in 2002 using shrimp trawl gear by vessels with and without LE trawl permits.

SPID	Common Name	LE Total (mt)	non-LE Total (mt)	Total (mt)
LCOD	LINGCOD	1.6	4.8	6.4
PCOD	PACIFIC COD	0.0	0.1	0.1
SABL	SABLEFISH	4.3	9.6	13.9
WDW1	NOM. WIDOW ROCKFISH	0.1	0.1	0.2
CNR1	NOM. CANARY ROCKFISH	0.2	1.0	1.2
CNRY	CANARY ROCKFISH	0.0	0.1	0.1
CLP1	NOM. CHILIPEPPER	0.3	0.1	0.3
BCC1	NOM. BOCACCIO	0.0	0.1	0.1
DBR1	NOM. DARKBLOTCHED ROCKFISH	0.0	0.6	0.6
BNK1	NOM. BANK ROCKFISH	0.1	0.0	0.1
BGL1	NOM. BLACKGILL ROCKFISH	0.2	0.0	0.2
YTR1	NOM. YELLOWTAIL ROCKFISH	4.6	18.1	22.7
YTRK	YELLOWTAIL ROCKFISH	0.4	2.3	2.7
NUSP	NOR. UNSP. SLOPE ROCKFISH	0.0	0.2	0.2
NUSF	NOR. UNSP. SHELF ROCKFISH	0.1	0.2	0.3
RCK4	UNSP. REDS RCKFSH	0.0	0.1	0.2
SCOR	CALIFORNIA SCORPIONFISH	0.0	1.1	1.1
URCK	UNSP. ROCKFISH	0.0	0.3	0.3
DOVR	DOVER SOLE	2.6	7.3	9.9
EGLS	ENGLISH SOLE	3.9	1.0	4.9
PTRL	PETRALE SOLE	7.2	1.6	8.9
ARTH	ARROWTOOTH FLOUNDER	0.0	0.7	0.7
UDAB	UNSP. SANDDABS	3.9	0.1	4.0
REX	REX SOLE	2.1	0.7	2.7
STRY	STARRY FLOUNDER	0.0	0.2	0.2
UFLT	UNSP. FLATFISH	0.0	4.9	4.9
LSRK	LEOPARD SHARK	0.0	0.1	0.1
SSRK	SOUPFIN SHARK	0.0	0.1	0.1
	TOTAL GROUNDFISH	31.8	55.3	87.2

IFQ Options - Equity Considerations

Link to Allocation Rule

Allocating IFQ based on a landings history that includes groundfish bycatch in the pink shrimp fishery, and then allowing LE permitted vessels to take groundfish bycatch in the pink shrimp fishery but not use IFQ to cover it might be considered double dipping (i.e., the vessel would take groundfish as bycatch, in common with other pink shrimp vessels, but also receive an allocation of IFQ based on groundfish caught in the pink shrimp fishery). This issue can be addressed in the allocation formula.

Operational Cost Burdens

If all IFQ landings must be made in compliance with the monitoring system, then the IFQ vessel making shrimp landings would incur greater operational costs than non-IFQ vessels participating in the shrimp fishery.

IFQ Options - Vessels with both Trawl and Fixed Gear Permits

An additional complication arises for vessels with LE permits endorsed for both trawl and fixed (fishpot or longline) gear. Presumably under a new program, the current LE allocation will be split between trawl and fixed gear and the gear used on the trip would determine which quota and requirements apply. However if one of these dual gear LE vessels uses open access gear, what catch accounting rules would apply for the open access gear catch? In 2004 there were five vessels carrying combined trawl/fixed gear LE permits.

IBQ Options - Halibut

Creation of IBQ for Pacific halibut would require prior consultation with the IPHC. In the BC IFQ system, IBQ for trawl caught halibut has substantially reduced halibut bycatch. The IFQ program being considered here includes an option that would allow the retention of halibut when covered with IBQ and caught with legal halibut gear (Option 2). If the monitoring system is adequate to ensure all catch is accounted for, allowing the transfer of IBQ to a sector that is allowed to harvest and retain that catch (Option 2) would likely reduce discards and increase utilization of the IBQ species. Currently the assumed bycatch discard mortality rate for halibut caught (as a prohibited species) by the trawl sector is less than 100%. Obviously, mortality would be 100% in a retention fishery. Hence if the program allowed retention of fish caught against IBQ (Option 2 or 3), the amount of halibut mortality represented by a given amount of IBQ would be greater under the retention fishery. Amounts of IBQ issued would be need to be adjusted to take into account the higher mortality rate (Option 3). Rather than involving another sector in the tracking and monitoring program, trawl vessels might be allowed to retain halibut covered with IBQ when (1) the catch is taken with legal halibut gear, and (2) adjustment to the IBQ pounds are made to account for the higher mortality rate. In whatever mode the halibut IBQ is taken (trawl or nontrawl vessels using legal halibut gear) a question to be addressed is How will the use of halibut IBQ be used to augment the harvest opportunity the vessels would have operating in common with other vessels using legal gear? (Would it provide opportunity outside the normal commercial season or higher limits within the season?)

If the system were designed such that IBQ for halibut were converted to IFQ for the trawl fishery (i.e., trawl vessels would be allowed to retain halibut caught with trawl gear), the halibut catch sharing plan would need to be modified and approval would be required by the IPHC. A June 30, 2004 letter to the Council from IPHC Executive Director Bruce Leaman observed "Recent proposals to the Commission requesting trawl retention of halibut have not been approved, so it is unlikely that the Commission would adopt this proposal."

IBQ Options - Salmon

Creation of IBQ for salmon may require consideration of the variation in stock composition depending on year, season and area of harvest. Coordinating management of salmon IBQ with annual salmon stock and run management could become complex. Also, salmon IBQ, if issued for individual runs, may be so small as to become very limiting on trawl activities at certain times and areas.

IBQ Options - Dungeness Crab

Dungeness crab is not currently managed under a quota, therefore some artificial bycatch quota would have to be established to create crab IBQ. Currently crab is managed using season and size restrictions.

Figure A1. Groundfish management areas off the West Coast of Canada.

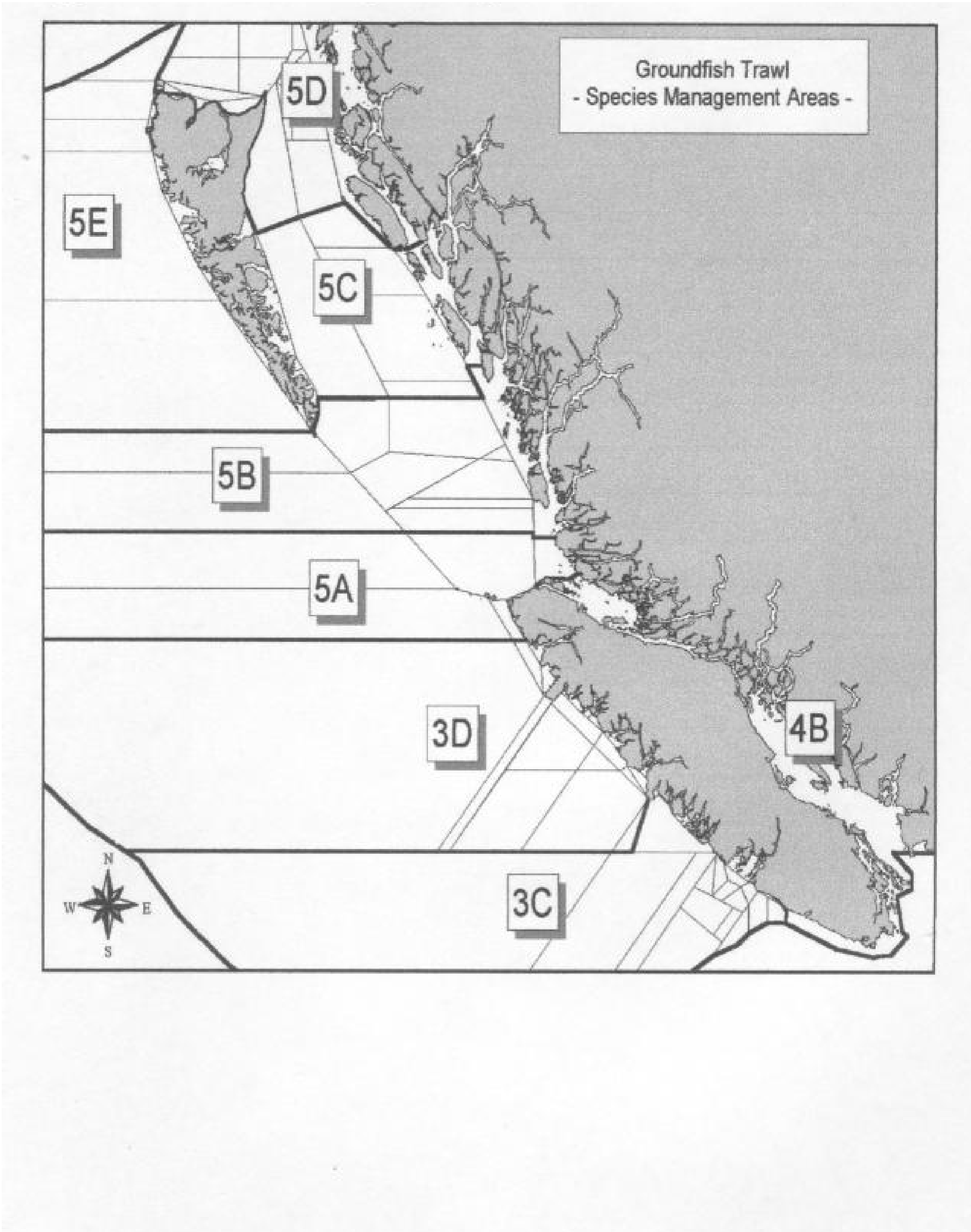

Table A1. Total allowable catches (TAC) of groundfish by British Columbia management area.

Species	Management Area	TAC (mt)
Yellowtail Rockfish	3C	995
	3D, 5A/5B, 5C/D/E	3,427
Widow Rockfish	Coastwide	4,422
Canary Rockfish	3C/D	529
	5A/B	265
	5C/D	101
	5E	151
Silvergrey Rockfish	3C/D	216
	5A/B	421
	5C/D	382
	5E	248
Pacific Ocean Perch	3C	300
	3D	230
	5A/B	2,070
	5C/D	2,818
	5E	730
Yellowmouth Rockfish	3C	219
	3D, 5A/5B	1,135
	5C/D	685
	5E	325
Rougheye Rockfish	Coastwide	530
Shortraker Rockfish	Coastwide	105
Redstripe Rockfish	3C	173
	3D,5A/B	772
	5C/D	330
	5E	246
Shortspine Thornyheads	Coastwide	736
Longspine Thornyheads	Coastwide	405
Qullback, Copper, China, and Tiger Rockfish	Coastwide	5
Pacific Cod	3C/D	500
	5A/B	390
	5C/D/E	400
Dover Sole	3C/D	1,375
	5C/D/E	1,100
Rock Sole	3C/D	102
	5A/B	875
	5C/D	673
Lemon Sole	3C/D	186
	5C/D/E	544
Petrale Sole	Coastwide	600
Lingcod	3C	800
	3D	220
	5A/B	862
	5C/D/E	580
Dogfish	4B	1,600
	Rest of Coast	3,840
Sablefish	Coastwide	384
Pollock	Gulf	1,115
	5A/B	1,790
Hake	Gulf	10,000
	Offshore	134,372
Big Skate	5C/D	567
Longnose skate	5C/D	47

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APPENDIX B: IFQ PROGRAM ELEMENTS AND ANALYSIS

Appendix B: IFQ Program Elements and Analysis

This appendix describes potential design elements and options for a trawl IFQ program. Included with each design element is an analysis of related impacts. Different choices of options for design elements will be grouped together in suites which define alternative IFQ programs. The alternative IFQ programs will be the subject of the main analysis in the EIS (see Section 2.1.2). The EIS impact analysis of management regime alternatives will draw on the analysis provided in this appendix.

As the initial recommendations of TIQ advisory groups have been reviewed and incorporated into this document, questions have arisen as to how some of the provisions would be implemented. These implementation questions are noted in italics and will be the subject of further discussion. Each section includes the TIQC recommendations provided in the public scoping document, recommendations from other Council advisors and comments received during the public scoping period which ran from May 24, 2004 through August 2, 2004.

Incorporated in the discussion on each design element are references to relevant Magnuson-Stevens Act language and recommendations of a recent report from the National Research Council of the National Academy of Sciences (NRC 1999). The NRC report was mandated by Congress. Section 303(d)(5) of the Magnuson-Stevens Act requires that "In submitting and approving any new individual fishing quota program . . . the Councils and the Secretary shall consider the report of the National Academy of Sciences and any recommendations contained in such report."

B.1.0 IFQ Allocation

Section 303(d)(5)(C) of the Magnuson-Stevens Act requires that any new IFQ program "provides for a fair and equitable allocation of individual fishing quotas, . . ." Initial allocations are the most controversial aspect of IFQ programs. Over the long run, performance of the program does not depend substantially on the initial allocation. However, the initial allocation does distribute wealth. A substantial portion of a common opportunity (the capture of fish) is converted to private wealth through the creation of a marketable fishing privilege. Even though the IFQ is revocable without compensation, its function as the near equivalent of a private asset is evidenced by the value placed on it in the market place. When IFQ is awarded without charge, the initial recipient of IFQ receives a "free" asset and unearned income upon sale or lease of that asset.[1/]

Program Summary and Main Options:

IFQ Allocation (Section B.1.0)

IFQ would be allocated to the following groups in the following proportions: . . . **[e.g. groundfish trawl permit holders (xx%), groundfish trawl vessel owners (xx%), processors (xx%)**]. Processors would be defined as . . . [FMP definition/alternative definition]. *(Section B.1.1)*

In order to qualify for an initial allocation the applicant would . . . **[have to/not have to] . . .** demonstrate recent participation. If recent participation is required, the recent participation requirement for each group would be as follows: make/receive at least . . . **[X deliveries – number of deliveries to be determined]** . . . of trawl caught groundfish from . . . **[1998-2003, or 2000-2003]**. *(Section B.1.2)*

Those eligible for an initial allocation will be allocated quota shares based on the following formula:
[0-100%] of the quota share issued for the group would be issued based on history of catch/landings/processing;
[0-100%] of the quota share issued for the group would be issued based on equal sharing.
[0-100%] of the quota share issued for the group would be allocated through an auction;
(Formula's may vary among groups, *Section B.1.3*)

For IFQ allocated based on delivery history, the applicant's . . . **[total groundfish; total for each IFQ species or species group; or total for each species, species group, or proxy species]** . . . **[caught; landed; or processed]** *(Section B.1.4)* . . . will be calculated for . . **[1994-2003, 1994-1999, 2000-2003, 1998-2003, or 1999-2004]** . . . , less . . . **[0, 1, 2 or 3]** . . . of the applicant's worst years. The calculation will be based on the applicant's . . . **[pounds, percent of total]** . . . for the relevant species/species group in each year. *(Section B.1.5)*

Permit history for combined permits would include the history . . . **[for all the permits that have been combined; for the permit originally associated with the permit number of the combined permit]**. Illegal deliveries would not count toward history. Catch in excess of trip limits, as authorized under an EFP and compensation fish . . . **[would/would not]** . . . count toward history. *(Section B.1.6)*

There would be no appeals process on the initial issuance of IFQ, other than that provided under the Administrative Procedures Act. Any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions. *(Section B.1.7)*

When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided. If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation. *(Section 1.8)*

1/ This unearned income can be regarded as an unfair windfall. Recovery of windfall and extraction of rents is addressed in Section A.9.

Within the context of current West Coast license limitation system, the creation of a IFQ would redistribute wealth through three mechanisms:

(1) The value of the asset received by the initial recipient (value in excess of any payment for IFQ issuance).
(2) The expenditure on IFQ that would be required of those who do not receive enough IFQ to enable them to maintain the stream of net revenue associated with current operations (or, if the choice is made not to acquire additional IFQ, the reduced net revenue stream).
(3) A reduction in the value of the existing LE permits due to the separation, redefinition and reallocation of the bundle of fishing privileges previously associated with the permit.

In many cases, the same individual may be subject to changes in wealth through all three mechanisms. The greater the degree to which the initial distribution of IFQ does not match the existing distribution of human and physical capital that exists in the fishery, the greater the disruption costs associated with implementation of the program. However, these disruption costs would be short-term phenomena that would not substantially affect the long-term performance of the program. In addition to disruption costs, there may be longer-term impacts on the balance of power between participants in the fishery, changing the composition of the stakeholders involved in managing the fishery. Initial recipients may be in a better position to obtain loans to buy additional quota than others in the fishery (NRC 1999) (pg. 202).

The NRC recommends that “the councils consider a wide range of initial allocation criteria and allocation mechanisms in designing IFQ program .. . “ and more broadly consider “. . . (1) who should receive initial allocation, including crew, skippers, and other stakeholders (councils should define who are included as stakeholders); (2) how much they should receive; and (3) how much potential recipients should be required to pay for the receipt of initial quota (e.g., auctions, windfall taxes).” (NRC 1999) (pg. 203). Councils should “avoid taking for granted the option of ‘gifting’ quota shares to the present participants in the fishery, just as they should avoid taking for granted that vessel owners should be the only recipients and historical participation the only measure of what each deserves. Council’s should consider using auctions, lotteries, or a combination of mechanisms to allocate initial shares of quota” (NRC 1999) (pg. 207).

Details on the IFQ options for initial allocation from the public scoping document are summarized in following subsections. Below are some general comments that did not fit neatly into one of the subsections.

Public Comments:

Comment	Source
Establish a control date for processors.	1 individual
Don’t make the shares so small that opportunity is reduced below current levels	1 individual

B.1.1 Eligible Groups and Group Shares

B.1.1.1 Discussion and Options

The topic of this section,"Who should be eligible to receive an initial allocation of IFQ?", is separate from a similar question "Who should be eligible to acquire IFQ after the initial allocation?" The latter question is covered in Section B.2.3.1.

The NRC report notes that vessel owners are usually the recipients of initial allocations and makes the following recommendations with respect to allocation to other fishery participants (NRC 1999) (pgs. 202-207).

NRC Recommendations for Allocation Groups **(Other than Vessel Owners)**	
Skippers and Crew Allocations	Consider where appropriate. Lack of detailed catch data is not a reason to forgo this option as equal allocation is an option. It may be less appropriate in industrial fisheries that do not involve crew members as co-venturers in the same sense as other fisheries.
Processor Allocation	No compelling reason to include or exclude processors from an initial allocation.
Communities	Consider initial allocations of IFQ to communities. Some communities may be heavily dependent on fishing for social, cultural, and economic values and/or are lacking in alternative economic opportunities.
Public	Consider auctions, lotteries or combinations of mechanisms to allocate initial shares. Avoid taking for granted the option of "gifting" IFQ.

Initial allocation to "permit owners" as a group is not considered in the NRC report. Since establishment of the groundfish license limitation system, permit owners have been the recipient of new limited entry allocations (the fixed gear sablefish endorsement, and fixed gear tier system). Criteria often mentioned in connection with this issue include compensation for those whose asset values are adversely are affected by the new program, and minimizing disruption (PFMC, 199X).

For each group to be included in the initial allocation there would need to be a determination of the amount of IFQ to be divided among members of the group, unless some common point system is developed that can be applied across all qualifying groups.

The following is a current list of options for: *the groups eligible for initial allocation* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Groups Eligible for an Initial Allocation	
Option 1	Allocate IFQ to Current Permit Owners.
Option 2	Allocate IFQ to Vessel Owners.
Option 3 (see TIQC recommendations for Options 3a and 3b)	Allocate IFQs to Permit-Owners/Vessel-Owners/Processors (consider all combinations and allocate to ownership of the vessel or facility at the time of initial allocation, where relevant).
	Processor Percentages: 0%, 25%, 50%
Option 4	Allocate to High Bidder in Auction (eligibility rules for participation to be developed)–not legal under the current Magnuson-Stevens Act.

There will need to be clear criteria for determining membership in each group. For permit owners and vessel owners the criteria are straight forward. For processors, skippers, crew and communities, definitions and criteria require more careful consideration.

The following is a current list of options for: *defining processors for the purpose of an initial IFQ allocation* as identified by the TIQC through the scoping process. Bolded options are those for which the TIQC included in the IFQ programs it recommended for analysis.

	Definition of Processor
Option 1	Limit Group Using Special IQ Program Definition: The processor is the entity which - 1. after processing, sells his or her own LE-trawl-vessel caught groundfish directly to a wholesale or retail market; OR 2. buys unprocessed trawl-caught groundfish, processes it, and sells it to the wholesale or retail market. The entity is defined as Suboption 1(a) the processing facility, and allocation goes to the current owner, unless leased, in which case it would go to the current lessee (Suboption 1(a)(i)) OR the current owner (Suboption 1(a)(ii)) Suboption 1(b) the person processing (individual, partnership, corporation or other entity).
Option 2	FMP Definition “person, vessel, or facility that engages in processing; or receives live groundfish directly from a fishing vessel for retail sale without further processing.” Same suboptions for definition of entities as in Option 1.

Processors should only receive credit toward the allocation formulas for fish they process (fish passed through to another processor without processing should not be counted). Information beyond what is on fishtickets will be needed to substantiate processing activities (fishtickets do not indicate whether or not the entity receiving the fish processed it).

The second part of the definition of Option 1 focuses on the entity processing, bypassing the person acting as a buyer or agent and gives credit to the actual processing entity. It also limits the initial recipient of IFQ to those who are the initial processors of the fish. Companies or facilities that receive and further process fish after initial processing would not qualify for IFQ. The following matrix identifies those who would and would not qualify as processors under Option 1 based on three key parameters (1) Do they take ownership of the fish? (2) Is the fish they receive processed or raw? and (2) Does the entity process it?

Status of entity as a processor based on the Option 1 processor definition .					
				Eligible for an Initial IFQ Allocation as Processor?	
Do they take ownership of the fish	Is the fish received processed	Does the entity process it	Category	Option 1 Definition	Option 2 Definition
Yes	No	Yes	Processor (Including: Operations that Both Harvest and Process AND Operations that Acquire Unprocessed Fish from a Vessel/Receiver/ Dealer/Buyer	Yes	Yes
No	No	Yes	Custom Processor	No	Yes
No	No	No	Buyer	No	No
Yes	No	No	Fish Receiving-Station/Dealer	No	No
Yes	Yes	Yes	Secondary Processor	No	Yes
Yes	Yes	No	Fish Dealer/Wholesaler	No	No

Clarification is needed on whether the custom processor or the person having the fish processed should be considered the processor.

<u>TIQC Recommendations:</u> The TIQC recommended that Options 1and 3 be maintained for the EIS. A minority supported maintaining Option 4 for purpose of analysis.

Groups Eligible for an Initial Allocation: Options Included In TIQC IFQ Program Recommendations:

Group	***Option 1***	***Option 3a***	***Option 3b***
Permit Owners	*100%*	*75%*	*50%*
Vessel Owners	-	-	-
Processors	-	*25%*	*50%*
High Bidder	-	-	-

The TIQC recommends against allocation to vessel owners rather than permit owners, because once the limited entry fishery was established most of the value of the fishery was capitalized into the value of the permit. The TIQC program recommendations contain the following three options.

The TIQC recommended against allocating to:

1. those who owned the permit at time of landings (if different from the current permit owner),
2. lottery entrants,
3. crew or skippers,
4. communities.

The TIQC recommends not considering allocation to the owner of a vessel or permit at time of landing (i.e. personal history) because no rationale could be identified for allocating to someone who no longer owns the fishing asset used to take the fish. Allocations should go to the current owner of an asset based on the history of the asset (e.g. permit or vessel).

There was no TIQC consensus with respect to the definition of processors. Both of the following options were maintained in the TIQC program recommendations. It was agreed that if allocation is based on the history of deliveries to a processor, the processor should only qualify for the portion of the catch they process.

<u>Other Previously Identified Options</u>

Another option would be to allocate to permit holders. Permit "holders" include permit owners and persons who lease or otherwise control a permit for use on his or her vessel. Thus allocation to permit holders would include all current vessel owners and permit owners. The NMFS NWR Limited Entry Permit Office identifies the vessel owner as the permit holder. The permit holder option differs from the vessel owner and permit owner option in that under the latter option a person could qualify for a portion of the IFQ allocation for permit owners and a portion of the IFQ allocation for vessel owners. In most situations, someone owning both a permit and vessel would likely qualify for approximately the same amount of an initial IFQ as they would under an option where the allocation was only for permit owners or only for vessels.

<u>Public Comments:</u>

Comment	Source
Allocate to processors that are NOT vertically integrated (do not own fishing operations)	1 individual
Allocate 50% to permit owners and 50% to primary processors.	CJC
Allocate to permits, processors (company or facility, to be decided) and communities handling more than 1% of the annual landings	WCSPA
Allocate to permit owners, processors and communities.	CJC
Allocate to skippers who can demonstrate dependence	ED and two individuals
Allocate to crew members	Survey (ED)
Allocate to communities	Survey (ED)
Allocate to processors	Survey (ED)
Do NOT allocate to processors	Survey (ED)

B.1.1.2 Initial Analysis

Distribution Among Groups

Some basis will need to be established to determine the amount of IFQ to be allocated among members of all the eligible groups. If IFQ is to be allocated to more than one group, the most direct means is probably to allocate an amount of IFQ to each group and then come up with allocation criteria to allocate between members of the group. There are other approaches that might be taken but they are more complicated or problematic, for example, establishing a common allocation criteria that could be applied to all members of all groups (e.g., years of participation or pounds handled), or assigning points on the basis of different qualifying criteria for members of different groups and then allocating based on number of points relative to a common pool of points (e.g., one point per year for crew members and 1 point per 100,000 pounds for permit owners). During deliberations on an IFQ program for the West Coast sablefish fishery, a formula was considered that would have given equal weight to catch history of the vessel owners and catch history of the permit holders. Under such a formula, individuals who owned their vessel and permit would receive a "full share" as if the allocation were based only on vessel or only on permit. Those who owned one or the other would receive half as much IFQ as a person with a similar catch history who owned both.

Asset Value

One criteria that has been suggested for allocation of IFQ is to provide IFQ as compensation for those who own assets the value of which might be adversely affected by an IFQ program. The following is a brief discussion of capital asset values. Skilled labor and community assets will be discussed below in sections on those topics.

Theory suggests that the value of assets, such as permits and quotas, is a measure of the discounted stream of profit expected to be generated by that asset. Factors, such as ecological uncertainty, external economic occurrences, and uncertainty associated with management of the resource, can influence this value. It is likely that implementing IQs, a new type of asset, will influence the value of existing assets like permits, vessels, and plants. For example there are theoretical reasons to believe that implementing IFQs would exert a downward influence on the value of existing groundfish limited entry permits, as possession of the permit and vessel would no longer be sufficient for the holder to engage in fishing. Additionally, if fleet consolidation occurs under IFQs, there will be a surplus of available permits. On this basis, granting IFQ to the permit owner would compensate the owner for the reduced value of the permit asset, reducing some of the dislocational effects of creating the IFQ program.

Economic theory also suggests that vessel values will be affected under an IFQ system. Vessel values will be influenced by the level of consolidation that occurs, the ability of new entrants to gain access to the resource and to other fisheries, and the flexibility of current permit owners to adjust their operations in response to IFQ implementation.

The available literature provides no consensus on how processor assets would be affected by implementation of IFQs, except to indicate that consolidation of quota and other changes under an IFQ program can result in the occurrence of stranded capital. It will be important to define what stranded capital is. The term "stranded" appears to have been introduced in analyses associated with Alaska processing plants where the issue was focused on the processing of one or two species over a short season and often being located in a remote area, such as was the case several large Pollock processing plants. One possible definition of stranded capital would be capital that has no alternative productive use as a result of a change in regulations. Under standard benefit-cost analysis, "stranded" capital reflects inefficient capital as a result of implementation of an IFQ system. Therefore, protecting or minimizing the amount of "stranded capital" becomes a public policy problem where efficiency goals are traded off against other social goals. It is not clear, whether or not in a situation in which processors have the potential to purchase IFQs after initial allocation (which may or may not include the processors), when capital can be considered to be "stranded" (November 29, 2004 conference call of NMFS economists).

The value some processors will be able to generate from their capital will likely go up while the value for others will go down as a result of IFQs. In addition, companies with several plants will likely be affected differently than companies owning single plants. Effects will depend on location and supply (November 29, 2004 conference call of NMFS economists).

In determining whether capital is "stranded" or utilization of the capital is enhanced as a result of IFQs, the alternative uses of the capital before and after implementation of IFQs needs to be assessed. The chief technique for measuring the value of alternative uses is the employment of net present value techniques on what ever is defined as a capital asset. In short, what matters is the net present value of equipment and infrastructure (to be defined) (November 29, 2004 conference call of NMFS economists).

An analysis of the potential initial financial effect on various capital assets may be needed as part of the impact analysis. Such an analysis may form the basis of potential requests for economic mitigation/compensation. The TIQC has requested an assessment of the asset values of vessels and processors that might be affected by an IFQ program. Challenges in responding to this request and developing an impact analysis will include: availability of information on asset values (including permits, vessels, and processing capital values), valuation basis for the assets (replacement, depreciated, opportunity cost, or other), valuation of publically owned assets (port owned facilities leased to fishing industry members), determining the portion of total value to assign to groundfish for facilities used in more than one fishery (vessels, offloading, processing). The analytical team has provided a general description of factors affecting asset value (Appendix H).

Impacts of IFQs on Processors

<u>British Columbia IVQ</u> - *Shortly after implementation there was some harvester rationalization (130 to 70 vessels). This was partially as a result of decreased landings due to the stricter adherence to the TAC.*

According to sources contacted, there was not a lot of change that occurred in the processing sector with regards to consolidation and harvester/processor relations. The lack of concern with regard to the occurrence of stranded capital and changes in bargaining power was due to 25-35% vertical integration of some sort (owned, co-owned, agreements) within the processing sector. Another reason for the lack of large scale changes was due to implementation of the GDA, the goal of which was to prevent geographic relocation and to prevent impacts on processors.

The outcome in the processing sector in BC was not the same as it was in the halibut fishery where there was a big change in product quality and impacts on processors. The number of processors actually increased slightly in BC following IVQ program implementation. Of the top 10 processors, two dropped out and two more entered the fishery. Consolidation did not occur. This was partially due to the fact that fishermen started landing catch in Canada instead of in the U.S. due to decreases in trip limits in the U.S. Also, the US $ dropped compared to the CA $ and that was another reason to land in Canada instead of the U.S. Also, as a result of the GDA, more fishermen fish closer to home.

There were large increases in ex-vessel prices paid to fishermen but this occurred for reasons other than changes in bargaining power.

Even though the GDA has provided some protection to processors, fishermen feel they have lost power due to the GDA program. Small processors also feel they have lost power to the GDA because they are at a disadvantage when it comes to writing a proposal. The bigger the processing facility, the greater the potential reward from the GDA.

GDA kept landings, processing, offloading and processing in coastal ports and away from Vancouver.

There has been some growth in custom processing but that may be due to the trend for custom processing in seafood and other products in general.

<u>*Nova Scotia ITQ*</u>*-A processing facility cannot own a groundfish license. To secure access to the resource, they developed contracts with harvesters.*

In the beginning, processors wanted 50% allocation of the IFQ. In 1990, a task force was developed to make decisions with regards to ownership of IFQ. They made recommendations after consulting for one year and these recommendations were adopted.

Delineating the Groups and Assigning Catch History

Permit Owners/Holders

Initial allocations of IFQ could be given to those owning or leasing limited entry permits at the time of initial IFQ allocation. If the amounts allocated to be allocated are based on catch history, the catch history counted could be that of the person owning the permit or that of the permit itself. Past modifications of the West Coast groundfish limited entry program (creation of the fixed gear sablefish endorsements and fixed gear tier endorsements) have used catch history of the permit. Some equity issues discussed in those deliberations include the following: If personal history is used (as a permit owner, vessel owner or other type of participant), and someone has recently bought a permit with little history, then they may suddenly find themselves with an asset substantially diminished in value and with little IFQ. Also to be considered if personal catch history is used is the division of catch history among business entities with changing composition and the individuals who comprised those entities (e.g., partnerships and corporations). On the other hand if permit catch history is used and a long-time participant recently traded an active permit for a relatively latent permit (perhaps as part of a vessel transaction), the long-time participant may suddenly find themselves with an asset substantially diminished in value and with little IFQ.

For the Amendment 6 license limitation program, allocation was based on vessel history as a means of taking into account present participation and minimizing disruption. Using vessel history allowed for orderly entry and exit to the fishery during the time the program was being developed. If personal history had been used, recent entrants would have been disadvantaged when permits were issued. A similar rationale might be considered in evaluating allocation based on personal catch history as a permit owner vs. catch history of the permit itself.

Past ownership of a permit or vessel (previous to the time of initial allocation) is not being considered because, by definition, such persons are no longer participating in the fishery as a vessel or permit owner. A strong rationale for allocation to past participants has not been made.

Vessel Owners

If an allocation is made to current vessel owners, when it comes to evaluating vessel history vs. history of the individual as a vessel owner, the equity considerations and allocational complications are similar to those described for permit owners.

First Receivers (Processors/Dealers/Buyers)

The business operations of entities receiving fish from groundfish trawl vessels may vary greatly. In the following, "wholesaler" and "dealer" are used synonymously. Vessels may sell directly to:

- a processing facility,
- a wholesaler/dealer,
- a buyer (state-licensed employee acting on behalf of a processor or wholesaler).

Not all processors are first receivers for some or all of the fish they process. Processors may receive fish from:
- vessels,
- other processing plants (owned by other companies),
- wholesalers/dealers,
- buyers (state licensed employee acting on behalf of a processor or wholesaler).

All of the above relationships (except a processor buying from another processor), are illustrated in Figure B.1-1. Table B.1-1 shows the state licensing requirements for various entities depending on who they purchase the fish from, whether or not they process the fish received and to whom the fish are sold. A following section provides definitions of "processing" and "processors" used by agencies.

Historically, PacFIN has used the term "processor ID" for state license identifying numbers for both processors and wholesalers. The field might be more accurately described as the "first receiver ID." The term "buyer" has recently been used in some reports to take into account that the data covers both processors and wholesalers. However, "buyer" has its own special meaning in the fish distribution chain: a state licensed individual acting on behalf of the wholesaler or processor.

The Council may want to consider alternative labels for the receivers of trawl caught fish that might be eligible for an initial allocation of IFQ. One option might be "those who process fish." Another option might be "those who have a reporting requirement as wholesale fish dealers (whether they process fish or not)." This would not include fish buyers who work for wholesale fish dealers. One issue that would need to be resolved is how to treat those holding commercial fishing licenses who are licensed or endorsed to sell fish directly to the ultimate consumer.[2/]

Several issues should be clarified in the discussion of options that would qualify processors for an initial allocation of IFQ:

1. Is the term processor being used to reference all “1st receivers” or only true “processing entities”?
2. If the term “processor” is meant to include only true processing entities:
   - Is it intended that processing entities that do not receive fish directly from vessels qualify for IFQ?
   - Should other types of entities that receive fish receive an initial allocation?

Once the class of persons that might be eligible for an initial allocation of IFQ based on participation in the processing/marketing chain is determined, there are questions to be addressed regarding the apportionment of landings history (if landings history is to be used as an allocation criteria for processors):

1. How should landings history be counted for fish received by one processing company (or at one processing facility) but transferred to another company (or another facility) for processing?
2. How should landings history be counted for fish received at a dealer/wholesaler’s offloading facility and transferred to another company for processing?

Finally is a set of questions related to the entity to which landings history accrues and how landings history might change with changes in ownership of that entity:

1. Is the entity for which landings history would be evaluated the facility or the company? In other words, If ownership of the facility changes does the catch history go with the buyer or the seller of the facility?
2. If catch history goes with the buyer, if ownership of this entity then changes, does the catch history go with the new buyer, stay with the sellers, or disappear?

For vessels, the facility is the vessel and each vessel has a unique and stable ID number. Through that ID number, ownership can be tracked and catch history assigned. Processor identifiers may or may not change with changes in the ownership of a facility or company, and in some circumstances ID code numbers may change even if there is no change in ownership. There may also be multiple processor/wholesaler/buyer codes used at a particular offloading site. As an example of how the system works in an individual state, in Washington dealers and buyers are licensed. Buyers are

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2/ Another issue would be those “processors” meeting the federal FMP definition, who purchase live groundfish for sale without additional processing. Much of the infrastructure and investment with these types of wholesale fish dealers is associated with holding and transportation facilities needed to keep fish alive and in good condition until they can reach the market. This would be an issue only if it is determined that some trawlers delivered to the live fish market.

individuals that work for dealers, and each buyer has their own unique identifier. Dealer ID numbers may change when the dealer is purchased by another company, or if the corporate status with the Washington Department of Revenue changes. When the dealer ID numbers change, the buyer ID numbers that work with that dealer would also change. While these difficulties in establishing unique identifiers make the analysis more complex, they do not prevent consideration of allocations to first receivers.

Related to the processing facility ownership is the question of what defines the facility and the status of lease holders. Does "facility" refer to the land and building, or to the equipment inside? If the rule for attributing catch history is that it goes with the facility and the facility is the land and building, then does the catch history accrue to the lessee or the lessor? A similar question might apply if the facility were defined as the equipment but the equipment were leased.

Definition of Processing

Discussion of "processing" and "processors" may benefit from the following background information on how these terms are defined under state regulations and under the Federal FMP. Each state program has a different licensing structure for fish business activities that deal with sale of commercially caught fish, including fishermen's retail sales, buying of fish for a wholesale fish dealer, wholesale fish dealing where fish are sold to retail dealers, and fish processing and canning. Definitions of fish processing or fish processor include:

Washington (RCW 77.08.010 (42) "To process" and its derivatives mean preparing fish, wildlife, or shellfish.

(WAC 220-69-210 (11)) "Processed" means preparing and preserving, and requires a wholesale dealer's license. Preserving includes treated with heat, including smoking and kippering. **Cooked crab are processed**. Preserving also includes freezing fish and shellfish.
(WAC 220-56-100 (20)) "Processed" means fish or shellfish which have been processed by heat for human consumption as kippered, smoked, boiled, or canned.

Oregon (OAR 635-006-0001 (15) "Processing" means smoking, reducing, loining, steaking, pickling, filleting, or fresh packaging requiring freezing of food fish, or any part thereof (**Does not include cooking crab**).

(16) "Processor" means a person who buys fresh food fish from a licensed commercial fisher or a wholesale fish dealer and processes food fish for sale through retail outlets or for sale to the ultimate consumer.

California "Fish Processor" is any person who processes fish for profit and who sells to other than the ultimate consumer.

California Fish and Game Code 8031 (a) (1) "Process fish" means any activity for profit of preserving or preparing fish for sale or delivery to other than the ultimate consumer, including, but not limited to, cleaning, cutting, gutting, scaling, shucking, peeling, cooking, curing, salting, canning, breading, packaging, or packing fish. "Process fish" also means the activity for profit of manufacturing fish scraps, fish meal, fish oil, or fertilizer made from fish. "Process fish" does not include the cleaning, beheading, gutting, or chilling of fish by a licensed commercial fisherman which is required to preserve the fish while aboard a fishing vessel and which is to prevent deterioration, spoilage, or waste of the fish before they are landed and delivered to a person licensed to purchase or receive fish from a commercial fisherman.

Federal Pacific Coast Groundfish Fisheries Management Plan "Processing or to process" means the preparation or packaging of groundfish to render it suitable for human consumption, retail sale, industrial uses, or long-term storage, including, but not limited to, cooking, canning, smoking, salting, drying, filleting, freezing, or rendering into meal or oil, but does not mean heading or gutting unless additional preparation is done.

" Processor" means a person, vessel or facility that (1) engages in processing, or (2) receives live groundfish directly from a fishing vessel for sale without further processing.

Vessel Operators/Crew Members

Rationalization of the fishery is also likely to affect the nature of employment opportunities for vessel operators and crew. The exact result for operators and crew is uncertain but it is likely that there may be consolidation in the fleet with the result being fewer but more stable jobs. The likely effect on compensation rates for employment is also uncertain at this time. At the same time, IFQ may provide an opportunity for crew members to incrementally gain ownership of capital in the fishery through acquisition of IFQ.

Two issues would need to be addressed to provide an initial allocation to vessel operators and/or crew members:

(1) The proportion of total quota shares that would be divided among the crew.
(2) The criteria that would be used to determine which crew members qualify and how much of the initial allocation they would receive.

This section provides information pertaining to the latter of these two issues.

Linking Vessel Operator and Crew to the Groundfish Trawl Fishery

In the fishery data systems, the only documentation pertaining to who works on fishing vessels comes from vessel operator/crew licensing system and the signatures on fish tickets. The fishery data system cannot generally link a crew member or vessel operator to a particular landing, or in some cases, to a particular vessel. Given the limited data available, the following table shows some options for allocating IFQ among crew and/or vessel operators.

Qualification Basis	Potential Allocation Formulas
Signature on a landings receipt (fish ticket). [This data is not in the data system and would have to be submitted at the time of application]	• Equal allocation • One point for each year in which a groundfish fish ticket is signed • Points based on pounds landed of each species for which the individual signed tickets
Tax return with information stating that the person received income from working on a groundfish trawl vessel (regardless of whether he or she helped in the harvest of groundfish)	• Equal allocation • One point for each year working on a groundfish trawl vessel • Points based on the vessel's annual landings of each species for that year (a person working on multiple vessels in a year would, OPTIONS: (1) have to choose a vessel for his or her catch history that year, or (2) receive full credit for each vessel he or she worked on). Either option entails confidentiality issues.
Sworn affidavit from the vessel owner/skipper. [Vessel owners may not know what crew was on board. Vessel skippers may have an interest in qualifying themselves–a conflict of interest.]	

Rules and circumstances determining who signs the fish ticket vary between states and vary such that different individuals may sign the fish ticket on different trips by the same vessel.

Another possible qualifying standard would be the submission of an affidavit by the applicant. Truthfulness of the affidavits would be difficult to verify, require self policing by the community and likely result in perceived inequities if it became broadly known that some individuals made substantial false claims.

Vessel Operator and Crew Licensing Rules

Which crew and operators on a vessel must be licensed in **California**?

- Everyone working on a vessel must hold a commercial license (except a person who does not contribute to the activities onboard or cause any fish to be brought ashore to sell and his/her presence is registered in the vessel log).
- The vessel may hold a permit for one crew member that may be assigned to any crew member working on the vessel.
- There is not a separate license for vessel operators.

In California there are some fisheries in which special crew member permits are required:

Crew Member Permit Categories	Conditions
General Commercial Fishing Crew member Permit	
Lobster Crew member Permit	* lobster operator permittee must be onboard when crew member is fishing.
Sea Urchin Crew member	* crew member cannot dive for urchins
Salmon Crew member Stamp	* "John Doe" crew member stamp.

In California, commercial licenses for crew members are not vessel specific.

Which crew and operators on a vessel must be licensed in **Oregon**?

- Crew members assisting in the fish harvest must hold licenses.
- The vessel may purchase "Commercial Crew member Fishing Licenses" (also known as "John Doe" licenses) and assign such licenses to the individuals working on the vessel. Names of individuals using these licenses are not recorded.
- There is not a separate license for vessel operators.

As in California, Oregon commercial licenses for crew members are not vessel specific.

Which crew and operators on a vessel must be licensed in **Washington**?

- Crew members are not licensed.
- Vessel operators are licensed and there may be multiple operators licensed for a single vessel (primary and alternate operators).

In Washington, vessel operator licenses are linked to a vessel, however, where there are multiple operators licensed for a single vessel the only information recorded documenting which operator was present for a particular landing is the signature on the fish ticket. The operator may not necessarily be the individual who signed the fish ticket. The names of who signed are not recorded in the data system but would be available from the original landing receipts.

Signatures on Fish Tickets

In California, the processors *(is this the first receiver?)* sign the tickets. The name and permit numbers for the vessel operators are recorded on the fish tickets.

In Oregon, the vessel owner or operator signs the tickets.

In Washington, the fish tickets must be signed by the buyer and the "fisher." The fisher signing must be the vessel operator.

Experience Making Initial Allocations to Crew in Other Fisheries

California has had experience allocating limited entry permits to crew members. California has had a practice--shared with other states, the Federal government, and other nations--of giving preference for issuing permits into a restricted access fishery to fishermen or vessels with past participation in that fishery. The practice has meant that those permits generally are issued to licensed California commercial fishermen rather than to non fishermen or persons not licensed in the State. The practice is a fair means to assure that those who rely on that fishery or who have invested in that fishery can remain in the fishery.

In determining priorities for the issuance of permits in a restricted access fishery, the priority for permits is given to licensed commercial fishermen/vessels with past participation in that fishery. Among fishermen or vessels with past participation in the affected fishery, preference for permits may be based on factors such as years of participation in the fishery or level of participation (landings). Second priority for permits may be based on such factors as **crew experience**, number of years in California fisheries, or participation in fisheries similar to that for which a program is being developed (An example of a similar fishery being considered for eligibility for a permit was when displaced abalone divers were added to those eligible for any new sea urchin permits). Drawings or lotteries for permits are only used when two or more applicants have identical qualifications (for example, the same number of points for eligibility for a herring permit). The following table shows conditions for crew member to apply and upgrade to operator permits in selected California fisheries

Fishery	Conditions/Criteria
Commercial Gillnet/ Trammel-net Crew member	Applicant must have worked as a crew member for at least 12 months on vessels using gillnets or trammel-nets and shall have worked at least 180 days at sea on such vessels, or passed a CDFG proficiency examination; **documented by fishing records or notarized document from a vessel owner/operator.**
Herring Crew member	Crew members receive 5 experience points for one year of service as paid crew member, 3 points for a second year, 2 points for a third year, up to a maximum of 10 points cumulative. Herring Permits are issued according to the total number of points, beginning with applicants who accrue the most points. Remaining permits (if any) are allocated by a lottery. Drawing is used to assign limited permits across applicants if there are more applicants than available permits. **Documented by proof of payment for service as a crew member; tax records or cancelled check.**
Sea Urchin Crew member	Available urchin dive permits are issued to applicants who held, for each of 2 immediately preceding years, a valid sea urchin crew member permit. **Documented by fishing records or notarized statement from vessel owner/operator that hired the crew member.** Random number drawing for applicants seeking urchin dive permit. Eligible crew members can receive one random number for the diving permit drawing. One additional random number is assigned for each additional year they possessed a crew member permit. Not more than 5 random numbers shall be assigned to any one individual in a given drawing.

The California salmon limited entry program was initially based on limiting the number of individuals participating as fishermen. In 1982, the fisherman-based moratorium was modified to a vessel owner-based license limitation system. Permits were issued to a number of classes of owners and to individuals who had been licensed to fish commercially for at least 20 years and who had participated in the salmon fishery in at least one of those 20 years (Senate Bill 1917, 1982).[3/]

Communities

The Magnuson-Stevens Act defines a fishing community as "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such a community (§3[16])." National Standard 8 (50CFR600.345(b)(3)) further defines a community as "a social or economic group whose members

3/ If new permits were to be issued, they were first issued as interim permits. Interim permits had to be used in two consecutive seasons before a permanent permit could be issued.

reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries-dependent services and industries."

Communities might be positively or adversely affected by an IFQ program through a variety of mechanisms. One such mechanism is the potential for a geographic redistribution of landings and related fishery benefits. The ability to divide and transfer quota shares under an IFQ system will increase the likelihood that fishing activities will be responsive to influences in the socioeconomic environment. These influences are muted under the current management system with its trip limits and indivisible permits. While the degree and direction of shift is not predictable, there is an increased likelihood of geographic shifts in fishing activity under IFQs compared with the current system. More background on factors influencing the distribution of harvest has can be found in the October 2004 Analytical Team Report (Appendix H).

A community's interest in fishing activities may include benefits derived from the economic activity associated with the harvest and processing of fish, fees collected from the use of port facilities including wharfage fees, and possibly revenue streams from economic development projects such as the construction and leasing of buildings to house processing activities. Communities also have an interest in the fishing industry families that are part of the local social network.

There be a number of ways to take community interests into account in the design of an IFQ program. These include:

- Placement of geographic restrictions on the area of catch or landing associated with the IFQ (Section 2.1.1.3).
- Annual allocation of a portion of the IFQ to vessels and processors based on the merit of industry proposals designed to benefit fishing communities.

Direct community participation in individual quota programs can be accommodated through community-based control of individual quota. Such control may be accommodated by:

- Specification of a certain portion of the OY for control by communities (sometimes called Community Development Quotas or CDQ).
- Allowing communities or their representatives to have an opportunity to acquire IFQ after initial issuance (Section B.2.3.1)
- Providing communities with an initial allocation of IFQ (covered in this section).

The issue to be addressed in this section is "Should communities receive an initial allocation of IFQ?" If the answer is yes then guidelines would likely be needed to identify those entities eligible to represent the community interests and criteria for determining which communities qualify. The Analytical Team has provided a review of other IFQ systems including examples of ways in which communities were defined and interests accommodated (see Suzanne Russell's report in Appendix H).

B.1.2 Qualifying Criteria: Recent Participation

B.1.2.1 Discussion and Options

Recent participation requirements can be used to favor recent participation and ensure that current participants benefit more from initial allocations than those who may have left the fishery. To some extent, an allocation that places greater weight on recent participation than participation in the distant past may reduce disruptive effects of the initial allocation.

The relative importance of a current participation requirement may be adjusted by limiting the portion of the allocation for which the recent participation requirement applies. Recent participation may be required to receive any allocation, or it may be only required for that portion of the IFQ allocated on a certain basis. For example, if a portion of the IFQ is to be allocated equally, that portion might be given only to those meeting recent participation requirements, and the portion being allocated on the basis of landings history may be distributed independent of whether or not a recent participation requirement is met.

The following is a current list of options for: *recent participation* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Qualification Criteria: Recent Participation	
Option 1.	No recent participation requirement
Option 2.	Recent participation (1998-2003) required to be eligible for an initial allocation (one groundfish trawl landing/delivery of any groundfish species, or a minimum number of trips and/or number of yrs to be specified).
Option 3.	Same as Option 2 but the years would be 2000-2003.
Option 4. (This option applies only to shorebased processors and motherships. Option 1, 2 or 3 could be applied to vessels or processors.)	Same as Option 2 but the years would be 1999-2004.

Recent participation in either the shoreside or at-sea fisheries would suffice to meet minimum landing requirements for shoreside or at-sea IFQ, if such a distinction is made. The requirements might apply to harvesters or processors.

<u>TIQC Recommendations:</u> The TIQC previously recommended that all options be maintained for the EIS. The TIQC program recommendations include only Options 1, 2, and 4. The 2000-2003 period covers the years for which use of a small footrope has been required.

<u>Public Comments:</u>

Comment	Source
Have a continuing recent participation requirement so that if IFQ are issued they do not go to individuals who have left the fishery.	1 individual

B.1.2.2 Initial Analysis

From the following table, it can be seen that a recent participation requirement for some groundfish trawl landing between 2000 and 2003 would eliminate 13 permits from qualifying for IFQ. The affect on the allocation to others would depend on the landings history for these vessels during the remainder of the allocation period (see B.1.5), and whether there are other criteria on which IFQ is allocated, such as some portion of the IFQ equally allocated (B.1.4).

Number of Unfished Permits by Consecutive Period (NMFS NWR, 3/9/04):

Period	Number of Permits Not Fished During the Period	Year	Number of Permits Not Fished During the Year
1998-2003	5	1998	18
1999-2003	7	1999	14
2000-2003	13	2000	20
2001-2003	24	2001	32
2002-2003	33	2002	40
2003	40	2003	40

The 2000-2003 recent participation period (Option 2) corresponds to the portion of the potential qualifying period during which restrictions on large footropes were in place. The 1998-2003 recent participation period (Option 3) includes time both before and after the imposition of large footrope restrictions and both before and after the year 2000 declaration of a groundfish disaster. The 1998-2003 recent period qualifying criteria may not match up well with the 1998-2003 allocation period, unless its purpose is to entirely eliminate from the allocation those vessels/permits/processors with very small amounts of catch. If landings history is the only criteria used in determining amounts of fish to be allocated, there would be little effect. If there are other allocation criteria, such as equal allocation, the effect on distribution of IFQs may be more significant.

The IFQ program will take most of the value currently embodied by the LE permit and split it off to the IFQ. Holders of permits for which no IFQ is issued will experience a significant decline in the value of the permit as an asset. The EIS for the Amendment 6 license limitation program identified that it was the Council intent that no use-or-lose provision be included in order that vessels not be encouraged to be more active than they otherwise would. A recent participation requirement that disqualifies permits entirely from receiving IFQ could be construed to retroactively impose a use-or-lose provision.

B.1.3 Elements of the Allocation "Formula"

B.1.3.1 Discussion and Options

In determining the amount of initial allocation (PFMC 1996) (pg. 224) encourages consideration of stewardship and other potential criteria in addition to landings history. The TIQC developed some preliminary recommendations for elements of formulas to allocate IFQ among permits and processors (1st buyers). If other groups are to qualify, such as those described in Section B.1.1, IFQ allocation formula would have to be developed for each group. Additionally, there would need to be an allocation of IFQ among the groups before it is subdivided within the groups (see Section B.1.1).

Vessel/Permit Related Allocation

The following is a current list of options for: *vessel/permit related allocation* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Allocation Formula Options for Qualified Permits/Vessels

Allocation Basis	Option 1	**Option 2**	Option 3	Option 4
Permit History	100%	Use permit catch/landings history for permits not bought back.	-	-
Augmented History (Catch/Landings History and/or Bycatch Estimate Based on Target Species)[a/]	-	-	100%	-
Equal Sharing	-	Catcher vessel permit owners: Equally split proportion of quota that could be attributed to bought back permits/vessels[b/] Incidentally harvested overfished species suboptions, either: (a) same as for other species OR (b) equally divide overfished species quota shares.	-	-
Auction	-	-	-	100%
Other	-	For catcher-processor permit owners, use an allocation schedule developed by unanimous consent of that sector (to be provided).	-	-

a/ In some cases, history of target species, rather than bycatch or incidental catch, might be used to avoid rewarding those with high incidental catch rates.

b/ Earlier versions of the equal sharing option included a statement that only those with catch history for a particular species would qualify for the equal share portion for that species (for example, a vessel that fished only south of Cape Mendocino would not qualify for quota shares for a management unit north of Cape Mendocino).

<u>TIQC Recommendations:</u> The TIQC previously recommended developing a suite of options covering the range of Options 1 through 4 for purpose of analysis. The majority of the TIQC voted to eliminate the auction option from detailed analysis and a minority supported maintaining it. The TIQC program recommendations contain only Option 2.

<u>Public Comments</u>:

	Source
Measure landings history by value of product rather than weight of catch	Survey (ED)
Allocate based on an auction	CJC, WCSPA
Allocate based on an auction tiered for different types of operations	ED
Do NOT allocate based on an auction	1 individual

Processor Allocation

The following is a current list of options for: *vessel/permit related allocation* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Allocation Formula Options for Qualified Processors

Allocation Basis	**Option 1**	Option 2
Processing history of trawl groundfish landings received unprocessed	100%	-
Auction	-	100%

TIQC Recommendations: The majority of the TIQC voted to eliminate the auction option from detailed analysis and a minority supported maintaining it. The TIQC program recommendations contain only Option 1.

Options from Public Comment Period: See recommendations for permits/vessels.

Allocation for Other Groups

Allocation formulas for any other groups to whom an initial allocation of IFQ might be made need to be developed. There is a discussion of some allocation formula possibilities for crew members in the October 2004 Analytical Team Report.

B.1.3.2 Initial Analysis

Initial allocations determine a distribution of wealth: the windfall from the initial allocation of IFQ distributed among IFQ recipients. The fairness and equity of that initial allocation is largely a judgement to be made by the Council, NMFS and the general public. Initial allocation will also affect transition costs. If IFQ is allocated such that those who have caught the fish in recent years do not receive the IFQ, then transactions will be required: either those recent participants will acquire the IFQ or the IFQ recipients will acquire the assets, labor and other productive resources necessary to harvest the IFQ while the recent participants sell fishing assets and/or seek out alternative activities. M-S Act Section 303(b)(6) also provides guidance on the following factors that must be taken into account in designing a limited entry program (either the initial allocation or other aspects of the program design):

(A) Present participation in the fishery.
(B) Historical fishing practices in, and dependence on, the fishery.
(C) The economics of the fishery.
(D) The capability of fishing vessels used in the fishery to engage in other fisheries.
(E) The cultural and social framework relevant to the fishery and any affected fishing communities.
(F) Any other relevant considerations.

Auctions

All or a portion of the IFQ could be allocated through auction, providing the necessary changes are made under the Magnuson-Stevens Act.

Equal Allocation

The asset value most directly affected by an IFQ program would likely be the LE permit itself. If the relative values of permits do not vary as much as the catch history associated with a permit, and if an intent of the initial allocation is to compensate those who might be most adversely affected by the IFQ program, then this objective may be furthered by placing some emphasis on equal allocation. There may be other rationales for not allocating equally or for allocating equally that have yet to be presented.

Landings History

Emphasizing landings history in the allocation formula is one means of reducing transition and disruption costs associated with the move to IFQ. This could be landings history for the permit, vessel, crew, processor, community, etc.

The quality of landings history data varies across the different allocation periods covered in Section B.1.5. The October 2004 Analytical Team Report covers data quality issues. Landings history for many species will have to be estimated by the application of species composition information to aggregate or unspecified landings categories. There are two issues of concern: First, some vessels may have more landings in an unspecified category than others. These vessels could be placed at a disadvantage in some allocation formulas. Second, the methods use to estimate the species composition of landings change over time. This could create argument over which methodologies should be used to estimate a vessel's true catch. The rationale for application of species composition data to the individual vessel will need to be carefully explained as will the rationale for fixing the species distribution methodology at a point in time. Provided there is sufficient and adequately documented justification, it is not apparent that any of these data quality issues present insurmountable barriers to the development and implementation of allocation formulas based on catch of species and species groups (as opposed to an approach where vessel allocations of all nonwhiting species is based on the relative share of all nonwhiting species summed together).

Of particular concern is the use of landings history data for incidental catch species, some of which have become overfished in recent years. The concerns are:

1. Until recently, some species were not sorted. Therefore, there will need to be heavy reliance on species catch composition information. While this data is not designed to be used at the individual landing or vessel level, it may be the best reasonable proxy available.
2. For some years of the proposed allocation period, most of the catch of some incidental species may have been discarded and not included in the vessel's landing records. These vessels may not receive the IFQ necessary to prosecute some of the fisheries in which they engage.
3. Allocation based on catch history of incidental species rewards fishers who were less successful avoiding the incidental species. In some cases, these are the species that are now overfished.

For these reasons it has been suggested that consideration be given to allocating some incidental species based on an estimate of their co-occurrence with target species (e.g., trawl bycatch rates).

To Whom Does Landings History Accrue?

Based on the precedent set in the limited entry fixed gear sablefish fishery, and absent Council guidance otherwise, it is presumed that landings history will accrue to the current owner of the permit.

If vessel owners are to be qualified, a determination is needed as to whether the current owner of the vessel gets credit for all the landings history of the vessel or whether vessel owners get credit only for landings made at the time they owned the vessel. For the license limitation program this question was resolved in favor of the current owner of the vessel as a means of taking into account present participation and minimizing disruption. Permit history was the allocation basis for the sablefish endorsement and tier program, no consideration was given to vessel history.

In order to allocate to processors/buyers based on the history of landings received, questions must be addressed that are similar to but more extensive than those for vessel owners. The equivalent of the vessel is the processing/buying facility, however these facilities are often owned by companies which themselves are bought and sold. The basic question is should landings history go with the ownership at the time the landing was received, or with the facility if it is sold to a different group? If landings history goes with ownership, how should landings history be treated for an ownership (e.g., corporation) that is acquired by another business entity (another corporation)?

B.1.4 History: Species/Species Groups to Be Used for Allocation

B.1.4.1 Discussion and Options

For some species, species composition information would need to be applied to develop allocations that are based on landings history. This would entail application of average fleet species composition data to aggregate and unspecified categories of species taken by individual vessels (e.g., applying fleet average species compositions to landings recorded as "Slope Rockfish").[4/] The other apparent choice would involve allocating all species based on larger levels of catch aggregation (e.g., allocating each individual slope rockfish species based on a permit's landings history of all slope rockfish species combined; or in the extreme allocating each individual nonwhiting species based on a permit's landings history for all nonwhiting species combined).

The following is a current list of options for: *species/species groups* to be used for allocation as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

4/ Such species composition information is often specific for a given area and time period.

Landings History: Species/Species Group Options	
Option 1.	Allocate Quota Shares Base on Nonwhiting Groundfish (In Aggregate) and Whiting: Allocate quota shares for each species/species group based on relative amounts of total groundfish caught/landed or processed, except whiting. Use whiting history to allocate whiting IFQ. For permits applies to permit history; for processors applies to amounts processed.
Option 2.	Allocate Quota Shares Based on Individual Species/Species Groups: Allocate quota shares for each species/species group based on relative amounts of each respective species/species group caught/landed or processed - for permits applies to permit history; for processors applies to amounts processed (Option 2).
Option 3.	Individual Species/Species Groups Plus Proxies for Special Cases: Allocate IFQ for each species/species group based on relative amounts of each species/species group caught/landed or processed, except for each of the following species use the indicated proxy: Species/Species Group — Proxy Species/Species Group xxxxx — xxxxxxxxxxxxxx xxxxx — xxxxxxxxxxxxxx xxxxx — xxxxxxxxxxxxxx For permits applies to permit history; for processors applies to amounts processed.

TIQC Recommendations: The TIQC previously recommended maintaining Options 1 and 2 for analysis. Option 3 is presented to provide consistency with Option 3 of Section B.1.3. The TIQC program recommendations contain only Option 2.

Public Comments: None.

B.1.4.2 Initial Analysis

The following table compares the primary tradeoffs associated with the two species allocation options:

Trade-Offs	
Option 1	**Option 2**
a simple allocation formula	a reliance on species comp data, generally not used at the vessel level.
an allocation result that does not match up with the species mix of the recipient's landings	some method is needed to address groundfish landings that remain in unspecified categories even after application of the species comp data

Data quality issues are addressed in the October 2004 Analytical Team Report.

B.1.5 History: Allocation Periods

B.1.5.1 Discussion and Options

If allocations are based on landings history, then a period would need to be used to define what landings count toward landings history. The periods and rules could be applied to any group for which a portion of the IFQ allocation is to be based on landings history and different periods and rules might be applied to different groups.

The following is a current list of options for: *allocation periods* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

History: Allocation Period Options			
	Number of Years in Allocation Period	SubOptions: Number of Worst Years to Drop from History	
Allocation Period Option		Suboption A	Suboption B
Option 1. 1994-2003	10	None	**2 for whiting fishery history 3 for nonwhiting fishery history**
Option 2. 1994-1999	6	None	1
Option 3. 2000-2003	4	None	None
Option 4. 1998-2003	6	**None**	1
Option 5. 1999-2004 (This option applies only to processors. Option 1-4 would be applied to vessels or processors).	6	None	**2**

Additionally, the following suboptions might be consisdered to give different weight to catches in different years.

Allocation Formula: Weighting Suboptions	
Suboption (i)	Absolute Pounds: Base allocation on a calculation using total pounds across all years (e.g. if total fleet landings were greater in 1994 than in 2003, a pound landed in 1994 will qualify an individual for the same amount of quota share as a pound landed in 2003)
Suboption (ii)	Relative Pounds: Base allocation on a calculation using the percent of the total for each species in each year (e.g. if total fleet landings were greater in 1994 than in 2003, landing 0.005% of the fish in 1994 would qualify an individual for the same amount of quota share as landing 0.005% of the fish in 2003).

TIQC Recommendations: Previous to its last meeting, the TIQC recommended Options 1-4 for analysis. Option 5 was added at their May 2005 meeting, along with the option to drop three years as part of Option 1 Suboption B. The IFQ programs recommended by the TIQC include Option 1 Suboption B, Option 4 Suboption A, and Option 5 Suboption B.

The TIQC has recommended both weighting suboptions for analysis, and both options are contained in the TIQC IFQ program recommendations.

Public Comments: None.

B.1.5.2 Initial Analysis

Weighting the Catch

If all years are weighted equally then years when there was more fishing opportunity would have a greater influence on the amount of IFQ allocated than years when there was less fishing opportunity. Since there has been less fishing opportunity recently, recent years would have less influence than years in the more distant past. A suboption would weight the landings history between years such that catch representing 0.05% of the landings in 1994 would receive a weight equal to catch representing 0.05% of the landings in 2003. The following table shows how groundfish catch varied over the years 1994-2003.

Groundfish landings in thousands of mts by all limited entry trawlers (buyback and non-buyback) (NMFS NWR, 3/9/04)

	Shore					
Year	Nonwhiting	Whiting	Total	Mothership (Nontribal)	All Whiting	All Groundfish
1994	46	80	126	93	173	219
1995	50	75	125	41	115	166
1996	52	85	137	47	132	184
1997	47	87	135	50	138	185
1998	34	91	125	50	140	175
1999	33	87	120	48	135	167
2000	29	89	117	47	136	164
2001	25	73	99	36	109	135
2002	25	46	71	27	72	98
2003	22	55	78	26	81	104

The landings for individual species vary even more than the grouped averages calculated from this table. The October 2004 Analytical Team Report provides historic landings information by species.

Rationale for the Years Defining the Allocation Period Alternatives

The following is a discussion of the reasoning behind including some of the years selected for the landings history qualifying periods.

1994. The earliest year for the allocation period options was set at 1994, because this was the first year of the license limitation program. If the program is to allocate based on permit history, there would be no permit history before 1994 unless it is determined that permit history includes vessel history prior to that time. However, given the complexities of the qualification requirements for the original license limitation program, history prior to 1994 may be difficult to track and treat in an equitable fashion. For example, LE permits were issued to vessels that replaced qualifying vessels prior to the start of the license limitation program. Additionally, LE permits were granted to vessels under construction or conversion on a par with vessels that qualified based on 1984-1988 landings history. The use of vessel landings history prior to 1994 may be inconsistent with the equal treatment afforded vessels under construction or conversion in 1994 and those that had a 1984-1988 landings history, the former having had no opportunity to establish landings history.

1999/2000. Regulations prior to 2000 allowed extensive use of large footropes on trawl gear. In 2000, the imposition of restrictions on the use of large footropes shifted trawl effort away from reef and rocky bottom substrates. This substantially changed fishing opportunities and the mix of species landed. An allocation period that ends in 1999 would place more emphasis on the mix of opportunities that was available when small and large footropes could be used. The period after 2000 would reflect how vessels operated under the opportunities present under the most recent management regime.

1998. This year is used to start a six year period (1998-2003) that is of sufficient length to allow vessels to demonstrate their level of activity in the fishery and landings mix. Shortening the allocation period puts more emphasis on recent participation patterns. The license limitation program used a four year period for vessels to demonstrate a pattern of activities that would qualify for a permit. The six-year period resulting by starting in 1998 includes landings history two years prior to the large footrope restrictions and four years under the large footrope restriction.

2003. In order to prevent speculative effort and the consequent exacerbated management problems, a control date of November 6, 2003 was announced. This announcement put fishery participants on notice that fishing after 2003 would not be counted toward qualifying for IFQ. Since there was little fishing opportunity in the last two months of 2003, all of 2003 is being included in the allocation period.

Dropping Worst Years

Allowing vessels to drop their worst years from the allocation period reduces the need to consider hardship provisions to develop and equitable basis for allocation. The effect of dropping the worst years is to even out the distribution of IFQ among recipients.

As an indicator of the effect of dropping worst years out of the allocation formula the following table shows the number of vessels for which the share of average revenues increases (winners) when the two worst years are dropped from a 10 year period (1994-2003). Note that average revenues for both winners and losers increases when the two worst years are dropped.

Group	Vessels	Percent	Avg No. of Years of Participation	10 Year Average Revenue	8 Yr Average Revenue	Percent Increase
Winners	276	73%	5.12	$60.2K	$72.7K	21%
Losers	101	27%	9.97	$208.0K	$228.9K	10%
Total	377	100%	6.42	$99.9K	$114.6K	15%

Number of vessels by maximum number of years of participation (whiting and nonwhiting vessels).

No of Years:	1	2	3	4	5	6	7	8	9	10
No. of Vessels:	74	23	22	18	12	16	19	19	26	149

Similar information can be produced for permits and buyers/processors.

B.1.6 History: Combined Permits and Other Exceptional Situations

B.1.6.1 Discussion and Options

Under the Pacific Coast license limitation program, permits may be combined to create single permits with a larger vessel size endorsement. This is different from, and sometimes confused with, registration of multiple permits for a singe vessel (permit stacking). When permit stacking occurs, the permits remain distinct from one another.

The following is a current list of options for: *treatment of the catch history of combined permits,* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

History: Combined Permits and Other Exceptional Situations		
	Option 1	Option 2
Combined permits:	All Permits Count: Consider all landings history of the permits that have been combined to be part of the landings history of the permit resulting from the combination.	Only the Base Permit Counts: The combined permit would have only the landings history associated with its permit number (landings history of other permits with which it has been combined would not accrue to the combined permit).
Illegal landings/catch:	Don't count illegal landings/catch.	[not a reasonable option]
Landings in excess of trip limits, as authorized under an EFP	Do not count landings in excess of cumulative limits in place for the nonEFP fisheries.	Count all landings authorized under the EFP, including those in excess of the cumulative limits in place for the nonEFP fishery.
Compensation fish (fish taken as payment by vessels assisting in research)	Don't count compensation fish	Count such landings

TIQC Recommendations: The TIQC recommended IFQ programs include only Option 1 under each of the above exception situations. No serious consideration was given to counting illegal landings/catch.

Public Comments: None.

B.1.6.2 Initial Analysis

Permit History for Permits that Have Been Combined

For the fixed gear sablefish endorsement and tier qualification requirements, landings history was considered to be transferred with the permit; and, when multiple permits were combined to create a single permit with a larger size endorsement, the landings history of all of the combined permits were considered to accrue to the resultant permit.

EFPs

On the one hand, EFPs provided fishermen with greater harvesting opportunity than they would have otherwise had, and participants in the EFP programs may have had an advantage in accumulating catch history. On the other hand, there is no way to determine the catch history that would have been accumulated by these vessels had they not been EFP program participants.

B.1.7 Initial Issuance Appeals Process

B.1.7.1 Discussion and Options

An appeals process will be needed to address disputes between permit applicants and the NMFS Limited Entry Permits office over landings records or other qualification criteria.

For the groundfish license limitation program there were numerous disputes over landings records and other qualifying criteria. Under that program there were minimum thresholds to reach and, depending on whether that threshold was reached, a permit either was or was not issued. As part of the appeals process, a Council Limited Entry Permit Review Board was convened composed of members of industry.

For the fixed gear sablefish tiered endorsement program, there was also a threshold landings history that had to be reached to qualify for a particular tier. However, the only criteria considered was total landings, and the thresholds were set at levels such there was a considerable gap between the permit with the highest landings history in the Tier 2 (or Tier 3) group and the amount of landings history required to qualify for the next highest tier. There were no appeals associated with administration of this program.

For an IFQ program qualification requirement based on landings history, on the one hand any additional poundage that can be demonstrated through challenging a fish ticket could lead to some additional quota for the applicant. On the other hand the amount of benefit may be small relative to the cost of the appeal, unless there are a large number of landings records in dispute. An exception to this might be a recent participation requirement, that may present a threshold amount of landings history that an applicant must demonstrate before being able to qualify for any IFQ. In this case, an applicant coming close to the threshold but falling short may have considerable incentive to appeal.

Only one provision identified thus far: Appeals would occur through processes consistent with the Administrative Procedures Act.

<u>TIQC Recommendations:</u> None identified.

<u>TIQ Enforcement Group Recommendations:</u> Require that any proposed revisions to fishtickets undergo review by state enforcement personnel prior to finalization of the revisions.

<u>Public Comments</u>: None.

B.1.7.2 Initial Analysis

No options have been developed to analyze. Allowing applicants qualifying based on catch history to drop their two worst years may reduce the need to rely on appeals to address hardship provisions (see Section B.1.6)

B.1.8 Creating New IFQ Species/Species Groups After initial Implementation

B.1.8.1 Discussion and Options

From time to time the IFQ program may need to be revised through the subdivision of IFQ already allocated. Such subdivisions may be necessary if management units are changed. Possible changes include the separation of a species from a species group, or the establishment of new management areas for a species or species group. In such an event, the following options outline procedures that could be used to do the reallocation *(options developed by staff for TIQC consideration)*:

After reviewing the following options the TIQC determined that due to administrative costs only IFQ Division Option 1 was viable. ***Even though Options 2 and 3 have been determined to not be viable, the option numbers are being maintained in this appendix until the text in Section 1.8.2 can be redrafted to reflect the elimination of these options from detailed anlaysis.***

IFQ Division Option 1

When a management unit is subdivided, quota shares for that unit will be subdivided by

issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided.

For example, let's say an individual holds 1% of the quota share for "Other Slope Rockfish" (OSR) which includes redbanded rockfish. If as a result of a new assessment redbanded rockfish is to be split out from OSR then the individual would receive 1% of the quota shares for redbanded rockfish and continue to hold 1% of the quota share for what was left in the OSR category. A similar approach would be used for an new area split. If the OSR quota share were originally coastwide and it was decided that a north-south split were needed, after the split, the same individual would hold 1% of the OSR quota for the north and 1% of the OSR quota for the south.

If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.

IFQ Division Option 2 (not viable due to quota share tracking costs)

When a management unit is subdivided, quota shares for that unit will be subdivided by:

apportioning the quota shares between the new subdivisions according to their relative use in the previous year. Using the quota share catch history from the previous year, a percentage based on the pounds landed in each new of the new subdivisions will be calculated, and the quota share will be split into the new subdivisions based on those percentages.

Continuing with the above example, under this approach, if 5% of the associated landings were redbanded rockfish and 95% were other OSR, then the shares would be split 5/95 between redbanded rockfish and OSR. With this approach, a quota share redbanded rockfish may vary substantially from its share of the OSR quota before the split. As an extreme example, say redbanded rockfish were only landed by two vessels, both associated with identical quota shares (1% of OSR) and identical landings history for the previous year. While before the subdivision each vessel held only 1% of the total OSR quota, after the subdivision each vessel would end up holding 50% of the redbanded rockfish quota shares, and 1% of OSR shares.

IFQ Division Option 3

When a management unit is subdivided, quota shares for that unit will be subdivided by:

allocating one share per pound landed of the newly subdivided management unit in the previous year

Under this approach, there would be a complete reallocation of quota shares based on the previous year's catch history. Continuing with the above example and using an extreme case, if 1% of OSR quota were associated with a particular account but no landings were made in association with that account in the previous year, the account would receive zero shares of the new, subdivided quota when the OSR quota shares were subdivided.

IFQ Division Options Rejected

Options that would be based on multiple years of quota share landings history were rejected because of the complexity and costs associated with tracking catch history over multiple years **(Rejected options are currently listed as Option 2 and 3 above. The option labeling will be removed in the next draft of this document, however, the options will be discussed sufficiently to explain why they were rejected.)**

B.1.8.2 Initial Analysis

Tracking Catch History for Quota Shares

There are several design element options under consideration for which the ability to associate catch history with quota shares is a central element. IFQ subdivision is one, and a "use-or-lose" provision is another.

Associating landings with quota shares would appear to be a complex and expensive undertaking. IFQ would be issued as quota shares. Each year, quota pounds would be issued to quota share holders based on the amount of quota share held. Quota pound accounts could be held by any type of entity but quota pounds would have to be transferred to a particular vessel in order to be used (Figure B.1-2). Thus there would be three types of accounts: quota share accounts, general quota pound accounts, and vessel quota pound accounts. Catch would be landed against the vessel quota pound accounts. In order to track catch to a specific quota share account, the portion of the vessel quota pound account against which a landing is made would have to be related back to the particular quota shares used to generate those quota pounds. The tracking of catch history to quota shares would be complex because of the many opportunities to transfer quota pounds generated from a single quota share account to quota pound accounts held by different owners and different vessels, and for quota shares to transfer from one account to another within and between years (Figure B.1-2). Consider a pound of fish landed by Vessel 5 in Figure B.1-2. First the pound would have to be attributed to one of the two quota pound accounts from which the vessel acquired its quota pounds. If the pound is attributed to Quota Pound Account 6, then it must be associated with one of three Quota Share Accounts. If it is attributed to Quota Share Account 6, and quota shares have transferred between Quota Share Accounts 6, 5 and 3, then those transfers would have to be followed and the catch history attributed to the proper quota share account. While technically feasible, the amount of programming and data which would have to be accurately recorded and maintained is substantial. Thus far, the only option that has been identified that would facilitate this type of tracking would be to serialize (assign something like a serial number to) each quota pound or blocks of quota pounds.

It might be possible to track catch history back to quota shares from a particular quota share account for one year. To do this quota shares and quota pounds would be "branded" with the quota share account number at the time the quota pound is issued each year. That "start of year" account number would have to remain with the quota share and quota pounds through all transfers during the year. At the end of the year, vessel catch history would be distributed among the quota pounds in the vessel's account on a proportional basis.[5/] For example, if 75% of the quota pounds came from quota share account A and 25% of the quota pounds came from quota share account B, then 25% of the catch history would go to account A and 75% to account B. No matter how many times the quota shares and quota pounds transferred during the year, the start of year account number would have to be maintained in order to assign catch history at the end of the year. Because history could not be assessed and new subdivisions could not be implemented instantaneously at the end of a year, it might be necessary to maintain two or three years of branding on the quota shares. The branding would need to be maintained so that if quota shares were traded it would be possible to go back and find out what account the shares were associated with during the year that was to serve as the basis for the subdivision. In order to maintain more than one year of branding, depending on the frequency of quota share transfers, may require a geometric increase in the amount of data that would need to be maintained in the system.

For purposes of quota share subdivision, two problems would have to be addressed to develop viable options based on quota share landing history:

- Treatment of quota pounds never associated with a vessel in a particular year.
- Treatment of quota shares for which no pounds were used in a particular year.

Adjustment Costs and Program Costs

The program costs would likely increase substantially under IFQ subdivision Options 2 and 3. A significant amount of data would be maintained on every quota share and quota pound transaction for only occasional use when new IFQ subdivisions are created. Thus, under Options 2 and 3 the burden of the adjustment costs for quota share subdivisions is largely borne by the government. However, industry would also be burdened by some increased record keeping requirements. Under Option 1, the burden of adjustment costs associated with IFQ subdivision would be borne mainly

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5/ This eliminates the need to assign pounds to a particular quota share at time of landing and the associated data entry work.

by quota share account owners and only at the time actual subdivision occurs. These costs would be incurred as transaction costs associated with the trading of quota shares and quota pounds to match the needs of participants in the system.

Potential Targeting Incentives

Under IFQ subdivision Options 2 and 3 there may be incentives to selectively target fish for which it is anticipated there will be a new subdivision. Such incentive would exist if fishermen anticipate that the shares for one of the new subdivisions would be of greater value than the other subdivision. Using the example from above, if it was anticipated (1) that redbanded rockfish would be split out from "Other Slope Rockfish" in a subsequent year as a result of a new stock assessment, and (2) that redbanded rockfish quota shares would be more valuable than the remaining "Other Slope Rockfish" quota shares, under Options 2 or 3, there would incentives to target redbanded rockfish. There would be no such incentive under Option 1, and the incentive under Option 3 could be much greater than under Option 2.

Matching Landings to Quota Holdings

Data from the BC trawl IFQ fishery appear to indicate that one or two years of adjustment was required when fishers were allocated IFQ for areas and species for which they did not fish. Fishermen in BC were allocated a percentage of IFQ for all species and areas based on their relative catch history of all groundfish combined. Thus, they received allocations for areas and species for which they did not fish. Discarding was high for the first few years of the program relative to later years. It has been suggested that the reason for the discarding was that catch did not match IFQ holdings and it took a few years for fishermen to adjust their IFQ holding to their catch composition. Thus an option which results in a fisherman receiving quota for an area or species they do not fish (Option 1) could result in more discards. However, for the West Coast trawl IFQ system (as specified to date) this would be an economic wastage problem, rather than a biological problem. The current system anticipates that IFQ must be held to cover all catch, and there is no credit provided for assumed discard survival.

B.2.0 IFQ/Permit Holding Requirements and IFQ Acquisition (After Initial Allocation)

Program Summary and Main Options:
Holding Requirements and Acquisition
(Section B.2.0)

In order to be used, IFQ representing quota pounds would need to be registered for use with a particular vessel (deposited to the vessel's quota pound account). Only LE trawl vessels would be allowed to participate in the IFQ fishery. A vessel would need to acquire quota pounds to cover a particular landing. . . **[by the time of the landing, no more than 24 hours after the landing, no more than 30 days after the landing].** A vessel . . . **[would not need to hold quota pounds; would need to hold at least xxx quota pounds]** . . . before leaving port on a fishing trip. An LE permit may not be transferred from any vessel for which there is deficit in the vessel's quota pound account for any species or species group (i.e. if the vessel has caught IFQ species not covered by quota pounds). *(Section B.2.1)*

Each year quota pounds would be issued to quota share holders based on the amounts of quota shares they hold. *(Section B.2.2.1)*. For species that are not overfished, a vessel . . . **[would/would not]**. . . be able to roll-over . . . **[up to . . . 5%, 10%, 20%, 30% . . . of its]** . . . unused quota pounds or cover an overage . . . **[of . . . 5%, 10%, 20%, 30%]** . . . with quota pounds from the following year. For overfished species, . . . **[a full; a partial; no]** . . . rollover allowance would be provided. *(Section B.2.2.2)*

Quota share use would be monitored as part of the TIQ program review process. **[Quota shares not used in at least one of three years would be revoked . . . OR . . . During program review processes, if it is determined that significant portions of the available quotas shares are not being used (catch is not being recorded against quota pounds issued for those shares), use-or-lose or other provisions will be considered to encourage more complete utilization]**. *(Section 2.2.3)*

There are many program features that would facilitate new entry and participation by small fishing operations (e.g. highly divisible access privileges as compared to limited entry licenses). Additional provisions for such purposes could include . . . **[none; a low interest loan program; provisions for new entrants to qualify for revoked shares being reissued (the latter two options are not mutually exclusive)]**. *(Section B.2.2.4)*

A percentage of the quota pounds each year . . . **[would/would not]** . . . be held back from that allocated to quota share holders (0-25%, based on analysis) would be awarded to proposals from fishermen and processors working together to benefit the local community. *(Section 2.2.5)*

[Anyone eligible to own a US documented fishing vessel; Anyone eligible to own or operate a US documented fishing vessel; Stakeholders] . . . would be eligible to own or otherwise control IFQ (quota shares or quota pounds) *(Section B.2.3.1)*. Leasing . . . **[would/would not]** . . . be allowed *(Section B.2.3.2)*. Quota pounds could be transferred any time during the year. Quota shares would be transferrable . . . **[any time during the year/only at the end of the year]** *(Section B.2.3.3)*. There would be no limit on the divisibility of quota shares for purpose of transfer. Quota pounds could be transferred in as little as single pound units *(Section B.2.3.4)*. Liens on IFQ are a matter of private contract and would not be specifically limited by this program. A central registry might be created as part of the program administration *(Section B.2.3.5)*. There . . . **[would/would not]** . . . be accumulation limits on the amounts of quota shares or pounds used on a vessel, owned, or controlled. The definition of control may extend beyond ownership and leasing. The range of limits being considered **varies from 1% to 50% to no cap.** The limits may **vary by species, segment of the fleet, or type of entity (e.g. vessel owner, permit owner, processor).** Accumulation limits for groundfish in aggregate may also be different than limits for individual species *(Section B.2.3.6)*. There would be no direct limits on vertical integration *(Section B.2.3.7)*.

B.2.1 IFQ and LE Permit Holding Requirements

B.2.1.1 Discussion and Options

If the only requirement for landing groundfish with trawl gear is the possession of IFQ, the number of vessels participating in the fishery could potentially increase. In order to facilitate cost effective enforcement it may be useful to identify and limit the number of participants. This can be done through a requirement that IFQ be fished only from vessels with limited entry trawl permits.

Determination of when the IFQ must be held has a substantial bearing on program enforcement and monitoring costs and on discard rates (bycatch). A program that requires IFQ be held at some time prior to offloading would allow greater opportunity for ensuring compliance through enforcement activity during fishing or offloading activities. In such a case, enforcement officers in the field (USCG at-sea, or state or NMFS agents on the dock) can determine whether there is sufficient IFQ to cover a particular landing. Allowing IFQ to be acquired after offloading has been completed provides no opportunity for in-the-field detection of quota busting (i.e., attempts to catch fish in excess of a vessel's IFQ holdings). On the other hand, allowing a vessel to cover its landing of IFQ after offloading has been completed reduces the incentive for at-sea discards (bycatch) or underreporting a landing for which insufficient IFQ is held.

Where IFQ may be acquired after a landing is completed, greater emphasis must be placed on ensuring that catch information is accurately recorded. Once accurately recorded, at a later time a determination can be made as to whether adequate IFQ was held to cover the landing. Ensuring accurate recording of catch may require at-sea monitoring and/or weigh master presence during offloading. Such presence would ensure that both discards and landings are recorded and counted against IFQ holdings. Even if IFQ must be held before harvest operations, monitoring must be sufficient to ensure that fishermen do not try to conserve their IFQ by underreporting catch (discards or landings). Enforcement program elements are discussed in Section B.3.1.

The following is a current list of options for: *IFQ and LE Permit Holding Requirements* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC recommends be maintained for more detailed analysis in an EIS

IFQ and LE Permit Holding Requirement Options	
Option 1	**Time of Landing:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) at the time of landing.
Option 2	**Within 24 Hours:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) within 24 hours of the time of landing.
Option 3	**Within 30 Days:** Register IFQ to the LE trawl vessel - vessels must cover the catch with IFQ representing pounds (i.e. quota pounds) within 30 days of landing.

Note: For all options, only vessels with LE trawl permits would be allowed to participate in the IFQ fishery. For any vessel with an overage (catch not covered by quota) there would be no more fishing until the overage is covered. Additionally, for vessels with an overage, the limited entry permit cannot be sold or transferred until the deficit is cleared.

SUBOPTION: These options may be combined with a suboption that requires that some threshold amount of unused IFQ be held at the time a vessel departs from port.

TIQC Recommendation: The TIQC IFQ program recommendations include only Option 3, however, all three options and the suboption should be considered as part of the analysis.

The industry would need flexibility in fishing under an IFQ program. The greater the opportunity to match catch to IFQ, the less incentive there would be for discards, and the more opportunity to acquire IFQ at a reasonable price. The Canadian program has shown that total allowable catches are rarely taken under their IFQ program, therefore, there appears to be little risk that optimum yield (OY) would be exceeded due to vessels catching fish for which they do not have IFQ and then not being able to acquire the needed IFQ after landing.

Initial TIQ Enforcement Group Recommendation: Option 2, including a suboption that requires some quota be held prior to departure from port, and that the vessel IFQ account have no deficits for any species.

If a landing is not covered within 24 hours, catch in excess of IFQ holdings (or, if there are carryover provisions, catch in excess of IFQ holdings plus carryover provisions) would be forfeited and additional enforcement actions possibly taken. Overages would be debited against a vessel's IFQ account and show up as a deficit balance until additional IFQ is acquired.

Public Comments: None.

B.2.1.2 Initial Analysis

When violators can be detected and cited in the field, enforcement actions can be taken more efficiently and a deterrence is created for engaging in the detectable phase of the illegal activity. However, this deterrence may lead to the adoption of less detectable methods of noncompliance, for example, underreporting discards rather than attempting to make landings of fish in excess of IFQ.

The following table compares monitoring and enforcement implications of the three IFQ holding options:

Monitoring and Enforcement Implications			
Option	When IFQ Needs to be Held to Cover Catch	In the Field Detection of Violation	Incentive for Illegal Discard or Underreporting
Option 1	Time of landing	Detect and cite for excess retained fish at time of landing (no difference in opportunity to detect unreported discards, as compared to options with grace periods).	High costs associated with tight time limit for acquiring IFQ create greatest incentive for illegal discarding. Greatest disincentive to attempt to underreport a landing.
Option 2	24 Hour Grace Period (catch must be covered with IFQ within 24 hours of a landing)	Detect potential violation at time of landing, verify w/in 24 hours, and immediately collect corroborating statements and evidence. Enforcement cost slightly higher.	Lower incentive for illegal discarding. May have to pay high prices for IFQ on "spot" market. More opportunity for underreporting if there is no monitoring presence.
Option 3	Within 30 Days (catch must be covered with IFQ within 30 days of a landing)	Same as Option 2 except 30 day delay substantially increases cost of developing enforcement cases.	Lowest incentive for illegal activity. Most time to locate IFQ at best price. Opportunity to underrerpot if there is no monitoring presence would be similar Option 2.

Under provisions that might allow fishermen a grace period of up to 30 days to acquire IFQ to cover their catch, individual vessels may end up with harvest uncovered by IFQ such that their individual quota is exceeded. If this were to occur it may cause the fleet allocation to be exceeded. The ramifications of the fleet exceeding its allocation are discussed in Section B.2.2.2.2 with respect to rollover provisions.

Frequency of Departure Without Sufficient IFQ

Nova Scotia - *One ton is needed to go out fishing. However, people have gone out with no quota before and the DFO has not gone after those people. Dockside monitors would record when a fisherman does not have enough pounds to cover landings. However, this information was not readily available since fishermen are allowed a certain amount of time and overage before penalties are assessed. In most cases, managers indicated that fishermen made phone calls at sea to cover what was caught. Managers contacted also indicated that fishermen have become very good at targeting.*

BC - *No pounds are required to go out fishing. At-sea monitors note when fish is caught that a vessel does not hold pounds for. Data on amounts of uncovered pounds was not available. Mr. Turris and Mr. Ackerman indicated that fishermen have become very good at targeting. Also, quota and pounds are often bought and sold "uncut" (combinations of quota or pounds sold together because they are typically caught together).*

B.2.2 Annual IFQ Issuance

B.2.2.1 Start-of-Year Quota Pound Issuance

IFQ would be issued as *quota shares* at the time of initial issuance (Section B.1). At the start of each years *quota pounds* would be issued to quota share holders. The amount of quota pounds issued to an entity would be based on the amount of quota shares the entity holds relative to all other quota share holders. An entity holding one percent of the quota shares for a particular management unit would receive one percent of the quota pounds to be issued in a particular year for that management unit.

B.2.2.2 Rollover (Carryover) of Quota Pounds to a Following Year

B.2.2.2.1 Discussion and Options

A one year rollover provision might be used to carry unused quota pounds over from one year to the next, or to count catch in a current year against quota pounds in a subsequent year.

In order to be used, quota pounds would be registered to particular vessel (see Section 2.1). Allowing a vessel to catch more than its quota pound holdings, but counting the catch against the following year's allotment, is one means of penalizing the vessel for exceeding its quota pound holdings without creating large incentives for the vessel to discard its excess harvest (NRC 1999) (pg. 217). Particularly in a multispecies fishery, allowing a vessel to carry over some portion of its unused quota pound allotment from one year to the next creates a situation in which there is less incentive for the vessel to catch up to its full quota pound holdings and hence risk exceeding those holdings. While midseason transfers can facilitate coverage of any over catch, as the season progresses there would be less and less IFQ available for transfer to cover overages.

The following is a current list of options for: *Rollover (Carryover) of Quota Pounds to a Following Year* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Provisions for nonoverfished and overfished species may be mixed-and-matched.

Rollover (Carryover) Options

	Non-overfished Species	Overfished Species
Option 1	No rollover.	No rollover
Option 2	5% rollover	No rollover
Option 3	10% rollover	5% rollover
Option 4	20% rollover	5% rollover
Option 5	30% rollover	Full rollover (30% rollover under Option 5, 20% when matched with Option 4, etc.)

Percentage-based rollover allowances would be evaluated based on pounds held in the vessel accounts. Vessels exceeding their account holdings and exercising their option to rollover an overage, would acquire pounds from the subsequent year's allocation before going fishing again. Such vessels would have to wait for the annual issuance of pounds for the subsequent year before they could start fishing again. Rules regarding not going fishing when a vessels account is in deficit would still apply (Section B.2.1). Therefore, any overage to be covered by pounds from a subsequent year would be limited by the rollover allowance and by the amount of the rollover allowance the vessel was able to take in a single trip. Vessels would be in potential violation until such time as they acquired the necessary quota pounds to cover their overage.

Vessels with unused quota pounds from one year would be able to use those quota pounds in the subsequent year.[6/] The rollover provision would not allow pounds to be carried over more than one year. Concern was expressed that underages not be allowed to accumulate across many years such that potential harvest might far exceed the target in some future year. Thus, for a 10% rollover allowance, the harvest in a subsequent year could never exceed the target for that year by more than 10% of the harvest in the previous year.

Initial TIQC Recommendations: The TIQC IFQ program recommendations include Options 2, 3, and 5; however, all options should be considered in the analysis.

Public Comments: None.

B.2.2.2.2 Preliminary Analysis

Potential for Fleet Overages

Roll-over provisions might allow or create circumstances under which the trawl sector exceeds its allocation in a single year. The trawl fleet allocation will be some portion of the total OY for many species (for some species it may be the entire OY). The advisability of creating a situation in which trawl overages could occur and result in exceeding the OY would need to be evaluated on a species by species basis. The potential effects of such overages on other sectors would vary depending on the circumstances. The OY is a target which we are trying to achieve over the long-term. The status of and response to overages may vary depending on whether the OY is set at or below ABC, and whether the stock is under a rebuilding plan. Exceeding the ABC constitutes overfishing. Therefore, if OY is set to ABC, an overage in the trawl fishery could result in inseason constraints on other sectors and visa versa. For stocks that are being rebuilt, even though the OY is set below the ABC, the OY may be considered a harder cap than for other stocks. For rebuilding stocks any provisions that might allow harvest to exceed OY in a given year, but achieve it on average, would need to be accounted for as part of the rebuilding plan. For healthier stocks for which OY is set below ABC, there may be more ability to allow OY overages so long as the system is designed to achieve the OY on average over the long-term. Overfishing (exceeding ABC) is based on a one year criteria, not a long-term average. Therefore, whatever system is developed should not result in

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6/ Unused pounds in an account not associated with a vessel would decline to whatever level is allowed by the rollover provision. For example, if at the end of the year there were 1,000 quota pounds in an individual's account, by definition none of it was used (otherwise it would be associated with a vessels). If there is a 30% rollover allowance the individual will be able to carry 300 pounds from one year to the next. On the other hand, a vessel may have 1,000 pounds in its account and fished against 700 of those pounds. The rollover provision would allow it to carry all of the unused 300 pounds into the next fishing year.

harvest in excess of the ABC in any one year. It may be that different rules for rollover would be appropriate for different stocks, depending on whether or not the OY is set below the ABC, and on whether a stock is overfished.

In multispecies fisheries, it is highly unlikely that every vessel would be able to fully utilize all of the IFQ for every species held by the vessel. Therefore some vessels are bound to underharvest their quota pounds resulting in a fleet harvest that is less than the total IFQ issued, unless there is a rollover. The main problem with a rollover would occur in circumstances under which vessels tend to run into limits on certain species before others, such that the fleet as a whole overruns its allocation for a particular year. The situation for overfished species may present such a circumstance. With the severe constraints on the harvest of overfished species, there may be a tendency for many vessels to limit out on those species first. The "rebuilding paradox" adds to the concern in this regard. Under the rebuilding paradox, as a species rebuilds fishermen encounter it more frequently, however, due to an information lag, the higher encounter rates precede any upward adjustments to stock assessments and management targets. As a result the fishery is more constrained than would be necessary given actual stock conditions and more vessels may tend to limit out on the same species, resulting in one year fleet overages for the species. With a rollover, that over harvest in one year would be taken off the following year's harvest (achieving the management objective on average). Similarly, underharvest of a particular species could result in a harvest in excess of the annual target in a subsequent year as a result of the rollover of unused quota pounds into that subsequent year.

The potential for a rollover provision to severely constrain harvest in a subsequent year is a concern. A rollover of excess harvest for a species like canary rockfish could substantially reduce the quota pounds available in a subsequent year–potentially resulting in a severe constraint on total harvest, depending on the size of the rollover allowance and whether the fleet harvest comes in at or below its annual allocation. The potential for a substantial constraint on harvest in a subsequent year due to over harvest in a previous year is one reason why the Council adopted discrete annual OYs for each year under the current biennial system.

For some vessels, a rollover could just become another target up to which it would fish. However, if the fishery is fully monitored at-sea, given that quota pounds count against catch, penalties would be incurred for fish caught in excess of the rollover provisions. For those wishing to avoid such penalties, the rollover provisions provide an opportunity to fully take each year's quota pounds without incurring penalties from violations or from leaving fish "on the table." The ability to fully take the available harvest is necessary if, on average, OY is to be achieved.

A system run without the roll-over provision (accounting starts fresh each year, as under status quo management) would result in harvest in excess of allocations more often than a system which adjusts TACs based on previous years overage. Because of the way it would be administered, the roll-over provision might be thought of as a means by which to impose an administrative penalty for low level overages (i.e., fishing must stop until your overage is covered and if you do not acquire IFQ pounds from the current year to cover the overage you must acquire it from a subsequent year). Without the rollover, some other penalty for an individuals overages would have to be imposed. There would be associated enforcement and administrative costs, but not the harvest reduction to compensate for the overage (unless some other mechanism were created to adjust subsequent harvest).

Rollover allowances need not be set at a constant level. The system could be designed to allow the Council to recommend changes in th overage and underage allowances from year to year based on stock conditions and previous years' experiences.

TAC Overages in the British Columbia System

The British Columbia trawl IFQ system has rollover provisions and grace periods similar to what is being discussed for the West Coast system. Evidence shown in the following table indicates that the BC fleet underharvests its targets far more often than it exceeds targets.

Fishing Year	Number of TACs	Number Exceeded	TACs Exceeded - Species (Percent Over)
'97-'98	54	3	Silvergrey Rockfish, Area 5C/D (3.34%) Pacific Ocean Perch, Area 5E (1.04%) Roughey Rockfish, Coastwide (10.30%)
'98-'99	52	5	Yellowtail Rockfish, Rest of Coast (0.11%) Silvergrey Rockfish, Area 5C/D (2.62%) Pacific Ocean Perch, Area 5E (4.79%) Pacific Hake, Coastwide (7.72%) Pacific Hake, Joint Venture (10.33%)
'99-'00	52	5	Yellowtail Rockfish, Area 3C (5.40%) Yellowtail Rockfish, Rest of Coast (3.61%) Silvergrey Rockfish, Area 5E (3.12%) Pacific Ocean Perch, Area 5E (3.65%) Pacific Hake, Joint Venture (4.00%)
'00-'01	53	2	Yellowtail Rockfish, Rest of Coast (4.78%) Pacific Ocean Perch, Area 5E (2.92%)
'01-'02	53	2	Yellowtail Rockfish, Rest of Coast (0.77%) Pacific Ocean Perch, Area 5E (2.92%)
'02-'03	54	1	Yellowtail Rockfish Area 3C (0.87%)

Source: http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/Groundfish/GFTrawl/GfTrawlInfo.htm
Note: The TACs are adjusted each year based on the previous year's overage or underage. Thus the yellowtail rockfish TAC that was exceeded in the 2002-2003 fishing year had been reduced by an amount equal to 2.92% of the 2001-2002 TAC (if the 2002-2003 TAC had not been adjusted downward due to the previous year's overage, the harvest would have been within the unadjusted 2002-2003 TAC). Because there is 100% observer coverage in the Canadian system, the small percent overage estimates are more likely to reflect actual overages than would be the case if such an estimate were derived for the West Coast fishery.

Rationale for Rollover Provisions from Other Systems

<u>Definition</u> - *A rollover (also called a carryover, carryunder, overage, underage, overrun) is typically a species-specific (and sometimes area specific) allowance of quota pounds that may be deducted (in the case of an overage) or added (in the case of an underage) from or to the following year's quota pounds allocation. Typically, rollovers only "roll over" for one year due to administrative*

burdens of extending rollovers for more than one year. Also, typically, a monetary fee is charged for an exceedance of an overage equivalent to the revenue the exceedance is worth. In addition, usually the individual that has an overage is restricted from fishing again (sometimes in that area and/or for that species he has an overage for) until the overage is covered by quota pounds.

<u>*Purpose of rollover provisions*</u> *- 1) Allows fishermen flexibility by providing another method for covering catch. This can be particularly useful in fisheries with species that have low TACs and in fisheries where avoiding catch of unwanted species is not entirely possible; 2) Decreases the incentive to discard when an individual does not have enough quota pounds to cover catch; 3) As a means to enforce individual accountability; 4) Eliminates the need to penalize fishermen that catch more than they can cover with quota.*

<u>*British Columbia*</u> *- A 30% underage or overage is allowed for most species. Species with low TACs have low or no overage allowances. If catch exceeds quota pounds held plus the allowed overage, catch must be matched to with quota pounds within 30 days or before the next fishing trip. Until the catch overage is covered by the quota pounds, the fisherman is restricted to mid-water trawl fishing in that area where the overage occurred, or for the remainder of the fishing year. Anyone owning a vessel licence is allowed to carry an underage or overage up to 30% of pounds held.[7/] In the instance where catch exceeds the overage allowance, catch can be retained but the revenue from that catch must be relinquished to the Canadian Groundfish Research and Conservation Society, an organization that conducts research for the benefit of the fishery. The society is responsible for securing the monies owed. In addition, the pounds of fish caught in excess of the overage allowance are deducted from next year's allocation. The BC experience has been that penalties for violations of rollover provisions have only been assessed twice in the past seven years. The British Columbia Groundfish Trawl Management Plan can be found at: http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/mplans/plans04/trawl0405.pdf*

<u>*Nova Scotia*</u> *- In the past, a 20% overage has been allowed for most species. This past year, there were twenty instances of overages. Most of these overages will be matched to purchased quota before next season. If someone exceeds their holding of pounds, they are restricted from fishing. They also give up the revenue earned from the pounds they exceeded their quota. No underages have ever been allowed to roll over. Starting April 1st, overages will no longer be allowed due to the administrative burden it entails. If someone exceeds their pounds holdings next year, they will have the pounds taken off of next year's allocation, will need to forfeit the revenue from those pounds, and are restricted from fishing until the pounds are covered.*

<u>*Note:*</u> *In Canada, in order to have an overage, one has to own a groundfish trawl licensed vessel. A license holder has to be a full time fisherman. This is defined as a person with two years experience fishing for seven months each year.*

Alaska, New Zealand, Iceland and Australia do not include rollover provisions as part of their IFQ programs.

7/ Overages are set less for some species including hake (15%), Pacific cod in certain areas (0%) and halibut (15% underage, 0% overage) to safeguard against an undesirable deviation from the TAC.

B.2.2.3 Quota Share Use-or-Lose Provisions

B.2.2.3.1 Discussion and Options

Use-or-lose provisions would require that if quota shares are not used over a certain period of time they would expire or be revoked and reallocated. Concerns motivating consideration of this provision stem from a desire to prevent the reservation of quota by persons that may not use it for a variety of reasons. Reasons include acquiring large amounts of quota shares for a key species and then cornering the market for it. These concerns relate to the goal of increasing regional and national net benefits, and objectives pertaining to providing for a viable, profitable and efficient groundfish fishery; minimizing adverse effects from IFQs on fishing communities; and promoting measurable economic and employment benefits (Section 1.2.3).

The following is a current list of options for: *Quota Share Use-or-Lose* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Quota Share Use-or-Lose Options

Option 1	Include use-or-lose provisions (e.g. must be used at least 1 year in 3).
Option 2	Do not include use-or-lose provisions.
Option 3	Do not include use-or-lose provisions but evaluate program performance: Identify the potential nonuse of IFQ as an issue to be evaluated in the program review process. Indicate that, depending on the findings of the evaluation, the program may be modified in the future to create use-or-lose or other provisions to address any concerns.

Several questions have been raised with respect to additional detail required for the use-or-lose provision:

- How long would quota shares need to go unused before they would be revoked?
- What portion of the quota shares would have to be used in order for this provision to be applied?
- If someone failed to utilize the required proportion, what portion of the quota shares in the account would be forfeited?
- Would the quota shares be reissued or would the value of all remaining quota shares simply be allowed to increase?

The use-or-lose provision would apply to the person owning the QS. A requirement that QS be used in three out of five years was considered.

TIQC Recommendations: The TIQC IFQ program recommendations include Option 1 and 3, however, all three options should be considered as part of the analysis.

Public Comments: None

B.2.2.3.2 Preliminary Analysis

Implementation Issues

The following implementation issues would need to be addressed in order to develop a viable use-or-lose provision.

1. How would it be determined which quota shares had been used and which not used?

2. If there were a requirement that quota shares be used in three out of five years or be lost, and it was determined that certain quota shares had not been used in two years, if the quota shares were then transferred to a new owner would the new owner be required to use the shares immediately? What if the new owner already has quota shares, other than requiring the owner to utilize all shares in his or her account is there a way to determine whether he or she had used the newly acquired shares?
3. If someone holds quota shares and leases out shares (or quota pounds) to someone who holds some of his or her own quota, how would it be determined which quota was utilized?
4. How would use-or-lose provisions be applied if part but not all quota shares were transferred from one account to another?

These questions all have to do with the difficulty of tracking the use of specific quota shares across time (quota share catch history). Quota share use would be defined as the landing of fish against quota pounds generated by the particular quota shares. The problem can be partially illustrated with a bank account analogy. If the requirement is that some portion of the money in a bank account be used over some period of time then how would such use be demonstrated and how would the "unused" portion of the money be tagged and tracked as it is transferred from one account to another. Barriers to these types of provisions and the potential for tracking quota share catch history are discussed in Section B.1.8.2. That discussion indicates that it may not be feasible to track more than the most recent year of quota share catch history, if that.

Interaction with Rollover Provisions

While a use-or-lose provision penalizes nonuse, a rollover provision (Section B.2.2.2) would be designed to accommodate nonuse. If both use-or-lose and rollover provisions are included in the program, nonuse threshold levels for the use-or-lose provision should be set to accommodate rollover provisions. Rollover provisions may be an important part of an effective IFQ program because, in a multispecies fishery catching near 100% of all quota pounds without exceeding some quota pound holdings would likely be impossible.

Potential Discard Incentive

If quota shares are issued for all species (including some that are currently not fully harvested) the use-or-lose provision could result in wastage as fishermen might catch and discard fish only to ensure that they do not lose quota shares that might someday become more valuable (either for catch and retention or to cover bycatch).

Comparison With Other Programs

<u>British Columbia</u> - *There have not been any use-or-lose provisions or other design elements implemented to prevent entities from not harvesting pounds. However, there are design elements that will become active in April 2005 to help prevent speculative activity and "armchair fishermen". In April, quota owners will be required to harvest 25% of groundfish equivalent (GFE) or they lose that 25% minus the rollover allowance. This will increase to 40% after three years and last for four years. In addition, the number of permanent reallocations (quota transfers) will be restricted to two*

over each of those periods of time. Purchase of quota by environmental groups that would not harvest what they owned has never been a big concern.

<u>Nova Scotia</u> - *There are no use-or-lose provisions or other design elements implemented to prevent entities from not harvesting pounds. Currently, there are "armchair fishermen". Approximately one-third of the fleet (100 of 350 quota owners) leases out all of their pounds each year to other fishermen.*

<u>Note:</u> *In order for an entity to hold pounds and not harvest them, the entity would have to either purchase quota or purchase pounds each year. In order to purchase quota or pounds, the entity would have to own a groundfish license for the IVQ fishery. To own a groundfish license, a license holder has to be a full-time fisherman. This is defined as a person with two years experience fishing for seven months each year. The Nova Scotia fishery representatives contacted felt the expense to hire a fisherman not to fish would be significant.*

Therefore, one of the reasons this issue is not a concern for either the BC or Nova Scotia fishery is because of the requirements for quota purchases which make speculative activity or ownership without harvesting more expensive and difficult.

B.2.2.4 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options

B.2.2.4.1 Discussion and Options

Section 303(d)(5)(c) of the Magnuson-Stevens Act requires that any new program "considers the allocation of a portion of the annual harvest in the fishery for entry-level fishermen, small vessel owners, and crew members who do not hold or qualify for individual fishing quotas."

Individuals who do not receive an initial allocation and lack collateral or credit history may have a difficult time acquiring IFQ, particularly in situations where IFQ price is overinflated (NRC 1999) (pg. 211). However, the NRC (pg. 210) warns that measures to facilitate new entry could defeat the purpose of an IFQ system if they expand the quota share pool or hinder consolidation.

There are also provisions in the Magnuson-Stevens Act that allow for the creation of loan programs to finance small boat and entry level participation. Section 303(d)(4) of the Magnuson-Stevens Act allows the dedication of 25% of fees collected for the IFQ program to be used to issue obligations to aid in financing:

- (i) purchase of individual fishing quotas in that fishery by fishermen who fish from small vessels; and
- (ii) first time purchase of individual fishing quotas in that fishery by entry level fishermen.

The criteria for qualifying under (i) and (ii) would need to be determined as part of the Council recommendations.

With respect to facilitating new entry, a central lien registry system could make loans more available (NRC 1999) (pg. 202), and taxing quota rents would reduce their price (NRC 1999) (pg. 214), though at the same time it would reduce the revenue stream from the IFQ and the purchasers ability to recover investment in the purchase of IFQ. The NRC recommends consideration of a zero-revenue auction (NRC 1999) (pg. 211). Under such a system, some percent of the IFQ reverts back to government each year for auctioning, with the proceeds of the auction returning to those forced to give up their quota shares. The advantages cited for this auction are that it provides excellent information about prices (helpful both to fishermen and bankers) and it guarantees the presence of a steady flow of IFQs in the market, ensuring an opportunity for potential entrants to gain access (NRC 1999) (pg. 145). It might also provide price information for the purpose of determining taxes to be levied against the first transfer of IFQ.

The following is a current list of options for: *Entry Level Opportunities* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Entry Level Opportunity Elements (NOT MUTUALLY EXCLUSIVE)	
Element 1	Provide a low interest loan program (qualification factors to be determined).
Element 2	Provide an opportunity for new entrants to qualify for shares revoked for program violations or, if there is a use-or-lose provision, non-use (qualification factors to be determined).

<u>TIQC Recommendations:</u> The TIQC recommendations for IFQ Program C include Element 2, and the other two programs (A and B) recommend that neither element be included. There was no support for Element 1 but it has been provided in order to ensure that all reasonable options are discussed.

The TIQC identified a number of provisions that will facilitate new entry.

The following are some provisions that would help ensure opportunity for new entry:
- Providing unlimited divisibility in the size of share blocks traded.
  Providing a central lien registry to facilitate obtaining financing by increasing security in the collateral and therefore lower interest rates.
- Limiting ownership to individuals.

A zero revenue auction should not be considered as there should be sufficient trading to ensure the availability of quota on the market for purchase by a new entrant.

<u>Public Comments:</u>

Comment	Source
Provide low interest loans for community nonprofit organizations to purchase IFQ	ED
Provide low interest loans for new entrants and younger fishermen to purchase IFQ	Survey (ED)
Allocate to new entrants or provide IFQ for purchase from: IFQ reclaimed from IFQ already distributed, IFQ created from increasing TAC, forced sale in an auction (each year existing IFQ holders would provide a portion of their IFQ for annual auction).	Survey (ED)
Provide low interest loans to assist “lease-dependent” fishermen	Survey (ED)

B.2.2.4.2 Initial Analysis

Option 1 is a loan program. The amount of fees collected under IFQ programs is limited to 3% of exvessel value. It is likely that administration of the program, including tracking and monitoring, would require the collection of the maximum fees allowed, leaving no additional money for a loan program. Some other source of funding would be required. Loan guarantees, the use of Capital

Construction Fund accounts or other such measures might be options which would reduce the cost of entry.

Under Option 2, a source of IFQ would need to be identified in order to provide an amount of IFQ each year for new entrants. There are other program provisions under which IFQ might be forfeited, either as part of an enforcement action or if a viable use-or-lose option is implemented. Such forfeitures might be used for supporting new entrants. Another option would be to issue a certain amount of new or recalled[8/] quota share each year to new entrants. The effect of these two mechanisms (new shares and recall) would be mathematically equivalent with respect to the reduction in the pounds represented by the quota share held by each existing participant.

Whether to qualify for a loan program or the reissuance of shares, qualifying requirements would need to be developed in order to identify and prioritize the various classes of beneficiaries.

B.2.2.5 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options

This section was added in May 2005. Further development of the options and analysis is needed.

B.2.2.5.1 Discussion and Options

The committee discussed the issue of community needs with respect to IFQ program. The following proposal has been put forward and is included as part of Program C.

> Set aside up to 25% of the nonwhiting shoreside trawl sector allocation each year and allocate that amount as quota pounds for joint fishermen/processor venture proposals, ranked on the basis of objective criteria that evaluate benefits to local communities. Criteria for these proposals would have to be developed but would include reference to the TIQ goals and objectives and encourage other community groups (Port, Chamber, etc.) to lend their support to the proposals being submitted. The program should be designed with simplicity, adaptability, fairness and potential revenue production as core elements.

<u>TIQC Recommendations:</u> This option has been included in one of the IFQ Programs recommended for analysis by the TIQC.

Public Comment: None.

B.2.2.5.2 Initial Analysis

To be developed.

8/ The mandatory return to the government of a certain portion of an entity's quota shares, independent of any enforcement action or penalty (e.g., all quota share holders return 1% each year).

The following has been submitted by TIQC members for discussion/analysis and is included as part of the TIQC June 2005 report. Some of this text will be incorporated in the above section "Discussion and Options."

The intent of the community hold back is to economically benefit coastal communities. Market development and enhancement, flexibility/coordination with market forces, facilitation of new operations, and industry stabilization at the local level are all desired outcomes.

This program should be simple and straightforward – using a point system based on specific measurable criteria. Program models in Alaska, Canada and the Shetland Islands are more subjective and would not be a good fit for the West Coast because of wide ranging differences community to community and the profusion of lawsuits based on subjective decisions.

Purpose: Quantitative benefits for coastal communities.

Description: Community set aside quota awarded to fishermen and fishermen/processors or others who submit proposals to a review panel which will rank the proposals based on a point system designed to specifically bring additional fishery economic benefits to coastal communities. This quota is in addition to the initial quota allocation for any specific fisherman.

Quantitative criteria would be used as a simple and clear means of ranking proposals received for review. These criteria are specifically linked to TIQ program Goal #1: *Increase regional and national net benefits including improvements in economic, social, environmental and fishery management objectives.*

These are further linked to specific TIQ Program Objectives:

- *#1. Provide for a viable, profitable and efficient groundfish fishery;*
- *#5. Increase stability for business planning;*
- *#6. Increase operational flexibility;*
- *#7. Minimize adverse effects from IFQs on fishing communities to the extent practical; and*
- *#8. Promote measurable economic and employment benefits through the seafood catching, processing , distribution elements, and support sectors of the industry.*

Who Reviews Proposals and Awards Quota

By using a point system and quantitative criteria, NMFS should be able to rank these proposals. Alternatively, a community committee could be formed with adequate community representation. PSMFC in consultation with community and fishery representatives could also rank these proposals.

Who May Submit Proposals

1. Fisherman(men) and processor(s) who meet the qualifying criteria set forth under TIQ Program design alternative Section B.1.2. Qualifying Criteria. These would be joint proposals
2 Fisherman(men) meeting the qualifying criteria set forth under B.1.2
   a. Alone
   b. In association with a coastal community member or coastal community organization (i.e. community economic development department; port district, etc.)
   c. In association with a person or organization from outside the community.

Criteria for Ranking Proposals:* (see notes)

Stabilization - (max 25 points) (Objectives #1, 5, 7*)*
Additional product flow into community
Maintain product flow into community
Additional traditional processing
Maintaining traditional processing

Innovation - (max 25 points) (Objectives 1, 5, 6)
New or additional niche marketing
New or additional value added products

Employment Opportunity - (max 25 points)* (Objectives 7, 8) (see notes)
Number of coastal community jobs created
Increase in jobs
Maintaining jobs, avoiding loss

Personal Quota Committed - (max 25 points) (Objectives 7, 8)
Amount of quota committed to community proposal

(Max 100 points total)

Additional Criteria for Subsequent Years and Applicants Who Re-Apply

Evaluation of Follow on Proposals - (max 10 points)
For existing projects, additional consideration will be provided for meeting or
exceeding performance indicated in prior award.

(Max of 110 points possible when subsequent year criterion in effect)

Timing of Awards and Duration

Awards made in January of each year, held for two years. May reapply to continue.

Program Review

Program reviewed and adjustments made as part of the overall TIQ Program review.

*Notes:

Net benefits measured in dollars, where possible.

Jobs created measured not only in employment numbers. Additional factors include full time vs. part time, year around vs. seasonal, wage, duration, training, and other benefits.

Small communities compete equally with larger communities. Point ranking based on the merits of the individual community.

In total personal quota committed, the intention is to promote collaboration between parties to foster investments into community

Suggest 10% of initial quota allocation held back for Communities.

Program intent is to award quota among multiple applicants in any single proposal review process. For example, the top five qualifiers may share the quota setback amount, or minimum requirements can be established for proposal scores to receive a percentage of hold back quota. How much is enough for any individual project needs to be determined.

B.2.3 Transfer Rules

Transferability promotes economic efficiency but often the potential structural changes to the fishing industry and fishing communities resulting from transfers are perceived as a threat. These perceived threats include the concentration of quota shares, a lopsided distribution of economic gains, and a change in social relations among members of a community (NRC 1999) (pg. 208).

To further goals of economic efficiency and rationalization, transferability should be as free as possible. Restrictions on transferability may be warranted to promote other goals such as protecting the owner-operator mode of production, preventing absentee ownership, or protecting fishery dependent coastal communities (NRC 1999) (pg. 208).

B.2.3.1 Eligible Owners/Holders (Who May Own/Hold)

B.2.3.1.1 Discussion and Options

In this section, the issue is who will be allowed to acquire IFQ after the initial allocation. In Section B.1.1 the issue addressed was identification of the groups that would receive an initial allocation of IFQ. In discussing who may own or hold IFQ one of the major concerns of the TIQC is that there not be absentee ownership of IFQ or ownership of IFQ by interests who would leave the IFQ unused. These concerns relate to the goal of increasing regional and national net benefits and objectives pertaining to providing for a viable, profitable and efficient groundfish fishery; minimizing adverse effects from IFQs on fishing communities; and promoting measurable economic and employment benefits (Section 1.2.3).

The NRC study notes that some communities may be heavily dependent on fishing for social, cultural, and economic values and/or are lacking in alternative economic opportunities; and recommends that Councils be permitted to “authorize communities to purchase, hold, manage and sell IFQs” (NRC 1999) (pg. 206). In making this recommendation the NRC states that Councils should determine the qualifying criteria for a community that is permitted to hold quota.

The potential for foreign ownership and control of IFQ is another issue related to determination of the class of eligible owners. In this regard, the NRC recommended that Congress take the lead in determining eligibility of foreign individuals and companies to receive IFQ in an initial allocation. Because of foreign ownership interest in the existing fishery, limitations on foreign ownership could be problematic and discriminate against US co-owners and investors. Also, bearing on this issue are current trends toward the liberalization of direct foreign investment worldwide (NRC 1999) (pg. 211). Groundfish LE permit ownership in the current license limitation system is controlled with provisions that prohibit ownership of permits by anyone not eligible to own a US documented fishing vessel.

Other groups to consider for potential eligibility to acquire IFQ include crew members, skippers, vessel owners, permit owners, members of fishing communities, those that may wish to hold IFQ for their nonuse benefits (e.g., members of conservation organizations), individual members of the general public, those with security interest in the IFQ (e.g., a lender), and any person (including business entities such as corporations).

The following is a current list of options for: *Eligible Owners/Holders* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis. The options apply to both quota shares and quota pounds, and describe eligibility criteria for owning or holding (leasing) quota.

Options for Eligible Owners/Holders	
Option 1	Any entity eligible to own a US documented fishery vessel.
Option 2	Any entity eligible to own or operate a US documented fishing vessel.
Option 3	Stakeholders: include owners and lessees of LE permits or vessels, skippers/crew, processors, buyers, communities. *(NOTE: If ownership is restricted to certain classes, criteria will need to be established to define membership in these classes.)*

<u>TIQC Recommendations:</u> The TIQC’s main concern is that anyone currently participating in the fishery should be allowed to continue to do so and to acquire IFQ. It is the TIQC’s understanding that certain provisions of the AFA are currently allowing participation by a limited number of entities that would otherwise not be eligible to own a US documented fishing vessel. It is the TIQC’s understanding that Option 2 would accommodate those entities but Option 1 may not. On this basis, the TIQC has included only Option 2 in its recommended IFQ programs. However, the other options shown here should be considered in the analysis.

The “stakeholder” option was specified to increase the likelihood the quota shares and the benefits therefrom are held by members of individual fishing communities, such that the communities benefit

Public Comments:

Comment	Source
Allow communities to form nonprofit organizations and acquire IFQs	ED

B.2.3.1.2 Initial Analysis

Initial allocation of IFQ generally determines how windfall benefits will be distributed. The question of who will be allowed to own IFQ is one of control over future benefits from the fishery.

In general the more participants and more types of participants in the IFQ market the closer IFQ prices will come to reflecting their true value given their full range of alternative uses, and the higher the likely price for IFQs.

Groups with social concerns can be accommodated at least in part through the scope of eligible owners. For example, communities and others that are concerned about losing the benefits of fishing activities can be provided the opportunity to organize themselves and acquire IFQ, unless the ownership provisions prohibit them from doing so.

If the class of persons eligible to own IFQs is to be limited, there would need to be rules for establishing membership in those classes. For example, if a qualifying class is“crew members,” among the states there is not consistent licensing of crew members or other means of crew identification. Therefore some system would need to be developed to identify members in this class. Section B.1.1 identifies issues pertaining to the identification of members of the following groups of fishery stakeholders: vessel owners, permit owners, vessel operators, crew members, buyers, wholesalers, processors, and communities.

Where the person in an eligible class is a partnership or corporation, a determination would need to be made as to whether the individuals holding an interest in the partnership or corporation can separately qualify to own or lease IFQ or whether only the partnership or corporation itself may own or lease IFQ. If the latter is the case, a person who owns a vessel in a partnership might not, on his or her own, separately own IFQ. If the former is the case, then Option 2, which attempts to restrict ownership to stakeholders, could allow a larger class of persons to own IFQs than Option 1.

B.2.3.2 Leasing and Sale

B.2.3.2.1 Discussion and Options

Leasing can allow fisheries to adapt to change and cover overages and incidental catch through the short term transfer of IFQ, rather than through discarding (NRC 1999) (pg. 208).[9/] One of the primary social concerns with leasing is the potential for absentee ownership in the fishery. Provisions that might be considered to restrict leasing (if such restriction is desirable) include

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9/ With 100% accounting of catch using observers or other means of monitoring, discarding to avoid the need to cover catch with IFQ would not be an option.

limiting the proportion of the total quota which may be leased, the frequency of leasing, and taxing leases (NRC 1999) (pg, 208). The NRC recommends permanent transfers generally be allowed with restrictions on to whom or where the quota may be transferred, if necessary to address concerns about absentee ownership, geographic distribution of the fishery or other structural features of the industry.

The following is a current list of options for: *Leasing and sale* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis. The options apply to both quota shares and quota pounds, and describe eligibility criteria for owning quota. These quota transfer options apply to both quota share and quota pounds (note: quota pound leasing and quota pound sale would be the equivalent as, once used, quota pounds convey no ongoing harvest opportunity).

Duration of Transfer - Quota Share Leasing and Sale Prohibition Options	
Option 1	Permanent quota share transfers only - leasing prohibited. Permanent transfers and leasing of quota pounds is allowed. (Note: Quota pounds are valid only for one year and expire at the end of the year (unless there is a rollover provision, see Section B.2.2.2); quota pound transfers do not affect ownership of the quota shares).
Option 2	Permanent transfers and leasing of quota shares and quota pounds allowed.
SubOption	Suboption: Prohibit all permanent transfers (leasing only) during the first year of the program.

<u>TIQC Recommendations:</u> The TIQC recommended IFQ programs include both Options1 and 2 but not the suboption. However, the suboption is included for consideration in the analysis. Eliminate the suboption that would temporarily restrict permanent transfers.

Option 2 allows lease and sale of IFQ. A suboption under Option 2 would restrict permanent transfers of quota shares in the first year(s) of the program in order to allow industry members to become familiar with them and gain a greater understanding of their value. Concern was expressed that restrictions on transfers would have two negative effects. First, for the individual fisherman the initial allocation is not likely to match recent catch, and exchange of quota share among fishermen would likely be necessary to allow them to achieve their recent mix. Second, the transfer of IFQ among fishermen is necessary for fleet rationalization, and not allowing permanent transfers would delay rationalization.

Prohibiting leasing would be intended to reduce the opportunity for absentee ownership in the fishery.

The purpose of the moratorium on transfers of quota shares contained in the suboption to Option 2 would be to allow fishers time to get used to the program so that they might make better business decisions when buying and selling quota shares.

<u>Public Comments</u>:

Comment	Source
Compel quota holders who have historically leased their permits to others to continue to lease their IFQ to those individuals.	Survey (ED)

B.2.3.2.2 Initial Analysis

Participants in the New Zealand fishery have reported that in the first year of the program some individuals made unwise transactions as they did not have a good understanding of how the program would work. They recommended that during the initial years of a new program consideration be given to prohibiting the permanent transfer of IFQ.

The analysis done for the Amendment 6 groundfish license limitation program showed that while rules may be put in place to prohibit leasing or sale of a permit, private contractual agreements provide many opportunities to circumvent the intended effect of such prohibitions.

B.2.3.3 Limits on Time of Transfer

B.2.3.3.1 Discussion and Options

One reason for considering a restriction on the time of sale is to facilitate tracking IFQ, particularly if roll-over provisions for catch overages are to be applied to quota share or if the IFQ tracking system is not a real time electronic system. In some programs there are restrictions on transfers of quota shares at the end of the year in order to facilitate the settling of accounts and issuance of quota pounds in for the subsequent year.

Also included in this category is an enforcement provision which would restrict the transfer of quota share from the holder of any account for which there is a deficit of quota pounds (landings in excess of quota pounds held).

The following is a current list of options for: *Time of Transfer* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis. The time of transfer options apply to quota shares only and not quota pounds. Quota pounds would be transferable any time during the year.

Time of Year for Quota Share Transfer Options	
Option 1	Allow transfers of quota shares any time during year.
Option 2	Allow transfers of quota shares only at the end of year.

On a related topic, an embargo on transfer of quota shares was considered for situations in which a vessel had catch not covered by quota pounds. However, because the quota shares underlying a vessel's quota pounds may be held by someone not directly associated with the vessel these options were eliminated as not reasonable.[10/] They were replaced with a limit on transfer of permits (see Section B.2.1).

10/ The TIQC has recommended elimination of the transfer embargo options.

Transfer Embargo Options	
Option 1	Quota shares may not be transferred from any account for which there is a deficit of quota pounds (i.e., any account for which catch exceed quota pounds for at least one species.
Option 2	Quota share pounds may be transferred from an account even if it is deficit for some species.

TIQC Recommendations: The TIQC IFQ program recommendations include only Option 1. The other option is maintained for purpose of analysis and possible need with respect to administration of the IFQ program.

A restriction on the inseason transfer of quota pounds has not been suggested because vessels need to be able to adjust their quota pound holdings to match the composition of their catch.

A transfer embargo on IFQs was considered but rejected because of diffulty relTransfers may also be restricted if a vessel's IFQ account is in deficit (a "Transfer Embargo"). The transfer embargo provision should be revised such that the embargo would only apply to quota shares owned by the vessel. Individuals who lease their quota pounds to a vessel should not be penalized for the vessel's excess harvest. Additionally, a vessel may acquire quota pounds from multiple sources, and it would not be possible to associate the overage with any particular source of quota pounds.

Public Comments: None.

B.2.3.3.2 Preliminary Analysis

The need for and costs of restrictions, or lack thereof, will likely become more apparent as the program is further developed. A limitation on the time of year of transfer might be useful in the administration of the program. Rules such as provisions allowing for roll-over may affect the need for restrictions on transfer.

Restrictions on transfers of quota shares from accounts with a deficit of quota pounds (catch in excess of quota pounds) would serve an enforcement and deterrence function. The restriction seeks to improve the likelihood that quota shares will be available if necessary to cover a deficit with pounds from a following year (if there is a rollover provision in place), or will be available for seizure as a penalty, if the deficit is part of a sufficiently severe compliance problem.

B.2.3.4 Divisibility

B.2.3.4.1 Discussion and Options

Limited divisibility (blocked quota shares) combined with limits on the number of blocks that can be stacked were used in Alaska to try to preserve the character of the fishery. With the limits on stacking, quota shares in small blocks were expected to preserve small fishing enterprises and be available at substantially lower prices. In the Alaska system, only a portion of the quota shares were blocked and the remainder were completely divisible. Greater divisibility of IFQ may increase the number of transactions and hence the administration costs.

The following is a current list of design elements for: *Divisibility* as identified by the TIQC through the scoping process. Options have not been developed and the design elements are not mutually exclusive. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Elements of Divisibility Provisions	
Element 1.	Quota Shares: quota would be issued as a percentage of total available harvest; shares would be nearly unrestricted in their divisibility - “many decimal points."
Element 2.	Quota Pounds: annual quota would be issued in weight units (pounds); and would be divisible down to a single pound of fish

TIQC Recommendations: The TIQC recommends no limit on divisibility and no blocked shares. The option of requiring quota shares and quota pounds be held in larger blocks was rejected from consideration in order to provide greater flexibility. Requiring that IFQ be traded in blocks may increase incentive for discards. Fishers faced with needing only small amounts of IFQ to cover incidental catch might chose to discard when faced with the cost of buying blocked shares in excess of their need. Allowing the purchase of small quantities will allow individuals to tailor their IFQ holdings to their needs. It will also make it easier for people to work their way into the fishery. Ability to transfer IFQ in small increments will make it easier to take full advantage of allowed harvest, generating the associated benefits for the nation.

During TIQC discussions it was noted that if transactions go through brokers, transaction costs should largely be privatized. Therefore, there should not be concerns over costs associated with high divisibility of IFQ.

Public Comments:

Comment	Source
Consider blocked quota shares	ED-Survey

B.2.3.4.2 Preliminary Analysis

Blocking quota shares with stacking limits could result in some quota being substantially lower in value on a per unit basis. Two factors may bear on the relevance of the Alaska system to what might be desirable for a West Coast trawl IQ program. First, the Alaska sablefish and halibut programs were not for multispecies fisheries. There was little need to acquire quota shares to cover incidental catch. Second, the blocked quota share program has since been repealed.

If quota shares were available in both blocked and unblocked form with a limit on the number of blocks that could be stacked, individuals entering the fishery could either acquire blocks (likely available at a lower price per unit of quota) or divisible quota in what ever size increment they could afford.

B.2.3.5 Liens

B.2.3.5.1 Discussion and Options

The NRC (NRC 1999) (pg. 202) found that “Individuals who do not receive an initial allocation, or those who received a small quantity of quota, may find it difficult to obtain bank financing to purchase shares because they lack acceptable collateral.” Lenders have expressed concern that liens on IFQ might be passed on to IFQ purchasers without the purchaser’s knowledge. This situation may undermine the confidence of lenders, making it more difficult for potential new entrants or existing operations to gain the financing needed to purchase IFQ. The Magnuson-Stevens Act includes creation of a lien registry system, but none has been implemented to date.

<u>TIQC Recommendations (Comment):</u> Liens are a matter of private contractual arrangements. The TIQC believes that placement of liens should not be restricted and that liens can and should be facilitated through a central lien registry. Encourage NMFS to establish the central lien registry system mandated under the Magnuson-Stevens Act, and specify that IFQ ownership information be available for public review. (See Section B.3.1 and 3.4)

<u>Public Comments</u>: None

<u>Options from Public Comment Period</u>: Comments received during public scoping will be placed here.

B.2.3.5.2 Preliminary Analysis

The ability for new entrants to acquire financing for purchasing IFQ may rest in part on their ability to use IFQ as collateral. A central lien registry system would help provide that assurance. However, even with the additional assurance provided by a lean registry system, IFQ would still be revokable either as part of an enforcement action or with a change in the program through an FMP amendment.

Consideration could be given to the creation of a West Coast lien registry system for IFQ and other Federal fishery permits.

B.2.3.6 Accumulation Limits

B.2.3.6.1 Discussion and Options

Accumulation limits may be used to promote equity by preventing a few IFQ holders from acquiring excessive market power and thereby adversely affecting other participants. Accumulation limits may also be an indirect way to encourage broader geographic distribution of quota shares. While some IFQ programs rely solely on antitrust law to prevent excessive concentration of shares, experience has shown this not to be sufficient to prevent problems resulting from excessive concentration of IFQ (NRC 1999) (pg. 209). The NRC also notes that concentration limits may not be very effective if ways can be found to circumvent them.

Section (d)(5)(c) of the Magnuson-Stevens Act requires that any new program “prevent any person from acquiring an excessive share of the individual fishing quotas issued . . .” The NRC has recommended that all IFQ programs define excessive shares, including specifying how that is measured, and prevent the accumulation of “excessive shares” of IFQ (NRC 1999) (pg. 210).

The TIQC developed the following options for ownership, control and use caps. Note that different options can be selected for ownership, control and use limits and for different species groundfish species as well as for divisions of the trawl sector (e.g. nonwhiting and whiting sectors.)

Options for IFQ Concentration Limits						
	Non-Whiting Groundfish			Whiting Fishery **(Separate Matrix for Each Sector Specified in the Options Selected in Section 2.1.1.4)**		
	Ownership	Control	Use by a Vessel	Ownership	Control	Use by a Vessel
Option 1	1%	1%	1%	5%	5%	5%
Option 2	5%	5%	5%	10%	10%	10%
Option 3	10%	10%	10%	25%	25%	25%
Option 4	50%	50%	50%	50%	50%	50%
Option 5	No Cap	No Cap	No Cap	No Cap	No Cap	No Cap

If an entity is eligible to receive more than the cap as part of the initial allocation, then that entity would be allowed to receive and use the amount in excess.

A person's ownership interest in an entity should be taken into account when calculating that person's holdings. For example, if a person has a 1% interest in a corporation, then only 1% of the IFQ owned by that corporation should count toward that person's cap.

The caps may be for individual species and/or total groundfish IFQ. A total groundfish cap should be lower than the individual species cap so that an individual cannot control the maximum amount of IFQ for every species. This provides another constraint on accumulation. The caps would need to take into account special situations, such as specialty fisheries, emerging or low utilization fisheries or those with a skewed geographic distribution such that they are harvested by relatively few vessels compared to the size of the fleet (e.g., whiting, arrowtooth, sanddabs, POP, dogfish).

If options are developed under which different caps apply to different types of entities then there needs to be a definition (qualifying criteria) for each entity to which a different accumulation cap would apply.

<u>TIQC Recommendations:</u>

Due to the unavailability of summary data, the limits included in the TIQC IFQ program recommendations are broad and not specific with respect to the various species or groups to which they might be applied. Once the needed summary data is available, it may be possible to craft more specific options for consideration.

The TIQC had extensive discussions on whether or not there should be different caps for different types of entities for example, one cap for permit owners, and other caps for processors, communities, crew members, etc. It was argued by some that processors need to be able to control larger portions of the IFQ in order to be economically competitive. While large, relative to the West Coast, the total product they would control through IFQ would be small in the context of combined West Coast, Alaskan, and British Columbia fisheries and markets. Small caps could put them out of business. Others argued that processors did not need to control IFQ in order to benefit from landings. Concern was expressed that if larger caps were created for some entities, individuals would find ways to qualify for the larger cap (for example, by acquiring a processor license). Those supporting a separate cap for processors felt that qualifications could be established that would make it difficult to qualify for the larger cap unless a person truly belonged to that class of individuals. Four TIQC members wanted to include separate caps for processors and other entities as a recommended option for Council consideration in this report. There were nine in opposition to separate caps for different types of entities. Minority position: Provide different caps for different types of entities (e.g., processors, communities, etc.)

Taking into account a person's ownership interest in an entity when evaluating an ownership accumulation cap was rejected. Under such an option, for example, a corporation would be charged with controlling all QS held by any member of the corporation and the individual members would be charged with holding 100% of the quota shares held by the corporation. Under the recommendation of the TIQC if an individual holds only a 1% interest in a corporation, then only 1% of that corporations QS count toward the individuals cap. The TIQC believed that to do otherwise would hold a corporation or partnership at "ransom" for the holdings of a minority partner.

Under the British Columbia system value equivalents are established, using Pacific Ocean Perch as a base unit. The Committee discussed the possibility of basing accumulation limits (caps) on measures of value and decided it would add too much complexity to the program.

Caps should be considered to limit the amount of IFQ held (owned or leased). However, the TIQC recommended analysis of broadening the definition of control to include more than just the ownership and leasing of permits. Control should include any ability to direct the use of quota share. For example, employers might try to acquire more control than allowed under the cap by having employees hold quota shares under their own name. Full disclosure of information on control should be required along with appropriate penalties for nondisclosure. At the same time, it should not be assumed that just because an employee owns quota share, that employee's use of the quota share is at the direction of his or her employer. The intent of using a broader definition of control is to allow prosecution of those who might use subterfuge to circumvent the intent of accumulation caps.

Independent Experts Panel Comment: If IFQs are area specific, the Council may wish to specify area specific accumulation caps.

Public Comments:

Option	Source
Include a no-cap option	WCSPA
Consider different caps for different types of owners (e.g., vessels, buyers, communities)	WCSPA
Apply the same caps to all types of owners	1 individual
Caps for processors should take into account any IPQ held (NOTE: applies only if there is IPQ)	1 individual

B.2.3.6.2 Preliminary Analysis

To address the concern that an excessive share of an individual segment of the fishery not be controlled by a single entity, caps would be applied to individual species IFQ and for total groundfish IFQ. Additionally, by essentially allowing more vessels to participate in the fishery, vessel caps may help reduce the chance that some ports may be bypassed due to consolidation of harvest.

A limit on control would be more restrictive than a limit on ownership. Since it may become relatively easy to circumvent limits on control or ownership of IFQ, placing limits on the concentration of catch by a single vessel may help spread the benefits from harvest more widely than the other types of caps.

An important issue pertaining to ownership and control is the degree of control required before IFQ counts against the ownership or control cap. Under the sablefish tier limit program, any interest in the ownership or control of a permit counts as complete ownership or control of that permit. A vessel owner is considered to control a permit if the permit is registered for use with a vessel (the permit is considered to have been leased by the vessel). Thus if a person has the maximum (three permits) for his or her vessel and he or she has a partial interest in a second vessel, no permits could be fished from the second vessel. The Alaska IFQ system is similar in that if an individual has any ownership interest in an IFQ account, all IFQ in the account counts against their cap.

Ownership and control of IFQ will likely be determined in part on the basis of ownership or control of IFQ accounts. IFQ would be held and tracked in accounts because it is likely to be fungible (interchangeable) and divisible much like money. However, an IFQ account may or may not be associated with a permit or vessel. In order to be used, however, quota pounds held in accounts not associated with vessel will likely need to be transferred to an account associated with a permit or vessel.

If rules parallel to the sablefish permit stacking program were in place under an IFQ system, a person who
- owns IFQ and fishes it off his or her vessel and
- has at least part ownership in a second vessel that is leased out to someone else:

could have counted as being under his or her control all of the following:

- quota pounds held under direct ownership,
- quota pounds held by a crew member that he allows to be fished off his vessel,
- quota pounds he leases from someone else to fish off his vessel,
- plus any quota pounds associated with the vessel he leases out, including
  - quota pounds owned by the person to whom he leases his vessel,
  - quota pounds the vessel lessee leases from other quota share holders, and
  - quota pounds fished by crew members off the leased vessel.

The TIQC has recommended control be based on percent interest in an IFQ account. Therefore, if a person had a 50% interest in a vessel then only 50% of any quota pounds would count against their personal cap.

The options developed by the TIQC include the potential for there to be different accumulation limits for different types of entities. This would require the developing criteria for qualifying each type of entity for which a different cap applies. The different licensing requirements for vessels, processors and buyers in each state are described in Section B.1.

Setting vessel caps greater than ownership caps would allow a vessel owner to hold the maximum quota allowed but still provide an opportunity for crew members to hold IFQ and fish them off the same vessel. However, owners of more than one vessel would not be able to hold the maximum IFQ per vessel for each vessel owned. .

To allow for greater potential efficiency in certain targeting strategies, individual species caps may be set higher than total groundfish caps. The whiting fishery is notably different in this regard and so greater degrees of consolidation may be appropriate.

Three important factors to consider in setting cap levels are the effects of different concentration caps on efficiency, market control, and the distribution of benefits among communities, crew, etc. In this regard the history of fleet consolidation and catch per vessel in the BC IFQ fishery may be instructive. Before the IQ program in BC there were 117 vessels in the groundfish fishery. After implementation of the IFQ program, there were 78 active vessels in 2003. Total catch of nonwhiting species was around 40,000 mt in 2003, and average of 500 mt nonwhiting groundfish harvest per vessel.

If the accumulation limits are expressed as percentages of the total IFQ, then consolidation may become very restricted under area management.

Caps may affect a vessel's ability to cover overages. For example, if a vessel owns IFQ up to the level of a cap and then exceeds the cap, the only way to cover the overage would be to violate the cap.

While it will be difficult to determine the optimal accumulations limits for each type of quota and each type of entity, it is much easier to prevent excessive market control using defined accumulation limits than by relying on federal antitrust enforcement.

Accumulation Cap Examples

The following examples of combinations of accumulation cap options were constructed to begin discussion of the key elements and associated strengths and weaknesses of the different approaches.

Example 1 (Simplest system administratively given certain assumptions):

Assumptions:

a. The term "vessel" implies a U.S. coastguard craft.[11/]

11/ Requiring this allows for easier identification of an individual to a vessel than allowing a "vessel" to be any seafaring craft since some states do not require registration.

b. Quota share or pounds and pounds must be directly associated with a groundfish trawl permit.[12/] That is, an entity cannot own quota share or pounds without owning or holding a permit.
c. Permit leases continue to be tracked by NMFS.
d. Latent permits allowed.
e. Permits can still only be allowed to be assigned to two vessels each year.
f. Still required renew permit each year.[13/]
g. Area and species-specific caps are necessary to prevent localized depletion.
h. Individuals who are allocated more than is allowed under the caps are restricted from purchasing more quota than they already own ("grandfathering-in").

Ownership cap: 1% on ownership of each area-specific species **pounds as a percentage TAC <u>or</u> quota share**. That is, no entity can be purchase or own more than 1% of the TAC of a species in a given area (coastwide or region specific) in a given year (pounds or quota of the TAC). Those entities allocated more than 1% are grandfathered-in but restricted from purchasing more quota than they already own.

Vessel cap:[14/] **2% cap on the total amount of groundfish that can be caught** each year by an entity. This would be tracked in an entirely separate software program from the ownership cap since it requires different data sources. If based on catch, the data that goes into the calculation would have to come from at-sea monitors (if 100%). If based on landings, the data that goes into the calculation would have to come from dockside monitoring reports. The calculation could be as simple as adding all poundage of all species under the IFQ caught by a vessel and dividing it by the total poundage of all TAC of all species under the IFQ.

Control cap: None. Left to the Department of Justice (antitrust determination).

12/ In this way, the number of people owning pounds each year is able to be tracked because: a) they are associated with an individual that NMFS has an address for; b) limited to a set amount of individuals, and; c) is consistent with management (tracking participation by permit ownership or holding) in other sectors of the groundfish fishery that may eventually be incorporated into the IFQ. If individual accountability is important to designers of the IFQ, then the quota share and pounds must be associated with a permit or vessel. Otherwise, individuals become extremely difficult to track. Associating quota share or pounds with a *permit* is preferable to associating quota share or pounds with a *vessel* because that is how the current software tracking system is set up and because vessel information is linked to an individual through Coast Guard data. Accessing and requiring updates to that data would require data requests and may not be immediately accessible.

13/ This ensures that NMFS has a record of the current permit owner's name and contact information.

14/ The maximum number of vessels is already capped at 340 since the number of permits is 170 and each permit can only assign a permit to two vessels each year. However, designers of the IFQ may want to limit the minimum number of vessels since there is no cap on the number of permits a vessel can lease; theoretically, a small number of vessels could lease all of the permits in the fishery and harvest all the pounds while permit holders still adhered to the "two vessels per permit each year requirement."

Statistics:
Permits (170 current inventory of active and inactive),
Vessels --associated with a permit sometime during the calendar year-- (between 50 if all landed up to the 2% cap, and 340 if all permits were assigned to the maximum two different vessels, i.e. transferred to a different vessel one time during the year)

Benefits:
1. Restricts tracking responsibilities for NMFS to a manageable level.
2. Allows for/enables individual accountability to occur.

Drawbacks:
1. No control cap. The program would likely be criticized for this.
2. Requires entities that would like to purchase quota share or pounds to purchase or lease a permit.
3. May create incentives for hiding degree of ownership of quota.

<u>Example 2</u> (Same scenario as Example 1 but with a control cap):

Assumptions: Same as Example 1.

Ownership cap: Same as Example 1.

Vessel cap: Same as Example 1.

***Control cap:** Control over ownership of quota share and pounds each year limited to 1% for each individual. A requirement can be made for IFQ fishery participants to reveal individual ownership names, contact information and portion of ownership of quota share and pounds. However, assessing control can be difficult since individuals could put ownership under another individual's name in the same family or entity. The data system would likely be suboptimal for ensuring complete compliance and need to evolve as problems are recognized. Enforcement of attempts to circumvent the control cap would require investigative work. Entities exceeding the control cap right now would likely have to be grandfathered-in.

Statistics: Permits and vessels same as Example 1. Between 100 individuals and an unlimited number of individuals (if no limit on number of individuals eligible for quota share ownership) would be eligible to control quota pounds.

Benefits:
1. Develops a system to attempt to track control of quota share and/or pounds which may build confidence in the system.
2. Somewhat restricts tracking responsibilities for NMFS to a manageable level.
3. Allows for/enables individual accountability to occur.

Drawbacks:
1. Tracking control may require a major programming and administrative effort that will likely not capture all information on control wanted.
2. Requires entities that would like to purchase quota share or pounds to purchase or lease a permit.

3. May create incentives for hiding degree of ownership of quota.

<u>Example 3</u> (Even more complex system that satisfies additional desired design elements including the ability to separate ownership of quota share and pounds from a permit):

***Assumptions:** Same as that stated for Example 1 **except that Assumption b is eliminated** thereby allowing any entity to own quota share or pounds without owning a groundfish trawl permit.

Ownership cap: Same as Example 1.

Vessel cap: Same as Example 1.

Control cap: Same as Example 2.

Statistics: Same as Example 2.

Benefits:
1. Develops a system to attempt to track control of quota share and/or pounds which may build confidence in the system.
2. Allows for relatively inexpensive entry into the fishery since no permit is required to purchase quota share or pounds.

Drawbacks:
1. Tracking control may require a major programming and administrative effort that will likely not capture all information on control wanted.
2. May not result in an adequate amount of individual accountability due to the lack of data on individuals without permits.
3. May create incentives for hiding degree of ownership of quota.
4. Creates very burdensome and perhaps inadequate tracking situation for NMFS in that there is no limit on the number of entities that need to be tracked for quota share or pounds ownership.

Evidence of control caps in IFQ fisheries was difficult to find. Preliminary research indicated that the BC fishery doesn't have control caps per se, but they do have lease/ownership caps. That is, an individual can own or lease a certain percentage of quota pounds each year by area/species. It doesn't matter if these are allocated through ownership of quota or leased from a quota owner. The same single cap applies and cannot be stacked. Control caps were considered at one time due to concern over Japanese ownership. But, due to the complexity of tracking ownership, it was decided that control caps would be too onerous and difficult to implement.

Similarly, there are no control caps the Nova Scotia IFQ fishery.

The following table summarizes ownership caps in some of the existing IFQ fisheries:

Fishery	Quota ownership cap
BC Groundfish ITQ	4-10% for most species/area, 15% (hake); about 2% vessel caps[15/]
Nova Scotia Groundfish ITQ	About 2% depending on species/area
AK Halibut & Sablefish	Area specific[16/]
AU SE Trawl ITQ	None
Iceland Groundfish ITQ	10% for cod and haddock; 20% for other species; 12% of value of all TACs in all areas.
NZ ITQ	35% of total IFQ in all areas <u>or</u> 20% of total IFQ in any one area for a species (will vary for some species)
U.S. Surf Clam/Ocean Quahog	Min: 5 cages (160 bushels); Max: None
U.S. Wreckfish	None

B.2.3.7 Vertical Integration Limit

B.2.3.7.1 Discussion and Options

Vertical integration in fisheries occurs when a single entity operates at more than one level in the harvesting, processing and distribution chain (e.g., a processing facility also owning a catcher vessel). This section will primarily discuss the role of IFQ accumulation limits in limiting vertical integration.

In discussing vertical integration limits it is important to be clear about what is meant by at-sea processing. Currently, heading & gutting and icing at sea is not considered processing. However freezing is generally considered processing.

<u>TIQC Recommendations:</u> The TIQC recommended no additional limits on vertical integration other than what is provided through the accumulation limits.

<u>Public Comment</u>: None

B.2.3.7.2 Preliminary Analysis

Some degree of vertical integration already exists in the West Coast groundfish fishery through processor control of permits and vessels. Vertical integration can reduce the impacts of

15/ IVQ holdings caps were calculated for each groundfish trawl license, during the first year of the IVQ program. The total IVQ holdings cap for each groundfish trawl license is measured in groundfish equivalents (described in FMP) as a percentage of total groundfish equivalents. These holdings caps, determined in 1997, continue to remain in effect.

16/ "Rules on the accumulation and transfers of halibut and sablefish IFQ are constantly evolving. In general, there are limits on accumulation and transferability. No person (individual, company, corporation) may own more than 0.5% of the total halibut QS in combined Areas 2C, 3A, and 3B; more than 0.5% of the total halibut QS in Areas 4A-E; or more than 1% of the total QS for Area 2C. No person may control more than 1% of the total Bering Sea-Aleutian Islands and Gulf of Alaska sablefish QS or more than 1% of the total sablefish QS east of 140 degrees west…Individuals whose initial allocation exceeded the ownership limits were grandfathered-in, but prohibited from acquiring additional QS."

implementation of an IFQ on processors. In BC, processor concern about IFQ was somewhat mitigated since 25% to 35% of the processors had vertical integration of some sort (owned, co-owned, agreements) and other features of the program (groundfish development quota) ensured processor influence over where fish was landed and sold.

Concerns over market control and foreign ownership in Alaska prompted attempts to identify ownership and the degree of processor-harvester vertical integration in the Pollock and crab fisheries. However getting this information for West coast groundfish fisheries will be very difficult.

Vertical integration will be automatically limited to some degree by the accumulation caps discussed in Section B.2.3.6. Any initial allocations to processors may already approach or exceed the accumulation limits selected under B.2.3.6. A grandfather clause may allow them to control their initial allocation, but probably wouldn't allow additional accumulation of quota share through consolidation or vertical integration.

It is not clear if IFQs will lead to more or less vertical integration. The creation of IFQ may redefine the privileges conveyed by a limited entry permit. For example, if processors can hold IFQ, there may be no incentive for processors to vertically integrate to control fishing permits. Instead they may contract with vessels for their deliveries. Consequently it will be difficult to assess whether the economic effects of vertical integration in the fishery will change. Initially, we may want to describe what little we know about the existing level of vertical integration in the fishery and review IFQ situations such as the BC, Iceland, and New Zealand Fisheries where processors either received initial IFQ allocations or were able to purchase such allocations after they were assigned.

B.3.0 Program Administration

B.3.1 Tracking IFQ, Monitoring Landings, and Enforcement

(MOVE THE FOLLOWING TO APPENDIX B) Enforcement suboption: If some IFQ are catch area specific, then all landings should occur in ports within the catch area, unless catch is separated and monitored at-sea.

B.3.1.1 Discussion and Options

The NRC report finds that compliance and self policing would be more likely if the process of establishing an IFQ program involves co-management schemes that allow fishermen to participate in the development and implementation of the IFQ program (NRC 1999) (pg. 216). This program is being developed and considered in an open Council process that provides substantial and significant opportunity for participation of members of industry, other interest groups and the public.

Section 303(d)(5)(B) of the Magnuson-Stevens Act requires that any new program "provides for the effective enforcement and management of any such [new IFQ] program, including adequate observer coverage...."

A program that requires IFQ to cover bycatch must have some means by which to ensure that bycatch is not discarded without being accounted for.

Program Summary and Main Options:
Program Administration (Section B.3.0)

Enforcement for the IFQ program may include one or more of the following elements:

- onboard compliance monitors;
- dockside compliance monitors (20%-100%);
- hailing requirements, small vessel exemptions for onboard compliance monitors;
- video monitoring systems;
- full retention requirements;
- a vessel-specific bycatch reporting system;
- electronic landings tracking system;
- limited delivery ports;
- limited delivery sites;
- electronic IFQ tracking systems, and
- VMS.

These measures have been arrayed into the enforcement and monitoring programs provided in Table B.3-1. While some likely specifics are identified to facilitate program design and impact analysis, the FMP amendment language on this issue may be general, specifying that the Secretary will promulgate regulations to establish an adequate monitoring and enforcement regime. Strong sanctions may be recommended along with provisions specifying that illegal overages be forfeited and debited against the vessel's account. Fishing by the vessel would be suspended until the overage is covered. *(Section B.3.1)*. A part of the program administration, a centralized publicly accessible registry for liens against quota shares would be requested with . . . **[all related ownership information/essential ownership information].** (*Section B.3.1*, also see Section B.3.4, Data Collection).

Landings fees would be charged to cover program costs and, over time, some elements of the program may be privatized, as appropriate. *(Section B.3.2)*

The IFQ program would not have a built-in sunset provision nor would quota shares be issued for fixed terms (i.e. IFQs would not expire after a certain number of years). The program would be revised as necessary through standard FMP and regulatory amendment processes. Information on certain aspects of program performance would be compiled annually and a program review would be conducted every 4 years. *(Section B.3.3)*

The data collection program . . . **[would/would not]** . . . be augmented to include the . . . **[expanded and mandatory; expanded voluntary]** . . . provision of economic data from the harvesting and processing industry. All data collected would be maintained in a confidential manner. Aspects of these provisions would require modification of the MSA. A central registry of IFQ shareholders and transactions would be maintained and include market value information. Government costs would also be tracked. *(Section B.3.4)*

The following are possible elements for a tracking, monitoring and enforcement system.

Elements of Tracking Monitoring and Enforcement System	
Element 1.	Onboard compliance monitors (20%-100%)
Element 2.	Dockside compliance monitors (20%-100%)
Element 3.	Hailing requirements
Element 4.	Small vessel exemptions for onboard compliance observers
Element 5.	Video monitoring system
Element 6.	Full retention requirement
Element 7.	Upgraded bycatch reporting system
Element 8.	Electronic landings tracking system
Element 9.	Limited delivery ports
Element 10.	Limited delivery sites
Element 11.	Electronic IFQ tracking systems
Element 12.	Vessel monitoring system (VMS)

Additionally, the following two options are provided pertaining to the provision of information to allow members of the public to ascertain the existence of a lean and ownership information about quota shares.

Lien Registry Options	
Option 1.	Create a central lien registry including all related ownership information.
Option 2.	Create a central lien registry but exclude all but essential ownership information.

Enforcement and Monitoring Options: These elements have been tentatively arrayed into enforcement programs in Table B.3-1.

With respect to enforcement related penalties, the NRC report to Congress on IFQ programs recommends a set of graduated sanctions:

> "Administratively imposed sanctions should be established for minor violations with specified increase in penalties for each additional offense. Criminal penalties (jail sentences and/or seizure of catch, vessel, and equipment and forfeiture of quota) should be reserved for serious offenders and for intentional falsification of reports" (NRC 1999) (pg. 217).

Consideration needs to be given to the likely effect of a set of penalties on the incentive to commit more serious crimes. For example, a severe penalty on landing incidental catch for which no IFQ were held would create incentive for discards (which would result in unmonitored discard mortality), whereas penalizing overages by deducting any overage from a subsequent year's IFQ would result in a lower incentive to discard (NRC 1999) (pg. 217).

Civil penalties for Magnuson-Stevens Act violations are limited to $100,000 for each violation and permit restriction, denial, suspension, or revocation (Magnuson-Stevens Act, Section 308). Criminal penalties are punishable by a fine of not more than $100,000, or imprisonment for not more than six months unless such acts involve threats to observers or enforcement officers, in which case the penalties may reach $200,000 and ten years imprisonment (Magnuson-Stevens Act, Section 309). Criminal penalties include knowingly and willfully submitting to a Council, the Secretary, or the Governor of a State false information regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying the Magnuson-Stevens Act (Magnuson-Stevens Act, Section 307).

Elements of Provisions Related to Penalties	
Element 1.	Strong sanctions for violators.
Element 2.	Forfeiture and suspension until overage is covered. Illegal overages should **be** forfeited on landing and debited against the IFQ holders account. Additional enforcement action should be taken, as appropriate. Fishing suspended until quota pounds have been acquired to cover the overage.

<u>TIQC Recommendations:</u>

The TIQC recommends a compliance monitoring program to monitor harvest (catch and/or landings). Only Enforcement Programs 1, 2 and 3 are considered reasonably viable without reducing harvest to compensate for noncompliance risk. Those three programs have been included in TIQC recommended IFQ programs.

The TIQC notes that the skills of compliance monitors may or may not be different from those generally required for Federal fishery observers.

With respect to enforcement penalties, the TIQC was generally supportive of strong sanctions for violators.

To facilitate liens and increase the acceptance of IFQ as collateral for loans, there should be a publically available record of ownership and liens on IFQ. Ownership information should be made available because fish are a publically owned resource and public scrutiny of who holds harvest privileges should be allowed. A minority of the TIQC (4 members) believed that IFQ ownership information is not necessary to establish an effective lien registry and unnecessarily divulges information that should be kept confidential. Minority (4 members) recommends excluding collection of detailed information on ownership in central lien registry system (November 2004 TIQC report)

<u>TIQ Enforcement Group Recommendations:</u>

The TIQ Enforcement Group developed the following goals and objectives for an enforcement program.

Goal: An effective enforcement system that ensures that the possible gains from violating rules do not exceed the risks of violation penalties and that the costs of enforcement are in balance with the final outcome.

Objectives:

A. Develop reasonably enforceable regulations that are not overly complex.
B. Ensure that catch, landings, and deliveries are properly recorded.
C. Ensure that IFQ is held/acquired to cover landings and deliveries.
D. Prevent and detect fraud.
E. Conduct operations in a cost-effective manner.

F. Facilitate joint Federal-state enforcement activities including the complete sharing of data between agencies.

Initial Application Fraud Detection

PacFIN data should be used to determine the initial allocations. Any proposed revisions to fishtickets should go through enforcement review. Capability should be built into the data system to screen illegal landings from the fishtickets–possibly focus primarily on gross violators using a threshold value . Other landings that may not qualify toward IFQ should also be screened from use in the determination of landings history (e.g., landings over fleet limits taken by EFP vessels, compensation fish).

IFQ Program Operation

The following enforcement program design elements were used to develop five initial enforcement program options for consideration (Table B.3-1).

At-Sea Monitors ("Observers"). At-Sea Monitors would be obligated to share information with enforcement personnel in a timely fashion. A camera backup might be considered for at-sea monitors.

With partial at-sea monitoring, require a camera if there is no compliance monitor onboard. If cameras are used to monitor a vessel there can be no discards of any species (e.g., no discards of sea-stars). There are issues associated with chain of custody and costs of reviewing films that would need to be addressed with a camera system. If there is not a camera requirement for vessels not carrying at-sea monitors (i.e., some trips are completely unmonitored while at-sea), adjustments would need to be made to the OY to account for likely illegal discards. An accurate violation factor to apply to the OY would be difficult to assess and would be dependent on the officer's ability to detect violations and comparison of observed and unobserved trips.

Retention Requirement. Under a full retention requirement, the role for at-sea monitors would be to ensure that no fish went overboard. Under a partial retention requirement the role for at-sea monitors would be to record information on any discards and ensure that information was entered into a discard recording system, to be debited against IFQ accounts.

Bycatch Reporting System: If at-sea discards are allowed and IFQ is required to cover catch, a bycatch recording system comparable to the landings reporting system would be required to match catch against IFQs.

Landings Tracking System: Either the current fish ticket system could be converted to an electronic system to record close to real time information, or a parallel reporting system could be developed. The paper fishticket system might work for an IFQ program but flexibility of the IFQ system and associated benefits would have to be substantially constrained. Under the current cumulative limit system, citations are issued on the basis of the dock receipt. The TIQ Enforcement Group believes that landings should be debited against IFQ accounts based on the dock receipt and not what goes on the final fishticket. How this would work for an electronic fishticket system or if the paper fishticket system is used needs to be addressed. If a parallel system for tracking landings is implemented, there could be inconsistencies between the fishticket system and what is reported as landed against IFQs.

Shorebased Monitoring: Either 100% of the landings would have to be observed, or the opportunity to observe would have to be provided through an advance-notice-of-landing requirement.

Limited Landing Locations: Limited landing locations would enhance cost-effective enforcement. Enforcement costs would be substantially greater without such limits than with the limits. One way to limit landing locations would be to specify that landings be made only in certain ports. Another way would be to license specific landing sites. Licensing specific sites would ensure that all communities can participate while still gaining enforcement efficiency. There would be facilities standards applied for licensing sites (e.g., activities at the site would have to be arranged such that a shorebased monitor can observe the off-loading and weighing activity at the same time).

Electronic IFQ Tracking System: Regardless of other elements of the system, an electronic IFQ tracking system would be required such that an enforcement officer in the field can determine the current IFQ account balances for a particular vessel.

With only partial at-sea monitoring and no full retention requirement, the Enforcement Group's initial assessment is that compliance would start to break down. If the IFQ were specified to cover landings instead of catch, expected compliance would likely be similar to the current system, except instead of existing cumulative landings limits there would be IFQs.

Databases would need to be built and communication equipment provided to go with the personnel requirements of the enforcement program.

<u>Penalties</u>

A situation should not be created in which it is cheaper to catch fish in a manner that violates the IFQ program and incur penalties than to acquire the IFQ needed to cover catch or otherwise comply with the program. Situation wherein a legal participant incurs greater operational costs than a violator are viewed as inequitable and reduce program compliance.

Illegal overages should be landed and forfeited and additional enforcement action possibly taken. Illegal overages should be debited against the IFQ holders account and fishing suspended until they are covered, thereby ensuring that compliance would have been less expensive than violating program rules (with respect to the trip on which the illegal overage occurred).

<u>Public Comments:</u>

Comment	Source
Require VMS and 100% observer coverage - shoreside and at-sea	ED
Analyze limits on number of ports to which deliveries are allowed	WCSPA

B.3.1.2 Initial Analysis

Details of the enforcement program will need to be developed for the EIS in order to complete the impact assessment. However, there is question as to how much of the detail needs to be included as part of the FMP amendment or formal Council policy. The Alaskan sablefish and halibut IFQ program monitoring system was developed by an implementation committee comprised of governmental representatives and working in consultation with an industry advisory committee. These groups developed an implementation plan that was included as a chapter in the EIS. Few details were provided in the Council FMP amendment. The following is the extent of the FMP language related to tracking and monitoring from the Alaska sablefish and halibut IFQ program.

(D) Limitation on Ownership and Use of Quota Shares

- Frozen products may only be off-loaded at sites designated by NMFS for monitoring purposes
- QS owners wishing to transport their catch outside of the jurisdiction of the Council must first check in their catch at a NMFS specified site and have the load sealed.
- Persons holding IFQs and wishing to fish must check-in with NMFS or their agents prior to entering any relevant management area, additionally any person transporting IFQ caught fish between relevant management areas must first contact NMFS or their agents.

(G) Administration and Enforcement

(1) All sales, transfers, or leases of quota shares (or IFQ arising from those quota shares) must occur in a manner approved by the Secretary. [administered by NMFS, in developing rules public hearing must be held]

(2) The Secretary will promulgate regulations to establish a monitoring and enforcement regime to assure compliance with this program. [appropriate penalties for violators, Council directs implementation to develop recommendations on penalties]

On board observers could be a large cost for small boats. The impacts of exempting vessels under a certain size from on-board observer requirements should be considered. Include consideration of possible long-term effect of distorting the size of vessels in the fleet. Consider the possibility of an observer pool and cost sharing.

The following table shows the number of LE trawl permits in the groundfish fishery before and after the recent buyback.

Permit Endorsed Length (feet)	All Permits	Permits After Buyback
33-40	5	5
41-50	26	21
51-60	73	41
61-70	40	26
71-80	71	38
81-90	27	23
91-100	7	6
101-110	8	6
111+	6	6
Total	263	172

Council and NMFS control over penalties is limited. Penalty determination is generally exercised by the courts. The Council may establish guidance on the reallocation of forfeited quota. Like the enforcement program, the Council should consider the level of detail into which it wants to enter in considering penalties. The following is the language from the Alaskan halibut and sablefish IFQ amendments:

(G) Administration and Enforcement

(2) The Secretary will promulgate regulations to establish a monitoring and enforcement regime to assure compliance with this program. [appropriate penalties for violators, Council directs implementation to develop recommendations on penalties]

B.3.2 Cost Recovery/Sharing and Rent Extraction

B.3.2.1 Discussion and Options

Fees or taxes can be used for cost recovery and to capture for the public some of the value fishers gain through use of the public resource (rents). Fees and taxes on transfers should not be so large as to eliminate transfers and the attendant benefits derived from establishing a market for harvest privileges (pg. 213). Moreover, because such charges would affect the value at which IFQ trades in the market place, they should be established at the start of the program rather than added on at a later time after investments have already been made (NRC 1999) (pg. 213).

Section 303(d)(5)(b) of the Magnuson-Stevens Act requires that any new program "provides for... fees... to recover actual costs directly related to... enforcement and management [of the new IFQ program]."

Section 304(d)(2)(A)[17/] states that the "Secretary is authorized and shall collect a fee to recover the actual costs directly related to the management and enforcement of any–(i) individual fishing quota program; and (ii) community development quota program that allocates a percentage of the total allowable catch of a fishery to such a program." Such a fee is not to exceed three percent of the exvessel value of the fish harvested under the program. Section 304(d)(2)(C)(ii) allows a state to receive up to 33% of any fee collected in relation to a community development program to reimburse the state for related management and enforcement costs.

Noting that for many resources the government captures a significant portion of the rent above cost recovery (timber, oil, etc), the NRC recommends that Magnuson-Stevens Act be amended to allow such cost recovery from fisheries, and that the collected rents be placed in funds dedicated to improving the fisheries and the fishing communities dependent on them (NRC 1999) (pg. 215). One means of extracting such rents would be a tax on first transfer of the IFQ (NRC 1999) (pg. 214).

17/ Section 304(d)(1) states that "The Secretary shall by regulation establish the level of any fees which are authorized to be charged pursuant to section 303(b)(1). The Secretary may enter into a cooperative agreement with the States concerned under which the States administer the permit system and the agreement may provide that all or part of the fees collected under the system shall accrue to the States." Section 303(b)(1) authorizes the charging of fees for permits for fishing vessels, operators and processors (first receivers).

The tax would serve a dual purpose of reducing the socially objectionable windfall and collecting rents.[18/] Another means of cost recovery and collecting rents would be a two-fee system. Under such a system a per IFQ share fee might be levied to recover program costs and a tax per pound of landing charged to recover rents (NRC 1999)(pg. 215).

The following is a current list of design elements for: *cost recovery* as identified by the TIQC through the scoping process. Bolded options are those which the TIQC included in the IFQ programs it recommended for analysis.

Elements of Cost Recovery/Sharing Rent Extraction Provisions	
Element 1.	Landings Fee (max of three percent under current Magnuson-Stevens Act).
Element 2.	Privatization of Elements of the Management System, for example: Monitoring IFQ Landings (e.g., industry pays for their own compliance monitors) Fishtickets (industry payment for Trawl IQ program landings information to be fed into a Federal electronic system)

TIQC Recommendations: Recommended IFQ Program B states that "cost recovery should be only for management (not enforcement or science) and should be limited to 3% of exvessel value." Recommended IFQ Program C states "Landings fee plus privatization of elements of the management system. In particular, monitoring of IFQ landings (e.g., industry pays for their own compliance monitors).Stock assessments should be privatized and the electronic fish ticket system should not be privatized." Program A is silent on this issue.

Public Comments:

Comment	Source
An IFQ Program should have discrete and secure funding.	UASC
Include cost recovery provisions with a sliding scale for those that may be disadvantaged by such provisions	ED
Split all or a portion of observer costs evenly between quota holders.	Survey (ED)

B.3.2.2 Initial Analysis

The three percent fee currently authorized under the Magnuson-Stevens Act may not be sufficient to recover all direct costs related to the IFQ program. (NRC 1999) (pg. 214) recommends an increase in the cap to above three percent.

The M-S Act requires the Councils and Secretary to provide for effective enforcement and management of an IFQ program including adequate observer coverage, and for fees to recover actual costs directly related to enforcement and management [303(d)(5)(B)] except that fees are limited to 3 percent of the ex-vessel value of the program [304(d)(2)(B)]. The initial interpretation of this is that the program costs are not limited to 3% of exvessel value, just the Secretary's ability to collect related fees from industry. That being said, program costs still must be considered and weighed against program benefits to determine whether implementation makes sense.

18/ A first transfer tax would have to be carefully structured so that mock transfers at lower than market values could not be used to minimize windfall payment. If a zero-rent auction were in place, prices from that auction might be used to determine taxes to be applied at first transfer.

It may work to set up a system that requires participants in the IFQ program to pay private contractors for government certified observers when making IFQ landings. Payments made under such provisions would not likely count against the 3% limit so long as the fees were not being paid to the Secretary. If the total costs for the IFQ program were no more 3% of exvessel value, the industry's direct payment for at-sea monitors (or any other direct payments to entities other than the Secretary) would reduce the amount of the fees that could be collected by the Secretary.

Interaction between the IFQ at-sea monitoring program and the NMFS observer program will need to be considered. Would an exception be made to the requirement for carrying an IFQ monitor if an observer from the WCGOP is on board? Would the WCGOP need to place observers on trawl vessels if IFQ monitors are required (i.e., could the IFQ monitors in combination with full catch accounting requirements supplant the need for WCGOP observers on trawl vessels, leaving the observer to focus on other sectors)? What would be the implications of having differential treatment of trawl and other sectors with respect to payment for observers? Would there be a problem in requiring trawl vessels without WCGOP observes to pay for at-sea monitors while those with WCGOP observers would not need to make such payments?

The TIQ Enforcement Group has indicated that the privatization of catch and landings monitoring responsibility would require increased enforcement activity to verify that the monitoring program is functioning properly.

B.3.3 Program Duration and Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))

B.3.3.1 Discussion and Options

Section 303(d)(5)(A) of the Magnuson-Stevens Act requires that any new program "establishes procedures and requirements for the review and revision of the terms of any .. .[program], (including any revisions that may be necessary once a national policy with respect to individual fishing quota programs is implemented), and, if appropriate, for the renewal, reallocation, or reissuance of individual fishing quotas."

Noting the need for the nation to learn from its mistakes and successes in order to improve management, the NRC has recommended the promulgation of guidelines for monitoring IFQ program effectiveness (NRC 1999) (pg. 218). A monitoring and evaluation program for short-term and long-term impacts should be included as part of the initial program design (pg. 198). The program should include a clear timetable, criteria to be used in evaluation, and steps to be taken if the programs do not meet these criteria (pg. 221). At a minimum, monitoring the effectiveness of an IFQ program should involve maintaining a central registry of shareholders and share transactions (including the value of such transactions); assessing the biological status of the stock, measuring economic performance and characteristics of commercial and recreational fisheries and subsistence patterns; assessing performance of the IFQ market; collecting data on administrative and enforcement costs, and monitoring translocational effects on other fisheries (pg. 218). Additionally, annual reports should be provided describing trends in the fishery and effects of the IFQ program (pg, 222).

The NRC report also recommends that to lay the groundwork for the impact review, a preliminary study be conducted of relevant socioeconomic aspects of a fishery prior to the design of the management program (NRC 1999) (pg. 198). Such information may be contained in recent groundfish programmatic EISs, the EISs for annual specifications and rebuilding plans, and in baseline description documents such as the community description produced by the Economic Fishery Information Network (EFIN) program of Pacific States Marine Fisheries Commission (PSMFC).

Sunset provisions signify the need to reevaluate an existing law or policy after a period to ensure that they are best achieving program objectives. However, with respect to IFQ programs, the NRC report identifies that sunset provisions are fundamentally inconsistent with the nature of IFQs and may be counter productive to their purpose (pg. 201).

While sunset provisions are not recommended by the NRC, it is recommended that consideration be given to the issuance of cascading fixed-term entitlements. This system works by issuing IFQ for a long but limited duration (e.g., 30 years). The program is then reviewed and if adjustments are needed, new IFQ are defined with a different set of privileges and obligations. IFQ holders are given the option of switching over to the new IFQ prior to the expiration of their existing shares or waiting until their existing shares expire. If they switch prior to the expiration of their existing shares, the new shares would be valid for another 30 years commencing with the date on which they switch. The recommendation for consideration of this design feature is not a recommendation that this type of feature should necessarily be incorporated.

Elements of Provisions Related to Performance Monitoring, Review and Revision		
Element 1	Revision Process	Standard for FMP and regulatory amendments
Element 2	Sunset Provisions and Fixed Term Entitlements	None (Sunset provisions and fixed term entitlements (i.e. IFQs that expire after a certain number of years) were considered and rejected from further analysis.
Element 3	Response to Forthcoming National Policy	Standard revision FMP and regulatory processes, clear public notice that the IFQ may be revoked and/or reissued and that the program may be modified or cancelled without compensation.
Element 4	Monitoring	Annual reports
Element 5	Review	Every four years

The following outlines program monitoring, review and revision procedures and standards in greater detail.

Process for Revision: Revision of the IFQ program will be achieved through FMP and regulatory amendments in compliance with the Magnuson-Stevens Act and policies and procedures specified in the FMP and Council procedural guidelines.

Sunset Provisions and Fixed Term Entitlements: In line with the recommendations of the NRC, program sunset provisions are not included in this option. Suboptions on fixed term entitlements were considered but rejected because of their complexity, adverse affect on business planning and flexibility and administrative costs.

Response to Forthcoming National Policy: If necessary and required for compliance with forthcoming national standards and policies, IFQ issued under the current program may be revoked and reissued in a manner that complies with such new national standards and policies. Revocation and reissuance will be a last resort means for achieving compliance with future national policy direction as certain costs and disruptive effects would be expected to accompany such actions. ***This section of the IFQ program re-emphasizes that IFQs are not property rights and are subject to modification or elimination through FMP and regulatory amendments without compensation to IFQ holders.***

Monitoring Program Performance: While the NRC recommends annual reports describing trends in the fishery and effects of the IFQ program, the Council's groundfish fishery is managed on a biennial cycle. Therefore, while data on the fishery will be collected annually, it will be summarized every two years, except for issues where annual reports are needed to assess criteria, such as for overfishing.

Review Schedule: The performance of the IFQ program will be reviewed every four years commencing in the first "off-year" occurring four years after the initiation of fishing under an IFQ system. An "off year" is the first year of the biennial groundfish management cycle. An amendment to the program which includes a comprehensive program review as part of the

Options on Fixed Term Entitlements Considered and Rejected

Fixed Term Option 1: Fixed term quota shares will be used to adjust characteristics of the quota shares, so long as (1) delayed implementation of changes to the nature of the quota shares do not result in significant adverse biological, economic or social impacts and (2) the maintenance of shares with different characteristics does not add excessive complexity to enforcement and administration of the program. Quota shares will be valid for a maximum of 10 years. Unless the program is modified or eliminated through FMP or regulatory amendment, shares will be automatically be replaced at the end of 10 years. If program adjustments made through amendment processes have included delayed implementation features, the characteristics of the replacement shares (i.e., associated privileges and obligations) may vary from those of the original shares. If it is found that maintaining a system with two different types of shares will not create an excessive enforcement or administrative burden or otherwise substantially increase costs or reduce program benefits, quota share holders may be given the option of replacing their original shares with new shares at any time. Nothing in this option precludes NMFS or Council action to make program adjustments that result in immediate modification of the characteristics of all quota shares. No compensation will be due any quota share holder from changes to or elimination of the IFQ program. A notice of the uncompensatable nature of the privilege associated with quota shares and quota pounds will be included on all communications, certificates or other documentation provided to quota share holders informing them of the amounts of quota share or quota pounds under their control.

Fixed Term Option 2: The term of quota shares will be limited only as specified by future FMP and regulatory amendments which may adjust the associated privileges and obligations or totally eliminate the IFQ program. No compensation will be due any quota share holder from changes to or elimination of the IFQ program. A notice of the uncompensatable nature of the privilege associated with quota shares and quota pounds will be included on all communications, certificates or other documentation provided to quota share holders informing them of the amounts of quota share or quota pounds under their control.

decision process will count as a program review and reset the review schedule such that the next review will occur in the first “off year” occurring four years after the implementation of such an amendment. Certain criteria may be assessed more frequently than every four years. The following are some of the main criteria on which basis the program will be reviewed and the documents in which the criteria will be assessed. These criteria will be augmented with forthcoming national standards on IFQ programs.

Source of Criteria (See Section 1.2.3)	Criteria	Report
Obj 1	Vessel Efficiency	4 Year Review
Obj 1	Processor Efficiency	4 Year Review
Obj 2	Habitat Impacts	4 Year Review
Obj 3	Discard Mortality	Annual Report
Obj 4	Externalities (Individual Accountability)	4 Year Review
Obj 5	Regulatory Stability	4 Year Review
Obj 6	Operational Flexibility	4 Year Review
Obj 7	Adverse Community Effects	4 Year Review
Obj 8	Employment Effects	4 Year Review
Const 1	Effects on Biological Status of the Stock	Stock Assessment
Const 2	Harvest in Excess of OY or ABC	Annual Report
Const 3	Total Mortality Accounting	Annual Report
Const 4	Change in Balance of Market Power	4 Year Review
Const 5	Quota Concentration	4 Year Review
Const 6	Enforcement Effectiveness	4 Year Review
Const 7	Assess Review Process	4 Year Review
Other Criteria 1	Degree to which Available Quota Pounds are Adequately Utilized	4 Year Review
Other Criteria 2	Existence of localized depletion problems	4 Year Review

Annual Reports (Annually Published Portion of the SAFE Document) Annual harvest impacts will be assessed in the SAFE. Harvest in excess of ABC or, for overfished species, OY, will require immediate remedial response. Similarly, if it is determined that the management system is not accounting for total mortality, needed adjustments will be made to ensure that once total mortality is taken into account the excess harvest does not occur.

Biennial Reports (Multiyear Management Specifications) Discard mortality will be summarized in biennial data reports along with degree of quota concentration. If it is determined that discard mortality or quota concentration are trending toward undesirable levels, early review of relevant segments of the program may be initiated.

Stock Assessments The terms of reference for stock assessments will be modified to include assessment of changes in the biological status of the stock that might be attributed to the IFQ program. The detection of adverse changes attributable to IFQs at levels that may significantly damage the long-term productivity of the stock will require immediate initiation of a review of the IFQ program.

4 Year Review All objectives, constraints and national standards will be evaluated as part of the four year program review. The four year review may be incorporated in broader groundfish program reviews including, but not limited to, programmatic EISs, biennial management EISs or strategic planning exercises. The four year review will include summarization of information and results from annual reports, biennial reports and stock assessments, as outlined above. Problems identified in the four year review will be addressed through FMP or regulatory amendments which will proceed on a schedule determined based on the relative severity of the problem. Any problems related to stock biology that may significantly damage the long-term productivity of the stock will be given high priority for action. Such effects on productivity may affect all sectors, including those not under IFQ management. The first four year review will occur in the first "off year" after completion of 2 biennial management cycles.

TIQC Recommendations: No options have been developed. All elements are included in all of the TIQC recommended IFQ programs. The program should include a review period, built in performance monitoring, and opportunity for adjustments to the program.

TIQC Considered But Rejected Options: The committee recommends that automatic sunset provisions for the program and limited duration (fixed term) IFQs not be considered. Sunset provisions make the fishery less stable and make investment planning more difficult.

Public Comments:

Comment	Source
Consider a range of automatic sunset provisions (1-10 years)	PMCC
Consider sunset provisions with disposal of the quota in a manner that satisfies the public trust.	UASC
Include performance reviews	PMCC

B.3.3.2 Initial Analysis

No analysis provided at this time.

B.3.4 Data Collection

B.3.4.1 Discussion and Options

The Magnuson-Stevens Act 303(a)(8) states that FMPs must assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan. Section B.3.3 discusses the need for ongoing assessments of the status of the program and its impacts in order to monitor and make changes required to meet the original objectives. (NRC 1999) (pg. 198) recommends these assessments be incorporated as part of the IFQ program design.

The NRC recommendations state that Councils and NMFS should ensure that long-term routine data collection and studies be initiated that are complementary to data collection for IFQ monitoring (NRC 1999) (pg. 218). Further, the NRC states that this data collection should occur separate from the consideration of specific management alternatives for a fishery and should facilitate evaluation of impacts of various allocation actions, including IFQs (pg. 199).

The issue of whether industry provision of data should be mandatory or voluntary will likely be addressed under this design element. Mandatory industry compliance provisions are included as part of the data collection provisions of the Alaska crab rationalization program.

Data Collection Options			
	Option 1: Mandatory	Option 2: Expanded Voluntary	Option 3: Status Quo
Limited Entry Trawl Industry (including processors)	Mandatory submission of economic data	Voluntary submission of economic data (expanded efforts)	Voluntary submission of economic data (status quo efforts)
Other Affected Sectors of the Fishing Industry	Voluntary submission of economic data	Voluntary submission of economic data	Voluntary submission of economic data
Central Ownership and Transaction Value Registry	Yes	Yes	No
Government Costs	Formal Monitoring	Formal Monitoring	Ad hoc Assessment

Option 1: Mandatory Data Collection Program

The following is patterned after a NPFMC motion to establish a mandatory data collection system in order to evaluate the impacts of the crab rationalization program.

> **Mandatory Provisions:** The Pacific Fishery Management Council and the National Marine Fisheries Service shall have the authority to implement a data collection program of cost, revenue, ownership and employment data compliance with which would be mandatory for members of the West Coast groundfish industry harvesting or processing fish under the Council's authority. Data collected under this authority will be maintained in a confidential manner and may not be released to any party other than staffs of Federal and state agencies directly involved in the management of the fisheries under the Council's authority and their contractors.
>
> A mandatory data collection program shall be developed and implemented as part of the groundfish trawl IFQ program and continued through the life of the program. Cost, revenue, ownership and employment data will be collected on a periodic basis (based on scientific requirements) to provide the information necessary to study the impacts of the IFQ program as well as collecting data that could be used to analyze the economic and social impacts of future FMP amendments on industry, regions, and localities. This data collection effort is also required to evaluate achievement of goals and objectives associated with the IFQ program. Both statutory and regulatory language shall be developed to ensure the confidentiality of these data. Additional funding (as compared to status quo) will be needed to support the collection of these data.
>
> Any mandatory data collection program shall include: A comprehensive discussion of the enforcement of such a program, including enforcement actions that would be taken if inaccuracies are found in mandatory data submissions. The intent of this action would be to ensure that accurate data are collected without being overly burdensome on industry for unintended errors.

Voluntary Provisions: A voluntary data collection program will be used to collect information needed to assess translocational impacts on nontrawl fisheries.

Central Registry: In addition to data collection requirements, the program will include a central registry for shareholders and share transactions as well as limited entry license holders and transactions (including information needed to assess the market value of such transactions).

Government Costs: Data will be collected and maintained on the monitoring, administration and enforcement costs related to governance of the IFQ program.

Option 2: Voluntary Data Collection Program

Voluntary Provisions: Attempts would be made to collect, on a voluntary basis, the same types of data identified for collection through a mandatory program. Additional funding (as compared to status quo) will be needed to support the collection of these data.

Central Registry: The program will include a central registry for shareholders and share transactions as well as limited entry licenses (including information needed to assess the market value of such transactions).

Government Costs: Data will be collected and maintained on the monitoring, administration and enforcement costs related to governance of the IFQ program.

Option 3: Status Quo Data Collection Program

Voluntary Provisions: NMFS will continue to support the PSMFC EFIN project attempts to collect economic and social data useful in evaluating the impacts of fishing and fishing regulations.

Central Registry: The program will include no new central registries for shareholders or limited entry license holders other than that necessary to directly support the IFQ tracking and monitoring system, as maintained by the NMFS LE permit office.

Government Costs: Data on the monitoring, administration and enforcement costs related to governance of the IFQ program will be collected and summarized on an ad hoc basis.

<u>TIQC Recommendations:</u> Options 1 and 2 are included in the TIQCs recommended IFQ programs. Option 3 should also be considered as part of the analysis.

Minority recommends excluding collection of detailed information on ownership in central lien registry system (November 2004 TIQC report)

<u>TIQC Considered But Rejected Options:</u> None identified.

<u>Public Comments:</u> None.

B.3.4.2 Initial Analysis

The NPFMC mandatory data collection program was adopted partially in response to a February 2002 report from the NPFMC SSC, which restated the need for mandatory data reporting as follows:

> A critical part of the Council's ability to understand the social and economic consequences of implementation of rationalization measures is mandatory reporting of socioeconomic data. For example, harvest and production costs, expenditure patterns, vessel ownership data including identifiers (name and address files), employment, and earnings data are absolutely necessary to determine the magnitude and distribution of net benefits that arise from the granting of an entitlement to a public resource. If these data had been required as a component of the plan amendments authorizing IFQs in the halibut/sablefish fisheries and co-operatives in the pollock fishery, analysts would be in a much better position to identify the likely economic consequences of the rationalization alternatives currently under consideration for the crab fishery. The SSC recommends that provision of the data listed above be made mandatory. This action is necessary to fulfill the Council's stated desire to have the economic performance of the rationalized crab fishery evaluated.
>
> Implementing a mandatory data collection requirement would require changes to the Magnuson-Stevens Act as well as other laws governing the collection of data from fishermen and processors. Changes to the Magnuson-Stevens Act would be required in Section 303(b)(7) and Section 402(a). Section 303(b)(7) prohibits the Council and NOAA Fisheries from collecting economic data from fish processors. Section 402(a) prohibits the Council from requesting that the Secretary implement an information collection program for the fishery which would provide the types of "information that would disclose proprietary or confidential commercial or financial information regarding fishing operations or fish processing operations".

B.4.0 Some Other Possible Provisions

The above categories were based on design elements that the TIQC identified for consideration. There may be other types of design elements for an IFQ program that are not covered in the above sections. This section is a placeholder for such provisions as may come forward in other parts of the scoping process. For example, owner-on-board provisions were rejected by the TIQC committee because they would be too complex, there are substantial numbers of trawl vessels for which owners are not on-board, and it would be difficult for processors that own permits and vessels. The TIQC's view was that there is no demonstrable conservation or economic benefit from such provisions and unclear social benefits. Design elements such as this, or other such elements that are brought forward during the public comment period, will be included here for Council consideration.

Public Comments:

Comment	Source
Prohibit highgrading	ED
Incorporate unambiguous language to address concerns about IQs becoming property right.	ED and 1 individual
Develop measurable performance objectives.	ED
Make a policy statement that IFQ program for groundfish trawl should not be considered a policy precedent for other sectors of the fishery.	Survey (ED)
Make a statement on the eventual need to address inter-gear transferability of IFQs	Survey (ED)
Crew	
Provide worker protections in the regulations.	Survey (ED)
Withhold 10% of quota from a vessel if a review board finds the vessel is not treating the crew well.	Survey (ED)
Tax quotas to fund crew protections such as unemployment insurance, pensions or health care.	Survey (ED)
Establish a minimum base wage in addition to any percentage based compensation.	Survey (ED)
Establish an outreach program to assist industry refugees in accessing public services and making transitions to other employment.	Survey (ED)
Buyers/Processors	
IFQ shares allocated to processors that diminish over time (e.g., annual % reductions)	Survey (ED)
IFQ processor shares that are valid only at the plants for which they are issued.	Survey (ED)
Hold back a percent of IFQ and allocate it annually based on fisher-processor proposals.	ED
Compensate processors through transfer payments at time of initial allocation.	Survey (ED)
Compensate processors through transfer payments, upon demonstration of stranded capital.	Survey (ED)
Harvesters	
Assign vessel size class endorsements to IFQ and restrict trading between size classes.	Survey (ED)
Require that the IFQ owner be on board the vessel when it is used.	Survey (ED)
Individuals leasing permits get the right of first refusal if the IFQ issued for that permit is sold.	Survey (ED)
Local Businesses	
Establish a fund to assist negatively affected businesses or to fund business development.	Survey (ED)
Local Governments	
Establish a revenue sharing system among active groundfish trawl ports	Survey (ED)
Other Fishing Sectors	
Set aside IFQ from TAC increases and allocate it to low impact gears	Survey (ED)
Set aside certain areas for fishing only by non-trawl gears	Survey (ED)
Use a buyback program to offset spillover effects	Survey (ED)
Restrict use of vessels that sell IFQ and leave the fishery (make IFQ allocation contingent on this provision)	Survey (ED)

Comment	Source
If a trawler sells IFQ to a fisher in another sector, require that a certain percentage of that IFQ be allocated among all participants in that sector (an increase in the quota for the sector)	Survey (ED)
Take into account disaster tows and increases in participation that exhaust the allocated quota and the resultant necessary adjustments to allocations both within and outside the trawl IFQ fishery.	UASC
Environment	
Set aside IFQ from TAC increases in order to address conservation concerns	Survey (ED)
Combine the IFQ system with marine reserves.	Survey (ED)
Research	
Capture some of the surplus and dedicate it to a fund for research and conservation.	Survey (ED)

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Table B.1-1. State license requirements in the foodfish distribution chain based on type of transaction and change to the product before resale.

Type of Transaction		Change to Product (Groundfish)[a/]			
Bought From	Sold To	None (passed thru, possibly repackaged)	Processed for Food (not canned)	Processed/Manufactured for Other Byproducts	Canned
None (Fishermen Selling Own Catch)	Consumers	WA - WFD OR - WFD R CA - FRET or MULT	WA - WFD OR - WFD R CA - FR or MULT	WA - WFD OR - WFD R CA - FR or MULT	WA - WFD OR - WFD CA - FR or MULT
	Anyone Out of State	WA - WFD OR - WFD R	WA - WFD OR - WFD R	WA - WFD OR - WFD R	WA - WFD OR - WFD R
Fishermen	Consumers	WA - WFD? OR - WFD R CA - FR or MULT	WA - WFD OR - WFD R CA - FR or MULT	WA - WFD OR - WFD R CA - FR or MULT	WA - WFD OR - FFC R CA - FR or MULT
	Wholesalers/ Retailers	WA - WFD? OR - WFD R CA - FR	WA - WFD OR - WFD R CA - FP	WA - WFD OR - WFD R CA - FP	WA - WFD OR - FFC R CA - FP
Wholesalers	Consumers	WA -No License Req OR - No License Req CA - No License Req*	WA - No License Req OR - No License Req CA - No License Req*	WA - No License Req OR - No License Req CA - No License Req*	WA - No License Req OR - No License Req CA - No License Req*
	Wholesalers/ Retailers	WA - WFD OR - WFD NR CA - FW or Mult	WA - WFD OR - WFD NR CA - (FW & FP) or Mult	WA - WFD OR - WFD NR CA - (FW & FP) or Mult	WA - WFD OR - FFC NR CA - (FW & FP) or Mult
Other processor/wholesaler licensing requirements		WA - Anyone employing a fish buyer - WFD			
State "buyer" licensing requirements:		WA - Fish buyer licenses for individuals acting "on behalf" of WFDs OR - Fish buyer licenses for individual employees of WFDs and for sites, vehicles, boats or barges??? CA - Fish buyer licenses - none.			

a/ Direct sale licensing requirements of selected species and licensing requirements for shellfish and baitfish not included.

* In California there is no Fish Business License Requirement but there is an Accounting Requirement (FGC Section 8050)

KEY: FP = Fish Processor (CA)
FR = Fish Receiver (CA)
FRET = Fisherman's Retail License (CA)
FW = Fish Wholesaler (CA)
Mult = Multifunction Commercial Fish Business License (CA)
WFD = Wholesale Fish Dealer License (WA)
WFD NR = Wholesale Fish Dealer License - NonReporting (does not receive from fishers) (OR)
WFD R = Wholesale Fish Dealer License - Reporting (landings reported) (OR)

Table B.3-1. TIQ Enforcement Group preliminary scoping of possible enforcement programs.

	Program 1	Program 2	Program 3	Program 4	Program 5
At-Sea Monitoring	100% (Compliance Monitors)	100% (Compliance Monitors)	100% (Compliance Monitors or Camera)	Partial Compliance Monitor Coverage	None
Retention Requirement	Full Retention	Discards Allowed	Full if Camera, Discards Allowed if Compliance Monitor Present (see NOTE)	Discards Allowed if Compliance Monitors Present	Full Retention
Bycatch Reporting System Comparable to Landing Tracking System	Not needed	System Needed (electronic)	System Needed (electronic)	System Needed (electronic)	Not needed
Landing Tracking System	Electronic	Electronic	Parallel Electronic Federal System (maintain paper fishtickets)	Parallel Electronic Federal System (maintain paper fishtickets)	Paper Fishticket
Shorebased Monitoring	100%	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)	Monitoring Opportunity (Based on Notice)
Vessel Provides Advance Notice of Landing	Yes	Yes	Yes	Yes	Yes
Limited Landing Locations	Specified Ports	Site Licenses	Site Licenses	Specified Ports	Specified Ports
Electronic IFQ Reporting	Yes	Yes	Yes	Yes	Yes
Limited Landing Hours	Yes	No	No	Yes	No
Overall Assessment of Program Effectiveness	Programs provide adequate control with different degrees of cost and flexibility for the vessels.			Control inadequate. Compensation required through a reduction in the OY in anticipation of unreported landings.	

VMS is an assumed component of the enforcement environment.

Small vessel provision: small vessels may apply for an exemption and carry a camera instead of an compliance monitors.

NOTE: For systems relying on cameras and a "no discard" rule, there may be a problem with not being able to discard prohibited species.

Figure B.1-1. Example paths in the foodfish distribution chain.

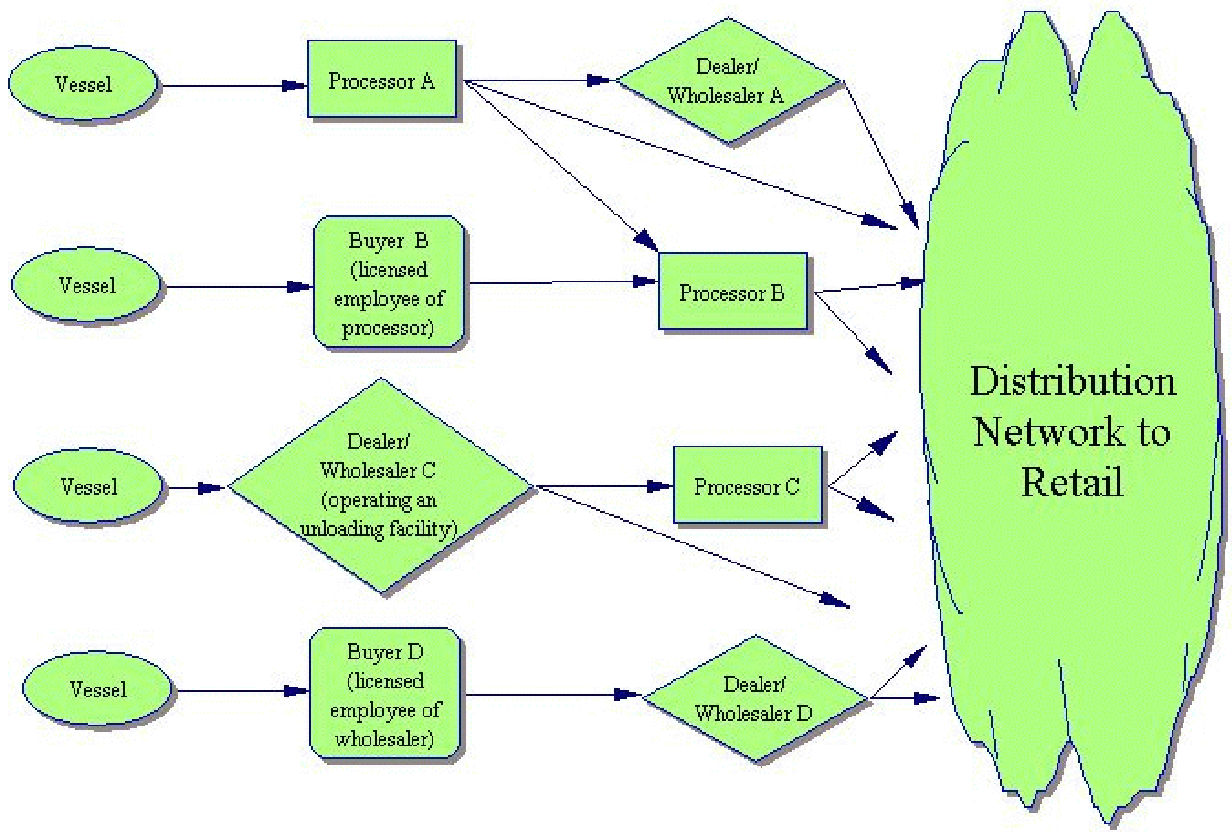
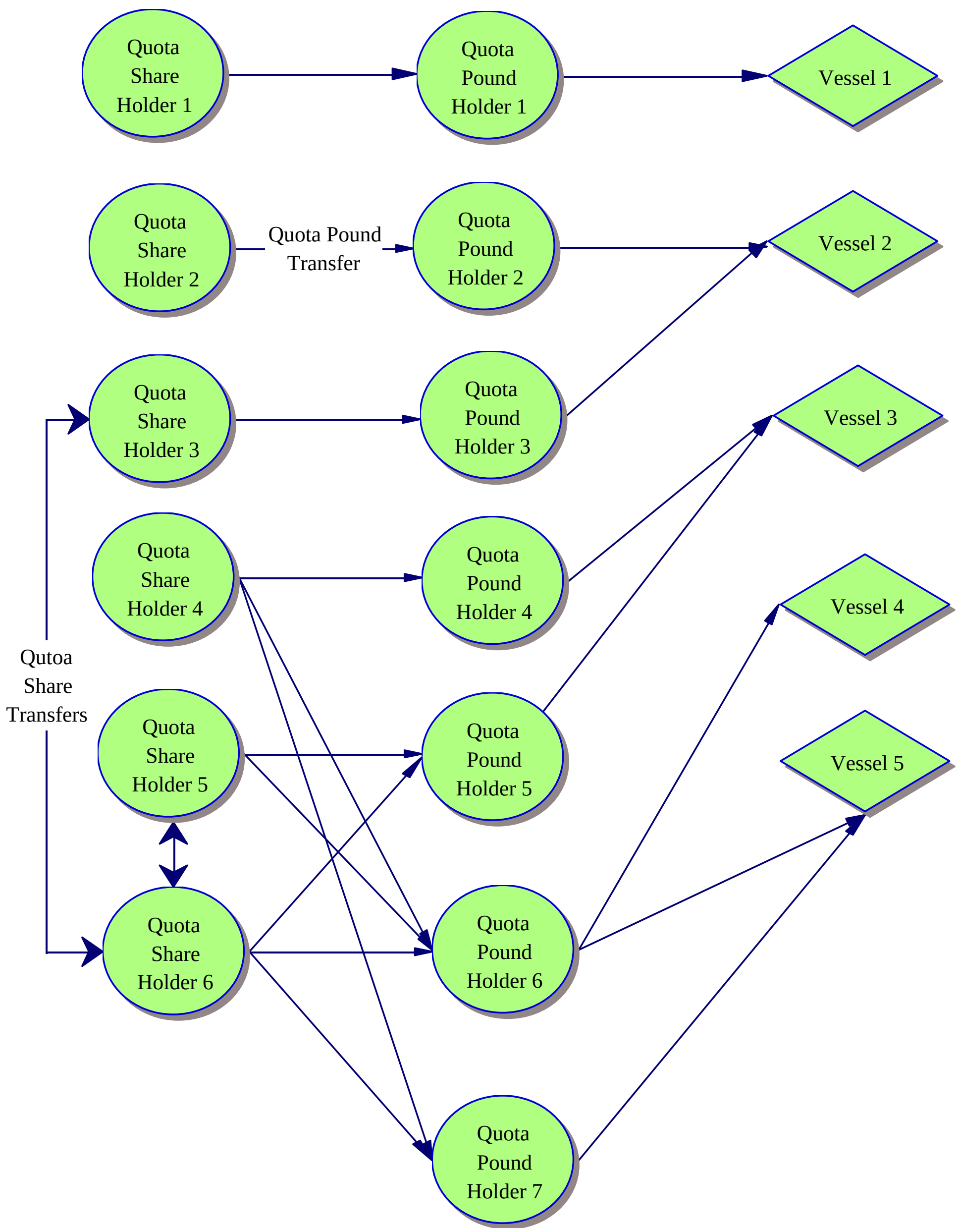


Figure B.1-2. Potential transfer paths for quota shares and quota pounds (arrows reflect the transfer of quota shares and quota pounds).



Appendix C - Determining Environmental Significance of NOAA Actions

NOAA 216-6 Guidelines
SECTION 6. INTEGRATING NEPA INTO NOAA LINE OFFICE PROGRAMS.

.01 Determining the Significance of NOAA's Actions. As required by NEPA Section 102(2)(C) and by 40 CFR 1502.3, EISs must be prepared for every recommendation or report on proposals for legislation and other "major Federal actions" significantly affecting the quality of the human environment. A significant effect includes both beneficial and adverse effects. Federal actions, including management plans, management plan amendments, regulatory actions, or projects which will or may cause a significant impact on the quality of the human environment, require preparation of an EIS. Following is additional explanation per the definitions used in determining significance.

a. "Major federal action" includes actions with effects that may be major and which are potentially subject to NOAA's control and responsibility. "Actions" include: new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by NOAA; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals. Refer to 40 CFR 1508.18 for additional guidance.

b. "Significant" requires consideration of both context and intensity. Context means that significance of an action must be analyzed with respect to society as a whole, the affected region and interests, and the locality. Both short- and long-term effects are relevant. Intensity refers to the severity of the impact. The following factors should be considered in evaluating intensity (40 CFR 1508.27):

    1. Impacts may be both beneficial and adverse -- a significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

    2. Degree to which public health or safety is affected.

    3. Unique characteristics of the geographic area.

    4. Degree to which effects on the human environment are likely to be highly controversial.

    5. Degree to which effects are highly uncertain or involve unique or unknown risks.

    6. Degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

    7. Individually insignificant but cumulatively significant impacts.

    8. Degree to which the action adversely affects entities listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources.

    9. Degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected; and

    10. Whether a violation of federal, state, or local law for environmental protection is threatened.

    11. Whether a federal action may result in the introduction or spread of a nonindigenous species.

c. "Affecting" means will or may have an effect (40 CFR 1508.3). "Effects" include direct, indirect, or cumulative effects of an ecological, aesthetic, historic, cultural, economic, social, or health nature (40 CFR 1508.8).

d. "Legislation" refers to a bill or legislative proposal to Congress developed by or with the significant cooperation and support of NOAA, but does not include requests for appropriations (40 CFR 1508.17). The NEPA process for proposals for legislation significantly affecting the quality of the human environment shall be integrated with the legislative process of the Congress (40 CFR 1506.8).

e. "Human environment" includes the relationship of people with the natural and physical environment. Each EA, EIS, or SEIS must discuss interrelated economic, social, and natural or physical environmental effects (40 CFR 1508.14).

.02 Specific Guidance on Significance of Fishery Management Actions. The following specific guidance expands, but does not replace, the general language in Section 6.01 of this Order. When adverse impacts are possible, the following guidelines should aid the RPM in determining the appropriate course of action. If none of these situations may be reasonably expected to occur, the RPM should prepare an EA or determine, in accordance with Section 5.05 of this Order, the applicability of a CE. NEPA document preparers should also consult 50 CFR 600, Subpart D, for guidance on the national standards that serve as principles for approval of all FMP and amendments. The guidelines follow.

a. The proposed action may be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action.

b. The proposed action may be reasonably expected to jeopardize the sustainability of any non-target species.

c. The proposed action may be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMP.

d. The proposed action may be reasonably expected to have a substantial adverse impact on public health or safety.

e. The proposed action may be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.

f. The proposed action may be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species.

g. The proposed action may be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc).

h. If significant social or economic impacts are interrelated with significant natural or physical environmental effects, then an EIS should discuss all of the effects on the human environment.

i. A final factor to be considered in any determination of significance is the degree to which the effects on the quality of the human environment are likely to be highly controversial. Although no action should be deemed to be significant based solely on its controversial nature, this aspect should be used in weighing the decision on the proper type of environmental review needed to ensure full compliance with NEPA. Socioeconomic factors related to users of the resource should also be considered in determining controversy and significance.

APPENDIX D - FMP GOALS, OBJECTIVES AND NATIONAL STANDARDS

Table of Contents

Groundfish FMP Goals and Objectives

FMP Goals and Objectives (Including Limited Entry) from Pacific Coast Groundfish Fishery Management Plan For the California, Oregon and Washington Groundfish Fishery As Amended Through Amendment [14]

General FMP Goals and Objectives

2.1 Goals and Objectives for Managing the Pacific Coast Groundfish Fishery

The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a stable planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. In developing allocation and harvesting systems, the Council will give consideration to maximizing economic benefits to the United States, consistent with resource stewardship responsibilities for the continuing welfare of the living marine resources. Thus, management must be flexible enough to meet changing social and economic needs of the fishery as well as to address fluctuations in the marine resources supporting the fishery. The following goals have been established in order of priority for managing the West Coast groundfish fisheries, to be considered in conjunction with the national standards of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Management Goals.

Goal 1 - Conservation. Prevent overfishing by managing for appropriate harvest levels and prevent any net loss of the habitat of living marine resources.

Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

Goal 3 - Utilization. Achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Objectives. To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation.

Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.

Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group.

Objective 3. For species or species groups which are below the level necessary to produce maximum sustainable yield (MSY), consider rebuilding the stock to the MSY level and, if necessary, develop a plan to rebuild the stock.

Objective 4. Where conservation problems have been identified for nongroundfish species and the best scientific information shows that the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a nongroundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of nongroundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

Objective 5. Describe and identify essential fish habitat (EFH), adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.

Economics.

Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.

Utilization.

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing) of the Pacific coast groundfish resources by domestic fisheries.

Objective 10. Recognizing the multispecies nature of the fishery and establish a concept of managing by species and gear or by groups of interrelated species.

Objective 11. Strive to reduce the economic incentives and regulatory measures that lead to wastage of fish. Also, develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. In addition, promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

Objective 12. Provide for foreign participation in the fishery, consistent with the other goals to take that portion of the optimum yield (OY) not utilized by domestic fisheries while minimizing conflict with domestic fisheries.

Social Factors.

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 14. Minimize gear conflicts among resource users.

Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

Objective 16. Avoid unnecessary adverse impacts on small entities.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

Objective 18. Promote the safety of human life at sea.

[Amended; 7, 11, 13]

Amendment 6: License Limitation Goals and Objectives

14.1.2 Goals and Objectives for Groundfish Limited Entry

The following are the goals and objectives for limited entry adopted by the Council in April 1990. The primary objective directly addresses the overcapacity problem, and the secondary objectives address the ways the Council hopes limited entry will promote achievement of the Council's goals and objectives for the groundfish fishery.

Goals. The goals for the West Coast groundfish fishery limited entry program are to improve stability and economic viability of the industry while recognizing historic participation, meet groundfish management objectives and provide for enforceable laws.

Primary Objective. The primary objective of the limited entry program will be to limit or reduce harvest capacity in the West Coast groundfish fishery.

Secondary Objectives. In pursuit of the primary objective, the following secondary objectives will be addressed:

Economic

- Promote long-term economic stability.
- Increase net returns from the fishery.
- Allow flexibility for combination vessels.

Management

- Stabilize management regimes by reducing need for frequent inseason changes.
- Reduce the cost of management.
- Reduce by-catch and waste.
- Encourage effort in underutilized species fisheries.

Enforcement

- Promote cost-effective enforcement by reducing need for frequent changes and tight trip limits.
- Promote logistically viable enforcement by minimizing need to use regulations such as trip limits or subarea closures which are more difficult to enforce.

Social

- Recognize and accommodate historical participation of those investing their life and resources in the fishery.
- Maintain a mechanism for fishery entrance/exit and flexibility for change in the fleet.
- Reduce conflicts between user groups by limiting or reducing effort competition for the same resource.
- Provide a stable supply of groundfish to the public at a reasonable price.

National Standards from the Magnuson-Stevens Act

EXCERPTS from
Public Law 94-265
As amended through October 11, 1996

TITLE III -- NATIONAL FISHERY MANAGEMENT PROGRAM
SEC. 301. NATIONAL STANDARDS FOR FISHERY 16 U.S.C. 1851
CONSERVATION AND MANAGEMENT

(a) IN GENERAL.--Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the following national standards for fishery conservation and management:
98-623
(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.
(2) Conservation and management measures shall be based upon the best scientific information available.
(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.
104-297
(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
104-297
(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.
104-297
(9) Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
104-297
(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Additional Magnuson-Stevens Act Considerations (303(b)(6))

The following must be taken into account in designing limited access systems:

(A) Present participation in the fishery.
(B) Historical fishing practices in, and dependence on, the fishery.
(C) The economics of the fishery.
(D) The capability of fishing vessels used in the fishery to engage in other fisheries.
(E) The cultural and social framework relevant to the fishery and any affected fishing communities.
(F) Any other relevant considerations.

Magnuson-Stevens Act 303(b)(6)

APPENDIX E - AD HOC GROUNDFISH TRAWL INDIVIDUAL QUOTA COMMITTEE

<u>Membership:</u>

Dave Hanson-PSMFC-Chair
Steve Bodner-Trawler
Ginny Goblirsch-Communities
Alan Hightower-Trawler
Marion Larkin-Trawler
Pete Leipzig-Trawl Rep
Brad Pettinger-Trawler
Richard Young-Trawler
Chris Garbrick-Whiting Trawler

Dave Jincks-Whiting Trawler
Jan Jacobs-Whiting Catcher-Processor
Dale Myer-Whiting Mothership
Joe Plesha-Whiting Processor
Jay Bornstein-Processor
Frank Dulcich-Processor
Steve Joner-Tribal
Dorothy Lowman-Environmental
Dayna Matthews -Enforcement

APPENDIX F - IQ CONTROL DATE

1563-1564 Federal Register / Vol. 69, No. 6 / Friday, January 9, 2004 / Proposed Rules

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
50 CFR Part 660
[Docket No. 031230329–3329–01; I.D.120903B]RIN 0648–AR82

Fisheries Off West Coast States and in the Western Pacific; Pacific Coast Groundfish Fishery; Advance Notice of Proposed Rulemaking regarding a Trawl Individual Quota Program and to Establish a Control Date

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Advance notice of proposed rulemaking; notice of control date for the Pacific Coast groundfish fishery; request for comments.

SUMMARY: The Pacific Fishery Management Council (Council) is considering implementing an individual quota (IQ) program for the Pacific Coast groundfish limited entry trawl fishery off Washington, Oregon and California. The trawl IQ program would change management of harvest in the trawl fishery from a trip limit system with cumulative trip limits for every 2–month period to a quota system where each quota share could be harvested at any time during an open season. The trawl IQ program would increase fishermen's flexibility in making decisions on when and how much quota to fish. This document announces a control date of November 6, 2003, for the trawl IQ program. The control date for the trawl IQ program is intended to discourage increased fishing effort in the limited entry trawl fishery based on economic speculation while the Pacific Council develops and considers a trawl IQ program.

DATES: Comments may be submitted in writing by February 9, 2004.

ADDRESSES: Comments may be mailed to Don Hansen, Chairman, Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, OR 97220–1384.

FOR FURTHER INFORMATION CONTACT: The Pacific Fishery Management Council at 866–806–7204; or Bill Robinson at 206– 526–6140; or Svein Fougner at 562– 980–4000.

SUPPLEMENTARY INFORMATION: The Pacific Fishery Management Council (Pacific Council) established under section 302(a)(1)(F) of the Magnuson- Stevens Fishery Conservation and Management Act (16 U.S.C. 1852(a)(1)(F)) is considering implementing an individual quota (IQ) program for the Pacific Coast groundfish limited entry trawl fishery off Washington, Oregon and California. The Pacific Coast groundfish limited entry trawl fishery is managed under the Pacific Coast Groundfish Fishery Management Plan (FMP) approved on January 4, 1982 (47 FR 43964, October 5, 1982), as amended 15 times. Implementing regulations for the FMP and its amendments are codified at 50 CFR part 660, subpart G. Additional implementing regulations can be found in the specifications and management measures for the Pacific Coast groundfish fishery published in the **Federal Register**, as amended through inseason actions. If the Pacific Council recommends and NMFS adopts a trawl IQ program, the program would be implemented through a proposed and final rulemaking, and possibly an FMP amendment.

The trawl IQ program would change management of harvest in the trawl fishery from a trip limit system with cumulative trip limits per vessel for every 2 month period to a quota system where each quota share could be harvested at any time during an open season. The trawl IQ program would increase fishermen's flexibility in making decisions on when and how much quota to fish.

With the lapse of the moratorium on new individual fishing quotas (IFQs) in October 2002, the Regional Fishery Management Councils may propose new IFQs and the Secretary of Commerce will review them for consistency with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), in particular section 303(d).

In advance of a rulemaking on the trawl IQ program, this document announces a control date of November 6, 2003, for the trawl IQ program. The control date for the trawl IQ program is intended to discourage increased fishing effort in the limited entry trawl fishery based on economic speculation while the Pacific Council develops and considers a trawl IQ program. This control date will apply to any person potentially eligible for IQ shares. Persons potentially eligible for IQ shares may include vessel owners, permit owners, vessel operators, and crew. The control date announces to the public that the Pacific Council may decide not to count activities occurring after the control date toward determining a person's qualification for an initial allocation or determining the amount of initial allocation of quota shares. Groundfish landed from limited entry trawl vessels after November 6, 2003, may not be included in the catch history used to qualify for initial allocation in the trawl IQ program.

Implementation of any management measures for the fishery will require amendment of the regulations implementing the FMP and may also require amendment of the FMP itself. Any action will require Council development of a regulatory proposal with public input and a supporting analysis, NMFS approval, and publication of implementing regulations in the **Federal Register**. The Pacific Council has established an ad-hoc Groundfish Trawl Individual Quota Committee to make recommendations on the development of IQs in the groundfish fisheries. Meetings of this committee are open to the public. Interested parties are urged to contact the Pacific Council office to stay informed of the development of the planned regulations. Fishers are not guaranteed future participation in the groundfish fishery, regardless of their date of entry or level of participation in the fishery.

This advance notice of proposed rulemaking has been determined to be not significant for purposes of Executive Order 12866.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: January 6, 2004.

Rebecca Lent,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

[FR Doc. 04–464 Filed 1–8–04; 8:45 am]

BILLING CODE 3510–22–S

APPENDIX G - NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT

Billing Code 3510-22-S
DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
50 CFR Part 660
[I.D. 051004B]
Pacific Fishery Management Council; Notice of Intent
AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.
ACTION: Notice of intent to prepare an environmental impact statement (EIS); request for comments; preliminary notice of public scoping meetings.
SUMMARY: NMFS and the Pacific Fishery Management Council (Pacific Council) announce their intent to prepare an EIS in accordance with the National Environmental Policy Act (NEPA) of 1969 to analyze proposals that provide dedicated access privileges for participants in the non-tribal Pacific Coast groundfish trawl fishery.
DATES: Public scoping meetings will be announced in the Federal Register at a later date. Written comments will be accepted at the Pacific Council office through August 2, 2004.
ADDRESSES: You may submit comments, on issues and alternatives, identified by [i.d. number] by any of the following methods:

- E-mail: TrawlAccessEIS.nwr@noaa.gov. Include [I.D. number] and enter "Scoping Comments" in the subject line of the message.

1. Federal Rulemaking Portal: http://www.regulations.gov.
1. Fax: 503-820-2299.
2. Mail: Dr. Donald McIsaac, Pacific Fishery Management Council, 7700 NE Ambassador Pl., Suite 200, Portland, OR, 97220.

FOR FURTHER INFORMATION CONTACT: Steve Freese, (Northwest Region, NMFS) phone: 206-526-6113, fax: 206-526-6426 and email: steve.freese@noaa.gov; or Jim Seger, Pacific Fishery Management Council, phone: 503-820-2280, fax: 503-820-2299 and email: jim.seger@noaa.gov.
SUPPLEMENTARY INFORMATION:
Electronic Access

This Federal Register document is available on the Government Printing Office's website at: www.gpoaccess.gov/fr/index/html.

Description of the Proposal

The proposed alternatives to the status quo, which will be the subject of the EIS and considered by the Pacific Council for recommendation to NMFS, are programs that provide dedicated access privileges for participants in the non-tribal Pacific Coast groundfish trawl fishery. The main dedicated access privilege alternative the Pacific Council is considering is an individual fishing quota (IFQ) program for the Pacific Coast groundfish limited entry trawl fishery off Washington, Oregon and California. A trawl IFQ program would change management of harvest in the trawl fishery from a trip limit system with cumulative trip limits for every 2-month period to a quota system where each quota share could be harvested at any time during an open season. A trawl IFQ program would increase fishermen's flexibility in making decisions on when and how much quota to fish. Status quo (no action) will also be considered along with dedicated access privilege and other reasonable alternatives that may be proposed to address issues identified in the problem statement.

At the request of the Pacific Council, NMFS published an Advance Notice of Proposed Rulemaking regarding a Trawl Individual Quota Program and to Establish a Control Date (69 FR 1563, January 9, 2004). This control date for the trawl IQ program is intended to discourage increased fishing effort in the limited entry trawl fishery based on economic speculation while the Pacific Council develops and considers a trawl IQ program. Although the control date notice discussed the development of the trawl IQ program, NMFS and the Pacific Council also plan to consider other dedicated access alternatives.

General Background

The Council implemented a Pacific Coast Groundfish Fishery Management Plan (FMP) in 1982. Groundfish stocks are harvested in numerous commercial, recreational, and tribal fisheries in state and Federal waters off the West Coast. The non-tribal commercial seafood fleet taking groundfish is generally regulated as three sectors: Limited entry trawl, limited entry fixed gear, and directed open access. Groundfish are also harvested incidentally in non-groundfish commercial fisheries, most notably fisheries for pink shrimp, spot and ridgeback prawns, Pacific halibut, California halibut, and sea cucumbers (incidental open access fisheries).

Despite the recently completed buyback program, management of the West Coast groundfish trawl fishery is still marked by serious biological, social, and economic concerns; and discord between fishermen and managers and between different sectors of the fishery, similar to those cited in the U.S. Commission on Ocean Policy's April 2004 preliminary report. The trawl fishery is viewed as economically unsustainable given the current status of the stocks and the various measures to protect these stocks. One major source of discord and concern stems from the management of bycatch, particularly of overfished species as described in the draft programmatic bycatch DEIS. The notice of availability of the DEIS was published in the FEDERAL REGISTER on February 27, 2004 (69 FR 9314). The DEIS is available from the Pacific Council office ((see ADDRESSES). After reviewing the draft programmatic bycatch DEIS the Pacific Council adopted a preferred alternative for addressing bycatch that included IFQ programs. The alternatives to status quo to be evaluated in the dedicated access EIS are amendments to the FMP and associated regulations to address these concerns through the use of dedicated access privileges. The concerns are described in more detail in the following problem statement:

As a result of bycatch problems, considerable harvest opportunity is being forgone in an economically stressed fishery. The trawl groundfish fishery is a multispecies fishery in which fishers exert varying and limited control of the mix of species in their catch. The optimum yields (OYs) for many overfished species have been set at low levels that place a major constraint on the industry's ability to fully harvest the available OYs of the more abundant target species that occur with the overfished species, wasting economic opportunity. Average discard rates for the fleet are applied to projected bycatch of overfished species. These discard rates determine the degree to which managers must constrain the harvest of targeted species that co-occur with overfished species. These discard rates are developed over a long period of time and do not rapidly respond to changes in fishing behavior by individual vessels or for the fleet as a whole. Under this system, there is little direct incentive for individual vessels to do everything possible to avoid take of species for which there are conservation concerns, such as overfished species. In an economically stressed environment, uncertainties about average bycatch rates become highly controversial. As a consequence, members of fishing fleets tend to place pressure on managers to be less conservative in their estimates of bycatch. Thus, in the current system there are uncertainties about the appropriate bycatch estimation factors, few incentives for the individual to reduce bycatch rates, and an associated loss of economic opportunity related to the harvest of target species.

The current management regime is not responsive to the wide variety of fishing business strategies and operational concerns. For example, historically the Pacific Council has tried to maintain a year-round groundfish fishery. Such a pattern works well for some business strategies in the industry, but there has been substantial comment from fishers who would prefer being able to pursue a more seasonal groundfish fishing strategy. The current management system does not have the flexibility to accommodate these disparate interests. Nor does it have the sophistication, information, and ability to make timely responses necessary to react to changes in market, weather, and harvest conditions that occur during the fishing year. The ability to react to changing conditions is key to conducting an efficient fishery in a manner that is safe for the participants.

Fishery stock depletion and economic deterioration of the fishery are concerns for fishing communities. Communities have a vital interest in the short- and long-term economic viability of the industry, the income and employment opportunities it provides, and the safety of participants in the fishery.

In summary, management of the fishery is challenged with the competing goals of: controlling bycatch, taking advantage of the available allowable harvests of more abundant stocks (including conducting safe and efficient harvest activities in a manner that optimizes net benefits over the short- and long-term), increasing management efficiency, and responding to community interest.

In consideration of this statement of the problem, the following goals have also been identified for improving conditions in the groundfish trawl fishery.

- Provide for a well-managed system for protection and conservation of groundfish resources.
- Provide for a viable and efficient groundfish industry.
- Increase net benefits from the fishery.
- Provide for capacity rationalization through market forces.
- Provide for a fair and equitable distribution of fishery benefits.
- Provide for a safe fishery.

Preliminary Identification of Alternatives

NEPA requires preparation of an EIS for major Federal actions significantly affecting the quality of the human environment. The Pacific Council and NMFS are seeking information from the public on the range of alternatives and on the environmental, social, and economic issues to be considered.

Based on the above problem statement, goals and objectives, and consistent with the Pacific Council's preferred alternative in the programmatic bycatch EIS, the Pacific Council has identified IFQs for the trawl fishery as one of the main types of alternatives to status quo that it will consider. The Pacific Council has begun developing specific provisions for IFQ alternatives. Under IFQs, total harvest mortality is controlled by allocating an amount to individual fishers and holding those individuals responsible for ensuring that their harvest or harvest mortality does not exceed the amount they are allocated.

The EIS will identify and evaluate other reasonable and technically feasible alternatives that might be used to simultaneously address capacity rationalization and the other problems and goals specified here. The Pacific Council is interested in public comment on alternatives to dedicated access privilege programs that address the problems surrounding and goals for this issue. The Pacific Council is also interested in receiving comments on different types of dedicated access privilege programs that should be considered and specific provisions that should be included in the alternatives.

According to the U.S. Commission on Ocean Policy's April 2004 preliminary report (pp. 232-236), there are several different types of dedicated access privileges:

IFQs allow each eligible fisherman to catch a specified portion of the total allowable catch. When the assigned portions can be sold or transferred to other fishermen, they are called individual transferable quotas.

Community quotas grant a specified portion of the allowable catch to a community. The community then decides how to allocate the catch.

Cooperatives split the available quota among the various fishing and processing entities within a fishery via contractual agreements.

Geographically based programs give an individual or group dedicated access to the fish within a specific area of the ocean.

There are also systems that allocate the right to buy fish. Such systems are often referred to as individual processing quotas (IPQs). The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) does not allow NMFS to implement IPQs. Congress has also prohibited the Department of Commerce and the Councils, via the Department's 2004 appropriations bill, from establishing or even considering IPQs (except in crab fisheries off Alaska). Therefore, they will not be considered in this EIS.

Not included in the proposed scope for this action are the two other nontribal commercial seafood harvester sectors: the limited entry fixed gear fleet and the open access fleets. The limited entry fixed gear fleet already operates under an IFQ program for sablefish, a species that dominates the groundfish economic activity for most vessels in this fleet. Including consideration of the fixed gear fleet in the development of a trawl IFQ program could increase the complexity of developing the program. The directed open access fleet has yet to be well identified. Identification of this fleet will likely be a major and controversial task in its own right, even without concurrent inclusion of the fleet under an umbrella IFQ program covering all sectors of the West Coast commercial seafood harvesting industry. However, this notice does not preclude further consideration of IFQ for other sectors of the fleet (open access and fixed gear).

At the end of the scoping process and initial Pacific Council deliberations, the Pacific Council may recommend specific alternatives and options for analysis. Depending on the alternatives selected, Congressional action may be required to provide statutory authority to implement a specific alternative preferred by the Council. Lack of statutory authority to implement any particular alternative does not prevent consideration of that alternative or option in the EIS (40 CFR 1502.14(2)).

Preliminary Identification of Environmental Issues

A principal objective of this scoping and public input process is to identify potentially significant impacts to the human environment that should be analyzed in depth in the dedicated access privilege EIS. Pacific Council and NMFS staff conducted an initial screening to identify potentially significant impacts resulting from implementing one of the proposed alternatives to status quo, as well as the continuation of status quo, no action. These impacts relate to the likelihood that there will be a substantial shift in fishing strategies, the configuration of the groundfish fleet, and fishery management and enforcement activities as a result of the implementation of a program meeting the specified goals. Impacts on the following components of the biological and physical environment may be evaluated (1) Essential fish habitat and ecosystems; (2) protected species listed under the Endangered Species Act and Marine Mammal Protection Act and their critical habitat; and (3) the fishery management unit, including target and non-target fish stocks. Socioeconomic impacts are also considered in terms of the effect changes will have on the following groups: (1) Those who participate in harvesting the fishery resources and other living marine resources (for commercial, subsistence or recreational purposes); (2) those who process and market fish and fish products; (3) those who are involved in allied support industries; (4) those who rely on living marine resources in the management area; (5) those who consume fish products; (6) those who benefit from non-consumptive use (e.g., wildlife viewing); (7) those who do not use the resource but derive benefit from it by virtue of its existence, the option to use it, or the bequest of the resource to future generations; (8) those involved in managing and monitoring fisheries; and (9) fishing communities. Analysis of the effects of the alternatives on these groups will be presented in a manner that allows the identification of any disproportionate impacts on low income and minority segments of the identified groups and impacts on small entities.

Related NEPA Analyses

Certain complementary and closely related actions are likely to be required to implement a dedicated access privilege program. As described herein, implementation of an IFQ program or an alternative dedicated access privilege program for the trawl fishery will be a two-step process. The first step is to design the basic program and its major elements (e.g., allocation of shares among participants, monitoring and reporting requirements, needed species to be allocated, etc.). With this notice, the Council and NMFS are seeking comments on this first step. The second step is to determine the amounts of each species that are to be allocated to the trawl and other sectors. Such allocations would be evaluated in a separate but related process supported by a separate but connected NEPA analysis.

Implementation of an IFQ alternative would require an allocation of available harvest between the commercial trawl fisheries and other fishing sectors (inter-sector allocation). This allocation would be needed to annually set the amount of fish that would be partitioned between participants in the trawl IFQ fishery. An inter-sector allocation may be based on an allocation formula or on a determination of the needs of a fishery for each management cycle. The only species now allocated between trawl and other sectors is sablefish. For a trawl IFQ program to succeed, the Council may need to quantify allocations for other species between the trawl sector and other fishing sectors. Allocation questions raise issues beyond developing a dedicated access privilege program. Thus, a second but related NEPA analysis will be undertaken, particularly as intersector allocations may be useful for managing the fishery even if an IFQ program is not adopted. This second NEPA analysis will be about the potential costs and benefits to all fisheries from developing specific commercial and recreational allocations and, within the commercial allocations, developing specific sub-allocations to the open access, trawl, and fixed gear fisheries.

The Council's Allocation Committee will be meeting to discuss the need for intersector allocations and criteria for making such allocation decisions. These meetings will be open to the public and announced in a separate Federal Register document. At approximately the time the Council approves a set of alternatives to be analyzed in the dedicated access privileges EIS, it will likely initiate formal scoping for a NEPA document to cover the intersector allocation issue. In the meantime, comments on the intersector allocation issue should be addressed to the Council office pfmc.comments@noaa.gov (enter "Intersector Groundfish Allocation" in the subject line). Potential outcomes of the allocation decision and impacts of that decision on the IFQ program would be considered in the cumulative effects section of the EIS on dedicated access privileges for the trawl fishery.

Scoping and Public Involvement

Scoping is an early and open process for determining the scope of issues to be addressed and for identifying the notable issues related to proposed alternatives (including status quo). A principal objective of the scoping and public input processes is to identify a reasonable set of alternatives that, with adequate analysis, sharply define critical issues and provide a clear basis for distinguishing among those alternatives and selecting a preferred alternative. The public scoping process provides the public with the opportunity to comment on the range of alternatives and specific options within the alternatives. The scope of the alternatives to be analyzed should be broad enough for the Pacific Council and NMFS to make informed decisions on whether an alterative should be developed and, if so, how it should be designed, and to assess other changes to the FMP and regulations necessary for the implementation of the alternative, including necessary intersector allocations.

Some preliminary public scoping of IFQ alternatives has been conducted through the Council process. Such preliminary scoping is consistent with the Council on Environmental Quality guidelines (46 FR 18026, 51 FR 15618). The results of this preliminary scoping are being used to develop a scoping document that will help focus public comment. Public scoping conducted thus far includes Council meetings held September 2003 (68 FR 51007) and November 2003 (68 FR 59589), and Ad Hoc Trawl Individual Quota Committee meetings held in October 2003 (68 FR 59358) and March 2004 (69 FR 10001). To provide additional preliminary information for the public scoping document, a group of enforcement experts will meet in Long Beach, CA, May 25 and 26, 2004, and a group of analysts will meet in Seattle WA, June 8 and 9, 2004. Times and locations for these meetings will be announced in the Federal Register and posted on the Council website (www.pcouncil.org). The public scoping document will be completed and released at least 30 days prior to the end of the scoping period. Copies will be available from the Council office (see ADDRESSES) or from the Council website (www.pcouncil.org).

Written comments will be accepted at the Council office through July 31, 2004 (see ADDRESSES).

Public scoping meetings will be announced in the Federal Register at a later date and posted on the Council website. There will be a public scoping session held June 13, 2004, in Foster City CA, in conjunction with the June 2004 Council meeting. The exact time and location for the meeting will be provided in the Federal Register notice announcing the June 2004 Council meeting.

Authority: 16 U.S.C. 1801 et seq.

Dated: May 18, 2004.

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Galen R. Tromble,
Acting Director,
Office of Sustainable Fisheries,
National Marine Fisheries Service.

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Appendix H - Analytical Team Reports & Other Background

Contents of Appendix H:

Groundfish Trawl Individual Quota Analytical Team
October 2004 Report[1/]

The TIQ Analytical Team has been working on analyses that will (1) be applicable regardless of the type of IFQ program the Council considers, and (2) help the Council prioritize when it specifies initial options for preliminary analysis at the November 2004 Council meeting. The following topics are covered in this report:

1/ This document ordinally appeared as an exhibit under Agenda Item E.6.b at the November 2004 PFMC Meeting, Portland, OR.

Executive Summary

Status Quo Management Regulations

What is the status quo against with IFQs and other management alternatives will be measured?

Status quo for management measures for the trawl fishery is generally characterized by cumulative landing limits and season management for Pacific whiting. A list of management measures entailed in status quo is provided in the first column of Table 1.

Increases in bycatch monitoring are anticipated under status quo and there is a need for an increase in enforcement effort associated with status quo regulations. These and other such changes under status quo should not attributed as costs of the IFQ program.

Harvest Levels Under Status Quo Harvest Polices

What harvest levels might be expected under status quo harvest policies?

The present fishery is characterized by significant underharvest of available catch OY for many species - approximately half of the available OY is being taken (Table 2). OYs for the foreseeable future are likely to remain fairly stable for most species, but constrained by overfished species (Table 3).

Subject to constraints of species under rebuilding plans, some opportunities may exist for reduced discard and fuller utilization of catch OYs. A carefully designed IQ program (and possibly other program alternatives) may provide incentives to modify gears and strategies to retain more catch and access more of the available OY.

Management Measures Remaining in Place with IFQs

Which current management measures would remain in place, and which would be replaced under an IFQ program?

Many management measures, including rockfish conservation areas, are likely to remain in place even with IFQs. The second column of Table 1 indicates the existing management measures likely to change and those likely to remain in place with adoption of an IFQ program.

Bycatch (Discard of Incidental Catch)

How much of the current bycatch problem might potentially be resolved by an IFQ program?

What are the reasons for current discards?

During 1995-1999 of the Enhanced Data Collection Program study, data on the reasons for discard were collected(Table 4). Market constraints were given as the primary reason for discard (68%), followed by regulations (24%) and finally for quality reasons (8%). The West Coast Groundfish Observer Program (WCGOP) collects similar data. This data has been requested but has not yet been made available.

What is the volume of the regulatory and nonregulatory discards currently?

Present information on discard is limited. Total catch estimates including discard mortality for 2002 and 2003 are provided in Tables 6 and 7. Estimated discards remain high especially for highly regulated species, although there was an overall reduction in discard in commercial fisheries between 2002 and 2003 (Table 2). Considerably more data have been collected by the WCGOP and these estimates are currently being revised. Updates to total catch mortality including discard, by species, adjusted for depth and management period, and those by fishery sector are pending the receipt of data from the WCGOP.

What effect may IFQ programs have on discards, and what design elements might tend to increase or decrease discards?

The concept of a management "toolbox" was outlined in the bycatch mitigation program draft EIS (PFMC 2004c). It is likely that a combination of present tools and new IQ tools would be used to help minimize bycatch should an IQ program be implemented. Quigley (Quigley 2004) identified several methods potentially useful in reducing at-sea discards under an IFQ program (Table 11). Quigley's review concluded that multispecies fisheries managed under IFQs have had mixed success. British Columbia experienced a decrease in discard along with an underachievement of the TAC for many species. Success in the BC program was attributed to linking quota to catch (including bycatch) instead of landings, the requirement of 100% observer coverage, transferability, and disincentives for not covering catch with quota.

Area Management

Is it reasonable to expect the redistribution or concentration of catch under an IFQ program compared with status quo?

A number of factors have been identified that influence the geographic distribution of harvest. In general, the ability to divide and transfer quota shares under an IQ system, as compared to the license limitation system, would likely increase the influence of factors whose effect has been muted by the lack of exclusivity in the fishery and fishermen's lack of opportunity to benefit from a decision to reduce the scale of operation. While the degree and direction of any shift is not predictable, the system changes that are projected indicate an increased likelihood of geographic shifts in fishing activity under IFQs as compared with a license limitation system.

What kind of geographic shifts have been observed historically?

Under past and present fisheries management, distribution of fishing effort has not generally been constrained, except by the application of depth or area specific regulations. Catch and catch per unit effort demonstrated strong changes over time and some changes over latitude. Generally, the survey biomass anomalies for lingcod, sablefish and Dover sole were associated with time but with less association by latitude. Catch and catch per unit effort demonstrated strong changes over time and some changes over latitude. Two dimensional surface plots of trawl landings anomalies of the same species demonstrated temporal and some latitudinal changes over time, but did not always follow the same trend as those indicated by survey data.

What biological concerns might be associated with an increase in the concentration of harvest in some areas?

In this report, we review the Canadian government's approach to area management of its TACs, and review stock assessor's concerns over potential area impacts.

The Canadian government adopted an area allocation scheme (DFO 2004) for conservation reasons (Figure 1 and Table 12). To the degree stock information was available, area allocation was used to prevent overfishing within these sub-areas due to possible effort concentration, and to achieve yields appropriate to the productivity of these areas. In addition, area allocation was prescribed as a precautionary measure in the absence of clear-cut stock information. The concerns for overfishing stemmed from consideration of the IVQ system and its application to a mixed stock fishery. Without area allocation, shareholders could concentrate on highly valued species in areas close to home ports. Area allocation, therefore, was designed to prevent overfishing and possible localized and/or serial depletion of resources.

Feed back from stock assessors was sought to provide the TIQ analytical team guidance on the potential impact of using an area allocation scheme for distribution of OY vs not doing so, in alternative IQ systems. There was a mixed response from stock assessment authors on th need for area management.

While the extent of potentially adverse concentrations of effort is unknown, area management may be a precautionary tool useful in preventing overfishing within sub-areas of groundfish stocks. Area allocation of OY for West Coast groundfish should be considered at least for species that have known problems of localized depletion (lingcod) or have a high potential for localized depletion.

Stock assessment scientists, fishery stakeholders, and managers should jointly evaluate the question as to whether or not area management will improve stock assessments, sustainability, and overall yield. If area management is found to be a preferred sub-alternative, then these groups should also be instrumental in defining management areas.

Magnitude of Economic Issues

Indicators of the approximate magnitude of the current activity that would be impacted by an IFQ program are shown along with some initial indicators of the size of potential impacts.

Tables illustrate the magnitude and distribution of harvesting and processing activity among West Coast port areas. Table 13 shows exvessel revenue from landings by limited entry trawl and other vessels in West Coast port areas in 2003. Table 14 shows the number of vessels, buyers and deliveries associated with these landings. The table also shows the number of vessels and total revenue associated with those vessels that retired from the limited entry trawl fleet following the buy back in December 2003.

The Fisheries Economic Assessment Model (FEAM) was used to estimate the regional income impacts generated by commercial fishing activities. Table 15 shows FEAM estimates of exprocessor value and regional income impacts resulting from deliveries by limited entry trawl and other vessels in West Coast port areas in 2003.

Effect of IQs on Asset Values

The literature on assets such as permits and quotas, in general, is based on asset theory, that is, permit and quota value is determined by the discounted stream of expected profit able to be gained from that asset. Factors such as ecological uncertainty, external economic occurrences (changes in the GDP), and uncertainty associated with management of the resource can influence this value. In addition, reported exchange prices for these assets can be skewed or inaccurate due to incentives to avoid surcharges, capital gains taxes or similar fees. It is also likely that prices reported for quota or permits will be difficult to sort out in situations where the exchanges also involved other assets (such as vessels and gear) or services. Furthermore, it is not known how individual quota, a new asset, will influence or be influenced by other assets like permits and vessels, though there are theoretical reasons to believe that for the West Coast, the implementation of IFQs would likely result in a reduction in the value of groundfish limited entry permits.

While there is no literature pertaining to vessel value changes under IQ management, economic theory suggests that vessel values will be influenced by the level of consolidation that occurs, the ability of new entrants to gain access to the resource and to other fisheries, and the ability of current permit owners to adjust there operation in response to IFQ implementation.

The literature available referring to processor assets provides no consensus on how processor assets will be affected by implementation of IFQs, except to indicate that consolidation and other changes can result in the occurrence of stranded capital.

Potential Efficiency Gains Under IFQs

A number of economic studies have analyzed the efficiency gains created by implementing an IFQ management system. The efficiency changes discussed in these studies typically occur through one or more of four mechanisms: fleet restructuring, increased efficiency of individual vessels, shifting of harvesting to relatively more efficient vessels, and increased product value.
Empirical studies of efficiency gains from IFQ implementation vary in key factors such as species under management, features of the IFQ program, harvesting technology, and data availability. Results vary considerably across studies, with a number of studies estimating annual efficiency gains of over $10 million.

The Northwest Fisheries Science Center (NWFSC) is undertaking a cost-earnings survey of the limited entry trawl fleet during the first quarter of 2005. With a satisfactory response rate, this survey will provide improved data for estimating potential efficiency gains from implementation of an IFQ program.

Program Setup Costs

The analysis outlines some major IFQ program costs associated with initial development and setup. The main focus is identifying factors that will influence the costs. Dollar estimates are not provided at this time. Some of the costs discussed are:

- **Quota Tracking and Matching (Software Purchase and Program Development)**
- **Initial Issuance of Quota**
- **Appeals Process**
- **At-Sea Observer Program Setup**

Other potential costs that will need to be addressed include:

- Education and Outreach
- Change in Administrative Costs associated with writing of regulations
- New Entrants Program
- Quota Market Development and Setup
- Committee and Team Meetings
- Updating and Coordination of Landings Recording Devices and Methods
- Dockside Monitoring

- Allocation Database Creation and Analysis

Enforcement Costs

With adequate tracking and monitoring elements in place (including 100% at-sea coverage and an a dockside monitoring program) very little additional enforcement effort would be required with the implementation of an IFQ program. FTE estimates have been developed by the TIQ Enforcement Group and will be forthcoming.

IFQ Allocation

Initial allocation of IFQ will be one of the most contentious issues. There are many decision points along the way.

Summary of Data Quality Issues

Landings of many of the rockfish and other groundfish species are recorded in PacFIN using generic "nominal" or "unspecified" categories. This is especially true prior to 1999. While in many cases, landings in these generic categories are assigned to individual PacFIN species codes by assuming average species composition, coverage is not uniform along the West Coast and not all generic categories are reassigned. This factor reduces the reliability of using historical landings as indicators for allocating individual species quotas. Data is provided to help illustrate the magnitude of this issue and to indicate how the data has changed over time.

Qualification by Crew

Allocations to crew members would require criteria be developed to determine which crew members qualify and how much of the initial allocation they would receive. Given the limited data available, the following are some options for allocating IFQ among crew members.

Qualification Basis	Potential Allocation Formulas
Signature on a landings receipt (fish ticket). [This data is not in the data system and would have to be submitted at the time of application]	• Equal allocation • One point for each year in which a groundfish fish ticket is signed • Points based on pounds landed of each species for which the individual signed tickets
Tax return with information stating that the person received income from working on a groundfish trawl vessel (regardless of whether he or she helped in the harvest of groundfish) Sworn affidavit from the vessel owner/skipper. [Vessel owners may not know what crew was on board. Vessel skippers may have an interest in qualifying themselves–a conflict of interest.]	• Equal allocation • One point for each year working on a groundfish trawl vessel • Points based on the vessel's annual landings of each species for that year. (A person working on multiple vessels in a year would either: (1) choose a vessel for his or her catch history that year, or (2) receive full credit for all vessels he or she worked on. Both options entail confidentiality issues.)

Another possible qualifying standard would be the submission of a affidavit by the applicant.

Qualification by Communities

An initial allocation of IFQ or CDQ to communities requires the identification of an amount of the OY to be set aside for the purpose, a body to represent the community and criteria for allocation. For CDQ programs there may be certain criteria the community must meet in order to qualify for participation in CDQ program.

Intersectoral Allocation

LE Vessels Using Open Access Gear

Data for 1998 and 2003 indicate that 80 and 16 LE trawl vessels landed a total of 280,000 and 154,000 pounds, respectively, of groundfish using open access gears.

Status Quo Management Regulations

Status quo does not necessarily mean that conditions in the fishery remain stable. Status quo is what would happen if no action is taken to change the current fishery management regime. It entails continuation of existing harvest policies and continued use of the management measures by which those harvest policies are implemented. The definition of status quo will determine which costs and benefits are attributed to an IFQ program or other alternatives and which costs and benefits would be incurred even if the proposed action is not taken. Thus, status quo is not the fishery as it exists this year or the next but rather the projection into the future of current trends and commitments. Because status quo includes changing conditions in future years, the 2003 fishery (or any specific year) would not be considered status quo.

Status quo for management measures for the trawl fishery is generally characterized by cumulative landing limits and season management for Pacific whiting. A list of management measures entailed in status quo is provided in the first column of Table 1.

Defining status quo requires a determination of the status of the preferred alternative adopted under the programmatic bycatch EIS in April 2004. The preferred alternative included the following elements:

- the use of existing bycatch management measures for the protection of overfished and depleted groundfish stocks and to reduce bycatch and bycatch mortality to the extent practicable.
- baseline accounting of bycatch by sector for the purpose of establishing future bycatch program goals.
- the development and adoption of sector-specific caps for overfished and depleted groundfish species where practicable (it is expected that sector bycatch caps will be phased in and would include: monitoring standards, full retention programs, and individual vessel incentives for exemption from caps).
- the future use of IFQ programs for appropriate sectors of the fishery (the FMP would incorporate the Strategic Plan’s goal of reducing overcapacity in all commercial fisheries).

The management tools associated with this preferred alternative are reflected at the bottom of the first column of Table 1.

On the one hand, the programmatic bycatch action committed the Council to full bycatch accounting and harvest mortality controls that take bycatch into account. This commitment implies that status quo entails certain follow-on actions. On the other hand, the trawl IFQ EIS will evaluate the main management alternatives adopted under the programmatic bycatch EIS (vessel cumulative catch limits, sector caps and IFQs). Additionally final action under the programmatic bycatch EIS anticipates increased observer coverage. The description of the adopted alternative (Alternative 7) states that over the longer term “the observer program will be upgraded to produce inseason catch data on overfished species.” On that basis it might be assumed that there will be increased bycatch monitoring in the future regardless of the management option selected. If this is the case, it would not be appropriate to include the cost of all additional monitoring for bycatch (the change from current conditions) as part of the cost of an IFQ program but rather some increase in monitoring should be included as part of status quo, reducing the change from status quo required to implement IFQs.

There is a similar situation with respect to enforcement costs. The TIQ Enforcement group has identified significant additional resources required to bring enforcement to adequate levels under current management. Once an adequate level is achieved under current management, the additional resources required for a move to IFQs would be substantially smaller, as compared to the move from today's enforcement levels to what would be necessary under an IFQ program.

Elements Defining Comparison Scenarios	Baseline	Status Quo
Bycatch Control	Score card accounting for overfished species including estimates of bycatch	Score card accounting for overfished species including estimates of bycatch
Enforcement	Current Levels (2003)	Approximately double
At-sea Monitoring - Observers	Approximately 15-20% (prior to implementation of the buyback program)	50% (for example)
Harvest Levels	Current (2003)	Projected (see Analytical Team Report)

Harvest Levels Under Status Quo Harvest Polices

Having some idea of potential future fishery production under status quo will help economists and stakeholders evaluate the merits of different alternatives compared to the current system. The management actions contemplated in conjunction with an IFQ program would not directly change the policies that determine the amount of annual catch available for harvest. Therefore, projections of available harvest under status quo harvest policies are relevant for evaluating the long-term net effects for IFQs and other alternatives to status quo.

Currently market limits and tight regulations on overfished species tend to constrain attainment of OYs. While an IQ program may address some of these constraints, it is likely that many will remain to some degree for the foreseeable future. These constraints should be eased to the degree that IQ participants change fishing strategies and gears to more selectively harvest non-overfished species, and develop markets for underutilized species.

Results:

The present fishery is characterized by significant underharvest of available catch OY for many species - approximately half of the available OY is being taken (Table 2).[2/] For some overfished

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2/ Methods: Estimated catch 2002 and 2003 (including discard) in metric tons were compared to target OY levels using data previously summarized in Amendment 16-3 (PFMC 2004d). (Note that for several species OY = ABC, which is usually the case when biomass is above the level where application of a rebuilding plan or the 40:10 Rule is necessary)

Future yields were estimated for groundfish using existing information to produce OY estimates for years 2010, 2015, and 2020. As a starting point, Council preferred OY numbers from Table 2-1 in the Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery (PFMC 2004a) were used to project potential yields out to 2020. This was the default projection if no additional information was available. Stock assessment authors and authors of rebuilding analyses were contacted to obtain any projections they may have provided using stock synthesis or the Andre Punt rebuilding model. Outputs were examined from various documents to ensure projected values were associated with Council preferred OYs for 2005-2006. In some cases, where projections were short of the desired year, the OY for the furthest year projected by the author was used for all subsequent years (e.g., if an author estimated yield out to 2012, the same yield was used for 2015 and 2020). In other cases - non-linear interpolation techniques were used to fill in years if estimates were given species such as lingcod and boccacio there was overharvest of OY in both 2002 and 2003. While some of the stocks of groundfish are presently being constrained by overfished species, several others may be underutilized due to market limits.

OYs for the foreseeable future are likely to remain fairly stable for most species, but constrained by overfished species (Table 3).[1, 2/] Projections were only able to be made for nine species of groundfish. Species like longspine thornyheads and yellowtail rockfish are substantially underharvested due to constraints, likely imposed by lower limits on shortspine thornyheads and canary rockfish. Most overfished species will require many years of constrained harvest levels as rebuilding occurs, due to the generally low productivity and intrinsic growth characteristics of the species. Lingcod may be one exception - OY is expected to be 2,414 mt in 2005 and beyond compared to 735 mt in 2004.

Discussion

Subject to constraints of species under rebuilding plans, some opportunities may exist for reduced discard and fuller utilization of catch OYs. A carefully designed IQ program (and possibly other program alternatives) may provide incentives to modify gears and strategies to retain more catch and access more of the available OY. It is difficult to forecast future harvests based on stock conditions with a high level of certainty. The status quo management and market forces appear not to permit full utilization of available catch. Present day stock assessments and catch OY levels suggest the potential for doubling landed catch if a suitable alternative fishery management program results in increased selectivity and efficiency in fishery practices. Inclusion of present non-marketable species may prevent an effort shift towards them (Quigley 2004). IQ holders would have to develop markets for several species in order to approach attainment of present or future OY levels.

Management Measures Remaining in Place with IFQs

Full description of the IFQ alternative involves specifying:

- the IFQ program
- existing management measures that would and change with implementation of an IFQ program

The second column of Table 1 indicates the existing management measures likely to change and those likely to remain in place with adoption of an IFQ program. This information will be incorporated with the description of the IFQ alternative.

Bycatch (Discard of Incidental Catch)

Reasons for current discards

The Magnuson-Stevens Act generally defines "bycatch" as fish that are discarded for regulatory or economic reasons.[3/] The term applies to both incidental and target catch. Quigley (2004)

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beyond 2020 but did not include desired intervening years. The source of information for the estimates is annotated in the spreadsheet.

3/ The term "fish" is defined to include nearly all types of marine life except marine mammals and seabirds. For purposes of this discussion, bycatch will be considered discarded incidental catch taken in the groundfish fishery. It is further assumed that all discarded fish die except for lingcod and sablefish which are assumed to have a 50% survival rate when summarized several regulatory and economic reasons for discarding fish (Table 4). Two main categories of economic reasons are generally market or quality related. During 1995-1999 of the Enhanced Data Collection Program study, data on the reasons for discard were collected by these categories (Table 5). Market constraints were given as the primary reason for discard (68%), followed by regulations (24%) and finally for quality reasons (8%). It should be noted that several species that have been highly regulated with constraining cumulative trip limits over these years have had higher than average rates of discard for regulatory reasons. These data were not necessarily collected randomly or proportionately to catches by various strategies, depth, and area. It was assumed that skippers providing the reasons for discard were doing so truthfully. The West Coast Groundfish Observer Program collects similar data. This data has been requested by has not yet been made available.

Discard Estimates in the Current Fishery

Present information on discard is limited. Total catch estimates including discard mortality for 2002 and 2003 used in this report are recent updates to Tables 4-1 and 4-2 of the 2005/2006 annual specifications EIS (PFMC 2004a) (Tables 6 and 7).[4/] Estimated discards remain high especially for highly regulated species, although there was an overall reduction in discard in commercial fisheries between 2002 and 2003 (Table 2). Discard of commercially caught lingcod was reduced between 2002 and 2003 but catch by all sectors exceeded OY by nearly 70% in 2002 and over 100% in 2003. Excess catch in both years can be attributed in part to overharvest in the recreational sector. In many cases, commercial discard rates were higher than 25% for some species but total catch still substantially less than OY.

Limited entry trawl bycatch of overfished species has been declining in recent years due in part to regulations that minimize effort in areas with high bycatch rates, and possibly due to changes in fishing strategies that tend to reduce the take of these species (PFMC 2004a).

> Shoreside: Discard mortality by weight of overfished species for the shoreside limited entry trawl sector appears to have declined between 2002 and 2003 for all overfished species. Discard rates also declined for the shoreside sector except increases were seen for canary rockfish and boccacio - two species with very restricted OY levels in 2003 (Tables 8 and 9).
>
> At-Sea Deliveries: Large reductions in widow rockfish catches and discard mortality were seen in the at-sea sector while discard rates and discard mortality for other species remained similar (Tables 8 and 9).

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discarded. Incidental catch are species taken in pursuit of target species.

4/ Discard Estimate Methods: PacFIN runs were used to develop coastwide landed catch for the 2002 and 2003 fisheries by sector. Annual landed catch by species was extracted from fishticket files by permit (limited entry) and fishing sector (shoreside trawl, at-sea trawl, fixed gear, tribal, and other). Sector discard amounts used to make estimates cited above (PFMC 2004a) were available as shoreside[1], at-sea, and fixed gear discard mortality. The proportion of commercial catch by limited entry shoreside and at-sea *trawl* sectors were estimated from PacFIN and multiplied by the total landed catch for key groundfish species listed in Tables 6 and 7. PacFIN landed catch was used directly for lingcod, canary rockfish, boccacio, and yelloweye rockfish which have a high contribution of landed catch by the recreational fishery. Percent discard mortality was then estimated for shoreside and at-sea fisheries using the following formula:

%Discard Mortality = Discard Mortality/(Discard Mortality+Landed Catch) x 100

Sector discard rates were compared to overall groundfish rates and those found in a study comparing US and BC discard (Branch *et al.* 2004) (Table 10). Discard rates (expressed as percentage) in the British Columbia bottom trawl fisheries were generally lower than West Coast bottom trawl estimates from the WCGOP report (NMFS 2004) for those species declared overfished in the West Coast U.S. fishery. Annual estimates of discard rates for the shoreside based West Coast trawl sector for 2002 and 2003 include both midwater and bottom trawl groundfish catches. Thus, this sector includes vessels with directed Pacific whiting catches, and the overall discard rate for this species is low in comparison with the bottom trawl sector, which catches and lands very little Pacific whiting. The West Coast at-sea trawl sector uses midwater gear exclusively and there was very little bycatch of flatfish. At-sea trawlers had a higher discard rate for several species of overfished rockfish compared to the shore based trawlers. It should be noted that annual rate comparisons include corrections for survival of sablefish and lingcod (50% survival rate assumed) compared to West Coast and British Columbia bottom trawl comparisons for the 2001-02 and 2002-03 period.

Considerably more data have been collected by the WCGOP and these estimates are currently being revised. Updates to total catch mortality including discard, by species, adjusted for depth and management period, and those by fishery sector are not available at this time.

IFQ Design Elements and Impacts on Discards

The concept of a management "toolbox" was outlined in the bycatch mitigation program draft EIS (PFMC 2004c). IQ tools and other management tools can be used to ' mitigate' for the effects of fishing and help minimize bycatch (discards) to the degree practicable. Several tools outlined above (see above in Management Measures Remaining in Place with IFQs) and some of the IQ tools and their potential effects on groundfish can be found in Chapter 4 of the Bycatch Programmatic EIS (PFMC 2004c). It is likely that a combination of present tools and new IQ tools would be used to help minimize bycatch should an IQ program be implemented.

Much can be learned by a review of IQ systems used elsewhere that may have potential application to a West Coast trawl IQ program. In a recent review of multispecies IFQ fisheries, Quigley (2004) outlined several design elements or IQ management tools potentially useful in designing a West Coast multispecies groundfish IQ program. Depending on the application of various tools, bycatch or discard may be reduced or increased under an IQ program. Quigley (Quigley 2004) identified several methods potentially useful in reducing at-sea discards under an IFQ program (Table 11). Key aspects of an IQ program that are potentially useful in reducing bycatch include:

- Quota transferability
- Inclusion of overfished and non-marketable species in the IQ program
- Carryover provisions
- Appropriate penalties for overages
- Easy access to quota to cover catch
- Efficient quota tracking system
- Robust catch accounting (full observer coverage, VMS, and dockside monitoring)

Quigley's review concluded that multispecies fisheries managed under IFQs have had mixed success. British Columbia experienced a decrease in discard along with an underachievement of the TAC for many species. Where discard rates were higher, TACs were very low. **Success in the BC program was attributed to linking quota to catch (including bycatch) instead of landings, the requirement of 100% observer coverage, transferability, and disincentives for not covering catch with quota.** Other fisheries were found to have little change in discard levels (New Zealand), or reduced discard in the offshore sector but continued problems inshore (Australia SE Trawl). Some problems were encountered due to the complexity of New Zealand's system for acquiring quota to cover catches. Australia has had to develop a new plan for addressing bycatch issues.

Area Management

Introduction

Present management of the West Coast groundfish fishery involves very little allocation of annual OY by area. When subdivisions in OY are made for some species, they are usually done north and south of 36° N. Lat. or by INPFC area. In contrast, British Columbia's TAC is allocated by Pacific States Marine Fisheries Commission (PSMFC) areas for their groundfish fisheries, including the trawl IQ fishery. PSMFC areas are about 1/3 the size of INPFC areas. BC's area allocation of TAC was done for biological reasons as a precautionary measure to prevent excessive concentration of fishing effort and localized depletion of fishing resources near fishing ports. Stakeholders in BC were concerned that the IVQ trawl fishery entitlement and tradable IVQ shares could allow such concentration of effort.

The Trawl Individual Quota Committee (TIQC) is preparing alternatives for a limited entry trawl individual quota system for consideration by the Pacific Fishery Management Council (PFMC). The alternatives may include options that would restrict distribution of optimum yield (OY) and access privileges on an area basis. However, the TIQC has recommended area restrictions be implemented only if needed for stock conservation reasons..

Under an area allocation scheme, IQ shares could be allocated for all areas, but only a portion of the total OY would be available within an area. Area allocation of OY could be based on existing INPFC boundaries or some other area distribution scheme. There are different way to approach the allocation of IFQ by area. IFQ could be allocated based on an entities catch history within and area. However, data quality problems could lead to a complex allocation process and appeals. Another approach would be to allocate a vessel an initial allocation of, for example, 1% of the coastwide sablefish OY. Continuing with sablefish as an example, this percentage could be applied to the portions of OY north and south of 36° N Lat. which are 7,486 mt and 275 mt respectively for 2005. However, shareholders would have to trade shares to create or maintain fishing opportunities in areas they were accustomed to fish.

Socio-economic and biological concerns may motivate consideration of an area allocation scheme. Maintenance of fishing opportunities and protection of local community interests and processing infrastructure could be potential socio-economic reasons for allocating OY on an area basis. Without area allocation, there is some potential for effort to be concentrated within some areas. Allocating OY by area may prevent localized depletion of stocks - to the extent that little mixing or migration of stocks within the area is occurring.

Effects of Fisheries Management Approaches on Geographic Shifts in Fishing Effort and Fishing Practices - the Potential for Effort Concentration Under an IFQ Program

In general, the ability to divide and transfer quota shares under an IQ system, as compared to the license limitation system, is likely to increase the influence of a number of factors previously muted by the lack of exclusivity and lack of opportunity to benefit from a decision to reduce the scale of operation. While the degree and direction of any shift is not predictable, the system changes that are projected indicate an increased likelihood of geographic shifts in fishing activity under IFQs as compared with a license limitation system.

The distribution of landings along the coast is the aggregate result of individual decisions on whether or not to participate in the fishery and at what level. Different management systems present a different suite of opportunities, incentives, and barriers for those entering or expanding their activities, and for those leaving or contracting their activities.

In the following sections we identify how the influence of various factors that affect the distribution of fishing activity change with changes in the management system. The greater the change in the influence of any factor the more likely it is that the change in the management system will be accompanied by adjustment in the scale and participation of individual fishing operations. If the individuals among whom the redistribution occurs are located in different areas, the consequence may be a geographic redistribution of activity and associated fishery benefits. Characteristics of the fishery which have little influence over the ultimate geographic distribution of effort under one management system may be more influential under another.

Initial assignment of quota shares are based on criteria developed by the fishery managers, usually linked to historical landings (volume or value of landings), current fishing capacity, or willingness to pay (as with auctioned quota shares). Under IFQs profits or rents tend to be higher since participants can match their capital and time their harvests to maximize the value of their landings.

Factors in the Decision to Fishing Practices:

The motivation to move or change fishing effort depends on the perceived benefits of making the change. Benefits may take the form of:

- Economic Factors - Increased profits (increased revenue, reduced cost);
- Social Factors - Intangibles (quality of life, cultural, familial, or community ties).

An individual fisherman's decision to change may result in the following actions:

- Expansion or contraction of fishing operations (or effort) in the existing geographical area or home port;
- Relocation of fishing operations to a different are or home port;
- Cessation of fishing operations in favor of selling, surrendering or allowing the fishing permit to lapse.

Key Economic Factors (Determinants) of Movement or Change in Fishing Activity

From a business standpoint, we assume that fishermen are motivated to maximize the profits derived from fishing activities. Economic factors, therefore, enter business decision processes, including decisions related to changing the level and location of fishing activities. Certain dynamic forces influence production related to fishing activities, and fishermen exercise varying degrees of control over them. These forces can be grouped into exogenous and endogenous forces (Box 2000).

Exogenous Forces:
Examples of exogenous forces include: seasonal weather patterns and oceanographic conditions, regulatory changes, geographic distribution of target fish species, foreign monetary exchange rates, fuel prices or other forces beyond the control of fishermen that nonetheless influence production and profitability. Management systems with open access or limited entry coupled with high latent capacity may reduce profits and decrease flexibility to make business decisions to change activities or fishing location. IQ systems, if properly designed, are thought to reduce latent capacity, concentrate fishing among fewer participants, and provide increased economic flexibility. Thus, responses to exogenous forces might be summarized as follows:

- Natural changes in weather and oceanographic conditions- increased flexibility may enable the fishermen to consider alternative areas to expand or contract fishing operations, to better meet desired scale of activity, or relocate their base of operations.
- Biological changes in abundance and or distribution patterns of target species - increased flexibility and profit offers fishermen greater latitude in decision to expand or contract fishing activities. The ability to buy or sell quota broadens the range of alternatives to better meet a desired scale of activity or relocate.
- Market conditions including financial markets and foreign exchange rates and demand - Market fluctuations would likely encourage expanding or contracting activities, as well as timing landings to maximize the value of quota landed. Again, flexibility, and a better financial posture would reduce barriers to relocation of operations if necessary.

- Infrastructure and Amenities - including harbor location and features, shipyard facilities, ice suppliers, fuel docks, etc. Increased flexibility may permit movement to locations with better infrastructure and amenities.

Movement and relation may occur from an entity relocating its fishing operations or through the transfer of IFQ to a different area.

Endogenous Forces:
Examples of endogenous forces include: fishermen's selection and level of labor inputs, choice of gear or materials used in harvest production, how much fuel to use, how and where to deploy gear, what species to target, in what condition the fish are landed, or other business decisions that are primarily under the control of the fishermen and that influence profitability. Responses to endogenous forces under a potential IQ management system also reflect increased flexibility and a better financial position:

- Production processes - choice and combination of inputs to production, where to fish, gear deployment, mix of fish and target species, where to land fish, and innovation. The ability to buy and sell quota, or to specialize in certain species provides a greater amount of control over production processes.
  An IQ system would likely provide the greatest latitude in business decisions to expand, contract, or relocate fishing activity compared to alternative systems.
- Investment options - prospects of exiting the fishery with a financial gain. Fishermen can consider opting out if more attractive investments are available. This type of flexibility provides a primary motive for consolidation of fishing effort among fewer remaining fishermen. Decisions of this type are likely to influence the overall geographic distribution of effort.

<u>Key Social Factors (Determinants) of Movement or Change in Fishing Activity</u>

Social factors play an important role in decisions to expand, constrict, or relocate fishing activities. Anticipation of these factors can also influence the design features of an IQ program to ensure preservation of core aspects of community, family, and cultural ties. As was pointed out above, IQ systems are thought to reduce latent capacity, concentrate fishing among fewer participants, and provide increased economic flexibility. The fact that effort may be consolidated creates tension to the degree consolidation affects community, family, and cultural structures. Key factors and possible responses to change are summarized below:

- Community Ties and Contribution - social connections fostered by fishing activity dependent on fishing, gear groups, those that target certain species, vessel types, groups associated with fishing. Some ties may be strengthened, especially with those remaining in the fishery, a closer interwoven community support structure may help support smaller family fishermen to keep them in the fishery. On the other hand, larger shareholders may have more flexibility and motivation to move operations.
- Familial Ties and Tradition - family lines passing down through generations, traditions(Gilden and Conway 2002). Movement to an IQ system involves changes that may have a disproportionate impact on family structures (McCay 1995). Smaller operations that stay are less likely to move, whereas, larger family based companies may move to seek consolidation of quota.
- Cultural Ties and Values - fishing a way of life, tradition. Quota may be so small as to threaten a fishing culture, and a reduction in fishing effort or a shift in geographic area may result if it preserves the culture. Shifts would depend on the size of the fishing operation and available resources.
- Social Relationships of Production - concentration of property rights or privileges relating to changes in relationships and vertical integration (McCay 1995). Crew shares may change as share owners develop economic strategies to deal with

increased cost of owning shares. Crew may shift locations to find equity. Smaller entities may relocate away from areas dominated by larger corporate entities in order to remain economically viable.

Historical Shifts in Catch, Effort and Stock Abundance

Under past and present fisheries management, distribution of fishing effort has not been constrained, except by the application of depth or area specific regulations. OY is largely set on a coastwide basis, or if partitioned, it is typically done so only for a few species north and south of lines of latitude dividing up the coast into two larger areas. Fishers have been free to move north and south of these boundaries to fish for cumulative trip limits associated with species-specific management measures designed to achieve target harvest levels for the area. PacFIN port landing and logbook data and triennial survey data were examined to look at historical shifts in catch, effort and stock abundance on an INPFC area basis. Spatial surface plots were made for representative groundfish species using catch and survey data. Catch and biomass were normalized so that latitudinal and temporal anomalies could be examined for trends. Catch and catch per unit effort demonstrated strong changes over time and some changes over latitude. Generally, the survey biomass anomalies for lingcod, sablefish and Dover sole were associated with time with less association by latitude (Figures 2, 4, and 6). Two dimensional surface plots of trawl landings anomalies of the same species demonstrated temporal and some latitudinal changes over time, but did not always follow the same trend as those indicated by survey data. Catch per unit effort trends in the INPFC Columbia area followed biomass anomaly trends for lingcod and Dover sole to some degree (Figures 3 and 7).

Survey, fishery information, and habitat suitability maps when available could be used to scale OY and allocate to more areas than those currently used (one or two). The rationale for doing so is explored below.

Biological Concerns Associated with Effort Concentration

Economic and biological forces could lead to concentration of fishing effort and areas of localized depletion. These impacts are a possibility under present management systems or a potential IQ system. Making an informed choice for an IQ program can be facilitated by evaluating several sources of information, including a review of other area management programs, review of stock assessment data, spatial analysis of fishery and survey data, and spatial analysis of habitat suitability maps soon to be available from National Marine Fisheries Service (Copps 2004). In this report, we review the Canadian government's approach to area management of its TACs, and review stock assessor's concerns over potential area impacts.

Canadian Government's Area Management Program

The Canadian government adopted an area allocation scheme (DFO 2004) for conservation reasons. Quota species have a total allowable catch (TAC) set either on a coastwide basis, sub-area, or grouping of sub areas (Figure 1 and Table 12). There are 23 Canadian ports and 3 authorized U.S. ports that receive groundfish. Most groundfish are landed into a few major ports. Major groundfish ports include Prince Rupert - northern mainland, Greater Vancouver - southern mainland, Ucluelet - West Vancouver Island, and Port Hardey - Northeast Vancouver Island. TAC was allocated by management area primarily for biological reasons. To the degree stock information was available, area allocation was used to prevent overfishing within these sub-areas due to possible effort concentration in the absence of an area management scheme, and to achieve yields appropriate to the productivity of these areas. In addition, area allocation was prescribed as a precautionary measure in the absence of clear-cut stock information. The concerns for overfishing stemmed from consideration of the IVQ system and its application to a mixed stock fishery. Without area allocation, shareholders could concentrate on highly valued species in areas close to home ports.

Area allocation, therefore, was designed to prevent overfishing and possible localized and/or serial depletion of resources. The proportion of TAC assigned by area was determined from a variety of sources including stock assessments, knowledge of stock genetics, tagging studies, physio-geography, catch and effort data, and advice from fishers with detailed knowledge of fishing grounds. In some cases, former management boundaries were adjusted as a consequence of the review and analysis process used to determine area allocations. The robust observer program Canada employs collects additional biological data on species composition, concentration, and distribution. DFO continues to review biological data and determine appropriateness of area allocations.

As described above, once Individual Vessel Quota (IVQ) shares were determined for each vessel, they were applied to management area distributions of OY such that vessels received shares for all areas. Shareholders then had the opportunity to trade species shares and acquire mixes and quantities of shares needed for desired fishing strategies and areas. Trading of shares remains a part of Canada's IVQ system.

Twenty percent of the groundfish trawl TAC was set aside for distribution based on advice from the Groundfish Development Authority (GDA). The GDA's recommendations address community development, fairness, and equity goals established by the GDA's plan.

<u>Input from West Coast Stock Assessment Scientists</u>

Existing fisheries management measures do not constrain fleet movements between large INPFC statistical areas. Most OYs are set on a coastwide basis. Current measures do constrain the amount of fish taken within Rockfish Conservation Areas (RCAs) causing changes in fishing patterns that have been well documented (Hannah 2003).

It is important to evaluate the potential impact of possible geographic effects that might be imposed by options being considered for the trawl IQ program. Feed back from stock assessors was sought to provide the TIQ analytical team guidance on the potential impact of using an area allocation scheme for distribution of OY vs not doing so, in alternative IQ systems.

Under an area IQ scenario, IQ shares of OY could be allocated by geographic area - sub INPFC, INPFC or larger (combinations of INPFC areas) to help ensure distribution of catch along the coast and to prevent localized depletion. Under another scenario, IQ share allocation would not be restricted to geographic area - vessels and or sales of shares could lead to movement of fishing effort and harvest between areas - impacting both stocks and assessments. The following questions/issues were discussed with several stock assessment scientists and generalized responses follow each issue.

Issue 1. Do you think an IQ program without area allocation would have the potential to adversely impact stocks (localized depletion, impacts on recruitment in other areas, or other impacts you might be aware of) if there were a concentration of effort into areas with highly valued species or into areas with higher concentrations of fish (higher CPUE)?

Responses: Generally, stock assessment scientists thought that effort under status quo has permitted concentration of effort. Fishers go to high CPUE areas, but these areas are ephemeral and thus effort will continue to shift. Effort is currently constrained by overfished species, and will likely continue to be so. A reduction in the numbers of participants might increase the potential to concentrate effort in certain geographic areas.

One scientist felt it was not a long term problem - as catch rates go down, the incentives to target in certain areas will dissipate as well. Also, the trawl fishery is a multispecies fishery and several species are sought as target species. It is likely that not all of these species are in highest concentration in the same areas. Localized depletion could be a problem, depending on the species - rockfish and lingcod are likely candidates. In fact, lingcod is thought to be overfished in the south but not in the north. Application of spatial restrictions could complicate things unnecessarily depending on the species - Pacific whiting is a good example of a species that may not need OY allocations on an area basis.

One scientist felt it can't be any worse than it is now. MPAs, if used, create the reverse of effort concentration - areas of underfishing. Another scientist provided a distribution graph of yellowtail rockfish - indicating a possible boundary between stocks - and wondered if similar data could be looked at to find boundaries of other species. There was some uncertainty about what the real impacts would be.

Issue 2. Do you think it would be possible to detect these impacts? What kind of indicators would you look for?

Responses: Lack of spatial restrictions could lead to problems depending on species. Detection of impacts might be possible, but data collection would have to be increased and a stratified sampling scheme used. Most scientists felt that you would need to look at changes in area specific abundance trends - using survey information and / or fishery CPUE, and age composition data. It might take a big change to detect a difference between areas due to the high degree of variability in logbook data. To detect local depletion, the scale of areas would have to be the same scale as the area depleted. Declines in CPUE, and changes in age composition coupled with heavy harvest could indicate a problem. Response to changes in fishing concentration would depend on species resiliency. One scientist felt that it would be impossible to detect impacts as there is no baseline established.

Issue 3. Stock assessments are typically done for large geographic areas. What impact would potential effort concentration (in the absence of controls to restrict proportions of harvest to particular geographic areas) have on stock assessments? Would it be possible to do stock assessments for species you are familiar with for smaller geographic areas?

Responses: Smaller sample sizes in sub-areas (under an area allocations scheme) would lead to greater uncertainty. Boundaries should use existing lines - as data are gathered that way and it is hard to dissociate data sets and recombine them. Assessments are done for large areas under the assumption that broad distribution of fleet and movements of fish diffuse localized recruitments and mortality. Concentrated effort in an area for a long enough period of time may lead to paradoxical model results. Impacts could bias results. MPAs may have an opposite but equally problematical effect - older fish from an MPA may spill over into fished areas giving the impression of lower mortality than truly exists.

Effort typically concentrates in some areas. The geographic scale of assessment would be limited by the coarseness of market sampling. It would be hard to separate fishing effects from effects of fish movement or sampling in interpreting age compositions. Effort concentration may be a long term problem already - localized depletions and surpluses are averaged when doing an assessment on a large geographic area.

Spatial modeling is needed along with more data on stock structure - It could be very complex due source and sink issues and how to characterize them. There may be too many variables to answer this question. A simple spatially segregated model could be used, but they demand data of highest quality. One scientist concluded that you can't do meaningful stock assessments in small areas.

<u>Discussion</u>

An area distribution of TAC was chosen for British Columbia's trawl IQ system. Canadian managers and scientists assert this was done for biological reasons - to prevent concentration of fishing effort, overfishing, and localized depletion of groundfish stocks, especially those close to home ports. Walters and Bonfil (1999) felt that species TACs managed by fishing ground could be successful in maintaining spatial and species diversity if quotas were adjusted annually based on accurate stock assessments. Even so, they favored limiting effort (through an effort quota system) and relying on spatial effort redistribution to prevent localized overfishing. While Canada has parsed out TACs for many species on an area basis, they have not relied entirely on accurate stock assessment information to do so.

Comparison of the Canadian system of TAC allocation by area with proposed alternatives under the West Coast Trawl IQ program should be done with caution. British Columbia's groundfish management area is geographically much different and occupies a much smaller spatial scale than the US Washington, Oregon, and California (WOC) management area. British Columbia has fewer ports and most are concentrated in the southern part of the management area. Considerable effort went into designing British Columbia's area allocation scheme, involving scientists, managers, and representatives of the fishing industry. At least as much effort would be required to develop such a scheme for the WOC management area.

Current stock assessments assume homogeneous distribution of the fish populations and free mixing across the region being assessed and the current suite of models do not yet have the capability to incorporate spatial structure such as mixing, moving, and dispersal rates (Punt and Methot 2004). Impacts of area management tools such as MPAs on stock assessments are only beginning to be evaluated (Punt and Methot 2004). This places limits on our ability to understand how current management, which incorporates the use of RCAs, and a possible future management alternative, which could use area allocation of OY and IQ shares, influence stock assessment results.

US scientists felt that current management has not prevented concentrations of fishing effort. They also felt it would be difficult to detect potential impacts without improvements in sampling and modeling. Some felt that designing an IQ system without area allocation of OY may not be a significant issue as effort does shift around anyway and declining CPUE would lead to compensatory fishing behavior that would result in changes in fishing location.

At the same time, factors other than stock CPUE affect distribution of harvest. For example, port costs, grounds familiarity, CPUE for a complex (as distinct from that from that of an individual stock), and fisherman social connections to a port.

There is evidence that pelagic and demersal groundfish distributions experience spatial and temporal changes in response to environmental drivers. A study of groundfish in the Gulf of Alaska found that adult and juvenile groundfish were structured primarily along depth gradients. Differences in abundance, species composition, and distributional patterns of groundfish appeared to be related to changes differences in upwelling between the eastern and western Gulf of Alaska (Mueter 1999). NMFS triennial trawl surveys off the Washington, Oregon, and California (WOC) management area have been used to characterize spatial characteristics of groundfish (Gabriel and Tyler 1980; Weinberg 1994). A study of groundfish off Oregon and Washington also found persistent groundfish assemblages along depth gradients and concluded that logbook data could be used to augment triennial trawl survey data to better characterize spatial and temporal distributions of groundfish (Lee 1997). Although persistent patterns in groundfish assemblages provide some stability and predictability - changes in abundance, diversity, and spatial distributions in response to fishing and environmental conditions can be anticipated. Use of several of sources of information may help to more fully understand spatial and temporal variability should the Council move towards management of OY on an area basis.

<u>Summary</u>

- There are several biological, economic, and social factors that may influence the distribution of fishing effort along the West Coast.
- Effort has shifted in the past and there is the real probability effort would continue to shift under an IQ program.

- While the extent of potentially adverse concentrations of effort is unknown, area management may be a precautionary tool useful in preventing overfishing within sub-areas of groundfish stocks.
- Area allocation of OY for West Coast groundfish should be considered at least for species that have known problems of localized depletion (lingcod) or have a high potential for localized depletion.
- The suggested boundaries for OY allocation should be based on OYs outlined in the Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery (PFMC 2004a).
- Understanding potential impacts of an IQ system within areas smaller than present management or assessment areas may be difficult as little information exists to evaluate past or present fishery impacts by sub-area. In addition, changes in fishing strategies may influence fishery-dependent data.
- The Council should continue to support research into spatial sampling and modeling approaches for stock assessments.
- Stock assessment scientists, fishery stakeholders, and managers should jointly evaluate the question as to whether or not area management will improve stock assessments, sustainability, and overall yield. If area management is found to be a preferred sub-alternative, then these groups should also be instrumental in defining management areas.
- As a precautionary measure - area allocation on a smaller than INPFC area basis could be considered using area distributions that are consistent with catch history, survey data, and habitat. If area allocation is used, fishery independent and fishery dependent data sources should be incorporated into an ongoing monitoring program to evaluate the appropriateness of area allocation of OY.

Magnitude of Economic Issues

Status Quo Gross Revenue (exvessel)

The following tables are provided to illustrate the magnitude and distribution of harvesting and processing activity among West Coast port areas.

Table 13 shows exvessel revenue from landings by limited entry trawl and other vessels in West Coast port areas in 2003. Table 14 shows the number of vessels, buyers and deliveries associated with these landings. The table also shows the number of vessels and total revenue associated with those vessels that retired from the limited entry trawl fleet following the buy back in December 2003.

Status Quo Gross Revenue (exprocessor) and Local Community Impacts

The Fisheries Economic Assessment Model (FEAM) is used by PFMC to estimate the regional income impacts generated by commercial fishing activities. Table 15 shows FEAM estimates of exprocessor value and regional income impacts resulting from deliveries by limited entry trawl and other vessels in West Coast port areas in 2003.

Effects of IQs on Asset Values

An asset is a valuable item that is owned. Fishing permits, individual fishing quotas, fishing vessels and gear, and processing equipment and facilities are all assets. It is possible that the value of some of these fish industry assets will change upon implementation of an IFQ. The following sections describe the potential changes in the value of fishing assets following implementation of an IFQ program. The following discussion provides a contextual background on the subject of fish industry asset values. It is hoped that this information is useful to those individuals and entities that own fish industry assets associated with the groundfish trawl fishery, and to fishery managers.

Summary

The literature surrounding assets such as permits and quotas, in general, corresponds to that predicted by asset theory. That is, permit and quota value is primarily influenced by the discounted stream of perceived profit able to be gained from that asset. Factors such as ecological uncertainty, external economic occurrences (changes in the GDP) and uncertainty, and uncertainty associated with management of the resource can influence this value. In addition, the reported transfer prices can be skewed or inaccurate due to incentives to avoid surcharges, capital gains taxes and similar fees. It is also likely that reported transfer prices for quota or permits will be difficult to sort out in situations where exchanges involved other assets (such as vessels and gear) or services. Further, it is not known how individual quota, a new asset, will influence or be influenced by other assets like permits and vessels, though there are theoretical reasons to believe that for the West Coast system the implementation of IFQs would likely result in a reduction in groundfish limited entry permit values.

While there is no literature pertaining to vessel value changes under IQ management, economic theory suggests that vessel values will be influenced by level of consolidation that occurs, the ability of new entrants to gain access to the resource and to other fisheries, and the ability of current permit owners to adjust there operation in response to IFQ implementation.

The scant literature referring to processor assets provides no consensus on how processor assets will be affected by implementation of IFQs except to indicate that consolidation and other changes can result in the occurrence of stranded capital.

Permits and Quotas

Under the current groundfish regulations pertaining to the trawl sector, a permit is required to legally harvest fish. The permit value is theoretically reflected in the price the permit is bought or sold for. This value is currently likely influenced by several factors including, but not limited to:

- The number and type of gear endorsements attached to the permit;
- Permit size endorsement [5/] (Future options to combine permits to combine permits to increase vessel length is more limited than before the buyback program.);
- The market supply and demand for fishing permits [6/];

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[5] The permit size endorsement is the vessel size range of up to five feet over the endorsed length that the permit can be used in conjunction with (depends on capacity points the permit has).

[6] One example of how the supply and demand for permits influenced value, was illustrated after the recent buyback program. Following the buyback program, a number of “A” Trawl permits changed hands. The prices per permit capacity point increased from $3000 per point in November 2003 to $6000-$10,000 per point in March 2004 (Dock Street Broker’s “Permit News” Report). Some of the price increase may have been due to an increased demand for permits (even though there is a control date on IQs). Increased demand may have occurred for the following reasons:

- Processors who lost vessels (to the buyback) may want to assure supply of fish to the processing plant. (One processor lost all of his delivery vessels to the buyback.)
- Processors may be buying permits to expand their market share.
- Permit holders who were ineligible to take part in the Buyback Program are willing to sell their permits because of increased prices.

- The perceived future prices the permit user can get for species the gear endorsement on the permit enables harvest for;
- The perceived species mix and poundage of fish the gear endorsement on the permit enables them to land;
- The perceived species mix and poundage of fish the ecosystem will supply;
- The perceived future stability of potential landings; and
- The perceived costs the permit owner will be subject to.

In general, the value of a fishing permit is likely determined by the perceived future stream of profit the permit enables the owner to obtain as well as the supply and demand of permits for sale.

Economists estimate the value of an asset according to its net present value (NPV). NPV is the discounted value of the future flow of net economic benefits from that asset. Discounting reflects the rate of return that society is willing to accept or trade for sacrificing present consumption. The lower the discount rate, the more weight society places on future periods, and hence the more likely society will be to sacrifice consumption in the present time period. Conversely, the higher the discount rate, the more society 'prefers' the current time period and the less likely it is to sacrifice present consumption. The discount rate often used in calculation of the NPV of an asset is the market rate of interest.

Estimates of permit and quota sale and lease values are typically made after program implementation to see if asset prices can serve as indicators of profitability of the fishery. For example, estimation of whether permit prices reflect the discounted value of current and expected future net earnings generated by permit ownership and use is used as an indicator of the success of license limitation in preserving economic rents in Alaska's commercial salmon fisheries (Huppert et al., 1996). In another study, Newell et al. (2002) assessed the quota markets in New Zealand to determine market activity, price dispersion and quota prices to determine whether the market for quota is competitive. Milon et al. (1998) looked at the performance of the market for spiny lobster transferable trap certificates to assess whether the Trap Certificate Program achieved the goals of the initial legislation. Gauvin et al. (1994) used the difference between quota and lease prices to see if conservation objectives were being attained.

Calculating the potential change in the NPV of permits or individual quota under an IFQ system requires knowledge about all of the factors mentioned as determinants of permit value as well as how changing asset values will impact each other. Under an IFQ program, permits, vessels, and individual species-specific quota will be required to gain access to the fish resource. Currently, only permits and vessels are needed to gain access.

It is not known how permit or vessels values will change when quota is created as a fishing asset. However, in theory, there will be two dynamics affecting permit prices: first, to the degree that IFQ is created to replace cumulative limits, a permit will no longer represent fishing opportunity, it will represent only the opportunity to have a vessel on the water. Currently permits represent both the opportunity to have a vessel on the water and to take certain amounts of fish, reflected in the cumulative trip limit and whiting season openings. Theoretically, IFQ will (likely) trade in the market at a marginal price which reflects the net profits per additional

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- Some buyers may be speculating the Council will relax its rules on IQs.
- Some buyers are buying permits to obtain potential IQ history.
- Some buyers may calculate that it's profitable to buy a permit and fish it during the three to five years it may take to implement IQs. In 2002, the average active permit (total=223) averaged $122,000 in groundfish revenues. If the 2002 groundfish fishery was carried out by the remaining 172 permits, the average groundfish revenue per permit would increase to about $187,000 (NMFS, 2004).

unit of harvest. Therefore it is likely that the value of most of the opportunity to take a certain amount of fish will be reflected in the IFQ (some fishing opportunity may continue to be provided as cumulative limits associated with the permits, depending on the species coverage of the IFQ system). Given that permits will reflect a lesser part of the fishing operation (opportunity to have a platform) as compared to a pre-IFQ system, and that IFQ are likely to reflect the opportunity to harvest an amount of fish (previously reflected by the cumulative limits associated with the permit) it appears likely that permit prices will decline in value. Another reason permit prices may decline is the possible reduction of capacity. If the result of fishery rationalization is fewer groundfish trawl vessels then there will be a surplus of permits available on the market.

However, the experiences of other IFQ programs can provide guidance pertaining to the factors that may potentially impact possible determinants of quota value, the potential reasons for fluctuations in quota sale and lease price dispersion, and possible reasons for value differences between quota sale and lease prices. The following subsections discuss these.

Possible Determinants of Quota Value

It is expected that the price of an annual lease on the right to catch one ton of fish should equal the marginal flow of profit or rent from that one ton over one year. The price of holding that right in perpetuity (quota sale price) should equal the summation of the annual flow of profit from that one ton over an individual's time horizon[7/]. Newell et al. (2002) attempt to describe the relationship between quota and lease price using an econometric model. They write that, in a setting with no uncertainty, quota prices would be a function of:

- Fish prices;
- Fishing costs;
- Gear types;
- Species biological characteristics; and
- Climatic conditions.

They note that finding an appropriate functional form to describe quota prices is difficult in practice due to the uncertainty surrounding fishing activities, biological populations, and the availability of information on demand in an IQ market. In their analysis, a flexible functional form is used to describe quota price as a function of contemporaneous export price, an index of fishing costs, actual annual catch, annual total allowable catch (TAC), actual quarterly catch, absolute value of the Southern Oscillation Index (a time-series measure of variability in water temperature and pressure), the real New Zealand GDP growth rate, an indicator of whether the fish stock faced significant reductions upon implementation of the ITQ, individual fish stock market fixed effects, and fixed effects for successive quarters within the fishing year.

Results confirmed that quota prices increased with:
- Increasing fish prices;
- Increased quota demand; and
- Higher GDP growth.

Quota prices decreased with:
- Increasing fishing costs; and

[7] The quota sale price will theoretically approximate the average lease price divided by the market interest rate. If lease prices are expected to increase or decrease due to changing economic or ecological conditions, the quota sale price also increase or decrease.

- Ecological uncertainty[8].

Alaska halibut and sablefish RAM staff indicate that these are all reasonable, however they have not been able to find any discernable patterns, partially due to gifting of quota shares. Other factors mentioned as probably quota share and lease price factors include;

- Availability of cheap loans; and
- Whether the exchange is part of a trade (Personal communication, Jessica Gharrett, 2004).

Price Dispersion

Newell et al. (2002) also examine the variability in quota sale and lease prices across time for the New Zealand quota markets. They describe average, deviations of about 35% around the mean in sale and lease markets one year after IFQ implementation. That variation decreased over time. By 2000, the average sale price dispersion had decreased to less than 15%. At the same time, the average lease price dispersion had decreased to around 28% (Newell et al., 2003).

They attribute price dispersion in the lease market to:

Intraseason variability in fishing conditions or other short-term consideration that would not affect the sale price;

Other factors influencing quota and lease price dispersion include:

- The fact that quota transactions take place bilaterally or through a broker, leading to differences in transaction costs, search costs, and bargaining power. In this respect, quota markets differ from more conventional assets and commodities that have existed for longer periods of time. As the market develops and fishermen and intermediaries learn

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[8] Newell et al. (2002) also reported the following findings:

- Elasticity of the quota price with respect to the fish export price is positive and statistically significant in both lease and sale price equations.
- There are indications that quota prices are much more sensitive to long-term cross-sectional differences in export prices than they are to fluctuations in export prices within species over time.
- Species with higher mortality rates had significantly lower quota prices. The elasticity was -.2 for lease prices and -.7 for sale prices. These results are consistent with the idea that species with higher mortality rates have more variability in their populations, which leads to greater profit variability and in turn lower quota prices.
- Stocks that faced initial reductions in allowable catch also experienced significant consolidation, with the median fish stock having a 38% reduction in the number of owners.
- Lease and sale prices for stocks faced with initial reductions rose faster than lease prices for the other stocks.
- Quota sale prices rose to a greater degree than quota lease prices possibly attributable to decreases in the market interest rate (11% to 3%). increases in quota sale prices could also be driven in part by the perception of increased security of quota assets, although such an effect should not be important for quota lease prices.
- Our analysis of the market arbitrage relationship between quota sale and lease prices, for example, shows that the expected rate of return for quotas follows the general historical level and trend of New Zealand’s real rate of interest.
- The authors note that quota and lease prices will likely vary by species and across regions and time.

how to operate in the newly created market, variability should decrease.

- Learning in these markets. Newell et al. (2002) write,

  We find that there has been substantial price dispersion within individual quota markets, but that the magnitude of this dispersion has gone down over time, particularly for quota sales, and is comparable to that found in other well-functioning markets. The trends are consistent with a period of market development where participants learn how to operate in the newly created market, and traders and brokers begin to set-up shop[9/].
- Incomplete understanding about the value of shares because it is a new market;
- Different perceptions of the future profitability of the fishery;
- Sellers may have different discount rates; and
- Incentives to misreport the true exchange price.

Possible misreporting of transfer prices to avoid surcharges (Larkin and Milon, 2002), and capital gains taxes (Gauvin et al., 1994) have been suspected as reasons for price dispersion occurrences in other dedicated access privilege programs. In the Florida Spiny Lobster Trap Certificate Program, a tradable gear permit program with similar features to IFQ programs, it is suspected that the reported transfer prices were not reliable reflections of the actual prices used in exchange due to a 25% surcharge on transfers. In many cases, an exchange price of $0.75, which is the annual certificate fee, was reported. When some of the possible misreported data was removed, Larkin and Milon (2002) note that average prices increase over time. To get a more accurate view of changes in transfer prices, Larkin and Milon (2002) use only prices above the annual certificate fee. Results showed that the average price rose from approximately 168% to 211% from 1994 to 1998. In addition, "the standard deviations associated with the trimmed average prices increased over time reflecting the increase in the highest reported transfer prices from less that $20 to nearly $70 per certificate." Increases in the maximum prices reported may have indicated an increase in the perceived value and/or confidence in the program (Larkin and Milon, 2000)[10/].

Gauvin et al (1994) suggest that, "there may also be some incentives for under reporting share sales prices to avoid capital gains taxes."

<u>Value Differences between Quota Sale and Lease Prices</u>

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[9] Newell et al. (2002) make the following suggestion to decrease price dispersion:

Price dispersion could potentially be reduced through the creation of a central trading exchange that posts bid and ask prices and levels of trading activity. With a clear signal from the market, the ability of quota owners and fishery managers to ascertain relevant economic and biological information would improve.

[10] Factors that have influenced the reported transfer prices include: "(a) the novelty of transferable ownership rights under the TCP; (b) uncertainty about the duration of the program; (c) uncertainty about future certificate reductions including the specification of the total number to be reduced and effects on yield per trap; (d) market imperfections such as difficulty in finding a willing buyer or seller with the desired number of certificates; (e) the surcharge applicable on the transfer (of certain classifications of certificates); (f) leasing activity that reduces the market for sales; and (g) potential under reporting of actual sale price. The combination of these factors has contributed to reports average prices that are lower than reasonable estimates of their expected market value, which are based on annual yields and current market price". In addition, reported prices are lower than those specified in local newspaper advertisements (Milon et al., 1998).

Differences in values between quota sale and lease prices are likely to occur when quota owners see the benefits of the IFQ program extending for more than a single year. While the lease price is expected to reflect the perceived profit the lessee can obtain from a single season, the quota price is expected to reflect the perceived profitability that can be obtained the duration of time the quota is of value to the individual or entity. The degree of difference between the quota and lease price is expected to depend on several factors including:

- The discount rate fishermen use to estimate quota sale value;
- The perceived future variation in profitability the quota enables the owner to obtain; and
- The level of understanding about the value of a quota share in a new market.

The discount rate implicitly used by quota holders could possibly be influenced by:

- The perceived permanence of the IFQ program (could be influenced by sunset provisions or other regulatory structures);
- The vested interest the quota holder feels they have in the fishery; and
- The perceived stability of the stock.

In describing the Wreckfish ITQ fishery, Gauvin et al. (1994) suggest that the difference between the sale and lease prices of quota (where sale price is greater than lease price) may be a possible indicator that conservation objectives are being attained. The discount rates of fishermen would "influence the degree that conservation incentives are created from having a vested interest in the fishery." This difference can provide insights into fishermen's expectations for the fishery.

<u>Market Activity</u>

Shortly after initial allocation, IFQ programs often experience relatively larger numbers of transfers of quota compared to later years. It is likely that quota owners are in the process of accumulating or decreasing the number or mix of shares they own in order to match quota share with operational capability.

In the halibut/sablefish IFQ program, the total number of approved transfers (permanent and lease) initially increased in the first 2-3 years of the program, and then decreased substantially and remained somewhat stable over the next five years (NMFS, 2003).

Under the Spiny Lobster Trap Certificate Program in Florida (a fishery with characteristics similar to individual quota programs), the percentage of certificates transfers dropped from 12% in 1993-94 to 6% in 1998. However, this may have been influenced by the fact that the total numbers of certificates were being decreased by 10% each year (Larkin and Milon, 2000).

With regards to the number of people transferring certificates between years (which fluctuated from 73 people in 1994-95 to 53 in 1995-96 to 43 in 1996-96 to 62 in 1997-98), Larkin and Milon (2000) write, "Transacting in consecutive years may reflect one or more of the following:

- The adjustment of traps necessary to correct for imperfections in the original allocation of certificates;
- The adjustment in trap numbers necessary to attain the most profitable size fishing operation given the scale of remaining inputs (e.g., vessel size); and/or
- Speculative activity in the market for certificates."

<u>Vessels</u>

There are very few references to vessel values in the IFQ literature. However, economic theory suggests that the value of fishing vessels is likely to be influenced by:

- The level of consolidation that occurs resulting in fishing vessels made available for sale (*Possible increase in vessels for sale – decrease in vessel value*);

- The ability of new entrants to enter the fishery that do not yet have vessels (*Possible increase in demand for vessels - increase in vessel value - if there are few barriers to entry, entry is affordable, fishing vessels available for sale are sufficiently versatile with respect to the other fisheries individuals can use them in, and new entrants are able to supplement groundfish activities with participation in other fisheries*); and

- The ability of vessel owners who receive initial quota allocation to increase quota share given vessel characteristics (*Possible increase in demand for vessels – increase in vessel value – if vessels are not able to increase landings without purchase of an additional vessel*);

Processing Equipment and Infrastructure

Thus far, the focus of the discussion has been on fishing permits, individual quota, and vessels due to the larger amount of literature written about these fishing assets compared to processing assets. There is very little literature written about the asset value of processing capital. There are two sources of empirical literature pertaining to the impacts of IFQs on processing entities. One report was commissioned by the State of Alaska (2002). It describes lost revenues in excess of variable costs to processors relative to pre-IFQ estimates[11/]. A report done by the GAO (2002) reacts to this report, finds deficiencies in its methodology and with regards to impacts on processors of the implementation of the halibut and sablefish IFQ concludes that, "Some processors were adversely affected by the IFQ program, while others benefitted". The theoretical literature argues that a harvester-only allocation of quota transfers wealth from processors to harvesters.

Derby fisheries often result in supply gluts. Under such circumstances, switching to an IFQ system can result in unused fishing and processing effort and capital since effort can be distributed over a longer period of time than previously. Some processing capital and cold storage facilities will be left unused since they were built under the setting of the derby fishery where large quantities come in at once. However, some processing capital has several uses and will likely only be partially impacted by a switch from a derby to fishery to an IFQ system.

The groundfish trawl fishery is not a classic derby fishery like the crab fisheries or the halibut and sablefish fisheries were.

Consolidation in the processing sector would also likely create an excess supply of processing equipment and facilities, resulting in a decrease in the market price for equipment and infrastructure[12/].

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[11] For example, Matulich and Clark (2002) estimated that "more than 82% of the halibut processing sector and 97% of the sablefish processing sector (raw fish weight) lost revenues in excess of variable costs relative to the pre-IFQ period." Matulich and Clark (2003) estimate that "the halibut processing sector lost 56% of its prior quasi rents, while sablefish processors lost 76%."

[12] One suggestion to mitigate for stranded capital has been to distribute individual processor quota. As an alternative to IPQ, some have suggested a "one-time buyback of stranded processor capital using funds from a loan from the government that will be paid back by IFQ holders". Another suggestion is to "set aside a portion of the TAC for processors or processor/fishermen teams who experience hardships because they are located in remote communities with few employment options" (Leal et al., 2003). Yet another possibility would be to allocate some portion of the IFQ to processors or provide processors the opportunity to buy IFQ.

It is possible that new processors will enter the fishery or existing processors will begin processing groundfish that hadn't previously, thus, decreasing the overall impact on the processing sector.

Further information about the type and flexibility of processing assets used to process groundfish will likely need to come from industry.

We are unclear as to how to treat the issue associated with "stranded capital" and the potential changes in processor assets. We are still exploring options for appropriate evaluation.

Future Additions

In order to explore the issue of fishing asset values further, the following efforts are being made:

- Incorporation of a discussion of the potential for the use of quota as collateral to obtain bank loans;
- Incorporation of a discussion of the potential for "stranded capital" among groundfish processing facilities resulting from conversations with processing interest representatives and NMFS economists;
- Incorporation of a discussion of how quota prices compare to revenue and how these have varied after IQ implementation;
- Incorporation of speculative activity and quota value in other fisheries;
- An expansion of the discussion of discount rates in calculation of potential quota value;
- Incorporation of a discussion of how community fishing infrastructure may be impacted by an IFQ; and
- Incorporation of a discussion of how different asset values may interact.

Potential Efficiency Gains under IFQs

A number of economic studies have analyzed the efficiency gains created by implementing an IFQ management system. The efficiency changes discussed in these studies typically occur through one or more of four mechanisms:

Fleet restructuring. An IFQ program allows transfer of quota among vessels, so some vessels may accumulate more quota and the number of vessels in the fleet may be reduced. Total fixed costs for the fleet are reduced through the reduction in the number of vessels. Quantifying this effect typically requires assumptions about vessel size and cost structure.

Increased efficiency of individual vessels. The efficiency of a given vessel may increase for a number of reasons. Vessels may be able to operate more efficiently due to more flexibility in determining when and how to harvest. By accumulating quota (subject to caps), a vessel may be able to move to a more efficient scale (output) of operation where cost per unit catch is lower. Vessels may be able to operate more efficiently by reducing their scope of operation (number of fisheries), thus avoiding the costs of changing from operating in one fishery to another.

Shifting of harvesting to relatively more efficient vessels. Even if the efficiency of any individual vessel does not change, an IFQ system allows more efficient vessels to purchase quota from less efficient vessels (subject to cap restrictions). Calculating this effect requires an estimate of the distribution of efficiency levels among vessels in the fleet. The more variation in efficiency level between vessels, the greater the potential benefit from quota transfer between vessels. .

Increased product value. In some fisheries, the value of harvested fish to consumers may rise due to improvements in product quality, such as a higher percentage of fish being landed as fresh. In order to estimate efficiency gains from improved product quality, it is necessary to separate changes in ex vessel prices which occur due to changes in product quality from changes in ex vessel prices which are caused by other factors affecting trade between harvesters and processors.

Empirical studies of efficiency gains from IFQ implementation vary in key factors such as species under IFQ management, features of the IFQ program, harvesting technology, and data availability. Empirical studies typically measure efficiency gains ex post, comparing pre-IFQ and post-IFQ data. Results vary considerably across studies, with a number of studies estimating annual efficiency gains of over $10 million.

Techniques have also been developed for ex ante estimation of the potential efficiency gains from an IFQ program before program implementation. These techniques require a cost-earnings data at the vessel level in the pre-IFQ fishery. While existing cost-earnings data provides excellent data on earnings from landings on the west coast (Washington, Oregon, and California), it provides very limited information on earnings from other sources (such as landings in Alaska or at sea deliveries) or costs. The Northwest Fisheries Science Center (NWFSC) is undertaking a cost-earnings survey of the limited entry trawl fleet during the first quarter of 2005. With a satisfactory response rate, this survey will provide improved data for estimating potential efficiency gains from implementation of an IFQ program.

Program Costs

The following pages outline some major IFQ program costs associated with initial development and setup. Some of the costs identified are:

- Quota Tracking and Matching (Software Purchase and Program Development)
- Initial Issuance of Quota
- Appeals Process
- At-Sea Observer Program Setup

Other IFQ program costs associated with initial development and setup that have not been evaluated are listed at the end of the document.

Quota Tracking and Matching

Quota tracking and matching activities would use data from landings destinations, sent through PacFIN or an electronic fish ticket system, to NMFS. The current system may need to be modified depending on how close to real-time reporting is required for the program to function properly. For example, an electronic fish ticket system may provide a faster transmission of data to NMFS allowing for quicker updating of individual quota holdings and therefore greater flexibility for fishermen to transfer quota when needed. The greater flexibility can decrease the possibility of going over the TAC, decrease the incentive to discard, and decrease time spent waiting for an update on quota holdings in order to go fishing. Real time updating will be particularly value if species with relatively low OYs are incorporated under the individual quota system. The longer the amount of time required for updating, the greater probability there is of exceeding the TAC. Once the data reaches NMFS, quota tracking and matching activities would likely be handled by the Permits Team of the Sustainable Fisheries Division in the Northwest Regional Office. The Permits Team would likely absorb activities associated with:

- Up-front quota tracking and matching database development;
- Maintaining tracking activities associated with the transfer of quota and annual poundage; and
- Annual maintenance for activities other than transfers (ex: billing, accounting for rollover provisions, issuance of dealer permits, etc.).

In general, the costs associated with implementation of an individual quota system for the limited entry trawl sector with regards to quota tracking and matching activities are highly dependent on the specific IQ system design and regulations. Therefore, it is not possible to quantitatively estimate cost associated with some of these activities. However, some qualitative information has been gathered regarding the factors that would influence these costs. In addition, costs associated with these activities have been gathered from the Alaska Halibut/Sablefish ITQ, the Crab Rationalization Program, and the British Columbia Groundfish IVQ programs.

Up-front Quota Tracking/Matching Database Development

Up-front database development costs would be influenced by:

- The amount of time available for database development (lead time);
- Number of species stocks needing quota tracking;
- Number of persons or entities involved in the fishery;
- Ownership caps (by species, area, etc.);
- How often quota trading is allowed and how much transfer verification the system must provide;
- Rollover provisions;
- Owner on board and similar requirements;
- Other attributes tracked for future research (ex: price at which quota was exchanged); and
- Whether all work is done in house (depends on availability of staff) or is outsourced (requires contract funds and staff oversight)

It will take an estimated two years to receive appropriate training, create the database, and conduct adequate testing if the database is developed in house from the time program features are well defined. It is believed that current hardware and software installments may be sufficient; however, hardware and software updates will be required.

Maintaining Tracking Activities Associated with the Transfer of Quota and Annual Poundage

Costs associated with using the database to track quota sales and annual poundage transfers will influence staff time requirements. Staff time will be influenced by:

- The ability fishermen have to avoid species they don’t hold annual poundage for;
- The ease with which fishermen can find individuals willing to sell poundage they need to obtain the portfolio of species they catch;
- How often quota transfers are allowed to occur according to regulations;
- Roll over provisions;
- The information that needs to be gathered and entered into the database regarding an individual transfer;
- The amount of verification required to approve a transfer; and
- Other factors.

Annual Maintenance for Activities Other than Transfers

Costs associated with annual maintenance for activities other than transfers will be influenced by:

- Billing requirements due to cost recovery regulations;
- Rollover provisions allowed to occur according to regulations;
- Issuance of annual poundage based on quota ownership;
- Issuance of notices regarding catch or landings that do not match quota holdings;
- Providing data and system support to enforcement activities; and
- Reporting on permit transfers, landings, and other trends for use by constituents and for program evaluation.

Provision of data on individuals fishing in excess of their catch or landings allowance will likely be made to enforcement when necessary.

Alaska Halibut/Sablefish Quota Tracking/Matching Costs

The cost of building the initial database and program used for annual allocation, tracking quota, and conducting queries for the AK Halibut and Sablefish IFQ was $1.2 million. Initial software program development was contracted out.

Other costs include: initial outreach to educate people about the IFQ and help people fill out applications (newspaper space, radio time, establishment of a toll free number for people to ask staff questions, and 23 workshops - included travel for staff), appeals process, and staff time toward outreach, system maintenance and paperwork. Staff time cannot be accurately estimated because start-up is much more staff-intensive and because staff allocate their time between the Halibut and Sablefish program and permitting tasks for other fisheries.

In the past, the fishery has been opened for only 8-8.5 months/year to allow time at the end of the year for IPHC and NMFS to publish annual management measures and TAC specifications, for RAM (AK Region NMFS Restricted Access Management Program) to alter the tracking software to account for new regulations, update the system to incorporate end of the year transfers and overrun allowances, and mail permits to remote locations to provide for a "fair start" for all participants who may wish to benefit from first season prices (Gharrett, 2004).

Alaska Crab Rationalization Program

Development and implementation of the electronic fish ticket reporting system and AK crab rationalization reporting software system design and implementation is estimated to cost $400,000. The reporting system is being designed to be used for other fisheries as well (ex: BSAI and GOA groundfish). The RAM division would provide staff time and expertise for tracking. Other costs associated with the program are an initial needs assessment ($120,000) and cost for a technology demonstrator ($75,000). Other costs will be borne by NMFS IT and management staff and IT contracts (Gharrett, 2004).

British Columbia Groundfish Individual Vessel Quota System Tracking/Matching Costs

(To be added)

Initial Issuance of Quota

The costs associated with initial issuance of quota would be influenced by:

- The number of people (with and without permits) or entities (communities, processing facilities) to whom quota is issued;
- The number of species and area specific allocations (i.e., the complexity of the program); and
- The availability of complete and accurate historical catch records (or other basis for initial awards).

One aspect of initial issuance of quota that will likely be challenging is establishment of an individual's historical catch due to the fact that permits have changed hands sometimes several times over the past 10 years.

Appeals Process

Development and operation of an Appeals Board as well as activities of the Permits Team are considered under this category.

Appeals Board activities have yet to be discussed and therefore, no further information about their activities or factors that would influence the costs associated with their activities is available at this time. However, it is likely that the costs would include hiring/contracting a GCF attorney.

The Permits Team would have limited involvement in the appeals process. They would possibly conduct the following types of activities:

- Providing data on individual historic catch to the group of people handling appeals, and
- Updating the quota tracking database with quota allocation information received from the appeals board.

Costs associated with the appeals process have yet to be evaluated. However, there are plans to assess these costs. The legal costs associated with individual applications for reconsideration of allocation are likely to increase with the time duration allowed for the appeals process.

At-Sea Observer Program Setup

There are several areas of uncertainty that make estimation of costs not possible at this time. The following issues need consideration and resolution before cost estimates can be made:

- Narrowing of the range of design elements that will eventually comprise the IQ program.

- Definition of full retention.

- Definition of the role of observers (biological samplers, compliance monitors, or both) - Equipment costs that adhere to NIST standards of measurement and error margins will need to be estimated if the observers have compliance duties. Without accurate onboard weighing equipment, enforcement and successful prosecution of those in violation of the rules will be difficult.

- Legal issues associated with who can provide compliance observer services if the contractor under consideration is a foreign entity.

- Issues associated with third party payment options - Implementation of a third party payment requirement may increase costs.

Other Potential Program Costs

Other potential program costs associated with IFQ initial development and setup that will likely be considered and explored in the future include:

- Education and Outreach
- Change in Administrative Costs associated with writing of regulations
- New Entrants Program
- Quota Market Development and Setup
- Committee and Team Meetings
- Updating and Coordination of Landings Recording Devices and Methods
- Dockside Monitoring
- Allocation Database Creation and Analysis

At-Sea Observer Program Costs

The following issues need consideration and resolution before accurate cost estimates for an effective IQ monitoring program can be made:

- The range of design elements that will eventually comprise the IQ program need to be narrowed so the purpose of the monitoring program can be clearly identified.

  A higher number of elements included in an IQ program may increase cost. For example, in-season data management may have to include daily satellite transmissions, computer infrastructure, and daily data quality review.

- The level of retention (full retention of all species or partial retention) needs to be determined so the level and type of sampling that will be required at-sea and on shore can be identified.

  For any discards at sea, a more rigorous (and hence, more costly) monitoring program would be required to collect the necessary data.
- The role of monitoring personnel (including NMFS observers, biological samplers, compliance monitors, weighmasters, or some combination of these) needs to be determined.
- Standards for observer gear are needed onboard vessels.

  Equipment costs that adhere to national standards of measurement and error margins will need to be estimated if the observers have compliance duties. Without accurate onboard weighing equipment, enforcement and successful prosecution of those in violation of the rules will be difficult.

- Legal issues associated with the use of foreign and third party service providers including the use of "no cost" federal contracts need to be resolved.

  The daily costs will vary depending on the types of service needed and the providers under consideration.

Enforcement Costs

With adequate tracking and monitoring elements in place (including 100% at-sea coverage and an a dockside monitoring program) very little additional enforcement effort would be required with the implementation of an IFQ program. FTE estimates have been developed by the TIQ Enforcement Group and will be forthcoming.

IFQ Allocation

Summary of Data Quality Issues

Landings of many of the rockfish and other groundfish species are recorded in PacFIN using generic "nominal" or "unspecified" categories. This is especially true prior to 1999. While in many cases, landings in these generic categories are assigned to individual PacFIN species codes by assuming average species composition, coverage is not uniform along the West Coast and not all generic categories are reassigned. This factor reduces the reliability of using historical landings as indicators for allocating individual species quotas. The tables described below are provided to help illustrate the magnitude of this issue and to indicate how the data has changed over time.

Tables 16 through 19 show annual PacFIN landings of groundfish groups on the West Coast and by state (Washington, Oregon and California) recorded before and after application of average species composition distributions. The years shown are 1994 through 2003. These tables show a general reduction in the amount of adjustments made to the initial species group assignments over time.

Table 20 shows annual PacFIN landings recorded in "nominal" and "unspecified" groundfish species categories before and after application of average species composition distributions. The years shown are 1994 through 2003. These tables show a significant reduction in the amount of landings assigned to these generic groundfish species groups over time.

Qualification by Crew

Two issues would need to be addressed to provide an initial allocation to crew members:

(1) The proportion of total quota shares that would be divided among the crew.
(2) The criteria that would be used to determine which crew members qualify and how much of the initial allocation they would receive.

This section provides information pertaining to the latter of these two issues.

In the fishery data systems, the only documentation pertaining to who works on fishing vessels comes from vessel operator/crew licensing system and the signatures on fish tickets.

Linking Crew to the Groundfish Fishery

The fishery data system cannot generally link a crew member or vessel operator to a particular landing, or in some cases, to a particular vessel. Rules and circumstances determining who signs the fish ticket vary between states and vary such that different individuals may sign the fish ticket on different trips by the same vessel. Given the limited data available, the following are some options for allocating IFQ among crew members.

Qualification Basis	Potential Allocation Formulas
Signature on a landings receipt (fish ticket). [This data is not in the data system and would have to be submitted at the time of application]	• Equal allocation • One point for each year in which a groundfish fish ticket is signed • Points based on pounds landed of each species for which the individual signed tickets
Tax return with information stating that the person received income from working on a groundfish trawl vessel (regardless of whether he or she helped in the harvest of groundfish)	• Equal allocation • One point for each year working on a groundfish trawl vessel • Points based on the vessels annual landings of each species for that year (a person working on multiple vessels in a year would OPTIONS: (1) have to choose a vessel for his or her catch history that year, or (2) receive full credit for each vessel he or she worked on). Either option entails confidentiality issues.
Sworn affidavit from the vessel owner/skipper. [Vessel owners may not know what crew was on board. Vessel skippers may have an interest in qualifying themselves–a conflict of interest.]	

Another possible qualifying standard would be the submission of a affidavit by the applicant. Truthfulness of the affidavits would be difficult to verify, require self policing by the community and likely result in perceived inequities if it became broadly known that some individuals made substantial false claims.

Summary of Vessel Operator and Crew Licensing Rules

California

Who

- Everyone working on a vessel must hold a commercial license (except a person who does not contribute to the activities onboard or cause any fish to be brought ashore to sell and his/her presence is registered in the vessel log).
- The vessel may hold a permit for one crew member that may be assigned to any crew member working on the vessel.
- There is not a separate license for vessel operators.

There are some fisheries in which special crew member permits are required:

Crew Member Permit Categories

General Commercial Fishing Crew member Permit	
Lobster Crew member Permit	* lobster operator permittee must be onboard when crew member is fishing.
Sea Urchin Crew member	* crew member cannot dive for urchins
Salmon Crew member Stamp	* "John Doe" crew member stamp.

Links to Vessel and Catch History

- Commercial licenses for crew members are not vessel specific.

Oregon

Who

- Crew members assisting in the fish harvest must hold licenses.
- The vessel may purchase "Commercial Crew member Fishing Licenses" (also known as "John Doe" licenses) and assign such licenses to the individuals working on the vessel. Names of individuals using these licenses are not recorded.
- There is not a separate license for vessel operators.

Links to Vessel and Catch History

- Commercial licenses for crew members are not vessel specific.

Washington

Who

- Crew members are not licensed.
- Vessel operators are licensed and there may be multiple operators licensed for a single vessel (primary and alternate operators).

Links to Vessel and Catch History

Vessel operator licenses are linked to a vessel, however, where there are multiple operators licensed for a single vessel the only information recorded documenting which operator was present for a particular landing is the signature on the fish ticket. The operator may not necessarily be the individual who signed the fish ticket. The names of who signed are not recorded in the data system but would be available off the original landing receipts.

Signatures on Fish Tickets

California

The processors sign the tickets. The name and permit numbers for the vessel operators are recorded on the fish tickets.

Oregon

The vessel owner or operators sign the tickets.

Washington

In Washington the fish tickets must be signed by the buyer and the “fisher.” The fisher signing must be the vessel operator.

Other Fisheries Experiences Making Initial Allocations to Crew

- California has had experience allocating limited entry permits to crew members.

California has had a practice--shared with other states, the Federal government, and other nations--of giving preference for issuing permits into a restricted access fishery to fishermen or vessels with past participation in that fishery. The practice has meant that those permits generally are issued to licensed California commercial fishermen rather than to non fishermen or persons not licensed in the State. The practice is a fair means to assure that those who rely on that fishery or who have invested in that fishery can remain in the fishery.

In determining priorities for the issuance of permits in a restricted access fishery, the priority for permits is given to licensed commercial fishermen/vessels with past participation in that fishery. Among fishermen or vessels with past participation in the affected fishery, preference for permits may be based on factors such as years of participation in the fishery or level of participation (landings). Second priority for permits may be based on such factors as **crew experience**, number of years in California fisheries, or participation in fisheries similar to that for which a program is being developed (An example of a similar fishery being considered for eligibility for a permit was when displaced abalone divers were added to those eligible for any new sea urchin permits). Drawings or lotteries for permits are only used when two or more applicants have identical qualifications (for example, the same number of points for eligibility for a herring permit).

Conditions/Criteria for Crew member to Apply and Upgrade to Operator Permit

Commercial Gillnet/ Trammel-net Crew member	*Applicant must have worked as a crew member for at least 12 months on vessels using gillnets or trammel-nets and shall have worked at least 180 days at sea on such vessels, or passed a CDFG proficiency examination; **documented by fishing records or notarized document from a vessel owner/operator.**
Herring Crew member	*Crew members receive 5 experience points for one year of service as paid crew member, 3 points for a second year, 2 points for a third year, up to a maximum of 10 points cumulative. Herring Permits are issued according to the total number of points, beginning with applicants who accrue the most points. Remaining permits (if any) are allocated by a lottery. Drawing is used to assign limited permits across applicants if there are more applicants than available permits. **Documented by proof of payment for service as a crew member; tax records or cancelled check.**
Sea Urchin Crew member	*Available urchin dive permits are issued to applicants who held, for each of 2 immediately preceding years, a valid sea urchin crew member permit. **Documented by fishing records or notarized statement from vessel owner/operator that hired the crew member.** Random number drawing for applicants seeking urchin dive permit. Eligible crew members can receive one random number for the diving permit drawing. One additional random number is assigned for each additional year they possessed a crew member permit. Not more than 5 random number shall be assigned to any one individual in a given drawing.

The California salmon limited entry program was initially based on limiting the number of individuals participating as fishermen. In 1982, the fisherman based moratorium was modified to a vessel owner based license limitation system. Permits were issued to a number of classes of owners and to individuals licensed to fish commercially for at least 20 years who had participated in the salmon fishery in at least one of those 20 years (Senate Bill 1917, 1982).[13/]

Qualification by Communities

Community participation in individual quota programs can be accommodated through community-based control of IFQ or the identification of a certain portion of the OY for control by communities (sometimes called Community Development Quotas or CDQ). Community-based control of IFQs does not require an initial allocation if rules are established that allow communities to purchase or otherwise acquire and hold IFQ.

An initial allocation of IFQ or CDQ to communities requires the identification of an amount of the OY to be set aside for the purpose, a body to represent the community and criteria for allocation. For CDQ programs there may be certain criteria the community must meet in order to qualify for participation in CDQ program.

A method used in the British Columbia system to benefit communities is the set aside of a percent of the IFQ, to be given to fisherman-processor coops. Coops develop proposals and apply for the IFQ. Proposals are scored, in part, based on benefits that will be provided to fishing communities. A special Groundfish Development Authority was established to administer the program.

Intersector Allocation

LE Vessels Using Open Access Gear

Vessels possessing LE trawl endorsed permits also engage in other fisheries, sometimes targeting groundfish species directly or sometimes taking groundfish as incidental catch. The Council will need to determine whether or not groundfish taken by LE trawlers while engaged in

13/ If new permits were to be issued, they were first issued as interim permits. Interim permits had to be used in two consecutive seasons before a permanent permit could be issued.

other fisheries will be subject individual quotas. The tables described below help illustrate the magnitude of this issue and to indicate how the data has changed over time.

Table 21 shows groundfish landings in 2003 by vessels with limited entry trawl permits using all types of gear.   Table 22 repeats this breakout for landings in 1998.

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TABLE 1. Existing management tools, management tools adopted under the programmatic bycatch EIS and management tools that would remain in place under IFQs.

Existing Management Tools (Status Quo)	**IFQs**
Commercial Trip Limits	None for Trawl Fishery (depending on scope)
Commercial Cumulative Limits	None for Trawl Fishery (depending on scope)
Commercial and Rec Closed Areas (RCA's, CCA, YRCA)	RCAs to protect fleet and other sectors from disaster tows of overfished spp. Habitat protection.
Inseason Adjustments	Disaster tows or overage in other sectors could shut down trawl fishery.
Sablefish Tier Limits	No change. Possibly allow fixed gear quota to be transferred to trawl (depends on provisions adopted for analysis)
Partial Observer Coverage (NMFS)	Observer coverage increase
Management Areas (Latitudes)	At least preserve existing areas
Differential Gear Requirements (exclusion area for lg footrope)	Maintain for habitat and disaster tow protection.
Differential Trip Limits (small, large, midwater)	None for Trawl Fishery (depending on scope)
Bycatch caps in EFP Fisheries (incl whiting)	Possible for Council to reserve some of the OY for EFP fisheries.
Recreational Bag Limits	No change, depending on IFQ transferability provisions. (depends on provisions adopted for analysis)
Recreational Seasons	No reason to change, allow IFQ to be purchased to allow fishing when season would otherwise be closed. (depends on provisions adopted for analysis)
Tribal Full Retention Programs	No reason to change.
Tribal Time/Area Closures (Bycatch Reduction)	No reason to change.
Full Retention in EFP Fisheries	No reason to change.
Voluntary Areas To Be Avoided (e.g., FG, OA, whiting)	No reason to change.
100% Observer Coverage in EFP Fisheries	No reason to change.
"Hotspot" Closures in EFP Fisheries	No reason to change.
Mesh Size	No reason to change.
Number of Hooks	No reason to change.
Hook Size	No reason to change.
Other Commercial and Rec Gear Restrictions	No reason to change.
Fish/Fillet size limits	No reason to change.
VMS	VMS would continue.
Cameras	Might increase in use.
Commercial seasons (spawning lingcod)	Might have closures requiring discards but any mortality would still count against IFQ.
sorting requirements	Sorting requirements to IFQ categories. Spp comp info still required for IFQ spp groups.
OY specifications	No change.
Preferred Alternative Tools from Bycatch EIS	
All current tools used for bycatch management	
overfished species caps	
caps would use: monitoring standards	
full retention programs	
vessel incentives for cap exemption	
IFQ program	

TABLE 2. (HL1.1) Estimated catch (including discard) and target OY (or ABC - in boxes) for the 2002 and 2003 West Coast groundfish fishery, and percentage over or under target harvest levels.

	2002					2003				
	Estimated Catch	Estimated Discard	%Discard	OY (ABC in boxes)	% Over or Under	Estimated Catch	Estimated Discard	%Discard	OY (ABC in boxes)	% Over or Under
Lingcod	980	159	16.2%	577	69.8%	1,367	71	5.2%	651	109.9%
Pacific Cod	798	42	5.2%	3,200	-75.0%	1,323	74	5.6%	3,200	-58.7%
Pacific Whiting	132,368	2,369	1.8%	129,600	2.1%	142,914	1423	1.0%	148,200	-3.6%
Sablefish (north)	4,330	702	16.2%	4,367	-0.8%	6,387	1126	17.6%	6,500	-1.7%
Sablefish (south)	190		0.0%	229	-17.1%	204		0.0%	294	-30.6%
Dover sole	7,584	1,265	16.7%	7,440	1.9%	8,342	957	11.5%	7,440	12.1%
English sole	1,594	415	26.0%	3,100	-48.6%	1,241	339	27.3%	3,100	-60.0%
Petrale sole	1,965	167	8.5%	2,762	-28.8%	2,161	144	6.7%	2,762	-21.8%
Arrowtooth flounder	4,979	2,889	58.0%	5,800	-14.1%	3,244	905	27.9%	5,800	-44.1%
Other flatfish	2,337	634	27.1%	7,700	-69.7%	2,094	491	23.4%	7,700	-72.8%
Pacific Ocean Perch	185	34	18.6%	350	-47.1%	160	22	13.7%	377	-57.5%
Shortbelly	12	11	97.5%	13,900	-99.9%	9	2	24.7%	13,900	-99.9%
Widow	547	193	35.4%	856	-36.1%	58	16	27.8%	832	-93.0%
Canary	110	41	37.6%	93	18.0%	47	14	30.4%	44	6.4%
Chilipepper	249	74	29.7%	2,000	-87.6%	50	15	31.1%	2,000	-97.5%
Bocaccio	140	29	20.4%	100	40.3%	29	8	29.2%	20	45.5%
Splitnose	79	23	28.6%	461	-82.8%	119	9	7.8%	461	-74.2%
Yellowtail	1,532	286	18.6%	3,146	-51.3%	504	22	4.4%	3,146	-84.0%
Shortspine Thornyheads	1,156	389	33.7%	955	21.0%	1,220	388	31.8%	955	27.8%
Longspine Thds. North	2,098	373	17.8%	2,461	-14.7%	1,835	324	17.7%	2,461	-25.4%
Longspine Thds. South	125			195	-36.1%	153			195	-21.5%
Unsp. Thornyheads	72						0			
Cowcod, Monterey	2	1	65.0%	2.4	-8.3%	0		0.0%	2	200.0%
Cowcod, Conception	0			2.4	-100.0%	0			2	-100.0%
Yelloweye	11	2	19.0%	13.5	-17.0%	8	2	19.0%	22	-63.2%
Darkblotched	202	96	47.6%	168	20.4%	140	52	37.0%	172	-18.7%
Black Rockfish (north)						174			615	-71.7%
Black Rockfish (south)						976			500	95.2%
Black Rockfish Total						1,150			1,115	3.1%
Total (including whiting)	163,647	10,194	6.2%	189,478	-13.6%	173,218	6,403	3.7%	212,466	-18.5%
Total (excluding whiting)	31,279	7,826	25.0%	59,878	-47.8%	30,304	4,981	16.4%	64,266	-52.8%

TABLE 3 (HL1.2) Projected OY for West Coast groundfish.(mt)*

Stock	2004	2005	2006	2010	2015	2020
LINGCOD - coastwide	735	2,414	2,414	2,414	2,414	2,414
Pacific Cod	3,200	1,600	1,600	1,600	1,600	1,600
Pacific Whiting (Coastwide)	250,000					
Sablefish (Coastwide)	7,786	7,761	7,634	6,760	6,362	6,362
N. of 36° (Monterey north)	7,510	7,486	7,363	7,363	7,363	7,363
S. of 36° (Conception area)	276	275	271	271	271	271
PACIFIC OCEAN PERCH	444	447	447	474	529	565
Shortbelly Rockfish	13,900	13,900	13,900	13,900	13,900	13,900
WIDOW ROCKFISH	284	285	289	442	392	409
CANARY ROCKFISH	47(42?)	43	45	52	60	69
Chilipepper Rockfish	2,000	2,000	2,000	2,500	2,500	2,500
BOCACCIO	250	307	308	400	554	769
Splitnose Rockfish	461	461	461	461	461	461
Yellowtail Rockfish	4,320	3,896	3,681	3,779	3,904	3,904
Shortspine Thornyhead - N. of 34°27'	983	999	1,018	1,018	1,018	1,018
Longspine Thornyhead - N. of 36°	2,461	2,461	2,461	2,461	2,461	2,461
Longspine Thornyhead - S. of 36°	195	195	195	195	195	195
COWCOD - S. of 36° (Conception area)	2.4	2.1	2.1	2.1	2.1	2.1
COWCOD - N. of 36° (Monterey area)	2.4	2.1	2.1	2.1	2.1	2.1
DARKBLOTCHED	240	269	294	294	294	294
YELLOWEYE	22	26	27	30	31	32
Nearshore Species						
Black WA	540	540	540	540	540	540
Black OR-CA	775	753	736	713	708	708
Minor Rockfish North	2,250	2,250	2,250	2,250	2,250	2,250
Nearshore HG	122	122	122	122	122	122
Shelf HG	968	968	968	968	968	968
Slope HG	1,160	1,160	1,160	1,160	1,160	1,160
Remaining Rockfish North	1,216	1,216	1,216	1,216	1,216	1,216
Bocaccio	238	238	238	238	238	238
Chilipepper - Eureka	32	32	32	32	32	32
Redstripe	432	432	432	432	432	432
Sharpchin	230	230	230	230	230	230
Silvergrey	28	28	28	28	28	28
Splitnose	182	182	182	182	182	182
Yellowmouth	74	74	74	74	74	74
Other Rockfish North	1,034	1,034	1,034	1,034	1,034	1,034
Minor Rockfish South	1,968	1,968	1,968	1,968	1,968	1,968
Nearshore HG	615	615	615	615	615	615
Shelf HG	714	714	714	714	714	714
Slope HG	639	639	639	639	639	639
Remaining Rockfish South	689	689	689	689	689	689
Bank	262	262	262	262	262	262
Blackgill	306	306	306	306	306	306
Sharpchin	34	34	34	34	34	34
Yellowtail	87	87	87	87	87	87
Other Rockfish South	1,279	1,279	1,279	1,279	1,279	1,279
Cabezon (off CA only)	94					
Dover Sole	7,440	7,476	7,564	8,254	9,631	10,037
English Sole	3,100	3,100	3,100	3,100	3,100	3,100
Petrale Sole	2,762	2,762	2,762	2,762	2,762	2,762
Arrowtooth Flounder	5,800	5,800	5,800	5,800	5,800	5,800
Other Flatfish	7,700					
Other Fish	14,700	7,300	7,300	7,300	7,300	7,300

*2004-2006 OYs from 2005-2006 Pacific Coast Groundfish Fishery Spex. Projections from 2005-2006 ABC document (default), or stock assessment and rebuilding plan projections (boxes).

Table 4 (BC1.1) Regulatory and economic reasons for discarding fish - adapted from Quigley

(2004).

Reason	Example	Applicability to West Coast Trawl Sector
Fish are the wrong species	Not a target species	Yes
Fish are the wrong size	Market limit on size	Yes, little or no value below a certain size
	Regulatory size	No, current regulation on size limits.
Fish are the wrong sex	Usually processing or marketing constraint.	Not Applicable
Fish are damaged	Gear, predation in nets, abrasion by nets.	Yes, some damage can occur
Fish are incompatible with rest of catch	Slime or abrasion from other species can damage target species.	Yes, some damage can occur
Fish are poisonous or otherwise inedible		Unknown
Fish spoil rapidly	Causing problems with rest of catch	Yes, can occur with 'hot spots' - fish with caustic stomach contents and/or lack of icing.
Lack of space on board	Fishing operations successful and target species take precedence over lower valued or non--target species.	Not likely under present limits
High grading	Sorting and retention of higher valued species or sizes.	Yes, differential prices exist for different sizes of sablefish.
Quotas, TACs or catch limits reached		Yes, current management uses cumulative catch limits. Regulatory discards documented.
Prohibited species	IQ shares may be inadequate to cover catch	Not applicable at present.
	Season closure	Yes
	Gear restrictions	Yes, halibut and salmon may not be retained if caught by trawl gear - except salmon may be retained under EFP.
Prohibited fishing grounds	Fishing ground may be closed for capture of one species but open for others	Yes, some limited MPAs exist, RCAs constrain type of gear used.
Safety	Sometimes necessary to release some or all of catch to ensure vessel stability	Yes, sometimes in foul weather or when gear becomes hung up - catch (and gear) may need to be discarded.

Table 5 (BC1.2) Reasons given for discard during three years (1997-1999) of the Oregon Enhanced Data Collection Project (EDCP).*

Environment	Species	Number of EDCP Records	Weight of Discard in lbs	Market	Qual-ity	Regu-lation	Grand Total
Northern Shelf	Canary rockfish	31	27,695	0.0%	34.8%	65.2%	100.0%
	Lingcod	309	35,938	2.2%	0.3%	97.5%	100.0%
	Yelloweye rockfish	0		--	--	--	--
	Yellowtail rockfish	66	68,020	6.2%	1.4%	92.4%	100.0%
	Arrowtooth Flounder	115	57,485	97.6%	2.4%	0.0%	100.0%
	English sole	214	15,301	83.5%	16.4%	0.2%	100.0%
	Petrale sole	29	960	100.0%	0.0%	0.0%	100.0%
Southern Shelf	Boccacio	0	0	--	--	--	--
	Cowcod	0		--	--	--	--
	Chilipepper	12	265	100.0%	0.0%	0.0%	100.0%
Slope	Darkblotched rockfish	0		--	--	--	--
	Pacific Ocean Perch	3	1,140	0.0%	8.8%	91.2%	100.0%
	Dover sole (p)	645	133,175	36.7%	7.8%	55.5%	100.0%
	Sablefish (p)	1,163	280,670	3.6%	6.3%	90.1%	100.0%
	Shortspine thornyhead (p)	514	54,810	23.7%	6.8%	69.5%	100.0%
	Longspine thornyhead	336	49,971	79.5%	11.7%	8.8%	100.0%
	Unsp. thornyhead	208	22,390	49.9%	9.5%	40.6%	100.0%
Pelagic	Widow rockfish	41	21,034	3.2%	0.0%	96.8%	100.0%
	Pacific whiting	962	622,600	93.1%	5.5%	1.5%	100.0%
Nearshore	Black rockfish	0		--	--	--	--
	Cabezon	0		--	--	--	--
Other	Small Rockfish	1,061	275,749	40.4%	4.1%	3.9%	100.0%
Grand Total	Above Species (by known category)	5,709	1,667,203	53.4%	6.0%	32.1%	100.0%
	All Species (by known category)	8,920	2,337,077	68.0%	7.8%	24.2%	100.0%
	Unknown or Unspecified Discard	7,455	2,665,545				
	Total All Discard	16,375	5,002,622				

*Percentages based on pounds discarded and recorded reasons for discard of species (market, quality, or regulation). Species discarded for an unspecified or unknown reason were not included in total pounds used to calculate percentages. Approximately 46% of the discarded species by weight had reasons associated with the discard. Environment refers to classification given for species used in EIS analysis, not necessarily the location where the reason for discard was determined by the EDCP observer.

TABLE 6 (BC1.3) Draft estimated 2002 total catch mortality of selected groundfish species from West Coast commercial, tribal and recreational fisheries (mt).[a/]

	LANDINGS AND MORTALITY			TARGETS		DISCARDS				
Species	Estimated Total Catch	PRELIMINARY Estimated Commercial Fishery Discard Mortality[b/]	Actual Landings[c/]	Total Catch ABC	Total Catch OY	Shoreside Discard	Shoreside Discard Mortality	At-Sea Whiting Bycatch	Mortality from Fixed Gear Sablefish (all north)	Mid-water Widow/ Yellowtail Fishery (Period 6)
Lingcod	980.0	159.1	820.9	841	577	313.5	156.7	0.5	1.8	0.1
Pacific Cod	798.5	41.8	756.7	3,200	3,200	41.8	41.8			
Pacific Whiting[d/]	132,367.9	2,368.5	129,999.4	188,000	129,600	2,312.2	2,312.2			56.3
Sablefish (north)	4,330.4	701.6	3,628.8	8,209	4,367	1,285.0	642.5		59.1	
Sablefish (south)	189.8		189.8	441	229					
Dover sole	7,583.8	1,264.8	6,319.0	8,510	7,440	1,264.8	1,264.8			
English sole	1,594.5	415.2	1,179.3	3,100		415.2	415.2			
Petrale sole	1,965.4	167.3	1,798.1	2,762		167.3	167.3			
Arrowtooth flounder	4,979.3	2,888.6	2,090.7	5,800		2,888.6	2,888.6			
Other flatfish	2,336.7	633.5	1,703.2	7,700		633.5	633.5			
Pacific Ocean Perch	185.3	34.5	150.8	689	350	30.5	30.5	3.8	0.0	0.1
Shortbelly	11.7	11.4	0.3	13,900	13,900	11.4	11.4			
Widow	547.0	193.5	353.5	3,871	856	3.3	3.3	154.7	0.0	35.5
Canary	109.7	41.2	68.4	272	93	32.1	32.1	5.2	1.3	2.7
Chilipepper	249.0	74.0	175.0	2,700	2,000	74.0	74.0			
Bocaccio	140.3	28.6	111.7	198	100	28.0	28.0	0.6		
Splitnose	79.1	22.6	56.5	615	461	22.6	22.6			
Yellowtail	1,532.3	285.6	1,246.6	3,146	3,146	285.6	285.6			
Shortspine Thornyheads	1,155.7	389.4	766.3	1,004	955	389.4	389.4			
Longspine Thds. (north)	2,098.4	373.3	1,725.1	2,461	2,461	373.3	373.3			
Longspine Thds. (south)	124.7		124.7	390	195					
Unspecified Thornyheads	71.6		71.6							
Cowcod, Monterey	2.2	1.4	0.8	19	2.4	1.4	1.4			
Cowcod, Conception	0.0		0.0	5	2.4					
Yelloweye	11.2	2.1	9.1	52	13.5	0.5	0.5		1.6	
Darkblotched	202.2	96.3	105.9	205	168	93.0	93.0	3.2	0.1	

a/ Preliminary estimates of total catch mortality based on species discard assumptions used when the OYs were set. These assumptions are currently being revised using data from the West Coast Groundfish Observer Program.

b/ Preliminary estimated discard mortality in the commercial fishery. Preliminary trawl discard calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer Program data to 2002 trawl logbook data, by area and depth strata. Discard totals estimated for tows recorded in logbooks are expanded using state-specific ratios of fishticket landings to retained logbook catch. Because tows conducted under Exempted Fishing Permits could not currently be removed from logbooks and fishtickets, applying fleetwide discard rates to these tows may overstate discard for some shelf species. This column also includes at-sea discards of rebuilding species. Preliminary fixed-gear discard in the directed sablefish fisheries is calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer Program data to northern sablefish landings data. No logbooks are available for fixed-gear vessels. Because of the limited geographic coverage of available data, fixed-gear discard amounts for species caught off central California are not well estimated at this time.

c/ Includes shoreside commercial and tribal landings from PacFIN, observed total catch including estimated discards in the at-sea whiting fishery, and RecFIN recreational catch plus observed discard mortality (A+B1).
d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

TABLE 7 (BC1.4) Draft estimated 2003 total catch mortality of selected groundfish species from West Coast commercial, tribal and recreational fisheries (mt).[a/]

	LANDINGS AND MORTALITY			TARGETS		DISCARDS			
Species	Estimated Total Catch	PRELIMINARY Estimated Commercial Fishery Discard Mortality[b/]	Actual Landings [c/]	Total Catch ABC	Total Catch OY	Shoreside Discard	Shoreside Discard Mortality	At-sea Whiting Bycatch	Mortality from Fixed-gear Sablefish (All, North of 36°)
Lingcod	1,355.6	70.7	1,284.9	841	651	137.8	68.9	0.5	1.3
Pacific Cod	1,323.1	73.5	1,249.6	3,200	3,200	73.5	73.5		
Pacific Whiting[d/]	142,913.8	1,422.7	141,491.1	188,000	148,200	1,422.7	1,422.7		
Sablefish (north)	6,386.6	1,126.1	5,260.5	8,209	6,500	2,067.4	1,033.7		92.4
Sablefish (south)	204.0		204.0	441	294				
Dover sole	8,342.2	956.6	7,385.7	8,510	7,440	956.6	956.6		
English sole	1,241.4	339.0	902.4	3,100		339.0	339.0		
Petrale sole	2,160.6	144.4	2,016.2	2,762		144.4	144.4		
Arrowtooth flounder	3,243.5	904.8	2,338.7	5,800		904.8	904.8		
Other flatfish	2,093.5	490.7	1,602.8	7,700		490.7	490.7		
Pacific Ocean Perch	160.1	21.9	138.2	689	377	15.5	15.5	6.3	
Shortbelly	9.3	2.3	7.0	13,900	13,900	2.3	2.3		
Widow	57.9	16.1	41.8	3,871	832	1.7	1.7	14.4	
Canary	48.5	14.2	34.3	272	44	12.7	12.7	0.9	0.6
Chilipepper	49.5	15.4	34.1	2,700	2,000	15.4	15.4		
Bocaccio	29.1	8.5	20.6	198	20	8.2	8.2	0.3	
Splitnose	118.8	9.3	109.5	615	461	9.3	9.3		
Yellowtail	504.5	22.1	482.4	3,146	3,146	22.1	22.1		
Shortspine Thornyheads[e/]	1,220.2	387.8	832.4	1,004	955	387.8	387.8		
Longspine Thds. North[e/]	1,834.8	323.9	1,510.9	2,461	2,461	323.9	323.9		
Longspine Thds. South	0.0			390	195				
Cowcod, Monterey	0.4	0.2	0.1	19	2.4	0.2	0.2		
Cowcod, Conception	0.0		0.0	5	2.4				
Yelloweye	8.1	1.5	6.6	52	22.0	0.3	0.3		1.3
Darkblotched	139.9	51.8	88.1	205	172.0	47.3	47.3	4.32986	0.2
Black Rockfish (north)	174.0		174.0	615					
Black Rockfish (south)	976.1		976.1	500					
Black Rockfish Total	1,150.1		1,150.1	1,115					

a/ Preliminary estimates of total catch mortality based on species discard assumptions used when the OYs were set. These assumptions are currently being revised using data from the West Coast Groundfish Observer Program.

b/ Preliminary estimated discard mortality in the commercial fishery. Preliminary trawl discard calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer Program data to 2002 trawl logbook data, by area and depth strata. Discard totals estimated for tows recorded in logbooks are expanded using state-specific ratios of fishticket landings to retained logbook catch. Because tows conducted under Exempted Fishing Permits could not currently be completely removed from logbooks and fishtickets, applying fleetwide discard rates to these tows may overstate discard for some shelf species. In an effort to minimize this problem, rockfish discard from target tonnage caught within the RCA off Oregon was estimated using bycatch rates from that EFP. Since the In an effort to minimize this problem, rockfish discard from target tonnage caught within the RCA off Oregon was estimated using bycatch c/Includes shoreside commercial and tribal landings from PacFIN, observed total catch including estimated discards in the at-sea whiting fishery, and RecFIN recreational catch plus observed discard mortality (A+B1).

d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

e/ Includes "unspecified thornyheads" allocated based on ratios estimated from California landings and At Sea north/south ABCs.

Table 8 (BC1.5) Draft estimated 2002 total catch mortality of selected groundfish species from West Coast commercial, tribal and recreational fisheries (mt). Shoreside and at-sea refer to the limited entry trawl fisheries. a/

	LANDINGS AND MORTALITY			TARGETS			Shoreside				At Sea			
Species	Estimated Total Catch	Esti-mated Com-mercial Fishery Discard Mortality b/	Actual Landing s c/	Total Catch ABC	Total Catch OY	% shoresid e landed catch	Esti-mated shore-side landed catch	Shore-side discard	Shore-side discard mortality	%shore-side discard mor-tality	% At-sea Catch	Esti-mated at-sea catch	At-sea whiting bycatch	% at-sea discard mor-tality
Lingcod	979.9	159.0	820.9	841	577	49.0%	101	313.5	156.8	60.9%	0.1%	0.3	0.5	32.6%
Pacific Cod	798.5	41.8	756.7	3,200	3,200	92.1%	697	41.8	41.8	5.7%	0.0%	0.0		
Pacific Whiting d/	132,367.9	2,368.5	129,999.	188,000	129,600	42.1%	54,757	2,368.5	2,368.5	4.1%	57.9%	75,242.4		0.0%
Sablefish (north)	4,330.4	701.6	3,628.8	8,209	4,367	40.6%	1,473	1,285.0	642.5	30.4%	0.6%	20.0		0.0%
Sablefish (south)	189.8	0.0	189.8	441	229		0					0.0		
Dover sole	7,583.8	1,264.8	6,319.0	8,510	7,440	99.4%	6,284	1,264.8	1,264.8	16.8%	0.0%	0.7		0.0%
English sole	1,594.5	415.2	1,179.3	3,100		96.1%	1,133	415.2	415.2	26.8%	0.0%	0.1		0.0%
Petrale sole	1,965.4	167.3	1,798.1	2,762		98.2%	1,766	167.3	167.3	8.7%	0.0%	0.0		
Arrowtooth flounder	4,979.3	2,888.6	2,090.7	5,800		99.4%	2,079	2,888.6	2,888.6	58.2%	0.1%	2.2		0.0%
Other flatfish	2,336.7	633.5	1,703.2	7,700		83.1%	1,416	633.5	633.5	30.9%	1.4%	24.0		0.0%
Pacific Ocean Perch	185.3	34.5	150.8	689	350	97.3%	147	30.6	30.6	17.3%	2.4%	3.6	3.8	51.2%
Shortbelly	11.7	11.4	0.3	13,900	13,900	9.8%	0	11.4	11.4	99.7%	90.2%	0.3		0.0%
Widow	547.0	193.5	353.5	3,871	856	63.9%	226	38.8	38.8	14.6%	32.7%	115.8	154.7	57.2%
Canary	109.7	41.2	68.4	272	93	82.8%	42	34.7	34.7	45.4%	4.8%	2.4	5.2	68.5%
Chilipepper	249.0	74.0	175.0	2,700	2,000	94.5%	153	74.0	74.0	32.6%	3.0%	5.3		0.0%
Bocaccio	140.3	28.6	111.7	198	100	82.9%	93	28.0	28.0	23.3%	0.9%	0.2	0.6	76.2%
Splitnose	79.1	22.6	56.5	615	461	55.7%	31	22.6	22.6	41.8%	38.4%	21.7		0.0%
Yellowtail	1,532.3	285.6	1,246.6	3,146	3,146	70.9%	884	285.6	285.6	24.4%	1.0%	12.0		0.0%
Shortspine Thornyheads	1,155.7	389.4	766.3	1,004	955	85.6%	656	389.4	389.4	37.3%	1.7%	13.1		0.0%
Longspine Thds. (north)	2,098.4	373.3	1,725.1	2,461	2,461	98.5%	1,699	373.3	373.3	18.0%	0.0%	0.0		
Longspine Thds. (south)	124.7	0.0	124.7	390	195	98.5%	123		0.0	0.0%	0.0%	0.0		
Unsp. Thornyheads	71.6	0.0	71.6				0		0.0			0.0		
Cowcod, Monterey	2.2	1.4	0.8	19	2.4	64.6%	1	1.4	1.4	74.0%		0.0		
Cowcod, Conception	0.0	0.0	0.0	5	2.4		0		0.0			0.0		
Yelloweye	11.2	2.1	9.1	52	13.5	21.2%	0.7	0.5	0.5	41.1%	0.5%	0.0		0.0%
Darkblotched	202.2	96.3	105.9	205	168	93.3%	99	93.0	93.0	48.5%	3.8%	4.0	3.2	44.2%

a/ Preliminary estimates of total catch mortality based on species discard assumptions used when the OYs were set. These assumptions are currently being revised using data from the West Coast Groundfish Observer Program.
b/ Preliminary estimated discard mortality in the commercial fishery. Preliminary trawl discard calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer data to 2002 trawl logbook data, by area and depth strata
c/ Includes shoreside commercial and tribal landings from PacFIN, observed total catch including estimated discards in the at-sea whiting fishery, and RecFIN recreational catch plus observed discard mortality (A+B1).
d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

Table 9 (BC1.6) Draft estimated 2003 total catch mortality of selected groundfish species from West Coast commercial, tribal and recreational fisheries (mt). Shoreside and at-sea refer to the limited entry trawl fisheries. a/

	LANDINGS AND MORTALITY			TARGETS			Shoreside					At Sea		
Species	Estimated Total Catch	Esti-mated Com-mercial Fishery Discard Mortality b/	Actual Landing s c/	Total Catch ABC	Total Catch OY	% shoresid e landed catch	Esti-mated shore-side landed catch	Shore-side discard	Shore-side discard mortality	%shore-side discard mor-tality	% At-sea Catch	Esti-mated at-sea catch	At-sea whiting bycatch	% at-sea discard mor-tality
Lingcod	1,355.6	70.7	1,284.9	841	651	37.4%	62	137.8	68.9	52.7%	0.3%	0.5	0.5	52.6%
Pacific Cod	1,323.1	73.5	1,249.6	3,200	3,200	82.6%	1,033	73.5	73.5	6.6%	0.0%	0.2		
Pacific Whiting d/	142,913.8	1,422.7	141,491.	148,200	42.1%	59,511	1,422.7	1,422.7	2.3%	54.6%	77,185.9			
Sablefish (north)	6,386.6	1,126.1	5,260.5	8,209	6,500	41.9%	2,205	2,067.4	1,033.7	31.9%	0.3%	16.4		
Sablefish (south)	204.0	0.0	204.0	441	294		0					0.0		
Dover sole	8,342.2	956.6	7,385.7	8,510	7,440	99.5%	7,346	956.6	956.6	11.5%	0.0%	0.9		
English sole	1,241.4	339.0	902.4	3,100		92.0%	830	339.0	339.0	29.0%	0.0%	0.0		
Petrale sole	2,160.6	144.4	2,016.2	2,762		95.3%	1,921	144.4	144.4	7.0%	0.0%	0.0		
Arrowtooth flounder	3,243.5	904.8	2,338.7	5,800		98.7%	2,309	904.8	904.8	28.2%	0.1%	2.8		
Other flatfish	2,093.5	490.7	1,602.8	7,700		88.5%	1,418	490.7	490.7	25.7%	0.5%	8.4		
Pacific Ocean Perch	160.1	21.9	138.2	689	377	95.8%	132	15.5	15.5	10.5%	3.8%	5.3	6.3	54.5%
Shortbelly	9.3	2.3	7.0	13,900	13,900	25.4%	2	2.3	2.3	56.5%	47.9%	3.3		
Widow	57.9	16.1	41.8	3,871	832	41.0%	17	1.7	1.7	8.8%	31.0%	13.0	14.4	52.7%
Canary	48.5	14.2	34.3	272	44	81.3%	8	12.7	12.7	61.6%	2.5%	0.2	0.9	79.3%
Chilipepper	49.5	15.4	34.1	2,700	2,000	90.8%	31	15.4	15.4	33.2%	6.3%	2.1		
Bocaccio	29.1	8.5	20.6	198	20	19.6%	4	8.2	8.2	67.0%	4.0%	0.8	0.3	25.9%
Splitnose	118.8	9.3	109.5	615	461	60.7%	66	9.3	9.3	12.2%	34.4%	37.7		
Yellowtail	504.5	22.1	482.4	3,146	3,146	32.8%	158	22.1	22.1	12.3%	0.2%	1.2		
Shortspine Thornyheads	1,220.2	387.8	832.4	1,004	955	81.2%	676	387.8	387.8	36.5%	2.1%	17.8		
Longspine Thds. (north)	1,834.8	323.9	1,510.9	2,461	2,461.0	97.5%	1,473	323.9	323.9	18.0%		0.0		
Longspine Thds. (south)	0.0	0.0	0.0	390	195.0	97.5%	0				0.0%	0.0		
Cowcod, Monterey	0.4	0.2	0.1	19	2.4	0.0%	0	0.2	0.2	100.0%	0.0%	0.0		
Cowcod, Conception	0.0	0.0	0.0	5	2.4		0					0.0		
Yelloweye	8.1	1.5	6.6	52	22	41.2%	0	0.3	0.3	39.8%	0.6%	0.0		
Darkblotched	139.9	51.8	88.1	205	172	93.8%	82.6	47.3	47.3	36.4%	5.5%	4.8	4.3	47.3%
Black RF (north)	174.0	0.0	174.0	615		49.9%	0					0.0		
Black RF (north)	976.1	0.0	976.1	500		49.9%	0					0.0		

a/ Preliminary estimates of total catch mortality based on species discard assumptions used when the OYs were set. These assumptions are currently being revised using data from the West Coast Groundfish Observer Program.
b/ Preliminary estimated discard mortality in the commercial fishery. Preliminary trawl discard calculated by applying discard mortality rates from combined 2001-03 West Coast Groundfish Observer data to 2002 trawl logbook data, by area and depth strata
c/ Includes shoreside commercial and tribal landings from PacFIN, observed total catch including estimated discards in the at-sea whiting fishery, and RecFIN recreational catch plus observed discard mortality (A+B1).
d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

Table 10 (BC1.7) Draft estimated 2002 and 2003 percent discard mortality of selected groundfish species from selected sectors of West Coast commercial, tribal, and recreational fisheries compared to estimates from British Columbia bottom trawl trips.

	W.C. All Sectors [a]		W.C. Shoreside Trawl [b]		W.C. At-sea Trawl [b]		W.C. Non-Whiting Bottom Trawl [c]		British Columbia Bottom Trawl [d]	
Species	2002	2003	2002	2003	2002	2003	2001-02	2002-03	2001-02	2002-03
Lingcod	16%	6%	61%	53%	33%	53%	74%	77%	8%	11%
Pacific Cod	5%	6%	6%	7%	0%	0%				
Pacific Whiting c/	2%	1%	4%	2%	0%	0%	99%	95%	80%	96%
Sablefish (north)	16%	18%	30%	32%	0%	0%	57%	32%	54%	69%
Sablefish (south)	0%	0%								
Dover sole	17%	11%	17%	12%	0%	0%	17%	10%	9%	10%
English sole	26%	27%	27%	29%	0%	0%				
Petrale sole	9%	7%	9%	7%			8%	6%	4%	9%
Arrowtooth flounder	58%	28%	58%	28%	0%	0%	51%	40%	24%	40%
Other flatfish	27%	23%	31%	26%	0%	0%	38%	34%	27%	27%
Pacific Ocean Perch	19%	14%	17%	10%	51%	54%	12%	15%	1%	1%
Shortbelly	97%	25%	100%	56%	0%	0%				
Widow	35%	28%	15%	9%	57%	53%	4%	66%	0%	0%
Canary	38%	27%	45%	62%	69%	79%	45%	63%	1%	0%
Chilipepper	30%	31%	33%	33%	0%	0%				
Bocaccio	20%	29%	23%	67%	76%	26%	79%	100%	0%	0%
Splitnose	29%	8%	42%	12%	0%	0%				
Yellowtail	19%	4%	24%	12%	0%	0%	22%	2%	0%	0%
Shortspine	34%	32%	37%	36%	0%	0%	34%	31%	5%	4%
Longspine Thds. North	18%	18%	18%	18%			19%	20%	10%	10%
Longspine Thds. South										
Uns. Thornyheads										
Cowcod, Monterey	65%	50%	74%	100.0%						
Cowcod, Conception										
Yelloweye	19%	19%	41%	39.8%	0%	47%	74%	74%	50%	64%
Darkblotched	48%	37%	48%	36%	44%		49%	60%	11%	15%
Black Rockfish (north)		0%								
Black Rockfish (south)		0%								

a/ Preliminary estimated discard mortality rate in the West Coast groundfish commercial fishery with respect to total estimated harvest of all fisheries (commercial, recreational, and tribal), including discard. Commercial discard rates based on West Coast Groundfish Observer Program.
b/ Preliminary estimated discard mortality rate in the West Coast groundfish shoreside and at-sea limited entry trawl sectors - including P. whiting.
c/ Preliminary estimate discard rates in the West Coast groundfish shoreside limited entry bottom trawl sector. Commercial discard rates based on WCGOP observer-covered bottom trawl trips only (NMFS, 2004). Estimated discard was expanded to the entire fishery by dividing by the amount of observer coverage (13% in 2001-02 and 16% in 2002-03). Trips excluded midwater trawl shoreside fishery directed at Pacific whiting.
d/ 100% observer coverage. Estimated discard rate = discards/(discards + landings) x 100 as percentage for the bottom trawl component of the British Columbia groundfish fishery 2001-02 and 2002-03. (Branch et al., 2004).

TABLE 11 (BC1.8) Tools potentially useful in reducing bycatch (at-sea discards) under an IFQ program for the West Coast groundfish trawl fishery - adapted from Quigley (2004).

IQ Tool	How it Potentially Reduces Bycatch	Potential Downsides
Quota transferability	Quota transfer may lead to concentration of effort and increase in shares per vessel, potentially reducing the number of occasions a vessel comes up against a quota limit. Transferability also allows purchase of quota needed in areas of high bycatch.	High transaction costs. Concentration of shares due to transfers lead to adverse economic shifts.
Incorporation of overfished species into the IQ program	Reducing bycatch of overfished species can permit more access to target species; bycatch quota shares can thus be freed and used in high bycatch rate areas.	If quota shares for overfished species are small, the IQ managed fishery could be influenced by excessive catches of these species in non-IQ fisheries receiving an overall allocation.
Incorporation of other gear types into the IQ program	If all sectors fishing in an IQ species are in an IQ program and shares could be transferred between sectors, then sectors with an IQ deficit could purchase surplus shares and reduce bycatch by finding covering shares.	Difficulty allocating and managing shares to sectors with a large number of participants - (recreational fishery).
Incorporation of non-marketable species into the IQ program	Prevents excessive fishing pressure on non-IQ and formerly non-marketable species; can also create a controlled environment for development of new markets.	May be no survey or assessment data to determine appropriate OY and IQ shares. Extra cost to IQ fishermen to purchase shares for a low value species.
Quota market that is convenient and easy to use.	Creates a central location for sellers/buyers to locate shares and keeps transaction costs low. Allows those needed quota to 'cover' catch with purchased shares to do so - a disincentive to discarding species with little or no share remaining at time of capture.	Quota shares may not be available when needed or price may be substantially higher than market value. A government created market may be cost prohibitive - tracking costs may be prohibitive.
Full observer coverage	Increased accountability, eliminates incentive to discard fish that will count against quota share.	Less than 100% observer coverage and or video monitoring would leave the door open to high-grading and discarding of fish not covered by quota share.
Carryover provisions	Provides a means of handling catch in excess of quota share - reduces incentives to discard instead of landing fish.	Additional tracking costs.
Adequate penalties for overcatches	Provides incentive to incorporate selective fishing strategies that minimize bycatch of overfished or prohibited species, promotes individual accountability.	If penalties are too high, or the threshold for application of penalties is too low, incentives for discarding might increase.
Education program	Knowledge of impact of at-sea discards on the resource and IQ holdings and value provide incentives for minimizing waste.	

Table 12 (AE 1.1) Total allowable catches (TAC) of groundfish by British Columbia management area.

Species	Management Area	TAC (mt)
Yellowtail Rockfish	3C	995
	3D, 5A/5B, 5C/D/E	3,427
Widow Rockfish	Coastwide	4,422
Canary Rockfish	3C/D	529
	5A/B	265
	5C/D	101
	5E	151
Silvergrey Rockfish	3C/D	216
	5A/B	421
	5C/D	382
	5E	248
Pacific Ocean Perch	3C	300
	3D	230
	5A/B	2,070
	5C/D	2,818
	5E	730
Yellowmouth Rockfish	3C	219
	3D, 5A/5B	1,135
	5C/D	685
	5E	325
Rougheye Rockfish	Coastwide	530
Shortraker Rockfish	Coastwide	105
Redstripe Rockfish	3C	173
	3D,5A/B	772
	5C/D	330
	5E	246
Shortspine Thornyheads	Coastwide	736
Longspine Thornyheads	Coastwide	405
Qullback, Copper, China, and Tiger Rockfish	Coastwide	5
Pacific Cod	3C/D	500
	5A/B	390
	5C/D/E	400
Dover Sole	3C/D	1,375
	5C/D/E	1,100
Rock Sole	3C/D	102
	5A/B	875
	5C/D	673
Lemon Sole	3C/D	186
	5C/D/E	544
Petrale Sole	Coastwide	600
Lingcod	3C	800
	3D	220
	5A/B	862
	5C/D/E	580
Dogfish	4B	1,600
	Rest of Coast	3,840
Sablefish	Coastwide	384
Pollock	Gulf	1,115
	5A/B	1,790
Hake	Gulf	10,000
	Offshore	134,372
Big Skate	5C/D	567
Longnose skate	5C/D	47

Table 13 (SQ1) Onshore Ex-Vessel Value by Port Group in 2003.

Port Group	GF LE (EEZ) Trawl Ex-Vessel Value Non-Whiting	Whiting	Total	Total Onshore Ex-Vessel Value	Percent GF LE Trawl Ex-Vessel Value
Washington	3,598,255	1,283,316	4,881,571	130,848,529	4%
1.01 Northern Puget Sound	2,285,912	1,201	2,287,113	28,690,565	8%
BELLINGHAM BAY	1,606,205	1,201	1,607,406	18,735,747	9%
BLAINE	679,707		679,707	4,033,118	17%
1.02 Southern Puget Sound				19,999,898	0%
1.03 Coastal Washington North	884,797		884,797	15,470,059	6%
1.04 Coastal Washington South and Central	427,546	1,282,115	1,709,661	62,496,204	3%
ILWACO/CHINOOK	5,271	227,632	232,903	17,308,879	1%
WESTPORT	422,275	1,054,483	1,476,758	38,393,537	4%
1.05 Unidentified Washington				4,191,803	0%
Oregon	12,766,494	3,642,453	16,408,947	82,526,895	20%
2.01 Astoria	5,185,741	1,443,180	6,628,921	27,584,980	24%
2.02 Tillamook	88,397		88,397	3,510,475	3%
2.03 Newport	2,786,118	1,997,470	4,783,588	24,793,494	19%
2.04 Coos Bay	3,536,915	201,803	3,738,718	18,033,249	21%
COOS BAY	3,514,865	201,803	3,716,668	15,898,092	23%
FLORENCE	22,050		22,050	686,491	3%
2.05 Port Orford				1,972,609	0%
2.06 Brookings	1,169,323		1,169,323	6,632,088	18%
California	8,582,254	165,506	8,747,760	126,556,748	7%
3.01 Crescent City	1,092,483	2,925	1,095,408	16,841,548	7%
3.02 Eureka	2,448,485	162,581	2,611,066	15,793,366	17%
3.03 Fort Bragg	1,562,767		1,562,767	11,042,291	14%
FORT BRAGG	1,554,089		1,554,089	10,122,437	15%
OTHER MENDOCINO COUNTY PORTS	8,678		8,678	69,833	12%
3.04 Bodega Bay	252,929		252,929	5,636,957	4%
3.05 San Francisco	1,112,135		1,112,135	14,436,063	8%
OTHER S. F. BAY AND SAN MATEO COUNTY PORTS	7,482		7,482	292,732	3%
PRINCETON / HALF MOON BAY	384,914		384,914	4,832,816	8%
SAN FRANCISCO	719,739		719,739	8,431,778	9%
3.06 Monterey	1,158,864		1,158,864	13,355,440	9%
MONTEREY	252,993		252,993	3,085,877	8%
MOSS LANDING	898,033		898,033	9,657,024	9%
SANTA CRUZ	7,838		7,838	583,149	1%
3.07 Morro Bay	953,081		953,081	3,465,129	28%
AVILA	825,428		825,428	1,699,297	49%
MORRO BAY	127,653		127,653	1,756,492	7%
3.08 Santa Barbara				21,038,279	0%
3.09 Los Angeles	293		293	19,196,550	0%
3.10 San Diego	1,217		1,217	5,612,176	0%
3.11 Unidentified California				138,949	0%
Total West Coast Onshore	24,947,003	5,091,275	30,038,278	339,932,172	9%

Table 14 (SQ2) Onshore Vessel, Buyer, and Delivery Counts by Port Group in 2003.

Port Group	Bought-out Vessels: Vessels Count	Bought-out Vessels: Vessels Percent	Bought-out Vessels: GF LE (EEZ) Trawl Ex-Vessel Value Non-Whiting	Bought-out Vessels: GF LE (EEZ) Trawl Ex-Vessel Value Whiting	Bought-out Vessels: GF LE (EEZ) Trawl Ex-Vessel Value Total	GF LE Trawl Vessels	Total Vessels	GF LE Trawl Buyers	Total Buyers	Large GF LE Trawl Buyers	Total Large Buyers	GF LE Trawl Deliveries	Total Deliveries
Washington	16	59%	2,868,683	379,297	3,247,980	27	1,168	9	397	8	47	993	75,523
1.01 Northern Puget Sound	6	75%	1,695,005	1,201	1,696,206	8	370	4	111	4	17	244	25,752
BELLINGHAM BAY													
BLAINE													
1.02 Southern Puget Sound							123		117		16		16,384
1.03 Coastal Washington North	4	57%	473,734		473,734	7	116	2	69	1	8	496	10,968
1.04 Coastal Washington South and Central	6	50%	699,944	378,096	1,078,040	12	558	3	122	3	17	253	16,461
ILWACO/CHINOOK													
WESTPORT													
1.05 Unidentified Washington							1		9		1		5,982
Oregon	29	31%	4,910,066	81,112	4,991,178	94	1,034	18	269	11	20	2,503	32,603
2.01 Astoria	9	28%	1,549,883	2,759	1,552,642	32	322	3	63	3	9	891	9,418
2.02 Tillamook						3	110	2	44	1	4	41	3,801
2.03 Newport	7	28%	1,266,270	77,921	1,344,191	25	246	4	105	3	9	843	6,148
2.04 Coos Bay	7	32%	1,373,257	432	1,373,689	22	217	10	99	6	8	589	6,436
COOS BAY													
FLORENCE													
2.05 Port Orford							57		12		3		3,116
2.06 Brookings	6	50%	720,656		720,656	12	82	4	33	3	5	139	3,684
California	46	54%	4,832,809		4,832,809	85	2,085	53	894	23	55	2,354	75,648
3.01 Crescent City	13	76%	788,600		788,600	17	122	7	51	6	16	224	3,824
3.02 Eureka	16	70%	2,254,037		2,254,037	23	125	8	79	6	13	417	4,895
3.03 Fort Bragg	5	50%	601,607		601,607	10	218	5	109	4	20	219	6,427
FORT BRAGG													
OTHER MENDOCINO COUNTY PORTS													
3.04 Bodega Bay	1	C	120,289		120,289	C	187	5	136	3	19	C	3,794
3.05 San Francisco	3	21%	154,085		154,085	14	331	26	243	14	27	586	8,764
OTHER S. F. BAY AND SAN MATEO COUNTY													
PRINCETON / HALF MOON BAY													
SAN FRANCISCO													
3.06 Monterey	3	25%	405,612		405,612	12	243	16	117	4	18	695	7,419
MONTEREY													
MOSS LANDING													
SANTA CRUZ													
3.07 Morro Bay	5	56%	508,579		508,579	9	149	7	67	3	11	139	4,069
AVILA													
MORRO BAY													
3.08 Santa Barbara							268		211		27		15,557
3.09 Los Angeles						C	293	1	172		18	C	12,874
3.10 San Diego						C	140	1	88	1	10	C	7,237
3.11 Unidentified California							9		18		1		788
Total West Coast Onshore	91	44%	12,611,558	460,409	13,071,967	206	4,287	80	1,560	42	122	5,850	183,739

Notes: 1. Vessel counts exclude invalid vessel ID's. Vessels are assigned to only one port group. GF LE trawl vessels are those that made a GF LE trawl landing at any of the ports in 2003.
2. Bought-out vessel's homeport port group was for last landings. Six of the 91 vessels had no landings in 2003, two of the vessels had no landings in 2002 and 2003, and one of the vessels had no landings 2001 through 2003. Bought-out vessel percent is a relative comparison against unique vessels making GF LE trawl landings.
3. Large buyers are those with purchases over $500,000.
C = Data withheld for confidentiality reasons.

Table 15 (SQ3) Onshore Ex-processor Value and Regional Income Impacts (REI) by Port Group in 2003.

Port Group	Non-Whiting GF LE Trawl Ex-Processor Value	Non-Whiting GF Other Trawl Ex-Processor Value	Non-Whiting Groundfish Ex-Processor Value	Whiting Ex-Processor Value	Total Ex-Processor Value	Non-Whiting GF LE Trawl REI	Non-Whiting GF Other Trawl REI	Non-Whiting Groundfish REI	Whiting REI	Total REI
Washington	5,911,560	3,944,752	18,461,965	9,528,686	224,237,275	8,707,992	5,812,038	26,946,665	12,331,142	317,207,142
1.01 Northern Puget Sound	3,854,090	2,277,525	8,838,882	44,062	46,359,504	5,847,815	3,429,949	13,279,928	61,313	69,597,908
Bellingham Bay										
Blaine										
1.02 Southern Puget Sound			429,799		32,981,949			617,333		44,585,730
1.03 Coastal Washington North	1,368,156	1,473,507	5,661,641		21,380,862	2,070,452	2,252,437	8,540,077		30,700,848
1.04 Coastal Washington South and Central	689,084	193,509	2,670,847	9,484,624	117,368,365	1,010,289	286,189	3,888,026	11,665,072	165,392,763
Ilwaco/chinook										
Westport										
1.05 Unidentified Washington										
Oregon	19,280,113	71,164	25,122,550	13,517,031	156,762,270	28,446,825	133,904	36,831,648	16,170,245	214,966,187
2.01 Astoria	7,818,584	71,164	8,626,142	5,362,197	66,663,105	11,360,081	131,994	12,438,227	5,556,608	91,155,596
2.02 Tillamook	117,753		274,145		5,559,887	174,755		423,343		7,528,132
2.03 Newport	4,270,043		6,180,467	7,407,679	42,419,652	6,390,906		9,137,301	8,051,816	57,081,497
2.04 Coos Bay	5,326,031		6,695,025	747,156	28,043,274	8,020,823		9,979,488	275,657	38,948,104
Coos Bay										
Florence										
2.05 Port Orford										
2.06 Brookings	1,747,696		3,346,573		12,161,090	2,550,859		4,924,513		17,410,047
California	13,055,963	15,337	20,453,693	934,489	230,012,648	18,559,128	21,718	29,233,003	1,087,785	319,340,306
3.01 Crescent City	1,629,139		2,361,209	11,216	24,071,209	2,334,420		3,394,066	11,860	36,318,315
3.02 Eureka	3,686,011	6,697	4,179,458	919,965	23,900,178	5,272,350	9,571	5,989,338	1,002,989	32,751,593
3.03 Fort Bragg	2,440,522		3,463,775		15,629,060	3,487,827		4,978,158		21,913,700
Fort Bragg										
Other Mendocino County Ports										
3.04 Bodega Bay	374,375		446,364		8,027,267	523,606		626,597		11,150,910
3.05 San Francisco	1,608,227	408	2,090,075		23,592,974	2,234,829	645	2,920,854		26,444,098
Other S. F. Bay and San Mateo County										
Princeton / Half Moon Bay										
San Francisco										
3.06 Monterey	1,842,919	4,844	3,325,897		32,650,260	2,506,978	6,674	4,553,736		40,459,723
Monterey										
Moss Landing										
Santa Cruz										
3.07 Morro Bay	1,472,830	967	2,534,612		5,240,139	2,213,498	1,457	3,846,301		7,516,800
Avila										
Morro Bay										
3.08 Santa Barbara		1,725	465,855	191	39,759,508		2,593	633,894	107	51,799,593
3.09 Los Angeles	325		1,057,269	3,117	49,626,436	505	26	1,395,914	2,565	67,077,532
3.10 San Diego	1,387		528,718		7,301,367	2,004		629,806		10,236,289
3.11 Unidentified California										
Total West Coast Onshore	38,247,637	4,031,253	64,038,208	23,980,206	611,012,194	55,713,944	5,967,660	93,011,316	29,589,172	851,513,634

Notes: 1. Ex-processor value and regional income impacts (REI) are estimated using PFMC Fisheries Economic Assessment Model (FEAM)

Table 16 (DQ1a) PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
WOC	Yellowtail Rockfish	10,937,997	14,401,345	3,463,348	+	10,553,027	10,737,965	184,938	+	12,434,743	12,436,872	2,129	+
WOC	Canary Rockfish	207,276	4,070,977	3,863,701	+	1,801,544	2,104,176	302,632	+	2,461,435	2,859,588	398,153	+
WOC	Widow Rockfish	13,677,020	15,659,056	1,982,036	+	14,690,844	14,766,162	75,318	+	14,135,185	13,947,406	187,779	<
WOC	Lingcod	6,406,817	6,408,946	2,129	+	3,854,983	3,858,271	3,288	+	4,085,254	4,087,571	2,317	+
WOC	Sablefish	18,099,035	18,095,241	3,794	<	18,430,861	18,451,847	20,986	+	19,050,648	18,993,734	56,914	<
WOC	Longspine Thornyhead		9,667,553	9,667,553	+	12,554,999	12,161,667	393,332	<	10,992,753	10,684,909	307,844	<
WOC	Shortspine Thornyhead	1,251,004	8,130,308	6,879,304	+	3,557,815	4,266,837	709,022	+	3,279,126	3,655,744	376,618	+
WOC	Dover Sole	22,925,454	22,888,834	36,620	<	24,398,964	24,395,089	3,875	<	27,971,907	27,828,694	143,213	<
WOC	Pacific Cod	2,823,708	2,823,358	350	<	2,035,758	2,035,728	30	<	1,673,165	1,671,597	1,568	<
WOC	Pacific Ocean Perch	7,917,420	4,981,129	2,936,291	<	5,746,110	4,250,215	1,495,895	<	5,324,141	3,741,038	1,583,103	<
WOC	Shortbelly Rockfish	6,195	94,685	88,490	+	12,600	70,370	57,770	+	61,440	79,146	17,706	+
WOC	Chilipepper	2,697,929	4,104,352	1,406,423	+	2,821,434	4,422,784	1,601,350	+	2,749,817	3,956,665	1,206,848	+
WOC	Bocaccio	1,887,791	3,029,540	1,141,749	+	1,679,617	2,782,216	1,102,599	+	1,022,012	1,574,581	552,569	+
WOC	Splitnose Rockfish	4,029	1,019,969	1,015,940	+	18	955,820	955,802	+	370	1,064,174	1,063,804	+
WOC	Bank Rockfish	56,439	749,602	693,163	+	106,377	899,800	793,423	+	66,639	1,221,580	1,154,941	+
WOC	Other Sebastes Complex	576,233	3,570,185	2,993,952	+	520,424	5,208,954	4,688,530	+	514,100	4,838,438	4,324,338	+
WOC	Black Rockfish	456,967	683,231	226,264	+	465,134	590,960	125,826	+	582,558	569,149	13,409	<
WOC	Blackgill Rockfish	579,910	862,273	282,363	+	410,645	774,388	363,743	+	479,863	825,502	345,639	+
WOC	Cowcod Rockfish	33,718	75,597	41,879	+	52,129	144,034	91,905	+	34,054	88,452	54,398	+
WOC	Darkblotched Rockfish		1,882,413	1,882,413	+		1,668,955	1,668,955	+	178	1,769,899	1,769,721	+
WOC	Redstripe Rockfish	2,478,028	1,658,897	819,131	<	1,991,826	2,147,563	155,737	+	2,445,342	1,926,451	518,891	<
WOC	Sharpchin Rockfish		1,074,289	1,074,289	+		836,965	836,965	+		748,550	748,550	+
WOC	Yelloweye Rockfish	56,765	551,500	494,735	+	67,001	629,393	562,392	+	99,667	457,641	357,974	+
WOC	Yellowmouth Rockfish		565,402	565,402	+		261,345	261,345	+		416,617	416,617	+
WOC	Other Rockfish	40,428,166	6,311,761	34,116,405	<	18,301,842	5,564,643	12,737,199	<	17,657,225	7,018,630	10,638,595	<
WOC	English Sole	3,094,450	3,093,994	456	<	3,068,628	3,068,554	74	<	3,196,424	3,196,351	73	<
WOC	Petrale Sole	3,242,583	3,242,272	311	<	3,865,899	3,865,822	77	<	4,149,998	4,149,895	103	<
WOC	Arrowtooth Flounder	11,056,894	11,053,730	3,164	<	8,733,941	8,734,175	234	+	8,490,099	8,485,047	5,052	<
WOC	Other Groundfish	13,583,829	13,690,235	106,406	+	12,558,220	12,558,185	35	<	13,210,056	13,208,681	1,375	<
	Total	164,485,657	164,440,674	75,788,061	<	152,280,640	152,212,883	29,193,277	<	156,168,199	155,502,602	26,250,241	<
	% movement			46%				19%				17%	

Table 16 (DQ1a) PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1997				1998				1999			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
WOC	Yellowtail Rockfish	5,826,917	6,208,923	382,006	+	7,459,317	7,671,158	211,841	+	6,615,446	6,643,215	27,769	+
WOC	Canary Rockfish	2,649,090	2,767,765	118,675	+	2,919,505	2,961,579	42,074	+	1,675,240	1,734,100	58,860	+
WOC	Widow Rockfish	17,149,999	17,067,608	82,391	<	10,876,295	10,770,806	105,489	<	9,976,121	9,978,952	2,831	+
WOC	Lingcod	3,848,847	3,845,529	3,318	<	1,196,824	1,196,809	15	<	1,036,277	1,018,473	17,804	<
WOC	Sablefish	18,157,992	18,143,415	14,577	<	10,097,480	10,085,958	11,522	<	15,059,150	15,046,250	12,900	<
WOC	Longspine Thornyhead	9,259,242	8,842,736	416,506	<	5,164,514	4,932,071	232,443	<	4,086,470	3,931,429	155,041	<
WOC	Shortspine Thornyhead	2,790,802	3,210,468	419,666	+	2,521,189	2,750,251	229,062	+	1,646,856	1,848,217	201,361	+
WOC	Dover Sole	23,292,675	23,189,549	103,126	<	18,652,557	18,644,877	7,680	<	20,860,393	20,828,306	32,087	<
WOC	Pacific Cod	1,739,228	1,738,036	1,192	<	1,612,592	1,609,631	2,961	<	789,782	787,025	2,757	<
WOC	Pacific Ocean Perch	5,181,273	3,645,121	1,536,152	<	4,906,761	3,545,226	1,361,535	<	3,655,338	3,043,835	611,503	<
WOC	Shortbelly Rockfish	44,888	164,870	119,982	+	15,088	52,054	36,966	+	17,634	17,813	179	+
WOC	Chilipepper	2,809,220	4,490,441	1,681,221	+	2,064,568	3,121,510	1,056,942	+	1,943,944	2,091,765	147,821	+
WOC	Bocaccio	599,993	1,563,145	963,152	+	297,317	954,855	657,538	+	150,905	382,829	231,924	+
WOC	Splitnose Rockfish	936	1,242,041	1,241,105	+	89,585	3,332,739	3,243,154	+	74,081	532,393	458,312	+
WOC	Bank Rockfish	81,466	930,022	848,556	+	451,652	1,226,260	774,608	+	27,166	84,719	57,553	+
WOC	Other Sebastes Complex	574,684	3,072,816	2,498,132	+	535,239	3,776,699	3,241,460	+	441,236	2,440,848	1,999,612	+
WOC	Black Rockfish	667,829	675,717	7,888	+	624,227	644,164	19,937	+	411,418	392,661	18,757	<
WOC	Blackgill Rockfish	414,261	825,508	411,247	+	348,464	525,112	176,648	+	77,976	161,273	83,297	+
WOC	Cowcod Rockfish	21,635	120,117	98,482	+	25,771	43,030	17,259	+	6,810	24,806	17,996	+
WOC	Darkblotched Rockfish	25,513	1,895,402	1,869,889	+	8,203	2,027,353	2,019,150	+	1,259	848,549	847,290	+
WOC	Redstripe Rockfish	2,342,716	626,298	1,716,418	<	1,947,558	600,128	1,347,430	<	531,313	165,260	366,053	<
WOC	Sharpchin Rockfish		864,696	864,696	+		268,236	268,236	+		144,838	144,838	+
WOC	Yelloweye Rockfish	92,221	437,598	345,377	+	38,216	177,339	139,123	+	20,670	250,222	229,552	+
WOC	Yellowmouth Rockfish		249,557	249,557	+		97,748	97,748	+		90,606	90,606	+
WOC	Other Rockfish	13,504,618	4,843,939	8,660,679	<	13,932,059	4,427,087	9,504,972	<	6,609,452	2,763,077	3,846,375	<
WOC	English Sole	3,729,087	3,729,005	82	<	3,260,367	3,260,020	347	<	2,584,809	2,584,743	66	<
WOC	Petrale Sole	4,387,578	4,387,541	37	<	3,363,974	3,363,905	69	<	3,428,529	3,428,465	64	<
WOC	Arrowtooth Flounder	8,026,214	8,026,137	77	<	10,749,413	10,749,370	43	<	14,227,305	14,227,270	35	<
WOC	Other Groundfish	15,839,934	15,838,590	1,344	<	10,368,169	10,367,700	469	<	10,769,144	10,766,813	2,331	<
	Total		142,642,590	24,655,530	<	113,526,904	113,183,675	24,806,721	<	106,724,724	106,258,752	9,665,574	<
	% movement			17%				22%				9%	

Table 16 (DQ1a) PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		2000				2001				2002			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
WOC	Yellowtail Rockfish	6,983,467	6,968,763	14,704	<	4,598,252	4,343,849	254,403	<	2,440,038	2,445,788	5,750	+
WOC	Canary Rockfish	218,288	223,503	5,215	+	197,629	196,475	1,154	<	153,888	155,348	1,460	+
WOC	Widow Rockfish	8,506,565	8,525,619	19,054	+	5,258,424	5,295,547	37,123	+	896,964	899,799	2,835	+
WOC	Lingcod	475,382	475,759	377	+	397,646	397,305	341	<	567,774	567,703	71	<
WOC	Sablefish	14,172,361	14,199,116	26,755	+	12,729,958	12,744,790	14,832	+	8,646,658	8,658,457	11,799	+
WOC	Longspine Thornyhead	3,667,490	3,340,040	327,450	<	2,720,716	2,629,909	90,807	<	4,337,625	4,170,137	167,488	<
WOC	Shortspine Thornyhead	1,392,914	1,739,267	346,353	+	1,047,218	1,149,770	102,552	+	1,511,386	1,690,752	179,366	+
WOC	Dover Sole	19,669,615	19,672,050	2,435	+	15,297,351	15,334,197	36,846	+	14,043,123	14,046,785	3,662	+
WOC	Pacific Cod	883,149	883,178	29	+	1,011,686	1,011,608	78	<	2,149,757	2,149,659	98	<
WOC	Pacific Ocean Perch	1,141,874	1,158,661	16,787	+	709,604	708,326	1,278	<	446,132	449,532	3,400	+
WOC	Shortbelly Rockfish	42,795	42,795	-	0	11,679	11,679	-	0	138	269	131	+
WOC	Chilipepper	986,692	1,012,979	26,287	+	764,281	954,261	189,980	+	346,795	367,102	20,307	+
WOC	Bocaccio	54,486	67,160	12,674	+	48,471	83,394	34,923	+	46,257	78,475	32,218	+
WOC	Splitnose Rockfish	49,962	232,378	182,416	+	30,475	171,127	140,652	+	40,304	149,345	109,041	+
WOC	Bank Rockfish	180,422	187,017	6,595	+	124,051	203,059	79,008	+	439,106	646,556	207,450	+
WOC	Other Sebastes Complex	2,107,986	1,476,345	631,641	<	1,621,564	1,217,936	403,628	<	1,360,162	962,192	397,970	<
WOC	Black Rockfish	350,682	337,240	13,442	<	555,764	542,192	13,572	<	484,113	487,064	2,951	+
WOC	Blackgill Rockfish	99,118	191,522	92,404	+	181,784	294,028	112,244	+	207,685	330,793	123,108	+
WOC	Cowcod Rockfish	1,626	2,909	1,283	+	56	1,904	1,848	+	113	311	198	+
WOC	Darkblotched Rockfish	25,148	497,257	472,109	+	206,606	357,228	150,622	+	174,543	236,009	61,466	+
WOC	Redstripe Rockfish	52,992	46,511	6,481	<	30,985	32,098	1,113	+	30,655	23,713	6,942	<
WOC	Sharpchin Rockfish		21,634	21,634	+		6,886	6,886	+		20,228	20,228	+
WOC	Yelloweye Rockfish	7,298	18,388	11,090	+	8,423	27,253	18,830	+	14,956	15,979	1,023	+
WOC	Yellowmouth Rockfish		22,652	22,652	+		8,345	8,345	+		4,575	4,575	+
WOC	Other Rockfish	2,574,229	2,347,935	226,294	<	2,010,710	1,897,029	113,681	<	9,554,401	9,333,386	221,015	<
WOC	English Sole	2,564,471	2,564,564	93	+	3,098,779	3,099,377	598	+	3,289,232	3,288,679	553	<
WOC	Petrale Sole	4,230,995	4,231,402	407	+	4,073,668	4,102,374	28,706	+	4,025,967	4,025,527	440	<
WOC	Arrowtooth Flounder	9,518,631	9,520,020	1,389	+	7,003,601	7,002,503	1,098	<	5,498,397	5,495,826	2,571	<
WOC	Other Groundfish	9,993,855	9,994,078	223	+	9,299,409	9,317,747	18,338	+	8,593,640	8,595,273	1,633	+
	Total	89,952,493	90,000,742	2,488,273	+	73,038,790	73,142,196	1,863,486	+	69,299,809	69,295,262	1,589,749	<
	% movement			3%				3%				2%	

Table 16 (DQ1a) PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003 (lbs).

2003

AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction
WOC	Yellowtail Rockfish	1,282,904	1,280,655	2,249	<
WOC	Canary Rockfish	169,198	169,206	8	+
WOC	Widow Rockfish	417,950	417,950	-	0
WOC	Lingcod	504,200	504,271	71	+
WOC	Sablefish	12,156,185	12,191,686	35,501	+
WOC	Longspine Thornyhead	3,559,033	3,430,688	128,345	<
WOC	Shortspine Thornyhead	1,590,470	1,745,525	155,055	+
WOC	Dover Sole	16,420,246	16,420,242	4	<
WOC	Pacific Cod	3,091,235	3,091,332	97	+
WOC	Pacific Ocean Perch	546,234	553,751	7,517	+
WOC	Shortbelly Rockfish	1,221	1,234	13	+
WOC	Chilipepper	38,799	40,002	1,203	+
WOC	Bocaccio	1,368	35,951	34,583	+
WOC	Splitnose Rockfish	49,778	349,592	299,814	+
WOC	Bank Rockfish	159,733	226,682	66,949	+
WOC	Other Sebastes Complex	949,890	878,986	70,904	<
WOC	Black Rockfish	387,705	384,079	3,626	<
WOC	Blackgill Rockfish	395,465	435,749	40,284	+
WOC	Cowcod Rockfish	11	101	90	+
WOC	Darkblotched Rockfish	164,615	177,041	12,426	+
WOC	Redstripe Rockfish	39,377	15,260	24,117	<
WOC	Sharpchin Rockfish		8,869	8,869	+
WOC	Yelloweye Rockfish	10,565	11,499	934	+
WOC	Yellowmouth Rockfish		9,069	9,069	+
WOC	Other Rockfish	2,038,197	1,625,426	412,771	<
WOC	English Sole	2,535,543	2,535,567	24	+
WOC	Petrale Sole	4,473,764	4,473,785	21	+
WOC	Arrowtooth Flounder	6,387,947	6,387,947	-	0
WOC	Other Groundfish	8,781,291	8,781,308	17	+
	Total	66,152,924	66,183,453	1,314,561	+
	% movement			2%	

Table 17 (DQ1b) PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
C	Yellowtail Rockfish	545,863	708,588	162,725	+	533,709	670,088	136,379	+	465,550	595,758	130,208	+
C	Canary Rockfish	207,276	463,788	256,512	+	341,978	429,008	87,030	+	404,443	595,134	190,691	+
C	Widow Rockfish	2,035,798	2,040,826	5,028	+	3,743,250	3,846,664	103,414	+	3,107,283	3,015,217	92,066	<
C	Lingcod	1,252,419	1,255,202	2,783	+	1,187,829	1,191,206	3,377	+	1,056,940	1,059,504	2,564	+
C	Sablefish	4,818,728	4,818,844	116	+	6,215,008	6,215,012	4	+	7,045,716	7,045,716	-	0
C	Longspine Thornyhead		4,443,310	4,443,310	+	5,840,791	5,674,388	166,403	<	5,420,011	5,353,617	66,394	<
C	Shortspine Thornyhead		2,593,210	2,593,210	+	1,652,892	2,118,409	465,517	+	1,543,068	1,712,707	169,639	+
C	Dover Sole	9,893,540	9,893,540	-	0	13,445,269	13,445,269	-	0	14,119,647	14,119,647	-	0
C	Pacific Cod	28	28	-	0	4	4	-	0	10	10	-	0
C	Pacific Ocean Perch	323	14,407	14,084	+	20	19,400	19,380	+	45	40,560	40,515	+
C	Shortbelly Rockfish	6,195	10,161	3,966	+	12,600	24,938	12,338	+	61,440	70,779	9,339	+
C	Chilipepper	2,697,929	4,063,232	1,365,303	+	2,821,434	4,402,530	1,581,096	+	2,749,817	3,936,350	1,186,533	+
C	Bocaccio	1,887,791	2,152,109	264,318	+	1,679,617	1,633,895	45,722	<	1,022,012	1,042,145	20,133	+
C	Splitnose Rockfish	4,029	702,350	698,321	+	18	763,530	763,512	+	370	912,101	911,731	+
C	Bank Rockfish	56,439	718,211	661,772	+	106,377	893,495	787,118	+	66,639	1,218,098	1,151,459	+
C	Other Sebastes Complex	576,233	2,092,270	1,516,037	+	520,424	1,787,856	1,267,432	+	514,100	1,595,712	1,081,612	+
C	Black Rockfish	248,729	294,009	45,280	+	244,943	363,533	118,590	+	272,937	255,752	17,185	<
C	Blackgill Rockfish	579,910	852,637	272,727	+	410,645	732,824	322,179	+	479,863	808,680	328,817	+
C	Cowcod Rockfish	33,718	74,904	41,186	+	52,129	141,376	89,247	+	34,054	86,177	52,123	+
C	Darkblotched Rockfish		635,818	635,818	+		783,051	783,051	+	178	899,526	899,348	+
C	Redstripe Rockfish	2,478,028	663,811	1,814,217	<	1,991,826	454,340	1,537,486	<	2,445,342	484,466	1,960,876	<
C	Sharpchin Rockfish		323,501	323,501	+		190,924	190,924	+		199,545	199,545	+
C	Yelloweye Rockfish	56,765	118,518	61,753	+	67,001	105,848	38,847	+	99,667	144,495	44,828	+
C	Yellowmouth Rockfish		10,489	10,489	+						11,967	11,967	+
C	Other Rockfish	13,668,805	2,082,550	11,586,255	<	6,986,445	1,945,224	5,041,221	<	7,876,360	3,561,187	4,315,173	<
C	English Sole	1,020,041	1,020,041	-	0	1,103,120	1,103,120	-	0	1,281,487	1,281,487	-	0
C	Petrale Sole	1,211,554	1,211,555	1	+	1,306,892	1,306,892	-	0	1,803,987	1,803,987	-	0
C	Arrowtooth Flounder	161,685	161,685	-	0	260,059	260,059	-	0	111,287	111,287	-	0
C	Other Groundfish	3,223,110	3,223,359	249	+	3,777,889	3,777,897	8	+	5,062,462	5,062,471	9	+
	Total	46,664,936	46,642,953	26,778,961	<	54,302,169	54,280,780	13,560,275	<	57,044,715	57,024,082	12,882,755	<
	% movement			57%				25%				23%	

Table 17 (DQ1b) PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1997				1998				1999			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
C	Yellowtail Rockfish	549,985	906,149	356,164	+	755,340	960,331	204,991	+	206,451	210,726	4,275	+
C	Canary Rockfish	477,193	500,152	22,959	+	399,366	428,714	29,348	+	233,097	259,855	26,758	+
C	Widow Rockfish	3,053,079	2,960,768	92,311	<	2,139,873	2,024,492	115,381	<	1,389,654	1,390,124	470	+
C	Lingcod	1,124,556	1,124,556	-	0	331,902	331,955	53	+	313,608	313,608	-	0
C	Sablefish	6,542,876	6,543,092	216	+	3,193,056	3,193,052	4	<	4,351,930	4,352,337	407	+
C	Longspine Thornyhead	4,607,822	4,416,280	191,542	<	2,852,235	2,668,523	183,712	<	2,382,463	2,258,033	124,430	<
C	Shortspine Thornyhead	1,315,415	1,532,340	216,925	+	1,214,818	1,398,220	183,402	+	781,918	945,631	163,713	+
C	Dover Sole	11,703,251	11,703,251	-	0	7,874,916	7,874,916	-	0	8,417,520	8,417,520	-	0
C	Pacific Cod	38	38	-	0	47	47	-	0	49	49	-	0
C	Pacific Ocean Perch		33,639	33,639	+		41,842	41,842	+	3,426	43,147	39,721	+
C	Shortbelly Rockfish	44,888	134,015	89,127	+	15,088	39,690	24,602	+	17,634	17,658	24	+
C	Chilipepper	2,809,220	4,470,875	1,661,655	+	2,064,568	3,070,955	1,006,387	+	1,943,944	2,085,144	141,200	+
C	Bocaccio	599,993	695,041	95,048	+	297,317	338,034	40,717	+	150,905	159,636	8,731	+
C	Splitnose Rockfish	936	1,034,516	1,033,580	+	89,585	3,203,714	3,114,129	+	74,081	450,277	376,196	+
C	Bank Rockfish	81,466	921,045	839,579	+	451,652	1,223,111	771,459	+	27,166	71,138	43,972	+
C	Other Sebastes Complex	574,684	1,427,808	853,124	+	535,239	1,450,037	914,798	+	441,236	953,415	512,179	+
C	Black Rockfish	269,199	277,352	8,153	+	188,741	192,076	3,335	+	130,272	117,815	12,457	<
C	Blackgill Rockfish	414,261	597,005	182,744	+	348,464	501,328	152,864	+	77,976	119,929	41,953	+
C	Cowcod Rockfish	21,635	112,571	90,936	+	25,771	35,777	10,006	+	6,810	24,229	17,419	+
C	Darkblotched Rockfish	25,513	941,468	915,955	+	8,203	1,058,227	1,050,024	+	1,259	245,785	244,526	+
C	Redstripe Rockfish	2,342,716	387,909	1,954,807	<	1,947,558	323,092	1,624,466	<	531,313	91,288	440,025	<
C	Sharpchin Rockfish		248,555	248,555	+		90,776	90,776	+		27,391	27,391	+
C	Yelloweye Rockfish	92,221	135,707	43,486	+	38,216	47,255	9,039	+	20,670	49,609	28,939	+
C	Yellowmouth Rockfish		1,400	1,400	+		320	320	+				
C	Other Rockfish	6,882,985	2,408,339	4,474,646	<	7,651,374	1,908,216	5,743,158	<	2,321,478	1,202,960	1,118,518	<
C	English Sole	1,433,932	1,433,932	-	0	941,188	941,188	-	0	849,839	849,839	-	0
C	Petrale Sole	1,832,861	1,832,861	-	0	1,042,054	1,042,054	-	0	1,249,621	1,249,621	-	0
C	Arrowtooth Flounder	104,739	104,739	-	0	82,096	82,096	-	0	94,301	94,301	-	0
C	Other Groundfish	6,501,853	6,501,856	3	+	4,382,245	4,382,254	9	+	5,036,887	5,037,770	883	+
	Total	53,407,317	53,387,259	13,406,554	<	38,870,912	38,852,292	15,314,822	<	31,055,508	31,038,835	3,374,187	<
	% movement			25%				39%				11%	

Table 17 (DQ1b) PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		2000				2001				2002			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
C	Yellowtail Rockfish	108,049	106,222	1,827	<	91,631	97,082	5,451	+	30,765	40,630	9,865	+
C	Canary Rockfish	34,963	38,206	3,243	+	32,035	30,504	1,531	<	24,051	25,396	1,345	+
C	Widow Rockfish	1,583,438	1,588,899	5,461	+	731,294	735,299	4,005	+	108,028	107,804	224	<
C	Lingcod	119,938	119,938	-	0	138,244	137,882	362	<	179,295	179,295	-	0
C	Sablefish	4,139,830	4,139,828	2	<	3,419,904	3,434,594	14,690	+	2,894,682	2,894,682	-	0
C	Longspine Thornyhead	1,940,510	1,684,462	256,048	<	1,320,716	1,246,815	73,901	<	2,484,195	2,326,924	157,271	<
C	Shortspine Thornyhead	636,635	910,163	273,528	+	451,692	537,681	85,989	+	857,478	1,026,401	168,923	+
C	Dover Sole	7,247,487	7,247,487	-	0	5,339,828	5,376,231	36,403	+	6,884,165	6,887,823	3,658	+
C	Pacific Cod	22	22	-	0	798	798	-	0	6	6	-	0
C	Pacific Ocean Perch	7,143	13,584	6,441	+	2,195	1,160	1,035	<	108	1,672	1,564	+
C	Shortbelly Rockfish	8,710	8,710	-	0	11,470	11,470	-	0	25	156	131	+
C	Chilipepper	986,692	1,011,962	25,270	+	764,281	727,935	36,346	<	346,795	366,845	20,050	+
C	Bocaccio	54,486	60,670	6,184	+	48,471	49,453	982	+	46,257	47,742	1,485	+
C	Splitnose Rockfish	49,962	180,314	130,352	+	30,475	161,578	131,103	+	40,304	132,498	92,194	+
C	Bank Rockfish	180,422	182,165	1,743	+	124,051	202,734	78,683	+	439,106	646,542	207,436	+
C	Other Sebastes Complex	835,336	588,782	246,554	<	843,595	540,126	303,469	<	774,234	472,903	301,331	<
C	Black Rockfish	110,830	103,284	7,546	<	229,671	219,826	9,845	<	203,988	208,193	4,205	+
C	Blackgill Rockfish	99,118	182,418	83,300	+	181,784	286,922	105,138	+	207,685	328,004	120,319	+
C	Cowcod Rockfish	1,626	2,882	1,256	+	56	1,694	1,638	+	113	194	81	+
C	Darkblotched Rockfish	25,148	233,870	208,722	+	38,522	190,301	151,779	+	42,613	105,616	63,003	+
C	Redstripe Rockfish	52,992	38,408	14,584	<	30,985	17,053	13,932	<	30,655	10,229	20,426	<
C	Sharpchin Rockfish		3,977	3,977	+		1,706	1,706	+		2,465	2,465	+
C	Yelloweye Rockfish	7,298	8,599	1,301	+	8,423	9,454	1,031	+	146	527	381	+
C	Yellowmouth Rockfish												
C	Other Rockfish	1,283,505	1,053,340	230,165	<	1,040,632	924,609	116,023	<	926,392	702,297	224,095	<
C	English Sole	668,165	668,165	-	0	929,144	929,779	635	+	822,078	822,078	-	0
C	Petrale Sole	1,400,703	1,400,703	-	0	1,238,371	1,267,667	29,296	+	1,057,633	1,057,633	-	0
C	Arrowtooth Flounder	57,646	57,646	-	0	20,586	21,003	417	+	64,085	64,085	-	0
C	Other Groundfish	3,738,890	3,738,895	5	+	4,151,015	4,169,945	18,930	+	2,439,728	2,441,504	1,776	+
	Total	25,379,544	25,373,601	1,507,509	<	21,219,869	21,331,301	1,224,320	+	20,904,610	20,900,144	1,402,228	<
	% movement			6%				6%				7%	

Table 17 (DQ1b) PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003 (lbs).

2003

AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction
C	Yellowtail Rockfish	5,045	5,045	-	0
C	Canary Rockfish	1,150	1,150	-	0
C	Widow Rockfish	10,186	10,186	-	0
C	Lingcod	115,749	115,748	1	<
C	Sablefish	3,613,876	3,613,995	119	+
C	Longspine Thornyhead	1,863,127	1,761,674	101,453	<
C	Shortspine Thornyhead	839,955	968,797	128,842	+
C	Dover Sole	7,188,066	7,188,066	-	0
C	Pacific Cod	1,316	1,316	-	0
C	Pacific Ocean Perch		278	278	+
C	Shortbelly Rockfish	1,123	1,130	7	+
C	Chilipepper	38,799	38,754	45	<
C	Bocaccio	1,368	1,368	-	0
C	Splitnose Rockfish	49,778	333,335	283,557	+
C	Bank Rockfish	159,733	226,589	66,856	+
C	Other Sebastes Complex	314,948	339,204	24,256	+
C	Black Rockfish	128,414	128,494	80	+
C	Blackgill Rockfish	395,465	420,486	25,021	+
C	Cowcod Rockfish	11	101	90	+
C	Darkblotched Rockfish	13,151	25,374	12,223	+
C	Redstripe Rockfish	39,377	12,021	27,356	<
C	Sharpchin Rockfish				
C	Yelloweye Rockfish	22	29	7	+
C	Yellowmouth Rockfish				
C	Other Rockfish	995,206	580,743	414,463	<
C	English Sole	289,836	289,836	-	0
C	Petrale Sole	838,339	838,339	-	0
C	Arrowtooth Flounder	95,711	95,711	-	0
C	Other Groundfish	2,528,988	2,529,003	15	+
	Total	19,528,739	19,526,772	1,084,669	<
	% movement			6%	

Table 18 (DQ1c) PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
O	Yellowtail Rockfish	6,875,837	7,028,556	152,719	+	6,743,150	6,765,906	22,756	+	7,834,529	7,703,645	130,884	<
O	Canary Rockfish		1,629,543	1,629,543	+	1,166,171	1,230,802	64,631	+	1,676,354	1,717,791	41,437	+
O	Widow Rockfish	9,728,256	9,744,000	15,744	+	8,566,311	8,534,318	31,993	<	8,372,794	8,271,035	101,759	<
O	Lingcod	1,898,239	1,897,556	683	<	1,433,279	1,433,176	103	<	1,581,978	1,581,959	19	<
O	Sablefish	9,037,724	9,037,690	34	<	6,980,398	6,980,376	22	<	7,065,073	7,064,938	135	<
O	Longspine Thornyhead		5,224,243	5,224,243	+	5,781,259	5,637,638	143,621	<	4,835,143	4,649,535	185,608	<
O	Shortspine Thornyhead		3,121,804	3,121,804	+	1,561,082	1,716,336	155,254	+	1,337,699	1,489,509	151,810	+
O	Dover Sole	8,533,771	8,533,509	262	<	7,793,874	7,793,526	348	<	10,334,613	10,334,592	21	<
O	Pacific Cod	376,053	375,803	250	<	177,067	176,989	78	<	185,068	185,058	10	<
O	Pacific Ocean Perch	4,470,513	1,473,338	2,997,175	<	2,835,425	1,301,004	1,534,421	<	2,711,938	1,364,269	1,347,669	<
O	Shortbelly Rockfish		84,524	84,524	+		45,402	45,402	+		8,317	8,317	+
O	Chilipepper		41,120	41,120	+		20,254	20,254	+		20,315	20,315	+
O	Bocaccio		278,745	278,745	+		222,796	222,796	+		174,489	174,489	+
O	Splitnose Rockfish		284,793	284,793	+		146,617	146,617	+		99,655	99,655	+
O	Bank Rockfish		31,391	31,391	+		6,305	6,305	+		3,482	3,482	+
O	Other Sebastes Complex		1,136,754	1,136,754	+		1,001,675	1,001,675	+		1,353,892	1,353,892	+
O	Black Rockfish	208,238	384,579	176,341	+	220,191	213,200	6,991	<	309,621	313,397	3,776	+
O	Blackgill Rockfish		9,636	9,636	+		13,233	13,233	+		5,166	5,166	+
O	Cowcod Rockfish		693	693	+		2,658	2,658	+		2,275	2,275	+
O	Darkblotched Rockfish		1,207,929	1,207,929	+		741,925	741,925	+		665,092	665,092	+
O	Redstripe Rockfish		847,538	847,538	+		468,992	468,992	+		400,391	400,391	+
O	Sharpchin Rockfish		628,000	628,000	+		287,415	287,415	+		263,262	263,262	+
O	Yelloweye Rockfish		223,801	223,801	+		327,517	327,517	+		213,858	213,858	+
O	Yellowmouth Rockfish		515,358	515,358	+		194,701	194,701	+		201,717	201,717	+
O	Other Rockfish	14,820,371	2,138,589	12,681,782	<	3,610,526	1,551,826	2,058,700	<	3,414,604	1,545,461	1,869,143	<
O	English Sole	789,608	789,157	451	<	689,004	688,936	68	<	860,721	860,654	67	<
O	Petrale Sole	1,357,412	1,357,092	320	<	1,756,061	1,755,990	71	<	1,588,255	1,588,153	102	<
O	Arrowtooth Flounder	3,793,635	3,790,478	3,157	<	3,115,812	3,115,792	20	<	2,465,395	2,465,356	39	<
O	Other Groundfish	2,370,743	2,370,692	51	<	2,616,684	2,616,643	41	<	2,418,615	2,418,528	87	<
	Total	64,260,400	64,186,911	31,294,841	<	55,046,294	54,991,948	7,498,608	<	56,992,400	56,965,791	7,244,477	<
	% movement			49%				14%				13%	

Table 18 (DQ1c) PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1997				1998				1999			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
O	Yellowtail Rockfish	2,785,108	2,808,312	23,204	+	3,791,830	3,802,472	10,642	+	3,547,421	3,554,966	7,545	+
O	Canary Rockfish	1,541,928	1,547,990	6,062	+	1,786,477	1,778,047	8,430	<	933,655	934,886	1,231	+
O	Widow Rockfish	11,109,047	11,114,120	5,073	+	6,462,447	6,457,188	5,259	<	6,640,382	6,626,973	13,409	<
O	Lingcod	1,695,848	1,692,524	3,324	<	355,727	355,648	79	<	383,210	383,206	4	<
O	Sablefish	6,542,950	6,541,210	1,740	<	3,888,687	3,888,647	40	<	6,590,299	6,590,258	41	<
O	Longspine Thornyhead	4,011,309	3,834,351	176,958	<	2,130,156	2,096,763	33,393	<	1,633,983	1,605,821	28,162	<
O	Shortspine Thornyhead	1,118,880	1,294,713	175,833	+	1,084,964	1,118,901	33,937	+	707,157	734,821	27,664	+
O	Dover Sole	8,742,456	8,740,220	2,236	<	8,376,815	8,376,811	4	<	9,950,464	9,950,422	42	<
O	Pacific Cod	115,644	114,740	904	<	173,076	172,265	811	<	82,995	82,969	26	<
O	Pacific Ocean Perch	2,664,652	1,286,300	1,378,352	<	2,358,284	1,180,039	1,178,245	<	1,427,343	830,879	596,464	<
O	Shortbelly Rockfish		30,855	30,855	+		12,364	12,364	+		155	155	+
O	Chilipepper		19,510	19,510	+		50,425	50,425	+		4,417	4,417	+
O	Bocaccio		176,210	176,210	+		127,529	127,529	+		63,275	63,275	+
O	Splitnose Rockfish		175,573	175,573	+		104,943	104,943	+		76,543	76,543	+
O	Bank Rockfish		8,977	8,977	+		3,149	3,149	+		13,581	13,581	+
O	Other Sebastes Complex		643,494	643,494	+		954,899	954,899	+		508,089	508,089	+
O	Black Rockfish	398,630	396,255	2,375	<	435,486	411,777	23,709	<	281,146	274,846	6,300	<
O	Blackgill Rockfish		7,273	7,273	+		3,499	3,499	+		9,689	9,689	+
O	Cowcod Rockfish		7,546	7,546	+		7,253	7,253	+		577	577	+
O	Darkblotched Rockfish		654,641	654,641	+		752,399	752,399	+		522,233	522,233	+
O	Redstripe Rockfish		204,347	204,347	+		181,889	181,889	+		49,289	49,289	+
O	Sharpchin Rockfish		376,863	376,863	+		137,187	137,187	+		54,777	54,777	+
O	Yelloweye Rockfish		271,400	271,400	+		85,766	85,766	+		120,262	120,262	+
O	Yellowmouth Rockfish		122,445	122,445	+		63,083	63,083	+		48,093	48,093	+
O	Other Rockfish	2,894,991	1,554,358	1,340,633	<	2,828,304	1,663,282	1,165,022	<	1,689,025	806,078	882,947	<
O	English Sole	1,214,554	1,214,474	80	<	1,047,200	1,046,852	348	<	768,843	768,772	71	<
O	Petrale Sole	1,776,714	1,776,678	36	<	1,503,352	1,503,286	66	<	1,486,914	1,486,859	55	<
O	Arrowtooth Flounder	2,561,594	2,561,515	79	<	3,506,589	3,506,552	37	<	5,021,558	5,021,525	33	<
O	Other Groundfish	3,522,866	3,521,515	1,351	<	2,058,513	2,058,037	476	<	2,968,476	2,968,423	53	<
	Total	52,697,171	52,698,409	5,817,374	+	41,787,907	41,900,952	4,944,883	+	44,112,871	44,092,684	3,035,027	<
	% movement			11%				12%				7%	

Table 18 (DQ1c) PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		2000				2001				2002			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
O	Yellowtail Rockfish	4,427,720	4,414,727	12,993	<	2,432,934	2,171,981	260,953	<	774,250	770,135	4,115	<
O	Canary Rockfish	71,346	71,682	336	+	42,045	42,301	256	+	38,240	37,942	298	<
O	Widow Rockfish	6,004,282	6,017,825	13,543	+	3,742,651	3,775,510	32,859	+	557,190	560,167	2,977	+
O	Lingcod	141,877	141,882	5	+	150,066	150,079	13	+	181,572	181,492	80	<
O	Sablefish	6,256,288	6,255,483	805	<	5,697,280	5,697,156	124	<	3,184,819	3,184,770	49	<
O	Longspine Thornyhead	1,685,484	1,621,359	64,125	<	1,362,549	1,349,973	12,576	<	1,835,958	1,824,832	11,126	<
O	Shortspine Thornyhead	628,308	693,336	65,028	+	495,351	507,268	11,917	+	577,238	587,822	10,584	+
O	Dover Sole	10,393,272	10,392,656	616	<	8,241,861	8,241,852	9	<	6,001,276	6,001,275	1	<
O	Pacific Cod	24,164	24,149	15	<	68,541	68,460	81	<	59,352	59,239	113	<
O	Pacific Ocean Perch	220,184	224,342	4,158	+	426,836	425,294	1,542	<	235,660	236,205	545	+
O	Shortbelly Rockfish	34,085	34,085	-	0	209	209	-	0	113	113	-	0
O	Chilipepper		422	422	+		226,326	226,326	+		91	91	+
O	Bocaccio		472	472	+		3,441	3,441	+		289	289	+
O	Splitnose Rockfish		45,408	45,408	+		7,591	7,591	+		8,083	8,083	+
O	Bank Rockfish		4,852	4,852	+		325	325	+		14	14	+
O	Other Sebastes Complex	921,024	597,104	323,920	<	420,941	370,611	50,330	<	234,228	207,852	26,376	<
O	Black Rockfish	239,852	233,956	5,896	<	326,093	322,366	3,727	<	280,125	278,260	1,865	<
O	Blackgill Rockfish		3,728	3,728	+		5,541	5,541	+		1,639	1,639	+
O	Cowcod Rockfish		27	27	+		210	210	+		117	117	+
O	Darkblotched Rockfish		244,013	244,013	+	148,875	147,391	1,484	<	116,158	114,254	1,904	<
O	Redstripe Rockfish		4,968	4,968	+		5,594	5,594	+		1,615	1,615	+
O	Sharpchin Rockfish		10,644	10,644	+		4,608	4,608	+		4,823	4,823	+
O	Yelloweye Rockfish		9,416	9,416	+		14,772	14,772	+	3,512	3,591	79	+
O	Yellowmouth Rockfish		19,187	19,187	+		8,330	8,330	+		4,552	4,552	+
O	Other Rockfish	322,399	325,558	3,159	+	382,344	384,686	2,342	+	420,632	423,712	3,080	+
O	English Sole	542,991	542,985	6	<	895,972	895,935	37	<	960,016	959,463	553	<
O	Petrale Sole	1,896,175	1,896,172	3	<	2,033,638	2,032,769	869	<	1,967,931	1,967,491	440	<
O	Arrowtooth Flounder	2,580,307	2,580,296	11	<	2,282,934	2,281,419	1,515	<	1,113,097	1,110,526	2,571	<
O	Other Groundfish	2,944,324	2,944,270	54	<	2,391,003	2,390,408	595	<	2,567,622	2,567,483	139	<
	Total	39,334,082	39,355,004	837,810	+	31,542,123	31,532,406	657,967	<	21,108,989	21,097,847	88,118	<
	% movement			2%				2%				0%	

Table 18 (DQ1c) PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003 (lbs).

2003

AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction
O	Yellowtail Rockfish	123,547	121,283	2,264	<
O	Canary Rockfish	8,111	8,111	-	0
O	Widow Rockfish	126,710	126,710	-	0
O	Lingcod	152,751	152,752	1	+
O	Sablefish	4,786,031	4,786,037	6	+
O	Longspine Thornyhead	1,625,772	1,603,659	22,113	<
O	Shortspine Thornyhead	648,870	670,330	21,460	+
O	Dover Sole	7,983,418	7,983,418	-	0
O	Pacific Cod	634,735	634,735	-	0
O	Pacific Ocean Perch	214,408	219,842	5,434	+
O	Shortbelly Rockfish	98	104	6	+
O	Chilipepper		390	390	+
O	Bocaccio		4,146	4,146	+
O	Splitnose Rockfish		10,617	10,617	+
O	Bank Rockfish		93	93	+
O	Other Sebastes Complex	273,824	230,920	42,904	<
O	Black Rockfish	259,291	255,585	3,706	<
O	Blackgill Rockfish		7,462	7,462	+
O	Cowcod Rockfish				
O	Darkblotched Rockfish	145,686	145,741	55	+
O	Redstripe Rockfish		636	636	+
O	Sharpchin Rockfish		6,248	6,248	+
O	Yelloweye Rockfish	3,173	4,100	927	+
O	Yellowmouth Rockfish		9,048	9,048	+
O	Other Rockfish	438,817	440,509	1,692	+
O	English Sole	773,668	773,668	-	0
O	Petrale Sole	2,424,986	2,424,986	-	0
O	Arrowtooth Flounder	1,768,611	1,768,611	-	0
O	Other Groundfish	3,350,330	3,350,329	1	<
	Total	25,742,837	25,740,070	139,209	<
	% movement			1%	

Table 19 (DQ1d) PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
W	Yellowtail Rockfish	3,516,297	6,664,201	3,147,904	+	3,276,168	3,301,971	25,803	+	4,134,664	4,137,469	2,805	+
W	Canary Rockfish		1,977,646	1,977,646	+	293,395	444,366	150,971	+	380,638	546,663	166,025	+
W	Widow Rockfish	1,912,966	3,874,230	1,961,264	+	2,381,283	2,385,180	3,897	+	2,655,108	2,661,154	6,046	+
W	Lingcod	3,256,159	3,256,188	29	+	1,233,875	1,233,889	14	+	1,446,336	1,446,108	228	<
W	Sablefish	4,242,583	4,238,707	3,876	<	5,235,455	5,256,459	21,004	+	4,939,859	4,883,080	56,779	<
W	Longspine Thornyhead					932,949	849,641	83,308	<	737,599	681,757	55,842	<
W	Shortspine Thornyhead	1,251,004	2,415,294	1,164,290	+	343,841	432,092	88,251	+	398,359	453,528	55,169	+
W	Dover Sole	4,498,143	4,461,785	36,358	<	3,159,821	3,156,294	3,527	<	3,517,647	3,374,455	143,192	<
W	Pacific Cod	2,447,627	2,447,527	100	<	1,858,687	1,858,735	48	+	1,488,087	1,486,529	1,558	<
W	Pacific Ocean Perch	3,446,584	3,493,384	46,800	+	2,910,665	2,929,811	19,146	+	2,612,158	2,336,209	275,949	<
W	Shortbelly Rockfish						30	30	+		50	50	+
W	Chilipepper												
W	Bocaccio		598,686	598,686	+		925,525	925,525	+		357,947	357,947	+
W	Splitnose Rockfish		32,826	32,826	+		45,673	45,673	+		52,418	52,418	+
W	Bank Rockfish												
W	Other Sebastes Complex		341,161	341,161	+		2,419,423	2,419,423	+		1,888,834	1,888,834	+
W	Black Rockfish		4,643	4,643	+		14,227	14,227	+				
W	Blackgill Rockfish						28,331	28,331	+		11,656	11,656	+
W	Cowcod Rockfish												
W	Darkblotched Rockfish		38,666	38,666	+		143,979	143,979	+		205,281	205,281	+
W	Redstripe Rockfish		147,548	147,548	+		1,224,231	1,224,231	+		1,041,594	1,041,594	+
W	Sharpchin Rockfish		122,788	122,788	+		358,626	358,626	+		285,743	285,743	+
W	Yelloweye Rockfish		209,181	209,181	+		196,028	196,028	+		99,288	99,288	+
W	Yellowmouth Rockfish		39,555	39,555	+		66,644	66,644	+		202,933	202,933	+
W	Other Rockfish	11,938,990	2,090,622	9,848,368	<	7,704,871	2,067,593	5,637,278	<	6,366,261	1,911,982	4,454,279	<
W	English Sole	1,284,801	1,284,796	5	<	1,276,504	1,276,498	6	<	1,054,216	1,054,210	6	<
W	Petrale Sole	673,617	673,625	8	+	802,946	802,940	6	<	757,756	757,755	1	<
W	Arrowtooth Flounder	7,101,574	7,101,567	7	<	5,358,070	5,358,324	254	+	5,913,417	5,908,404	5,013	<
W	Other Groundfish	7,989,976	8,096,184	106,208	+	6,163,647	6,163,645	2	<	5,728,979	5,727,682	1,297	<
W	Total	53,560,321	53,610,810	19,827,917	+	42,932,177	42,940,155	11,456,232	+	42,131,084	41,512,729	9,369,933	<
	% movement			37%				27%				22%	

Table 19 (DQ1d) PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		1997				1998				1999			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
W	Yellowtail Rockfish	2,491,824	2,494,462	2,638	+	2,912,147	2,908,355	3,792	<	2,861,574	2,877,523	15,949	+
W	Canary Rockfish	629,969	719,623	89,654	+	733,662	754,818	21,156	+	508,488	539,359	30,871	+
W	Widow Rockfish	2,987,873	2,992,720	4,847	+	2,273,975	2,289,126	15,151	+	1,946,085	1,961,855	15,770	+
W	Lingcod	1,028,443	1,028,449	6	+	509,195	509,206	11	+	339,459	321,659	17,800	<
W	Sablefish	5,072,166	5,059,113	13,053	<	3,015,737	3,004,259	11,478	<	4,116,921	4,103,655	13,266	<
W	Longspine Thornyhead	640,111	592,105	48,006	<	182,123	166,785	15,338	<	70,024	67,575	2,449	<
W	Shortspine Thornyhead	356,507	383,415	26,908	+	221,407	233,130	11,723	+	157,781	167,765	9,984	+
W	Dover Sole	2,846,968	2,746,078	100,890	<	2,400,826	2,393,150	7,676	<	2,492,409	2,460,364	32,045	<
W	Pacific Cod	1,623,546	1,623,258	288	<	1,439,469	1,437,319	2,150	<	706,738	704,007	2,731	<
W	Pacific Ocean Perch	2,516,621	2,325,182	191,439	<	2,548,477	2,323,345	225,132	<	2,224,569	2,169,809	54,760	<
W	Shortbelly Rockfish												
W	Chilipepper		56	56	+		130	130	+		2,204	2,204	+
W	Bocaccio		691,894	691,894	+		489,292	489,292	+		159,918	159,918	+
W	Splitnose Rockfish		31,952	31,952	+		24,082	24,082	+		5,573	5,573	+
W	Bank Rockfish												
W	Other Sebastes Complex		1,001,514	1,001,514	+		1,371,763	1,371,763	+		979,344	979,344	+
W	Black Rockfish		2,110	2,110	+		40,311	40,311	+				
W	Blackgill Rockfish		221,230	221,230	+		20,285	20,285	+		31,655	31,655	+
W	Cowcod Rockfish												
W	Darkblotched Rockfish		299,293	299,293	+		216,727	216,727	+		80,531	80,531	+
W	Redstripe Rockfish		34,042	34,042	+		95,147	95,147	+		24,683	24,683	+
W	Sharpchin Rockfish		239,278	239,278	+		40,273	40,273	+		62,670	62,670	+
W	Yelloweye Rockfish		30,491	30,491	+		44,318	44,318	+		80,351	80,351	+
W	Yellowmouth Rockfish		125,712	125,712	+		34,345	34,345	+		42,513	42,513	+
W	Other Rockfish	3,726,642	881,242	2,845,400	<	3,452,381	855,589	2,596,792	<	2,598,949	754,039	1,844,910	<
W	English Sole	1,080,601	1,080,599	2	<	1,271,979	1,271,980	1	+	966,127	966,132	5	+
W	Petrale Sole	778,003	778,002	1	<	818,568	818,565	3	<	691,994	691,985	9	<
W	Arrowtooth Flounder	5,359,881	5,359,883	2	+	7,160,728	7,160,722	6	<	9,111,446	9,111,444	2	<
W	Other Groundfish	5,815,215	5,815,219	4	+	3,927,411	3,927,409	2	<	2,763,781	2,760,620	3,161	<
W	Total	36,954,370	36,556,922	6,000,710	<	32,868,085	32,430,431	5,287,084	<	31,556,345	31,127,233	3,513,154	<
	% movement			16%				16%				11%	

Table 19 (DQ1d) PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003 (lbs).

		2000				2001				2002			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
W	Yellowtail Rockfish	2,447,698	2,447,814	116	+	2,073,687	2,074,786	1,099	+	1,635,023	1,635,023	-	0
W	Canary Rockfish	111,979	113,615	1,636	+	123,549	123,670	121	+	91,597	92,010	413	+
W	Widow Rockfish	918,845	918,895	50	+	784,479	784,738	259	+	231,746	231,828	82	+
W	Lingcod	213,567	213,939	372	+	109,336	109,344	8	+	206,907	206,916	9	+
W	Sablefish	3,776,243	3,803,805	27,562	+	3,612,774	3,613,040	266	+	2,567,157	2,579,005	11,848	+
W	Longspine Thornyhead	41,496	34,219	7,277	<	37,451	33,121	4,330	<	17,472	18,381	909	+
W	Shortspine Thornyhead	127,971	135,768	7,797	+	100,175	104,821	4,646	+	76,670	76,529	141	<
W	Dover Sole	2,028,856	2,031,907	3,051	+	1,715,662	1,716,114	452	+	1,157,682	1,157,687	5	+
W	Pacific Cod	858,963	859,007	44	+	942,347	942,350	3	+	2,090,399	2,090,414	15	+
W	Pacific Ocean Perch	914,547	920,735	6,188	+	280,573	281,872	1,299	+	210,364	211,655	1,291	+
W	Shortbelly Rockfish												
W	Chilipepper		595	595	+						166	166	+
W	Bocaccio		6,018	6,018	+		30,500	30,500	+		30,444	30,444	+
W	Splitnose Rockfish		6,656	6,656	+		1,958	1,958	+		8,764	8,764	+
W	Bank Rockfish												
W	Other Sebastes Complex	351,626	290,459	61,167	<	357,028	307,199	49,829	<	351,700	281,437	70,263	<
W	Black Rockfish										611	611	+
W	Blackgill Rockfish		5,376	5,376	+		1,565	1,565	+		1,150	1,150	+
W	Cowcod Rockfish												
W	Darkblotched Rockfish		19,374	19,374	+	19,209	19,536	327	+	15,772	16,139	367	+
W	Redstripe Rockfish		3,135	3,135	+		9,451	9,451	+		11,869	11,869	+
W	Sharpchin Rockfish		7,013	7,013	+		572	572	+		12,940	12,940	+
W	Yelloweye Rockfish		373	373	+		3,027	3,027	+	11,298	11,861	563	+
W	Yellowmouth Rockfish		3,465	3,465	+		15	15	+		23	23	+
W	Other Rockfish	968,325	969,037	712	+	587,734	587,734	-	0	8,207,377	8,207,377	-	0
W	English Sole	1,353,315	1,353,414	99	+	1,273,663	1,273,663	-	0	1,507,138	1,507,138	-	0
W	Petrale Sole	934,117	934,527	410	+	801,659	801,938	279	+	1,000,403	1,000,403	-	0
W	Arrowtooth Flounder	6,880,678	6,882,078	1,400	+	4,700,081	4,700,081	-	0	4,321,215	4,321,215	-	0
W	Other Groundfish	3,310,641	3,310,913	272	+	2,757,391	2,757,394	3	+	3,586,290	3,586,286	4	<
W	Total	25,238,867	25,272,137	170,158	+	20,276,798	20,278,489	110,009	+	27,286,210	27,297,271	151,877	+
	% movement			1%				1%				1%	

Table 19 (DQ1d) PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003 (lbs).

2003

AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction
W	Yellowtail Rockfish	1,154,312	1,154,327	15	+
W	Canary Rockfish	159,937	159,945	8	+
W	Widow Rockfish	281,054	281,054	-	0
W	Lingcod	235,700	235,771	71	+
W	Sablefish	3,756,278	3,791,654	35,376	+
W	Longspine Thornyhead	70,134	65,355	4,779	<
W	Shortspine Thornyhead	101,645	106,398	4,753	+
W	Dover Sole	1,248,762	1,248,758	4	<
W	Pacific Cod	2,455,184	2,455,281	97	+
W	Pacific Ocean Perch	331,826	333,631	1,805	+
W	Shortbelly Rockfish				
W	Chilipepper		858	858	+
W	Bocaccio		30,437	30,437	+
W	Splitnose Rockfish		5,640	5,640	+
W	Bank Rockfish				
W	Other Sebastes Complex	361,118	308,862	52,256	<
W	Black Rockfish				
W	Blackgill Rockfish		7,801	7,801	+
W	Cowcod Rockfish				
W	Darkblotched Rockfish	5,778	5,926	148	+
W	Redstripe Rockfish		2,603	2,603	+
W	Sharpchin Rockfish		2,621	2,621	+
W	Yelloweye Rockfish	7,370	7,370	-	0
W	Yellowmouth Rockfish		21	21	+
W	Other Rockfish	604,174	604,174	-	0
W	English Sole	1,472,039	1,472,063	24	+
W	Petrale Sole	1,210,439	1,210,460	21	+
W	Arrowtooth Flounder	4,523,625	4,523,625	-	0
W	Other Groundfish	2,901,973	2,901,976	3	+
W	Total	20,881,348	20,916,611	149,341	+
	% movement			1%	

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

		1994				1995				1996			
Common Name	SPID	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion	Unadjusted	Adjusted	Movement	Direc-tion
Nom. Yellowtail Rockfish	YTR1	10,937,997	1,330,871	9,607,126	<	10,553,027	1,128,967	9,424,060	<	12,434,743	2,197,066	10,237,677	<
Nom. Canary Rockfish	CNR1	207,276	86,752	120,524	<	1,801,544	333,538	1,468,006	<	2,461,435	510,559	1,950,876	<
Nom. Widow Rockfish	WDW1	13,677,020	1,054,910	12,622,110	<	14,690,844	901,888	13,788,956	<	14,135,185	539,353	13,595,832	<
Nom. Longspine Thornyhead	LSP1					12,554,999	1,310,568	11,244,431	<	10,992,753	1,468,621	9,524,132	<
Nom. Shortspine Thornyhead	SSP1	1,251,004	48,802	1,202,202	<	3,557,815	374,235	3,183,580	<	3,279,126	517,349	2,761,777	<
Gen. Shelf/slope rf	POP1	3,256,920	107,809	3,149,111	<	1,819,758	174,309	1,645,449	<	1,651,746	205,054	1,446,692	<
Nominal Pop	POP2	1,213,593	259,744	953,849	<	1,015,667	237,931	777,736	<	1,060,192	292,206	767,986	<
Unsp. Pop Group	UPOP	3,446,584	616	3,445,968	<	2,910,665	625	2,910,040	<	2,612,158	498	2,611,660	<
Nom. Shortbelly Rockfish	SBL1	6,195	6,195	-	0	12,600	12,600	-	0	61,440	61,440	-	0
Nom. Chilipepper	CLP1	2,697,929	579,477	2,118,452	<	2,821,434	373,324	2,448,110	<	2,749,817	274,553	2,475,264	<
Nom. Bocaccio	BCC1	1,887,791	408,076	1,479,715	<	1,679,617	189,762	1,489,855	<	1,022,012	111,351	910,661	<
Nom. Splitnose Rockfish	SNS1	4,029	4,029	-	0	18	18	-	0	370	370	-	0
Nom. Bank Rockfish	BNK1	56,439	3,076	53,363	<	106,377	83,551	22,826	<	66,639	18,262	48,377	<
Nom. Aurora Rockfish	ARR1												
Nom. Black-and-yellow Rockfish	BYL1	5	5	-	0					7	7	-	0
Nom. Blue Rockfish	BLU1	73,618	28,739	44,879	<	40,385	23,278	17,107	<	25,346	9,150	16,196	<
Nom. Bronzespotted Rockfish	BRZ1	54	54	-	0	627	627	-	0				
Nom. Brown Rockfish	BRW1	7,737	7,737	-	0	3,931	3,681	250	<	2,729	2,729	-	0
Nom. Calif. Scorpionfish	SCR1		113,215	113,215	+		90,918	90,918	+		76,677	76,677	+
Nom. Chameleon Rockfish	CML1												
Nom. China Rockfish	CHN1	67,916	31,827	36,089	<	58,193	35,994	22,199	<	38,428	16,810	21,618	<
Nom. Copper Rockfish	COP1	77,001	31,690	45,311	<	97,882	52,855	45,027	<	142,814	56,139	86,675	<
Nom. Flag Rockfish	FLG1	180	180	-	0	1,005	1,005	-	0	18	18	-	0
Nom. Gopher Rockfish	GPH1	31,158	31,191	33	+	17,448	17,448	-	0	12,110	12,110	-	0
Nom. Grass Rockfish	GRS1	72,944	68,171	4,773	<	109,136	107,221	1,915	<	93,690	92,832	858	<
Nom. Greenblotched Rockfish	GBL1												
Nom. Greenspotted Rockfish	GSP1	33,381	17,765	15,616	<	15,358	4,581	10,777	<	41,796	10,423	31,373	<
Nom. Greenstriped Rockfish	GSR1	3,140	3,140	-	0	4,235	4,235	-	0	1,529	1,384	145	<
Nom. Kelp Rockfish	KLP1	6,706	6,427	279	<	5,343	5,078	265	<	4,342	4,235	107	<
Nom. Mexican Rockfish	MXR1												
Nom. Olive Rockfish	OLV1	136	136	-	0	564	564	-	0	728	728	-	0
Nom. Pink Rockfish	PNK1												
Nom. Pinkrose Rockfish	PRR1	214	214	-	0								
Nom. Quillback Rockfish	QLB1	2,809	2,809	-	0	11,448	4,809	6,639	<	17,937	14,046	3,891	<
Nom. Redbanded Rockfish	RDB1	6,138	6,138	-	0	2,175	2,175	-	0	1,104	1,104	-	0
Nom. Rosethorn Rockfish	RST1	10,157	10,157	-	0	10,250	2,121	8,129	<	15,855	15,855	-	0
Nom. Rosy Rockfish	ROS1	1,002	1,002	-	0	202	202	-	0	39	39	-	0
Nom. Speckled Rockfish	SPK1	13	13	-	0	10	10	-	0	4,707	4,707	-	0
Nom. Squarespot	SQR1	1,413	1,413	-	0	94	94	-	0				
Nom. Starry Rockfish	STR1	18,711	18,711	-	0	4,355	4,355	-	0	455	455	-	0
Nom. Swordspine Rockfish	SWS1									1,423	1,423	-	0

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	1994 Unadjusted	1994 Adjusted	1994 Movement	1994 Direc-tion	1995 Unadjusted	1995 Adjusted	1995 Movement	1995 Direc-tion	1996 Unadjusted	1996 Adjusted	1996 Movement	1996 Direc-tion
Nom. Tiger Rockfish	TGR1												
Nom. Treefish	TRE1	117	113	4	<	203	203	-	0	1,540	1,505	35	<
Nom. Vermillion Rockfish	VRM1	48,497	7,304	41,193	<	46,662	42,284	4,378	<	30,826	30,826	-	0
Nor. Unsp. Near-shore Rockfish	NUSR												
Nor. Unsp. Shelf Rockfish	NUSF												
Nor. Unsp. Slope Rockfish	NUSP												
Unsp. Near-shore Rockfish	USHR												
Unsp. Shelf Rockfish	USLF												
Unsp. Slope Rockfish	USLP												
Nom. Black Rockfish	BLK1	456,967	225,163	231,804	<	465,134	129,504	335,630	<	582,558	215,573	366,985	<
Nom. Blackgill Rockfish	BGL1	579,910	176,601	403,309	<	410,645	122,744	287,901	<	479,863	134,836	345,027	<
Nom. Cowcod Rockfish	CWC1	33,718	33,269	449	<	52,129	46,657	5,472	<	34,054	23,703	10,351	<
Nom. Darkblotched Rockfish	DBR1									178	178	-	0
Nom. Stripetail Rockfish	STL1												
Unsp. Dpwtr Reds Rckfsh	RCK3	2,368	2,368	-	0	36,572	36,572	-	0	6,138	6,138	-	0
Unsp. Reds Rckfsh	RCK4	1,374,722	531,600	843,122	<	1,029,658	342,311	687,347	<	1,227,624	436,047	791,577	<
Unsp. Small Reds Rckfsh	RCK5	1,100,938	118,185	982,753	<	925,596	62,542	863,054	<	1,211,580	38,609	1,172,971	<
Nom. Yelloweye Rockfish	YEY1	56,765	18,541	38,224	<	67,001	5,070	61,931	<	99,667	21,862	77,805	<
Black+blue Rockfish	RCK9	10,309	1,635	8,674	<	384	384	-	0	2,226	2,226	-	0
Bocaccio+chilipepper Rckfsh	RCK1												
Canary+vermilion Rckfsh	RCK8	147	2	145	<	227	227	-	0	33	33	-	0
Nom. Cabezon	CBZ1	83,346	80,620	2,726	<	194,687	183,824	10,863	<	246,181	238,085	8,096	<
Nom. Kelp Greenling	KGL1	2,949	2,949	-	0	2,674	2,674	-	0	7,293	7,293	-	0
Other Groundfish	OGRN					164	164	-	0	1,757	1,757	-	0
Other Rockfish	ORCK	2,516,791	537,240	1,979,551	<		35,072	35,072	+		30,610	30,610	+
Thornyheads (Mixed)	THDS	16,223,816	847,215	15,376,601	<	527,420	225,373	302,047	<	345,721	242,109	103,612	<
Unsp. Bolina Rckfsh	RCK2	73,667	48,666	25,001	<	56,353	35,497	20,856	<	97,519	65,272	32,247	<
Unsp. Gopher Rckfsh	RCK7	147,625	80,159	67,466	<	168,649	108,385	60,264	<	221,777	191,676	30,101	<
Unsp. Grenadiers	GRDR	2,046,690	2,042,741	3,949	<	2,102,442	2,102,417	25	<	3,446,926	3,446,915	11	<
Unsp. Rockfish	URCK	18,033,737	1,914,259	16,119,478	<	13,948,934	2,195,663	11,753,271	<	12,353,706	2,405,049	9,948,657	<
Unsp. Rosefish Rckfsh	RCK6	549,425	6,160	543,265	<	649,779	1,489	648,290	<	594,180	32,589	561,591	<
Nom. Longfin Sanddab	LDB1												
Nom. Pacific Sanddab	PDB1	91,278	91,278	-	0	9,908	9,908	-	0	958	958	-	0
Nom. Speckled Sanddab	SDB1												
Other Flatfish	OFLT	572	572	-	0	1,012	1,012	-	0	1,680	1,680	-	0
Unsp. Flatfish	UFLT	62,481	62,535	54	+	108,108	108,109	1	+	87,089	87,089	-	0
Unsp. Sanddabs	UDAB	1,428,483	1,428,483	-	0	1,492,832	1,492,832	-	0	1,741,884	1,741,884	-	0
Unsp. Skate	USKT	478,499	478,546	47	+	1,069,398	1,069,380	18	<	3,431,713	3,431,724	11	+
Unsp. Turbots	UTRB	10,047	10,047	-	0	14,962	14,962	-	0	16,453	16,453	-	0
Total		84,471,074	13,017,342	71,680,430	<	77,288,539	13,857,826	63,682,695	<	79,203,797	19,370,232	60,048,161	<
Percent Movement				85%				82%				76%	

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	1997 Unadjusted	1997 Adjusted	1997 Movement	1997 Direc-tion	1998 Unadjusted	1998 Adjusted	1998 Movement	1998 Direc-tion	1999 Unadjusted	1999 Adjusted	1999 Movement	1999 Direc-tion
Nom. Yellowtail Rockfish	YTR1	5,826,917	1,092,606	4,734,311	<	7,459,317	2,045,871	5,413,446	<	6,615,446	1,407,063	5,208,383	<
Nom. Canary Rockfish	CNR1	2,649,090	744,840	1,904,250	<	2,919,505	986,065	1,933,440	<	1,675,240	381,729	1,293,511	<
Nom. Widow Rockfish	WDW1	17,149,999	3,771,762	13,378,237	<	10,876,295	2,674,216	8,202,079	<	9,976,121	1,627,209	8,348,912	<
Nom. Longspine Thornyhead	LSP1	9,259,242	834,517	8,424,725	<	5,164,514	524,679	4,639,835	<	4,086,470	231,915	3,854,555	<
Nom. Shortspine Thornyhead	SSP1	2,790,802	423,138	2,367,664	<	2,521,189	335,142	2,186,047	<	1,646,856	139,352	1,507,504	<
Gen. Shelf/slope rf	POP1	1,782,834	344,960	1,437,874	<	1,470,855	252,851	1,218,004	<	741,304	117,013	624,291	<
Nominal Pop	POP2	881,818	307,358	574,460	<	887,429	373,553	513,876	<	686,039	204,334	481,705	<
Unsp. Pop Group	UPOP	2,516,621	4,987	2,511,634	<	2,548,477	59	2,548,418	<	2,224,569	160	2,224,409	<
Nom. Shortbelly Rockfish	SBL1	44,888	3,996	40,892	<	15,088	15,088	-	0	17,634	17,634	-	0
Nom. Chilipepper	CLP1	2,809,220	632,914	2,176,306	<	2,064,568	252,181	1,812,387	<	1,943,944	109,318	1,834,626	<
Nom. Bocaccio	BCC1	599,993	47,709	552,284	<	297,317	32,024	265,293	<	150,905	27,539	123,366	<
Nom. Splitnose Rockfish	SNS1	936	936	-	0	89,585	55,647	33,938	<	74,081	15,394	58,687	<
Nom. Bank Rockfish	BNK1	81,466	8,648	72,818	<	451,652	66,746	384,906	<	27,166	7,682	19,484	<
Nom. Aurora Rockfish	ARR1	97	97	-	0	4	4	-	0				
Nom. Black-and-yellow Rockfish	BYL1	908	59	849	<	2,069	1,261	808	<	23,668	2,148	21,520	<
Nom. Blue Rockfish	BLU1	86,166	26,716	59,450	<	92,190	11,730	80,460	<	30,447	20,402	10,045	<
Nom. Bronzespotted Rockfish	BRZ1	16	16	-	0	136	136	-	0				
Nom. Brown Rockfish	BRW1	29,391	29,391	-	0	13,297	13,297	-	0	24,547	19,150	5,397	<
Nom. Calif. Scorpionfish	SCR1		96,056	96,056	+	113,066	113,066	-	0	86,853	62,862	23,991	<
Nom. Chameleon Rockfish	CML1					18	18	-	0				
Nom. China Rockfish	CHN1	47,728	11,028	36,700	<	21,949	13,767	8,182	<	14,419	3,255	11,164	<
Nom. Copper Rockfish	COP1	101,488	26,134	75,354	<	66,820	36,464	30,356	<	35,580	10,915	24,665	<
Nom. Flag Rockfish	FLG1	130	130	-	0	170	170	-	0	1	1	-	0
Nom. Gopher Rockfish	GPH1	19,450	11,478	7,972	<	23,551	18,321	5,230	<	93,749	11,663	82,086	<
Nom. Grass Rockfish	GRS1	68,242	58,517	9,725	<	92,428	25,689	66,739	<	59,427	12,248	47,179	<
Nom. Greenblotched Rockfish	GBL1					19	19	-	0				
Nom. Greenspotted Rockfish	GSP1	44,779	6,677	38,102	<	27,162	14,089	13,073	<	13,526	9,358	4,168	<
Nom. Greenstriped Rockfish	GSR1	1,909	1,776	133	<	7,317	7,144	173	<	1,782	1,782	-	0
Nom. Kelp Rockfish	KLP1	2,017	1,726	291	<	1,658	1,304	354	<	2,989	397	2,592	<
Nom. Mexican Rockfish	MXR1												
Nom. Olive Rockfish	OLV1	648	532	116	<	1,262	1,262	-	0	1,219	1,219	-	0
Nom. Pink Rockfish	PNK1	2	2	-	0								
Nom. Pinkrose Rockfish	PRR1	296	296	-	0	3,757	3,757	-	0				
Nom. Quillback Rockfish	QLB1	20,745	15,353	5,392	<	26,173	22,215	3,958	<	18,042	10,644	7,398	<
Nom. Redbanded Rockfish	RDB1	1,480	1,480	-	0	447	342	105	<	252	141	111	<
Nom. Rosethorn Rockfish	RST1	18,794	18,794	-	0	5,312	5,312	-	0	1,107	1,107	-	0
Nom. Rosy Rockfish	ROS1					8,560	8,560	-	0	592	592	-	0
Nom. Speckled Rockfish	SPK1	455	455	-	0	1,447	392	1,055	<	4,975	4,975	-	0
Nom. Squarespot	SQR1									23	23	-	0
Nom. Starry Rockfish	STR1	148	148	-	0	3,482	3,482	-	0	2,275	2,275	-	0
Nom. Swordspine Rockfish	SWS1	2	2	-	0					295	295	-	0

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	1997 Unadjusted	1997 Adjusted	1997 Movement	1997 Direc-tion	1998 Unadjusted	1998 Adjusted	1998 Movement	1998 Direc-tion	1999 Unadjusted	1999 Adjusted	1999 Movement	1999 Direc-tion
Nom. Tiger Rockfish	TGR1												
Nom. Treefish	TRE1	1,746	1,723	23	<	233	125	108	<	1,993	241	1,752	<
Nom. Vermillion Rockfish	VRM1	31,991	12,314	19,677	<	22,712	7,420	15,292	<	23,346	13,424	9,922	<
Nor. Unsp. Near-shore Rockfish	NUSR												
Nor. Unsp. Shelf Rockfish	NUSF												
Nor. Unsp. Slope Rockfish	NUSP												
Unsp. Near-shore Rockfish	USHR									129	129	-	0
Unsp. Shelf Rockfish	USLF												
Unsp. Slope Rockfish	USLP												
Nom. Black Rockfish	BLK1	667,829	219,775	448,054	<	624,227	143,449	480,778	<	411,418	139,014	272,404	<
Nom. Blackgill Rockfish	BGL1	414,261	126,975	287,286	<	348,464	210,427	138,037	<	77,976	27,368	50,608	<
Nom. Cowcod Rockfish	CWC1	21,635	15,825	5,810	<	25,771	8,982	16,789	<	6,810	6,810	-	0
Nom. Darkblotched Rockfish	DBR1	25,513	506	25,007	<	8,203	250	7,953	<	1,259	1,259	-	0
Nom. Stripetail Rockfish	STL1												
Unsp. Dpwtr Reds Rckfsh	RCK3	4,332	392	3,940	<	379	379	-	0				
Unsp. Reds Rckfsh	RCK4	850,863	348,624	502,239	<	710,243	264,518	445,725	<	243,203	32,962	210,241	<
Unsp. Small Reds Rckfsh	RCK5	1,487,521	26,780	1,460,741	<	1,236,936	47,061	1,189,875	<	288,110	44,480	243,630	<
Nom. Yelloweye Rockfish	YEY1	92,221	18,126	74,095	<	38,216	12,692	25,524	<	20,670	6,366	14,304	<
Black+blue Rockfish	RCK9	8,197	6,171	2,026	<	2,696	2,696	-	0	487	487	-	0
Bocaccio+chilipepper Rckfsh	RCK1	542	542	-	0								
Canary+vermilion Rckfsh	RCK8	58	58	-	0					164	164	-	0
Nom. Cabezon	CBZ1	265,594	206,891	58,703	<	374,291	87,057	287,234	<	277,668	36,849	240,819	<
Nom. Kelp Greenling	KGL1	46,532	46,532	-	0	36,460	36,460	-	0	86,863	86,863	-	0
Other Groundfish	OGRN	37	37	-	0	405	405	-	0	1,147	1,147	-	0
Other Rockfish	ORCK		12,502	12,502	+		7,339	7,339	+		6,062	6,062	+
Thornyheads (Mixed)	THDS	271,471	247,699	23,772	<	107,730	107,730	-	0	129,376	91,335	38,041	<
Unsp. Bolina Rckfsh	RCK2	126,196	86,055	40,141	<	125,959	21,412	104,547	<	112,923	8,743	104,180	<
Unsp. Gopher Rckfsh	RCK7	142,167	103,792	38,375	<	135,606	12,224	123,382	<	28,513	7,060	21,453	<
Unsp. Grenadiers	GRDR	2,076,739	2,076,696	43	<	1,723,682	1,723,678	4	<	964,134	964,130	4	<
Unsp. Rockfish	URCK	9,656,485	1,794,071	7,862,414	<	8,551,586	2,020,306	6,531,280	<	4,367,562	1,041,922	3,325,640	<
Unsp. Rosefish Rckfsh	RCK6	773,483	34,486	738,997	<	2,761,055	5,343	2,755,712	<	409,944	49,787	360,157	<
Nom. Longfin Sanddab	LDB1									3	3	-	0
Nom. Pacific Sanddab	PDB1	1,041	1,041	-	0	2,758	2,758	-	0	24,399	24,399	-	0
Nom. Speckled Sanddab	SDB1	30	30	-	0	231	231	-	0				
Other Flatfish	OFLT	229	229	-	0	1,946	1,946	-	0	707	707	-	0
Unsp. Flatfish	UFLT	67,927	67,927	-	0	123,213	123,213	-	0	87,157	83,999	3,158	<
Unsp. Sanddabs	UDAB	2,049,581	2,049,581	-	0	1,417,345	1,417,345	-	0	2,021,742	2,021,742	-	0
Unsp. Skate	USKT	5,742,625	5,742,008	617	<	2,834,379	2,834,307	72	<	3,694,488	3,694,473	15	<
Unsp. Turbots	UTRB	20,910	20,910	-	0					8,023	8,023	-	0
Total		71,686,473	21,793,532	50,110,057	<	58,492,811	17,015,676	41,491,813	<	43,571,757	12,861,742	30,722,139	<
Percent Movement				70%				71%				71%	

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direction	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direction	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direction
Nom. Yellowtail Rockfish	YTR1	6,983,467	1,579,484	5,403,983	<	4,598,252	629,938	3,968,314	<	2,440,038	216,887	2,223,151	<
Nom. Canary Rockfish	CNR1	218,288	70,517	147,771	<	197,629	36,992	160,637	<	153,888	18,705	135,183	<
Nom. Widow Rockfish	WDW1	8,506,565	1,629,834	6,876,731	<	5,258,424	1,839,828	3,418,596	<	896,964	239,435	657,529	<
Nom. Longspine Thornyhead	LSP1	3,667,490	632,390	3,035,100	<	2,720,716	486,792	2,233,924	<	4,337,625	280,602	4,057,023	<
Nom. Shortspine Thornyhead	SSP1	1,392,914	393,123	999,791	<	1,047,218	267,142	780,076	<	1,511,386	274,247	1,237,139	<
Gen. Shelf/slope rf	POP1	16	16	-	0								
Nominal Pop	POP2	220,168	109,725	110,443	<	426,836	285,664	141,172	<	235,660	30,264	205,396	<
Unsp. Pop Group	UPOP	914,547	1,219	913,328	<	280,573	79	280,494	<	210,364	51	210,313	<
Nom. Shortbelly Rockfish	SBL1	42,795	42,795	-	0	11,679	843	10,836	<	138	138	-	0
Nom. Chilipepper	CLP1	986,692	65,482	921,210	<	764,281	19,229	745,052	<	346,795	4,224	342,571	<
Nom. Bocaccio	BCC1	54,486	18,312	36,174	<	48,471	8,736	39,735	<	46,257	5,929	40,328	<
Nom. Splitnose Rockfish	SNS1	49,962	11,869	38,093	<	30,475	17,324	13,151	<	40,304	5,701	34,603	<
Nom. Bank Rockfish	BNK1	180,422	15,950	164,472	<	124,051	10,675	113,376	<	439,106	2,184	436,922	<
Nom. Aurora Rockfish	ARR1	1,527	495	1,032	<	339	339	-	0	825	825	-	0
Nom. Black-and-yellow Rockfish	BYL1	32,214	2,645	29,569	<	19,807	3,796	16,011	<	18,992	8,513	10,479	<
Nom. Blue Rockfish	BLU1	26,529	19,135	7,394	<	35,278	7,957	27,321	<	45,049	11,199	33,850	<
Nom. Bronzespotted Rockfish	BRZ1	61	61	-	0	55	55	-	0	109		109	<
Nom. Brown Rockfish	BRW1	29,228	4,251	24,977	<	59,314	7,197	52,117	<	47,432	6,567	40,865	<
Nom. Calif. Scorpionfish	SCR1	41,359	41,359	-	0	44,202	44,204	2	+	29,811	29,811	-	0
Nom. Chameleon Rockfish	CML1					29	33	4	+				
Nom. China Rockfish	CHN1	12,374	3,666	8,708	<	10,537	5,168	5,369	<	11,362	3,059	8,303	<
Nom. Copper Rockfish	COP1	21,855	14,012	7,843	<	32,953	11,690	21,263	<	28,267	9,227	19,040	<
Nom. Flag Rockfish	FLG1	281	281	-	0	83	83	-	0	181	111	70	<
Nom. Gopher Rockfish	GPH1	78,204	10,385	67,819	<	97,420	9,092	88,328	<	74,761	17,702	57,059	<
Nom. Grass Rockfish	GRS1	63,071	7,319	55,752	<	51,431	8,105	43,326	<	37,523	7,658	29,865	<
Nom. Greenblotched Rockfish	GBL1	477	477	-	0	1,113	1,113	-	0	147	147	-	0
Nom. Greenspotted Rockfish	GSP1	6,495	5,814	681	<	1,446	1,092	354	<	1,556	1,319	237	<
Nom. Greenstriped Rockfish	GSR1	986	986	-	0	635	581	54	<	274	185	89	<
Nom. Kelp Rockfish	KLP1	2,243	1,350	893	<	2,172	1,802	370	<	2,532	1,215	1,317	<
Nom. Mexican Rockfish	MXR1									141	141	-	0
Nom. Olive Rockfish	OLV1	2,188	2,188	-	0	2,367	2,267	100	<	1,884	1,830	54	<
Nom. Pink Rockfish	PNK1									48	48	-	0
Nom. Pinkrose Rockfish	PRR1					5	5	-	0				
Nom. Quillback Rockfish	QLB1	13,859	8,252	5,607	<	26,165	8,211	17,954	<	9,952	2,431	7,521	<
Nom. Redbanded Rockfish	RDB1	10,174	10,174	-	0	742	742	-	0	1,585	1,367	218	<
Nom. Rosethorn Rockfish	RST1	285	285	-	0	513	513	-	0	200	200	-	0
Nom. Rosy Rockfish	ROS1	297	297	-	0	2,568	2,568	-	0	6,493	6,493	-	0
Nom. Speckled Rockfish	SPK1	223	223	-	0	46	46	-	0	41	41	-	0
Nom. Squarespot	SQR1												
Nom. Starry Rockfish	STR1	335	335	-	0	237	237	-	0	198	198	-	0
Nom. Swordspine Rockfish	SWS1	1,778	1,778	-	0	46	46	-	0				

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direc-tion	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direc-tion	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direc-tion
Nom. Tiger Rockfish	TGR1										506	506	+
Nom. Treefish	TRE1	3,763	2,128	1,635	<	3,491	675	2,816	<	2,771	790	1,981	<
Nom. Vermillion Rockfish	VRM1	22,945	9,409	13,536	<	26,067	17,550	8,517	<	18,668	12,760	5,908	<
Nor. Unsp. Near-shore Rockfish	NUSR	58,406	13,638	44,768	<	59,779	5,505	54,274	<	55,531	4,430	51,101	<
Nor. Unsp. Shelf Rockfish	NUSF	206,554	79,482	127,072	<	241,244	109,644	131,600	<	145,803	34,609	111,194	<
Nor. Unsp. Slope Rockfish	NUSP	999,066	395,379	603,687	<	468,333	226,605	241,728	<	377,697	146,755	230,942	<
Unsp. Near-shore Rockfish	USHR	6,558	4,461	2,097	<	6,255	4,539	1,716	<	2,547	1,449	1,098	<
Unsp. Shelf Rockfish	USLF	42,883	11,537	31,346	<	26,972	8,193	18,779	<	26,502	6,032	20,470	<
Unsp. Slope Rockfish	USLP	421,768	45,103	376,665	<	399,920	11,665	388,255	<	411,280	5,637	405,643	<
Nom. Black Rockfish	BLK1	350,682	143,457	207,225	<	555,764	96,497	459,267	<	484,113	102,471	381,642	<
Nom. Blackgill Rockfish	BGL1	99,118	43,809	55,309	<	181,784	85,135	96,649	<	207,685	51,309	156,376	<
Nom. Cowcod Rockfish	CWC1	1,626	1,344	282	<	56	56	-	0	113	59	54	<
Nom. Darkblotched Rockfish	DBR1	25,148	7,018	18,130	<	206,606	59,859	146,747	<	174,543	24,291	150,252	<
Nom. Stripetail Rockfish	STL1	14	14	-	0								
Unsp. Dpwtr Reds Rckfsh	RCK3	271	271	-	0					21	21	-	0
Unsp. Reds Rckfsh	RCK4	40,349	25,431	14,918	<	23,220	9,272	13,948	<	17,999	7,248	10,751	<
Unsp. Small Reds Rckfsh	RCK5	12,358	12,358	-	0	7,765	7,769	4	+	12,635	2,960	9,675	<
Nom. Yelloweye Rockfish	YEY1	7,298	3,596	3,702	<	8,423	3,646	4,777	<	14,956	15,014	58	+
Black+blue Rockfish	RCK9	48	48	-	0	1,021	1,021	-	0				
Bocaccio+chilipepper Rckfsh	RCK1					26	26	-	0				
Canary+vermilion Rckfsh	RCK8	23	23	-	0	5	5	-	0				
Nom. Cabezon	CBZ1	256,587	59,492	197,095	<	159,930	38,357	121,573	<	111,175	111,175	-	0
Nom. Kelp Greenling	KGL1	94,093	45,380	48,713	<	87,667	67,887	19,780	<	135,827	135,827	-	0
Other Groundfish	OGRN	309	309	-	0								
Other Rockfish	ORCK		3,226	3,226	+		33,877	33,877	+		3,078	3,078	+
Thornyheads (Mixed)	THDS	165,734	149,486	16,248	<	105,100	105,100	-	0	148,982	130,647	18,335	<
Unsp. Bolina Rckfsh	RCK2	67,498	22,664	44,834	<	36,089	36,089	-	0	17,866	12,773	5,093	<
Unsp. Gopher Rckfsh	RCK7	12,065	2,551	9,514	<	4,559	4,065	494	<	2,812	2,812	-	0
Unsp. Grenadiers	GRDR	693,853	693,859	6	+	676,750	677,196	446	+	608,107	608,109	2	+
Unsp. Rockfish	URCK	1,009,375	987,575	21,800	<	45,220	41,789	3,431	<	61,647	25,411	36,236	<
Unsp. Rosefish Rckfsh	RCK6	192,311	54,497	137,814	<	206,317	62,109	144,208	<	165,620	1,189	164,431	<
Nom. Longfin Sanddab	LDB1					107	107	-	0				
Nom. Pacific Sanddab	PDB1	10,447	10,447	-	0	16,999	16,999	-	0	64	64	-	0
Nom. Speckled Sanddab	SDB1									64	64	-	0
Other Flatfish	OFLT	796	796	-	0	275	275	-	0	2,710	2,710	-	0
Unsp. Flatfish	UFLT	85,276	85,275	1	<	104,070	104,196	126	+	54,981	54,979	2	<
Unsp. Sanddabs	UDAB	1,638,269	1,638,269	-	0	1,740,231	1,739,785	446	<	1,328,580	1,328,580	-	0
Unsp. Skate	USKT	3,778,678	3,778,624	54	<	3,073,500	3,084,692	11,192	+	1,869,562	1,869,538	24	<
Unsp. Turbots	UTRB	4,369	4,369	-	0	12,944	12,944	-	0	6,633	6,633	-	0
Total		33,872,393	13,041,809	20,837,048	<	24,384,597	10,393,313	14,082,586	<	17,445,382	5,898,584	11,554,086	<
Percent Movement				62%				58%				66%	

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

Common Name	SPID	2003 Unadjusted	2003 Adjusted	2003 Movement	Direction
Nom. Yellowtail Rockfish	YTR1	1,282,904	91,862	1,191,042	<
Nom. Canary Rockfish	CNR1	169,198	6,849	162,349	<
Nom. Widow Rockfish	WDW1	417,950	129,313	288,637	<
Nom. Longspine Thornyhead	LSP1	3,559,033	245,180	3,313,853	<
Nom. Shortspine Thornyhead	SSP1	1,590,470	241,444	1,349,026	<
Gen. Shelf/slope rf	POP1				
Nominal Pop	POP2	214,408	20,967	193,441	<
Unsp. Pop Group	UPOP	331,826	22	331,804	<
Nom. Shortbelly Rockfish	SBL1	1,221	1,220	1	<
Nom. Chilipepper	CLP1	38,799	2,732	36,067	<
Nom. Bocaccio	BCC1	1,368	1,362	6	<
Nom. Splitnose Rockfish	SNS1	49,778	43,887	5,891	<
Nom. Bank Rockfish	BNK1	159,733	7,774	151,959	<
Nom. Aurora Rockfish	ARR1	3,399	884	2,515	<
Nom. Black-and-yellow Rockfish	BYL1	16,706	6,993	9,713	<
Nom. Blue Rockfish	BLU1	26,767	6,700	20,067	<
Nom. Bronzespotted Rockfish	BRZ1				
Nom. Brown Rockfish	BRW1	44,255	7,060	37,195	<
Nom. Calif. Scorpionfish	SCR1	11,608	11,608	-	0
Nom. Chameleon Rockfish	CML1				
Nom. China Rockfish	CHN1	3,480	2,377	1,103	<
Nom. Copper Rockfish	COP1	6,622	5,135	1,487	<
Nom. Flag Rockfish	FLG1	54	54	-	0
Nom. Gopher Rockfish	GPH1	29,657	4,795	24,862	<
Nom. Grass Rockfish	GRS1	29,880	4,654	25,226	<
Nom. Greenblotched Rockfish	GBL1	27	3	24	<
Nom. Greenspotted Rockfish	GSP1	703	64	639	<
Nom. Greenstriped Rockfish	GSR1	827	821	6	<
Nom. Kelp Rockfish	KLP1	2,507	1,739	768	<
Nom. Mexican Rockfish	MXR1	4	4	-	0
Nom. Olive Rockfish	OLV1	1,591	1,591	-	0
Nom. Pink Rockfish	PNK1	6	6	-	0
Nom. Pinkrose Rockfish	PRR1				
Nom. Quillback Rockfish	QLB1	4,324	4,324	-	0
Nom. Redbanded Rockfish	RDB1	403	403	-	0
Nom. Rosethorn Rockfish	RST1	81	81	-	0
Nom. Rosy Rockfish	ROS1	536	536	-	0
Nom. Speckled Rockfish	SPK1	64	64	-	0
Nom. Squarespot	SQR1	424	424	-	0
Nom. Starry Rockfish	STR1	49	49	-	0
Nom. Swordspine Rockfish	SWS1	10	10	-	0

Table 20 (DQ2) West Coast PacFIN landings recorded in "nominal" and "unspecified" groundfish categories before and after application of average species composition distributions: 1994-2003 (lbs)

			2003		
Common Name	SPID	Unadjusted	Adjusted	Movement	Direction
Nom. Tiger Rockfish	TGR1	123	123	-	0
Nom. Treefish	TRE1	1,776	485	1,291	<
Nom. Vermillion Rockfish	VRM1	18,323	12,097	6,226	<
Nor. Unsp. Near-shore Rockfish	NUSR	42,444	15,916	26,528	<
Nor. Unsp. Shelf Rockfish	NUSF	168,090	28,051	140,039	<
Nor. Unsp. Slope Rockfish	NUSP	409,877	118,034	291,843	<
Unsp. Near-shore Rockfish	USHR	458	378	80	<
Unsp. Shelf Rockfish	USLF	1,629	1,574	55	<
Unsp. Slope Rockfish	USLP	123,186	10,908	112,278	<
Nom. Black Rockfish	BLK1	387,705	79,763	307,942	<
Nom. Blackgill Rockfish	BGL1	395,465	84,110	311,355	<
Nom. Cowcod Rockfish	CWC1	11		11	<
Nom. Darkblotched Rockfish	DBR1	164,615	31,900	132,715	<
Nom. Stripetail Rockfish	STL1				
Unsp. Dpwtr Reds Rckfsh	RCK3	59	59	-	0
Unsp. Reds Rckfsh	RCK4	34,981	7,625	27,356	<
Unsp. Small Reds Rckfsh	RCK5	4,337	4,337	-	0
Nom. Yelloweye Rockfish	YEY1	10,565	11,191	626	+
Black+blue Rockfish	RCK9	93	93	-	0
Bocaccio+chilipepper Rckfsh	RCK1				
Canary+vermilion Rckfsh	RCK8				
Nom. Cabezon	CBZ1	87,617	87,617	-	0
Nom. Kelp Greenling	KGL1	55,472	55,471	1	<
Other Groundfish	OGRN				
Other Rockfish	ORCK		1,692	1,692	+
Thornyheads (Mixed)	THDS	130,237	103,026	27,211	<
Unsp. Bolina Rckfsh	RCK2	4,903	4,903	-	0
Unsp. Gopher Rckfsh	RCK7	3,644	3,644	-	0
Unsp. Grenadiers	GRDR	697,581	697,581	-	0
Unsp. Rockfish	URCK	82,220	65,413	16,807	<
Unsp. Rosefish Rckfsh	RCK6	373,299	2,855	370,444	<
Nom. Longfin Sanddab	LDB1				
Nom. Pacific Sanddab	PDB1	187	187	-	0
Nom. Speckled Sanddab	SDB1				
Other Flatfish	OFLT	90	90	-	0
Unsp. Flatfish	UFLT	73,646	73,645	1	<
Unsp. Sanddabs	UDAB	1,376,493	1,376,493	-	0
Unsp. Skate	USKT	2,972,196	2,972,201	5	+
Unsp. Turbots	UTRB	5,705	5,705	-	0
Total		15,627,699	6,710,158	8,922,187	<
Percent Movement				57%	

Table 21 (IA1) PacFIN Groundfish landings in 2003 by vessels with Limited Entry (LE) trawl permits using all types of gear (lbs).

		Landings with Non-Trawl Gear			Landings Totals	
Groundfish species groups	With LE Trawl Gear	With LE Fixed Gear	With OA Fixed Gear	With Other OA Gears	NonTrawl Gear (LE+OA)	All Gears
YELLOWTAIL ROCKFISH	301,676			156	156	301,832
CANARY ROCKFISH	17,434					17,434
WIDOW ROCKFISH	35,683	667		930	1,597	37,280
LINGCOD	136,533	1,420		859	2,279	138,812
SABLEFISH	5,032,320	309,637		2,185	311,822	5,344,142
LONGSPINE THORNYHEAD	3,470,123			474	474	3,470,597
SHORTSPINE THORNYHEAD	1,310,362	379		355	734	1,311,096
DOVER SOLE	16,116,356	338		300	638	16,116,994
PACIFIC COD	2,276,766					2,276,766
PACIFIC OCEAN PERCH	279,251	4			4	279,255
SHORTBELLY ROCKFISH	592					592
CHILIPEPPER	37,567			283	283	37,850
BOCACCIO	279					279
SPLITNOSE ROCKFISH	46,109			2,517	2,517	48,626
BANK ROCKFISH	124,690					124,690
OTHER SEBASTES COMPLEX	380,822	3,190	4	1,892	5,086	385,908
BLACK ROCKFISH	2,110	75			75	2,185
BLACKGILL ROCKFISH	98,399					98,399
COWCOD ROCKFISH	11					11
DARKBLOTCHED ROCKFISH	162,684					162,684
REDSTRIPE ROCKFISH	31,452					31,452
YELLOWEYE ROCKFISH	807					807
OTHER ROCKFISH	1,251,184	4	69	1,215	1,288	1,252,472
ENGLISH SOLE	1,775,789	14		4,375	4,389	1,780,178
PETRALE SOLE	4,207,827			17,840	17,840	4,225,667
ARROWTOOTH FLOUNDER	5,054,522	42			42	5,054,564
OTHER GROUNDFISH	6,604,435	368		20,148	20,516	6,624,951
Subtotal PFMC Groundfish (lbs)	48,755,783	316,138	73	53,529	369,740	49,125,523
Number of Unique vessels	206	11	1	15	27	233
No. of Deliveries (fish ticket counts)	5,501	50	1	40	91	5,592
PACIFIC WHITING	112,898,253			100,100	100,100	112,998,353
Total (lbs)	161,654,036	316,138	73	153,629	469,840	162,123,876

Table 22 (IA2) PacFIN Groundfish landings in 1998 by vessels with Limited Entry (LE) trawl permits using all types of gear (lbs).

		Landings with Non-Trawl Gear			Landings Totals	
Groundfish species groups	With LE Trawl Gear	With LE Fixed Gear	With OA Fixed Gear	With Other OA Gears	NonTrawl Gear (LE+OA)	All Gears
YELLOWTAIL ROCKFISH	4,743,871	8,988	10	59,965	68,963	4,812,834
CANARY ROCKFISH	1,951,763	3,015	11	8,151	11,177	1,962,940
WIDOW ROCKFISH	8,185,816	15		11,540	11,555	8,197,371
LINGCOD	476,158	160		7,316	7,476	483,634
SABLEFISH	4,724,579	199,548	87	10,185	209,820	4,934,399
LONGSPINE THORNYHEAD	5,106,757			6,134	6,134	5,112,891
SHORTSPINE THORNYHEAD	2,345,916	30		3,065	3,095	2,349,011
DOVER SOLE	17,545,514	439		37,906	38,345	17,583,859
PACIFIC COD	897,249			375	375	897,624
PACIFIC OCEAN PERCH	2,697,539	76		9,354	9,430	2,706,969
SHORTBELLY ROCKFISH	15,088					15,088
CHILIPEPPER	1,403,327			4,627	4,627	1,407,954
BOCACCIO	134,469			787	787	135,256
SPLITNOSE ROCKFISH	78,425					78,425
BANK ROCKFISH	335,974					335,974
OTHER SEBASTES COMPLEX	8,130	43	48	44	135	8,265
BLACK ROCKFISH	136,982	15		7	22	137,004
BLACKGILL ROCKFISH	114,508					114,508
COWCOD ROCKFISH	2,620	50		286	336	2,956
DARKBLOTCHED ROCKFISH	8,002					8,002
REDSTRIPE ROCKFISH	1,470,913			10,630	10,630	1,481,543
YELLOWEYE ROCKFISH	4,181					4,181
OTHER ROCKFISH	8,904,448	2,128	376	67,114	69,618	8,974,066
ENGLISH SOLE	2,498,455			3,766	3,766	2,502,221
PETRALE SOLE	3,183,859	5		10,254	10,259	3,194,118
ARROWTOOTH FLOUNDER	6,976,826	7	23	2,710	2,740	6,979,566
OTHER GROUNDFISH	7,118,619	31		25,681	25,712	7,144,331
Subtotal PFMC Groundfish (lbs)	81,069,988	214,550	555	279,897	495,002	81,564,990
Number of Unique vessels	235	13	2	78	93	328
No. of Deliveries (fish ticket counts)	5,501	50	1	40	91	5,592
PACIFIC WHITING	193,623,076	60,367		4,134	64,501	193,687,577
Total (lbs)	274,693,064	274,917	555	284,031	559,503	275,252,567

Figure 1 (AE1.1) British Columbia groundfish trawl species management areas.

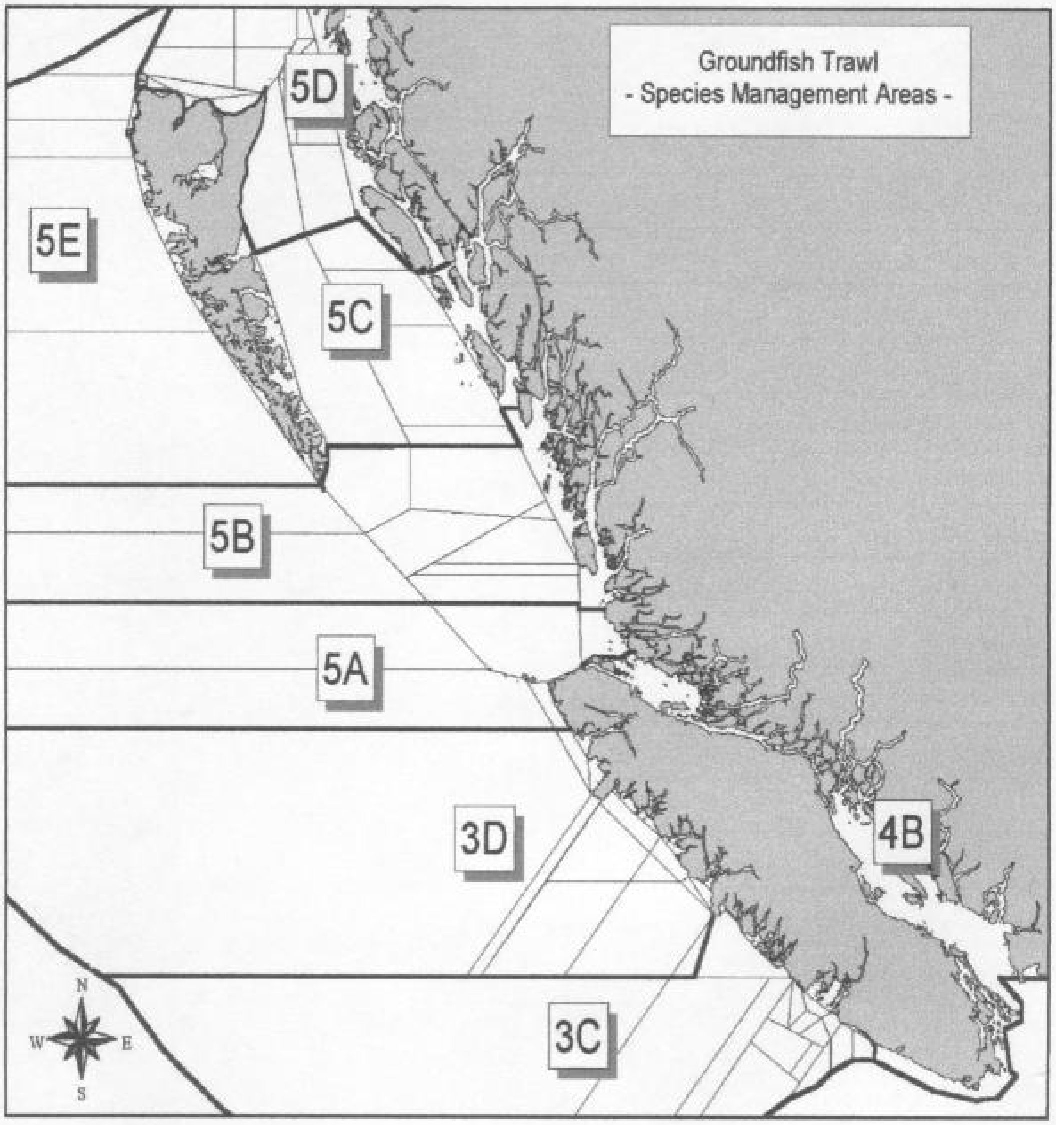
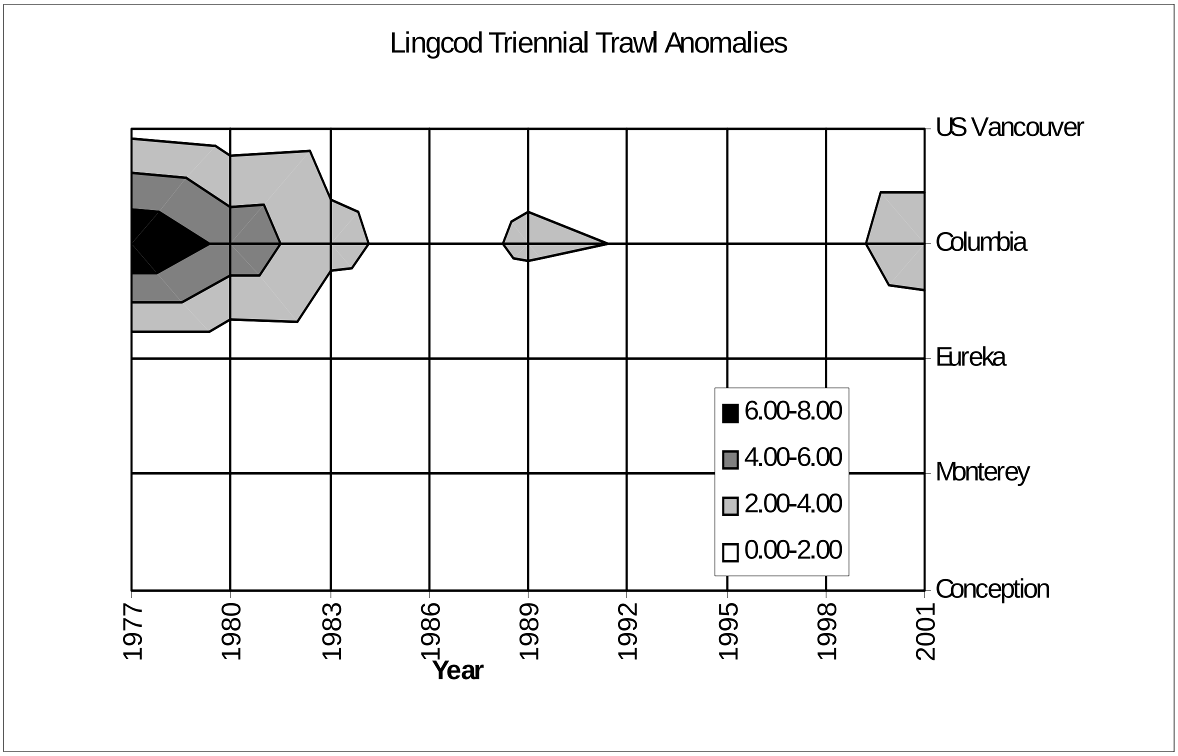
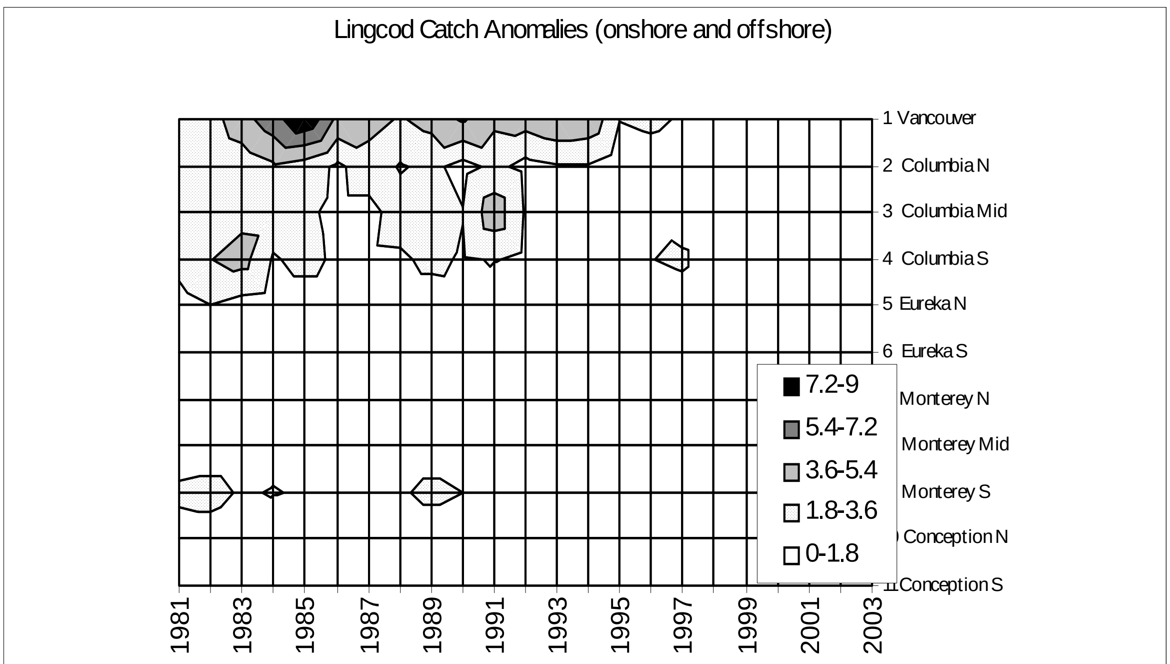


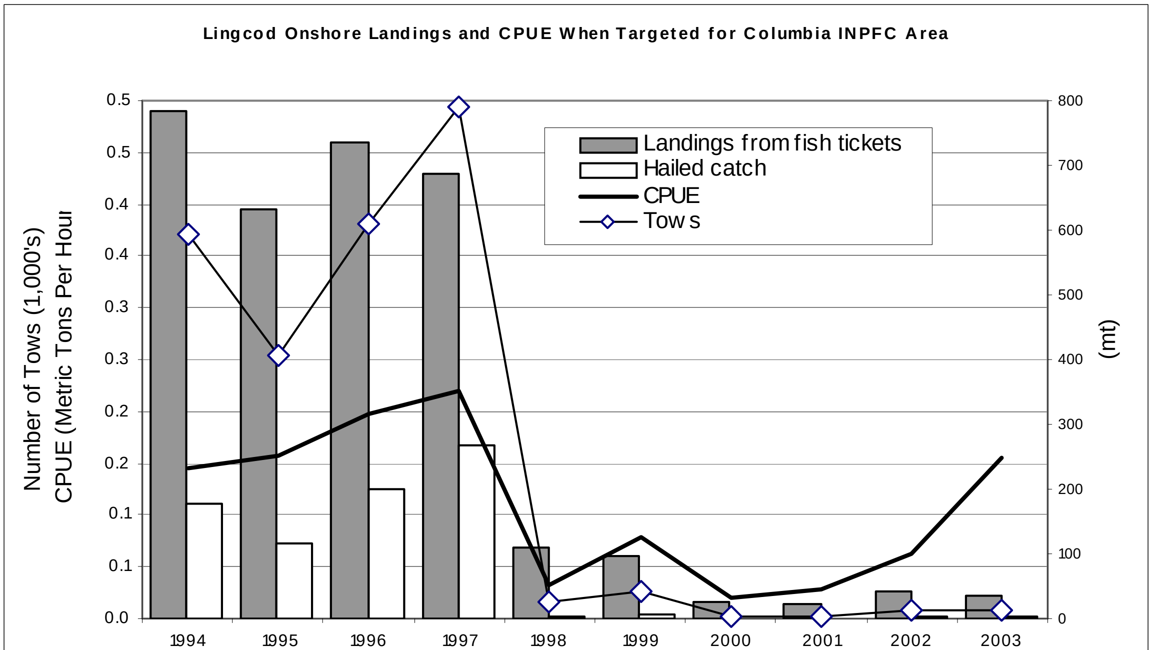
Figure 2 (A1.1a) Lingcod triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





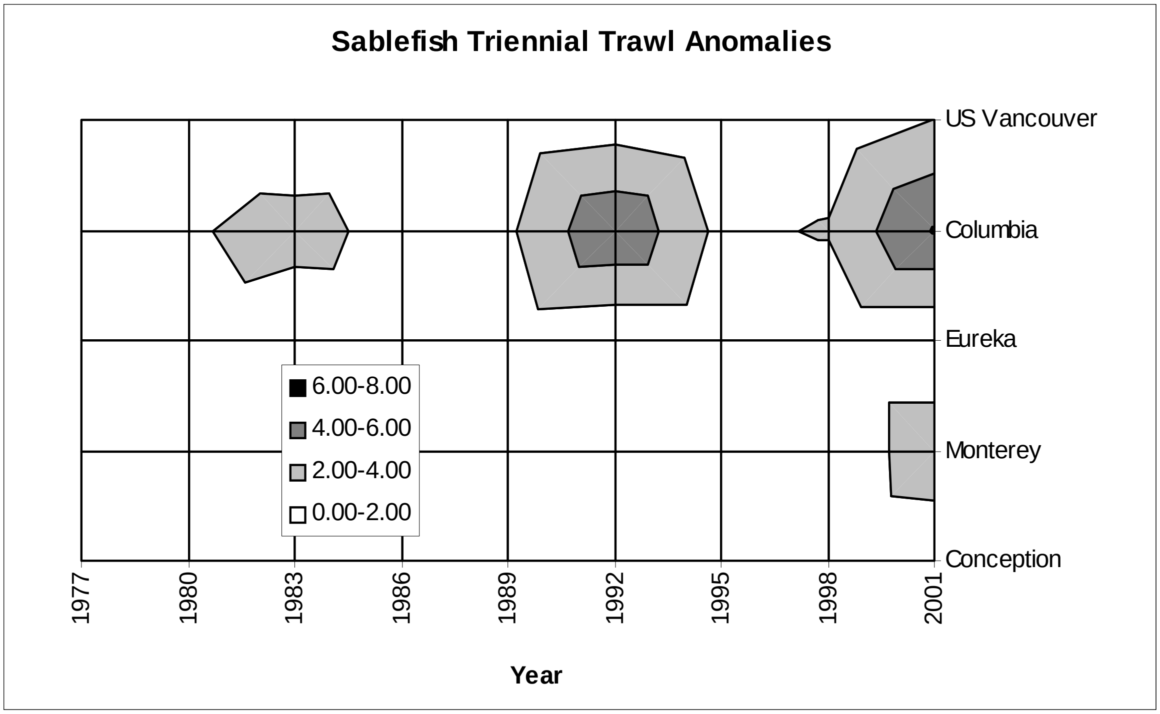
Notes: 1. Years prior to 1991 include only onshore landings.
2. Average of all areas and years includes zeros when no landings were made.

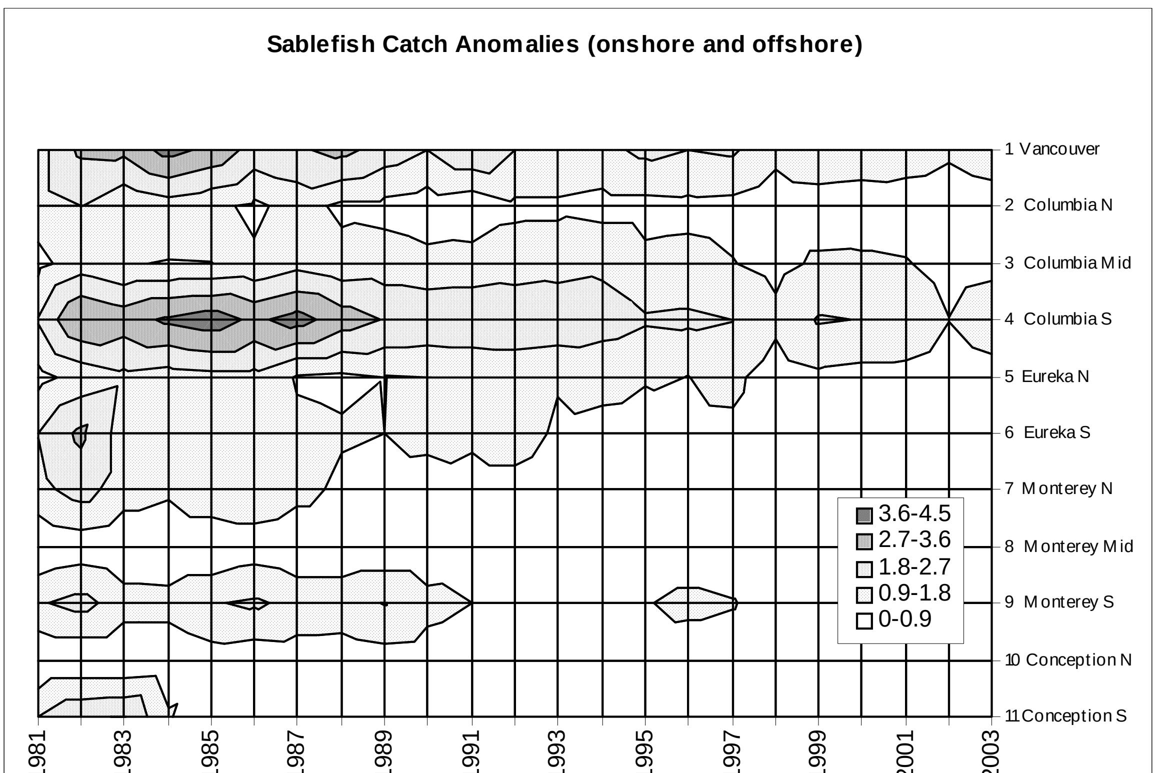
Figure 3 (A1.1b) Lingcod onshore landed catch and CPUE for INPFC Columbia area (1994-2003).



Notes: 1. INPFC areas defined by trawl logbook port of return.
Source: PacFIN fish ticket data extraction August 2004, and trawl logbook data extraction August 2004.

Figure 4 (A1.2a) Sablefish triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).

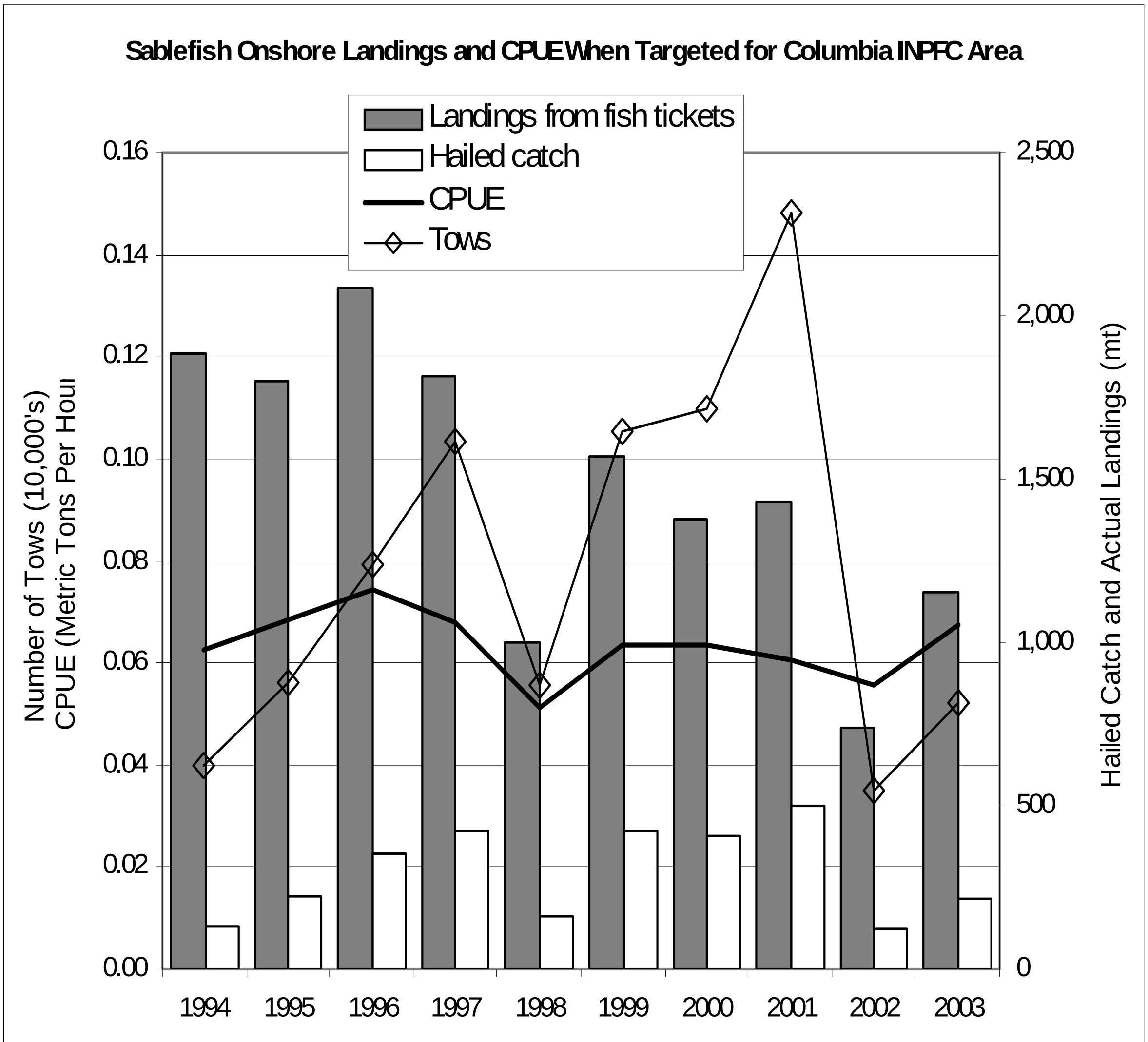




Notes: 1. Years prior to 1991 include only onshore landings.

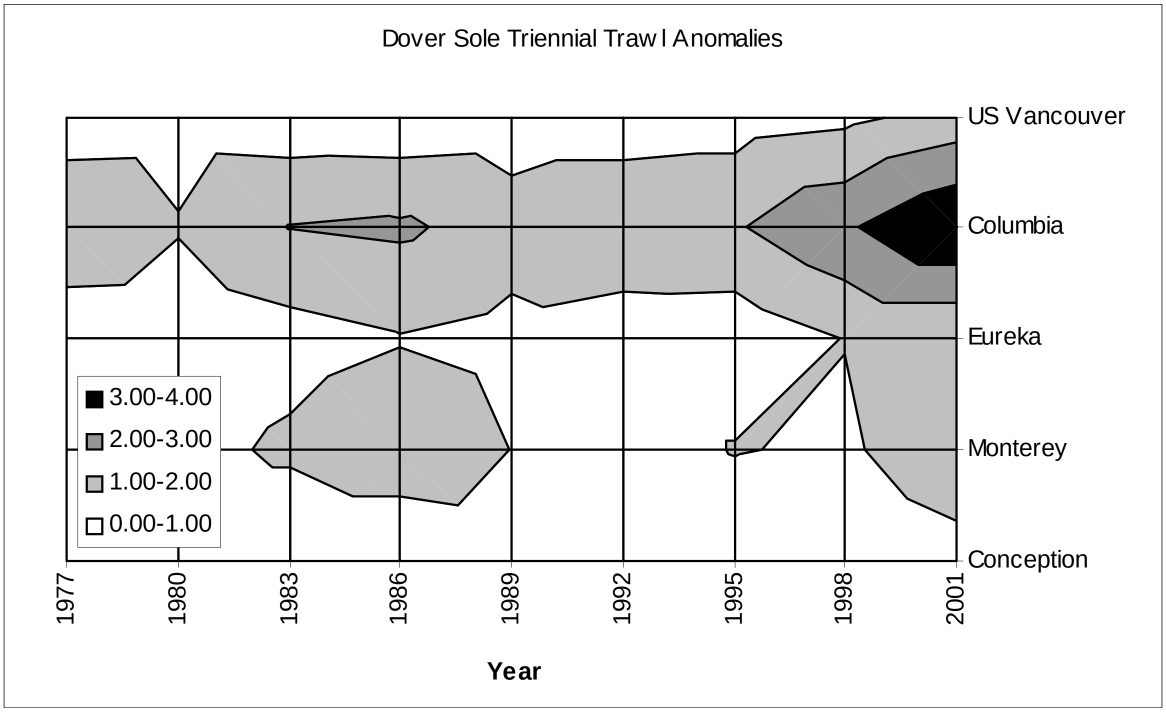
2. Average of all areas and years includes zeros when no landings were made.

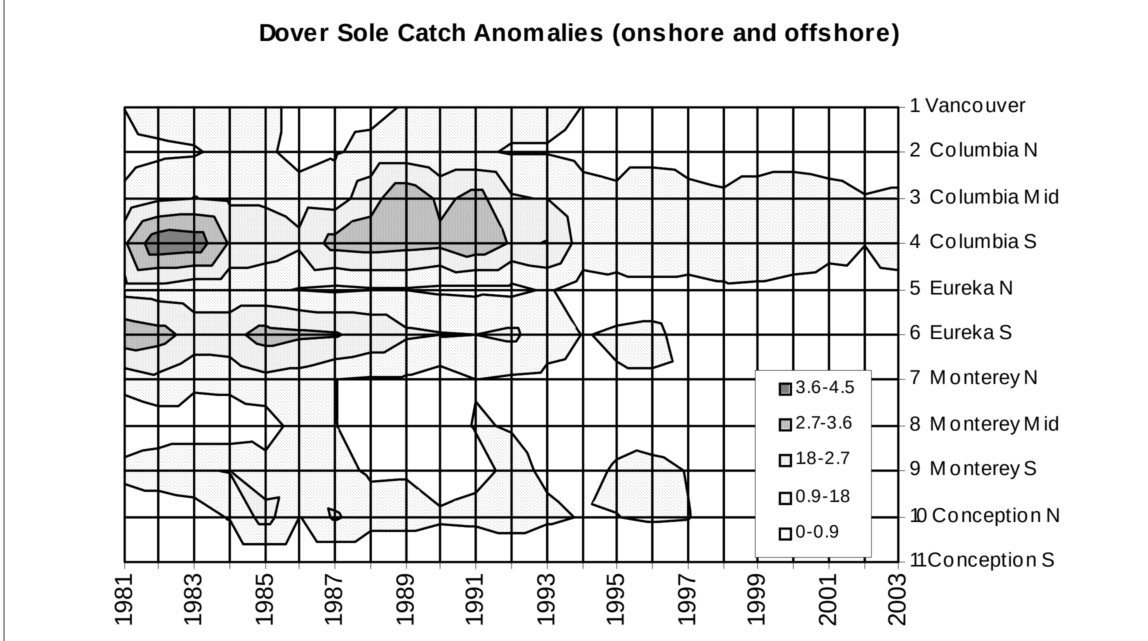
Figure 5 (A1.2b) Sablefish onshore landed catch and CPUE for INPFC Columbia area (1994-2003).



Notes: 1. INPFC areas defined by trawl logbook port of return.
Source: PacFIN fish ticket data extraction August 2004, and trawl logbook data extraction August 2004.

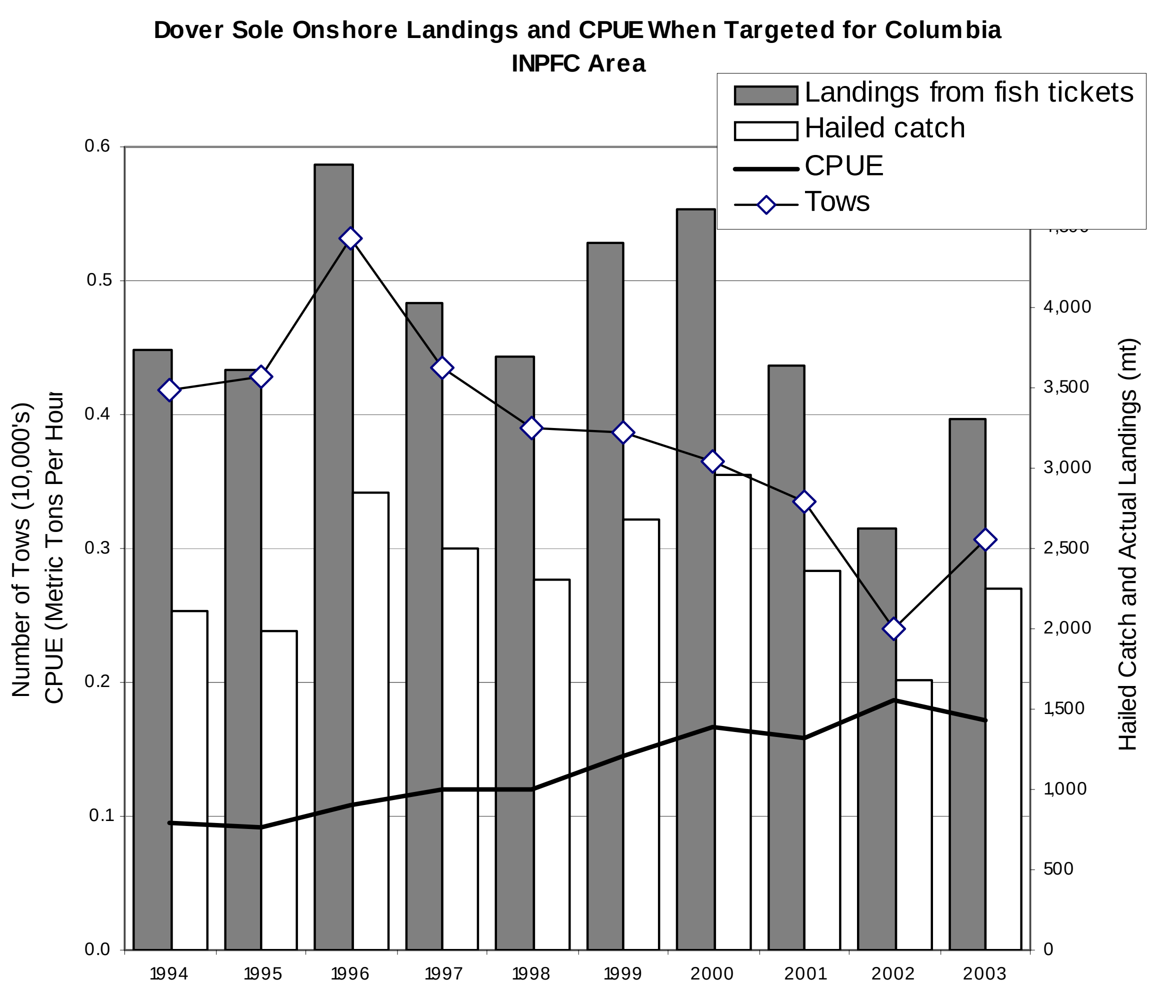
Figure 6 (A1.3a) Dover sole triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





Notes: 1. Years prior to 1991 include only onshore landings.
2. Average of all areas and years includes zeros when no landings were made.

Figure 7 (A1.3b) Dover sole onshore landed catch and CPUE for INPFC Columbia area (1994-2003).



Notes: 1. INPFC areas defined by trawl logbook port of return.
Source: PacFIN fish ticket data extraction August 2004, and trawl logbook data extraction August 2004.

APPENDIX A - Socio-Economic Factors Affecting Geographic Distribution of Landings

Geographic Redistribution of Fishing Activity

The distribution of landings along the coast is the aggregate result of individual decisions. Different management systems present a different suite of opportunities, incentives, and barriers for those entering or expanding their activities and those leaving or contracting their activities.

In the following sections we identify how the influence of various factors that affect the distribution of fishing activity change with changes in the management system. The greater the change in the influence of any factor the more likely it is that the change in the management system will be accompanied by adjustment in the scale and participation of individual fishing operations. If the individuals among whom the redistribution occurs are located in different areas, the consequence is a geographic redistribution of activity and associated fishery benefits. Characteristics of the fishery which have little influence over the ultimate geographic distribution of effort under one management system may be more influential under another.

In general, the transferability and divisibility of harvest opportunity as compared to the license limitation system is likely to increase the influence of a number of factors previously muted by low profits, open access competition, and the lack of exclusivity and opportunity to benefit from decision to reduce the scale of operation. While the degree and direction of any shift is not predictable, the system changes that are projected indicate an increased likelihood of geographic shifts in fishing activity under IFQs as compared to a license limitation system.

Effects of Fisheries Management Approaches on Geographic Shifts in Fishing Effort and Fishing Practices

Different approaches to fisheries management may likely yield dissimilar effects on geographic movement of fishing effort, for example under Open Access management, Limited Entry management, and Quota Based Limited Entry management. Descriptions of the more qualitative aspects of these effects and differences are discussed below under two general groupings: Social Factors, and Economic Factors.

Characteristics of each Fisheries Management System :

Open Access. The fishery can be exploited by any and all entrants, and is divisible such that the harvest by anyone subtracts from the harvest available to others. Because of new entry, there is usually too much competition in the fishery and persistent latent capacity in the fishing fleet. Stewardship or conservation incentives are stifled under the "free-rider" atmosphere of open access. This is because the benefits of individual conservation practices end up being divided among all permittees, and the gains from conservation cheating are captured entirely by the cheater. Overall rents or profits approach zero, since new entry into the fishery continues as long as profits are to be made. Traditional management measures for Open Access fisheries tend to take the form of input controls: vessel or gear restrictions, restricted seasons, area restrictions, etc.

Limited Entry. Entry into the fishery is limited to the number of permittees considered appropriate for sustainable harvest of the resource. Target levels of sustainable effort are based on estimates of overall fishing capacity, balanced against the strength and resiliency of the fish populations (stock size and recruitment potential). While the number of permittees is limited, latent capacity persists in the fishery either because the number of vessels has not yet been sufficiently reduce or potentially more efficient configurations of fishing activity cannot be achieved due to the lack of flexibility in the regulatory regime. As a result of the latent capacity rents or profits are reduced as compared with a rationalized fleet. In the West Coast groundfish trawl fishery, the primary management measures are an output control (two-month cumulative trip limits) and an input control (the license limitation system). This combination of an input control with an output control, while not achieving full rationalization, effectively stifles any incentive for expanding capitalization within the groundfish trawl fishery. There are also numerous input controls such as gear and area restrictions.

Quota Based Limited Entry. Entry into the fishery is limited to enough permittees considered appropriate for sustainable harvests. Overall fleet fishing effort, and individual effort, is regulated through quota shares held by each permittee. Quota shares are quasi-property rights entitling the permittee to harvest some portion of the allowable catch, usually expressed as a percentage of the allowable catch (NRC 1999). Shares are infinitely divisible and transferable, with transfers between permittees allowed throughout the fishing season (subject to some restrictions and fees on transfers). Initial assignment of quota shares are based on criteria developed by the fishery management authority, usually linked to historical landings (volume or value of landings), current fishing capacity, or willingness to pay (as with auctioned quota shares). Profits or rents tend to be higher since participants can match their capital, and time their harvests, in order to maximize the value of their landings. The primary management measures are output controls: individual harvest amounts (subject to an overall allowable catch for the fleet for the season). Additionally, input controls such as gear restrictions and area closures will remain in place.

Factors in an Individual's Choice Whether to Alter Fishing Practices: Assuming that fishermen will behave as rational individuals and profit-maximizing businesses, the motivation to move or change fishing effort depends on the perceived benefits making the change under each fishing scenario: Open Access, Limited Entry, and Quota Based Limited Entry. Benefits may be in the form of increased profits or intangibles that increase individual satisfaction. Profit impetus may take the form of either increased revenues potential or cost minimization opportunities. Intangibles may be nonmarket components of individual welfare such as individual quality of life, or ties to cultural, familial, or community welfare. Thus, many reasons may factor into a fisherman's decision to change fishing practices under a given fishing scenario.

Manifesting the Decision to Change or Move Fishing Practices in the Fishery:
In general the individual's resulting decision whether to change their fishing effort or fishing practices under each fishing scenario, will take the form of one or more of the following three actions:

- To expand or contract fishing operations (or effort) in the existing geographical area or home port,
- To relocate fishing operations to a different geographical area or home port, and,
- To cease fishing operations in favor of selling, surrendering, or allowing the fishing permit to lapse.

Determinants of Movement or Change:

A. Economic Factors:

As a rational business person, fishermen are motivated to maximize the profits derived from fishing activities. Accordingly, economic factors would enter business decision processes, including decisions whether to move or change the level of fishing activities. These economic factors include the realm of all the inputs to production, and how the inputs are combined, that affect each fisherman's profitability. Fishermen strive to employ inputs to maximize gross revenues or minimize production costs, either of which figure into profitability or profit maximization. Certain dynamic forces and their influence on production may be more, or less, under the control of the individual fisherman; Endogenous forces, and Exogenous forces (Box 2000). Examples of exogenous forces include: seasonal weather patterns and oceanographic conditions, regulatory changes, geographic distribution of target fish species, foreign monetary exchange rates, price per gallon of fuel, or other forces beyond the control of the fishermen that nonetheless influence production and profitability. Examples of endogenous forces would include: fishermen's selection and level of labor inputs, choice in gear or materials used in harvest production, how much fuel to use, how and where to deploy gear, how raw inputs are combined together, what species to target, in what condition the fish are landed, or other business decisions that are primarily under the control of the fishermen and influence profitability.

Exogenous Forces

Natural Features and Patterns

This entails factors beyond the control of the fishermen that nonetheless can impact individual decisions on how or where to expend fishing effort. Examples include oceanographic features; prevailing currents, bottom topography, shoreline features; weather conditions and seasonal patterns.

<u>Open Access</u>

The stifled profit potential under open access conditions may present a barrier to adapting fishing activities, in light of limited financial resources. To the extent that natural features restrict the alternatives available to the fishermen; alternative ports or fisheries, this may present a disincentive to expanding or relocating fishing activities. The decision to cease fishing may or may not be influenced by natural features since, in the highly competitive open access fishery, all participants are presented with the same challenges.

<u>Limited Entry</u>

The benefits of reduced competition are dissipated to the extent that latent capacity persists under limited entry. Profit potential under limited entry, improves when it entails significant reduction in fleet size, but may still be subject to the conditions in open access; latent capacity and overcapitalization. Natural features may restrict the alternatives available to the fishermen like alternative ports or fisheries, and may present a disincentive to expanding or relocating fishing activities. The decision to cease fishing may not be influenced by natural features since, under limited entry fishery, fishermen are presented with comparatively better prospects for earning profits.

<u>Quota Based Limited Entry</u>

Increased profit potential and flexibility in timing of landings offers the fishermen greater latitude in business decisions to expand or contract fishing activities or relocate fishing effort. Under transferable individual quotas, some fishermen may elect to constrict their scale of operations, and opt to sell all or part of their quota. Balancing this choice to sell quota and constrict operations, is the buyer counterpart, the fisherman who desires to purchase quota and expand operations. In the face of natural features, this increased flexibility may enable the fishermen to consider alternative areas to expand or constrict fishing operations, to better meet their desired scale of activity, or relocate their base of operations.

Biological Features

This represents biological features over which the fishermen may have little or no control. An example is the geographical distribution (or movement patterns) of target fish species.

<u>Open Access</u>

Conditions under open access, which stifle profit potential, may present barriers to adapting fishing activities, in light of limited financial resources. To the extent that biological features dictate what alternative fishing areas are available to the fishermen, this may present a disincentive to expanding or relocating fishing activities. The decision to cease fishing may or may not be influenced by biological features since, in the highly competitive open access fishery, all participants are presented with the same challenges. However, at or near some threshold of minimum fishing activity, fishermen may decide to cease fishing when biological resources are insufficient to sustain business operations.

<u>Limited Entry</u>

Persistent latent capacity tends to dissipated profit potential and offsets some benefits of reduced competition under limited entry. To the extent that biological features dictate what alternative fishing areas are available to the fishermen, this may or may not present a disincentive to expanding or relocating fishing activities. The decision to cease fishing may not be influenced by biological features since reduced competition between fishermen should improve prospects for sustained or higher profits in the future. However, at or near some threshold of minimum fishing activity, fishermen may decide to cease fishing if biological resources prove insufficient to sustain business operations.

Quota Based Limited Entry

Increased flexibility and profit potential offers the fishermen greater latitude in business decisions to expand or contract fishing activities or relocate fishing effort. Given the biological distribution of target species, some fishermen may elect to alter their scale of operations, and opt to sell all or part of their quota. Balancing the sale of quota and constriction operations would be those fishermen who desire to purchase quota and expand or relocate their operations. In the face of biological features, this increased flexibility for business activities broadens the range of alternative areas to expand or constrict fishing operations, to better meet their desired scale of activity or relocate their base of operations.

Market Conditions

This encompasses financial markets, foreign exchange markets, geographical centers of demand (for fish products), demand for variety of deliverable products, availability of substitutes, and regional cost of living.

Open Access

Fishermen operating under a highly competitive open access fishery exercise little individual market power over price paid and quantity of product purchased. This, coupled with the comparatively low profits, makes fishermen vulnerable to outside influences like competition from substitute products, processor inventories/supply-on-hand, or costs for production inputs. Consequently, market influence may establish limits for fishermen, and represent a disincentive to expand or relocate activities. Likewise, market conditions may or may not influence a fisherman’s decision to cease fishing under an open access circumstance.

Limited Entry

Fishermen operating under the less competitive limited entry environment, may be able to exercise more individual market power over price paid and quantity of product purchased. To the extent that persistent latent capacity allows some profit potential, fishermen may be better equipped to weather localized market conditions and expand or relocate activities to improve profit potential. Consequently, market conditions may or may not present forces that encourage expanding or relocating fishing activities. Under limited entry, market fluctuations may not greatly influence a fisherman’s decision to cease fishing, given prospects for sustained or higher profits in the future and some individual market power.

Quota Based Limited Entry

Fishermen with individual quotas would have the greatest individual market power over price paid and quantity of product purchased, relative to open access and limited entry. These circumstances would likely lead to higher profit potential for quota holders. Consequently, market fluctuations would likely encourage expanding or constricting activities as well as timing of landings, to maximize the value of the quota landed. The fishermen would have more flexibility, and a better financial posture, to relocate operations as a rational business decision. Market fluctuations would probably not influence a fisherman’s decision to cease fishing, unless coupled with some other influence; e.g., influence of financial gain by exiting the fishery.

Infrastructure and Amenities

Benefits, services, and provisions available to the fisherman at their business location, which are necessary to the continued production process, can affect the flexibility the fisherman has in how or where they locate their fishing business and efforts. Examples of infrastructure and amenities include harbor location and features, shipyard facilities, ice suppliers, fuel docks, processors, chandlers, offloading facilities, supplemental income sources, and attainable housing.

Open Access

Conditions under open access, which stifle profit potential, may present barriers to adapting fishing activities, in light of limited financial resources. To the extent that the fisherman's business operations depend on local infrastructure and amenities, they may represent a limiting factor and disincentive to expanding or relocating fishing activities. However, the decision to cease fishing may or may not be influenced by infrastructure and amenities since, in the highly competitive open access fishery, all local participants would be presented with the same conditions. However, the loss of certain critical infrastructure or amenities could result in a decision to cease fishing; e.g., loss of distribution channels or local processor.

Limited Entry

The location of acceptable infrastructure and amenities, suitable for the fisherman's desired scale of operations, may limit the options for a fisherman to expand or relocate fishing operations. To the extent that the local offers established markets for product, there would be disincentives to relocate or cease fishing operations under limited entry. Particularly given comparatively better prospects for earning future profits, and reduced competition under limited entry.

Quota Based Limited Entry

Increased profit potential and flexibility in timing of landings offers the fishermen greater latitude in business decisions to expand or contract fishing activities or relocate fishing effort. Under transferable individual quotas, some fishermen may elect to constrict their scale of operations, and opt to sell all or part of their quota. Balancing this choice to sell quota and constrict operations, are the fishermen desiring more quota to expand operations. In the face of limited infrastructure and amenities, this increased flexibility and profitability may enable the fishermen to consider alternative areas to expand or constrict fishing operations, to better meet their desired scale of activity, or relocate their base of operations. Infrastructure and amenities would probably not influence a fisherman's decision to cease fishing, unless coupled with some other influence; e.g., influence of financial gain by exiting the fishery. This is due to the increased flexibility under the quota based system, affording the fisherman more liberty to move or adapt operations to a new location or adapt to better suit the current location.

Endogenous Forces

Production Processes

Production processes primarily under the influence of the fisherman and may include: choice and combination of inputs to production, where to focus fishing effort, how to deploy gear, level of diversification, choice of product mix or condition of fish landed, where to land the fish, and individual innovation.

Open Access

The highly competitive open access fishery and stifled profit potential would likely present a barrier to altering fishing activities; expanding or relocation operations. Much of the decisions on capital investment and choice of production inputs are geared more toward harvest capture potential and not harvest value potential. In an overcapitalized fleet this could mean much of the fishing profits go toward sustaining unnecessary capital and burdensome financial liabilities. In some cases financial obligations may represent a primary motive to continue fishing, though the activity may not be profitable or an optimal business decision.

Limited Entry

Fishermen operating under the less competitive limited entry environment, may exercise more individual control over the kind and quantity of product delivered to market. While persistent latent capacity may erode overall profit potential, fishermen may be better situated to vary their use of production inputs or pursue innovations in order to enhance their harvest potential. As a result fishermen may or may not choose to expand or relocate fishing operations under limited entry. Under limited entry, production processes may not influence a fisherman's decision to cease fishing, given prospects for lower competition and for sustained or higher profits in the future.

Quota Based Limited Entry

Increased flexibility and profit potential under an individual quota system would offer the fishermen the greatest latitude in business decisions to expand or contract fishing activities or relocate fishing effort. Given the biological distribution of target species, some fishermen may elect to alter their scale of operations, opt to sell or buy quota, or specialize in certain species or product quality. Under a quota based limited entry system, we would expect fishermen to exercise the greatest control over production processes, and that these conditions would facilitate expanding or relocating operations as a rational business decision. The increased flexibility for business activities broadens the range of alternative areas to expand or constrict fishing operations, to better meet their desired scale of activity or relocate their base of operations. Furthermore, given the greater flexibility in making business decisions under individual quotas, there would be little incentive to cease fishing activities unless coupled with some other influence; e.g., financial gain by exiting the fishery.

Investment Options

Aside from the production decisions in day to day fishing operations, other non-fishing investing consideration may affect a fisherman's decision on how or where to conduct fishing activities, if at all. An example of investment options would be the prospects available to the fisherman for exiting the fishery with a financial gain. Financial gain may provide the fisherman the flexibility either to remove themself entirely from the fishery (divest) or to reinvest in alternative fisheries.

B. Social Factors:

Community Ties and Contribution

This category represents the inter-relatedness of fishermen in a community. The social connections fostered by fishing activity and in a sense dependent on fishing. Examples include social ties within and between different gear groups, those that target specific species, or those that have specific vessels. Businesses related to fishing such as ice manufacturer's, net suppliers, or fuel suppliers are some examples as well. Fishermen's associations or fishermen's wives groups also contribute and support community ties.

Open Access

- Stability and strong community ties support fishing activity, unlikely to break community ties and move to a different location.
- Difficult to rebuild trust and business relationships in a new community.
- Community ties may be structured around fishing success and accomplishments (Gilden and Conway 2002) that are knowledgeable in an existing community and therefore would need to be recreated in a new community.

Limited Entry

- Limited entry may result in a slight consolidation of fishing resources and therefore a stronger community support network and structure.
- Business relationships may become more unique and specialized.
- Geographic shift may depend upon area restrictions, the seeking of additional permits, otherwise strong community ties are likely to be maintained and counter any movement.

Quota Based Limited Entry

- Community ties are strengthened in a limited entry program, so they are only likely to become stronger with more limitations.
- Consolidation of resources impacts entire community from family members to business partners. As a result a closer interwoven community support structure may support smaller family fishermen to keep them in the fishery.
- Larger entities that seek to acquire additional quota would be more likely to choose a geographic location shift in order to obtain higher quota limits.

Familial Ties and Tradition

This category represents family lines passing down fishing through generations, traditions. Linkages may form the fishing community's identity. Fishing becomes a family business, where members of the family may participate in fishing activities as well as in the management of business and family finances (Gilden and Conway 2002). The practice of fishing is ingrained in the everyday lives of the fishing families.

Open Access
- Movement unlikely for an overcapitalized fishery when familial ties are strong and the support structure is solid.

Limited Entry
- Familial ties may strengthen under a limited system.
- Family and tradition interlinked with community and community members, web of society, not likely to move to different community and different traditions

Quota Based Limited Entry
- Dependent on design of IFQ negative impacts and consolidation of quota may have a disproportionate negative effect on family based structures (McCay 1995) resulting in some removal from the fishery.
- Higher values of IFQ's often result in higher costs and taxes and difficulties passing quotas as inheritance (McCay 1995).
- A smaller number of fishermen may cling to significance of fishing to family and traditions and hold onto the quota as long as possible even if they are out competed by larger entities.
- Smaller family fishing operations are less likely to move, whereas, larger family based companies may move to seek consolidation of quota.

Cultural Ties and Values

Fishing as a way of life inherent in every day life, values, beliefs, and norms surround how fishing is conducted. In families of strong fishing backgrounds, fishing is seen as the optimal job, the thing to do that is significant in life.

Open Access
- Cultural ties may be linked to a specific geographic region and community and therefore movement may be unlikely.

Limited Entry
- Under a system where access is limited the importance of fishing may be more realized and therefore more culturally significant.
- Efforts to retain culture may be a disincentive to move.

Quota Based Limited Entry
- If quota allocation is so small where a fishing culture may be threatened, it may be possible to see a geographical shift for the purpose of maintaining the culture.
- Any geographic shift would be dependent on the size of the fishing operation and the available resources.
- In the case of smaller entities whose identity is tied to fishing, if resources are not available to move, fishing may be continued at a lower level until a time where the ability to fish is lost or they are forced out of the fishery by a larger entity.

Job Satisfaction

McCay (1995) describes job satisfaction as a "confluence of personal, situational, and socio-cultural community values."

Open Access

- Depending on connection to fishing, cultural, familial, etc., job satisfaction may be more difficult to achieve for someone just interested in fishing without have a community and cultural background. If this is the case entrance and exit from the fishery may be common.

Limited Entry

Not much information available, feasible to suggest an incentive to cease as job satisfaction is reduced with permitting costs.

- Not much information on this, but it is feasible to consider any ability to fish, even limited, yields some job satisfaction

Quota Based Limited Entry

- Satisfaction may vary dependent on the specific role of an individual in the fishing industry under IFQ's.
- Those that are able to meet the costs and compete in an arena where IFQs may increase in value, may yield a higher job satisfaction and continue in the fishery, and if resources are available may move around to increase IFQ ownership
- Those who are unable to withstand the costs, bear the brunt of the costs, may represent a negative effect in job satisfaction and depending on the community may stay in the fishery or may exit.

Social Relationships of Production

McCay (1995) describes this dynamic as a change in the "concentration of property rights" or privileges relating in changes in relationships and vertical integrations. As values change, costs change, and social structures change. Specifically this may impact the relationships between larger entities, owners of both boats and quotas, crew and other employees.

Open Access

- No real change to effect geographic movement.

Limited Entry

- Good business structures that are successful may only see some consolidation from effort limits, but the social relationships of production may not change, resulting in no real change in geographic efforts.

Quota Based Limited Entry

- McCay (1995) indicates a contraction as consolidation occurs and participants fight to establish a favorable position to maintain economic value. As a result, relationships of dependency and exploitation between larger firms who hold large amounts of IFQs change. Increased costs are placed on owners, who then change wage structure of crew so they can shift burden of increased costs. As a result crew may shift locations trying to find reasonable place within the system that respects
- Incentive to relocate to an area with fewer large corporations. Smaller entities may be forced to sell permits and exit as smaller entities are squeezed by larger corporations who have resources to drive values of IFQ's, small entities cannot keep up and are unwillingly forced to exit **.**

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Communities and Individual Quota Programs
Discussion on Community Definitions, Community Eligibility Criteria and Allocation Process in Quota Systems

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Understanding communities in the context of fisheries management is important as the term can be interpreted in several different ways. It is critical to define how the term is being referred to for any particular management measure. The definition may be supplemented by designing specific eligibility criteria which would help distinguish communities. As Individual transferable quota (ITQ) systems throughout the world are focused on individuals, a few have learned the importance of acknowledging communities and have adjusted their quota systems to reflect community quota eligibility. This brief section will consider the various ways communities can be defined, how the Magnuson-Stevens Act defines the term, and how different systems selected communities for quota through eligibility criteria.

Defining Communities

When referring to community is it common to consider it to be a place based definition regarding a specific geographic area and the people that occupy the area. For example one definition of the term states "...a social group of any size whose members reside in a specific locality, interact with one another on an ongoing basis, and who have a shared sense of identity, interests, values, governmental institutions, and cultural and historic heritage (McGoodwin 2001)." Examples of place based communities may be Bellingham WA., Brookings OR., or Crescent City, CA.

Other types of communities may be 'communities of interest,' 'virtual communities', and 'occupational communities' to name a few. "Communities of interest" are based on 'common interests' or common activities of the participants or community members (Gilden1999)(NRC 1999). Examples of a community of interest may be clubs, commodity groups, or business organizations. In an ITQ system, a community of interest is created encompassing those who hold quota shares.

"Virtual communities" are likened to a place based community except the members may not live in the same geographic communities (NRC 1999a). Examples of these communities may be fishers that are interested in a specific fishery and its correlating habitat, or individuals that are interested management measures such as closed areas, which affects various communities over a large geographic area. These communities may represent associations of different occupations such as fishers, fish processors, biologists, and conservationists. The differentiation of fishermen by a specific gear group, for example trawlers or urchin divers, also represents a virtual community, they are linked by the commonality of a gear group but are geographically dispersed (Gilden 1999).

"Occupational communities" are those linked by similar occupations, such as crabbing or trolling (Gilden 1999). Fishermen may be considered an occupational community which may be further identified by specific fishing gear groups such as trawlers or pot fishers.

The Magnuson-Stevens Act defines a fishing community as "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such a community (§3[16])." National Standard 8 (50CFR600.345(b)(3)) further defines a community as "a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries-dependent services and industries."

A point noted by the GAO (2004), when defining a community based on geographic criteria, is to take into consideration the requirements of National Standard 4 (NS4). NS4 states "conservation and management measures shall not discriminate between residents of different states (§301[4])." A community definition which may be too narrowly defined may conflict

with NS4. As a result, a clear definition of a community or community eligibility criteria is required.
When categorizing a community, it is plausible that a single community can be defined by several different definitions. A community of interest, may also be an occupational community. It is also important to note that communities are ever changing, dynamic, and responsive to change (McCay & Jentoft 1998). Management measures cause change in communities. As a result, it is important to carefully define the term or clearly identify eligibility criteria.

Community Development Quota of Western Alaska

The CDQ program of western Alaska was developed by the North Pacific Fishery Management Council in 1992 to assist in the social and economic development of coastal villages in rural western Alaska. The program encompasses the Bering Sea and Aleutian Island (BSAI) region and their associated fisheries. Upon the initiation of the plan, allocations were provided for Bering Sea pollock, however, over time other fisheries were added such as halibut, sablefish, crab, and multispecies groundfish. Community eligibility criteria were developed, CDQ groups were established to represent communities, and allocation is managed through the Council process based on recommendations from the State of Alaska.

Eligibility Criteria

Communities within western Alaska are small rural communities which are often very isolated. As a result, the purpose of the CDQ program and the eligibility criteria appropriately target these small communities. The major eligibility criteria are as follows:

- Location within 50 nautical miles of the Bering Sea.
- Native village as defined by the Alaska Native Land Claims Settlement Act.
- Residents conduct over 50% of their current commercial or subsistence fishing effort in the waters of the Bering Sea.
- No previously developed harvesting or processing capacity sufficient to support substantial groundfish fisheries participation.

Initially 56 communities were determined to be eligible, with additional communities qualifying to a current date total of 65 eligible communities. Most of the qualified communities had high rates of poverty and unemployment (NRC 1999b). Community members held planning meetings during which six separate CDQ coalitions or groups were established.

Community Development Groups

CDQ groups were ‘self-determined’ during community planning meetings and were designed based on cultural boundaries and regional similarities (Alaska 2003). Each of the CDQs is a nonprofit organization.   Groups determined the need to find an industry partner with Bering Sea harvesting ability. As a result, each CDQ group received proposals from harvesters and processors and chose the proposals that reflected the goals of their specific group. Royalty agreements or contracts were signed between industry and the CDQ groups. Royalty payments received for access to the communities share of quota are then used to meet development goals (NRC 1999b).

All CDQ groups share the common objective of developing fisheries related economies in western Alaska. Each group determines the best use of its allocation and outline what activities are best suited for their region. While not all groups approached how to achieve this objective in the same manner, and have varying levels of success, all have incorporated efforts to create jobs and some type of education and training component (NRC 1999). Examples of goals include: promote and participate in business opportunities with capital investment fund, facilitate fisheries management through research; construct vessel repair, maintenance and storage facility, small boat harbor projects; and to improve the social conditions through creating human resource programs that will be self-sustaining over time (Alaska 2003).

Community Development Quota Allocation

CDQ groups are required to complete extensive annual Community Development Plan (CDP) applications to be eligible for quota. The plans are reviewed by a CDQ team comprised of designees of Alaska's governor. The applications include the group's goals and objectives, employment information, fishing related infrastructure, a budget, documented support from each participating community, appropriate management and technical experience, and a plan to prevent exceeding quota.

Once completed, the plans are submitted to the State of Alaska for review. The state checks the plans for federal and state regulatory compliance and then recommends allocation to the governor. Upon approval, the state must consult with the North Pacific Fisheries Management Council and the National Marine Fisheries Service (NMFS). After any questions are resolved and findings approved, allocations are finalized through the Council process.

Initial allocation in the Bering Sea pollock fishery was derived from the 15% harvest "reserve" held to assist in-season management. The allocation was not outside the total allowable catch (TAC) for that season. It was determined that an amount equal to half of the of the "reserve", 7.5%, would be allocated to community quotas. This amount held until the passing of the American Fisheries Act, which increased the pollock quota to the CDQ program to 10% in 1999.

Initial allocation of BSAI sablefish was 20%. Halibut allocations were varied and are distributed across management areas. Expansion added Pacific cod, Atka mackarel, turbot, yellowfin sole, and other flatfish species, Tanner crab, and snow crab under the mulitspecies program at a total of 7.5% of the quota. Bering Sea opilio, bairdi, and king crab was phased in at 3.5% in 1998, 5% in 1999, and 7.5% in 2000. The maximum award to any single CDQ group is 33% of the overall 7.5% allocation (NRC 1999b).

The process to determine how to distribute these quota across each CDQ group is handled by the State of Alaska and their CDQ teams. Through standards and criteria established in Alaska state regulations, the CDQ teams evaluate the information provided by the CDQ groups in their CDP against the standards and criteria and from the overall evaluations determine a quota allocation.

Gulf of Alaska Halibut and Sablefish IFQ Program

Overcapitalized halibut and sablefish fisheries resulted in the development of the IFQ program for the Gulf of Alaska (GOA). Program implementation occurred in 1995 with the issuance of quota shares (QS) to individuals. By the late 1990's quota had been consolidated, primarily transferred to large communities leaving fewer shares for small coastal communities. The impacts of reduced access to IFQ shares compounded by poor salmon prices led to declining fishery economies in small communities (Smith 2004). Community leaders created the Gulf of Alaska Coastal Community Coalition (GOACCC) which sought a solution to gain access to quota for small communities. In April 2002, the NPFMC took action providing the opportunity for communities to "buy in" to the IFQ program. Quota shares would be held by non-profit corporations who would represent communities.

Eligibility Criteria

Eligibility criteria and program requirements for the GOA communities was included in the Final Rule published in the Federal Register on April 30, 2004 [69FR No. 84; 23681]. Communities must meet all of the following criteria to be eligible to participate in the IFQ program:

- Have a population of less than 1,500 persons based on the 2000 United States Census.
- Have direct saltwater access.
- Lack direct road access to communities with a population greater than 1,500 persons.
- Have historic participation in the halibut and sablefish fisheries.
- Be specifically designated on a list adopted by the Council and included in this rule.

Initially 42 communities qualified under this criteria. If a community does not qualify under
criteria, but appears to meet the criteria, they may apply directly to the Council for inclusion. Once qualified as an eligible community, they are then able to designate a nonprofit organization to hold QS on behalf of the community.

Community Quota Entity

The Final Rule designates the ability of nonprofit organizations to apply for the status of a Community Quota Entity (CQE) to act on the behalf of eligible communities. Each CQE may represent more than one community, but each community can only have one CQE. Nonprofit entities apply directly to NMFS for their CQE status. Applications included articles of incorporation and by-laws, an organizational chart and management structure, procedures for distribution of annual IFQ to represented communities, and the formal statement of support (resolution) from the governing bodies of eligible communities. Upon receipt of the application, the NMFS will review and once determined to be complete, will forward the application to the State of Alaska for a review period. Upon reviewing comments from the state, NMFS may approve, partially approve, or deny the application. Upon approval, a CQE will be designated to act on behalf of a specific community. The CQE will be issued a "transfer eligibility certificate" (TEC) and will be able to enter the QS market and hold QS for the community.

The CQE then "leases" annual IFQ permit amounts to individual permanent community residents to fish. The CQE continues to purchase more quota for fishermen in the community to fish. There are caps on the amount of QS a single community can hold, caps on the amount of QS held by all participating communities, and "block" limits of quota. Community use caps are the same as found in the current ITQ program. They are: 1% of 2c halibut QS, 0.5% of all GOA halibut QS, 1% of SE sablefish QS, and 1% of all sablefish QS (Smith 2004). Cumulative use caps on all CQE holdings vary by year and commence with 3% the first year, 6% the second year, 9% the third year, 12% the fourth year, 15% the fifth year, 18% the sixth year, and 21% the seventh year. The program will be reviewed in five year increments, during which time these use caps will be reviewed.

Other limitations prohibit the purchase or transfer of ITQs from specific designated management areas in the GOA. CQE block rules apply prohibiting the purchase/use of more than 10 blocks of halibut or 5 blocks of sablefish QS in any one management area. Rules also prohibit the combination of small "sweep up" blocks to form a larger block. "Sweep up" amounts are smaller QS blocks intended to facilitate the purchase of QS by new entrants. The intent of this prohibition is to avoid a "potentially unfair competition in the QS market between CQE's and individuals for these small blocks [69FR No. 84; 23684]."

The Final Rule also states that CQE's can not sell QS unless the sale will generate revenues to improve, sustain, or expand the opportunities for the communities residents to participate in the halibut and sablefish fisheries. NMFS will not authorize the transfer of the QS held by a CQE unless the community for which the QS was held authorized the transfer. This authorization must come as an Approval of Transfer form signed by an authorized representative of the governing body of the specific community. If it is determined that the transfer was issue conducted for any reason other than for the benefit of the community, the CQE will face restrictions on holding and administering QS for the specific community for up to a period of three calendar years.

Quota pounds are issued on an annual basis and are leased by CQE's on an annual basis. Once the annual allocation is received by the CQE, it may then be transferred or 'leased' in full or part of the applicable pounds to one or more permanent residents of the represented community.

Criteria for an Individual to Lease QS from a CQE

Eligibility of an individual to qualify to lease quota from a representative CQE requires the individual to be a permanent resident of the represented community. Residents must affirm that he or she has maintained a residence in the community from which the IFQ is leased for a period of at least 12 consecutive months immediately preceding the time when the residence is being claimed. The individual can not have claimed residence in any other community, state, territory, or country during the same period of time. Individuals who receive quota are considered to be equal to IFQ permit holders and the same regulations are applicable. An individual can also qualify for CQE shares if they are a "IFQ crew member" and can demonstrate 150 days of fishing experience. One can also qualify if they received QS by the initial issuance.

QS holders are required to be present on the vessel while fishing and delivering, the hiring of skippers is prohibited. IFQ holdings by a lessee may not exceed 50,000 pounds of halibut or sablefish. The amount of IFQ fished from any vessel may not exceed 50,000 pounds of halibut or sablefish in any season, inclusive of all IFQ fished aboard the vessel.

<u>Canadian Groundfish Scotia-Fundy Fisheries Community-Based Management</u>

The Scotia-Fundy groundfish fisheries functioned under quasi-property rights for a period of time in the early 1980's. By the mid to late 1980's initial allocation of non-transferable quotas to fishing companies, termed Enterprise Allocations, were extended to the entire fleet. Catching capacity of the inshore fleet continued to increase under a competitive quota system until a rapid decline of groundfish resulted in a closure of fishing grounds and the need to reduce harvest capacity which was met through license buyouts. In 1996, an experimental community quota system was introduced for the inshore fleet. The system divided the fleet into seven community based groups. The experimental program was extended annually through 1998 at which time it was again extended for a five year period (DO 2000).

Eligibility Criteria

Initially the Canadian Department of Fisheries and Oceans (DO) supported a concept to determine communities based on "like-minded individuals" but this concept was set aside in an effort to avoid "corporate concentration" (Peacock and Hansen 1999). Instead communities were selected solely based on geography. Seven community groups were established and are clearly outlined in the fisheries management plan. The program is specifically for the inshore fleet fixed gear vessels less than 45ft.

All license holders were assigned to a specific community based on the area of registry of the license holder in the year the program was developed. Opting out provisions were available.

Community Management Boards & Allocation

Community Management Boards (CMBs) are private boards comprised of elected representatives, whom are usually fishers (Peacock and Hansen 1999). The CMBs were established to represent communities and are responsible for distributing catch allocation, and the development, implementation, control, and monitoring of in-season management plans. Each of the seven communities has a CMB with the exception of one, which has two. In this case, the community had varying philosophies and performance due to different vessel groups, and as a result the community has two CMBs, one for each group (DO 2000). The CMBs are considered a social/economic driver for their designated community and as a result, are responsible for all activities related to these functions including the implementation of co-management approaches (Peacock and Hansen 1999).

Allocations of quota were provided to each CMB based on the catch history of each individual between 1986-1993 period, which was then standardized to 1996 levels. Calculations were based on landings linked to individual license-holders plus unidentified landings from processors within the community. Mediators were used to resolve any issues that arose. CMBs determine allocation to individual fishers and are able to conduct temporary quota trades between communities. Each management board may manage multiple species quota based on species allocations for specific fishery management areas.

<u>New Zealand ITQ System and Traditional Fishing</u>

After the implementation of the New Zealand ITQ program, the indigenous Maori people identified that their fishing rights were not being honored as guaranteed under the 1840 Treaty of Waitangi (Batstone and Sharp 1998). After years of negotiations and legal proceedings, the Maori people were allocated almost 40% of the New Zealand ITQ through the Treaty of Waitangi (Fisheries Claims) Settlement Act of 1992 (NRC 1999). The settlement resulted in a waiver of any additional Maori claims in exchange for a 50% Maori shareholding in Sealord Products limited and 20% of all new commercial fisheries entered into the quota management system (Te Ohu 2005). Through this act the Waitangi Fisheries Commission was created to hold the assets on behalf on behalf of the iwi (tribes) and to determine a fair allocation scheme.

After more than a decade of working with the iwi, Maori, and lobby groups, accompanied by successive legal challenges, the Maori Fisheries Act 2004 was passed through Parliament. This Act specifies allocation among the Maori, establishes trusts to hold allocations, and addresses all administrative roles and qualification criteria for individual iwi and their affiliated organizations.

Eligibility and allocation criteria are largely based on tribal qualification parameters, residence, coastline entitlements, and population considerations. Allocations are very complex and are outlined in the Act, but appear to allow equal amounts to be allocated to each iwi within each allocation sector. This program is unique due to the allocation through a legal rights process surrounding native rights.

<u>Icelandic ITQ System and Community Protection</u>

While the Icelandic ITQ system is based on quota allocated to vessels, and doesn't have direct community quota allocation, they do incorporate what may be considered 'community protection' measures within the ITQ program (GAO 2004). The Icelandic ITQ system applies to all fisheries, quotas are representative of shares of the TAC, quotas are permanent, divisible, and transferable with a few exceptions. Portions of any share are transferable, but a full annual vessel quota is only transferable between vessels within the same geographic region. These transfers within the geographic regions are reviewed by the appropriate fisher's unions and local authorities. The intent of geographic restrictions is to stabilize local employment (Runolfsson and Arnason 1997). Transfers outside of the region are subject what is referred to as a "community right of first refusal" rule which provides the community an opportunity to purchase vessels with their designated quota from within the community before the vessels are sold outside of the community (GAO 2004). Through these measures the community has a more direct voice in the utilization of the vessel quota.

Conclusion

Various programs that have incorporated community aspects into their quota program have various levels of detail and regulatory control over the quota. Each program is unique to the types of communities they are representing, for example, tribal, inshore fleets, gear types etc.. An understanding of the types of communities that will be affected by a quota implementation and the characteristics of those communities will undoubtedly assist in the process to define the term 'community' as it will apply to the specific program, help develop applicable community eligibility criteria, and assist in quota allocation decisions.

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Coastal Fishing Community Considerations in the Context of Trawl IFQ's

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October 18, 2004

The 1996 revision of the Magnuson-Stevens Fishery Conservation and Management Act recognizes the importance of human communities and their relationship to fisheries. Among other things, National Standard 8 declares that fishery conservation must take into account the importance of fishery resources to coastal fishing communities, with the goals of providing for the "sustained participation" of those communities in fisheries and minimizing "adverse economic impacts" as much as possible. This focus on communities represents a shift taking place in many areas of natural resource management. (1) As we consider the proper place of communities in the IFQ debate, we are using the MSA and NMFS definition that a fishing community exists in a specific **place** – such as Astoria.

An analysis of a system which includes the ability of coastal fishing communities or groups representing particular coastal fishing communities to participate in the quota marketplace must be included in any proposals or recommendations forwarded to the Council for analysis. The facilitation of ownership by communities of quota that could then be leased should be a minimum design element of any IFQ Program design. Consideration of a mechanism that allows communities opportunities to retain quota should also be considered as a design element.

Coastal Fishing Communities and the IFQ Program Design:

Community interests and needs must be adequately represented in this process. This can be done by providing the opportunity for communities to be involved in the program and by providing flexibility to change with changing conditions.

To that end, an analysis of a system which includes the ability of coastal fishing communities or groups representing particular coastal fishing communities to participate in the quota marketplace is imperative.

- ✓ The facilitation of ownership by communities of quota that could then be leased should be a minimum design element of any IFQ Program design.

  It is recognized that initial direct quota allocation to communities may not be the most desirable or operationally feasible option.

- ✓ Include a mechanism to ensure that quota usage benefits and involves communities. This includes options such as the ability of communities or groups representing communities to purchase quota, first right of refusal agreements, and annual allocations to proposals containing community-specific commitments.

For those communities which desire to support and strengthen their local fishing industry, an option needs to be in place for communities to obtain quota to be used for the benefit of that community - especially if that community is investing in its fisheries via infrastructure development and the adoption of policies to support and enhance the local fishing industry (such as protecting the use of valuable waterfront for fisheries related needs). Such a system could have design elements which would ensure that the interests of other sectors like fishermen and processors are also protected. For example, if a community had "quota" it could only be fished by permitted trawl vessels and this quota could be over and above the allocation an individual fisherman received. Further, if the quota was required to be landed in a particular port, this could help ensure benefits to community-based fish processors. There are several ways this could be designed. The community quota would have to be delivered in the community holding the quota, or could be delivered elsewhere by a community quota holder (fisherman/vessel) whose earnings would come back to benefit the community in which the vessel is homeported. Groups entitled to hold community quota could be any place-based community group – including fishermen and processors. Use of this quota could also be designed to help new entrants who have a groundfish trawl permit to get started by having the ability to lease quota if they cannot afford to buy it in their early years.

Community quota accumulation would be based on a particular community's desire to obtain the quota for the purpose of strengthening or maintaining its fleet, processors and support services. Not all communities are equal in this desire – some are actively planning for and supporting the local fleet and some are not. However, those communities which are planning for an industry in their future, and which want the opportunity to participate in the IFQ process should be granted the ability protect their local interests and investments by the accumulation of quota at some level.

Other mechanisms to address community concerns that should be included for further analysis include:

- ✓ Provide incentive for voluntary coops. This incentive might be important if there are tight caps on ownership that may not allow harvesters and processors to accumulate enough quota to operate at economies of scale. For example, if ownership was capped at 1 or 2%, harvesters and processors could form a coop or joint venture that would allow them to increase their collective and jointly managed quota share by some additional amount. This could be tied to a community of place.

- ✓ Community having the right of first refusal before any quota based in the community is sold outside of the community (voluntary coop held quota, processor held quota, or whatever). If communities are allowed to have ownership they can acquire first refusal rights from other owners – this could all be voluntary without communities having direct ownership.

- ✓ Hold back some percent of the quota share and allocate annually based on proposals brought forth jointly by processors and harvesters who have committed their quota to be delivered to a given port community.

- ✓ Geographic limits on quota use, whether used to designate landing or harvesting locations, can ensure dispersion of fishing effort, continued industry distribution along the coast and even engagement in specific ports.

Information needs for analysis:

List of coastal fishing communities and level of participation in West Coast fisheries including trawl fisheries.

Economic information
Social information
Community planning goals regarding fisheries (trawl).

A well structured IFQ program which incorporates community interests can meet the Pacific Fishery Management's Council's (PFMC) goals of providing for a well-managed system to protect and conserve groundfish resources; providing for a stable and efficient groundfish industry; increasing net benefits that arise from the fishery; providing for a fair and equitable distribution of fishery benefits; providing for a safe fishery; and rationalizing capacity through market forces

Background Information

In a letter (6/18/04) to selected participants, Senators Gordon Smith (OR) and Patty Murray (WA) expressed their desire that the process for developing an IQ program for the West Coast groundfish trawl fishery include a policy framework that provides for a stable and healthy coastal economy. They said "We encourage efforts to bring lasting value back to our groundfish fishery. However, we believe that we must proceed judiciously to ensure that all options are carefully considered and the interests of all- commercial fishermen, sport fishermen, seafood processors, marine suppliers, broader coastal communities and most importantly, the fishery resource itself-are taken into account as options are developed." At a meeting with the Senators' staff – Casey Sixkiller (Murray), Betsy McDonnell and Martin Doern (Smith), it was made clear that it was important to the Senators that consideration of how management decisions affect coastal fishing communities and all segments of communities (ports, cities, banks, etc.) have an interest in the outcome of this process. Fishery regulations should include the maximization of benefits to coastal communities. (3)

What is a Fishing Community?

The Magnuson-Stevens Act (MSA) defines a fishing community as:

> "*a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community*." (1)

In interpreting this definition, the National Marine Fisheries Service has stated that "A fishing community is a social or economic group whose members reside in a specific location…" This "official" interpretation means that a fishing community exists in a specific place like Astoria, San Pedro, or Seattle. However, other types of communities exist. For example, an "occupational community" is a group of people involved in the same occupation, like the coast wide community of trawlers who engage in similar activities. A "community of interest" is made up of people who share similar interest5s – for example, people who are concerned about making the fishing industry safer. One town or city might include many different occupational communities and communities of interest. (1)

However you define fishing communities, it can be said that they are composed of diverse, independent people who do not fit easily into neat categories and who rarely, if ever, present themselves as a homogeneous group. (5)

Coastal Fishing Community Needs

Communities desiring to plan their future with fisheries need to have involvement in the system and some control over their destiny. Basic needs include:

- Healthy fisheries
- Family wage jobs
- Infrastructure – ports, fish plants, support services, etc.
- Leadership – a community governing body which understands the fishing industry and issues (local and global) affecting local communities.

- Economic and social information regarding fisheries at the local, regional and national level. This is crucial for community planning and decision-making.
- Interactive communication and involvement with the fisheries management system.
- Interactive communication and involvement with the local fleet and support services.
- A system which incorporates cross community needs and impacts (regulations in one community which affects neighboring communities).
- Pro-active planning at the local level (planning for a future in fisheries, planning for working waterfronts, incorporating a diverse economy including fishing.)

Coastal Fishing Community Concerns Related to IFQ's:

The following is a compilation of community *concerns* articulated by a survey group of nearly 100 individuals and organizations including fishermen, processors, crewmembers, port representatives, city, county, state, and federal government representatives, non governmental organizations and other interested parties during the summer of 2004. (4)

- The Council and IFQ committee will not address community concerns in the IFQ program**.**
- The Council must be forthcoming in acknowledging and addressing the community impact of management decisions in order to build trust
- The full scope of potential impacts, including impacts on other parts of the trawl fishery, other fisheries, and on communities are not being considered.
- Lack of specific program elements to address community concerns (they are too general).
- Not engaged in the process because of the potential high costs.
- Legitimate concerns would be dismissed because addressing them would be overly complex.
- Management policy should not unduly harm or help specific communities, neither should it stand in the way of letting markets inspire appropriate community change.
- The line between addressing community concerns and protectionism is subtle but very important, and the council should consider it in weighing program design issues.
- Fear of excessive consolidation of IFQs in both harvesting and processing sectors; job loss and abandoned ports.
- Any transition in the industry should be controlled so that effects on communities, even if unavoidable or on some level desirable develop at a measured pace and to a reasonable extent so as to avoid real social disruption.
- Clearly describe and address anticipated impacts, though more difficult, would better serve the public than ignoring the side effects of rationalization.

References:

1 – www.pcouncil.org/communities

2 – *Information for Public Scoping of Dedicated Access Privileges for the Pacific Coast Limited Entry Trawl Groundfish Fishery*. PFMC, Portland, OR 2004.

3 – Letter dated June18, 2004 to TIQC Committee from Gordon Smith and Patty Murray

4 – *Addressing Community Concerns in the Development of Individual Fishing Quota Program Alternatives for the Pacific Groundfish Trawl Sector. A Survey of Community Stakeholders*. Environmental Defense, Sept 6, 2004

5 – *Oregon's Changing Coastal Coastal Fishing Communities*, Jennifer Gilden, Editor. ORESU-0-99-001, OSU, Corvallis. 1999.

Others:

New England's Coastal Fishing Communities, Madeleine Hall-Arber et al, MIT Sea Grant, Cambridge, MA 2001.

Personal Communication: Flaxen Conway, OSU Sea Grant; Gil Sylvia, COMES;
Dorothy Lowman, Environmental Defense

Brief Description of the Eligbility Criteria and Initial Allocation Information for Community Quota Programs

Program	Community Eligibility Criteria	Initial Allocation
Community Development Quota of western Alaska	• Location within 50 nautical miles of the Bering Sea. • Native village as defined by the Alaska Native Land Claims Settlement Act. • Residents conduct over 50% of their current commercial or subsistence fishing effort in the waters of the Bering Sea. • No previously developed harvesting or processing capacity sufficient to support substantial groundfish fisheries participation.	Pollock Fishery - 7.5% from "reserve" TAC - Increased to 10% with American Fisheries Act in 1999 BSAI Sablefish - 20% of TAC Mulitspecies Fishery - 7.5% TAC - Pacific cod, Atka mackarel, turbot, yellofin sole, other flatfish species, Tanner crab, snow crab - 7.5% -Bering Sea opilio, bairdi, and king crab were phased in 1998 - 3.5%, 1999 - 5%, 2000 - 7.5% - Maximum amount of quota award to any single CDQ group is 33% of the total 7.5% allocation State of Alaska recommends breakdown of allocation to CDQ groups based on community development plans submitted by each representative community group
Gulf of Alaska halibut and sablefish Community Quota Program	• Have a population of less than 1,500 persons based on the 2000 United States Census. • Have direct saltwater access. • Lack direct road access to communities with a population greater than 1,500 persons. • Have historic participation in the halibut and sablefish fisheries. • Be specifically designated on a list adopted by the Council and included in this rule.	Community Quota Entities (CQE) purchase Quota Shares (QS) on behalf of designated communities Individuals lease QS from CQE's - Not to exceed 50,000lbs halibut or sablefish - IFQ fished from any vessel not to exceed 50,000 of halibut or sablefish in any season, from all IFQ's
Canadian Scotia-Fundy Groundfish ITQ	• Participating communities were specifically named based on geographic location	Allocation to the program on a whole was based on the collective catch history of the holders in a group + the unidentified processor landings within the specific community Community Management Boards representing each community distribute allocations among licensed fishermen in the community.

Analytical Team Tasks Assigned at November Meeting

Kate Quigley

Note: Information was provided by DFO staff in British Columbia (Barry Ackerman), industry reps (Bruce Turris), DFO staff in Nova Scotia (Andrew McMaster, Jorge Hansen, Michael Campbell), Jim Sanchirico (Resources for the Future), Dan Holland (New Zealand Seafood Industry Council), and AK RAM staff.

5c) Data request on how often fishers go fishing without enough IFQ to cover what they landed.

Nova Scotia - One ton is needed to go out fishing. However, people have gone out with no tons before and the DFO has not gone after those people. Dockside monitors would record when a fisherman does not have enough pounds to cover landings. However, this information was not readily available since fishermen are allowed a certain amount of time and overage before penalties are assessed. In most cases, managers indicated that fishermen made phone calls at sea to cover what was caught. Managers I spoke with also indicated that fishermen have become very good at targeting. Also, companies often pool their quota to avoid going over.

BC - No pounds are required to go out fishing. At-sea monitors note when fish is caught that a vessel does not hold pounds for. I was not able to get this data. Turris and Ackerman indicated that fishermen have become very good at targeting. Also, quota and pounds are often bought and sold "uncut" (combinations of quota or pounds sold together because they are typically caught together).

Note: If this becomes a really important issue, I can make a formal data request. However, it looks like it might take some work for people to pull together. It is not something they are concerned about unless landings or catch cannot be covered through the mechanisms (transferability, overages) available.

Data comparing TAC to catch from 1997-2002 by species can be found under "Summary of Historic catch vs. Available Weight" at:
http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/Groundfish/GFTrawl/GfTrawlInfo.htm

7) a) Outline examples of various caps. Start with a simple system, provide example. Increase complexity, identify benefits and drawbacks. (Developed through consultation with the NMFS Permits Team.)

<u>Example 1</u> (Simplest system administratively given certain assumptions):

Assumptions – a) The term "vessel" implies a U.S. coastguard craft [14/]; b) Quota share or pounds and pounds must be directly associated with a groundfish trawl permit [15/]. That is, an entity cannot own quota share or pounds without owning or holding a permit; c)Permit leases continue to be tracked by NMFS; d) Latent permits allowed; e) Permits can still only be allowed to be assigned to two vessels each year; f) Still required renew permit each year [16/]; g) Area and species-specific caps are necessary to prevent localized depletion; and h) Individuals who are allocated more than is allowed under the caps are restricted from purchasing more quota than they already own ("grandfathering-in").

Under these assumptions an example was provided for ownership, vessel and control caps:

Ownership cap - 1% on ownership of each area-specific species **pounds as a percentage TAC <u>or</u> quota share**. That is, no entity can be purchase or own more than 1% of the TAC of a species in a given area (coastwide or region specific) in a given year (pounds or quota of the TAC). Those entities allocated more than 1% are grandfathered-in but restricted from purchasing more quota than they already own.

Vessel cap [17/] - 2% cap on the total amount of groundfish that can be caught each year by an entity. This would be tracked in an entirely separate software program from the ownership cap since it requires different data sources. If based on catch, the data that goes into the calculation would have to come from at-sea monitors (if 100%). If based on landings, the data that goes into the calculation would have to come from dockside monitoring reports. The calculation could be as simple as adding all poundage of all species under the IFQ caught by a vessel and dividing it by the total poundage of all TAC of all species under the IFQ.

Control cap – None. Left to the Department of Justice.

Statistics – Permits (170 active and inactive), Vessels (between 50 and 340)

Benefits: 1) Restricts tracking responsibilities for NMFS to a manageable level; and
2) Allows for/enables individual accountability to occur.

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[14] Requiring this allows for easier identification of an individual to a vessel than allowing a "vessel" to be any seafaring craft since some states do not require registration.

[15] In this way, the number of people owning pounds each year is able to be tracked because: a) they are associated with an individual than NMFS has an address for; b) limited to a set amount of individuals, and; c) is consistent with management (tracking participation by permit ownership or holding) in other sectors of the groundfish fishery that may eventually be incorporated into the IFQ. If individual accountability is important to designers of the IFQ, then the quota share and pounds must be associated with a permit or vessel. Otherwise, individuals become extremely difficult to track. Associating quota share or pounds with a *permit* is preferable to associating quota share or pounds with a *vessel* because that is how the current software tracking system is set up and because vessel information is linked to an individual through Coast Guard data. Accessing and requiring updates to that data would require data requests and may not be immediately accessible.

[16] This ensures that NMFS has a record of the current permit owner's name and contact information.

[17] The maximum number of vessels is already capped at 340 since the number of permits is 170 and each permit can only assign a permit to two vessels each year. However, designers of the IFQ may want to limit the minimum number of vessels since there is no cap on the number of permits a vessel can lease; theoretically, a small number of vessels could lease all of the permits in the fishery and harvest all the pounds while permit holders still adhered to the "two vessels per permit each year requirement".

Drawbacks: 1) No control cap. The program would likely be criticized for this; and 2) Requires entities that would like to purchase quota share or pounds to purchase or lease a permit.

<u>**Example 2**</u> (More complex system that satisfies additional desired design elements):

Assumptions – Same as that stated for Example 1.

Under these assumptions an example was provided for ownership, vessel and control caps (changes to a category indicated with an asterix):

Ownership cap – Same as that stated for Example 1.

Vessel cap - Same as that stated for Example 1.

***Control cap (I don't really know much about this and need to do more research but it appears that very few, if any, fisheries have a control cap – still looking around) – Control** over ownership of quota share and pounds each year limited to 1% for each individual. A requirement can be made for IFQ fishery participants to reveal individual ownership names, contact information and portion of ownership of quota share and pounds. However, assessing control can be difficult since individuals could put ownership under another individual's name in the same family or entity. The system would likely be suboptimal and need to evolve as problems are recognized. Entities exceeding the control cap right now would likely have to be grandfathered-in.

Statistics – Same as those stated for Example 1 with the addition of control of ownership of pounds (between 100 individuals and an infinite number of individuals, given no limit on number of individuals sharing in quota share ownership).

Benefits: 1) Develops a system to attempt to track control of quota share and/or pounds which may build confidence in the system; 2) Somewhat restricts tracking responsibilities for NMFS to a manageable level; and 3) Allows for/enables individual accountability to occur.

Drawbacks: 1) Tracking control may require a major programming and administrative effort that will likely not capture all information on control wanted; 2) Requires entities that would like to purchase quota share or pounds to purchase or lease a permit.

<u>**Example 3**</u> (Even more complex system that satisfies additional desired design elements including the ability to separate ownership of quota share and pounds from a permit):

Changes to a category indicated with an asterix:

***Assumptions –** Same as that stated for Example 1 **except that Assumption b would be eliminated** thereby allowing any entity to own quota share or pounds without owning a groundfish trawl permit.

Under these assumptions an example was provided for ownership, vessel and control caps:

Ownership cap – Same as that stated for Example 1.

Vessel cap - Same as that stated for Example 1.

Control cap – Same as those stated for Example 2.

Statistics – Same as those stated for Example 2.

Benefits: 1) Develops a system to attempt to track control of quota share and/or pounds which may build confidence in the system; and 2) Allows for relatively inexpensive entry into the fishery since no permit is required to purchase quota share or pounds.

Drawbacks: 1) Tracking control may require a major programming and administrative effort that will likely not capture all information on control wanted;
2) May not result in an adequate amount of individual accountability due to the lack of data on individuals without permits;
3) Creates very burdensome and perhaps inadequate tracking situation for NMFS in that the number of entities that need to be tracked for quota share or pounds ownership becomes infinite.

b) Provide a table of ownership caps in other IFQ programs.

Fishery	Quota ownership cap
BC Groundfish ITQ	4-10% for most species/area, 15% (hake); about 2% vessel caps [18/]
Nova Scotia Groundfish ITQ	About 2% depending on species/area
AK Halibut & Sablefish	Area specific [19/]
AU SE Trawl ITQ	None
Iceland Groundfish ITQ	10% for cod and haddock; 20% for other species; 12% of value of all TACs in all areas.
NZ ITQ	35% of total IFQ in all areas <u>or</u> 20% of total IFQ in any one area for a species (will vary for some species)
U.S. Surf Clam/Ocean Quahog	Min: 5 cages (160 bushels); Max: None
U.S. Wreckfish	None

9c) Summarize reasons used for building in rollover provisions in other IFQ programs.

[18] IVQ holdings caps were calculated for each groundfish trawl license, during the first year of the IVQ program. The total IVQ holdings cap for each groundfish trawl license is measured in groundfish equivalents (described in FMP) as a percentage of total groundfish equivalents. These holdings caps, determined in 1997, continue to remain in effect.

[19] "Rules on the accumulation and transfers of halibut and sablefish IFQ are constantly evolving. In general, there are limits on accumulation and transferability. No person (individual, company, corporation) may own more than 0.5% of the total halibut QS in combined Areas 2C, 3A, and 3B; more than 0.5% of the total halibut QS in Areas 4A-E; or more than 1% of the total QS for Area 2C. No person may control more than 1% of the total Bering Sea-Aleutian Islands and Gulf of Alaska sablefish QS or more than 1% of the total sablefish QS east of 140 degrees west…Individuals whose initial allocation exceeded the ownership limits were grandfathered-in, but prohibited from acquiring additional QS" (NRC's *Sharing the Fish*, 1999).

Def. - A rollover (also called a carryover, carryunder, overage, underage, overrun) is typically a species-specific (and sometimes area specific) allowance of pounds that may be deducted (in the case of an overage) or added (in the case of an underage) from or to the following year's quota allocation. Typically, rollovers only "roll over" for one year due to administrative burdens of extending rollovers for more than one year. Also, typically, a monetary fee is charged for an overage equivalent to the revenue the overage amount is worth. In addition, usually the individual that has an overage is restricted from fishing again (sometimes in that area and/or for that species he has an overage for) until the overage is covered by pounds.

Purpose of rollover provisions - 1) Allows fishermen flexibility by providing another method for covering catch. This can be particularly useful in fisheries with species that have low TACs and in fisheries where avoiding catch of unwanted species is not entirely possible; 2) Decreases the incentive to discard when an individual does not have the quota pounds required to cover catch; 3) As a means to enforce individual accountability; 4) One possible purpose of rollovers would be to avoid pursuing penalties against fishermen that exceed their quota or pounds holdings.

BC - A 30% underage or overage is allowed for most species. Species with low TACs have low or no overage provisions. The BC experience has been that penalties for violations of rollover provisions have only been assessed twice in the past 7 years.

Nova Scotia - In the past, a 20% overage has been allowed for most species. This past year, there were twenty instances of overages. Most of these overages will be matched to purchased quota before next season. If someone goes over their holding of pounds, they are restricted from fishing. They also give up the revenue earned from the pounds they exceeded their quota. No underages have ever been allowed to roll over. Starting April 1st, overages will no longer be allowed due to the administrative burdens it requires. If someone exceeds their pounds holdings next year, they will have the pounds taken off of next year's allocation, will need to forfeit they revenue from those pounds and are restricted from fishing until the pounds are covered.

Note: In CA, in order to have an overage, one has to own a groundfish license. A license holder has to be a full time fisherman. This is defined as a person with two years experience fishing for seven months each year.

AK - The Crab Rationalization Program does not include rollover provisions and this is viewed as a big benefit administratively. I am waiting to receive more info on this and the halibut and sablefish rollover allowances.

NZ - waiting for reply to info request

Iceland - waiting for reply to info request

AU - waiting for reply to info request

10b) Are there other IFQ programs with use-or-lose provisions or other mechanisms that prevent IFQ from being acquired and held by those with an interest in not harvesting?

BC - There have not been any use-or-lose provisions or other design elements implemented to prevent entities from not harvesting pounds. However, there are design elements that become active in April to help prevent speculative activity and "armchair fishermen". In April, quota owners will be required to harvest 25% of groundfish equivalent (GFE) or they lose that 25% minus the rollover allowance. This will increase to 40% after three years and last for four years. In addition, the number of permanent reallocations (quota transfers) will be restricted to two over each of those periods of time. Purchase of quota by environmental groups that would not harvest what they owned was never a big concern.

Nova Scotia - There are no use-or-lose provisions or other design elements implemented to prevent entities from not harvesting pounds. Currently, there are "armchair fishermen". Approximately one-third of the fleet (100 of 350 quota owners) leases out all of their pounds each year to other fishermen.

Note: In order for an entity to hold pounds and not harvest them, the entity would have to either purchase quota or purchase pounds each year. In order to purchase quota or pounds, the entity would have to own a groundfish license for the IVQ fishery. To own a groundfish license, a license holder has to be a full-time fisherman. This is defined as a person with two years experience fishing for seven months each year. The Nova Scotia fishery reps I spoke to felt the expense to hire a fisherman not to fish would be significant.

Therefore, one of the reasons this is not a concern for either the BC or Nova Scotia fishery is because of the requirements for quota purchases which make speculative activity or ownership without harvesting more expensive and difficult.

12f) Stranded capital meeting notes - sent. I didn't mention it earlier, but feel free to share what I sent with the Analytical Team.

12g) What happened to BC processors (number of companies and custom processors before and after IVQ, turnover)?

Question asked: How have processors been impacted by the IQ system? Did the number of companies change after implementation of the IVQ? Did ex-vessel prices go up? Was this due to changes in product quality, product form, a shift in power, or some other occurrence? Are there more custom processors now than before the IVQ? Do you have any pre or post IVQ analysis of the impact of the IVQ on processors (stranded capital, changes in bargaining power, predictions of consolidation or geographical relocation)?

BC - In the short run, there were some changes. In the long run there were no concerns. In the beginning there was lots of harvester rationalization (130 to 70 vessels). Initially, landings decreased due to the adherence to the TAC.

A lot the lack of concerns with processors was due to 25-35% of the processors having vertical integration of some sort (owned, co-owned, agreements). Another reason why things didn’t change much was due to the GDA of which the goal was to prevent geographic relocation and to prevent impacts on processors. The outcome was not the same as it was in the halibut fishery where there was a big change in product quality and in impacts on processors. The number of processors actually increased slightly. Of the top 10 processors, two dropped out and two more entered the fishery. Consolidation did not occur. This was partially due to the fact that fishermen started landing catch here instead of in the U.S. due to decreases in trip limits in the U.S. As a result of the GDA, more fishermen fish closer to home. There were large increases in ex-vessel prices to fishermen but this was due to reasons other than changes in bargaining power. There was a quality increase though. Also, the US $ dropped compared to the CA $ and that was another reason to land in CA instead of the U.S. Fishermen feel they have lost power due to the GDA. Small processors also feel they have lost power to the GDA because they are at a disadvantage when it comes to writing a proposal. The bigger you are the more you get rewarded from the GDA. There has been some growth in custom processing but that may be due to the trend for custom processing in seafood and other products in general. GDA kept landings, processing, offloading and processing in coastal ports and away from Vancouver.

Nova Scotia - A company cannot own a groundfish license. Instead, they have developed forced contracts. In the beginning, processors would blockade DFO offices because they wanted 50% of the IFQ. In 1990 a task force was developed, they made recommendations after consulting for one year and these recommendations were adopted.

Other information I thought might be useful for distribution to the Analytical Team and perhaps to incorporate into the report being prepared for the TIQC meeting in Jan/Feb:

1) Greg Cassad had noted that he had heard that it does not take fishermen in the AK halibut and sablefish fisheries 30 days to cover landings when landings exceed pounds held. He thought 24 hours may be sufficient time to allow for transfers to take place.

I asked this question of Barry Ackerman in BC. He said that 30 days was initially a necessary design element to have to make all necessary transfers. Now, harvesters and processors are better prepared and can plan and target better. The 30 day period is no longer necessary.

2) Does the comparison between catch and TAC include rollovers (underages and overages) in the BC fishery?

Underages are included in the TAC (and catch). Overage allowances are not included in the TAC but are included in catch.

3) Is there hoarding of certain species quota in the BC and Nova Scotia fisheries?

Fisheries managers I spoke to said this does not occur to their knowledge. In BC, mush of the quota is bought and sold "uncut" (in species and area combination resembling catch). In Nova Scotia, companies often pool their quota to decrease risk and paperwork burdens (transactions costs).

4) Do leases in other fisheries extend for more than one year?

In BC and Nova Scotia, leases last for one year only. If you do not fish all that you leased in the Nova Scotia fishery, you lose those pounds since there is no underage allowed as part of the rollover provision. If you do not fish all that you leased in the BC fishery, those pounds are rolled over to the next year and they can be fished by the individual who bought the pounds the previous year. It is not too burdensome to track these individuals since they must own a groundfish license to lease and since the BC Groundfish IVQ is a limited entry fishery there are a limited number of people who own and lease quota and pounds.

5) What exactly is tracked by IFQ management entities?

<u>BC</u> - Quota and pounds are tracked. Anyone owning quota share or pounds has to own a groundfish license. Leases are not tracked. Only sales of pounds are tracked. Tracking is not burdensome and updating occurs every 24 hours.

<u>Nova Scotia</u> - It used to be that a DFO officer observed the offloading. Then the slips were picked up and entered into a database. This was sometimes a slow process. Now, the system is computerized and dockside monitors (there are five companies doing waymastering for the Groundfish fishery) enter this information and it is sent to DFO. Enforcement has access to this information. For an ITQ system, it is very important to have an electronic system. Updating occurs every 48 hours from dockside monitoring to DFO. We are also working on implementation of VMS and electronic logbooks.

Tracking transfers requires two or three staff and one or two data quality persons. These people also have other duties. Sometimes the two months at the end of the season allowed for matching quota to catch is not long enough to enter all the data and make all the changes required due to the fact that the staff have other work obligations.

6) Are there fees on transfers?

BC - no

Nova Scotia – no

7) Do other fisheries have control caps (caps on what can be owned and leased and tracked by individual, even though they may be part of a company)?

BC - We don't have "control caps”. We have lease/ownership caps. That is, an individual can own or lease a certain percentage of pounds each year by area/species. It doesn't matter if they are allocated through ownership of quota or leased from a quota owner. The same cap applies and one cannot be stacked on the other. Control caps were considered at one time due to concern over Japanese ownership. But, due to the complexity of tracking ownership, it was decided that this would be too onerous and extremely difficult to do.

Nova Scotia - No control caps.

8) What mechanisms are used in other fisheries for aiding new entrants?

BC - Groundfish development Authority (GDA)

Nova Scotia - There is no special program specifically designed for this purpose. One problem in the fishery right now is if a father wants to pass his quota to his son or another individual, he has to give up his license and the Minister of Fisheries re-issues another license. This is entirely at the discretion of the MOF though. If the fisherman sells his son the license, he has to pay capital gains taxes and people would like to see an exemption for this particular circumstance of bequeathing licenses.

9) What has happened to quota value over time? What has happened to license prices since implementation of the IVQ/ vessel values? Processor capital?

BC - License prices have increased due to several factors. At first, license prices increased due to speculation. Quota value has increased two to three times its initial value. Sablefish quota has increased four to five times its initial value. Groundfish quota is less valuable than sablefish quota value due to species caps and holding caps as well as limitations imposed by other species caught that are not under IVQ. Vessel values did not change much. The larger vessels were sold outside the country to countries in South America. The small vessels are still around and still have value because they still have a license associated with them. This is an inexpensive way for new entrants to access the fishery.

Nova Scotia - As TAC has gone up, ex-vessel price and quota price have gone down due to increased supply and therefore decrease in ex-vessel price. The cost of diesel and the exchange rates between the US and Canada influence quota value.

10) A link to the BC Groundfish management plan with all details of its 2004-05 management can be found at: http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/Groundfish/GFTrawl/default.htm? To access the management plan, you have to register on the website (involves providing an email address and password).

Comments and Suggestions from "Stranded Capital" Conference Call

(November 29, 2004 conference call of NMFS economists)

Comments:

" It will be important to define what stranded capital is. Possible definition: stranded capital - capital that has no alternative productive use as a result of a change in regulations. The term "stranded" appears to have been introduced in analyses associated with Alaska processing plants where the issue was focused on the processing of one or two species over short season and often being located in a remote area such as several of the large Pollock processing plants. It is not clear, if processors have the potential to purchase IFQs after their initial allocation, whether any capital can be considered "stranded."

" What matters to industry and what is needed for analysis? For analytical reasons, we may want to indicate the potential initial financial impact on various capital assets. For policy reasons and for the basis of potential requests for economic mitigation/compensation, asset owners may want to have such an analysis undertaken. Economic mitigation/compensation could take various forms. For example, in the case of processors, processors may want some form of "processor buyback," some guarantee that a certain minimum percentage of the groundfish will be delivered to their dock, an initial allocation of the IFQ, or some form of IPQ.

" On one hand IFQs may increase the potential for "stranded" capital but on the other hand IFQs would also lead to "augmented" capital. "Augmented" capital is capital that is now more fully employed and thus more valuable. The value of capital for some processors will likely go up while the value for others will go down as a result of IFQs. In addition, companies with several plants will likely be affected differently than singly owned plants. Effects will depend on location and supply.

" In determining whether capital is "stranded" or "augmented" as a result of IFQs, what needs to be assessed are the alternative uses of the capital before and after implementation of IFQs. The chief technique for measuring the value of alternative uses is the employment of net present value techniques on what ever is defined as a capital asset. In short, what matters is the net present value of equipment and infrastructure (what is infrastructure?).

" Often issues concerning capital are associated with ownership, which in turn leads to issues concerning vertical integration. Because of concerns about market control and foreign ownership, in AK, there have been attempts to identify ownership and how much vertical integration existed in the Pollock and crab fisheries between processors and harvesters. Getting any of this information for West coast groundfish fisheries will be very difficult. Vertical integration can decrease the impacts of implementation of an IFQ on processors.

Suggestions for Analysis and Research:

" Under standard benefit-cost analysis, "stranded" capital reflects inefficient capital as a result of implementation of an IFQ system. Therefore, protecting or minimizing the amount of "stranded capital" becomes a public policy problem where efficiency goals are traded off against other social goals. For analytical reasons and for public policy reasons, it may be helpful to analyze such tradeoffs by comparing the effects of IFQs on different plant structures and on the industry as a whole.

" If economic mitigation or compensation is the issue, we may want to compare alternative compensation techniques including allocation of IFQs to processors against the long run effects of IFQs being initially allocated to fishermen.

" It is not clear if IFQs will lead to more or less vertical integration. For example, if processors hold IFQ, there may be no incentive for processors to make efforts toward increasing vertical integration. They may contract out with vessels instead. Therefore, it may be difficult to answer the question: "Will economic benefits associated with vertical integration change?" Initially, we may want to describe what little we know about the existing level of vertical integration in the fishery and review IFQ situations such as the B.C., Icelandic, and New Zealand Fisheries where processors either received initial IFQ allocations or were able to purchase such allocations after they were assigned.

" We also need to research the use of fish ticket data and NMFS Processed Product data to determine levels of capacity in existing groundfish processing plants and the alternative uses of such plants for other species. We may also want to take the processing sector up on its offer to provide the analysts with needed data which could include information on plant assets.

" We need to talk with Mark Fina about his ownership/vertical integration research concerning the Alaska Crab fishery and Chris Anderson of URI to get information about his experimental approach to finding out how processors may react to an IFQ system. (For our monitoring analysis we may also want to contact Martin Loefflad of the NMFS Alaska Observer Program about using video cameras for monitoring as well as the NWFSC on the use of cameras in the Pacific whiting fleet.)

Draft Discussion paper outline - Impacts to processor assets from a harvester-only IFQ implementation alternative.

For now, I have decided to focus the discussion paper on addressing the problems processors have brought up.

I. In what ways do processors think they may potentially be impacted by an alternative where IFQs are allocated and/or owned by harvesters only?

A. Kent Craford's (representing the Coastal Jobs Coalition) statement at the Analytical Team meeting:

1. Geographical relocation of harvesters similar to buyback
2. Stranded capital (overinvestment by processors)
3. Ex-vessel price increases due to increased harvester bargaining power with no way to increase final product prices

B. Conversations with whiting fishery representatives - Do they feel differently from Coastal Jobs Network statement?

II. What factors would influence geographical relocation? What are the benefits and drawbacks associated with geographical relocation to processor assets?

A. Initial allocation of area specific quota

B.

III. What is "stranded capital"? Does it exist? What factors influence its prevalence? How could processors be compensated for "stranded capital"? (This section would include a discussion of compensation versus long run allocation as well as strategies to achieve each.)

A. Origination of the phrase and its applicability to West Coast Groundfish situation

B. Compensation mechanisms

IV. Is there likely to be a shift in bargaining power? Conceptually, why would this occur? What contracts and vertical integration already exists? Might vertical integration prevent this from occurring? What other design elements could affect a shift in bargaining power?

A. Current methods of bargaining
B.

V. Methodologies for assessing potential geographic relocation, potential stranded capital, shift in bargaining power.

VI. Vertical integration and its effect on processor impacts. Ways to assess the level of vertical integration that currently exists.

VII. Other factors likely to impact processor assets

A. Management uncertainty
B. Opportunities for participation in changes made to the IFQ that could affect processors

VIII. Summary

Notes on Efficiency and Initial Quota Allocations

The initial allocation of quota can affect efficiency not only through transaction costs, but also through strategic behavior by quota buyers and sellers who believe they have some degree of market power in the quota market. As the difference between the pre-exchange initial allocation of quota and the post-exchange final quota holdings increases, transaction costs will increase due to the greater amount of exchange in the quota market. The magnitude of transaction costs will depend on factors which include the rules for quota exchange.

Strategic behavior by buyers and sellers in the quota market may also affect efficiency. This line of thought began in a non-fisheries paper by Hahn in1984, and was extended to fisheries and ITQs by Anderson in 1991. If buyers and sellers believe that they have some degree of market power, they may alter the amount of quota they buy or sell so as to influence the price of quota. Consider the case of a harvester allocated less quota than needed for the desired level of landings. The harvester will be a net buyer of quota. If the harvester believes his demand for quota raises the market price, he may buy less than the "efficient" level of quota so as to keep the market price of quota down. Similarly, a harvester allocated more quota than needed for his desired level of landings will be a net seller of quota. If the harvester believes his supply of quota lowers the market price, he may sell less than the "efficient" level of quota so as to keep the market price of quota up. This potential effect of the initial quota allocation on efficiency through strategic behavior by buyers or sellers depends upon the presence of market power in the quota market.

Hahn, R. "Market Power and Transferable Property Rights." Quarterly Journal of Economics, 1984, pp. 735-65.

Anderson, L., "A Note On Market Power in ITQ Fisheries" Journal of Environmental Economics and Management, 1991, pp. 291-296.

On the Need for Spatial Management in West Coast Groundfish Fisheries

Executive Summary

The Trawl Individual Quota Committee (TIQC) is preparing alternatives for a limited entry trawl individual quota system for consideration by the Pacific Fishery Management Council (PFMC). The alternatives may include options that would restrict distribution of optimum yield (OY) and access privileges on an area basis. Time and area controls that specifying fishing rate and area fished are considered input controls (Walters and Pearse 1996), whereas allocation of catch to IQ holders by area would be considered an output control.

Under an area allocation scheme, IQ shares could be allocated for all areas, but only a portion of the total OY would be available within an area. Area allocation of OY could be based on existing International North Pacific Fisheries Commission (INPFC) boundaries or some other area distribution scheme. For example, a vessel might receive an initial allocation of 1% of the coastwide sablefish OY. This percentage would be applied to the portions of OY north and south of 36° N which are 7,486 mt and 275 mt respectively for 2005. Shareholders would have to trade shares to create or maintain fishing opportunities in areas they were accustomed to fish.

Socio-economic and biological arguments can be made for using an area allocation scheme. Maintenance of fishing opportunities, protection of local community interests and processing infrastructure could be potential socio-economic reasons for allocating OY on an area basis. Without area allocation, there is some potential for effort to be concentrated within some areas. Allocating OY by area may prevent localized depletion of stocks - to the extent that little mixing or migration of stocks within the area is occurring. During the TIQ Committee and Council review of the TIQ analytical team's work products on area effects, questions were raised about the biological need for area allocation and evidence for localized depletion. The following literature review and analysis attempts to address these questions.

In summary, evidence presented supports consideration of both initial allocation of select species to a trawl IQ program, and area allocation as a precaution against localized depletion, depending on the species.

Introduction

Fishing mortality can be expected to produce measurable changes in distribution, abundance, and age structure of marine fish populations. The degree of change fisheries managers can detect depends on the intensity of fishing effort with respect to catchability (fraction of population removed per unit of effort) and productivity of the stock as well as the degree of movement of the species being fished. Catch per unit effort may decline in heavily fished areas and the number of productive fishing locations may be reduced. With an increase in overall mortality, a reduction in age classes can be anticipated (Gulland 1977). Studies done within the last two decades have documented ecological effects associated with intense fishing pressure such as the removal of top predators, reduced biodiversity, and habitat impacts (Francis 2003). More recent work on recruitment dynamics and population structure also have implications for both temporal and spatial management of groundfish.

Localized depletion is viewed as a relative term for purposes of this paper. That is, a local area may be as large as a group of INPFC areas (typically >100 nm of coastline) for some species, or as small as a Pacific States Marine Fisheries Commission (PSMFC) area for other species (<100 nm). With a few exceptions the latter is considered to be the smallest practical management unit. Development of nearshore management plans or marine reserves by state and federal agencies may result in local management areas of even smaller size.

This paper provides some examples of localized depletion in fisheries and describes attempts by fisheries managers to spatially manage to prevent localized depletion. More importantly, biological features of groundfish are discussed which provide evidence that some species should be managed through temporal input and spatial input and output controls.

Examples of Localized Depletion

On a large spatial scale, the collapse of the Atlantic cod (Gadus morhua) stocks reflected some characteristics of localized depletion. Temporal and spatial changes in abundance were noted in this fishery as stocks declined to overfished levels steadily beginning in 1962 (Hutchings and Myers 1994). The cod stocks were thought to have been significantly reduced by trawling in the 1970's. Subsequently, harvest of cod offshore of Newfoundland and Labrador by gill nets began after the sharp decline in inshore gillnet landings between 1982 and 1985. Increases in gill net catches were coupled with declining catch rates. Catch rates declined both inshore and offshore, thus indicating a sequence of serial depletion. During the stock decline, technological advances permitted the fleet to continue to locate and exploit remaining stocks at ever increasing rates of fishing mortality.

On a much smaller spatial scale, Mason (1995) analyzed species trends in sport fisheries occurring withing the Monterey Bay area between 1959-86. Most of the fish were taken by more mobile commercial passenger fishing vessels (CPFV) and smaller more local skiff fleet. Earlier in Monterey Bay's fishing history, abundant species closer to port were targeted by both fleets. Mason found that as effort increased, the catch of certain nearshore rockfish species (genus Sebastes) taken primarily by the skiff fishery declined and species composition changed to reflect declines in populations of the most abundant species. Commercial passenger fishing vessels moved further offshore to target on more abundant deepwater species as target species. Fishing pressure and variable recruitment were cited as reasons for a decline in blue rockfish (Sebastes mystinus) formerly sought inshore by the skiff fleet, and in more distant (from home port) shallow reefs targeted by CPFVs. With a reduction in blue rockfish abundance, CPFVs began targeting semi-pelagic yellowtail rockfish (Sebastes flavidus) over deeper water reefs, then shifted to a still deeper water red complex of Sebastes species further offshore. Mason cited rockfish life history characteristics such as residential behavior, variable recruitment, and natural longevity as sources of vulnerability to localized overfishing for several species. Further, Mason concluded that the high site fidelity exhibited by nearshore species in particular, made them particularly vulnerable. Other studies cited by Mason in this paper indicated that many nearshore species (blue rockfish and olive rockfish (Sebastes serranoides) move less than a kilometer or two from reefs, while more pelagic species such as yellowtail rockfish may move more than 25 km.

Spatial Management of Groundfish Fisheries

In Gulf of Alaska and Bering Sea and Aleutian Islands, total allowable catches (TACs) are established for individual species and species complexes based on biomass distribution to prevent localized depletion (Witherell 1995). Flatfish TACs are typically set lower than ABC levels to protect the available bycatch for valuable trawl fisheries for pollock, Pacific cod, and rockfish. TACs may be set for specific smaller regulatory areas, particularly in the GOA, in proportion to biomass distribution, to distribute catch and effort. These sub-areas are comparable in size to INPFC areas used to manage the West Coast groundfish fishery.

The Canadian government uses such an area allocation scheme (DFO 2004). Quota species have a total allowable catch (TAC) set either on a coastwide basis, sub-area, or grouping of sub-areas (Figure 1 and Table 1). Major groundfish ports include Prince Rupert - northern mainland, Vancouver and Richmond - southern mainland, Ucluelet - West Vancouver Island, and Port Hardey - Northeast Vancouver Island. TAC was allocated by management area primarily for biological reasons. To the degree stock information was available, area allocation was used to prevent overfishing within these sub-areas due to possible effort concentration in the absence of an area management scheme, and to achieve yields appropriate to the productivity of these areas. In addition, area allocation was proscribed as a precautionary measure in the absence of clear-cut stock information. The concerns for overfishing stemmed from consideration of the IVQ system and its application to a mixed stock fishery. Without area allocation, shareholders could concentrate on highly valued species in areas close to home ports. Weaker stocks might also be present in the catch with target species. Concentration of shares to enable access within these areas may lead to depletion and or serial depletion of target and incidentally caught species.

Area allocation, therefore, was designed to prevent concentration of IVQ shares and fishing effort (within an area) with commensurate overfishing and possible localized and/or serial depletion of resources. The proportion of TAC assigned by area was determined from a variety of sources including stock assessments, knowledge of stock genetics, tagging studies, physio-geography, catch and effort data, and advice from fishers with detailed knowledge of fishing grounds. In some cases, former management boundaries were adjusted as a consequence of the review and analysis process used to determine area allocations. The robust observer program Canada employs collects additional biological data on species composition, concentration, and distribution. DFO continues to review biological data and determine appropriateness of area allocations.

As described above, once Individual Vessel Quota (IVQ) shares were determined for each vessel, they were applied to management area distributions of OY. Shareholders then had the opportunity to trade species shares and acquire mixes and quantities of shares needed for desired fishing strategies and areas.

<u>Biological Factors Indicating a Need to Spatially Manage West Coast Groundfish</u>

Berkeley et al.(2004) reviewed stock status, population age and genetic structure, and management implications, citing examples from the West coast groundfish fishery. The authors presented evidence of stock structure on a finer scale than is typically assumed in stock assessments. Further more, they argue that truncation of age structure within rockfish populations in particular may lead to reduced larval viability and survival - older black rockfish appear to spawn earlier (Bobko and Berkeley 2004) and produce more viable larvae (Berkeley 2004). While not a West Coast groundfish, older female Atlantic cod (Gadus morhua) also appear to be more reproductively successful than younger females (Murawski et al. 2002). Berkeley et al.(2004) conclude that both spatial structure and age structure are important for long term viability of a stock, and that a network of marine reserves could be used as an alternative management measure to ensure protection of these important population components.

Most groundfish stock assessments assume that the genetic structure of the assessed species is panmictic - that is the stock is fully mixed and members from all geographic regions regularly interbreed and that populations are homogenous, or if there is evidence of separate stock structure these differences are ignored as input data are typically not fine enough to conduct stock assessments on separate sub-stock components. Larval disperal mechanisms theorized based on ocean currents tended to support this view in that passive dispersal occurs over fairly large distances. There is however, a growing body of evidence that suggests many species of groundfish have a complex and subtle stock structure that varies by geographic region within the WOC management area. Miller and Shanks(2004) examined otolith microstructure and microchemistry of black rockfish and found evidence that larvae from different locations did not mix during ontogeny and possibly did not disperse long distances latitudinally. The authors estimated larval dispersal distances to be much shorter (<120km) than previous estimates based on models of passive dispersal. Smaller mean dispersal distances imply the need for spatial conservation of adults producing the larvae - especially if the species is overfished.

Genetic evidence also suggests finer and more complex population structure for rockfish in particular. Withler et al.(2001) through microsatellite DNA studies affirmed earlier work by Gunderson(1972) which identified two populations of Pacific ocean perch (Sebastes alutus) within Queen Charlotte Sound, British Columbia. Withler et al. (2001) separated Eastern and Western Queen Charlotte Island stocks and a Vancouver Island stock. An interesting feature of this finding was that the QCI stocks overlapped latitudinally - distance did not appear to be a factor in the degree of genetic isolation. The study supports other findings that many marine populations, in spite of their potential to reach large population sizes, are fragile due a high degree of genetic variability, longevity, slow growth rates, and to episodic recruitments influenced by environmental changes (Grant and Bowen 1998) and (Fitch 1969). The authors concluded that separate management would be advisable to conserve the spatial integrity of Pacific ocean perch.

Copper rockfish (Sebastes caurinus), a benthic, nearshore species with a high degree of site fidelity, was found to be genetically divergent between Puget Sound and coastal stocks (Buonaccorsi et al. 2002). Furthermore, genetic divergence along the coastline was also significant suggesting isolation between regions even though larvae drift for up to 3 months prior to settlement. The authors suggest a pattern of recolonization since the last glacial period (14,000 years ago) and more limited realized larval dispersal due to oceanographic barriers such as recirculating oceanographic currents and mesoscale eddies along with potential unique larval behaviors that may tend to counteract passive drifting.

Genetic patchiness in marine populations may be explained to a “sweepstakes-chance” model proposed by Hedgecock (1994). Hedgecock argues that observed genetic heterogeneity on a microgeographic scale may result from temporal variation in the genetic composition of recruits. Furthermore, he argues that this variability could be due to selection on larval populations or large variations in the reproductive success of individuals whereby successful parents match reproductive activity with favorable windows of oceanographic conditions that promote fertilization, larval development and retention, and recruitment. Larson and Julian (1999) argue that fisheries management should account for spatial unpredictability in spawning success by “spatial bet-hedging”. If fish populations are composed of groups of spawners whose success in producing recruits is variable and spatially distributed, representative areas would need to be protected throughout their range to ensure some parents in any given year (the “sweepstakes winners”) would make a contribution to future recruitments. The authors suggest more information is needed to determine the spatial scale of genetic patchiness, and that this information would help design marine no-take areas to protect population structures geographically

<u>Current Management Measures that May Influence the Spatial Distribution in the West Coast Groundfish Fishery</u>

West Coast groundfish management uses a variety of input and output controls to regulate the fishery (PFMC 2004e). Although the areas are large, these management tools imply some measure of temporal and spatial control. Relaxation of some of these controls may be considered under a trawl IQ program.

- Some allocation of OY by area.
- Differential Trip Limits - Differences exist in cumulative trawl trip limits north and south of 40°10' N. Latitude. Cumulative limits reflect differences in opportunities due to distribution of OY north and south and their potential to be realized. In addition, the need to protect overfished species constrains the take of co-occuring species and these constraints vary north and south.
- Current participation has been reduced due the vessel buy-back program. In addition to fleet consolidation, processor consolidation has occurred. Thus, with fewer boats and processors, the ability catch and process fish has been

concentrated among remaining fleet and ports. Under an IQ program, the potential to see further concentration is anticipated.

- RCAs - Tight restriction occur in large areas within bathymetric ranges established to protect overfished rockfish. These provide marine reserve like protection to the population and age structure.
- Selective trawl designs - Recent development of less efficient gear (with respect to bycatch of overfished rockfish) has allowed the use of this input control to take flatfish in the northern area while minimizing the take of overfished species.

Discussion

The Trawl IQ Committee does not support allocation of OY by area, unless it is necessary for biological reasons. Past and current management of West Coast groundfish on a spatial basis has only been done on a course scale. Alaska and British Columbia groundfish fisheries use some form of allocation by area to ensure catches are distributed in proportion to available biomass. In a few examples West Coast groundfish and fisheries elsewhere indicate evidence of localized depletion and support the need for spatial management. Current stock assessments generally assume a large degree of homogeneity in stocks of groundfish - due in part to the problem of distribution of catch and biological data and the inability to conduct stock assessments on a finer spatial scale than coastwide. Currently, there is little documented evidence of localized depletion for most species of groundfish, however, there does not appear to be sufficient analytical capacity or effort to determine if localized depletion is taking place. Some anecdotal information from fishermen who have been long time participants indicate a historically broader distribution of species such as Pacific ocean perch, canary rockfish, and black rockfish, to name a few.

There is a significant amount of evidence that population structure of many species of groundfish (rockfish in particular) is complex and genetically fragile. Furthermore, preservation of age class structure appears to be important as recent studies indicate older fish may produce more viable larvae. There is evidence in the literature and from stock assessments that the age structure of groundfish species has been truncated and that growth and maturity of some species has been affected (Francis 2003). Rebuilding plans for known overfished species have been developed to rebuild populations. Some of the measures taken should have the effect of restoring population and age structure in the short-short term.

Both population genetic structure, patterns of larval distribution, and age structure indicate a need to manage in a way that significantly reduces fishing mortality throughout the geographic range of the species. Allocation of catch by area would help protect the genetic components of rockfish - which appear to have a complex structure. A closure during spawning might ensure all potential successful parents have the opportunity to spawn during a given year. However, they would remain vulnerable during open periods, and unless areas were restricted, risk of excess fishing mortality on potentially successful parents would remain to the degree fishing effort was concentrated in a particular area. A reduction in risk might be accomplished if spawners were significantly more vulnerable during the spawning period - a closure would tend to reduce overall vulnerability if this were the case. Reduced fishing mortality overall would help protect the age class structure. Both population and age structure could be conserved through a network of marine reserves. More information is needed for various species to determine effective population size, larval contribution, and recruitment patterns in order to be able to design an effective network of marine reserves. Current RCAs provide some protection for both population and age structure. If these are removed, along with other controls that could be used to reduce the possibility of concentrating fishing effort, some groundfish stocks may continue to be at risk.

One of the benefits of the trawl IQ program may be an increase in efficiency in taking quota shares, un-encumbered by many of the present regulations. Time and area restrictions could be used as input controls on harvest in combination with an IQ program (Walters and Pearse 1996). Temporal and spatial restrictions (input controls) alone would tend to undermine this efficiency and may continue to do so under an IQ program if shareholders are forced to compete for local concentrations of fish within restricted windows of opportunity (Walters and Pearse 1996). Reduction of uncertainty in stock assessments is key to ensuring reduced risk of assessment errors and thus long-term viability of fisheries. This might be accomplished through co-operative arrangements between industry and government to finance and better utilize and extend (spatially) fishery and research data used in stock assessments(Walters and Pearse 1996).

<u>Recommendations</u>

- § The Council should continue to support research into spatial sampling and modeling approaches for stock assessments. The degree of localized overfishing is unknown - fishery and survey data and habitat information should be analyzed on a finer spatial scale to develop a better understanding of fishing and fish distribution patterns.
- § Recent studies of population and age structure and recruitment dynamics raise serious biological concerns with present and proposed management. Present management measures (RCAs, selective gears, etc.) and new tools (finer area allocation, MPAs, etc.) should be employed to ensure proper spatial management to safeguard against localized overfishing as a precautionary measure, and to conserve population and age structure needed to increase the likelihood of successful recruitment events.
- § Area allocation of OY for West Coast groundfish should be employed as a hedge against unpredictable spawning success. Available information on species characteristics (genetic structure, age structure, reproduction, and larval dispersal) should used as a guide to establish boundaries and OYs for sub-areas within the WOC.

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Figure 1. Groundfish management areas off the West Coast of Canada.

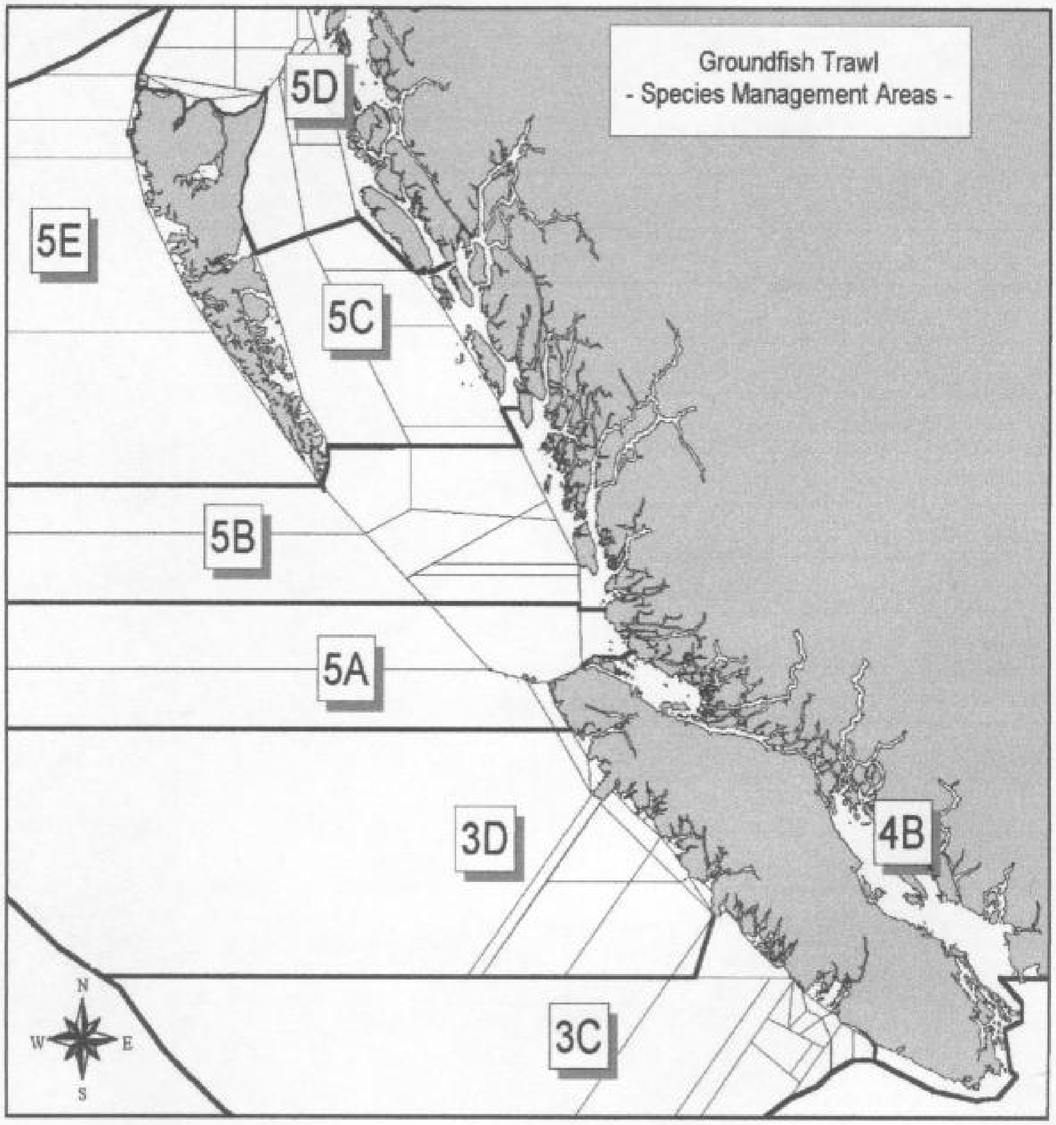

Table 1. Total allowable catches (TAC) of groundfish by management area of British Columbia.

Species	Management Area	TAC (mt)
Yellowtail Rockfish	3C	995
	3D, 5A/5B, 5C/D/E	3,427
Widow Rockfish	Coastwide	4,422
Canary Rockfish	3C/D	529
	5A/B	265
	5C/D	101
	5E	151
Silvergrey Rockfish	3C/D	216
	5A/B	421
	5C/D	382
	5E	248
Pacific Ocean Perch	3C	300
	3D	230
	5A/B	2,070
	5C/D	2,818
	5E	730
Yellowmouth Rockfish	3C	219
	3D, 5A/5B	1,135
	5C/D	685
	5E	325
Rougheye Rockfish	Coastwide	530
Shortraker Rockfish	Coastwide	105
Redstripe Rockfish	3C	173
	3D,5A/B	772
	5C/D	330
	5E	246
Shortspine Thornyheads	Coastwide	736
Longspine Thornyheads	Coastwide	405
Qullback, Copper, China, and Tiger Rockfish	Coastwide	5
Pacific Cod	3C/D	500
	5A/B	390
	5C/D/E	400
Dover Sole	3C/D	1,375
	5C/D/E	1,100
Rock Sole	3C/D	102
	5A/B	875
	5C/D	673
Lemon Sole	3C/D	186
	5C/D/E	544
Petrale Sole	Coastwide	600
Lincod	3C	800
	3D	220
	5A/B	862
	5C/D/E	580
Dogfish	4B	1,600
	Rest of Coast	3,840
Sablefish	Coastwide	384
Pollock	Gulf	1,115
	5A/B	1,790
Hake	Gulf	10,000
	Offshore	134,372
Big Skate	5C/D	567
Longnose skate	5C/D	47

Commercial Fish Business Licenses in Washington, Oregon, and California

Each state program has a different licensing structure for fish business activities that deal with sale of commercially caught fish, including fishermen's retail sales, buying of fish for a wholesale fish dealer, wholesale fish dealing where fish are sold to retail dealers, and fish processing, and canning. Definitions of fish processing or fish processor include:

> **Washington** (RCW 77.08.010 (42) "To process" and its derivatives mean preparing fish, wildlife, or shellfish.
>
> (WAC 220-69-210 (11)) "Processed" means preparing and preserving, and requires a wholesale dealer's license. Preserving includes treated with heat, including smoking and kippering. Cooked crab are processed. Preserving also includes freezing fish and shellfish.
>
> (WAC 220-56-100 (20)) "Processed" means fish or shellfish which have been processed by heat for human consumption as kippered, smoked, boiled, or canned.
>
> **Oregon** (OAR 635-006-0001 (15) "Processing" means smoking, reducing, loining, steaking, pickling, filleting, or fresh packaging requiring freezing of food fish, or any part thereof (Does not include cooking crab).
>
> (16) "Processor" means a person who buys fresh food fish from a licensed commercial fisher or a wholesale fish dealer and processes food fish for sale through retail outlets or for sale to the ultimate consumer.
>
> **California** "Fish Processor" is any person who processes fish for profit and who sells to other than the ultimate consumer.
>
> California Fish and Game Code 8031 (a) (1) "Process fish" means any activity for profit of preserving or preparing fish for sale or delivery to other than the ultimate consumer, including, but not limited to, cleaning, cutting, gutting, scaling, shucking, peeling, cooking, curing, salting, canning, breading, packaging, or packing fish. "Process fish" also means the activity for profit of manufacturing fish scraps, fish meal, fish oil, or fertilizer made from fish. "Process fish" does not include the cleaning, beheading, gutting, or chilling of fish by a licensed commercial fisherman which is required to preserve the fish while aboard a fishing vessel and which is to prevent deterioration, spoilage, or waste of the fish before they are landed and delivered to a person licensed to purchase or receive fish from a commercial fisherman.
>
> **Federal Pacific Coast Groundfish Fisheries Management Plan** "Processing or to process" means the preparation or packaging of groundfish to render it suitable for human consumption, retail sale, industrial uses, or long-term storage, including, but not limited to, cooking, canning, smoking, salting, drying, filleting, freezing, or rendering into meal or oil, but does not mean heading or gutting unless additional preparation is done.
>
> " Processor" means a person, vessel or facility that (1) engages in processing, or (2) receives live groundfish directly from a fishing vessel for sale without further processing.

See attached tables for other business license definitions and the relationship between them and licensed processors (Regulations are not attached but sent as separate files).

Discussion

If the Trawl IQ Committee considers options for including fish processors in the initial allocation of IQ shares, questions may be raised as to which businesses dependent on groundfish would be eligible for shares. Some businesses are licensed to purchase fish for resale while others process fish then resale. Oregon identifies dealers as reporting and non-reporting. The Committee may want to consider those eligible for a "processor" allocation as those businesses who have a reporting requirement as wholesale fish dealers (whether they process fish or not). This would not include fish buyers who work for wholesale fish dealers. One issue that would need to be resolved would be how to treat those holding commercial fishing licenses who are licensed or endorsed to sell fish directly to the ultimate consumer. Another issue would be those "processors" meeting the federal FMP definition, who purchase live groundfish for sale without additional processing. Much of the infrastructure and investment with these types of wholesale fish dealers is associated with holding and transportation facilities needed to keep fish alive and in good condition until they can reach the market. One suggestion is to look at the landing records of various processing business types and develop a processor IQ share based on certain species or amounts of fish landed. Thus, even small businesses that could be considered "primary processors" could be ensured a share of fish based on species and/or catch history without impacting larger processing firms. Alternatively, a reserve may need to be set aside to allocate a portion of the groundfish OY for other purposes than assigning an IQ share to large processing firms.

WASHINGTON COMMERCIAL BUSINESS FISHING LICENSE MATRIX

Food Fish Harvester	Bait Harvester
Commercial Fishing License - Gear and Species Specific, ranges from R-$110-$630, N–$115-$1085, per species/per license	Same as food fish harvester
A person may ***NOT*** engage in any of the following activities without a license or permit issued by the director: • commercially fish for or take food fish or shellfish; • deliver food fish or shellfish taken in offshore waters; • operate a charter boat or commercial fishing vessel engaged in a fishery; • engage in processing or wholesaling food fish or shellfish	

Direct Retail Endorsement
Endorsement is added to the portfolio of commercial licenses - *$50* • Permits the holder of a commercial license to commercially harvest retail-eligible species and to clean, dress. And sell his or her catch directly to consumers at retail, including over the internet. • Endorsement can only be held by a single individual. • Currently endorsement is only applicable to crab and salmon

Wholesale Fish Dealer	Fish Buyer
$250 plus bond	$95 plus bond
License required for: • Processor • Food fish Canner • Shellfish Canner	
• A business in the state to engage in the commercial processing of food fish or shell fish, including custom canning or processing of personal use food fish or shellfish. • A business in the state to engage in the wholesale selling, buying, or brokering of food fish or shellfish. • A wholesale fish dealer's license ***is not*** required of businesses which buy exclusively from Washington licensed wholesale dealers and sell solely at retail. • Fishermen who land and sell their catch or harvest in the state to anyone other than a licensed wholesale dealer or outside the state. • A business to engage in the commercial manufacture or preparation of fertilizer, oil, meat, caviar, fish bait, or other by-products from food fish or shellfish. • A business employing a fish buyer.	An individual who purchases food fish or shellfish on behalf of a licensed wholesale dealer. May represent only one wholesale fish dealer

OREGON COMMERCIAL BUSINESS FISHING LICENSE MATRIX

<table>
<tr><th colspan="3">Food Fish Harvester</th><th>Bait Harvester
($60)</th></tr>
<tr><td>Tuna Landing License $20
For tuna only</td><td>Or…</td><td>Commercial Boat License R-$200, N-$400 <u>and</u>
Commercial Fishing License R-$50, N-$100 <u>and</u>
Limited Entry Permit $75 (may be multiple permits depending on species harvested)</td><td></td></tr>
<tr><td colspan="3">Takes, Operates Boat and/or Lands Food Fish
For sale only to wholesale fish dealer, food fish canner, shellfish canner or wholesale bait dealer, except limited fish seller.</td><td>- In lieu of commercial fishing and boat license for sale only to wholesale bait dealers for bait.
- Cannot sell to wholesale fish dealer</td></tr>
</table>

OREGON COMMERCIAL BUSINESS FISHING LICENSE MATRIX (continued)

Wholesale Fish Dealer ($350)		Food Fish Canner		Shellfish Canner		Limited Fish Seller ($20)	Wholesale Bait Dealer ($60) plus bond
Reporting ($350 plus bond)	Non-reporting ($350)	Reporting ($350 plus bond)	Non-reporting ($350)	Reporting ($350 plus bond)	Non-reporting ($350)	Reporting	Only for use as bait, for scientific or educational purposes or for live public display
Buys, processes and/or sells food fish	- Processes and/or sells food fish - Buys only from other fish dealers	Buys, cans, processes, and/or sells food fish or shellfish	- Cans, processes and/or sells food fish or shellfish - Buys only from other fish dealers	Buys, cans, processes, and/or sells shellfish	- Cans, processes and/or sells shellfish - Buys only from other fish dealers	- Sells only own catch from own boat - Sells only to ultimate consumer - Sale of salmon limited to 40 vessels	
Fish Buyer individual, site, vehicle, boat, or barge ($150)		Fish Buyer individual, site, vehicle, boat, or barge ($150)		Fish Buyer individual, site, vehicle, boat, or barge ($150)			
Employed by Wholesale Fish Dealer Buys or receives away from licensed location		Employed by Wholesale Fish Dealer Buys or receives away from licensed location		Employed by Wholesale Fish Dealer Buys or receives away from licensed location			

OREGON COMMERCIAL BUSINESS FISHING LICENSE MATRIX (continued)

Retail Fish Dealer	Retail Fish Bait Dealer
No License Required Buys from Wholesale Fish Dealer, Foodfish Canner or Shellfish Canner Sells *only* to ultimate consumer May process (fillet, smoke, steak, pickle), provided sales are only to ultimate consumer	No License Required Buys from Wholesale Fish Dealer or Wholesale Bait Dealer Sells only for bait No processing Sells to Ultimate Consumer

06/01/05

K.Brown, updated by Jim Golden

CALIFORNIA COMMERCIAL FISHING BUSINESS LICENSE MATRIX

Fishermen's Retail	**Marine Aquarium Receiver**
$70	$1,393.75
Commercial fishermen who sells all or a portion of his/her catch to the ultimate consumer.	Person engaged in the business of receiving live marine species native to California waters for the purpose of wholesaling or retailing those species for the pet industry or for hobby purposes.

Multifunction Commercial Fish Business	**Fish Importer**	**Fish Processor**	**Fish Wholesaler**	**Fish Receiver**
$1,393.75	$557.25	$557.25	$376.50	$557.25
Fish importer, fish processor , fish wholesaler, fish receiver. If the licensee is a commercial fisherman,,fisherman can act as a fish retailer.	Person who, for the purpose of resale to persons <u>other than ultimate consumers</u>, receives or purchases fish taken outside of State and not landed by State licensed commercial fisherman.	Person who processes fish for profit and who sells to other than the ultimate consumer.	Person who obtains fish from another person for purpose of resale to persons other than the ultimate consumer, and is required to purchase from a person licensed as a fish processor, fish receiver, or fish wholesaler.	Any person who purchases or receives fish for commercial purposes from a commercial fisherman not licensed as a fish receiver.

06/01/05 J.Golden, reviewed by T. Tillman

APPENDIX I
SUMMARY OF PUBLIC COMMENT

Formal Scoping Period Comments on
Dedicated Access Privileges (Individual Quotas)
For the
Pacific Coast Limited Entry Trawl Groundfish Fishery

Summaries of the hearings and summaries of written comments are provided in this document, and transcripts of public testimony from the hearings and written comments are attached as an appendix.

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HEARING SUMMARY
Scoping Hearing on
Individual Quotas (Dedicated Access Privileges) for
the Pacific Coast Groundfish Trawl Fishery
Pacific Fishery Management Council
Crowne Plaza Hotel
Alexandria I Room
1221 Chess Drive
Foster City, CA 94404
June 13, 2004

Public Attendance: 12

Council Staff: Dr. Kit Dahl, Mr. Jim Seger

Testifying: Seven people testified representing five organizations.

Mr. Bob Osborne	United Anglers of Southern California
Mr. Kent Crawford	Coastal Jobs Coalition
Mr. Peter Huhtala	Pacific Marine Conservation Council
Mr. Tom Raftican	United Anglers of Southern California
Ms. April Wakeman	United Anglers of Southern California
Mr. Pete Leipzig	Fishermen's Marketing Association
Mr. Steve Bodnar	Bandon Submarine Cable Committee

Summary of Comments:

Mr. Bob Osborne, United Anglers of Southern California

- We have asked to have a recreational angler represented in the process.
- Seems like an individual fishing quota (IFQ) program would be granting rights.
- Seems the Council is trying to avoid difficult questions, such as cross-sector transfer of quotas and call for National Standards.
- Concerned about bycatch and habitat damage caused by trawling.

Mr. Kent Craford, Director, Coastal Jobs Coalition

- Support balanced fisheries rationalization.
- Strongly support IQ system.
- Believe any IQ system must provide equally for harvesters and processors.
- Support establishment of community development quota (CDQ) or community quota to operate parallel to IFQs.
- Council should analyze the use of an auction-based system.
- Council should analyze different combinations of allocation, including 50-50 initial allocation of IFQ to trawl permit owners and primary processors, and combinations of initial allocation to trawl permit owners, primary processors, and community entities.

- Urge study of the recently rationalized Bering Sea crab fishery.
- Concerned that this environmental impact statement (EIS) process is premature; allocation should be dealt with first.

Mr. Peter Huhtala, Pacific Marine Conservation Council

- Concerned about bycatch.
- Concerned that move into IFQs might be distracting the Council from bycatch issues; should spend time completing the bycatch EIS.
- A programmatic EIS should be completed before a trawl IFQ EIS.
- The fact that allocation isn't being dealt with now is a problem; can't conduct cumulative impact analysis without considering allocation.
- Support U.S. Ocean Commission recommendations regarding National Standards.

Mr. Tom Raftican, United Anglers of Southern California

- The groundfish fishery needs a programmatic review before an IFQ can be considered.
- The recreational sector must be included in the initial program and in the design of intersector allocation.
- The Ad Hoc Groundfish Trawl Individual Quota Committee (TIQC) should include recreational representatives.
- Funding for the TIQ program must be discrete and secure.
- Support National Standards for IQ programs.

Ms. April Wakeman, attorney (United Anglers of Southern California)

- Include recreational sector in planning, etc. for trawl IQ program.

Mr. Pete Leipzig, Fishermen's Marketing Association

- Support moving forward with IQ program.

Mr. Steve Bodnar, Coos Bay Trawlers Association

- Trawl fleet supports the program, but now that it's about trawlers, there's much attention being paid.

HEARING SUMMARY
Scoping Hearing on
Individual Quotas (Dedicated Access Privileges) for
the Pacific Coast Groundfish Trawl Fishery
Pacific Fishery Management Council
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115
July 20, 2004

Public Attendance:	22 (12 representatives of government/academia, three environmental representatives, one fisherman, three processors, and three unknown).
Council Staff:	Mr. Jim Seger
Testifying:	Five people testified:

Mr. Ray Hartwell	Environmental Defense
Mr. Tom Casey	Bering Sea crab vessel owners' representative
Mr. Dave Fraser	Fishing vessel skipper
Mr. Peter Huhtala	Pacific Marine Conservation Council
Mr. Joe Bersh	Supreme Alaska Seafoods (mothership)

Summary of Comments:

Mr. Ray Hartwell, Environmental Defense

- Supports development of IQ alternatives.
- Supports addition of coastal community representative on the TIQC.
- Process should be open to stakeholders' input.

Mr. Tom Casey, Bering Sea crab fishing vessel owners

- In the Alaska crab ITQ program, ownership caps favor processors leading to vertically integrated operations. Impose the same ownership caps on processors as apply to fishermen.

Mr. Dave Fraser, fishing vessel skipper

- The Council should move ahead quickly with ITQs.
- Doesn't support fourth option on page 2.9.
- Doesn't support individual processor quota (IPQ) programs.
- It is important to maintain a competitive marketplace.
- Communities may or may not support processor shares. Communities contain both harvesters and processors.
- Allocation of harvester shares to skippers or permit owners should be considered as one of the options.

Mr. Peter Huhtala, Pacific Marine Conservation Council

- The IFQ development process is premature because a programmatic EIS needs to be completed for the groundfish fishery and National Standards developed for IFQs before the TIQ program goes forward.
- A program of sector-specific bycatch caps for overfished species should be considered as an alternative to IFQs. Such a program could be implemented more quickly.
- Bycatch caps, if implemented, should not be tradable.

Mr. Joe Bersh, Supreme Alaska Seafoods (whiting mothership)

- Some rationalization has occurred during the window period established to qualify for initial allocation in a TIQ program. As a result, individuals who have permanently left the fishery could qualify for quota shares. Therefore, there should be an ongoing participation requirement.
- A control date should be established for processors, in the event that the program includes processor shares.
- Consider allocating shares to processors who are not vertically integrated, since the issue of preserving non-mobile capital is not as important for vertically integrated operations.
- Consider an accumulation limit for processors that takes into account harvester ITQs they receive through fishing vessel ownership.
- There are significant differences between conditions on the U.S. West Coast and British Columbia—overfished species in particular—which makes it hard to readily transfer the British Columbia model to West Coast fisheries.

HEARING SUMMARY
Scoping Hearing on
Individual Quotas (Dedicated Access Privileges) for
the Pacific Coast Groundfish Trawl Fishery
Pacific Fishery Management Council
Mark O. Hatfield Marine Science Center
2040 SE Marine Science Drive
Newport, OR 97365
July 27, 2004

Public Attendance:	22 (eight representatives of the fishing industry; three representatives of non-governmental organizations; three representatives of state or federal agencies; three members of academia; three representatives of coastal community organizations; and two unknown).
Council Staff:	Mr. Jim Seger
Testifying:	Five people testified:

Mr. Leesa Cobb	Port Orford Ocean Resource Team
Mr. Peter Huhtala	Pacific Marine Conservation Council
Mr. David Jincks	Midwater Trawlers Cooperative
Ms. Dorothy Lowman	Environmental Defense
Mr. Denny Burke	F/V Timmy Boy

Summary of Comments:

Ms. Leesa Cobb, Port Orford Ocean Resource Team

- Identify Port Orford as an individual port; do not lump with Brookings, etc.
- Consider CDQs.
- Analyze impacts on Port Orford, especially inter-sector allocation.
- Identify how fishing opportunities are allocated, so communities know whether effort will be shifting into their areas.

Mr. Peter Huhtala, Pacific Marine Conservation Council

- This is an extremely controversial topic.
- Support development of National Standards by Congress to ensure that shares are allocated equitably and to prevent domination of industry by a few large businesses.
- Advocate a programmatic EIS to review the groundfish fishery management plan (FMP), paying attention to effects of management changes on communities.
- Advocate hard bycatch caps by sector (total mortality caps) for overfished species.
- Difficult to consider cumulative impacts without knowing how fisheries will be allocated.
- Cumulative impacts section should look at all recent management changes (area closures, buyback, etc.).

Mr. David Jincks, Midwater Trawlers Cooperative

- Support TIQs.
- Need to rationalize the fishery.
- IQs will bring stability.

Ms. Dorothy Lowman, Consultant, Environmental Defense

- Support dedicated access privileges from groundfish trawl fleet.
- Include alternative that looks at bycatch caps for overfished species; allocate them as tradeable quotas.
- Consider CDQs or other methods to address concerns of coastal communities.
- To maintain fishing and processing opportunities in coastal communities, consider holding back a percentage of the IQ each year to be allocated annually based on joint proposals with fishermen and processors.
- Analyze initial allocation to skippers who can demonstrate history of dependence on the fishery.
- Consider area-specific IQs based on socioeconomic and biological considerations.
- Consider a mechanism to allow communities to form nonprofits that can hold and lease quota to community members and allow the nonprofits to apply for loans.
- Don’t wait too long to start inter-sector allocation discussion.
- Modify the Ad Hoc Allocation Committee, so all sectors and stakeholders are represented.

Mr. Denny Burke, fisherman

- Support quota program.
- Don’t make shares smaller than they are now. It’s very hard to make a living.

SUMMARY OF WRITTEN COMMENTS
Scoping on
Individual Quotas (Dedicated Access Privileges) for
the Pacific Coast Groundfish Trawl Fishery
Pacific Fishery Management Council

Number of Written Comments: Nine submissions from seven parties

Comments were received from the following parties:

Captain Gordon Murray (F/V Blue Horizon)
Coastal Jobs Coalition (Mr. Kent Craford)
Morro Bay Commercial Fishermen's Org./Crab Boat Owners Assn. of San Francisco
Environmental Defense (Dr. Rod Fujita)
International Pacific Halibut Commission (Dr. Bruce Leaman)
Pacific Coast Federation of Fishermen's Associations (Mr. Zeke Grader, Jr.)
Pacific Marine Conservation Council (Mr. Peter Huhtala: two letters and one e-mail)
B. Sachau
United Anglers of California
United Anglers of Southern California
West Coast Seafood Processors Association (Mr. Rod Moore)

Summary of Comments:

Captain Gordon Murray, Past Captain of the F/V Blue Horizon

- Captains and crew who were responsible for significant past catch records, but who did not own the vessels they fished, should not be overlooked, but should be granted IFQ access shares.

Coastal Jobs Coalition (Mr. Kent Craford)

[Coastal Jobs Coalition written comments from Kent Craford are identical to oral testimony taken at June 13, 2004 scoping hearing and are summarized as part of that hearing.]

Environmental Defense (Dr. Rod Fujita)

- Consider sectoral bycatch caps allocated as transferable bycatch quota.
- Initial allocation alternatives should address the potential impacts on coastal communities.
- Mechanisms should be explored that would help maintain fishing and processing opportunities in coastal communities.
- Analyze an initial allocation to skippers who can demonstrate specific history and dependence on the fishery.
- Explore using an auction mechanism, but recommend that it be tiered to provide opportunities for diverse operations to effectively compete.
- Consider area-specific IFQs based primarily on biological considerations to address concerns about local depletion.

- Urge effective monitoring of any IFQ system. Support 100% at-sea observer coverage, 100% dockside monitoring and mandatory vessel monitoring systems.
- Explicitly ban highgrading.
- Develop measurable environmental performance objectives to which the IFQ program will be held accountable.
- Support cost recovery for the monitoring activities described, as well as industry financial contributions to research and management. Urge considering a "sliding scale" or initial loan opportunities for members of the fleet who might be disadvantaged in paying these costs.
- Allow coastal communities to form nonprofits whose purpose would be to hold and lease quotas to community members, and these nonprofits qualify for any loan program opportunities.
- Include unambiguous language that is thoroughly vetted with stakeholders who have expressed concerns about IFQs constituting or evolving to become a de facto property right.

International Pacific Halibut Commission (Dr. Bruce Leaman, Executive Director)

- Any provision allowing retention of trawl-caught halibut would require IPHC approval.
- The Halibut Catch Sharing Plan would need to be amended to account for retention by this additional user group.
- Requiring retention of halibut would double the amount of legal-sized halibut mortality by the trawl fishery and would exceed the current catch limit for the directed commercial halibut fishery.

Morro Bay Commercial Fishermen's Org./Crab Boat Owners Assn. of San Francisco (Barbbara Stickel on behalf of Thomas J. Stickel, Craig Barbre, Larry Collins)

- Manner of notice and timing of the scoping sessions did not give open access fishermen that target salmon adequate opportunity to participate and comment.
- Prefer status quo and oppose all IFQ systems.

Pacific Coast Federation of Fishermen's Associations (PCFFA) (Mr. Zeke Grader, Jr., Executive Director)

- Consideration of the trawl IFQ program is premature; an analysis of the effect of the buyback on trawl effort, reallocation of quota back to other groundfish sectors, and establishment of National Standards for IFQ programs should take place first.
- The justifications for an IFQ system are not strong enough. The proposal fails to say how an IFQ program will lessen bycatch, and the rationale for groundfish management seems to have changed from supporting a year-round fishery to allowing fishermen to fish when they want. An explanation for this change in rationale is needed.
- No mention is made of the increased cost of IFQ systems. The cost issue needs to be carefully considered.
- PCFFA urges the Council not to proceed at this time with the preparation of an IFQ system.

Pacific Marine Conservation Council (Mr. Peter Huhtala, Senior Policy Director) letter of May 25, 2004

- Concerned that this process is moving forward too quickly.

- The Pacific Council should decline to approve a public scoping document for a trawl ITQ EIS, and should instead recommend that NOAA Fisheries proceed with the issuance of a Notice of Intent (NOI) to prepare a comprehensive programmatic EIS that will facilitate an open public process for planning for the future of the groundfish fishery as a whole.
- A comprehensive programmatic EIS must be completed for the West Coast groundfish fishery prior to consideration of options for new forms of dedicated access privileges specific to the trawl sector of this fishery.
- The NOI to prepare an EIS regarding implementation of dedicated access privileges in the groundfish trawl fishery is deficient, and some premises set forth in the NOI can be considered misleading.
- The process leading to the public scoping document has been severely flawed, inherently tainting the material offered to the Council.
- Under objective criteria developed by the National Research Council, the West Coast groundfish trawl fishery is unlikely to be considered an appropriate fishery for implementation of an IFQ system.
- The way in which exploration of a possible IFQ system has transformed into a rush to implement a trawl IFQ program, demonstrates the need for Congress to enact National Standards. If Congress cannot act swiftly to pass National Standards, then a moratorium on new IFQ systems should be established until they are adopted.

Pacific Marine Conservation Council (Mr. Peter Huhtala, Senior Policy Director) includes letter of July 29, 2004, and comments in separate August 2, 2004 email

- Believe time and resources are being inappropriately diverted to design the dedicated access privileges (DAP) system, while a comprehensive programmatic EIS for the groundfish FMP is overdue.
- Urge completion of the bycatch program EIS, its associated FMP amendment, and implementation of associated regulations.
- Propose a new alternative based on sector caps on the total catch of each overfished species. (Detailed proposal included).
- Consider longer cumulative landing limit periods under status quo management (three, four, or six months).
- Elements of the attached proposal could be implemented swiftly, while not precluding additional solutions.
- Consider how any DAP system will respond to or discourage future changes in area-based management, both for biological and economic reasons.
- Recommend analyzing a range of sunset provisions from one to ten years. Also, consider reviewing the performance of the IFQ system prior to the sunset date. Short-term sunsets (such as two years) would increase flexibility.
- Sunsets would help ensure the IFQ program achieves its goals.
- Recommend the program be required to achieve measurable conservation goals.
- Offer a range of referendum scenarios, including a double referendum where two-thirds of those involved in the fishery would be allowed to vote first on whether to develop an IFQ system, then whether to implement the system.
- Analyze the current fishing situation spatially and model scenarios to help understand the biological and economic changes that various IFQ systems might cause.

- Concerned that IFQs could encourage local depletion of some populations. A spatial analysis could help address this concern.
- Constitutional problems may arise with community quotas. Please describe the range of legally possible solutions for community quotas and requiring landings in certain ports.

B. Sachau

- Raises questions about how the public is protected from self interest of fishermen and supports protecting the public from the self interested actions of fishermen.
- The resource belongs to the general public and the Council should make that clear.
- Reduce the number of fishermen so that seasons will be longer and fishermen will not rotate between fisheries.
- Establish marine reserves, and reduce quotas by 50% and 10% every year thereafter.
- Capacity rationalization through market forces is not appropriate.
- Community quotas are not appropriate as the fish are a public resource.
- Incorporates by reference Pew Foundation reports on overfishing and the Councils.

United Anglers of California (Bob Strickland, President)

- Recreational sector has been excluded
- If the IFQ program will lock in an allocation then the inter-sector allocation needs to be done first.
- Economic and biological implications of locking in bottom trawling need to be considered.
- Wait on developing IFQs until national standards for IFQ programs are developed.

United Anglers of Southern California (Bob Osborn, Fishery Consultant for Tom Raftican, President)

- Wait on developing IFQs until a programmatic EIS is completed.
- Wait on developing trawl IFQs until impacts on benthic habitats are understood.
- Provide for transferability of IFQ between a full range of approved gears and future gears.
- A hard allocation of IFQ for an indefinite time frame is unfair to the open access fisheries.
- Benefits grated to a sector are a cost to the public sector.
- IFQ programs should have reasonable expectations of providing conservation and habitat benefits for the resources.
- Evaluate the likelihood of investment of capital for conservation of a slow growing and low productivity resource such as those found in the groundfish fishery.
- Take into account disaster tows and increases in particiaption that exhaust the allocated quota and the resultant necessary adjustments to allocations both within and outside the trawl IFQ fishery.
- Wait on developing IFQs until national standards for IFQ programs are developed.

West Coast Seafood Processors Association (Mr. Rod Moore, Executive Director)

- Have concerns about the process chosen to develop the EIS; allocation should come first.
- Cannot analyze the social and economic effects of a DAP without first knowing whether fishing will be allowed and how it will be allocated.
- The DAP should include all species of Pacific groundfish covered under the FMP and legally available for harvest; or separate DAPs should be developed for Pacific whiting and for non-Pacific whiting groundfish fisheries.
- Providing privileges to some but not all harvested species will negate the economic benefits of a DAP and reduce impacts on bycatch reduction.
- The Council should consider three groups for initial allocation of privileges: owners of limited entry (LE) trawl permits, processing companies that purchase LE trawl-caught groundfish (with a sub-option of processing facilities, rather than companies); and communities where at least 1% of the annual landings of LE trawl-caught groundfish are made.
- The Council should consider allocating directly to recipients through a regulatory process and distributing privileges through an auction system.
- The Council should consider having no caps on quota ownership in order to allow maximum economic flexibility. The Council should also consider having different caps for different privilege holders.
- For ease of enforcement, the Council should analyze an option that limits the number of ports where trawl-caught groundfish may be landed.

APPENDIX

TRANSCRIPT OF PUBLIC COMMENTS
Trawl IQ Scoping Hearing
Pacific Fishery Management Council
Crowne Plaza Hotel
1221 Chess Drive
Foster City, CA 94404
June 13, 2004

Mr. Bob Osborne, recreational angler and fishery consultant for United Anglers of Southern California

It's been over a year since we started talking about this. We've been asking for an opportunity to get a recreational angler into the process to discuss putting some potential alternates into the process, looking at other stuff that would affect recreational angling that might be covered in the process with the team currently in place.

I've heard where it's at that the Council doesn't consider this IFQ program to be granting rights, but the last time I was aware of a process where it made that determination that didn't involve the full public was King George, with the colonials. It's complicated. … The complications are covered in the NOAA publication "Sharing the Fish." I don't think it's simply cut and dried to have an IFQ program without answering some of these more difficult questions that the Council seems to be trying to avoid.

For example, cross-sector transfer of quotas; in addition, the call for national standards for IFQs, from a broad sector, very clearly states that this is not an easy process and that there needs to be a wide public process in establishing the goals and objectives for this process and in designing (it well?). Bycatch still is a problem. There are number of fish species subject to bycatch, such as northern bocaccio, which there is no stock assessments on. Another issue is habitat considerations. The damage to bottom habitat, over which the drag gear passes; and also offsite damage from the dragger gear, from clouds of sediments that increase water turbidity and may have smothering effects on filter feeders well away from the trawl passage. Thank you.

Mr. Kent Craford, Director, Coastal Jobs Coalition

We're a group recently formed by the WCSPA to evidence the broad base of support for *balanced* fisheries rationalization that recognizes and provides for all stakeholders in the west coast groundfish fishery, including seafood dependent communities. I'm here today representing dozens of companies and organizations employing thousands of people in primary processing and its supporting industries, including transportation, cold storage, and packaging, for example, in addition to seafood industry customer groups, like restaurants… Thank you for the opportunity to comment today… first I'd like to express our coalition's strong support for dedicated access privileges or IQ systems. There are significant economic and management benefits that can be derived from IQ systems for these 2 groundfish fisheries, but the key to obtaining those benefits, especially economic benefits, is in the proper design of an IQ system. We've heard it said many times by both processors and fishermen that neither can exist, much less succeed, without the other; therefore it is imperative that any IQ program…recognize this fact, and work to foster the vitality of both for their mutual benefit and the benefit of the communities that depend on them. So the primary message we'd like to send today is that any IQ system must provide equally for harvesters and processors. A balanced approach will bring needed stability to both sectors, for supporting industries as well as coastal communities. With this in mind we formally proposed the inclusion of the following alternatives... And some of these may already be partially covered in the scoping documents. We feel that the socioeconomic impacts of each of these alternatives should be analyzed fully and independently of each other. The alternatives we propose are:

1. Establishment of community quota or CDQ to operate parallel to an IFQ. Despite use in other fisheries, this option was rejected by the ad hoc trawl IQ committee without sufficient justification. CDQ is a reasonable alternative and should be analyzed in the EIS.

2. Second, an auction-based system should be analyzed as a reasonable alternative to status quo or an IFQ system, so we'd like to see an auction-based system put alongside a more traditional IFQ system. Such was the recommendation of NRC to include an auction-based system in the scoping process, as referred to in the scoping document. …

   As stated in the EIS, initial allocation of quota is the most controversial aspect of quota systems, recognizing the tremendous economic and social impacts and shifts that will occur through the initial allocation. … We support analysis of various combinations of IFQ initial allocation. Each of these deserves equal consideration as a reasonable alternative to status quo in the EIS.

3. A 50-50 initial allocation of IFQ to trawl permit owners and primary processors.

4. Combinations of initial allocation of IFQ to trawl permit owners, primary processors, and community entities.

Additionally, the Coastal Jobs Coalition supports analysis of existing dedicated access privilege or quota systems related to the above-mentioned alternatives, as well as others considered in the EIS. As part of the analysis, we feel it imperative to study our nation's most recently rationalized fishery, Bering Sea crab. We recognize and understand that Congress has temporarily prohibited the consideration of such as a system as a reasonable alternative to status quo for west coast groundfish, but analysis of that system is appropriate for learning purposes. As seafood industry business, we feel strongly that the short experience we've had with crab rationalization will speak well for the socioeconomic benefit that such a balanced approach can have for processors, harvesters, community, and all stakeholders on the seafood industry. Ignoring the most recent and relevant American fishery quota system while we try to develop our own from scratch would be foolish.

Finally we must express our concerns that this EIS process is premature. It's been recognized that allocations between groundfish harvest sectors need to be negotiated before any trawl IQ system can move forward. Why is this not being done first? To march down the path towards an IQ system without even knowing where the trawl fishery stands vis a vis fixed gear, open access, and recreational fisheries is putting the cart before the horse. … [We will participate actively in the coming months. Thanks.]

Mr. Peter Huhtala, Pacific Marine Conservation Council

I would like to introduce a letter submitted under C9, would like the substance considered in this process. Thanks for opportunity to speak. Although I have a lot of concerns about process (I'll limit those to the C9 discussion on Thursday), I have relevant comments on the notice of intent. I'll primarily talk about the cumulative impact analysis required. The NOI came jointly from the NOAA Fisheries and PFMC, and at every Council I'm racking my brain to find that moment where the Council explicitly voted to instruct staff and NOAA Fisheries to move forward with a trawl IQ EIS. I haven't figured that out yet. But I know we're working on a bycatch program EIS… and there is some sort of linkage. It's very important to PMCC to get a good handle on bycatch – both in monitoring and reducing bycatch, and coming into legal compliance with the FMP amendment for bycatch – and not just legal compliance, but getting down to producing regulations that improve this fishery, and that move us in the future, that increase the economic viability of the fishery and the health of the resource in both the short and long term.

I get the impression though, [that we are] moving quickly and heavily resource oriented into trawl ITQ development, that we may be losing sight of the bycatch EIS itself, referred to in the NOI. The resources, to my mind, really could be better spent in completing, as best we can, that bycatch program EIS, and developing a really useful FMP amendment that can be the basis of regulations for improving the fishery. The resources diverted into this trawl ITQ development could also be better spent on the programmatic EIS, and actually, are requisite to developing a trawl ITQ EIS, because the type of analysis that would be required to take place within the programmatic EIS is the type of information you need to complete the cumulative impacts analysis for these dedicated access privileges. The comprehensive programmatic EIS would not only link our bycatch monitoring and reduction efforts, our efforts to protect EFH, our approach to rebuilding overfished fish populations and preventing overfishing, but it would also provide a forum for analysis of major changes that have occurred in the fishery over the past several years, including our response to overfished species, but also the major closed area management decisions, which have had tremendous impacts on recreational and commercial fishing and fishing communities. And completing the analysis of the open access situation. Should we move the open access fishery into LE? We haven't completed that debate yet.

These are some of the ways that a programmatic [EIS] can start bringing us up to at least a baseline understanding of the what the past effects, the present actions, and possible future actions, could be, in a process in which the public can have a voice in the future of this fishery. And if the public, with eyes wide open, says a trawl ITQ is the way to go to really improve this fishery, then that's the way we go. [But we should go there through an open and inclusive process.]

The NOI and scoping document and the process that's been laid out here today has a fatal flaw which the previous speaker pointed out, in that the idea is to design the trawl ITQ program and then figure out allocation. Well, the cumulative impact analysis can't even be reasonably complete unless you consider the development of the program as well as the allocation. The allocation has considerable impact on fishing community, processors, the recreational fishing fleet, adjacent fisheries, fixed gear, OA, etc., and there is no way that we can separate these, whether the allocation should go first – maybe it should; in some ways, in completing and implementing the bycatch program EIS perhaps there needs to be some allocation issue worked out. But certainly in the context of a trawl ITQ, the program cannot be separated from the allocation, because it's far too complex and we end up with a program design that is a foregone conclusion before we get the allocation, and that is no way to be fair in the social and economic analysis necessary to protect our fisheries and our fishing communities.

Finally the fact that DAP is the new buzzword is interesting to me. It became popularized with the US Commission on Ocean Policy report. The US Commission was supportive of considering DAPs at various times, but they very specifically, in their draft report, recommended a series of national standards that these programs should adhere to, or lacking standards, that … and they're remarkably similar to the standards proposed by the MFCN, a group that the PMCC is part of…there are over 170 groups involved (said who is involved in MFCN.) But the US Commission—I have to read their recommendations into the record here:

At a minimum, the national guidelines should require DAPs to specify the biological, social, and economic goals of the plan; recipient groups designated for the initial quota shares and data collection protocols; provide for periodic reviews of the plan to determine progress in meeting goals; assign quota shares for a limited period of time to reduce confusion concerning public ownership of living marine resources; allow managers flexibility to manage fisheries adaptively, and provide stability to fishermen for investment decisions; mandate fees for exclusive access based on a percentage of quota shares held; these user fees should be sued to support ecosystem-based management. Fee waivers, reductions or phase-in schedule should be allowed until a fishery is declared recovered, or a fishermen's profits increase. Include measures such as community-based quota shares or quota share ownership caps to lessen the potential harm to fishing communities during the transition to DAPs; and something we haven't heard about yet today, hold a referendum of all permitted commercial fishermen after adequate public discussion and close consultation with all effected stakeholders to ensure acceptance of the dedicated access plan prior to final RFMC approval. Worth reflecting on.

Mr. Tom Raftican, United Anglers of Southern California, and speaking on behalf of United Anglers of California, who couldn't be here today

The groundfish fishery needs a programmatic review before an IFQ program can be considered. According to NEPA, federal managers are required to analyze the impacts of recent changes to the groundfish fishery. The fishery is in tremendous flux, and needs this type of analysis before moving into a major reconfiguration of the fishery. Implementation of the trawl IFQ could lock us into sector allocations and gear configurations that may not be appropriate.

2. The recreational sector must be included in the initial program and design of intersector allocation. Trawl IQ committee membership has excluded representatives of the recreational sector. We have requested membership from the Council, and our exclusion has created uncertainty in the recreational community about the impacts of trawl IFQ on the recreational sector, especially w/regard to bycatch. Participation in the inter-sector allocation portion of the process is impaired by not having (been) part of the initial program design.

3. Funding for the trawl IFQ must be discrete and secure. The rush to complete an IFQ for the trawl sector has led to a virtual scramble for funds. The scramble indicates that the cart has been placed before the horse, and that a well thought out, integrated approach for design and funding should take place.

4. National standards for Congress have not been enacted. While it's certainly in the Council's right to pursue an IFQ program given that the moratorium has expired, it is the position of the UA of SC and the UA of CA that national standards such as those described in HR 2621 be enacted before new IFQ program are approved by NOAA Fisheries. NOAA Fisheries has made it clear that they want to see criteria from Congress before approving any new IFQ programs.

Ms. April Wakeman, attorney representing United Anglers of Southern California

Want to reiterate the fact that recreational fishermen will be affected, and do need to be represented, and would appreciate the chance to participate. From a personal point of view, buy-in is much better if everybody has participated in the solution, so it's just good common sense.

Mr. Pete Leipzig, Fisherman's Marketing Association

… This process is going to be a long one. It's a complicated issue, and a lot of work will go into putting this together. For many of us it will be a very frustrating process. Much of what is going to occur is very bureaucratic. But it's a requirement; you have to adhere to the requirements to complete all the necessary analysis. But for someone like myself, I feel much like a father bringing an injured child to the emergency room, and before he can be attended to there's the requirement to complete all the insurance paperwork. He needs attention, but we're gonna spend the time dealing w/the paperwork. And as I hear some of the other speakers, it's almost as though that analogy has expanded, that they're suggesting that perhaps we need to have a review of the admission procedures before we can begin the paperwork before we can have the child see a physician. This is frustrating. I hope that we can continue to move forward. Some of these issues that people raise can occur concurrently, in parallel with the work that the committee is doing, with the work that the analysis group is doing. The council has been requesting for years to get along with sector allocations. We've limped along; we have some things in place because of the declaration of overfished species; they're not adequate; we need to get past these things. But they don't have to occur sequentially. Those who suggest that they occur sequentially, I have to be very skeptical; in view of what you're saying, I believe you're not interested in having an ITQ program go forward, and that the perfect way to delay it, to kill it, is to have it go sequentially. Thank you.

Mr. Steve Bodnar, Coos Bay Trawlers Association and Bandon Submarine Cable Council

The trawl fleet wants the IQ program; everybody comes to the door and is knocking there; it is amazing to me that there wasn't this kind of attention done when the fixed gear, the LE fixed gear, pulled the same thing and got their IQs basically by permit stacking. It's just amazing to me that the gear makes the difference in who's at the door and who wants in. Welcome aboard everybody!

TRANSCRIPT OF PUBLIC COMMENTS
Trawl IQ Scoping Hearing
Pacific Fishery Management Council
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115
July 20, 2004

Mr. Hartwell, Environmental Defense

Environmental Defense fully supports the Council's decision to move forward to develop IQ alternatives for the West Coast groundfish fishery. We look forward to working with Council in developing a program to improve management and resource sustainability and bring economic sustainability to fishermen, processors, and coastal communities. We are interested that there be a range of alternatives to address coastal community concerns. Over the summer we are working with coastal community leaders to better understand their concerns and needs and will be presenting a report to the Council at their September meeting describing our findings and their implications for IQ alternatives. We are pleased that the Council recently added a coastal community representative to the Trawl IQ Committee. We believe that it is of utmost importance that the process continues to be open to all stakeholders' input throughout the EIS process. Finally, ED will be hosting an open forum on the British Columbia ITQ program in Newport, Oregon, next week from 9 am to 1 pm on July 27th. The public will have an opportunity to hear firsthand about the environmental and economic benefits of IFQs from participants in the BC groundfish fishery and will be able to discuss the implications for our own ITQ development process. We will be submitting a summary of this meeting as part of our formal written scoping process after July 27th. I encourage interested parties to seem me after about the Newport forum. Thank you.

Mr. Casey, Bering Sea crab vessel owners representative, Woodinville, Washington

My clients are Bering Sea crab vessel owners, and if I lie to you today Bob Alverson and Dave Fraser can tell you that they saw everything that I saw. I simply came to warn you. I read this article on the web about what you are doing and all my remarks refer to page A9, accumulation limits. I simply wanted to tell you what happened in Alaska and warn you about a socioeconomic virus that I think we let loose up there and could very easily come down here all along the Pacific coast. In my opinion with the next rewrite of the Magnuson Act it spread all over the country. I believe it is against a hundred-year historical tradition in this country of antitrust containment. Here is what it is in a nutshell. I ask you to write down two numbers: eight, which is the percent of the IFQs in crab that processors own in the Bering sea. That's what they qualify for under the qualifying year scenarios decided on by the [North Pacific] Council. Number two, please write forty, question mark. I believe this is right; I get that number by multiplying eight processors times a five percent ownership cap. As you know, every fisherman, Dave Fraser for example, may only accumulate one percent of the IFQ in crab, according to the Secretary of Commence. Glenn's people may each acquire five percent. This is all legal, all above board, all on the public record. But when I tell you who decided that I think you will be surprised. Gary Locke decided that. Governor Kulongowski decided that. Governor Kitzhaber decided. Governor Knowles decided that. And Governor Murkowski decided that. And do they even know it? Of course not. However, the

Magnuson law says that they have a seat, a voting seat ex-officio, on those councils. All of their representatives voted to give Dave Fraser one percent max and give Glenn's people each five percent max. And when I read your article I thought maybe we can contain this to crab in the Bering sea. You remember who decisively won the Civil war by overrunning Atlanta? He had a brother who wrote a law called the Sherman—not William Tecumscah Sherman, his brother—the Sherman Antitrust law. You know that we've come to that in Alaska. The way the decision was made all of Glenn's guys are subject to the antitrust laws today and into the future. There is no escape from that. But what is the golden ingredient that gets all the way around that? It's the five-to-one ratio. If 240 Dave Frasers can only own one percent and eight processors can own five percent each, who cares about the Sherman or Clayton Antitrust Acts? Within 10 years, most likely the harvesting privilege will be owned and controlled by the vertically integrated operations. And you know what? Some of them are fishermen owned. Let's not point fingers. Not only international corporations, they are partnerships with the fishermen. We tend to think that's the wrong way to go, and I hope that when you guys make this decision.... I think I was looking at page A9, it says one percent or nine percent, and that's where we started too. I hope you make it the same. My message is purely that. Whatever you decide, give the fishermen the same as the processor. Otherwise I believe you are creating a system—remember in the *New Industrial State* John Kenneth Galbraith talked about countervailing power between labor and capital? This is a little different. But to maintain a competitive market it seems to me you don't want to accumulate large blocks of fishing privilege in the hands of a small group. Eight, and 240 can only have one percent. Thank you.

Mr. Dave Fraser, F/V Muir Milach

I haven't taken much time to go through this and I hope there's an opportunity to submit email comments on this. I just wanted to say real quickly that I support the comments of EDF. I think that the experience we had early on in the presentation from the B.C. fishermen and processors presents a real good model. I think the Council should move ahead quickly—2009 didn't sound real quickly—but as quickly as possible to move toward a rationalized environment. On page 2.9, socioeconomic environment, I think its real important, this is in the context of the allocation options on page 8-21, and I'm assuming the ones under the TIQ recommendations are the ones that will be further developed. [Inaudible response from Jim Seger.] Right. And I have no objections to the first three on the list. I think option number four isn't currently legal and I wouldn't encourage moving in that direction. One that isn't on the list that I've seen supported elsewhere is individual processing quotas in addition to the the allocation of quota to processors, which is a horse of a different color. I don't support IPQ systems. But I do think that the NRC set some good guidelines in *Sharing the Fish*. Looking at processor concerns is relevant, and in that context and coming back to what's on page 2.9, it's important to look at the relevant amounts of non-malleable capital invested in the harvesting and processing sectors and how relevant that capital is to the particular fishery. You can have a non-malleable processing plant, but it may be doing crab and salmon and sardines and this and that. So those sort of comparisons are relevant if you go down the road of alternative three of allocating harvest share to processors and trying to put that in perspective. I think an important element that needs to be woven into the socioeconomic environment is maintaining a competitive marketplace. The one IPQ system that is recently popularized, the Department of Justice pointed out very serious competition issues with that. I heard the comments about communities, and EDF comments, and its interesting to note what's important to communities can go two different ways. In Alaska, the Pribilof Islands are totally isolated from road access and kind of different situation from communities down here. They sort of jumped on board with the processors. On the other hand, Kodiak Island felt that they would be best be served by a single pie system that encouraged competition in the marketplace, which would be good for the community as a whole. I'm just thinking about our situation on whiting, we deliver in Ilwaco. But some of our fish is processed in Ilwaco and some of it ends up in a truck going up to Bellington or Stanwood, going up the road. The community issue doesn't necessarily resolve in one specific direction. Our crews are scattered from Bellingham to Port Townsend. Anyway, I'll try to submit more coherent comments by email. [Inaudible comment from Jim Seger.] I think it is a relevant option in terms of that. I mean the connection between the communities is both harvesters and the processors. One thing I did mean to mention, I found it rather odd that the TIQC included the allocation of harvest shares to processors but excluded the option of allocation to harvesters or skippers or permit owners. And that seem contrary to the general tone of advice from the NRC. It always baffles me why skippers would end up lower on the totem pole. [Inaudible comment from Jim Seger.] Yea, thank you.

Mr. Peter Huhtala, Pacific Marine Conservation Council

Some interesting additions to the discussion today. PMCC has commented on this before and we will in the future. We are real concerned about some of the issues that have been brought up today, around consolidation, also about potential loss of fleet diversity. We look forward to the detailed analysis in that regard. And certainly the issues of vertical integration and the real potential for this to spread to processor quotas, if not explicitly in this initial process, inevitably perhaps. PMCC's position remains that this process is premature to adoption of national standards for IFQ programs by Congress and premature to completion of a programmatic EIS for the groundfish fisheries, the whole programmatic to review the current state of the groundfish FMP and in an open process to establish the values, goals, and direction of the groundfish fishery. Today I'm going to just briefly offer an alternative to the primary issue as it's stated in the problem statement of the notice of intent to prepare an EIS, which basically comes down to we have a serious problem in the fishery that is constrained by the incidental catch of overfished—certain overfished groundfish species—and in association with healthy stocks. Our suggestion is to analyze something that is a little different from what was stated in the NOI. We'd like to look at a system of hard caps on the total mortality of each overfished species by sector. And in this case you may consider, for example, the nonwhiting groundfish trawl fishery to be a sector. The sector cap would be established through some sort of allocation process. Perhaps not a permanent allocation, but at least an allocation adequate to the season involved or two year period involved. The sector would receive a cap on each overfished species, and upon attainment of the total mortality cap for any of those overfished species the sector would cease fishing. Other sectors that may encounter the same species, as long the sector that was shut down didn't blow past the OY, could continue to fish. Within the sector, individuals would have the opportunity to choose to opt out of the sector cap, taking with them an individual bycatch cap for their operation. In order to do that, the individual vessel or permit owner would need to agree to carry an observer to verify their compliance with the hard individual bycatch cap. They would, in exchange, also receive access to additional higher trip limits of the healthy target stocks. These individuals that have opted out may also choose to form groups or clubs to pool their hard individual bycatch caps and share the risk. In the case of a sector being shut down, the individuals that opted out would not be shut down; they would get to continue fishing regardless. In addition, the current system of two-month cumulative caps for each of these species could be analyzed in different ways. The hard total mortality caps could be for two months, they could be for four months, they could be for six months, they could be for a year, or they could even be for a two-year period. We're not going to get too far down into the weeds of that, but we'd like analysis looking at getting away from the two-month cumulative limits. But also maintaining some potential for somebody to get back into the fishery and not get shut out for a full two-year period, perhaps. It makes more sense to start that cap over again. We'd like to see this type of hard cap system analyzed in relationship to the complexity and time necessary to develop the other systems that have been suggested to deal with the problems that were stated in the NOI. In the end, we suspect this could be implemented in shorter order, or at least aspects of it, pilot programs, similar to this could be implemented. In fact, the arrowtooth flounder EFP moving to regulations next year is an example of a fishery that is managed very similar to what we are talking about. This allows additional time to go through a programmatic process to review the possibilities for different sorts of dedicated access privilege systems that may be a longer term solution to rationalizing the fishery. But in the meantime we are impatient and we'd like to get on with getting a better hand on the total mortality of groundfish that are in an overfished state, rebuilding those with some degree of assurance and providing access to healthy stocks through the use of incentives in reward. My little offering for today. [Inaudible comment from Jim Seger.] Well yea, if you run into a total mortality cap for one of the other species and you may have to quit fishing. But as far as hard sector caps, going through this, which is a bit of an allocation problem initially, focus on the overfished species rather than going through the full allocation battle. There is sure to be a battle on all the other species as well. Does that clarify what I mean? [Inaudible response from Jim Seger.] Probably. [Inaudible comment from Jim Seger.] Yea. Ultimately, but right now having the kind of monitoring necessary to set hard caps on the recreational sector sounds to me like a nightmare. You know, eventually we're going to have to have them, but since the subject of this problem statement is the trawl fishery, and the subject of this discussion is developing dedicated access privileges for the trawl fishery, I limited it to the trawl fishery. It is easier to define sectors; you can define it as the entire trawl fishery; you can divide up the whiting fishery out; you can divide up the sectors of the whiting fishery; and its relatively easy compared to some of the other sectors, open access for example. [Inaudible comment.] Yea it is; yea, I think that's correct Jim. I just see it in a different way than was presented in the ICA [Inaudible comment from Jim Seger.] And we're clearly not interested in tradable total mortality caps for the overfished species. But that doesn't mean you can't analyze them, which I'm sure you will. Thank you.

Mr. Joe Bersh, Supreme Alaska Seafoods

We operate the Excellence, a mothership in the tribal and nontribal whiting fisheries. My first point has to do with provision A13.2 and its interaction with provision A6, the use-it-or-lose-it and the recency provisions. Unfortunately, this program is apparently going to take some time to implement; yet we fixed in time the recency cap limits, which I believe are 2000 to 2003. At the present time there is a set or fixed allocation period for history years, which I don't see necessarily any reason to change. But one of the goals of this is rationalization through market forces, and I think an analysis of participation in this fishery would show that there has been rationalization that's occurred during the allocation years. Which if the recency requirements don't continue to call for an ongoing participation requirement, if they don't move forwared when it comes time to allocate some of this in an IFQ, it's going to give fish to people who have long since retired from the fishery and currently have no intent to return to the fishery. I would say that an ongoing participation requirement would be consistent with the A6 use-it-or-lose-it requirement. If my memory serves me, use it every three out of five years is the requirement there. My next item would be provision A13.5. I suspect I'm not the first person in any of these scoping meetings to raise the issue regarding returning to putting a control date in these and that there is an allocation to the processing sector or to non-harvest sectors. So I would ask that that would be reconsidered. Comments from members of the TIQC suggested that the reason that it was not appropriate to put in the control date was because it somewhow validated the concept of giving IFQ to processors. Certainly that is not a reasonable position as to why it should not be considered. If there are reasons for a harvesters' control date to prevent speculative harvesting, I would argue there is a reason to do it to prevent speculative processing. Another non-popular issue relative to allocation to processors would be to—or maybe this would be a popular one, I don't know—would be to consider alternatives which would only provide ITQ to processors who are not vertically integrated. The concept of preserving non-mobile capital really isn't such an overriding concern if the processor has its own harvest fleet which is already receiving ITQs. So I would suggest that there might be an analysis of placing some type of accumulation limit in the event that shares are given to processors, which would take into account what they are receiving as a harvester ITQ as owners of harvesting vessels. My final comment is I think that the panel has put together a group of people to put in input. We have strong input regarding the Canadian program. Yet I think there's—I fear a tendencey to follow too much of the B.C. program without peeling back the layers of the onion in their program to see how it works for them and why it works for them. I would say why some of there provisions would not work for us is because we are faced with a very serious probem regarding overfished species. Peter makes some valid points as to how to treat overfished species. I don't think that there's anything within the B.C. model that can be readily transferred to our system. So I just hope we won't become too focused on looking at their system, thinking that it is working for them and that it will work in all areas for us. I think it's a good starting point, but we need to address our unique issues ourselves. Thank you.

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TRANSCRIPT OF PUBLIC COMMENTS
Trawl IQ Scoping Hearing
Pacific Fishery Management Council
Hatfield Marine Science Center
2040 SE Marine Science Drive
Newport, OR 97365
July 27, 2004

Ms. Leesa Cobb, Port Orford Ocean Resource Team

Firstly, when you do measure any impacts, if you get to that type of work with this program, and we hope you will…identify Port Orford as an individual port and don't lump us in with Brookings or Coos Bay, which has consistently been the practice in the past. It's going to be very important to us during this work that that doesn't happen because of our long history with the groundfish fishery. So we'd like to get that on the record.

I also want to speak in favor of CDQs as an alternative as you're developing these scoping issues. Our community has a community based management project in place that's been up and running for 3 years, so we have the infrastructure to manage a quota, and there's work being done in central California also with another group that could manage a quota. So we're interested in you scoping that.

And [we] request that as at this work proceeds, and as you identify alternatives, that you analyze the impacts on our community all through the process, and one that comes to mind is that when you talk about inter-sector allocation, we're interested in—I guess that means who gets the fish, right?—We're particularly interested in that type of analysis, because of our long history in groundfish fisheries in Port Orford, and essentially not fishing now on groundfish because of the closures on the prohibited species and also the area closure that we have. So we need that type of analysis done. That would help our community understand what this trawl IQ plan is going to mean to us.

In addition, as you do break up the fish and the trawl fleet and develop a process for that, we'd be very interested to identify where that fish is going, so we'll know if there's going to be a shift of effort into our area, accumulation into our area, that might impact our fishing grounds. Thanks.

Mr. Peter Huhtala, Pacific Marine Conservation Council

I've been talking to folks up and down the coast about this issue, had some meetings, public forums in Astoria, Port Townsend, and – gosh. There's a wide range of opinion and you know just for the record, the general idea of this proposal is outrageously controversial. There's some who really think that full-blown tradable IFQs for every species is the cat's pajamas. And there's the more extreme side, saying this is a gifting of a public resource and many of the people who are getting the gift are those who just took the buyback money from the public coffers, which need to be paid by a lot of folks in both the trawl fishery and other fisheries like pink shrimp and crab. There's some—in Astoria—that were [concerned] that IFQs would reward those responsible for creating the problems that they intend to solve. Others are saying it's a grand economic experiment whose time has come.

I've talked to you a bit about the anxiety that many in PMCC have about the potential IFQs [have] to squeeze out small businesses, cause the loss of jobs and communities—potentially result in big boat domination of the fishery and alternately contribute to the processing sector being monopolized by a few major processors that end up coming in on the coattails of this. I don't know that all of that would happen, because there's a lot of ways that this could go. So we've consistently advocated that national standards be adopted by Congress as recommended by the US Commission on Ocean Policy, and I'm not going to go into the standards exactly right now, certainly we have before; but this would be a development of a some basic national standards in a democratic process in Congress, and it would give us a whole lot more comfort if some of these sideboards on accumulation, vertical integration, time periods for these programs to be expired or be reviewed… because I know you keep mentioning the Council's a public process and all these meetings are open to the public, but frankly the Council may be a public process, but it's not necessarily a real accessible institution, and the actual decision making authority is made by folks that— there's no requirement for the non-fishing public to have any representation on the Councils whatsoever.

So … not only are we interested in national standards to be developed through a democratic process, but we've also advocated for a programmatic EIS to review the FMP. We consider a programmatic EIS review outrageously overdue, and potentially very useful. This would be a way, a public process, in which the public can look at the goals and objectives and future policy directions of the FMP, and consider the major changes that have occurred in this fishery over the past several years. The overfished species that need to go into rebuilding plans—what's that doing to our communities? What's that doing to our fisheries? The spatial management, the closed area management, wide areas of the coast—how is that affecting individual communities? The buyback itself—how did that play out? What really turned out, what capacity was reduced, and what's that doing to our towns?

That said, in Seattle, Jim, I talked with you a bit about looking at another alternative within this process—assuming this process does move forward, with or without a programmatic EIS—and that was looking at what we call hard bycatch caps by sector, or total mortality caps—very similar to the cumulative catch limits that are described in the scoping document. … Basically we advocate for a cumulative catch limit, total mortality catch limits by sector, first off; (?) defining the trawl sector—you can surely subdivide that if you like—and giving individuals the option of opting out of their sector, taking with them the personal vessel total mortality cap—we're talking only on overfished species. And in exchange for accepting personal accountability, you get more fish, and if your sector gets closed down, you don't get closed down if you stay within your cap. You can also share the risk with your friends if you trust them, and pool those caps. Which is not unreasonable, because people may want to use gear, techniques, shorter tow times, simply communication to keep away from hot spots of the overfished species, that sort of thing. And we think this makes good sense, especially if we combine this with longer, potentially analyzing longer cumulative periods, so you end up with higher trip limits, higher cumulative period limits, and more flexibility within that period. And we believe this can be accomplished in far less time than 2008-2009; …we're only talking about the overfished species, and this can be accomplished with what I call soft allocation or [the] annual process of making sense of what … to offer each sector, and we don't have to go through the whole complete allocation battle, but we can actually start getting a handle on reducing bycatch of overfished species, gaining access to the healthy stocks that we're foregoing at this point, and making things better for the fishery, even as the longer-term potential for other types of dedicated access privileges for the trawl fishery or for the whole west coast groundfish fishery are explored over a longer period of time.

Finally, today I have to touch on a part of this—NEPA documents have a section called the cumulative impacts (or effects) analysis—and what that means is you've got to look at the combined effects of decisions that have been made, or are being made, or are likely to be made sometime in the near future on the decision at hand. And when you're looking at the cumulative impacts of this hard bycatch proposal or any of the other dedicated access schemes on the table, you're gonna have to look at cumulative impacts. And it's really hard for me to get my mind around how you look at the cumulative impacts of the designed phase of a trawl IFQ without looking at the allocation issues—who gets the fish… the communities, the fisheries, the trawl fishery itself—unless you know how many fish are gonna be roughly available between the sectors as well as within the sector. It's really hard to complete that cumulative impacts analysis.

In addition, the cumulative impacts analysis should take a look at the cumulative impacts [for] communities of the major changes in the fishery recently—the rebuilding plans, the shelf closure, the buyback, and look at those impacts carefully, and look them most specifically in how they affect the smaller boat fishermen, the smaller communities, the lower income and minority workers, local processing businesses of all sorts, and certainly adjacent fisheries.

Mr. David Jincks, President, Midwater Trawler's Cooperative, and owner of trawl vessels that fish in Alaska waters and off the West Coast

I'm speaking in favor of trawl ITQs; in favor of ways that I think will benefit not just the trawlers that are fishing, and the vessel owners, but also the communities that the vessels fish out of; the ports; I think it'll be a good thing for all. As far as rationalizing the fishery and moving through ITQs, there are several different ways besides ITQs; there are IFQs, there are several names to put on it; but one of the things that's needed in this fishery is some incentive for the fishermen to continue fishing, and to help with conservation and sustainability of the fisheries that they're fishing for. It gives us the opportunity to go to sea knowing what we can catch, how much we can catch, without throwing the fish away that we caught that we didn't intend to catch. Allocation issues—yes, there will be allocation issues; as I believe Jeff mentioned that between hook, longline, pot, shrimp, open access, we do have some issues there, but right now we are fishing under these scorecards that are ratcheted up and down on us, so not knowing fully each year what that scorecard's going to be set at makes it a little harder to fish. Some of the fisheries that try and fish clean, their scorecard might be dumped down lower to help another fishery. So yes, there should be allocations; we will need allocations. But as far as a set-aside to a certain group of fishermen, yes, I think this is needed; I think it's a long time coming. We've had buyback; I supported buyback only with the thought of moving into ITQs. My vessel personally just fishes for whiting down here; my part of the buyback, which will go for probably the incidental catch that I bring in, but I am more than willing to still support it; I think it was a good thing, but only if we move into ITQs. Without ITQs, I think buyback wasn't necessary. We need to rationalize the fishery. I'm fully in support of it. The National Standards are in place today. As they change, possibly we'll have to change with them. I think that ITQ Committee, which I am also a member of, in some of our statements we did mention that if new national standards come into place they also will be looked at and incorporated if possible. Right now it's open to look at everything. But it is worth moving ahead with. It will bring stability to these fisheries. Thank you.

Ms. Dorothy Lowman, Environmental Defense

I'm going to give a few comments on behalf of Environmental Defense. E.D. does believe that designing a groundfish trawl dedicated access privilege that utilizes individual quotas may be one of the most important management initiatives ever undertaken by the Pacific Council. We've studied a lot of IFQ programs from around the world and we believe that IQs combined with other management measures can greatly improve the sustainability and economic viability of fisheries. E.D. is very committed to working in partnership with the Council and with all of the stakeholders to ensure that the West Coast trawl IQ process considers a full range of alternatives and their impacts. We really believe that if we work together we can design a program that meets the needs of the resource, industry, and our coastal communities. So we're going to provide you with some written comments, but I wanted today just to highlight, just concentrate on things that I don't think are in the scoping document at this time, that we ought to include to expand the scope at the beginning of this process before we start narrowing the scope.

And first of all, over on the general ideas of alternatives to be analyzed, given Council action on the programmatic bycatch EIS and some of the bycatch objectives that are identified during this process so far, that we should include another alternative for analysis which would be to look at having bycatch caps or incidental catch caps—I don't think I have my terminology quite right—for the overfished species, for all sectors, and then, where possible, allocate them as individual tradable quotas that could be traded between sectors as well as between individual vessels.

We also are concerned that when we design IFQ programs that it is critical that we understand and address the concerns of coastal communities. We're actually going to present a report to the Council in September that will describe the concerns of coastal communities that may not otherwise be engaged in the planning process, and some means of mitigating potential problems based on a summer-long outreach effort that we're currently undertaking. At that time we might have some additional design proposals, but at a minimum we think that it's too soon to take off the table initial allocation to coastal communities. And so we should include CDQs or some other mechanism to allocate to coastal communities.

In addition we ought to look at some other alternative that might be able to be explored to help maintain fishing and processing opportunities within coastal communities. One option that we recommend is to hold back some percentage of the IQ each year to be allocated annually based on joint proposals with processors and fishermen. Fishermen and processors could present their proposals to the Council or some other body that would rank proposals based on a set of criteria that could include things such as contribution to coastal jobs, maintenance of processing opportunities, sustainable fishing practices, among other ideas. This is based on the British Columbia GDA mechanism, but of course we would modify it to meet the needs of our fishery.

We also think that we should analyze some initial allocation to skippers that could demonstrate some specific history of dependence on the fishery.

Also, in terms of the issues of area-specific IFQs, there may be localized depletion concerns that could warrant area-specific IQs. Therefore we recommend the consideration of area-specific IQs based on socioeconomic as well as biological considerations.

I'm not going to talk about things that are already in the document, although there are certainly some very important monitoring options and others that we think are going to be critical to design of a good program. Finally, one other area that I think we'd like to see a little extension is there's a section on trying to look at maybe a loan program or other options for new entry. We suggest [including] a mechanism [that allows] coastal communities to form nonprofits whose purpose would be to hold and lease quota to community members, that would allow these nonprofits to then qualify for loan program opportunities.

We have not addressed issues related to inter-sector allocations, not because they're not important, but because we know this is a separate EIS. But it's clearly going to be a very important and difficult set of decisions, and we believe that the impact analysis and the controversy of these decisions that we shouldn't wait too long to start that process. I urge the Council to being that soon, and modify the allocation committee to ensure that all sectors and stakeholders have representation and are actively involved.

Mr. Denny Burke – Fisherman with 55-foot crab, blackcod, shrimp boat

I support quota. The trip limit system that we have now isn't really an effective tool with the amount of fish available. When we get our 60-day limit, we really have 15, maybe 20 days and we're done. So if a guy doesn't have something else to do, he parks his boat a lot. So I'm for something other than what we have now, but having said that, I want to express that I have fear for the future. I've had my boat close to 20 years, and in that 20 years every year I've seen less and less access to the ocean and to fish. I mean, I used to catch a lot more pounds than I do now, and it's not because the fish aren't there; the fishing's actually good. I just don't have any access. So I'm for quota, but I'm hoping that as this thing comes down the road, when allocation comes, a guy's share isn't less than he already has now. I mean, what I consider we have now is a real weak pot of soup. It's been watered down, and what's left hardly keeps you alive. Dragging really is maybe 25-30% of my income, and I hope that when this thing's done, it doesn't give a guy less share than he has already, 'cause what he has now isn't enough to stay in business. And along those lines, something I want to ask the Council is, you're gonna get a lot of pressure to change that cutoff date. People are going to want to extend that, and I hope that they stick to their guns and keep it at the November 2003. That's one thing that can help. Another thing, I hope they don't do to make the pot of stew even weaker than it is already is spread the allocation any further, in other words, right now we don't have access to the ocean. We don't have pounds today, and all we're talking about is the catchers. I mean, the fish is divided among people that are on the boat fishing, the trawlers, it's open access, fixed gear, but it's the actual catchers. There's other groups now looking for allocation—processors, I've heard suppliers, you know; I'm not selfish, but if I have 20 days out of 60 days that I can work now, and somebody else wants some of that, am I gonna get 10 days? So I'm for it. I just hope that when it's over, we don't all look each other in the eye and go "whoa, that was another mistake" because a lot of things that we've done, I didn't see any relief, really, from limited entry; so far I haven't gotten an increase from buyback—the only good thing is so far, there's no payback. And I hope that stays that way. Cause I mean, you know, my cannery has more boats than it used to, and my limits are no better. So I can wander on forever. I'm for this; obviously status quo isn't going to get it. But we can't water this down any more than it is. Everybody wants a piece of the pie. It's an awfully small pie already. I hope it stays where it started, which is with the fishers. Thank you.

WRITTEN COMMENTS

Following are the actual written comments received.

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AUG 0 2 2004

PFMC

July 29, 2004

Pacific Fishery Management Scoping Council

Concern: Access Privileges
Individual Fishing Quotas

I started working on West Coast Trawlers in Eureka, CA in 1970. I worked on deck for 8 years. In 1978 I started operating a multitude of West Coast Trawlers. As a Captain I saw the fishery as prolific and sustainable.

I have devoted over 20 years of my life to catching groundfish as Captain/Manager. I have saved money towards purchase of a Trawler in the Capital Construction Fund. I may lose over half of this fund as my ability to buy a boat has changed with the buyback.

Captain/Crew who were responsible for significant past catch records but did not own the vessels they fished should not be overlooked and instead be granted IFQ Access Share in groundfish. As I state my situation I speak for many others.

I received nothing from the buyback. I am unemployed in less than a viable job market in my preferred and chosen profession.

Access to groundfish after many years of past catch history seems just. More just than Processors acquiring IFQ.

Sincerely, G. L. Murray

Captain Gordon Murray
Past Captain of the F/V Blue Horizon
PO Box 948
Astoria, OR 97103
Email Address: GordonLMurray@EarthLink.NET
Cell: (503) 551-4846

Coastal Jobs Coalition

Working for Sustainable Fisheries and Communities

Testimony of Kent Craford
Pacific Fisheries Management Council IQ Public Scoping Hearing
Foster City, CA
June 13, 2004

My name is Kent Craford and I am the director of the Coastal Jobs Coalition. We are a group recently formed by the West Coast Seafood Processors Association to evidence the broad base of support for balanced fisheries rationalization that recognizes and provides for all stakeholders in the West Coast groundfish fishery including seafood-dependent communities.

I am here today representing dozens of companies and organizations employing thousands of people in primary processing and its supporting industries including transportation, cold storage and packaging for example, in addition to seafood industry customer groups like restaurants. Together, these many specialized sectors make up the seafood industry.

Thank you for the opportunity to comment today on reasonable alternatives for the development of dedicated access privileges for the West Coast groundfish trawl fishery, and potential impacts of those alternatives.

First, I would like to express our coalition's strong support for dedicated access privileges or individual quota systems. There are significant, economic and management benefits that can be derived from IQ systems for these two groundfish fisheries. But the key to attaining those benefits, especially economic benefits, is in the proper design of an IQ system.

We've heard it said many times by both processors and fishermen that neither can exist, much less succeed, without the other. Therefore it is imperative that any IQ plan developed for West Coast groundfish recognize this fact, and work in such a way as to foster the vitality of both for their mutual benefit, and the benefit of the communities which depend on them. <u>And so, the primary message we would like to send today is that any IQ system must provide equally for harvesters and processors.</u> A balanced approach will bring needed stability to both sectors, their supporting industries as well as coastal communities.

With this in mind, we formally propose the inclusion of the following alternatives, to be given full and equal consideration in the EIS process in addition to those already outlined by the Ad Hoc Trawl IQ committee. We feel that the socio-economic impacts of each of these alternatives should be analyzed fully and independently of each other. The alternatives we propose are:

1. The establishment of Community Quota or CDQ, to operate parallel to an IFQ. Despite use in other fisheries, this option was rejected by the Ad Hoc Trawl IQ Committee without sufficient justification. CDQ is a reasonable alternative and should be analyzed in the EIS.

2. An auction-based system should be analyzed as a reasonable alternative to status quo or an IFQ system. Such was the recommendation of NRC as referred to in the scoping document. Such a system has merits and should be analyzed.

As stated in the EIS scoping document, initial allocation of quota is the most controversial aspect of quota systems. Recognizing the tremendous economic and social impacts and shifts that will occur through the initial allocation of fishing quota if an IFQ system is adopted, we support analysis of various combinations of IFQ initial allocation. We feel that each of these deserves equal consideration as a reasonable alternative to status quo within the EIS. They are:

3. 50/50% initial allocation of individual fishing quota to trawl permit owners and primary processors

4. Combinations of initial allocation of individual fishing quota to trawl permit owners, primary processors, and community entities.

Additionally, the Coastal Jobs Coalition supports analysis of existing dedicated access privilege or quota systems related to the above mentioned alternatives as well as others considered in the EIS. As part of this analysis, we feel it imperative to study our nation's most recently rationalized fishery, Bering Sea Crab.

We recognize and understand that Congress has temporarily prohibited the consideration of such a system as a reasonable alternative to status quo for West Coast groundfish. But, analysis of that system is appropriate for learning purposes.

As seafood industry businesses, we feel strongly that the short experience we have had with Bering Sea Crab rationalization will speak well for the socio-economic benefits that such a balanced approach can have for processors, harvesters, communities, and all stakeholders in the seafood industry. Ignoring the most recent and relevant American fishery quota system as we try to develop our own from scratch would be foolish.

Finally, we must express our concerns that this EIS process is premature. It has been recognized that allocations between groundfish harvest sectors will need to be negotiated before any trawl IQ system can move forward. Why is this not being done first? To march down the path towards an IQ system without even knowing where the trawl fishery stands vis-à-vis fixed gear, open access and recreational fisheries is putting the cart before the horse.

Over the coming months as the Council and its appointed committees analyze options for groundfish and whiting IQs, the Coastal Jobs Coalition plans to participate actively to ensure that the full range of reasonable options are investigated. We look forward to working with you and thank you again for the opportunity to comment.

August 2, 2004

Mr. Don Hansen, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

IFQ Scoping Comments

Dear Chairman Hansen:

Designing a groundfish trawl dedicated access privilege system, which uses individual quotas may be one of the most important management initiatives ever undertaken by the Pacific Council. Experiences from around the world show that properly designed IFQ programs, when combined with other management measures, can greatly improve the ecological sustainability and economic viability of fisheries.

Environmental Defense is committed to working in partnership with the Council and all of its stakeholders to assure that the west coast trawl IQ process considers a full range of alternatives and their impacts. By working together, we are hopeful that we can design a program that meets the needs of the resource, the industry and our coastal communities.

To this end, we have reviewed the June 2004 scoping document, and offer the following recommendations regarding the range of alternatives, IFQ design elements, and impact considerations. These are preliminary recommendations intended to meet the NEPA deadline, and we intend to provide ongoing comments through the Council process to encourage that the concerns of all stakeholders be adequately considered.

<u>Additional Alternatives to Be Considered</u>

Sectoral Bycatch Caps Allocated as Transferable Bycatch Quota

An additional alternative that should be considered is to develop hard bycatch caps for overfished species for all sectors of the groundfish fishery as a whole. Then, for the sectors where feasible, allocate the sectoral bycatch allowance as tradable Individual Bycatch Quota, which could be tradable between sectors as well as between individual vessels.

<u>IFQ Design Elements</u>

In designing an IFQ program, it is critical that we understand and address the concerns of coastal communities for which fisheries are an important part of their economy and culture. Environmental Defense intends to present a report to the Council in September that will describe both the concerns of coastal communities who may not be otherwise engaged in the planning process, and means of mitigating potential problems. The report will reflect summer-long outreach efforts by our staff, and will describe strategies for ensuring that any IFQ system works for communities as well as industry and the environment. The results may provide some additional design options at that time. However, at a minimum the design options to be considered should include the following:

Initial Allocation

Out-migration of quota from a community has been a concern in other IFQ programs. Initial allocation alternatives should address the potential impacts on coastal communities. Mechanisms should be explored that would help maintain fishing and processing opportunities in coastal communities. One option that should be included is to hold back some percentage of the IFQ each year to be allocated annually based on joint proposals from fishermen and processors. Fishermen and processors would present their proposals to a committee that would include community representation and would rank the proposals based on a set of criteria that could include contribution to coastal jobs, maintenance of processing opportunity, sustainable fishery practices, among others. This option is based on the British Columbia Groundfish Development Authority but would be modified to meet the specific needs of our fishery.

We also recommend that initial allocation to skippers who can demonstrate some specific history and dependence on the fishery be analyzed.

With respect to Initial Allocation options that have already been identified, we support exploring using an auction mechanism, but recommend that it be tiered to provide opportunities for diverse operations to effectively compete for quota.

Area-Specific IFQs

There may be localized depletion concerns that could warrant area-specific IFQs. Therefore, we recommend consideration of area-specific IFQs based primarily on biological considerations. We suggest that agency and academic biologists recommend how best to determine area- and stock-specific management. Area-specific IFQs should also be considered as an option for protecting community interests, balanced with the need for flexibility and transferability to meet the primary objectives of the IFQ program.

Other Design Elements

Monitoring

Through our examination of other IFQ programs, we have been convinced that a key component of programs successful at achieving environmental goals have been individual accountability. Fishermen, managers, and processors in British Columbia alike testify to the importance of effective monitoring to support accountability. We support the 100% at-sea observer alternative as well as 100% dockside monitoring and mandatory VMS options that are included in the scoping document as critical design elements. We would also suggest that an explicit ban on highgrading be included.

Environmental Performance Objectives

The Council should develop measurable environmental performance objectives to which the IFQ program should be held accountable. Environmental performance objectives should be designed to protect habitat, conserve forage species, and sustain target and bycatch species/populations. Such objectives can result in innovative, practical, and cost-effective gear designs and fishing practices.

Cost Recovery

Environmental Defense supports cost recovery for the monitoring activities described above as well as industry financial contributions to research and management phased in over time. In order to preserve options for small boat participants, we also urge the consideration of some form of "sliding scale" or initial loan opportunities for members of the fleet that might otherwise be put at a disadvantage in paying for the costs of monitoring, management and research. Phasing of cost recovery should also be considered, to allow for a transition to a more profitable fishery that is more capable of cost recovery.

Level- Entry Opportunities

The scoping documents describes options for establishing a loan program to assist new entrants, small boat operators and crew who meet qualifying criteria in acquiring quota shares. We recommend that coastal communities be allowed to form non-profits whose purpose would be to hold and lease quota to community members; and that these non-profits also qualify for any loan program opportunities.

Definition of Individual Quotas as Privileges and Ensuring Against Defacto "Rights"

Congress was careful not to create a vested property right under Magnuson-Stevens, which states that an IFQ "shall not create, or be construed to create any right, title, or interest in or to any fish before the fish is harvested." (1996 Cong. US S 39 s 108(d)(3)(D)). Similarly, the National Marine Fisheries Service defines IFQs as a harvest privilege only and not as property for purposes of a takings claim.[1] The federal rule establishing an IFQ program in the Atlantic also emphasizes this point: "The system is not irreversible. It does not convey property rights in the resource...the right to sell an allocation exists only until the Council or the Secretary amend the FMP to modify or withdraw the allocation scheme." (55 Fed. Reg. 24187 (1990)).

[1] NFMS stipulates that the privilege "may be revoked or amended subject to the requirements of the Magnuson Fishery Conservation and Management Act and other applicable law." (50 C.F.R. s. 676.20(g) (1995)).

The government creates IFQs, and therefore has the ability to define them to ensure that they will not be considered legal property rights.[2] We encourage the Council and NMFS to include unambiguous language that is thoroughly vetted with those stakeholders who have expressed public concerns about IFQs constituting or evolving to become a defacto property right.

Conclusion

These scoping comments are focused on broad alternative and trawl IQ program design issues which were either not identified or had been initially rejected by the Trawl IQ Committee. We have not addressed issues related to inter-sectoral allocation. Clearly, this is going to be an important and difficult set of decisions and impact analyses that must occur before any trawl IQ program is implemented. We urge the Council to begin the inter-sectoral allocation EIS process as soon as possible and to modify the allocation committee to ensure that all sectors and stakeholders have representation and are actively involved.

We will be presenting additional information and comments based on ongoing outreach efforts in September and look forward to working closely with the Council, NMFS, and stakeholders on all aspects of this important management initiative throughout the design and implementation process.

Sincerely,

Rod Fujita

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[2] The government can thus avoid takings claims under the Fifth Amendment. See Robert H. Nelson, 1986 U. Ill. L. Rev 363, 374 (1986).

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA

AND THE UNITED STATES OF AMERICA

DIRECTOR
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June 30, 2004

RECEIVED
JUL 0 6 2004
PFMC

Dr. Donald O. McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Don,

The staff of the International Pacific Halibut Commission (IPHC) has reviewed the materials available at the June meeting of the Pacific Fishery Management Council regarding the proposal for an Trawl Individual Quota (TIQ) program. An IQ program for this fishery clearly has the potential to address some of the problems currently facing this sector on the Pacific coast. However, the Council briefing document on the TIQ program suggests that prohibited species bycatch, which would include Pacific halibut, would be allowed to be retained by trawl vessels, presumably for sale. We have several comments on this issue for the Council as it develops the elements of the program.

1. Any provision allowing retention of trawl-caught halibut would require IPHC approval. Permissible gear for the retention of Pacific halibut is governed by the Halibut Convention between the U.S. and Canada and must be approved by the IPHC. Current IPHC regulations do not allow trawl-caught halibut to be retained, so allowing this type of retention would require approval by the IPHC and a change in IPHC regulations. In addition, the IPHC would need to address other management measures, e.g., fishing season and minimum size limit. Recent proposals to the Commission requesting trawl retention of halibut have not been approved, so it is unlikely that the Commission would adopt this proposal.

2. The Halibut Catch Sharing Plan (CSP) would need to be amended to account for retention by this additional user group. The CSP currently allocates the annual available halibut yield among recreational, directed and incidental commercial, and treaty tribal fishers. Allowing retention by trawls would effectively create another user group for the halibut resource off the west coast, which the Council would need to include in the CSP.

3. Effect on bycatch reduction. In 1991, Canada and the U.S. agreed to reduce halibut bycatch mortality in non-target fisheries by 50 percent. Requiring retention would, in effect, double the amount of legal-sized halibut mortality by the trawl fishery, as the current discard requirement allows for survival of those in the best condition, or 50 percent of the total caught. In turn, this 100% mortality associated with trawl retention would decrease the yield available to the other current harvesters of the halibut resource. The amount of additional mortality exceeds the current catch limit for the directed commercial halibut fishery.

A member of our staff will be attending the meeting scheduled for July 20, and can answer any questions the technical group may have.

Sincerely yours,

Bruce M. Leaman
Executive Director

cc: Commissioners

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

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AUG 0 4 2004
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30 July 2004

BY FAX AND BY MAIL

Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220

RE: Comments on Notice of Intent to Prepare an Environmental Impact Statement (EIS) for Consideration of Establishing an Individual Fishing Quota (IFQ) System for the Pacific Coast Groundfish Trawl Fishery.

Dear Dr. McIsaac:

The Pacific Coast Federation of Fishermen's Associations (PCFFA), representing working men and women in the west coast commercial fishing fleet, has reviewed the document noticed in the 24 May 2004 *Federal Register* (Vol. 69, No. 100, pp.29482-29485) noticing the intent of the Pacific Fishery Management Council to prepare an Environmental Impact Statement (EIS) and take scooping comments for the purpose of considering an Individual Fishing Quota (IFQ) system for the Pacific Coast groundfish trawl fishery. PCFFA, which represents some trawl fishermen along the central and southern California coast and various limited access and open access longline and hook-and-line fishermen in the groundfish fishery, has the following comments:

Consideration of Trawl IFQ Program is Premature

PCFFA believes that prior to proceeding with the preparation of an EIS to consider and IFQ system for the Pacific groundfish trawl fishery a number of steps must first be taken. It is premature at this time to be considering an IFQ system for trawling or any other sector of the groundfish fishery until the following occur:

1. ***Analysis of Affect of Buyback on Trawl Effort.*** Prior to moving ahead with an IFQ system, basing the reasons on many of the factors preceding the buy-back, that just took place this year, an analysis should be done to describe what the affect has been. Has the buyback appreciably reduced effort in the trawl fishery? Have vessels with "latent" trawl

permits moved in to fill the void left by the departure of the buy-back vessels? How does the new trawl fleet catch capacity/economic needs stack up against projected groundfish stock abundance? An analysis of the existing system as affected by the buy-back is needed prior to moving to a new system that may not be warranted by such an analysis.

2. ***Reallocation of Quota Back to Other Groundfish Sectors.*** Prior to moving ahead with consideration of an IFQ system for the trawl fleet, the Pacific Council has an obligation to consider the needs of the non-trawl limited entry fishery and the open access fishery. Both of these fisheries have watched their share of the groundfish resource be whittled away since 1982 in order to provide for the bycatch of the trawl fleet and the somewhat specious claims by some processors that they had to have access to trawl-caught groundfish throughout the year, disregarding either biological considerations (e.g., spawning periods) or economic considerations (the higher value of some of the hook-and-line or longline caught fish). Now that is it evident trawl groundfish may not be available throughout the year and the need to maximize the value of the fish that can be taken, the Pacific Council should consider first reallocating some of the total catch back to the non-trawl sector prior to issuing quota shares in the trawl fishery.
3. ***Establishment of National Standards for IFQ Systems.*** Neither the Pacific Council, nor the National Marine Fisheries Service should proceed with any IFQ system until Congress establishes national standards for the creation of such systems. Since 1996, Congress had a moratorium on IFQ systems, which was to allow time for NMFS to prepare a set of standards for IFQ systems. NMFS failed to do what Congress asked and the moratorium elapsed in September 2003. There is legislation currently in the House and language has been introduced in the Senate to establish standards. The Pacific Council and NMFS should wait, out of deference to the Congress and out of respect for those in the groundfish trawl fishery (in the event Congress enacts standards forcing changes in any groundfish IFQ system), until national standards for IFQ systems are established to assure any program created by the Pacific Council is consistent with the national standards.

Justification of an IFQ System

PCFFA recognizes that for some fisheries an IFQ system may be preferable, providing a number of conditions are met, including assurances that all the active participants in the fishery have access to quota, the quota is apportioned fairly, and ownership of quota is restricted to fishermen. However, in addition to the concern raised above that consideration of an IFQ system for the groundfish trawl fishery is premature at this time, PCFFA believes the rationale given in the notice, fails to make a compelling case for consideration.

1. ***Bycatch Reduction.*** The proposal for consideration of an IFQ system discusses the bycatch issue in the trawl fishery but fails to say how an IFQ system will improve lessen bycatch over the current trip limit system. Are bycatch quotas being considered as well? Not only is no basis given for how bycatch will be reduced under an IFQ system, the issue of "highgrading" (i.e., sorting through fish to take only the largest or most valuable fish pursuant to a quota) is totally ignored. The notice discusses the problem the groundfish fleet has with being constrained, not be allowed to fish abundant stocks because of the incidental take of less abundant species. That issue is hardly unique to groundfish, but is something the salmon fishery has had to deal with since the Pacific Council instituted "weak stock" management for that fishery.

2. ***Change in Rationale for Groundfish Fishery?*** In the notice it is mentioned one of the advantages for fishermen under an IFQ system is the ability to fish when they want, when the weather and markets are best as well as to access other fisheries. This rationale is contrary to that given by the Pacific Council for nearly two decades to assure there was groundfish fishing year around to supply shoreside plants and processing lines. Indeed, as mentioned above, the rationale for wanting a year around trawl fishery was used to take catch from the non-trawl fishery. How does the Pacific Council and the IFQ proponents explain this change in rationale for groundfish management?
3. ***Cost of an IFQ Program.*** No mention is made of the increased cost of IFQ systems, or even the cost of preparing the EIS, at a time when the councils and NMFS are under pressure to contain costs given the magnitude of the federal budget deficit. PCFFA questions proceeding with an EIS at this time given the costs and the issues raised above, or the ability to pay for such a system if it were adopted. The cost issue has to be carefully considered.

PCFFA, for the reasons state above, urges the Pacific Council not to proceed at this time with the preparation of an IFQ system. The only reason PCFFA can see for rushing ahead with an IFQ system at this time is to grant as much of the fishery as possible to the trawl vessel owners with large catch histories. This is not a proper basis for moving ahead at this time.

If you have any questions regarding these comments, please do not hesitate to contact us.

Sincerely,

W.F. "Zeke" Grader, Jr.
Executive Director

6/13/04 For ITQ Hearing Record.

Exhibit C.9.d
Public Comment
June 2004

Pacific Marine Conservation Council

May 25, 2004

Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Trawl Individual Fishing Quota public scoping document

Dear Chairman Hansen,

The Pacific Marine Conservation Council (PMCC) is a public-benefit, non-profit corporation that works with fishermen, marine scientists, conservationists, and the general public. PMCC seeks to ensure that needed steps are taken to rebuild and sustain depleted groundfisheries along the West Coast, as well as to balance healthy marine ecosystems with viable fishing community economies.

PMCC is very concerned that the development of an individual transferable quota (ITQ) system for the trawl sector of the groundfish fishery is moving forward with inadequate forethought. The haste in which the Pacific Fishery Management Council (Pacific Council) is being asked to approve a public scoping document to support this development is objectionable, and commencing scoping for a trawl ITQ environmental impact statement (EIS) is, in itself, inappropriate and premature.

The Pacific Council should decline to approve a public scoping document for a trawl ITQ-EIS, and should instead recommend that NOAA Fisheries proceed with the issuance of a Notice of Intent (NOI) to prepare a comprehensive programmatic EIS that will facilitate an open public process for planning for the future of the groundfish fishery as a whole. Within this programmatic EIS process, scientific investigation should occur which examines the biological, social, and economic implications of instituting various forms of dedicated access privileges within the West Coast groundfish fishery – including the possibility of ITQs in the trawl sector. The Pacific Council could, through the programmatic EIS process, also draw on the expertise of their Science and Statistical Committee (SSC) to attempt to reconcile divergent scientific points of view on this controversial subject. This process would assist the Council in deciding whether or not to move forward with an EIS regarding a specific IFQ program – based on a credible scientific foundation.

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A comprehensive programmatic EIS must be completed for the West Coast groundfish fishery *prior* to consideration of options for new forms of dedicated access privileges specific to the trawl sector of this fishery.

PMCC has consistently cautioned against moving forward with a major management change such as a trawl ITQ program, and its associated allocations, before taking stock of the major changes that have already occurred in the groundfish fishery in recent years. These include several overfished species with rebuilding plans under development, large areas of the continental shelf closed to certain types of fishing effort, the buyback of 91 trawl permits and the subsequent transfer of at least 17 latent permits, and environmental impact statements under development for both bycatch and essential fish habitat. PMCC has called for analysis of these major changes and linkage between the various National Environmental Policy Act (NEPA) initiatives. This would require an open, public process, where informed decisions can be made about a vision for the future of the groundfish fishery – a comprehensive programmatic EIS.

Prior to taking the radical step of seriously considering ITQ-based management, it is essential to review and analyze the impacts of recent changes to the groundfish fishery, and important new information that is now available. NEPA (at 40 C.F.R. § 1502.9(c)) requires preparation of supplemental [programmatic] EIS when "the agency makes substantial changes in the proposed action that are relevant to environmental concerns;" or when "there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." The groundfish fishery certainly qualifies on both accounts, and it would be entirely appropriate for the Pacific Fishery Management Council to urge NOAA Fisheries to begin work on a programmatic EIS as soon as possible, both for the utility of the process and to comply with the law.

The willingness of NOAA Fisheries to fund the trawl ITQ-EIS process should raise concern in light of a statement made by Bill Robinson of the Northwest Region at the June 2003 Council meeting, when development of a comprehensive programmatic EIS was abandoned in order to focus more narrowly on bycatch. From page 34 under B.12.b of the NMFS report: *"Mr. Robinson wanted to point out to the Council that the concept of a broader programmatic EIS is still alive as far as NMFS is concerned. But the resources available didn't allow preparing three major EIS's simultaneously. The EFH EIS and bycatch reduction are mandated by the Court so they take precedence. Hopefully, NMFS can prepare a programmatic EIS in the future once resources were made available."* Yet, resources were apparently found for developing a trawl ITQ, instead.

The Notice of Intent (NOI) to prepare an EIS regarding implementation of dedicated access privileges in the groundfish trawl fishery is deficient, and some premises set forth in this NOI can be considered misleading.

Providing exactly 21 days of notice of the only Pacific Council meeting-associated scoping session, as is here the case, for an EIS which would herald a major departure for Council-system management is outrageous. When taken along with a promise to provide a draft public scoping document *at the time* of the session, outrage must turn to grief for the insult to public process that

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this represents. This is an issue that affects people's lives, their livelihood, our ocean environment, and is integral to the future management of West Coast marine fisheries. This is not an isolated instance where the timing of notice limited the ability for the public to be involved with this process. The October 2003 meeting of the Ad Hoc Trawl Individual Quota committee was held after providing just 14 days advance notice in the Federal Register, the exact minimum notice required under the Magnuson-Stevens Act. Only 15 days Federal Register notice was provided for this committee's second meeting in March 2004.

Frankly, I'm surprised that this NOI was pushed to publication in the Federal Register, since I'm still not sure where the funding for this EIS might come from. Mr. Chairman, we have all heard about the attempt to access for this purpose the remaining $550,000 or so in California's share of the groundfish disaster relief funds. The irony is clear: take funds that were intended to help the fishing community cope with the economic hardship of a fisheries disaster, then use that money to set up a system from which a few people will profit while putting many times more out of a job.

The authors of the NOI seized upon a phrase used by the U.S. Commission on Ocean Policy: "dedicated access privileges," perhaps as a euphemism for the vilified "individual fishing quotas." In fairness, the new term broadens the concept somewhat. However, there is a big problem here in that the NOI authors selectively take the work of the U.S. Commission out of context, completely omitting the commission's recommendation to enact national standards for implementation of dedicated access privileges – to guide processes like that being placed before the Pacific Council. (Please see page nine of these comments for a list of the U.S. Commission on Ocean Policy recommendations for minimum standards.)

It would seem that those developing this trawl ITQ would either rather not wait for Congress to enact standards such as those proposed by the U.S. Commission on Ocean Policy, or perhaps they just don't like those particular standards. Judging from the ITQ proponents' opposition to setting quota shares for limited durations, or even allowing participants in a fishery to vote in a referendum as to whether an ITQ system should be established, to name two standards, I the latter is likely the case.

The authors of the NOI also engage in an unfortunate misappropriation of the Bycatch Program EIS and the Pacific Council's choice of a preferred alternative. The Bycatch EIS is an important document designed to help guide the Pacific Council's program for bycatch monitoring and reduction over the next few years. The Pacific Council's preferred alternative moves toward sector-based bycatch caps, while making explicate the status quo efforts to quantify and minimize bycatch. Support for potential "future IFQ programs in appropriate sectors of the fishery" was mentioned, but not explained. The Pacific Council specifically *did not* choose an alternative in the Bycatch EIS that would have centered around "rights-based" management, even though this option was presented to the Council as an alternative. To use the Bycatch EIS in any way to form a programmatic nest for a trawl ITQ is worse than a stretch, it would be utterly misleading and disingenuous.

This is not to say that IFQ systems could not have a beneficial impact on bycatch reduction. Apparently most have not, though, and many IFQ systems have exasperated bycatch problems. Since the NOI highlights bycatch and the constraints imposed by encounters with overfished species

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as major problems in the West Coast groundfish fishery, it will be interesting to see how the offered public scoping document proposes to reduce bycatch over the status quo, if in fact this is attempted. If peer-reviewed science is offered that is contrary to much of the current literature, this could be useful within the scientific review process discussed earlier, in the context of a comprehensive programmatic EIS, including consideration by the SSC.

In any event, the Bycatch Program EIS needs to lead in short order to a Fishery Management Plan Amendment that fully addresses bycatch monitoring and reduction, in a legally-compliant fashion. A hypothetical trawl ITQ years in the future is not going to fulfill this requirement, any more than the Bycatch EIS lays the foundation for a trawl ITQ.

Again, it comes back to a reasonable mandate: the Pacific Council and NOAA Fisheries should fully engage in developing a comprehensive programmatic EIS, linking disparate efforts in a thoughtful, measured way, and fully engaging the public. This step could go a long way toward improving a management system that has too often been crisis-driven.

The process leading to the public scoping document has been severely flawed, inherently tainting the material offered to the Council.

When the Pacific Council's Trawl Individual Quota Committee (TIQC)) met in March 2004, the TIQC continued to develop recommendations for *how* a trawl ITQ would function, working to create a public scoping document to "focus" public comment during scoping for an EIS that would support development of a trawl ITQ system. The committee report to the April Council meeting states: "Public scoping sessions are not a required part of the scoping process, however, because of the controversial nature of individual quotas and the scoping effort that has already occurred through the Trawl IQ Committee meetings, such sessions may be warranted. An open process that 'invites broad participation by stakeholders' is one of the recommendations contained in the National Research Council report produced pursuant to the Sustainable Fisheries Act."

PMCC continues to maintain that an open process is needed *before* considering moving forward with developing a specific IFQ program. Systematically attempting to narrow the scope of alternatives for the groundfish fishery by presuming that a trawl ITQ system (or even trawl "dedicated access privileges) is the public's preferred general direction is premature. Spending federal resources to support the TIQC's development of specific recommendations which may further prejudice public scoping (because recommendations have been agreed to by a Pacific Council-appointed committee, and now potentially approved by the members of the Pacific Council) raises eyebrows – especially when interested stakeholders from recreational, fixed gear, open access, and other potentially impacted fisheries have been deliberately excluded – along with conservation groups that support the agenda of the Marine Fish Conservation Network (a coalition of over 170 conservation groups, commercial and recreational fishing organizations, and marine science groups), that new IFQ programs should not be established until after Congress enacts national standards that protect fishermen, coastal communities, and the environment from the many potentially harmful effects of this type of management.

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The preliminary motion creating the TIQC, made by trawl fisherman and Pacific Council member Ralph Brown, specifically named eight trawl fishery and three processor representatives as the primary representation. Although the official motion was modified to describe representation rather than individuals, the same people ended up appointed (along with a tribal representative, a representative from enforcement, and, later, another processor). The named individuals also included a contractor with Environmental Defense (ED) as a "conservation" seat. It is well known that ED is very unusual in the conservation community as proponents of rights-based management; the staff of ED had been strongly advocating in support of IFQs, and the organization has since contributed money to support the Pacific Council's development of a trawl ITQ system.

Mr. Brown as well as several individuals who were appointed to this committee, which is primarily supported by public dollars, stand to see substantial financial benefit if a trawl ITQ is enacted, while other commercial and recreational fishermen excluded from the development process may lose market share, or even their businesses, depending on how the ITQ might be implemented. This situation argues strongly for legislation that would require council members to recuse themselves from votes which would have a direct financial implication upon their business. As it now stands, Mr. Brown did not violate any law by acting to support his personal financial self-interest.

But even conflict-of-interest reforms at the council level would not ameliorate the inherent flaws in setting up a committee designed to avoid dissenting opinions, other than the tensions of negotiating power between trawlers and processors. This is an insider, backrooms game that excludes adjacent commercial fisheries, the less-efficient trawl businesses, the entire recreational fishery, and the American public. There is no wonder that this process has inspired the widespread perception that what is going on here is a privatization of this country's ocean resources, a "theft of the commons."

For the Pacific Council to take the dramatic step of approving a scoping document for a trawl ITQ-EIS would be extraordinarily unwise, because this would quickly be interpreted as Council support for the basic idea that a trawl ITQ is desirable, and all that's left is to debate the precise structure and allocation of species. This would also be a rejection of the right of the public to have a voice in the future of West Coast groundfish.

Under objective criteria developed by the National Research Council, the West Coast groundfish trawl fishery is unlikely to be considered an appropriate fishery for implementation of an individual fishing quota system.

According to the National Research Council's Sharing the Fish: Toward a National Policy on Individual Fishing Quotas, *"IFQ programs will be more successful when the following conditions are met:*

1) *The total allowable catch can be specified with reasonable certainty.*
2) *The goals of economic efficiency and reducing the number of firms, vessels, and people in the fishery have a high priority.*
3) *Broad stakeholder support and participation is present.*
4) *The fishery is amenable to cost-effective monitoring and enforcement.*

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5) *Adequate data exist. Because of the long-term impacts and potential irreversibility of IFQ programs, it is important that sufficient date are available to assess and allow the mitigation of, insofar as possible, the potential social and economic impacts of IFQs on individuals and communities.*
6) *The likelihood for spillover of fishing activities into other fisheries is recognized and provision is made to minimize its negative effects.*

Certainly a situation exists (1) in groundfish where the allowable catch for each managed species or group of species is *specified* each year, although most of these species have not undergone a complete stock assessment. I think the intent here is to point out the difficulty inherent in setting up IFQs for populations of exceptionally variable biomass, such as Dungeness crab or pink shrimp. However, implementation of IFQs can also be problematic in multi-species fisheries that include depleted populations with a low biomass. The need to rebuild the populations of these species demands a higher priority than quota-holder access to their percentage of healthy stocks. Data reporting limitations in other fisheries (including recreational) that encounter the overfished species, and potential overages in these fisheries, can also contribute to considerable uncertainty regarding access to quota.

The capacity reduction feature of (2) seemed to have importance in the trawl fishery during advocacy for the buyback, even though the trawl industry and NOAA Fisheries preferred to leave a substantial number of latent and underused permits available for those who took the buyback money to re-enter the fishery or expand their businesses, or for processors to purchase in an attempt to replace lost delivery capacity.

So, I'm not sure that capacity reduction is really a high value. The buyback reduced some capacity, and a large number of skippers and deckhands were put out of work, and the business plans of some processing plants were challenged. Whether additional consolidation, efficiency, and unemployment are desirable would depend upon one's point of view. Less than optimally efficient businesses that support coastal families can provide a substantial benefit to our communities, and IFQ systems have been observed to destroy such businesses from British Columbia to Iceland.

As far as (3) goes, we don't really know whether there might be "broad stakeholder support and participation," because the Ad Hoc Trawl Individual Quota committee was set up specifically to limit participation. In addition, the public has been resoundingly excluded by the continuing resistance to a comprehensive programmatic EIS process. Additionally, in September 2003, the Pacific Council heard testimony *against* inclusion of a referendum where participants in the fishery might vote on whether they wanted to develop and implement IFQs. On all accounts the Pacific trawl ITQ process fails this condition; this is clearly an insider play by those who would gain the most.

To suggest that airing these issues within the council process accommodates sufficient public involvement is inaccurate. Even the voting body of the Pacific Council itself does not include a fair and balanced cross-section of all sectors of the fishery and the public interest. This is not the fault of the Council, but rather a subject requiring national reforms. But the point is that the Pacific Council is an inadequate forum to ensure broad public participation.

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On the other hand, there are many stakeholders who participate in the Council process - and discuss issues among themselves – who would be limited in their involvement in this scoping process, as the comment period, after an adopted scoping document is provided, does not include a Council meeting.

Number (4) is interesting, considering the long-time resistance of many in the trawl fleet to at-sea observers. Will industry now be willing to pay for 100% observer coverage, even with catch levels constrained by encounters with overfished species? Or will the public be expected to foot the bill, even as public resources are "gifted" to the private sector? Meanwhile, enforcement personnel are already strained with current tasks, as well as with national security.

We have huge problems with (5) because of lack of data in the biological, economic, and social realms. As mentioned earlier, most of the managed groundfish populations have not been fully assessed – there are not enough data available to assess many of them. The status of non-managed marine life is, in many cases, even more difficult to evaluate. As we move toward a more ecosystem-based management approach, the concept of operating a system of single species-based IFQs seems incompatible, if not outright bizarre. It gets worse if we consider the adaptive management consequences of in-season adjustments which attempt to ensure that total catch by species in the groundfish fishery as a whole stays within allowable levels, particularly those involving overfished species or bycatch species on a reduction plan; the IFQ setup might actually create a race-for-fish, driven by the fear that the accelerated mortality of constraining species might shut the fishery.

The social and economic impacts of (5) are also challenging. Useful new tools, such as the Groundfish Fleet Restructuring Information and Analysis (GFR) project, undertaken as a proof-of-concept by Ecotrust and PMCC, demonstrate that there are the means to look at the likely effects of IFQ-driven consolidation, unemployment, loss of infrastructure, reduction in diversity, concentration of fishing effort, deleterious impacts to the recreational fleet, and the adverse consequences suffered by communities. This argues for careful evaluation of these types of effects, their possible mitigation, and any offsetting benefits of IFQ programs, within the larger context of a comprehensive programmatic EIS.

This is a complex subject that needs to be informed by both biological and social scientists. The information to be provided by the analytical team is a start, but it would be prudent to have a substantial amount of data, which *could* be made available, provided to the SSC, the Pacific Council, and the public, *before* a decision is made to proceed with a trawl ITQ-EIS. The situation here involves approving a scoping document to go forward with this EIS without scientific foundation, based instead on self-interest and politics. This would, of course, bolster the case often made by critics of the council process, that scientific decisions – biological, sociological, and economic – should be insulated from the political realm, leaving only advice on allocation matters to the regional fishery management councils.

Finally, there should be no problem in recognizing the spillover probabilities (6) of a trawl ITQ, both due to increased capitalization and more flexible business planning. The Dungeness crab fishery in

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Oregon, for example, saw a tremendous influx of pots this year, in part due to the capital infusion from the groundfish buyback. Many of the same individuals who took the profits of the buyback and expanded operations in other fisheries stand to also gain financial advantage through ITQs, and would likely continue expansion. We could run some sociological and economic analysis and make reasonable projections of expected behavior – and we should – *before* we decide whether to commit to the development of a trawl ITQ-EIS.

These are just a few criteria for evaluating whether a fishery might be a candidate for IFQ management, as posed by the National Research Council. There are a number of other biological, social and economic factors that can be examined in evaluating whether a fishery is appropriate for IFQs. NOAA Fisheries has begun some of this work by looking at IFQs in multi-species fisheries internationally. A draft of these findings was made available to the TIQC, but apparently went no farther within the council system. It is only reasonable to expect the fisheries service to present these findings as completely as possible, along with the other material discussed earlier, through a comprehensive programmatic EIS, with vetting before the SSC, before encouraging the Pacific Council to move blindly on a path from which return would be difficult at best.

The Pacific Council deserves full information and adequate opportunity for deliberation, rather than a rush for approval of a scoping document. Certainly at the present it appears that the West Coast groundfish trawl fishery is not an appropriate candidate for IFQ management.

The way in which exploration of possible use of individual fishing quota systems in the Pacific Region has transformed into a headlong rush to implement a trawl ITQ, demonstrates clearly the vital need for Congress to enact strong national standards to protect marine ecosystems, commercial and recreational fishermen, our coastal communities, and the public trust from potentially substantial deleterious impacts of individual fishing quota systems. If Congress cannot act swiftly to pass standards legislation, such as HR 2621, then a moratorium on new IFQ systems should be established until national standards are adopted.

PMCC supports the national agenda of the Marine Fish Conservation Network (MFCN) regarding IFQs, including the following:

The Magnuson-Stevens Act should be amended to:

- *Acknowledge that marine fish are publicly owned and that IFQs are not property rights;*
- *Ensure that IFQ programs enhance fish conservation;*
- *Protect fishing communities from excess consolidation;*
- *Limit IFQs to no more than five years, after which they may be renewed if conservation is enhanced; and*
- *Recover all administrative costs*

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The PMCC board of directors adds these additional requisite standards:

- *Any IFQ must have a community component that results in appropriate harvest in the full fishing ranges of traditional coastal communities.*

- *Any IFQ allocation should provide incentives for use of gear which has the least bycatch and the least adverse impacts on habitat.*

- *No provisions that allow for the transfer of bycatch quota (including non-target marine life and overfished or Endangered Species Act-listed species) will be allowed.*

More details about the need for national standards, and about the impacts of IFQ systems worldwide, can be found at .

The U.S. Commission on Ocean Policy also understands the compelling need to establish national standards, if dedicated access privilege systems are to be considered. The Commission recommended on page 235 of their Preliminary Report:

At a minimum, the national guidelines should require dedicated access programs to:

- *specify the biological, social, and economic goals of the plan; recipient groups designated for the initial quota shares; and data collection protocols.*

- *provide for periodic reviews of the plan to determine progress in meeting goals.*

- *assign quota shares for a limited period of time to reduce confusion concerning public ownership of living marine resources.*

- *allow managers flexibility to manage fisheries adaptively, and provide stability to fishermen for investment decisions.*
- *mandate fees for exclusive access based on a percentage of quota shares held. These user fees should be used to support ecosystem-based management. Fee waivers, reductions or phase-in schedules should be allowed until a fishery is declared recovered or fishermen's profits increase.*

- *include measures, such as community-based quota shares or quota share ownership caps, to lessen the potential harm to fishing communities during the transition to dedicated access privileges.*

- *hold a referendum among all permitted commercial fishermen after adequate public discussion and close consultation with all affected stakeholders, to ensure acceptance of a dedicated access plan prior to final Regional Fishery Management Council approval.*

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Conclusions:

It is clear from the information presented in this letter that it would be decidedly inappropriate to approve a public scoping document for trawl dedicated access privileges at this time, or in any way to encourage NOAA Fisheries to develop an EIS solely for a trawl ITQ system. Nor should Pacific Council staff time continue to be diverted to this effort.

The appropriate, valuable, and legally-required course of action is for the Pacific Council and NOAA Fisheries to forthrightly begin scoping for, and development of a comprehensive programmatic EIS for the commercial and recreational groundfish fishery. This is the proper vehicle to fully assess the efficacy and impacts of the Rockfish Conservation Areas; decipher the actual impacts of the buyback program; create linkages between rebuilding overfished populations, assessing and reducing bycatch, and protecting essential fish habitat; investigate how to better implement ecosystem-based management; and…evaluate whether types of dedicated access privileges might be appropriate tools for some sectors of this fishery.

Seeking the best work in the biological and social sciences, including worldwide experiences with forms of dedicated access privileges, to incorporate into the analysis within a comprehensive programmatic EIS is a wise way to proceed. After this science is reviewed by the SSC, and general policy alternatives are selected for the future directions of the West Coast groundfish fishery, only then might it be appropriate to begin development of an EIS to support dedicated access privileges in a particular sector.

Respectfully,

Peter Huhtala
Senior Policy Director

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Pacific Marine Conservation Council

July 29, 2004

Donald O McIsaac, Ph.D.
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220

Re: Trawl IFQ-EIS scoping comments

Dear Dr. McIsaac,

These comments are intended to supplement oral testimony that Pacific Marine Conservation Council (PMCC) has made at scoping hearings for this environmental impact statement (Trawl IFQ-EIS) at Foster City, Seattle and Newport. Specifically, I'll take this opportunity to elaborate on PMCC's recommendation for the council and NOAA Fisheries to analyze an additional alternative, should a decision be made to proceed with this EIS.

To be clear, PMCC remains resolved that we believe that time and resources are being inappropriately diverted to designing a trawl dedicated access privilege system while a comprehensive programmatic EIS for the groundfish fishery management plan (FMP) is overdue. In addition, we believe that focus and resolve needs to be committed to completing the Bycatch Program EIS, its associated FMP amendment, and implementing regulations that make for effective monitoring and reduction of bycatch. There remains, nonetheless, the current Notice of Intent (NOI) and scoping process, and if the council decides to continue down this path then an additional alternative should be considered.

The problem statement in the NOI highlights the bycatch problems in the groundfish fishery, particularly the unintended encounters with overfished species. This statement summarizes some of these concerns as "uncertainties about the appropriate bycatch estimation factors, few incentives for the individual to reduce bycatch rates, and an associated loss of economic opportunity related to the harvest of target species." PMCC agrees that these are significant problems that should be addressed as quickly as possible.

The NOI makes reference to the council's preferred alternative for the draft Bycatch Program EIS. I'm attaching for the record your letter of April 27, 2004, to Regional Administrator Robert Lohn, describing this alternative. This alternative has many elements in common with the "Draft Proposal for Counting and Minimizing Bycatch in the West Coast Groundfish Fishery" submitted by PMCC and other groups for analysis within the Bycatch Program EIS process. I'm also attaching this document. I will draw upon ideas expressed in these two documents in describing a new alternative for the Trawl IFQ-EIS.

This alternative is based on sector caps on the total catch of each overfished species. While this concept is discussed in the scoping document (2.0 Alternatives and Impacts) under "Cumulative Catch Limits" and "ICAs (Pooled Species Caps)," it would be useful to include some additional flexibility with these tools.

We would like to accommodate an approach that begins with sector-based catch caps (in this case the limited entry trawl sector, although there might be ways to further subdivide this sector to, say, delineate the whiting fleet). All vessels within the sector would be required to stop fishing once the cap for any species was attained. Adequate, but not necessarily 100% monitoring would be required. This is not a huge departure from status quo, although the allocation to the trawl sector of catch of the overfished species would be explicit, at least for the time period involved.

Permit holders would have the opportunity to opt out of their sector for the fishing season. If they make this choice, they take with them a proportionate share of the catch caps on each overfished species, which now become individual catch caps. The vessels that have opted out of the sector must carry an observer or a compliance monitor (if operating in a full-retention arrangement) or otherwise assure 100% accounting of catch. Incentives for opting out of the sector will be provided to offset the cost of monitoring, such as higher cumulative landing limits for non-overfished species. The other implicit incentive is that vessels that have opted out of a sector would get to continue fishing if their sector was shut down, as long as they stayed within their individual caps.

Those have chosen to accept individual catch caps would additionally have the opportunity to pool their caps with others who have opted out of the sector. However, the entire group that has pooled their caps would have to stop fishing upon attainment of the aggregate catch cap of any species. PMCC does not advocate making the individual catch caps for overfished species transferable.

Additional performance standards and incentives could be built into this system, as suggested in the "Draft Proposal for Counting and Minimizing Bycatch in the West Coast Groundfish Fishery." We expect that some analysis of similar constructs for the groundfish fishery as a whole will be included in the final Bycatch Program EIS, as the authors complete work to incorporate public comments and the council's preferred alternative.

Turning to Table 2.1-1 in the scoping document, this alternative could be described as "Alternative 5" and simply include this hybrid of ICAs and Cumulative Catch Limits as the means to manage the overfished species within the trawl fleet. All other species would be subject to status quo management. (I should acknowledge that, although this proposal is pretty specific it might be wise look more generically at CL/ICA management for the overfished species, as the council could then request to see a range of options analyzed within this alternative.)

I'm not sure how this will fit in your scoping report, but I'd like there to be a mechanism for looking at longer cumulative landing limit periods under status quo management – perhaps 3, 4, or 6 months – and how that might play out with the new Alternative 5.

One important area to consider when looking at Alternative 5 is the timeline for possible implementation. Elements of this proposal could be implemented more swiftly than other dedicated access privilege systems under consideration, while not precluding consideration of additional solutions. The benefits of superior accounting of bycatch to reduce uncertainty about the total catch of overfished species, and instituting incentive systems to reduce bycatch can lead to increased economic opportunity even as conservation mandates are fulfilled. Even though we are asking that Alternative 5 be considered and compared with other dedicated access privilege systems within the Trawl IFQ-EIS, the council could choose to move in this proposal into regulation without going through the lengthy process expected under other options. We believe this could be in place by the beginning of 2007, if not sooner.

Appendix A of the scoping document includes a discussion on area restrictions (A.2.0). We suggest anticipating that some groundfish stocks that are managed on a coast-wide basis may be determined in future years to include genetically distinct populations, and that we don't have the biological basis now to determine these future geographical ranges. Therefore, it's important to consider how any dedicated access privilege system will respond to or discourage future changes in area-based management, both for such biological reasons or for enhancing economic equity. Alternative 5 could provide the flexibility needed for making adaptive management decisions, particularly in that the catch caps are set by season and are non-transferable.

Thank you for considering this alternative and the other suggestions PMCC has made during this scoping period.

Respectfully,

Peter Huhtala
Senior Policy Director

Draft Proposal for Counting and Minimizing Bycatch in the West Coast Groundfish Fishery

March 31, 2004

This proposal to count and minimize bycatch relies on enhanced bycatch observation in the groundfish fishery, the use of bycatch caps for sectors of the groundfish fishery, and the continued use of spatial management to reduce bycatch. The sectors referred to in this document match those currently used in the Council's "bycatch scorecard" and can be further subdivided by area. We propose that a statistically adequate reporting methodology to assess the amount and type of bycatch occurring in each fishery be established using the criteria contained in "Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs" (Powers Report) and "How Much Observer Coverage is Enough to Adequately Estimate Bycatch" (Pikitch report). Implementation will be phased in over time based on a ranking of need and feasibility consistent with these reports.

Proposed Alternative to Minimize Bycatch in the Groundfish Fishery

The proposed alternative is a modification of Alternative 4 in the Bycatch EIS. This proposed alternative would combine sector caps with continued use of spatial management to minimize bycatch. The groundfish fishery will initially be subdivided into the sectors defined by gear type (limited entry trawl, fixed gear, etc), as used in the bycatch scorecard (attached). These sectors may be further subdivided by the Cape Mendocino line (40-10) into North and South components and by the RCA, into fishing zones seaward and landward of the RCA. Vessel operators who want to fish both seaward and landward of the RCA must provide proof of past fishing in both of these areas using catch history for that vessel over the past three years. Upon further analysis, these sectors may be further subdivided into geographical areas to fit area-based management initiatives.

Caps on total mortality of each overfished species will be established for each sector, and a sector will be closed to fishing upon attainment of any of theses caps. Additional management measures will be employed to ensure that the total mortality of every managed species stays within its OY.

Boats from within a sector can opt out of the sector cap, thereby preserving the opportunity to continue fishing if their sector is shut down, by meeting some established criteria such as funding 100% observer coverage for one's vessel. Upon opting out, a commercial vessel would get individual bycatch caps and incentives such as higher trip limits from a reserved portion of target species OY. This cap would be deducted from that of the vessel's sector. Vessels that opt out of sector allocations can form collectives to pool bycatch quotas amongst collective members. The entire collective is prohibited from further fishing once a collective bycatch cap is met.

Furthermore, vessels are permitted to switch to another sector by changing gear type. Similar to those vessels that opt for individual bycatch caps, bycatch cap amounts will transfer with the vessel to the new sector.

The initial bycatch caps will be for those species identified on the bycatch scorecard (bocaccio, canary rockfish, etc.), and the most current bycatch scorecard will be used to apportion the OY of each species among the sectors. The Council will review bycatch rates for other managed species not contained on the bycatch scorecard. If bycatch rates for these species are higher than an established threshold, a bycatch cap will be set for those species, and gradually reduced over time. As OY levels increase for the capped species, the increase beyond what may be needed as a buffer will be allocated to operators with the lowest bycatch rates among those with individual caps, and through other means that provide incentives for bycatch reduction individually, by sector and within collectives.

For species without set OYs (for example, unassessed species), information will be collected through a standardized reporting methodology for bycatch. After a to-be-determined time period of data collection, a bycatch cap will be established for individual species or species groups if bycatch of any unmanaged species is found to increase or decrease by 10% or more relative to the previous year. After a set number of years (e.g. five) after establishment of a bycatch cap, bycatch would be reduced by some set percentage (10%, for example) per time period through reductions in the caps, while providing incentives for those most successful at avoiding bycatch. In the interim, bycatch of unassessed and other species will be minimized by use of the RCA and additional spatial management measures as needed (for example, on the slope).

Establishing a Standardized Reporting Methodology for Bycatch

A bycatch reporting methodology will be established consistent with the criteria in the Powers and Pikitch reports. Groundfish fishing sectors will be analyzed consistent with these reports within the following categories: status of current reporting methodologies and bycatch interaction (fish, endangered animals and marine mammals). The sectors will then be ranked within the two categories. After consultation with appropriate NMFS and PSMFC staff, decisions will be made as to which sectors should be considered priorities for an enhanced reporting methodology. A timeline will be developed for establishment of this reporting methodology for each sector.

Reference Documents:

Powers report: http://www.nmfs.noaa.gov/by_catch/EvalBycatch.pdf
Bycatch EIS: http://www.pcouncil.org/groundfish/gfbdpeis.html
Pikitch report: http://www.oceana.org/uploads/BabcockPikitchGray2003FinalReport.pdf

PACIFIC FISHERY MANAGEMENT COUNCIL

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April 27, 2004

Mr. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
Building 1, BIN C15700
7600 Sand Point Way NE
Seattle, WA 98115-0070

RE: The Pacific Coast Fishery Management Plan Bycatch Mitigation Draft Programmatic Environmental Impact Statement

Dear Mr. Lohn:

At its April 5-9, 2004, meeting in Sacramento, California, the Pacific Fishery Management Council (Council) reviewed the Pacific Coast Fishery Management Plan (FMP) Bycatch Mitigation Draft Programmatic Environmental Impact Statement (DPEIS) released on February 20, 2004, and identified its preferred alternative for NMFS to incorporate into the EIS. This would be identified as Alternative 7 in the Final Programmatic EIS (FPEIS) and would contain elements of several alternatives described in the DPEIS. The Council approved the following motion describing the recommended preferred alternative:

> Create a new Alternative 7 that includes elements of Alternatives 1, 4, and 5. Elements from Alternative 1 that would be included in Alternative 7 would be all current programs for bycatch minimization and management, including but not limited to: setting optimum yield specifications, gear restrictions, area closures, variable trip and bag limits, season closures, establishing landings limits for target species based on co-occurrence ratios with overfished stocks, etc. The FMP would be amended to more fully describe our standardized reporting methodology program and to require the use of bycatch management measures indicated under Alternative1 for the protection of overfished and depleted groundfish stocks and to reduce bycatch and bycatch mortality to the extent practicable. These would be used until replaced by better tools as they are developed.
>
> Elements from Alternative 4 that would be included in Alternative 7 would be the development and adoption of sector-specific caps for overfished and depleted groundfish species where practicable. We anticipate phasing in sector bycatch caps that would include: monitoring standards, full retention programs, and individual vessel incentives for exemption from caps.

Elements of Alternative 5 that would be included in Alternative 7 would be the support of future use of Individual Fishing Quota programs for appropriate sectors of the fishery. The FMP would incorporate the Strategic Plan's goal of reducing overcapacity in all commercial fisheries.

Additionally, baseline accounting of bycatch by sector shall be established for the purpose of establishing future bycatch program goals.

Consistent with our recommendation, we ask the EIS project team to further describe Alternative 7 as necessary for the purpose of making it consonant with the descriptions of the other alternatives and to support sufficient analysis of its impacts on the human environment, but to not change matters of intent substance.

After this action is finalized, the Council will consider undertaking preparation of a new groundfish FMP amendment consistent with the findings in the FPEIS. We look forward to working with NMFS after the release of the FPEIS to implement the policies and program direction described by the preferred alternative.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

KRD:rdd

Subject: Scoping Comments - I.D. 051004B
From: "Peter Huhtala" <peter@pmcc.org>
Date: Mon, 2 Aug 2004 14:21:28 -0700
To: <TrawlAccessEIS.nwr@noaa.gov>
CC: <Jim.Seger@noaa.gov>, <steve.freese@noaa.gov>

Comments on Notice of Intent to Prepare an Environmental Impact Statement, ID # 051004B

August 2, 2004

Pacific Marine Conservation Council (PMCC) offers a few additional comments.

Sunsets: In the scoping document under A.11.0, the TIQC rejects the inclusion of automatic sunsets. We recommend analyzing a range of sunset provisions from one to ten years. In addition, the concept of conducting a review of the performance of an IFQ system prior to the sunset date should be examined (For example, setting a review at five years and a sunset at seven years, so that continuation or expiration of the IFQ system could be anticipated as a result of the review.)

Short-term sunsets, say two years, might make for flexibility, especially in a system focused exclusively on the overfished species.

Sunsets put teeth in performance standards designed to ensure that IFQ programs achieve the goal for which they are designed. We recommend that any program be required to achieve measurable conservation gains, such as reduction of bycatch or significant habitat protection, or they not be allowed to continue. This helps to return some value to the public, the owner of the resource, for granting a valuable privilege.

Setting the duration of quota shares for a fixed period not only can clarify any confusion about property rights, as recommended by the US Commission on Ocean Policy, but can obviate possible equity and biological problems. Short-term arrangements allow management to avoid long-term proportional allocations between gear groups. As overfished populations rebuild, the structure of the available resource will change, as will the basis for inter-sector allocations. Sunsets avoid a possible conundrum.

Referendums: A range of referendum scenarios should be offered, including a double referendum where two-thirds of those involved in the fishery would be allowed to vote first whether to develop an IFQ system, and finally whether to implement the system. Consideration should be given to allowing anyone earning more that three-quarters of their income (permit holders, skippers, deckhands) from groundfish harvest to participate in the referendum.

Spatial analysis: In order to project some of the biological and economic changes that various IFQ management systems may bring, it would be useful to describe the current situations spatially, and model some scenarios. First, we could look at catch by fishing block and landings by port in as fine a scale as possible. In addition, we could look at estimates of biomass by area (NMFS survey & ?).

Then we could look at how catch and landings might occur if all stocks were at MSY (a goal of the council). Again, we could draw on the historical data-set from the NMFS surveys. Another run might forecast the state of the ecosystem in, say, 2020 based on the rebuilding plans now in place.

These sort of projections might inform decisions about whether and how proportional allocation between sectors might be set. But this is not just an allocation issue; it speaks directly to the design of any dedicated access system, and, I believe will make obvious the need to limit share distribution to short periods.

One concern that we've raised about possible IFQ plans is that they might encourage localized depletions of some populations. This would be especially problematic if it turns out that a stock managed on a coastwide basis is actually genetically-distinct in certain areas. The spatial analysis described here could be used to consider whether any localized depletions due to fishing have already occurred.

Community quota: You've received requests to consider forms of community quota, CDQs and the like. This is certainly reasonable, as the GAO recently suggested that such arrangements might be one of the best means to mitigate the adverse impacts of IFQ systems. However, in a multi-state fishery certain constitutional problems might arise in relation to the Port Preference Clause. Would you please describe the range of legally possible solutions for community quota and/or requiring landings in a particular port. What does it take to get around the constitutional and inter-state commerce issues; what are the realistic possibilities in regard to community quota systems? Even if harvest quota is assigned to a community, could the community distribute the quota to fishermen and stipulate that they land their catch in the community?

Thank you for considering these comments, and our previous testimony and submissions.

Peter Huhtala
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Subject: public comment on federal register of 5/24/04 vol 69 no 100 pg 29482
From: Bk1492@aol.com
Date: Wed, 26 May 2004 18:42:51 EDT
To: TrawlAccessEIS.nwr@noaa.gov, rodney.frelinghuysen@mail.house.gov
CC: steve.freese@noaa.gov, jim.seger@noaa.gov

us doc noaa 50 cfr part 660 id 051004B - pacific fish

how is the public protected from fishermen who will keep lying to the council and pressuring as long as you let them to take out every fish in the ocean for their own financial profit? Meanwhile, they'll be making illegal catch all they want.

The general public says that in the face of pressure by fish profiteers the council has to stand up for the interests of the general public. Turn away special segments who beg for the whole pie, when the whole pie belongs to the whole american public. That is the job of the council. Tell that to the fishermen.

I do not want a large quota in a short season, because then the fish profiteers will go to another area and overfish in that area, which is not a good idea. Let's reduce the number of fishermen - that is a good beginning.

cut quotas 50% this year and by l0% every year thereafter. Establish marine sanctuaries.

comment on page 4 - I thoroughly oppose providing for capacity rationalization through market forces - that is completely inappropriate.

I do not think "community" quotas are a good idea. The fish are not a "community" resource - they belong to the entire american public. Letting comunity quotas be established would mean rich powerful would get the whole quota.

comment on page 5 - We have to set up limits for these financial profiteers so that there is fish left in the ocean. It is quite clear that fish profiteers will take every single fish in the ocean for their own profit, and forget about any obligations to the general american good.

comment on page 6 - the largest issue here is putting the commercial fish profiteers in their place, since compared with american population which needs protection of fish stocks, the profiteers will take everything for their own financial wealth.

As if fully set forth herein at length, I hereby make the Pew foundation report on overfishing part of this comment, as well as the well known Pew Foundation report on councils and how they have been commandeered by the commercial fish industry to stop protecting the general american public.

b. sachau
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florham park nj 07932

WEST COAST SEAFOOD PROCESSORS ASSOCIATION

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Serving the shore based seafood processing industry in California, Oregon and Washington

July 26, 2004

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PFMC

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220

Dear Dr. ~~McIsaac~~ Don:

The following comments are submitted on behalf of the West Coast Seafood Processors Association (WCSPA) in response to the notice of intent to prepare an environmental impact statement on dedicated access privileges published in the *Federal Register* on May 24, 2004. WCSPA members harvest, process, transport, and sell Pacific groundfish which would be included in a dedicated access program.

Before discussing alternatives and options to be considered in a dedicated access (DA) program, we want to express serious concern about the process chosen by the Pacific Fishery Management Council for developing a program. We believe that the issue of allocating harvest percentages among fisheries groups needs to take precedence over designing a system that might fail once allocations are made. The Council has already allocated the harvest of sablefish and Pacific whiting; some limited allocation has been made between limited entry and open access sectors; and a preliminary allocation system was established between sport and commercial harvest of lingcod and bocaccio rockfish. However, any single fishery sector could harvest enough of a single species (e.g., canary rockfish) to close down every fishery on the west coast.

It is impractical, verging on impossible, to adequately analyze the social and economic effects of a DA program when there is no way to predict on an annual basis whether any fishing will be allowed (see canary rockfish example, above). Before providing resources to analyzing and developing a program that might not be implemented, the Council needs to take the necessary step of establishing firm inter-sector allocations.

Once the necessary inter-sector allocations have been established, the Council should consider the following alternatives:

Species considered. We believe that all species of Pacific groundfish covered under the Pacific Groundfish Fishery Management Plan and legally available for harvest by limited entry trawl vessels should be included in any DA program. As a sub-option, we believe that separate DA programs should be developed, one for all Pacific groundfish *except* Pacific whiting and one for Pacific whiting.

The limited entry trawl groundfish fishery is a mixed stock fishery which remains economically viable because fishermen have a variety of fishing strategies to pursue. Providing DA privileges to some, but not all, of the species harvested will negate the economic benefits of a DA program, as well as reducing any positive impacts of bycatch reduction.

The sub-option of separating most Pacific groundfish from Pacific whiting recognizes that the whiting fishery is subject to a separate international treaty, has already been the subject of allocation between harvesting sectors, and is conducted under specific seasonal and gear restrictions; in effect, it is a separate fishery.

Initial allocation of privileges: The Council should consider three groups for initial allocation of privileges - owners of limited entry trawl permits; processing companies that purchased limited entry trawl-caught groundfish, with a sub-option of processing facilities, rather than companies; and communities where at least 1% of the annual landings of limited entry trawl-caught groundfish were made. By looking at these three groups of entities, the Council can analyze the effects on the listed objectives.

Means of allocation: The Council should consider at least two alternatives - allocating directly to recipients through a regulatory process, and distributing privileges via an auction system Including an auction system achieves the stated goal of rationalizing capacity through market forces.

Caps on ownership: At a minimum, the Council should consider having no caps on quota ownership in order to allow maximum economic flexibility. The Council should also consider having different caps for different privilege holders. For example, if the initial allocation is made to harvesters, processors, and communities, as suggested above, a single cap (i.e., limit on total privileges that can be owned in order to avoid excessive quota concentration) might not fit each of the groups. The same might be true if Pacific whiting is considered separately from other Pacific groundfish, especially if the existing allocation within the whiting fishery is maintained.

Enforcement concerns: The Council should analyze an option that limits the number of ports where trawl-caught groundfish may be landed. This is analogous to a similar provision that is included in the Alaska halibut/sablefish individual quota program Enforcement of a complex system involving over 80 species of fish and 100+ vessels can be facilitated if the vessels are confined to certain specific landing areas.

Thank you for allowing us the opportunity to comment. We believe that including these alternatives in the environmental impact statement will lead to a more useful and defensible document.

Sincerely,

Rod Moore
Executive Director

From <javascript:parent.toggle()>"Barbara & Tom Stickel"
<b.stickel@charter.net>
Date Friday, July 30, 2004 1:03 pm
To <TrawlAccessEIS.nwr@noaa.gov>
Cc "Craig Barbre" <preamble@earthlink.net>, "Barbara Emley"
<Barbara.Larry@worldnet.att.net>, "Zeke Grader" <Fish4IFR@aol.com>,
"Chuck Wise" <CLJuliet@mail.ap.net>
Subject Scoping Comments

On behalf of directors and members of the Morro Bay Commercial Fishermen's Organization and the Crab Boat Owners' Association of San Francisco, I've been asked to submit the following comments:

1. The manner of noticing and the timing of the scoping sessions did not give open access fishermen participating in the salmon troll fisheries adequate opportunity to consider these issues and comment.

2. At this time, we prefer Status Quo Management to any of the proposed changes in access. (We believe the current groundfish observer system should go a long way toward clarifying "uncertain" bycatch rates.)

3. We oppose any type of IFQ systems.

Barbara Stickel
F/V Regina

on behalf of:

Thomas J. Stickel, Director
Morro Bay Commercial Fishermen's Organization

Craig Barbre, Director
Morro Bay Commercial Fishermen's Organization

Larry Collins, Vice President and Director
Crab Boat Owners Association of San Francisco

"Be who you are and say what you feel, because those who mind don't matter and those who matter don't mind." Dr. Seuss (1904-91)

From <javascript:parent.toggle()>"Bob Strickland"
<bobstrickland@unitedanglers.org>
Date Monday, August 2, 2004 2:42 pm
To <TrawlAccessEIS.nwr@noaa.gov>
Subject RE: Trawl IFQ EIS Scoping Comments; ID #: 051004B

August 2, 2004

Via E-Mail

Dr. Donald McIsaac
Pacific Fishery Management Council
7700 NE Ambassador Pl., Suite 200
Portland, OR, 97220
E-Mail: TrawlAccessEIS.nwr@noaa.gov
Fax: (503) 820?2299

RE: Trawl IFQ EIS Scoping Comments; ID #: 051004B

Dear Dr. McIsaac:

United Anglers of California has several concerns regarding the proposed individual fishing quota program:

The recreational sector has been excluded from the process of designing the program thus far. The recreational sector has made repeated requests to be included but these have been rejected.

We do not know how the allocation between the commercial and recreational sectors is going to be set. Instead of developing an inter-sector allocation first, the Council is choosing to develop the program first and then do the inter-sector allocation. This prevents us from having a realistic understanding of where we stand in relationship to an IFQ program. Since the proposal does not contain a sunset provision (where the program would be reviewed after a certain number of years), we have to assume that this program would lock in for life an allocation between the commercial and recreational sectors. If this is the case, then the inter-sector allocation needs to be done first, so we can assess the proposal with the knowledge of how we will be affected and how marine resources will be affected by that level of trawling.

The recreational sector is very concerned about the impacts of bottom trawling. This proposal will lock in bottom trawling as a gear for fishing in perpetuity. We need to think very carefully about doing this: the economic implications as well as the biological implications.

Lastly, UAC is concerned that, contrary to the advice of Congress, development of this program is proceeding without the benefit of national standards. UAC fully supports the standards proposed in H.R. 2621, the Fishing Quota Standards Act and urges the Pacific Council to wait until such standards are enacted before developing the trawl IFQ program.

Sincerely,

Bob Strickland, President
United Anglers of California

From <javascript:parent.toggle()>"Bob Osborn" <bob@pacificangler.com>
Date Monday, August 2, 2004 4:20 pm
To <TrawlAccessEIS.nwr@noaa.gov>
Subject Scoping Comments for Dedicated Access Privileges for LE Trawl

UNITED ANGLERS OF SOUTHERN CALIFORNIA
5948 Warner Ave
Huntington Beach, CA
(714) 840-0227

August 2, 2004

Dr. Don McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place
Portland, OR 97220

RE: Scoping Comments for Dedicated Access Privileges (Including Individual Fishing Quotas) for the West Coast Limited Entry Trawl Groundfish Fishery

Dear Dr. McIsaac:

United Anglers of Southern California is the state?s largest association of recreational anglers. We represent approximately 50,000 affiliated sportfishermen throughout California dedicated to ensuring quality fishing today and tomorrow. We are deeply concerned about the impacts that dedicated access privileges for the trawl fishery will exact on sustainable fisheries.

UASC believes it is essential to only design dedicated access privilege programs for fisheries when fishery problems are well understood and all commercial sectors of the fishery are included. We recommend that the council complete a complete programmatic EIS for the groundfish fishery including bycatch and essential fish habitat prior to considering dedicated access privilege programs. It has been clear from public testimony that the purpose of a dedicated access program is to provide an economic shot in the arm to the trawl fishery. UASC is not opposed to management measures that provide economic benefits for fishermen; however, such measures need to be carefully considered in light of the known caveats regarding dedicated access privileges and their effects on other sectors and other fisheries. Providing extraordinary economic stability for only one sector increases the likelihood of economic instability for other sectors.

UASC believes a great risk exists in building economic value and economic certainty in a fishery for long term or indefinite term periods when that fishery uses heavy mobile equipment to scrape the seafloor. Such decisions should not be lightly considered and should not be considered until such time that the impacts of this gear on the benthic habitats that support all our fisheries are well understood. .

UASC believes that any dedicated access program needs to provide for transferability of quota within the full range of approved gears and future gears established through experimental programs. Only in this way can the council ensure our resources are being utilized at their highest and best use.

UASC believes that the hard allocation of quota for an indefinite period of time is unfair for open access fisheries. The rights of public to catch a reasonable number of fish for their own use should not be abridged. Any dedicated access program considered should at a minimum provide within the program a mechanism at no cost to the public to reclaim adequate quota over a reasonable period of time for the purpose of ensuring the public?s direct access to fish. National Standard 8 states: ?Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.? It quite simply is unfair to design a hard allocation system that places all the economic burdens of increasing demand for fish on participants in the open access sectors while granting the equivalent of assured property rights to a percentage of the resource to a privileged class of individuals.

UASC believes that any time long-term economic benefits are granted to a sector, these benefits are a cost to the public sector in that there will be some probability that there will be a cost to the public to retrieve or cancel those benefits. Therefore, any such program should have reasonable expectations of providing conservation and habitat benefits for the resources over the course of the program. Those expectations should be modeled and mechanisms installed to adjust the program to ensure that conservation and habitat goals are being achieved. National Standard 5 states: ?Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.?

UASC believes that the expectation of conservation benefits from a dedicated access program is closely coupled to the expectation that the dedicated access fishery will use the economic certainty arising from the program to commit capital to conservation. Careful financial analysis should be conducted prior to the implementation of a dedicated access program to determine the likelihood of a reasonable investor investing additional capital in the futures of slow growing and low productivity resources such as is found in our groundfish fisheries.

Consideration should be given to a program that sunsets the dedicated access program or as part of the program withdraws quota on a regular periodic basis and disposes of that quota in a way to satisfy the needs of the public trust.

UASC believes that consideration within the dedicated access program needs to be given to unexpected events such as disaster tows and in the case of open access fisheries, increases in participation that exhausts allocated quota and how those events will require adjustments to allocations both within and outside of the dedicated access fishery so as to treat all individual fishermen fairly. National Standard 6 states: Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

UASC believes that dedicated access fisheries should not be considered until standards have been established. As one member of the current Groundfish Trawl Individual Quota Committee said: ?This is an opportunity to set those standards?. We agree, however, note that all sectors need representation on any committee establishing standards for dedicated access programs that have the potential of affecting them. National Standard 4 states: ?Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.? UASC notes that this standard specifically includes more than allocation and encompasses the assignment of fishing privileges.

Thank you for the opportunity to comment on the initial scoping documents.

Sincerely,

Bob Osborn, Fishery Consultant
For Tom Raftican
President, United Anglers of Southern California

Cc: Dr. William Hogarth, Assistant Administrator for Fisheries, NMFS

ERRATA TO SUPPLEMENTAL ATTACHMENT 2

Page 13, top of page. Options 1 and 4 should **not** be bolded.
Page 13, bottom of page. Element 2 should be bolded.
Page 15, bottom of page. Option 2 should **not** be bolded.
Page 19, top half of page. Elements 1 through 5 should be bolded.
Page 19, bottom of page. Options 1 and 2 should be bolded.

PFMC
06/14/05

AD HOC GROUNDFISH TRAWL INDIVIDUAL QUOTA COMMITTEE REPORT

The Ad Hoc Groundfish Trawl Individual Quota Committee (TIQC) is unanimous in its recommendation that the Council continue considering individual fishing quotas (IFQs) for the groundfish trawl fishery. The committee has met five times over the last year-and-a-half to conduct preliminary scoping of alternatives and review results of the public scoping under National Environmental Policy Act (NEPA), completed last summer. Additional work on this project includes the efforts of the Groundfish Trawl Individual Quota Enforcement Group (2 meetings), the Groundfish Trawl Individual Quota Independent Experts Panel (2 meetings) and the Groundfish Trawl Individual Quota Analytical Team (4 meetings). On May 11, 2005, the TIQC completed its deliberations for this phase of the process and recommends the Council approve five basic management regime alternatives for analysis in a draft environmental impact statement (EIS):

Alternative 1: Status Quo
Alternative 2: IFQs for Trawl Target and Species for Which There is a Trawl Allocation
Alternative 3: IFQs for All Groundfish Species Except "Other Fish"
Alternative 4: IFQs for All Groundfish Species Except "Other Fish" and Individual Bycatch Quota (IBQ) for Pacific Halibut (with sector caps for halibut as a suboption)
Alternative 5: Permit Stacking with Cumulative Catch Limits and an Extended Season

These alternatives are specified in detail in **TIQC Decision Table A** (attached), which the committee proposes the Council adopt to cover the actions requested under Decision Table A of Agenda Item C.5.a, Attachment 1.

For **Decision Table B** (Agenda Item C.5.a, Attachment 1), the committee recommends the Council plan to establish additional areas as needed, at a later time (Process Option 1). Provisions in the IFQ programs provide for the later subdivision of IFQ (Section B.1.8).

Decision Table C (Agenda Item C.5.a, Attachment 1) calls for the Council to consider specific design elements for the catch control tools: IFQ programs, cumulative catch limits, and permit stacking. In what follows, the committee recommends three different IFQ programs for analysis, elimination of the cumulative catch limit options that do not include permit stacking, and the adoption of one permit stacking option, that includes moving from cumulative landing limits (status quo) to cumulative catch limits.

For purpose of facilitating the analysis, the TIQC has developed three different IFQ programs. These programs are comprised of slates of options for various program design elements and are reflected in **Option Table C-1** (attached and identical to Option Table C-1 of Agenda Item C.5.a, Attachment 1). It is the committee's intent and understanding that the Council will be able to mix and match provisions of each program at the time of final action, so long as the effects of the resulting program fall within the scope of the analysis. To fill out the above list of management regime alternatives, the IFQ programs will need to be associated management regime alternatives. The committee recommends the following associations between the IFQ program and the management regime alternatives:

Alternative 2 (IFQ for Trawl Targets): Program C
Alternative 3 (IFQ for All Groundfish Except "Other Fish"):
Alternative 3A: Program A
Alternative 3B: Program B
Alternative 3C: Program C
Alternative 4 (IFQ for All Groundfish Except "Other Fish" and IBQ for Pacific Halibut): Program C

It is the committee's understanding that impacts related to differences in species coverage between Alternatives, 2, 3 and 4 are so great that they will likely swamp any differences in impacts related to differences between the programs (e.g. the differences between Alternative 2 Program C and Alternative 3B Program B will be driven more by differences in the species coverage than differences between the IFQ program design). Therefore, Alternative 3 has been divided into 3 subalternatives (3A, 3B, and 3C), associated with IFQ programs A, B and C, respectively. These subalternatives will be used when necessary to illustrate the effects of different IFQ program designs on management regime impacts.

The committee recommends that the Council drop the stand alone cumulative catch limit options provided in **Option Table C-2**. It is the committee's understanding that if cumulative catch limits with permit stacking are considered for Alternative 5 that the Council could still adopt cumulative catch limits without permit stacking. Therefore there is no need for a separate alternative that includes only cumulative catch limits.

The committee recommends that for management regime Alternative 5, the Council adopt Permit Stacking Alternative 2 (PS Alt 2 from **Option Table C-3** of Agenda Item C.5.a, Attachment 2) as follows

PS Alt 2. Stacking With Fractional Cumulative Limit for Additional Permits and Extended Period Lengths

- A vessel would receive partial credit for an additional cumulative limits for each stacked trawl endorsed permit. The percentage of an additional limit allowed could be a fixed amount or depend on permit length or history of recent participation.
- Length endorsement provisions: Only one permit would need to have the appropriate length for the vessel.
- Period Length: 4-month cumulative limit periods.
- No limit on the number of permits stacked.
- At-sea monitoring (observers or video cameras).
- Permit transfers are only effective at the end of a cumulative limit period.

The above recommendations, taken in combination, compose the following committee recommendation with respect to **Decision Table D** (Agenda Item C.5.a, Attachment 1):

TIQC Decision Table D - Main analytical alternatives for the EIS.							
			Alt 3: IFQ for Groundfish Except "Other Fish"				
Catch Control Tool Alternatives	**Alt 1** Status Quo	**Alt 2** IFQ for Targets Spp	**Alt 3**-A	**Alt 3**-B	**Alt 3**-C	**Alt 4** IFQ for Groundfish Except "Other Fish" and IBQ for Halibut	**Alt 5** Stacking , Cum Catch Limits, & Extend Periods
Cumulative Landing Limits	X	-	-	-	-	-	-
Season Closures	X	*	*	*	*	*	X
IFQ: Program A Program B Program C	-	Program C	Program A	Program B	Program C	Program C	-
Cumulative Catch Limits	-	X	(Low OYs)	(Low OY)	(Low OY)	-	X
Permit Stacking and Extended Cumulative Limit Periods (PS - Alt 2)	-	-	-	-	-	-	X

*There may be seasons for whiting to limit impacts on ESA listed salmon stocks, but season closures would not be the primary catch control tool.

Decision Table E (Agenda Item C.5.a, Attachment 1) covers allocation among trawl sectors. The committee recommends that the period eventually chosen for allocation of IFQ be used to allocate groundfish among the trawl sectors. If different periods are used to allocate to different trawl sectors, either use the shortest period common to the allocation of IFQ for all sectors or calculate a sector share of catch based on the IFQ period and adjust the shares proportionally such that they sum to 100%. If the Council adopts the committee's recommendations, the periods under consideration for IFQ allocation (and hence division of catch among the trawl sectors) would be: 1994-2003; 1998-2003; 1999-2004.

Two suboptions would be considered with respect to the above allocation rule. Under one suboption, a recency requirement would be applied and the catch history of permits not meeting the recency requirement would not be included as part of the calculation of the relative sector shares. Under the other suboption, no such recency requirement would be applied. Under either option, a permit formed from the combination of several permits would include the catch history of all of the combined permits.

If the shoreside fishery is segregated into a shoreside whiting and nonwhiting fishery, the following are the options for criteria to be applied to distinguish the two types of landings. A whiting landing would be any landing in which . . .

Option 1: more than 50% of the landing is whiting AND there is more than 10,000 pounds of whiting

Option 2: more than 50% of the landing is whiting OR there is more than 10,000 pounds of whiting

Option 3: more than 50% of the landing is whiting

The TIQC recommends Options 2 or 3, but has requested additional data.

TIQC Major Recommendations

In summary, the committee recommends the Council continue with considering IFQs for the groundfish trawl fishery and take the following actions with respect to each of the decision tables before the Council:

(TIQC Decision Tables A and D vary from the Attachment 1 tables in ways noted in Attachment 1. All other attached tables are the same as in Attachment ,1 except notes on TIQC recommendations have been added to the tables)

Decision Table A . . . . Adopt for analysis **TIQC Decision Table A**
Decision Table B . . . . Adopt Option 1 of **TIQCDecision Table B**
Decision Table C . . . . Adopt for analysis **TIQC Option Table C-1** for the IFQ Program
. . . . **TIQC Option Table C-2** (Eliminate all cumulative limit alternatives in this table)
. . . . Adopt for analysis Option PS-2 from **TIQC Option Table C-3**
Decision Table D . . . . . . Adopt for analysis alternatives in **TIQC Decision Table D (Above)**
Decision Table E . . . . Adopt for analysis options in **TIQC Decision Table E**

Other TIQC Recommendations on Options for Analysis

B.1.1 Eligible Groups and Group Shares

Eliminate detailed analysis of the option of allocating to vessel owners. The TIQC recommends against allocation to vessel owners rather than permit owners, because once the limited entry fishery was established most of the value of the fishery was capitalized into the value of the permit. Elimination from detailed analysis means the option will not be included in the option list but will be discussed to the extent necessary to explain why it was eliminated and as a possible point of contrast for options that are the primary focus.

B.1.3 Elements of the Allocation "Formula"

Eliminate detailed analysis of auctions as a means of allocating IFQ (minority supports maintaining the auction option).

B.2.3.3 Limits on Time of Transfer

A transfer embargo on quota shares was considered for situations in which a vessel had an overage (a landing not covered by quota pounds). However, because the quota shares from which a vessel's quota pounds were derived may be held by someone not directly associated with the vessel and difficult to trace, these options have been eliminated as not being reasonable.[1/] They were replaced with a limit on permit transfer (see Section B.2.1).

Supplement on the Community Stability Hold Back Program

1/ The TIQC has recommended elimination of the transfer embargo options.

Transfer Embargo Options	
Option 1	Quota shares may not be transferred from any account for which there is a deficit of quota pounds (i.e., any account for which catch exceed quota pounds for at least one species.
Option 2	Quota share pounds may be transferred from an account even if it is deficit for some species.

(Not Reviewed by Full TIQC)

The TIQC included a community stability hold back provision in Section B.2.2.5 of Program C (as can be found in Option Table C-1) with the understanding that more complete development of the provision would be provided by the proponents of the provision. The proponents of this provision have submitted the following contribution in order to more fully develop this provision. ***This submission has not been reviewed or endorsed by the full TIQC.***

The following is for discussion/analysis.

The intent of the community hold back is to economically benefit coastal communities. Market development and enhancement, flexibility/coordination with market forces, facilitation of new operations, and industry stabilization at the local level are all desired outcomes.

This program should be simple and straightforward – using a point system based on specific measurable criteria. Program models in Alaska, Canada and the Shetland Islands are more subjective and would not be a good fit for the West Coast because of wide ranging differences community to community and the profusion of lawsuits based on subjective decisions.

Purpose: Quantitative benefits for coastal communities.

Description: Community set aside quota awarded to fishermen and fishermen/processors or others who submit proposals to a review panel which will rank the proposals based on a point system designed to specifically bring additional fishery economic benefits to coastal communities. This quota is in addition to the initial quota allocation for any specific fisherman.

Quantitative criteria would be used as a simple and clear means of ranking proposals received for review. These criteria are specifically linked to trawl individual quota (TIQ) program Goal #1: *Increase regional and national net benefits including improvements in economic, social, environmental and fishery management objectives.*

These are further linked to specific TIQ Program Objectives:

- *#1. Provide for a viable, profitable and efficient groundfish fishery.*
- *#5. Increase stability for business planning.*
- *#6. Increase operational flexibility.*
- *#7. Minimize adverse effects from IFQs on fishing communities to the extent practical.*
- *#8. Promote measurable economic and employment benefits through the seafood catching, processing , distribution elements, and support sectors of the industry.*

Who Reviews Proposals and Awards Quota

By using a point system and quantitative criteria, National Marine Fisheries Service (NMFS) should be able to rank these proposals. Alternatively, a community committee could be formed with adequate community representation. Pacific States Marine Fisheries Commission in consultation with community and fishery representatives could also rank these proposals.

Who May Submit Proposals

1. Fisherman(men) and processor(s) who meet the qualifying criteria set forth under TIQ Program design alternative Section B.2.1 Qualifying Criteria. These would be joint proposals.
2. Fisherman(men) meeting the qualifying criteria set forth under B.2.1.
   a. Alone.
   b. In association with a coastal community member or coastal community organization (i.e., community economic development department; port district, etc.).
   c. In association with a person or organization from outside the community.

Criteria for Ranking Proposals:* (see notes)

Stabilization - (max 25 points) (Objectives 1, 5, 7)
Additional product flow into community
Maintain product flow into community
Additional traditional processing
Maintaining traditional processing

Innovation - (max 25 points) (Objectives 1, 5, 6)
New or additional niche marketing
New or additional value added products

Employment Opportunity - (max 25 points)* (Objectives 7, 8) (see notes)
Number of coastal community jobs created
Increase in jobs
Maintaining jobs, avoiding loss

Personal Quota Committed - (max 25 points) (Objectives 7, 8)
Amount of quota committed to community proposal

(Max 100 points total)

Additional Criteria for Subsequent Years and Applicants Who Re-Apply

Evaluation of Follow on Proposals - (max 10 points)
For existing projects, additional consideration will be provided for meeting or exceeding performance indicated in prior award.

(Max of 110 points possible when subsequent year criterion in effect)

Timing of Awards and Duration

Awards made in January of each year, held for two years. May reapply to continue.

Program Review

Program reviewed and adjustments made as part of the overall TIQ Program review.

*Notes:

Net benefits measured in dollars, where possible.

Jobs created measured not only in employment numbers. Additional factors include full time vs. part time, year around vs. seasonal, wage, duration, training, and other benefits.

Small communities compete equally with larger communities. Point ranking based on the merits of the individual community.

In total personal quota committed, the intention is to promote collaboration between parties to foster investments into community

Suggest 10% of initial quota allocation held back for Communities.

Program intent is to award quota among multiple applicants in any single proposal review process. For example, the top five qualifiers may share the quota setback amount, or minimum requirements can be established for proposal scores to receive a percentage of hold back quota. How much is enough for any individual project needs to be determined.

TIQC Decision Table A (Proposed Replacement): Accept or modify the following 5 management regimes (see bottom of table for Alt 5) (Page 1 of 4).				
		Species Groups and Management Tools		
	Alt 1 - Stat Quo	**Alt 2 - IFQs for Trawl Target Groundfish**	**Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]**	**Alt 4 - IFQs for All Groundfish Except "Other Fish" and IBQ for Halibut**
		NonWhiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)		
Primary Management Tools	-	Mange with IFQ for Target Species(Spp) and Species for Which There is a Trawl Allocation	Mange with IFQ for all groundfish except the "Other Fish" category of groundfish and except in situations in which the OY for the species is very low (see below).	Mange with IFQ for all groundfish except the "Other Fish" category of groundfish.
	Cumulative landing limits for nonwhiting species/species groups	Transferable cumulative catch limits for other groundfish species managed with cumulative landing limits under status quo[b/]		-
	Monitoring only for other species	Monitoring only for other species	Monitoring only for other species	-
Adjustments for Low Harvest Levels	The Council may suspend intersector allocations when a species is overfished	Same as status quo plus For IFQ species, management does not change with low OYs. If the OY for a nonIFQ species becomes extremely low (such as for a rebuilding species) manage with nontransferable cumulative catch limits.[c/d/e/] Low OY Threshold: Establish a threshold at which point a species would switch from incidental catch management to "Low OY management." (e.g., $B_{25\%}$)	Same as status quo plus Low OY Management If the OY for any species becomes extremely low, switch from IFQs for that species and instead manage the sector allocation as a pool using nontransferable cumulative catch limits.[f/e/] Decide on whether or not to use "Low OY management" as part of the bienniel specifications process.	Same as status quo
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only except IBQ for halibut (or sector cap)

TIQC Decision Table A (Proposed Replacement): Accept or modify the following 5 management regimes (see bottom of table for Alt 5) (Page 2 of 4).

	Species Groups and Management Tools			
	Alt 1 - Stat Quo	**Alt 2 - IFQs for Trawl Target Groundfish**	**Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]**	**Alt 4 - IFQs for All Groundfish Except "Other Fish" and IBQ for Halibut**
		Whiting Fishery Management Tools and Species (Sections 2.1.1.1 - 2.1.1.3)		
Primary Management Tools	No IFQ	IFQ for whiting	IFQ for whiting and all incidentally caught groundfish except the "Other Fish" category of groundfish	IFQ for whiting and all incidentally caught groundfish except the "Other Fish" category of groundfish
	Sector allocation with catch limited by season closure	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks	Possible continuation of seasons to control impacts on ESA listed salmon stocks
	Possible season constraints to protect overfished species.	Sector catch caps for other incidentally caught nonwhiting groundfish species for which allocations have been specified. No cumulative catch limits. Season closes when fleet catch cap is reached.	-	-
	Monitoring only for other species	Monitoring only for other species	Monitoring only for other species	Monitoring only for other species
Prohibited Species	Trawl prohibited species - monitoring only	Trawl prohibited species: monitoring only	Trawl prohibited species: monitoring only	IBQ for halibut (or sector cap)

TIQC Decision Table A (Proposed Replacement): Accept or modify the following 5 management regimes (see bottom of table for Alt 5) (Page 3 of 4).				
	Species Groups and Management Tools			
	Alt 1 - Stat Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish Except "Other Fish" and IBQ for Halibut
	Trawl Sectors and Intersector Transfers (Section 2.1.1.4)			
Sectors	Three Sectors • shoreside deliveries • mothership deliveries and • catcher-processor deliveries	Four Sectors: • shoreside whiting deliveries • shoreside nonwhiting deliveries • mothership deliveries and • catcher-processor deliveries (FROM 2.1.1.4 Option 3)	Three Sectors: • shoreside deliveries • mothership deliverie,s and • catcher-processor deliveries (FROM 2.1.1.4 Option 2)	One Sector (FROM 2.1.1.4 Option 1)
Intersector Transfer/ Trading	***Whiting***: Sector allocations fixed by formula with procedure for midseason transfer of unused allocation. ***Nonwhiting species***: There is no inseason transfer of catch opportunity between trawl sectors except through Council inseason management.	***Whiting*** Option 1: IFQ nontransferable between trawl sectors. Option 2: IFQ nontransferable between trawl sectors with procedure for midseason rollover of unused IFQ to another sector. ***Nonwhiting species***: Sector catch cap roll-over: Roll-over any unused incidental catch from one whiting sector to the next as the year progresses.[g/] Allow purchase of nonwhiting species IFQ from the nonwhiting sector. Such IFQ would be placed in the pool for vessels operating in the whiting sector.	***Whiting*** IFQ nontransferable between trawl sectors. ***Nonwhiting species***: Do not allow transfer of nonwhiting IFQ from one trawl sector to another.	No subdivision of whiting sectors (there may or may not be a subdivision for purposes of initial allocation)

TIQC Decision Table A (Proposed Replacement): Accept or modify the following 5 management regimes (see bottom of table for Alt 5) (Page 4 of 4).				
		Species Groups and Management Tools		
	Alt 1 - Stat Quo	Alt 2 - IFQs for Trawl Target Groundfish	Alt 3 - IFQs for All Groundfish Except "Other Fish"[a/]	Alt 4 - IFQs for All Groundfish Except "Other Fish" and IBQ for Halibut
		Groundfish Catch of Limited Entry Trawl Vessels Using Gears Other Than Groundfish Trawl (Section 2.1.1.5) (Options are Relevant for IFQ Catch Control Only)		
Trawl Vessel Exempted Gear Catch: Quota Accounting and Catch Control (Includes Exempted Trawl and Exempted Nontrawl Gears)	**Exempted gea**r catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits. *With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.	**Exempted gear** - IFQ is **not** required. Catch counts against the OA allocation and is managed as part of the OA fishery. Some catch will be allocated from the LE trawl to OA fishery. (FROM 2.1.1.5 Opt 2c)	**Exempted gear -** IFQ required. Catch counts against LE Trawl. Open access catch control regulations apply (FROM 2.1.1.5 Option 1A)	**Exempted gear -** IFQ required. Catch counts against LE Trawl. Open access trip limits **do not** apply (FROM 2.1.1.5 Option 1B)
Trawl Vessel Longline and Fish Pot Catch Without LE Endorsement (Fixed Gear Gear): Quota Accounting and Catch Control	**Longline and fishpot** catch by LE trawl vessels counts against LE allocation (trawl and fixed gear)* but is subject to open access trip limits. *With the exception of sablefish for which there is a separate LE trawl allocation against which such catch is counted.	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed gear catch control regulations apply. (FROM 2.1.1.5 Option 1A)	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed catch control regulations **do not** apply. (FROM 2.1.1.5 Option 1B)	**Longline and fishpot** - IFQ required. Catch counts against LE Trawl. LE fixed catch control regulations **do not** apply. (FROM 2.1.1.5 Option 1B)
Alternative 5: Nonwhiting Cumulative Catch Limits, Permit Stacking and Extended Periods - all other features of status quo remain in place.				

a/ "Other Fish" is a groundfish category that includes sharks, skates, rays, ratfish, morids, genadiers, kelp greenling, and Pacific cod.
b/ NonIFQ Species - Trawl share based on biennial Council decision.
Transferable cumulative catch limit between vessels within period (full or partial limit transfers, depending on length of limit period).
Any transfers between vessels are temporary.
c/ Eliminate the transferability of cumulative catch limits and implement season closure for the affected species on reaching the fleet limit for that species.
d/ Retention allowances within the catch limits may vary based on annual management measure decisions.
e/ Other measures to keep bycatch rates low may stay in place (e.g., RCAs).
f/ Implement season closure for the affected species on reaching the fleet limit for that species.
g/ There would not be a rollover from the nonwhiting to whiting sector.

TIQC Decision Table B: Decide on a process for addressing regional management area issues .

Process Option 1	Plan to establish additional regional management areas as needed at a later time. *(TIQC recommendation: Area restrictions should be based solely on the need to address stock conservation concerns.)*
Process Option 2	**Task a group to immediately** begin considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future. THE TIQC DID NOT RECOMMEND THIS OPTION
Process Option 3	**If an IFQ Program is adopted, task a group** with considering the need for additional regional management areas (biological or socio-economic) and potential boundaries along with a process for identifying and responding to regional management area issues that may develop or become more apparent in the future. THE TIQC DID NOT RECOMMEND THIS OPTION

TIQC Decision Table C - Adopt catch control tool design element alternatives for analysis (Section 2.1.2)

Status Quo - Cumulative Landing Limits and Season Closures (Section 2.1.2.1)

No decisions needed

Trawl Individual Quotas (Section 2.1.2.2) -
Table of options provided starting on page 11 of this document
(Options Table C-1).

A narrative of the IFQ program design elements is provided starting on page 2 of Attachment 2, and is followed by a complete list of options, elements,[a/] **and pubic comment.**

The Council should:

adopt trawl IFQ programs to be included for full analysis in the EIS (Option Table C-1) and
make adjustments to the programs, as it deems appropriate.

THE TIQC RECOMMENDS OPTION TABLE C-1 BE ADOPTED FOR ANALYSIS.

Cumulative Catch Limits (Section 2.1.2.3) -
Table of options provided on page 16 of this document
(Options Table C-2).

The Council should:

adopt cumulative catch limit design alternatives to be included for full analysis in the EIS (Option Table C-2) and
make adjustments to the alternatives, as it deems appropriate,
(if cumulative catch limit alternatives were included as part of decision made on Decision Table A).

THE TIQC RECOMMENDS ELIMINATION OF OPTION TABLE C-2.

Permit Stacking and Extended Limit Periods (Section 2.1.2.4) -
Table of options provided on page 16 of this document.
(Options Table C-3).

The Council should:

adopt permit stacking and extended limit period design alternatives to be included for full analysis in the EIS (Option Table C-3) and
make adjustments to the alternatives as it deems appropriate,
(if permit stacking alternatives were included as part of decisions made on Decision Table A).

THE TIQC RECOMMENDS PERMIT STACKING ALTERNATIVE 2 BE ADOPTED FOR ANALYSIS.

a/ The term "element" is used for design provisions that are not mutually exclusive (several elements from a list may be adopted). The term "option" is used when a choice must be made between design elements.

TIQC Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 1 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.0 IFQ Allocation			
B.1.1 Eligible Groups	*Allocate 50% of quota shares to current permit owners and 50% to processors (Option 3b)*	*Allocate 100% of quota shares to current permit owners (Option 1)*	*Allocate 75% of quota shares to current permit owners and 25% to processors (Option 3a)*
Processor Definition:	*Use special IQ Program definition (processors: receive and process unprocessed fish; or catch and process) (Option 1)*	*Use FMP Definition (Option 2)*	*Same as Program A*
B.1.2 Qualifying Criteria: Recent Participation	***Harvesters (including catcher-processors):*** *1998-2003 participation required in order to qualify for an initial allocation of quota shares (number of trips or years to be specified) (Option 2)* ***For shoreside processors and motherships:*** *1999-2004 recent participation requirement (number of trips or years to be specified). (Option 4)*	*All Members of Eligible Groups: No recent participation required in order to qualify for an initial allocation of quota shares (Option 1)* *OR* *All Members of Eligible Groups: 1998-2003 participation required (one trawl groundfish landing/delivery of any groundfish species) in order to qualify for an initial allocation of quota shares (Option 2)*	*Same as Program A*
B.1.3 Elements of the Allocation "Formula"			
Vessel/Permit Related Allocation	*Catcher vessel permit owners will receive quota shares based on their permit history plus an equal division of the quota that could be attributed to permit history of bought-back permits (catcher-processors permit owners will not receive a portion of the quota shares distributed on an equal sharing basis) (Option 2)* *Suboptions for incidentally caught overfished species, either: (a) same as for other species OR (b) equally divide quota for incidentally caught overfished species.* *For catcher-processors permit owners, use an allocation schedule developed by unanimous consent of that sector (to be provided).*	*Same as Program A, except no special catcher-processor schedule.*	*Same as Program A*
Processor Allocation	*Processors are allocated quota shares based entirely on the processing of groundfish trawl landings received unprocessed. (Option 1)*	*No Allocation*	*Same as Program A*

TIQC Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 2 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.4 History: Species/Species Groups to Be Used for Allocation	*Allocate Quota Shares Based on Individual Species/Species Groups: Allocate quota shares for each species/species group based on relative amounts of each respective species/species group caught/landed or processed - for permits applies to permit history; for processors applies to amounts processed (Option 2).*	*Same as Program A, except applies only to permit catch/landings history (i.e. there is no processor allocation).*	*Same as Program A*
B.1.5 History: Allocation Periods			
Periods/Years to Drop:	***Vessels:*** *1994-2003* *Drop 2 years for whiting sector fishing (applies to incidental harvest and whiting)* *Drop 3 years* ***for nonwhiting sector fishing*** *(Option 1, Suboption B)* ***Shore Processors:*** *1999-2004* *Drop 2 years* *(Option 5, Suboption B)* ***Motherships:*** *1998-2003.* *No opportunity to drop worst year.* *(Option 4, Suboption A)*	*Same as Program A for vessels but no allocations for shore processors or motherships.*	*Same as Program A*
Weighting Among Years:	*Absolute pounds - no weighting between years (Suboption (i))*	*Relative pounds (calculate history based on the entity's percent share of each year's total) (Suboption (ii))*	*Same as Program B*
B.1.6 History: Combined Permits and Other Exceptional Situations			
Combined permits:	*All Permits Count (Option 1)*	*Same as Program A*	*Same as Program A*
Illegal landings/catch:	*Don't count*	*Same as Program A*	*Same as Program A*
Landings in excess of trip limits, as authorized under an EFP	*Don't count landings in excess of the cumulative limit in place for the nonEFP fishery*	*Same as Program A*	*Same as Program A*
Compensation fish:	*Don't count*	*Same as Program A*	*Same as Program A*
B.1.7 Initial Issuance Appeals Process	*Only one provision has been identified: Appeals would occur through processes consistent with the Administrative Procedures Act, and any proposed revisions to fishtickets would undergo review by state enforcement personnel prior to finalization of the revisions.*		

TIQC Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 3 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.1.8 Creating New IFQ Species/Species Groups After initial Implementation	*Only one practical option has been identified: When a management unit is subdivided, quota shares for that unit will be subdivided by issuing quota share holders amounts of shares for the subdivisions equivalent to their holdings of the shares being subdivided.* *If a new management unit is established that is not a subset of an existing unit managed with IFQ, the Council will need to take action at that time to develop criteria for quota share allocation.*		
B.2.0 IFQ/Permit Holding Requirements and IFQ Acquisition (After Initial Allocation)			
B.2.1 IFQ and LE Permit Holding Requirements	Catch must be covered with quota pounds within 30 days of the landing (Option 3). Only LE trawl vessels would be allowed to participate in the IFQ fishery. For any vessel with an overage (landings not covered by quota) there would be no more fishing by the vessel until the overage is covered. Additionally, for vessels with an overage, the limited entry permit cannot be sold or transferred until the deficit is cleared. A possible suboption would require some amount of quota pounds be held prior to departure from port (to be analyzed).	Same as Program A	Same as Program A
B.2.2 Annual IFQ Issuance			
B.2.2.1 Start-of-Year Quota Pound Issuance	Only one practical option has been identified: Quota pounds are issued annually to share holders based on the amount of quota shares they held. (Quota shares are issued at the time of initial IFQ allocation).		
B.2.2.2 Rollover (Carryover) of Quota Pounds to a Following Year			
Nonoverfished	10% rollover for nonoverfished (Option 3)	30% rollover for nonoverfished (Option 5)	5% rollover for nonoverfished species (Option 2)
Overfished	5% rollover for overfished species (Option 3)	Full (30%) rollover allowance for overfished species (Option 5)	No rollover allowance for overfished species (Option 2)
B.2.2.3 Quota Share Use-or-Lose Provisions	Include use-or-lose option (require use at least once every three years). (Option 1)	Do not include a use-or-lose provision but evaluate need as part of future program reviews (Option 3).	Same as Program B
B.2.2.4 Entry Level Opportunities for Acquiring Quota Shares and Low Interest Loan Options	No special provisions.	No special provisions.	Provide new entrants an opportunity to qualify for revoked shares and shares lost due to non-use (if such non-use provisions are created) (Element 2)

TIQC Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 4 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.2.2.5 Community Stability Hold Back	No special provisions.	No special provisions.	Set aside up to 25% of the nonwhiting shoreside trawl sector allocation each year and allocate that share as quota pounds for joint fishermen/processor venture proposals, ranked on the basis of objective criteria that evaluate benefits to local communities.
B.2.3 Transfer Rules			
B.2.3.1 Eligible Owners/Holders (Who May Own/Hold)	Any entity eligible to own or operate a US documented fishing vessel. (Option 2) TIQC intent: preserve opportunity for existing participants)	Same as Program A	Same as Program A
B.2.3.2 Duration of Transfer - Leasing and Sale	Permanent transfers and leasing of quota shares and quota pounds allowed. (Option 2)	Permanent quota share transfers only--leasing prohibited. Permanent transfers and leasing of quota pounds allowed. (Option 1)	Same as Program A
B.2.3.3 Limits on Time of Transfer			
Time of Year	Allow transfers of quota shares any time during year (Option 1).	Same as Program A	Same as Program A
~~**Embargo When in Deficit**~~	Provisions prohibiting transfer of quota shares when a vessel makes a landing not covered by quota pounds were eliminated as not being practical due to the difficulty of tracing quota pounds back to quota shares, the ownership of which may not be associated with the vessel. The quota share embargo was replaced with a limit on permit transfers when deficits occur (see Section B.2.1).		
B.2.3.4 Divisibility	Only one practical option has been identified: Quota Shares: nearly unrestricted divisibility - "many decimal points." Quota Pounds: divisible to the single pound		
B.2.3.5 Liens	No options have been proposed to restrict liens. Liens can and should be facilitated through a central lien registry. Options for the central lien registry are covered in Section B.3.1.		
B.2.3.6 Accumulation Limits	50% or No Limits (Option 5).	Consider all limits as suboptions	Most restrictive limits(1% or 5% Intermediate level limits (10% or 25%)
B.2.3.7 Vertical Integration Limit	Only one option has been identified: No additional limits on vertical integration beyond those already provided through accumulation limits.		

TIQC Option Table C-1. IFQ program design alternatives recommended by the TIQC, for analysis (Section 2.1.2.2). (Page 5 of 5)			
	IFQ Program A	*IFQ Program B*	*IFQ Program C*
B.3.0 Program Administration			
B.3.1 Tracking IFQ, Monitoring Landings, and Enforcement (see Table B.3-1)	Enforcement Program 2 100% at-sea monitors Discards allowed Upgraded bycatch reporting system needed Electronic landings tracking Shoreside monitoring opportunity Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS	Enforcement Program 1 100% at-sea monitors Full retention required No upgraded bycatch reporting system needed Electronic landings tracking 100% shoreside monitoring Advance notice of landing Limited ports of landing Electronic IFQ reporting Limited landing hours VMS	Enforcement Program 3* 100% at-sea monitors or cameras Discards allowed if at-sea monitor is present (otherwise full retention) Upgraded bycatch reporting sys needed Parallel federal electronic landings tracking Shoreside monitoring opportunity* Advance notice of landing Licenses for delivery sites Electronic IFQ reporting Unlimited landing hours VMS ***With 100% shoreside monitoring**
Quota Share Tracking	Create a central lien registry but exclude all but essential ownership information(Option 2).	Create a central lien registry including all related ownership information (Option 1).	Same as Program B.
B.3.2 Cost Recovery/Sharing and Rent Extraction The TIQC has not developed options for this issue; however, it has discussed the following elements of a cost recovery/sharing and rent extraction program: Privatization of Elements of the Management System, for example: • Monitoring IFQ Landings (e.g., industry pays for their own compliance monitors) • Fishtickets (industry payment for Trawl IQ program landings information to be fed into a Federal electronic system)	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Cost recovery for management (not enforcement or science). Up to 3% of exvessel value, the limit specified in the Magnuson-Stevens Act.	Landings fee plus privatization of elements of the management system. In particular, monitoring of IFQ landings (e.g., industry pays for their own compliance monitors). Stock assessments should not be privatized, and the electronic fishticket system should not be privatized.
B.3.3 Program Duration and Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))	A four year review process is specified along with review criteria. Among other factors, the review would include evaluation of whether or not there are localized depletion problems and whether or not quota shares are being utilized. Standard fishery management plan and regulatory amendment procedures will be used to modify the program.		
B.3.4 Data Collection	Expanded voluntary submission of economic data (Option 2).	Expanded mandatory submission of economic data (Option 1).	Expanded mandatory submission of economic data (Option 1).

TIQC Option Table C-2. Cumulative catch limit design alternatives (Section 2.1.2.3) THE TIQC RECOMMENDS ELIMINATING ALL OF THESE ALTERNATIVES		
CC Alt 1: Nontransferable Cumulative Catch Limits	**CC Alt 2:** Transferable Cumulative Catch Limits	**CC Alt 3:** Transferable and Divisible Cumulative Catch Limits
Cumulative limits may not be transferred from one permit to another and permit transfers are only effective at the end of a cumulative limit period.	Temporary transfers between permits are allowed. Cumulative catch limits are period specific. Partial transfers **are not** allowed.	Same as CC Alt 2 except Partial transfers **are** allowed
Cumulative limit periods will remain two months long	Cumulative limit periods will remain two months long	Cumulative limit periods will be four or six months long
Full retention and at-sea video camera	At-sea compliance monitors (100%)	Same as CC Alt 2
Spot dockside enforcement presence and plant audits	Dockside compliance monitors (100%)	Same as CC Alt 2
No change to system for reporting at-sea catch data.	Upgrade at-sea catch data reporting system such that catch data is complete and available at the vessel level in a time frame similar to that for dock receipts and fish tickets	Same as CC Alt 2

Note: Provisions below the dashed line may be mixed and matched between alternatives.

TIQC Option Table C-3. Cumulative catch limits with permit stacking and extended period design alternatives (Section 2.1.2.4) THE TIQC RECOMMENDS ADOPTING FOR ANALYSIS PS ALT 2, ONLY.	
PS Alt 1. Stacking With **Whole** Cumulative Catch Limits for Additional Permits and **Status Quo Period Lengths**	**PS Alt 2.** Stacking With **Fractional** Cumulative Catch Limit for Additional Permits and **Extended Period Lengths**
A vessel would receive a full cumulative limit for each trawl endorsed permit stacked (increased utilization of cumulative limits would be expected and would reduce the amount of the cumulative limit associated with each permit).	A vessel would receive a full cumulative limit for its "base" permit and a part of an additional cumulative limit for each stacked trawl endorsed permit. The percentage of an additional limit allowed could be a fixed amount or depend on permit length or recent catch history.
Length Endorsement: The vessel would need to have only one permit with the appropriate length endorsement. Trawl permits with other size length endorsements could be stacked without penalty.	Length Endorsement: Same as PS Alt 1
Period Length: status quo, 2-month cumulative limit periods	Period Length: 4-month cumulative limit periods
A maximum of 3 permits could be stacked	No limit on the number of permits stacked
Monitoring and enforcement measure such as those under the cumulative catch limit alternatives (Option Table C-2) would be includes as part of the permit stacking alternatives..	

Note: Provisions below the dashed line may be mixed and matched between alternatives.

TIQC Decision Table D provided in Text of TIQC Report (Page 3)

TIQC Decision Table E - Within Trawl Allocations (Section 2.1.3)

For analysis, adopt options to allocate groundfish between divisions of the trawl sector.

Options: For whatever subdivisions of the trawl sector are established (see Decision Table A: Trawl Sectors and Intersector Transfers--Section 2.1.1.4) ,

establish the subdivision of the trawl sector allocation based on the relative shares for each sector during the time period used for the initial IFQ allocation.

Options: Options will be the same as for the allocation periods considered for the trawl IFQ program (Section B.1.5).

If different periods are used to allocate to different trawl sectors, either use the shortest period common to the allocation of IFQ for all sectors or calculate a sector share of catch based on the IFQ period and adjust the shares proportionally such that they sum to 100%.

When calculating fleet history based on permit history of the individual vessels, a permit formed from the combination of several permits would include the catch history of all of the combined permits.

Suboption a: **A recency requirement would be applied** and the catch history of permits not meeting the recency requirement would not be included as part of the calculation of the relative sector shares. The recency requirement would be the same as that used for the IFQ program.

Suboption b: **No recency requirement.**

THE TIQC RECOMMENDS ANALYSIS OF ALL OF THE ABOVE OPTIONS

For analysis, adopt options to separate shoreside nonwhiting landings from shoreside whiting landings

	Criteria for a Whiting Trip		
Classification Option 1	>50% whiting	AND	>10,000 pounds of whiting
Classification Option 2	>50% whiting	OR	>10,000 pounds of whiting
Classification Option 3	>50% whiting		

THE TIQC RECOMMENDS CLASSIFICATION OPTIONS 2 OR 3 BUT HAS REQUESTED ADDITIONAL DATA.

DRAFT SUMMARY MINUTES
Ad Hoc Allocation Committee

Pacific Fishery Management Council
Shilo Inn Suites Hotel
Willamette 1 Room
11707 N.E. Airport Way
Portland, OR 97220-1075
(503) 252-7500
May 2-3, 2005

MONDAY, MAY 2, 2005 - 1 P.M.

Members Present:
Mr. Donald Hansen, Dana Wharf Sport Fishing, Pacific Fishery Management Council Chairman
Dr. Stephen Freese, Northwest Region National Marine Fisheries Service
Mr. Phil Anderson, Washington Department of Fish and Wildlife
Dr. Patty Burke, Oregon Department of Fish and Wildlife
Ms. Marija Vojkovich, California Department of Fish and Game

Advisors Present:
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Mr. Rod Moore, West Coast Seafood Processors Association, Processor Representative
Mr. Pete Leipzig, Fishermen's Marketing Association, Limited Entry Trawl Representative
Ms. Michele Longo Eder, Limited Entry Fixed Gear Representative
Ms. Kathy Fosmark, Open Access Representative
Mr. Bob Osborn, Recreational Representative

Others Present:
Mr. Steve Joner, Makah Tribe
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Mr. Peter Huhtula, Pacific Marine Conservation Council
Mr. Steve Bodnar, Coos Bay Trawlers Association
Mr. Chris Dorsett, The Ocean Conservancy
Mr. Dan Waldeck, Pacific Whiting Conservation Cooperative
Mr. Dayna Matthews, National Marine Fisheries Service Office of Law Enforcement
Ms. Kate Quigley, Northwest Region National Marine Fisheries Service
Ms. Yvonne de Reynier, Northwest Region National Marine Fisheries Service
Mr. Mark Cedergreen, Westport Charterboat Association
Mr. Allen Chan, Government Accounting Office
Ms. Susan Malone, Government Accounting Office
Mr. Richard Carroll, Ocean Gold Seafoods
Dr. Kit Dahl, Pacific Fishery Management Council staff
Dr. Don McIsaac, Pacific Fishery Management Council Executive Director
Dr. Ed Waters, Pacific Fishery Management Council staff

Mr. Jim Seger, Pacific Fishery Management Council staff
Mr. John DeVore, Pacific Fishery Management Council staff

A. Call to Order

Mr. Hansen called the meeting to order at 1 p.m. Dr. McIsaac provided opening remarks regarding the role of the Ad Hoc Allocation Committee (Committee). He reviewed the agenda and laid out the expectations for this meeting. The Committee approved the agenda without modifications.

B. Goals and Objectives of this Meeting

Mr. DeVore explained there are two primary goals and objectives for this Committee meeting. The first goal is to recommend design elements of the Trawl Individual Quota (TIQ) that affect non-trawl sectors (the TIQ Committee will recommend design elements affecting the trawl sector). The Council will be approving a range of TIQ alternatives for analysis and public review at their June meeting and the Committee's recommendations would be helpful. The second goal is to make progress on the intersector allocation initiative. Intersector allocation is needed to support development of the TIQ program, the Amendment 18 bycatch reduction initiative, and biennial management decision-making.

Mr. Moore asked how the Amendment 18 implementation work plan relates to this process. Are these simultaneous processes? Mr. DeVore explained the Council approved a plan to pursue development of a TIQ program and an intersector allocation process independently and simultaneously. Intersector allocation is needed for other Council initiatives beyond TIQ development. It is expected that the intersector allocation process may be completed prior to potential implementation of a TIQ program.

Mr. Dorsett said there was an agenda item at the last Committee meeting in January regarding allocation incentive and disincentive mechanisms. Has this been dropped from today's agenda? Mr. DeVore explained this concept should be incorporated in discussions regarding intersector allocation at this meeting.

Mr. Anderson asked when the parallel TIQ allocation and intersector allocation processes merge. Mr. DeVore said the intersector allocation process is expected to be completed prior to TIQ implementation. Ms. Longo Eder asked what happens if the TIQ process doesn't go through? Mr. DeVore said there are other reasons to complete an intersector allocation process, so that process would continue regardless of the TIQ process. Mr. Leipzig stated "species of concern" link all sectors in these Council processes. Mr. Anderson noted ad hoc allocations will work for some species, but hard allocations are needed for trawl target species to implement a TIQ program.

C. Trawl Individual Quota Program Review

Mr. Seger reviewed the TIQ process using a document entitled, "Guide to Council Decision Process for Trawl Individual Fishing Quotas (June 1005 Meeting)" (Draft Agenda Item E.5, Attachment 1, June 2005). The Council needs some advice from the Committee on the scope of the allocation process needed to implement a TIQ program.

Mr. Seger explained there are five decision tasks for the Council in June. The first task is identifying goals and objectives of the TIQ program. The second task is recommending a range of alternatives for analysis. The third task is recommending design elements/alternatives for developing the program. The fourth task is to adopt for analysis options for allocating quota shares among trawl sectors and separating shoreside whiting landings from those for the rest of the shoreside trawl fishery. Task five is identifying additional impacts that should be analyzed. Task six is to decide whether or not to initiate scoping for the intersector allocation process.

Mr. Seger directed the Committee's attention to Decision Table A on pages 4 and 5 of the draft decision process document. Concerns were expressed regarding alternative 4 (individual fishing quotas (IFQ) for all groundfish species) and the suboptions regarding trawl retention of Pacific halibut. These options affect the limited entry fixed gear sectors and other sectors that take halibut. Ms. Longo Eder was concerned that the higher discard mortality rate in the trawl fishery will disrupt the intersector allocation balance since the International Pacific Halibut Commission assumes a 50% discard mortality of Pacific halibut using limited entry trawl gear. If this changes to a 100% mortality rate, since IFQ might be used to retain halibut, it will affect intersector allocations. She thought the allocation to Area 2A might also be reduced. Others thought this would not be the case since there are 300,000 pounds of the Area 2A allocation set aside to accommodate trawl discard mortality. They thought the potential problem could be resolved by allocating 50% of that amount for trawl retention. Mr. Anderson thought observers on board could decide which halibut should be retained. Dead fish could be retained and live fish released to keep from reducing the Area 2A allocation. Mr. Leipzig said these issues need to be analyzed.

The Committee then discussed TIQ alternatives regarding non-trawl and limited entry trawl interactions (page 7 of the draft decision process document). Status quo from Fishery Management Plan Amendment 6 is catches made by limited entry trawl vessels using open access gear count against limited entry trawl quotas/allocations. TIQ Option 1 requires IFQs for trawl catches made using open access gear and under option 2, IFQs are not required. Option 1A imposes open access catch control rules and Option 1B would not impose open access trip limits. Ms. Vojkovich asked how non-trawl gear catch alternatives are differentiated. Options and alternatives were derived independently and later matched to provide a consistent cline from least to most IFQ-intensive management. However, there can be mixing and matching of alternatives and options. Ms. Longo Eder said, at first glance, she prefers option 1B where IFQs are required and catches made by trawlers using open access or limited entry fixed gear count against trawl allocations. Constraints are imposed by sector-specific catch control rules under option 2B. Ms. Longo Eder stated she is opposed to option 2B since it utilizes limited entry fixed gear allocation while fishing using a limited entry trawl permit. She considered this unfair (however, there is one permit with dual trawl and sablefish fixed gear endorsements). Ms. Fosmark said she opposes options 2B and 2C for similar reasons.

Mr. Seger reviewed a schematic of IFQ design elements. There are three main parts to the IFQ program: initial allocation, holding requirements (transfers, etc), and administrative (tracking, monitoring, etc.). He detailed the issues under the holding requirements. The basic tenet of the program is one would need IFQ and a limited entry permit to fish. One provision is the need to obtain IFQ within thirty days of landing. Another provision is that a vessel could not go fishing again until all previous catch had been covered with IFQ. These provisions could negatively affect non-trawl sectors if these landings occur at the end of the year. Rollover provisions to use some quota from the following year could have non-trawl sector affects if the fleet in total goes over their allocation. There is a risk of the fleet exceeding an optimum yield (OY) under these scenarios. Exceeding the OY is more problematic for overfished species than for healthy stocks. If OY overages are allowed for overfished species, the potential for such overages would need to be accounted for in the rebuilding plan. Therefore, implementing rollover provisions would probably require a rebuilding plan amendment.

Mr. Moore referred to another distributed document entitled, "List of Options from Appendix B", and asked if the rollover/carryover options are intended to cover a range. Mr. Seger clarified the rollover provisions for overfished and non-overfished species are separable in these options. Ms. Longo Eder raised the question of what happens when the fleet as a whole goes over a quota. She thought there should be consistent treatment for other sectors. If a sablefish-endorsed fisherman exceeds their tier limit in a year, they should have a rollover/carryover provision. Mr. Moore recommended the analysis of rollover/carryover provisions look at how the FMP would be amended to allow the fleet to fish over the OY. Mr. Seger agreed that will be addressed. Mr. Leipzig said there are other inconsistent intersector policies (i.e., permit stacking allowed in the limited entry fixed gear sector but not trawl). He also mentioned that any rollover would come off the following year's quota share. Mr. Anderson said it is difficult to address rollover provisions without reviewing standing policies for managing OYs. Managing a mixed stock fishery with individual quota shares seems daunting especially to the administration/tracking efforts to support the TIQ program. If a sector as a whole exceeds an annual OY, this is a concern to the Committee since it will affect other sectors.

Mr. Osborn wondered how IQ divested is kept within the trawl sector. Mr. Seger said, consistent across all sectors, the limited entry trawl permit is required to use quota share. The vessel can then participate as an open access vessel only if it sells its permit. Ms. Longo Eder said she was opposed to rollover provisions that would cause the possibility of the fleet exceeding an OY and thus impacting non-trawl sectors. Ms. Fosmark said the rollover provisions may be counter to Amendment 18 provisions which implement sector catch limits and puts the responsibility of staying within allocations to each sector. Mr. Leipzig said there is a concern in developing a TIQ program of consolidation of the fishery. This would have non-trawl impacts as well. However, limited entry fixed gear permit stacking caused some consolidation which was not well addressed under Amendment 14.

Mr. Anderson urged the TIQ program development should minimize indirect allocational impacts on non-trawl sectors. This is the perspective this committee should take. Dr. Burke wondered how the rollover provisions would be unlikely to cause the fleet to exceed an allocation. Mr. Seger said the provision that a vessel's fishing would cease until IQ was bought to cover the overage would minimize the possibility of fleet-wide exceedance of a species' allocation to the sector. Ms. Longo Eder asked if TIQ shares could be used with any gear type. She stated bycatch could be reduced if quota shares were fished by fixed gear vessels. Mr. Seger said TIQ could be fished with other legal gear types under some of the options, assuming it is tied to a limited entry trawl permit. Mr. Joner said the tribes have some concern regarding potential intersector affects. However, this discussion does address some of these concerns. The tribes are interested in regional management to avoid a disproportionate concentration of effort with economic and biological (e.g., localized depletion) effects. Mr. Huhtula said there is a concern about geographic consolidation under some of these TIQ options. Ms. Longo Eder agreed with this concern. Trawls and pots fish different grounds. Allowing multiple gear types by limited entry trawlers will create competition on these grounds. The limited entry fixed gear fleet wants to be able to purchase TIQ and limited entry trawl permits. Mr. Anderson added the differential trawl and non-trawl Rockfish Conservation Areas also separate these fleets. This is another complication to allowing trawlers to use multiple gear types.

Mr. Seger continued the review of potential TIQ design elements. He explained TIQ design elements were presented last June during the scoping phase. These elements were further discussed in November 2004. A quota share "use or lose" provision is part of this design consideration. However, this complicates tracking and monitoring as IQs are traded and further split. Therefore, the TIQC may be backing off recommending this provision for the outset of the program.

Entry level opportunities (i.e., reserving some quota share for new entrants to the fishery) are being de-emphasized by the TIQC. Ms. Fosmark wondered if this recommendation would compromise the ability to develop a new fishery.

A new option, a community stability quota, where a certain percentage of quota is set aside and reallocated to coastal communities, has recently emerged. This alternative was modeled after a similar program in British Columbia, Canada. Reallocation would be based on objective criteria to rank proposals forwarded by fishermen and processors. Ms. Vojkovich asked if this would stimulate a community to re-establish an eroded economic base (i.e., ports that had lost their trawl fleet to buyback). Mr. Seger said that depends on the objective ranking criteria.

Mr. Seger continued by reviewing the eligibility requirements for holding/owning IQ. Options include any entity eligible to own a U.S. documented vessel, any entity eligible to own or operate a U.S. documented vessel, and stakeholders in general (vessel owners, vessel lessees, skippers, crew, processors, communities, etc.). Ms. Vojkovich asked about the requirements for owning a U.S. documented vessel. Mr. Seger explained there is a mix of individual ownership to corporate ownership of limited entry trawl vessels. Each owner in a corporation would need to be identified. There are legal provisions regarding ownership of a U.S. documented vessel where there is a limit on foreign ownership interest. Depending on how the "stakeholders" option is ultimately defined, there may be more foreign ownership of TIQ under that option.

The next TIQ design element discussed was duration of transfer and leasing and sale prohibition options. Option 1 under the transfer options would allow the transfer of TIQ shares at any time during the year and option 2 would only allow TIQ shares to be transferred at the end of the year. There are also two transfer embargo options: TIQ shares may not be transferred from any account with an IQ deficit and TIQ shares may be transferred from an account with a deficit for some species.

Mr. Seger briefly reviewed the options for dividing quota shares, but he didn't believe these options would have non-trawl sector effects.

The next design element discussed was lien registry options. Both options would create a central lien registry with one option having the registry include all ownership information and the other excluding this information except for essential ownership. Dr. Freese said creating a central lien registry system for limited entry permits owners is called for in the Magnuson-Stevens Act, but, to his knowledge, has never been established in this country. He mentioned that establishing a regional registry was beyond the resources currently available in the Northwest Region.

The Committee next discussed design element options regarding accumulation limits. Options for owning, controlling, and/or using TIQ shares vary from 1% to 5%, 10%, 50% of total shares to no cap at all. Ms. Longo Eder asked how control of shares is defined and Mr. Seger answered ownership and leasing of shares defines control. However, there is a proposal for a broader definition of control. Mr. Osborn remarked that 20% ownership of a corporation grants that person or entity a lot of control in the corporation. He asked what reporting and auditing requirements are there. Mr. Seger said ownership, control, and use of shares would need to be tracked, which adds to the administrative costs of the system. Dr. Freese stated ownership of IQ shares can be tracked, but control of IQ shares cannot. He thought many of these design elements can't be done regionally and can only be done nationally. He was hopeful these elements could be culled from the range of alternatives so they don't keep resurfacing. Finally, Mr. Seger addressed vertical integration limits and stated there were no additional limits forwarded in the scoping process beyond what was provided by the accumulation limit options.

The Committee continued to discuss these design elements. Ms. Vojkovich returned to the issue of eligible groups for the initial allocation of TIQ shares and asked how processors are identified. Ms. Longo Eder asked if processor shares could result in a disadvantage to non-trawl sectors. Could processor ownership of shares compromise a fisherman's ability to market non-trawl caught fish? Mr. Moore said these were legitimate questions and concerns. Geographic consolidation of TIQ shares may affect non-trawl sectors. Processors would have to prove they are processors by showing their business records.

Ms. Fosmark said she was opposed to auctioning TIQ shares. She also questioned the need for processors to obtain quota shares. Mr. Seger said the Magnuson-Stevens Act does not currently allow for auctions of IFQ shares that would result in landings fees exceeding three percent of the ex-vessel revenue in any one fishing season. Auctions are nevertheless in the suite of alternative design elements since an EIS does not limit alternatives analyzed just because they are not currently allowed. That fee limit could be changed in a future Magnuson-Stevens Act re-authorization. Mr. Leipzig said the Council has asked NOAA General Counsel whether processor shares violate anti-trust laws and whether there are other legal issues with this option.

Mr. Anderson asked if the concept of extended periods has been fleshed out. Mr. Seger said yes to some degree. There has been initial exploration of designing a three- or two-period fishing season. Work is needed on specifying how inseason management decision-making would occur with extended periods.

Specifying ports or requiring site licenses to effectively track and enforce landings is part of the suite of options. Ms. Vojkovich said this may erode the ability to develop an infrastructure for emerging fisheries.

Ms. Longo Eder thought the benefits of the buyback program should be shared with non-trawl fleets. This is an issue when deciding allocation formulae for issuing IFQs. However, some explained these costs are not a taxpayer subsidy of the trawl fishery since the fleet is paying back the loan. Mr. Bodnar said the $10,000,000 grant was to cover capital gains taxes accrued by owners who sold permits and boats. Ms. Longo Eder said this was impossible with a capital gains tax of 15%. She pointed out that only a portion of the cost of the program was being paid back by the fleet, and the cost of the program paid by the taxpayers should result in allocation of the fish to all fishermen, not just the trawl fleet.

Mr. Leipzig wanted the TIQ Committee to be aware of non-viable options such as tracking control of IQ shares. He asked NMFS staff to list such options and provide them to the TIQ Committee.

TUESDAY, MAY 3, 2005

Members Present:
Mr. Donald Hansen, Dana Wharf Sport Fishing, Pacific Fishery Management Council Chairman
Dr. Stephen Freese, Northwest Region National Marine Fisheries Service
Mr. Phil Anderson, Washington Department of Fish and Wildlife
Dr. Patty Burke, Oregon Department of Fish and Wildlife
Ms. Marija Vojkovich, California Department of Fish and Game

Advisors Present:
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Mr. Rod Moore, West Coast Seafood Processors Association, Processor Representative
Mr. Pete Leipzig, Fishermen's Marketing Association, Limited Entry Trawl Representative
Ms. Michele Longo Eder, Limited Entry Fixed Gear Representative
Ms. Kathy Fosmark, Open Access Representative
Mr. Bob Osborn, Recreational Representative

Others Present:
Mr. Steve Joner, Makah Tribe
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Mr. Mark Saelens, Oregon Department of Fish and Wildlife
Mr. Peter Huhtula, Pacific Marine Conservation Council
Mr. Steve Bodnar, Coos Bay Trawlers Association
Mr. Chris Dorsett, The Ocean Conservancy
Ms. Dorothy Lowman, Consultant- Environmental Defense
Mr. Dan Waldeck, Pacific Whiting Conservation Cooperative
Mr. Dayna Matthews, National Marine Fisheries Service Office of Law Enforcement
Ms. Kate Quigley, Northwest Region National Marine Fisheries Service
Ms. Yvonne de Reynier, Northwest Region National Marine Fisheries Service
Mr. Mark Cedergreen, Westport Charterboat Association
Mr. Allen Chan, Government Accounting Office
Ms. Susan Malone, Government Accounting Office
Mr. Richard Carroll, Ocean Gold Seafoods
Dr. Kit Dahl, Pacific Fishery Management Council staff
Dr. Don McIsaac, Pacific Fishery Management Council Executive Director
Dr. Ed Waters, Pacific Fishery Management Council staff
Mr. Jim Seger, Pacific Fishery Management Council staff
Mr. John DeVore, Pacific Fishery Management Council staff

The meeting was called to order at 8:30 a.m. by Chair Hansen.

D. Review of Historical Landings by Sector

Dr. Waters reviewed the historical landings by sector for the years 1988, 1994, 1998, and 2002. There was a glitch in the 2004 landings data that could not be resolved in time for the meeting so those data were not displayed. The sectors depicted in this tables were: shoreside limited entry trawl (whiting and non-whiting sectors combined), whiting catcher-processors, whiting motherships, limited entry fixed gear- line gears, limited entry fixed gear- pot/trap gears, open access- directed groundfish, open access- incidental groundfish, shoreside tribal, at-sea tribal (whiting-directed), and recreational. It was noted that there was not enough time prior to the meeting to analyze catch data at the fish ticket level to stratify the shoreside limited entry trawl catches into the whiting-directed and non-whiting sectors. The criterion used to stratify open access catches into directed groundfish and incidental groundfish sectors was if >5% of annual ex-vessel revenues on a per vessel basis came from groundfish, those catches were assigned to the directed groundfish sector of the open access fishery. Otherwise, open access catches were assigned to the incidental groundfish sector. It was also noted that one would want to add the catches for shoreside tribal and at-sea tribal to determine total tribal groundfish catches, which is the sector aggregation the Committee originally recommended for management. The left-hand column of the dataset denoted (with a “#” symbol) a species or species’ complex where no one sector had 90% or more of total reported landings and deliveries and the total landings for all sectors was at least 1 mt. The Committee was told these species or species’ groups should be considered candidates for intersector allocation according to the criterion used.

Ms. Longo Eder requested a future display of landings by sector as a percentage of the total. She also thought the 1998 landings of sablefish in the limited entry fixed gear- pot/trap gears sector were low at 58.3 mt. Mr. Joner remarked the total landings estimated for 1998 seemed correct and recalled the OY set in 1998 was low due to the more pessimistic sablefish stock assessment conducted in 1997. Ms. Vojkovich remarked the limited market sampling of landings in southern California (south of Pt. Conception) confounds our understanding of species composition in those fisheries. The Committee agreed with Ms. Longo Eder’s data request and added their desire to see footnotes describing major events affect the management regime in future versions of these landings tables. This will help provide the context for some of the catch history depicted in these tables.

E. Intersector Allocation Options

Mr. DeVore provided a more in-depth overview of this agenda item and reviewed the minutes of the last Committee meeting in January. The Committee had discussed in conceptual terms the duration and frequency of future allocation decisions and the potential structure of species’ allocation formulae in January. Of the three primary objectives of the intersector allocation process (Amendment 18 bycatch reduction, biennial management decision-making, and development of a TIQ program), a more permanent allocation is desirable for developing the TIQ program since it would provide stability for the industry. It was thought allocations of trawl-dominant (or any sector-dominant) species or species’ complexes could occur using a fixed percentage of OY, while allocations for more constraining species, such as those overfished species managed under rebuilding plans, could be managed using a sliding scale formula. A sliding scale allocation structure would vary the sector allocation percentages according to changes in biomass or OY. This allocation structure is inherently more flexible and responsive to the needs of the fishery. The Committee had also discussed a five-year review of future allocation decisions and the desire to consider intersector allocation decisions with a view of how the fishery should be shaped five years from now.

Mr. Moore asked for which species a sliding scale allocation formula might apply? Species already declared overfished? Species recently found to be overfished? Mr. DeVore said those species that constrain fishing opportunities for multiple sectors should be considered for such an allocation structure. Some overfished species such as Pacific ocean perch (POP) may not be the binding constraint and are dominant in one sector. An allocation of POP using a straight percentage of the OY may make the most sense. But a species such as canary rockfish might be a good candidate for a sliding scale allocation formula since it is a binding constraint for many sectors. As the canary rockfish OY varies, a different percentage of the OY might be considered for setting sector total catch limits to allow an economically optimal mix of fishing opportunities.

Ms. Vojkovich asked if there exists a document that portrays what OYs are needed to prosecute certain fisheries. Mr. DeVore said the annual/biennial specifications environmental impact statements may be the best documents to find analyses of West Coast fisheries interactions. Mr. Leipzig said the IQ concept makes it unnecessary to completely anticipate the mix of species caught in prosecuting a certain fishery. Tradable quotas provide an economic strategy for reducing/minimizing bycatch.

Ms. Vojkovich said she would like to see the current geographic distribution of the West Coast trawl fleet. Mr. DeVore stated the 2005-2006 specifications EIS shows trawl landings by West Coast port. However, the best analysis of trawl fleet distribution would probably come from trawl logbooks since the areas (ports) where landings are made do not necessarily reflect the areas where fishing occurred. This is an analysis that could be assigned to the Groundfish Management Team.

Mr. Anderson said he has been thinking about the inherent, yet confounding values of flexibility vs. stability in the intersector allocation decision-making process. The timeline is important in deciding what the allocation framework should be. Since the long term is much less certain than the short term, he recommends we design allocations to last for 2-3 biennial management cycles with a determination of desirable fishing strategies for that period. Mr. Osborn agreed and stated new data may emerge that would affect an allocation decision. The lack of economic data makes it difficult to plan beyond the next few management cycles. Mr. Leipzig asked what criteria would trigger a re-allocation. It was thought a new understanding of a critical stock's status or a better understanding of a sector's bycatch might trigger reconsideration of an allocation.

The Committee discussed other elements of intersector allocation. Ms. Fosmark thought the open access fishery should be more thoroughly analyzed. She wanted to see open access landings and revenues by gear type to better understand the economic needs of that sector. Ms. Longo Eder recommended allocating some future yields or set asides for experimental or emerging fisheries. As an example, she said the fixed gear fleet has recently experimented with flatfish traps. Mr. Leipzig thought the Committee should assume the existing RCAs will remain in place for the next 2 or 3 management cycles. Mr. Dorsett recommended the Committee focus on creating incentives in an allocation scheme to minimize bycatch. Any intersector allocation analysis should pay attention to the bycatch taken by various gear types and include a rationale for this bycatch. He thought any allocation scheme should also consider the habitat impacts of that fishing strategy.

Mr. DeVore recommended the Committee consider intersector allocation requirements for developing the TIQ program and develop alternatives for trawl/non-trawl allocations. Mr. Anderson raised the question of the timeframe (i.e., duration) of this allocation and thought 2-3 management cycles might be appropriate for this allocation as well. Mr. Moore thought of two alternatives for the duration of a trawl/non-trawl allocation: 1) allocation decisions sunset after a set time, or 2) Council reviews an allocation decision at the end of a biennial management period, but the allocation endures in lieu of a review. Mr. Anderson preferred the second option with criteria set for what would trigger a review. Mr. DeVore thought alternatives analyzing straw man scenarios that mix and match different species' OYs might be informative. For instance, analyze fishing opportunities by sector when one target or constraining species has a relatively high OY and another one has a low OY. Different strategically decided scenarios might effectively tease out the types of fishery interactions the Committee and Council would need to understand to make these allocation decisions.

Mr. Moore thought the Committee could identify the trawl-dominant species and easily structure allocation alternatives for those species. He identified longspine thornyheads, shortbelly rockfish, arrowtooth flounder, Dover sole, English sole, petrale sole, and Pacific cod as species in our FMP that are not overfished and dominant to the trawl sector. He recognized the tribal fishery does harvest some of these species, but thought allocation could be more easily reconciled for these species than for others. Ms. Longo Eder said some of these species are caught by fixed gears in some years and questioned whether they were truly dominant to the trawl sector. She was not ready to agree some of these species shouldn't have a non-trawl allocation beyond an incidental set-aside. Ms. Vojkovich stated constraining species' allocations will determine what can be caught. Such allocations will also provide the incentives for reducing bycatch and creating cleaner fishing strategies. She recommended a sensitivity analysis of a species like canary rockfish with a range of trawl/non-trawl allocations. Mr. Moore said the issue is how much of a target species can be caught given the allowable harvest (i.e., sector total catch limit) of weak stocks. Allocation of weak stocks will establish the values of IQs. Mr. Leipzig mentioned IQs for only the trawl target species is one of the alternatives in the TIQ program. Allocating trawl target species is essential for developing the TIQ program. Mr. Moore said allocating the trawl-dominant species first will make the other allocation decisions easier. He recommended the first step should be deciding the set-asides of these trawl-dominant species to accommodate incidental catches in other sectors. Mr. Anderson agreed and said the initial allocation of trawl-dominant species will provide the incentive to reduce bycatch.

Ms. Vojkovich asked about set-asides for research and experimental fisheries. Mr. Anderson thought, as a starting point, analyze an 80% allocation of these seven trawl-dominant species to the trawl sector and a 20% allocation to accommodate incidental catch, research, and experimental fisheries. Mr. Moore said another alternative would be to range the percent of OY allocated for these incidental catch purposes (i.e., 2%, 5%, 10%, etc.) and allocate the remaining yield to the trawl sector. Ms. Longo Eder said arrowtooth flounder, Dover sole, and petrale sole were caught by line gears in the past (e.g., 10% of the 1998 petrale sole catch was by limited entry line gears). Don't assume these are just incidental catches.

Mr. Moore recommended the analysis assume the management regime won't change dramatically in the next six years. It is unlikely that we will have the same management regime we did in 1998. Mr. Leipzig said he would agree to any alternative that would get this analysis started. Why not structure alternatives for analysis that would allocate the lowest proportion of any species' OY observed in the last ten years for the trawl sector? Mr. Moore recommended the alternative should analyze the lowest proportion for all sectors in that time frame. Perhaps the analysis should assume a 10% set-aside for incidental catches. Ms. Vojkovich said such an analysis won't capture the growth of the recreational fishery. Mr. Leipzig remarked the inflated Marine Recreational Fisheries Statistics Survey estimates are problematic in the analysis. Mr. Osborn liked the approach of analyzing yield buffers as well.

Ms. de Reynier recommended an alternative approach for structuring alternatives for analysis. Be mindful of fishing philosophies and the tenets of the Council Groundfish Strategic Plan. She also thought the Committee should consider different allocations for nearshore, shelf, and slope species, since there is a different array of fishing sectors targeting these assemblages. Mr. Moore agreed and remarked the Council has tended to design nearshore fishing opportunities for the recreational sector and slope fishing opportunities for commercial sectors.

Ms. Vojkovich returned to the topic of allocating the trawl-dominant species as an alternative for analysis. She thought the alternative could be structured as outlined by Mr. Moore, but the other species could be allocated 50% to the trawl sector. Mr. Leipzig said this will not be realistic for some species since the trawl fishery has traditionally taken more than 50% of the harvestable yield of some species and taken a very small proportion, if any, of other species such as nearshore rockfish. Ms. Longo Eder asked if we need another allocation option for the seven trawl-dominant species discussed earlier. Mr. DeVore said a reasonable range of allocation options could be structured by analyzing the maximum and minimum proportions of the annual harvest for each sector within the last ten years. Mr. Anderson said a range of allocation options for the seven trawl dominant species could be determined by analyzing ± 10% of the lowest trawl harvest percentage within the last ten years. Mr. Leipzig thought analyzing that range of options, coupled with the high and low harvest percentages by sector, would be informative. He recommended the Committee also consider some "set-aside" options. Mr. DeVore said harvest trends of some key indicator species and complexes by sector in the last ten years would also inform folks of how the fishery has changed. Ms. Vojkovich wanted these data extracts aggregated to the list of species and complexes we currently manage with OYs. She also wanted a display of all the open access/limited entry allocations currently used in the management regime. Ms. de Reynier said the specifications table from the *Federal Register* notice of annual/biennial regulations would be helpful to the Committee, because it depicts the hard sector allocations by species and complexes. Mr. DeVore asked what sectors the Committee wanted to see in these data extracts. They agreed the catch data should be stratified to the ten sectors discussed at the last meeting, but the annual catch proportions by sector should be in terms of percentage of non-tribal catch. This was because of the legal opinion that it would be harder for the Council to impose sector catch limits on the tribal fishery.

Mr. DeVore asked if there were additional data requests or analyses the Committee would like to see. He also asked about the timing of these requests. Ms. Longo Eder requested economic analyses and made the point some fisheries have a higher value than others. Ms. McCall said economic analyses are part of any National Environmental Policy Act analysis of alternatives. Mr. Leipzig said recreational catches also have a value that is not currently captured. Ms. Fosmark requested a Marine Protected Areas/ Marine Life Protection Act timeline as part of the background material for the analysis. Mr. Moore said the alternatives should be developed at the next meeting after looking at these data runs and analyses. The Committee agreed. Dr. Burke asked for a summary or footnotes in these data tables denoting state management constraints. Mr. Anderson requested a regional stratification of catch data for those species with regional

OYs. He also wanted to shape the management system such that discards are converted to landed catch. In that spirit, he wanted an analysis of the amount of yield necessary to accommodate some retention of prohibited catch (e.g., compare the yields needed to go from no retention to a 1-fish bag limit).

Mr. Osborn noted that the California process for allocating the nearshore rockfish species was very difficult. Ms. Vojkovich said California Department of Fish and Game currently uses these allocations to structure recreational harvest guidelines geographically within the state. Two sets of data were used because the commercial live fish fishery has recently become more important.

Mr. DeVore reviewed the data/analysis requests. (These data extracts and analyses are outlined in “Summary of Allocation Committee Recommendations” appended to this document.)

Ms. Vojkovich wondered if we need to include discard rates for commercial fisheries. Mr. DeVore made the point that we currently manage with discard rates determined through the Observer Program for some sectors, assumed discard rates for other sectors, and reported discards in the recreational sector. There has been a mix of assumed and deterministic discard rates used to manage fisheries in the last yen years. It was also noted that commercial discard rates were assumed prior to the implementation of the Observer Program. The Committee debated the need for discard estimates for developing intersector allocation alternatives. They agreed that the most comparable catch data for developing intersector allocation alternatives is landings given the variable estimates of discards by sector. Therefore, they refined their requests to only include landed catch data. Ms. Vojkovich further requested footnotes in these data tables indicating when a precautionary reduction of an OY was implemented.

F. Scoping For Intersector Allocation Analyses

The Committee discussed the next steps in the intersector allocation process. Mr. DeVore said the requested analyses cannot be completed prior to the June Council meeting. He thought he, and perhaps other staff, could work on these analyses during the summer or fall. Dr. Freese said he would like to see these tables in the Groundfish Stock Assessment and Fishery Evaluation (SAFE) document. He thought these tables would be more useful than the current tables in the SAFE document. Mr. DeVore said he was concerned with the current plan to update the SAFE since some of the historical commercial and recreational catch data differs from more recent data extracts. He agreed with Dr. Freese that production of the SAFE document should be delayed until this next data run is completed. This plan will lead to less confusion regarding historical catches.

Mr. DeVore asked if the Committee members would like to reconvene this summer or fall. He explained the GMT will meet later this month and he can ask them what time they might have to help with these analyses. Mr. Seger asked when scoping for the intersector allocation process should commence. Mr. DeVore recommended a delay in the scoping process until preliminary intersector allocation alternatives are developed. This will give the public some information they can react to and is a better way to engage in constructive scoping of alternatives. Dr. Burke asked when staff can have the data runs and analyses prepared. She noted the importance of having these data complete prior to the next Committee meeting. Ms. Vojkovich asked about the Amendment 18 timeline. Mr. DeVore agreed the next Committee meeting will be more constructive if the analyses are complete. He stated the Amendment 18 work plan calls for implementation of some sector total catch limits at the start of the 2007-2008 management period. He added that if the next Committee meeting occurred after the November Council meeting, when a range of 2007-2008 harvest specifications and management measures is decided, the Committee could begin work in allocating available harvest by sector, thus accomplishing initial Amendment 18 and 2007-2008 management objectives. The Committee agreed and tentatively scheduled the next Committee meeting for November 14-15.

Mr. Seger explained the importance of providing Committee TIQ recommendations at the June Council meeting. Mr. DeVore said he would prepare Committee minutes for this meeting, distribute draft minutes to Committee members for their review and edit, and incorporate the minutes in the June briefing book under the TIQ agenda item. He reminded Committee members of the May 25 briefing book deadline. The Committee agreed with this plan.

Chairman Hansen adjourned the meeting at 2:15 p.m.

Summary of Allocation Committee Recommendations

Trawl Individual Quota Program

- The non-trawl sector representatives were opposed to sub-options allowing trawl retention of Pacific halibut under Management Regime Alternative 4 (Decision Table A).
- The limited entry fixed gear and open access sector representatives were opposed to options 2b and 2c (page 4 of Decision Table A) where trawl IFQ is not required for trawlers fishing exempted gears. Option 2b counts such catch against any open access allocation and option 2c is the same as 2b except some catch would be allocated from the limited entry trawl sector to the open access sector.
- There was general concern that provisions of the TIQ program, such as rollover/carryover provisions that risk exceeding an OY, should be carefully developed to minimize adverse impacts to non-trawl sectors.
- The Committee recommended against options and provisions that would lead to geographic consolidation of TIQ shares, since that could adversely impact some coastal communities and non-trawl sectors.
- The Committee recommended against the option of creating a West Coast central lien registry for tracking control of TIQ shares since that is apparently a non-viable option.

Intersector Allocation

- Committee members requested the following data runs and analyses prior to developing preliminary intersector allocation alternatives:
  - Provide annual catch data for 10 management sectors during 1995-2004.
  - Footnote key management events affecting sector catches in these data extracts.
  - Stratify species/catch data by the species and complexes currently managed with OYs.
  - Provide the proportion of non-tribal catches by sector by year during 1995-2004.
  - Summarize maximum and minimum catch proportions for each sector during 1995-2004.
  - Identify ±10% of the lowest trawl catch proportions during 1995-2004.
  - Identify all open access/limited entry allocations in the current management regime.
  - Regionally stratify catches by state or region for fisheries with regional OYs/harvest guidelines.
  - Provide a marine protected areas/Marine Life Protection Act timeline of events.
  - Provide the specifications table from the recent *Federal Register* notice of biennial regulations.
  - Provide landed catch trends for key species and complexes important for intersector allocation.
- Scoping for an intersector allocation environmental impact statement should be delayed until preliminary alternatives are developed at the next Committee meeting.

Other Issues

- The next Ad Hoc Allocation Committee meeting is tentatively scheduled for November 14-15, 2005.

06/01/05

GROUNDFISH MANAGEMENT TEAM REPORT ON TRAWL INDIVIDUAL QUOTA PROGRAM DEVELOPMENT

The Groundfish Management Team (GMT) reviewed and discussed the goals, objectives, constraints, and guiding principles for a trawl individual quota (TIQ) system, the different TIQ alternatives, and the recommendations of the Ad Hoc Groundfish Trawl Individual Quota Committee (TIQC) with Jim Seger at our May meeting, and offers the following comments and recommendations.

Constraints and Guiding Principles

The GMT recommends adding to the list of constraints, a statement referencing management and administrative costs of implementing and overseeing a TIQ program and complementary catch monitoring programs. With regard to catch monitoring alternatives—specifically, observer coverage and shoreside sampling—the GMT notes that state and federal resources are becoming increasingly limited. Therefore, mechanisms for recovering the increased costs of catch monitoring from the fleet will likely need to be developed and discussed further as the TIQ initiative moves forward.

TIQ Alternatives

The GMT believes the TIQC made significant progress at its last meeting by focusing on key alternatives and narrowing the scope of the analysis; however, there was some confusion as to which species were covered under alternatives 3 and 4. The TIQC revised alternative 3 to include all groundfish species, except those in the "other fish" category (e.g., Pacific cod, spiny dogfish), and eliminated alternative 4 (all groundfish species). As a result, there is no alternative currently that includes all species and species groups covered under the groundfish fishery management plan. The GMT recommends that the Council consider retaining alternative 4 (individual fishing quota (IFQ) for all groundfish species).

The GMT recommends the TIQC recommendations be approved and that two additional alternatives—one that includes IFQs for overfished species and another based on permit stacking—be included in the suite of alternatives the Council adopts for public review:

IFQs for Overfished Species

The GMT recommends creating a new alternative that implements an IFQ system for overfished species only. The GMT considers two primary factors in developing trip limits for target species: 1) the amount of incidental catch of co-occurring species and bycatch of overfished species that is estimated to be taken; and 2) the amount of target species estimated to be taken, both of which are predicted using the trawl bycatch model. Logbook and fish ticket data are used to project the amount of individual vessel effort in terms of when and where the vessel has fished, and trip limit achievement for recent years, weighted to the most recent year. In estimating the amount of incidental catch and bycatch of non-targeted species, the GMT uses the NMFS groundfish observer program data and assumes that the vessels covered are representative of the fleet.

In a few cases, target species trip limits are set at levels that are expected to achieve the optimum yield (OY) on an annual basis. The achievement of the OY for those species, however, may be restricted by the vessel's ability to access the full amount because of Rockfish Conservation Area constraints. In many cases, though, trip limits are set based on the amount of assumed bycatch of overfished species. For these cases, in particular, having IQs for overfished species could allow vessels to access more target species, provided that they acquire sufficient quota pounds to cover their bycatch. This would also encourage fishers to develop mechanisms to avoid overfished species, as doing so would permit them to sell overfished species quota. And, because this alternative implements a more stringent bycatch accounting system, the GMT anticipates that trip limits for target species would be liberalized considerably.

Permit Stacking

The GMT recommends retaining the previous alternative 6 (which was eliminated by the TIQC). This alternative includes permit stacking and consideration of cumulative catch limits for species with low OYs, such as overfished rockfish. While these elements are contained within alternative 7 (which the TIQ Committee kept in the mix), alternative 7 also includes the element of the extended season. The GMT recommends that a full analysis of alternative 6 (without the extended season) be included.

While permit stacking would not accomplish all of the objectives of an IQ program, it would be considerably less complex, less expensive, and easier to implement and administer, and would move toward achieving the objectives in the Council's Groundfish Strategic Plan. As such, the GMT believes that alternative 6 is a viable alternative and should remain in the suite of alternatives adopted for public review.

As part of the permit stacking alternatives, there are two options: 1) allowing fishers to get the full amount of the permit limit when permits are stacked; or 2) setting a limitation (percentage) on the amount of the permit limit that can be stacked. Under option 1, permit limits would be set to achieve respective OY; whereas under option 2, the cumulative total of permit limits would be higher than respective OYs with the expectation that, as a result of stacking, total catch would remain within the OYs. Therefore, the individual permit limits under option 1 would be lower than those set under option 2. If the permit limits are set at a level that accommodates some individual fishing practices, then option 2 would create a disincentive to stack permits, would run counter to the objective of capacity reduction in the Council's Groundfish Strategic Plan. Additionally, there would be difficulty in estimating how many and which permits would be stacked prior to the fishery and modeling catch projections. Therefore, the GMT recommends keeping permit stacking option 1 and removing permit stacking option 2.

Cumulative Catch Limits

The GMT identified a couple of issues on cumulative catch limits for the Council's consideration. On the one hand, in implementing cumulative catch limits for low OY species (e.g., overfished species) as is proposed in IFQ alternative 3, the GMT notes that the individual limits (on a periodic basis), in some cases, would be extremely low (e.g., 40-50 lbs/2 mo. for canary, one fish/2 mo. for yelloweye). As these cumulative catch limits would not be transferable, it is unlikely that fishers would be able to access high amounts of target species before a cumulative limit for an overfished species was reached. Also, by using two-month limits, rather an aggregate annual limit, there is a greater potential for "disaster tows" of species, such as canary rockfish, to affect other fishing sectors inseason.

On the other hand, the GMT notes that use of cumulative catch limits (as opposed to landing limits, which are used under status quo), in general, would provide a more accurate catch accounting method. This is becoming increasingly important as we try to manage to particularly low OYs for some species, such as canary rockfish, that are encountered by several fisheries coastwide.

GMT Recommendations

1. Approve the TIQ Committee recommendations with the following changes:

   a. Add the following statement to the list of Constraints and Guiding Principles:

      "Taking into account the management and administrative costs of implementing and overseeing a TIQ program and complementary catch monitoring programs and the limited state and federal resources available."

   b. Retain alternative 4 (IFQ for all groundfish species.)

   c. Add a new alternative for an IFQ program for overfished species only.

   d. Include former alternative 6 (permit stacking with cumulative catch limits) with permit stacking option 1 only (exclude permit stacking option 2.)

06/01/05

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TRAWL INDIVIDUAL QUOTAS
(FROM NOVEMBER 2004)

Mr. Jim Seger briefed the Scientific and Statistical Committee (SSC) on the process for developing alternatives for trawl individual quotas (TIQs) on the West Coast. Currently, description of the TIQ process is contained in several documents, including reports by the Ad Hoc TIQ Analytical Team and Ad Hoc TIQ Independent Experts Panel (IEP). The TIQ process is now addressing several preliminary issues including defining goals and objectives, development of tools to achieve objectives, and description of data needed to define a baseline for comparing alternatives. The SSC agrees with the IEP that clarification and refinement of goals and objectives is necessary so that measurable criteria may be specified. These criteria will aid formulation and analysis of alternatives and facilitate future evaluation of the TIQ program. The TIQ Analytical Team and IEP's statements of TIQ goals and objectives are given in the Decision Step Summary (E.6.a. Attachment 3, November 2004 ***[Table 1.2-1 of C.5.a, Attachment 3 of the June 2005 Briefing Book])***. Two overarching objectives of the TIQ program appear to be: (1) efficiency gains in the trawl sector, and (2) reduction of discard mortality.

As described in the reference materials, TIQs could provide efficiency gains to the groundfish fishery. Typically, efficiency gains from IQ programs are associated with more efficient fishing operations (i.e., those with lower unit costs) purchasing quota from less efficient operations, thus, providing an equitable means of capacity reduction. The extent of these gains can be affected by several factors including the trawl buyback program, degree of fleet heterogeneity, and other regulations. The trawl sector is one component of a multi-sector, multi-species fishery, which raises important issues of quota transferability between sectors.

The reference materials explain how IQ-based management tools can have unintended consequences. These include increased economic discards (i.e., high-grading), and changes in the balance of market power among vessel crew, vessel owners, and processors. In addition, the establishment of IQs can create barriers to entry and changes in the distribution of fishing effort, catch, and landings. In some well-known cases, IQs have redistributed landings from rural fishing communities to urban areas where processing facilities are located.

By providing economic incentives to avoid bycatch, an IQ program could be a cost-effective means of reducing discard mortality. Some elements of the British Columbia groundfish IQ program could provide a reasonable case study. In this regard, a framework to analyze effects of management alternatives on economic incentives would be useful. At the Council's direction, the SSC would be willing to consult with the TIQ Analytical Team and IEP on developing this framework. As a starting point, the SSC refers to sections on IQs in the SSC Report on Overcapitalization in the West Coast Groundfish Fishery (March 2000) and the Groundfish Strategic Plan (June 2000).

PFMC
11/03/04

STATEMENT OF THE GROUNDFISH ADVISORY SUBPANEL ON TRAWL IQ PROGRAM

The Groundfish Advisory Subpanel (GAP) reviewed the reports of the Ad Hoc Groundfish Trawl Individual Quota (TIQ) Committee, the Allocation Committee, and the Groundfish Management Team (GMT), as well as the extensive documentation prepared for this agenda item. The GAP appreciates the assistance of Mr. Jim Seger and members of the TIQ Committee in providing information to the GAP.

The GAP looked first at the Goals and Objectives identified in Agenda Item C.5.a, Attachment 1 (page 2). The GAP agrees with the Goals and Objectives - which include comments made by the GAP at previous meetings - and endorses the additional Constraint recommended by the GMT.

The GAP then examined the list of impacts found in Agenda Item C.5.a, Attachment 1 (pages 19 and 20). Again, this list encompasses comments previously made by the GAP, and the GAP recommends that the list be adopted.

The GAP then endorsed the alternatives recommended by the TIQ Committee and urges the Council to adopt them as appropriate options for analysis. The GAP does not support the additional alternatives recommended by the GMT.

Finally, the GAP urges the Council to begin the scoping process for groundfish allocation as soon as possible, as it is important both for the TIQ program and for a variety of management issues.

PFMC
06/15/05

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of General Counsel, GCNW
7600 Sand Point Way N.E.,
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June 10, 2005

Donald K. Hansen
Chairman
Pacific Fishery Management Council
7700 NE. Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Dear Mr. Hansen:

This letter is in response to your letter, dated January 27, 2005, in which you requested a NOAA General Counsel opinion on any legal issues or constraints posed by several alternatives under consideration during the ongoing development of a possible individual fishing quota (IFQ) program for the West Coast limited entry trawl groundfish fishery. Mariam McCall, representing NOAA General Counsel, provided oral responses to the letter at the February 23-24, 2005, meeting of the Ad Hoc Groundfish Trawl Individual Quota Committee. Her responses have been incorporated in the Draft Summary Minutes of that meeting and are summarized below.

Questions 1 and 2: What are the legal issues or constraints posed by "allowing IFQ to be held (owned) by fish processors, at any time," and "issuing IFQ to fish processors at the time of initial allocation of shares?"

Response: The Council has considerable leeway in making the decision about who may be issued or hold IFQ; processors as well as other groups or persons could be issued or hold IFQs. Any allocation decision must have a record developed to support it. As part of the record, the requirements of Magnuson-Stevens Fishery Conservation and Management Act (MSA) National Standard 4 and section 303(b)(6), among other provisions, must be considered.

Question 3: What are the legal issues posed by requiring fishermen to sell their fish to particular processors by establishing a license limitation system for processors or an individual processing quota (IPQ)? The Council also requests information on other legal issues that might be associated with limiting the processors to whom a harvester might sell fish.

Response: As you are aware, it is NOAA's longstanding opinion that the MSA does not provide the legal authority to establish a "processor quota" system for shorebased processors. See Memorandum for North Pacific Fishery Management Council from Lisa Lindeman, NOAA General Counsel, Alaska Region, Magnuson Act authority to allocate fishing and processing privileges to processors, September 20, 1993 (enclosed). Thus, under the MSA, no program that amounts to an allocation of shorebased processing privileges can be implemented (except for one recent exception for specific Alaska fisheries). As for any potential legal issues, providing a legal opinion on a hypothetical program that assumes new authority to establish limited entry systems for processors is difficult because the parameters of the hypothetical program have not been developed. I understand you are interested in having the antitrust questions referred to the Department of Justice, however, it is unlikely that DOJ could provide meaningful advice at this point in the process. As you are aware, DOJ provided comments on a proposed Alaska crab IPQ program in August of 2003. At that time, the crab program had been developed in detail by the Council, and legislation authorizing it was anticipated shortly. Enclosed is a copy of that letter from DOJ to the NOAA General Counsel.

Question 4: What are the legal issues posed by requiring that fishermen sell their fish to processors that hold IFQ? The primary difference between this and an IPQ program would be that the processors and fishers would purchase their individual quota from a single IFQ pool rather than pools split into IPQ and IFQ.

Response: Requiring that fishermen sell their fish only to specific processors that hold IFQ is the equivalent of allocating on-shore processing privileges and thus is not authorized by the MSA.

Question 5: What are the legal issues posed by limiting or restricting in any way the number of fish processors that may purchase fish from fishermen?

Response: In general, a limit could not be placed on the number of processing sites if the purpose were to allocate shoreside processing privileges. However, the licensing or permitting of processor sites could be allowed for enforcement or monitoring purposes, as long as the requirements were necessary for the conservation and management of the fishery and not a disguised limited entry program. Incidental allocation consequences could be permissible depending on the record. Provisions that have the practical effect of limiting the number of ports or sites to which deliveries could be made could be defensible if the record is clear that they are designed for biological, conservation or management purposes.

Question 6: What are the legal issues posed by accumulation caps, including whether there are legal issues to be considered in developing options with different caps for different types of entities and how the legal considerations may change on whether caps are applied to amounts used on a vessel, amounts owned and amounts controlled (leased or owned).

Response: The response will depend on the record and the rationale developed to support proposed caps, and the justification to support the measures as necessary conservation and management measures. Once the Council has identified the accumulation caps to be considered, and adequate analysis and background information is available, it may be possible to request a Department of Justice opinion on antitrust or related issues. In general, while it is possible to ascertain and monitor the ownership of quota as recorded with NOAA Fisheries, it would be very difficult to ascertain and monitor the control of quota.

You also forwarded some questions that the IQ Committee included in the report of its October 2004 meeting. The report included two basic questions. First, if a rebuilding OY is exceeded, would the IQ fishery need to be shut down? And second, could quota overages or underages be rolled over to the next year?

Response: There is not a legal prohibition on doing this if the overall plan is structured such that this makes biological sense. For example, the rebuilding plans, and the FMP itself, would need to be structured to ensure that a variable OY (as a result of overages and underages) would meet the rebuilding targets and the OY requirements. You would also have to deal with how this affected the rest of the groundfish fishery. Finally, there would need to be a conclusion that it would not be so complex that in reality it couldn't be tracked.

As always, Mariam McCall and I are available to discuss these issues further.

Sincerely,

Eileen M. Cooney
NW Regional Counsel

Enclosures

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September 20, 1993

MEMORANDUM FOR: North Pacific Fishery Management Council

FROM: Lisa L. Lindeman *Lisa Lindeman*
NOAA General Counsel--Alaska Region

SUBJECT: Magnuson Act authority to allocate fishing and processing privileges to processors

BACKGROUND

The North Pacific Fishery Management Council (NPFMC) is currently reviewing potential elements and options for the Comprehensive Rationalization Plan (CRP) in the North Pacific groundfish and crab fisheries. One of the elements, initial assignment of quota share, currently contains five options for consideration by the NPFMC.[1] One option is described as initially allocating a portion of the harvesting quota share to processors under a limited access system. Another option, known as the two-pie system, is described as allocating Individual Processor Quota (IPQ) to processors, creating a limited access system for processing <u>in addition to</u> a limited access system for harvesting. Proponents of an initial allocation to processors contend that allocations of fishing privileges must be fair and equitable and must consider past and current participation in the fisheries. They argue that allocating fishing privileges only to the harvesting fleet fails to recognize the participation and capital investments made by the processing sector of the fishing industry.

You have requested a legal opinion from NOAA General Counsel as to whether the NPFMC and the Secretary of Commerce (Secretary)

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[1]As of June 28, 1993, there are five recommended options for the initial assignment of quota share:
- (A) to vessels or vessel owners at the time IFQ is issued;
- (B) to vessel owners at time of landings activities, considering two general types of recipients: (1) those still in the fisheries and (2) those who have exited the fisheries;
- (C) assign harvesting quota share to other fisheries investors including processors, skippers, and crew;
- (D) coastal communities; and
- (E) assign separate processor quota share (the two-pie system).

have the statutory authority under the Magnuson Fishery Conservation and Management Act (Magnuson Act or the Act) to implement either of these two options. This memorandum answers these questions first by analyzing what types of allocations are authorized under the Act and then analyzing whether the Act requires that all allocations be allocated among harvesters. The third section of the memorandum presents a summary of issues that may arise when a Council considers making allocations to persons other than harvesters.[2]

SUMMARY OF FINDINGS

1. There is authority under the Magnuson Act to allocate fishing privileges. The Magnuson Act requires the Councils and the Secretary to implement measures regulating fishing that are necessary and appropriate for the conservation and management of the fishery. The Councils and the Secretary also have the authority to limit access to one or more fisheries. Access to these fisheries is limited by the allocation of fishing privileges.

2. The Magnuson Act defines "fishery" as one or more stocks of fish and any fishing for such stocks. The term "fishing" under the Magnuson Act includes harvesting activities and operations at-sea in support of or in preparation for harvesting activities. At-sea processing is an operation at-sea in support of harvesting. On-shore[3] processing is not "fishing."

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[2]In a memorandum from Chris Oliver dated August 13, 1993, a third question was also asked: If there is authority under the Magnuson Act to allocate harvesting or processing privileges to processors, are there any legal obstacles to allocating those privileges to foreign-owned processors? The answer to this question will require more legal analysis than time permits before the September Council meeting. However, a memorandum addressing this question can be prepared and presented at the December Council meeting if the Council is still interested in the answer to this question. Mr. Oliver's memorandum is attached to this memorandum.

[3]For purposes of this memorandum, "on-shore processor" means processors that are located landward of the baseline of the United States and "on-shore processing" means processing activities conducted at facilities located landward of the baseline. It is important to note that the definition of "on-shore" for purposes of this memorandum differs from the definition of "inshore" used in 50 CFR 672.2 and 675.2. The definition of inshore includes more than on-shore processors.

3. Because the Councils and the Secretary have the authority to allocate fishing privileges, an IPQ system that allocates Individual At-Sea Processing privileges is authorized under the Act. Allocations of other fishing privileges, such as at-sea transshipping privileges and at-sea supplying privileges are also authorized. However, an IPQ system that purports to create and allocate individual on-shore processing privileges is not authorized under the Magnuson Act.

4. There is authority under the Magnuson Act to allocate fishing privileges to harvesters, processors and to other persons or groups as long as such allocations are consistent with the national standards, including national standard 4, other provisions of the Magnuson Act and other applicable law.

5. Any allocation scheme considered by the Councils and the Secretary that allocates fishing privileges to persons other than harvesters will encounter fairness and equity questions that must be addressed in the administrative record.

CAVEAT

The reader should keep in mind that this memorandum does not address the adequacy of any record developed by any Council to support the creation and allocation of at-sea processing privileges or to support an allocation of fishing privileges to on-shore processors. The analysis is completely theoretical; Secretarial approval and legal defense of any measure that establishes at-sea processing privileges or that initially allocates fishing privileges to on-shore processors would depend on the existence of a record justifying the measure and demonstrating the net benefits to be derived from implementation.

DISCUSSION

When Congress charges an agency with the responsibility of carrying out a statute, such as the Magnuson Act, questions concerning Congressional delegations of authority to that agency may arise. Judicial review of an agency's interpretation of statutory authority is governed by the test set forth in[4] Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.. The first part of the Chevron test requires a determination of "whether Congress has directly spoken to the precise question at issue" and "whether the intent of Congress is clear." If not,

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[4] 467 U.S. 837 (1984). In this case, the Environmental Protection Agency issued regulations based on its interpretation of the Clean Air Act's statutory language concerning treatment of pollution sources within a single plant.

the second prong of the Chevron test is applied and a reviewing court must decide whether the agency's interpretation is based on a reasonable construction of the statute.[5] In applying this deferential standard of review, the court should uphold an agency's interpretation of a statute it administers as long as the interpretation is permissible.[6] If Congress was not "clearly averse" to the agency's interpretation, and if the interpretation is "not manifestly contrary to the statute," it should be upheld.[7] Finally, courts should be most deferential in cases involving complex regulatory schemes.[8] Since a reviewing court would apply the Chevron test to determine whether the Secretary has the authority to develop and implement an IPQ system, the Chevron test will be used in responding to the NPFMC's questions.

There is no explicit language in the Magnuson Act authorizing the Councils and the Secretary to establish an IPQ limited access system for processors or to allocate harvesting privileges to processors. Moreover, Congress' intent concerning the Councils' and the Secretary's authority, or lack thereof, to establish either of these two systems is not clearly stated. Failing to resolve the issue using the first prong of the Chevron test, an examination of the statutory language and the legislative history of the Magnuson Act, past legal opinions and case law is necessary to determine whether the Act contains implicit authority to establish such systems.

I. Allocations that are authorized under the Magnuson Act.

Fundamental to answering the question of whether the Councils and the Secretary have the authority to allocate processing privileges are the answers to the questions of what types of allocations are authorized by the Magnuson Act and whether the Act requires that all allocations be allocated among harvesters.

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[5] 467 U.S. at 842-43.

[6] National Fisheries Institute v. Mosbacher, 732 F. Supp. 210, 217 (D.D.C. 1990).

[7] Stinson Canning Co., v. Mosbacher, 731 F. Supp. 32, 37 (D. Me. 1990).

[8] Washington Crab Producers, Inc. v. Mosbacher, 924 F.2d 1438, 1447 (9th Cir. 1990).

a. <u>The Councils and the Secretary have the authority to allocate fishing privileges</u>.

The only specific reference in the Magnuson Act for allocating privileges appears in subsection 301(a)(4), or national standard 4.[9] National Standard 4 states:

> Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this subchapter shall be consistent with the following national standards for fishery conservation and management:
>
> > . . . (4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign <u>fishing privileges</u> among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

(Emphasis added.) Although national standard 4 contains the only specific reference to allocating fishing privileges, many other sections of the Magnuson Act focus on the Councils' and the Secretary's authority to regulate fishing and the fishery. Subsections 303(a) and (b) authorize the Councils and the Secretary to prepare fishery management plans (FMPs) for "fisheries."[10] Additionally, subsection 303(a) contains a list of those provisions Congress, through the Magnuson Act, requires the Councils and the Secretary to include in each FMP. Subsection 303(a)(1)(A) states that any FMP prepared must "contain the conservation and management measures, applicable to foreign <u>fishing</u> and <u>fishing</u> by vessels of the United States which are (A) necessary and appropriate for the conservation and management of the <u>fishery</u> to prevent overfishing and to protect, restore, and promote the long-term health and stability of the <u>fishery</u>." (Emphasis added.) Subsection 303(a)(2) requires a description of the <u>fishery</u> including all <u>vessels</u> involved, <u>fishing gear</u> used, actual and potential revenues from the <u>fishery</u>, recreational interest in the <u>fishery</u>, and nature and extent of foreign <u>fishing</u> and native American treaty <u>fishing</u>

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[9] 16 U.S.C. 1851(a)(4).

[10] "Fishery" is defined by the Act as "(A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any <u>fishing</u> for such stocks." 16 U.S.C. 1802(8) (Emphasis added.)

rights. The remaining subsections of 303(a) continue to focus on other aspects of the "fishery" or "fishing."

Other support can be found in subsection 303(b), and specifically subsection 303(b)(6). Subsection 303(b)(6) authorizes the Councils and the Secretary to establish systems for limiting access to the fishery in order to achieve optimum yield. Factors that need to be considered by the Councils and the Secretary all focus on the fishery to which limited access would apply: present participation in the fishery; historical fishing practices in and dependence on the fishery; the economics of the fishery; the capability of fishing vessels used in the fishery to engage in other fisheries;[11] and the cultural and social framework relevant to the fishery.

Given the Magnuson Act's emphasis on the Councils' and the Secretary's authority to regulate "fishing," it logically follows that, in order to limit access, the Councils and the Secretary would allocate fishing privileges to fish for one or more stocks of fish.

b. "Fishing" does not include on-shore processing.

Although it is clear that the Councils and the Secretary have the authority to allocate fishing privileges, the next question is what constitutes "fishing." "Fishing" is defined in the Magnuson Act at subsection 3(10) as:

> (A) the catching, taking or harvesting of fish; (B) the attempted catching, taking, or harvesting of fish; (C) any other activity that can reasonably be expected to result in the catching, taking or harvesting of fish; or (D) any operations at-sea in support of, or in preparation for, any activity described in subparagraphs (A) through (C). Such term does not include any scientific research activity which is conducted by a scientific research vessel.[12]

In 1978, NOAA General Counsel prepared a legal opinion analyzing the Secretary's statutory authority to deny applications for permits that would authorize foreign vessels to operate in the EEZ. The Secretary wanted to know whether she had the authority to deny those permits on the basis that U.S. fish

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[11] Some other sections of the Act are 2(b)(1) and (3) (purposes of the Act are to conserve and manage the fishery resources off the coasts of the United States and to promote domestic commercial and recreational fishing.) 16 U.S.C. 1801(b)(1) and (3).

[12] 16 U.S.C. 1802(10).

processors had the capacity or intent to receive and process the fish concerned. Although the 1978 legal opinion addresses a different question than the ones before the NPFMC now, its analysis of the term "fishing" and conclusion that the term "fishing" included processing conducted at-sea but did not include processing conducted on-shore are relevant to this discussion.[13]

First, the 1978 opinion interpreted subsection 3(10)(D) as including processing as a support or preparation activity described in subparagraphs (A) through (C) <u>but only if</u> the processing is "at-sea." Second, it interpreted subsection 3(10)(C) as not including on-shore processing as "fishing:"

> In our view, the logical interpretation of section 3(10)(C) would restrict its application to activities at-sea which directly result in the catching of fish. An activity on land which merely provides an incentive to catch fish is insufficiently related to the catching of fish to constitute "fishing" under section 3(10)(C). This conclusion is consistent with the legislative history of the FCMA which at no point indicates that the term "fishing" was intended to include on-shore processing. It is also consistent with section 2(b)(1) which refers to the need to manage the fishery resources off the coasts of the U.S.[14]

The 1978 opinion concluded that the Secretary did not have sufficient authority under the Magnuson Act to disapprove the applications on the basis that U.S. fish processors had the capacity or the intent to receive and process fish harvested from the EEZ. This conclusion led Congress to amend the Magnuson Act later that same year to provide the Secretary with the necessary statutory authority. That amendment[15] became known as the processor preference amendment.

Most relevant to the immediate question of whether "fishing" includes on-shore processing are the changes that were <u>not made</u> to the Magnuson Act by the processor preference amendment. Congress contemplated amending the definition of "fishing" by deleting subsection (D) in order to separate "processing" from the harvesting aspects of "fishing."[16] The term "processing" would have been defined, thus clearly separating the two

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[13] General Counsel Opinion No. 61, at 12 (1978).

[14] *Id.*, at 10 (1978).

[15] Authorization, Appropriations--Fishery Conservation and Management Act of 1976, Pub. L. No. 95-354, 92 Stat. 519 (1978).

[16] S. Rep. No. 935, 95th Cong., 2d Sess. 2-3.

activities. As finally passed, however, the amendment did not change the definition of "fishing" or define "processing." Representative Murphy provided the following explanation for the decision to leave the definitions unchanged:

> In the end, we decided to leave the [Magnuson Act] definitions unchanged on this point while, at the same time, making clear the act was intended to benefit the entire fishing industry. I want to emphasize that, even though the final bill does not include the House clarification, it is the understanding of the House that "fishing" in section 3 of the [Magnuson Act] does include "processing" and that, for that reason, the proposed clarification is unnecessary.

124 Cong. Rec. H8265-66 (August 10, 1978) (statement of Rep. Murphy). Although Representative Murphy stated that the definition of "fishing" includes "processing," he did not clarify whether his use of the term "processing" included only at-sea processing or both at-sea and on-shore processing.

Despite Representative Murphy's lack of clarification, the definition of "fishing" in the Magnuson Act continues to exclude on-shore processing. The 1978 legal opinion concluded that subsection (C) did not include any processing activities, and that subsection (D) included processing activities but only those conducted at-sea. Congress' contemplated changes would only have deleted subsection (D) from the fishing definition in order to keep the entire definition of "fishing" related to catching, taking, or harvesting, and not to processing. When Congress chose not to amend the definition, but clarified that the definition included processing, it had to be referring only to subsection (D). Even with the knowledge that NOAA General Counsel interpreted subsection (D) as applicable only to at-sea processing, Congress did not delete the phrase "at-sea" from the definition. Therefore, only processing at-sea is considered fishing under the Magnuson Act. On-shore processing does not constitute "fishing" as that term is defined by the Magnuson Act.

c. <u>The Councils and the Secretary do not have the authority to create and allocate on-shore processing privileges</u>.

If "fishing" does not include on-shore processing, then can the Councils and the Secretary establish an IPQ limited access system that creates and allocates on-shore processing privileges? Based on the preceding discussion, the Councils and the Secretary do not have the authority to allocate on-shore processing privileges or establish a system that contained such allocations. Assuming that the two-pie system is one that includes allocations of on-shore processing privileges, it would most likely fail under the <u>Chevron</u> test as an unreasonable agency interpretation of statutory authority. Therefore, this memorandum concludes that the portion of the IPQ option that allocates individual on-shore processing quota would be an invalid extension of the Councils' and the Secretary's statutory authority.

The NPFMC may be presented with the argument that subsection 303(b)(10) of the Act would provide the Councils and the Secretary with the authority to allocate on-shore processing quota. Subsection 303(b)(10) states:

> Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, may--(10) prescribe such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery.

Proponents of the two-pie system may argue that an IPQ system is necessary and appropriate for the conservation and management of the fishery because conservation and management measures include the promotion of economic and social goals included in the Magnuson Act. Establishing an IPQ system would achieve the Magnuson Act's economic and social goals because on-shore processors would not be at a competitive disadvantage and possibly driven out of business as the at-sea processing sector drove up the price of fish.[17] An IPQ system would balance the playing field so that on-shore processors and the communities that benefit economically, socially and culturally from the existence of an on-shore processor would be protected.[18]

This argument fails to withstand scrutiny on two grounds. First, subsection 303(b)(10) was not included by Congress as a means for the Councils and the Secretary to circumvent any limits on their statutory authority contained in other sections of the Magnuson Act. Subsection 303(b)(10) provides the Councils and the Secretary with the discretionary ability to develop necessary and appropriate conservation and management measures not enumerated in subsections 303(a) or (b). To interpret 303(b)(10) in such a sweeping manner would swallow up the other provisions of the Act. Second, there is nothing within the subsection to expand the definition of fishing.

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[17] See Attachment (memorandum from Chris Oliver dated August 13, 1993).

[18] Id.

d. <u>The Councils and the Secretary have the authority to allocate fishing privileges which include harvesting privileges, at-sea processing privileges, or privileges to conduct operations in support of or in preparation for harvesting</u>.

Using the same statutory analysis presented earlier, the Councils and the Secretary have the authority to allocate fishing privileges. Since "fishing" includes at-sea processing, a system that allocates at-sea processing privileges would most likely be deemed a reasonable interpretation of statutory authority. Therefore, that portion of the two-pie system that allocates Individual <u>At-Sea</u> Processor Quota, or that allocates <u>at-sea processing privileges</u>, is authorized. Although the two-pie system currently envisioned by the NPFMC would be beyond the Councils' and the Secretary's authority to implement, a system that allocates at-sea processing privileges based on at-sea processing history would indirectly allocate a portion of the total allowable catch for on-shore processing. Such indirect allocation to on-shore processors has been recognized as a legitimate exercise of statutory authority.[19] It must be stressed that such a system would have to be supported by an adequate record and a Secretarial finding that the system is consistent with the Magnuson Act and other applicable law.

It is important to note that, in addition to the Councils' and the Secretary's authority to allocate at-sea processing privileges, it is also within the Councils' and the Secretary's authority to allocate privileges for activities conducted at-sea that are in support of, or in preparation for, the catching, taking or harvesting of fish. Such at-sea activities could include transshipping, fueling, or crew provisioning to list just a few examples. To repeat, the Councils and the Secretary would have to provide a record that justify such an allocation under the Magnuson Act and other applicable law.

II. Does the Magnuson Act require that all fishing privileges be allocated among harvesters?

Although it is within the Councils' and the Secretary's discretionary authority to allocate fishing privileges among only harvesters, does the Magnuson Act actually limit the Councils' and the Secretary's authority to making allocations <u>only</u> to persons that have a harvesting history or are currently

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[19]See Memorandum dated December 1, 1989, for the North Pacific Fishery Management Council from Margaret H. Frailey and Craig R. O'Connor re: Limitations on Roe Stripping (concluding that on-shore processors could only be regulated indirectly as an incidence of managing "fishing."

harvesting fishery resources? Statutory language and past allocations demonstrate that the Magnuson Act authorizes the Councils and the Secretary to allocate fishing privileges to a wide range of individuals or groups, and does not limit those allocations to only harvesters.

The Act authorizes the Councils and the Secretary to establish FMPs that contain measures applicable to fishing that are necessary and appropriate for the conservation and management of the fishery and that promote the long-term health and stability of the fishery.[20] Drawing from the previous discussion, harvesters, along with at-sea processors, transshippers, suppliers, and other persons involved in at-sea support activities, are all fishing. Because the Councils and the Secretary are authorized to regulate fishing by making allocations of fishing privileges, these "fishermen" are all examples of persons to whom the Councils and Secretary can allocate fishing privileges. This analysis alone demonstrates that authority to allocate fishing privileges under the Magnuson Act extends beyond the harvester.

Previous allocations made by the Secretary also support the interpretation that the Magnuson Act authorizes the Councils and the Secretary to allocate fishing privileges to various persons and groups and not solely to harvesters. One of the most well-known allocations is the surf clam and ocean quahog ITQ system. In this plan, the Mid-Atlantic Council chose to allocate surf clam and ocean quahog quota initially to vessel owners. Initial allocations of harvesting privileges were made to vessel owners based on the vessel's reported landings between January 1, 1979, and December 31, 1988.[21] The regulations also provide for the transfer of allocation percentage or cage tags to "any person eligible to own a documented vessel under the terms of 46 U.S.C. 12102(a)."[22] By selecting vessel owners for initial allocation and anyone who can document a vessel under 46 U.S.C. 12102(a) for transfers of allocation percentage or cage tags, the Mid-Atlantic Council clearly chose to allocate ITQ to persons that may or may not have ever harvested fish.[23] While the specific question of

[20] 16 U.S.C. 1853(a)(1)(A).

[21] 50 CFR 652.20(a) (1992).

[22] 50 CFR 652.20(f)(1) (1992).

[23] This allocation decision was raised in Sea Watch International v. Mosbacher. Plaintiffs claimed that the allocation to vessel owners was unfair and inequitable because it "ignored the high rate of vessel turnover in the industry, excluding individuals with a substantial catch history who recently sold a vessel, and award[ed] a "windfall" to individuals

whether the Councils and the Secretary had the authority to allocate fishing privileges to vessel owners was not raised, a reviewing court found that the Secretary had the authority to establish an ITQ system and that the surf clam and ocean quahog ITQ system was supported by an administrative record that justified the Secretary's decision to approve it.[24]

Another example is the Community Development Quota (CDQ) allocation made by Amendment 18 to the FMP for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area (BSAI). As stated in the regulations, "one half of the pollock TAC placed in the reserve for each subarea will be assigned to a Western Alaska CDQ for each subarea. Portions of the CDQ for each area may be allocated for use by specific western Alaska communities in accordance with the community fishery development plans . . . ."[25] The purpose behind the allocation was "to help develop commercial fisheries in western Alaska communities" and one of the eligibility requirements was that a community not have previously developed harvesting or processing capability sufficient to support substantial fisheries participation in the BSAI.[26]

An argument that the language in national standard 4 limits the Councils and the Secretary to allocating fishing privileges to U.S. fishermen has not been supported by a reviewing court. In AFTA v. Baker, Intervenor-Plaintiff American Independent Fishermen (AIF) challenged the Secretary's allocation of pollock and Gulf of Alaska Pacific cod to the inshore component, claiming that such allocations were outside of the Secretary's statutory authority. Arguing that because the inshore component included on-shore processors and national standard 4 authorizes allocations only to U.S. fishermen, which does not include on-shore processors, AIF asked the court to find the allocation invalid. The judge disagreed with AIF, finding that "national standard 4 does not express 'clear Congressional intent' to

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with little or no [catch] history who recently purchased a vessel." Ruling on whether the allocation was fair and equitable under national standard 4, rather than an unauthorized extension of the Secretary's authority, the court did not agree with plaintiffs' claim and found that the record supported the Mid-Atlantic Council's use of vessel, rather than individual, catch data. Sea Watch Int'l v. Mosbacher, 762 F. Supp. 370, 377 (D.D.C. 1991).

[24] Id., at 375-76.

[25] 50 CFR 675.20(a)(3)(i) (1992).

[26] 57 FR 46139, 46139, 46140 (1992) (codified at 50 CFR part 675) (proposed October 7, 1992).

prohibit the allocation which AIF challenges" and found that the challenged regulations allocated fishing privileges among fishermen.[27] Judge Rothstein continued by stating that "[the regulations] in effect regulate offshore catcher-processors, which would otherwise preempt the coastal sector of the fishing industry."[28]

Based on this analysis, there is no explicit or implicit statutory requirement that the Councils and the Secretary allocate, either initially or by subsequent transfer, fishing privileges only to harvesters. To the contrary, the Magnuson Act has been construed as authorizing the Councils and the Secretary to make allocations of fishing privileges to harvesters as well as other persons or groups. Relying on the authority established by this interpretation, the Councils and the Secretary have allocated fishing privileges among various "fishermen," harvesters as well as others. And as long as an allocation is consistent with the Magnuson Act and other applicable law, a reviewing court is not likely to determine that such an interpretation is "manifestly contrary" to Congressional intent.

III. Allocations of fishing privileges must be consistent with national standard 4.

It is important to keep in mind that any allocation of fishing privileges must be consistent with national standard 4. National standard 4 requires that allocations be fair and equitable, reasonably calculated to promote conservation and carried out such that no particular individual, corporation or other entity acquires an excessive share of fishing privileges. Any allocation scheme that a Council selects must demonstrate how it complies with these three requirements.

Recognition of capital investment and past participation of processors, specifically on-shore processors, in the initial allocation of quota share raises several fairness and equity difficulties. First and foremost is the fact that allocations of fishing privileges that benefit one group to the exclusion or detriment of another must be justified in the administrative record developed by the Councils and the Secretary. If a Council adopts an allocation scheme that allocates fishing privileges to vessel owners, leaseholders and on-shore processors, for example, it will have to explain why other participants, such as skippers and crewmembers, were excluded from receiving an allocation.

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[27] American Factory Trawler Ass'n v. Baker, Civ. No. 92-870R, Order at 17 (W.D. Wash. July 24, 1992).

[28] Id., at 18.

Compounding the difficulties in developing such a justification is determining how much quota to allocate to persons that do not have a documented catch history. Can on-shore processor investment in buildings and equipment be equated to catch histories and investments in vessels for harvesters such that the allocations would result in a fair and equitable distribution of fishing privileges? If a Council can devise a method of determining the appropriate allocation of quota shares for on-shore processors, would it be able to devise a method for determining the appropriate allocation of quota shares for skippers and crewmembers. It is a question whether the Councils and the Secretary would be able to adequately justify an allocation scheme that allocates fishing privileges to some participants that cannot document a catch history but excludes other participants that cannot document a catch history. It must be remembered that the Councils and the Secretary clearly have the authority to allocate fishing privileges among those persons dependent on the fishery. However, the Councils and the Secretary must be able to justify the allocation scheme as fair and equitable and not arbitrary and capricious.

A third problem is that any initial allocations of fishing privileges to persons other than harvesters may represent a reduction to quota available for harvesters. The allocation "pie" is a finite resource; an allocation of fishing privilege to one person represents a loss of fishing privileges to another. Finally, an initial allocation of fishing privileges to vessel owners or skippers results in an allocation of fishing privileges to U.S. citizens due to U.S. Coast Guard documentation laws and manning requirements. Allocations to some crewmembers or on-shore processors may result in allocations to alien crewmembers or foreign owners.

Because of the implications of each allocation scheme, it is important for a Council to examine the goals and objectives to be attained by allocations of fishing privileges and determine which allocation scheme will achieve the desired results.

CONCLUSION

In conclusion, an allocation scheme that allocates at-sea processing privileges is permissible under the Magnuson Act. As long as the Councils and the Secretary allocate fishing privileges to achieve a purpose recognized under the Act and that furthers the achievement of optimum yield and is consistent with the national standards, other provisions of the Magnuson Act and other applicable law, NOAA General Counsel concludes that such an allocation scheme is authorized under the Act. However, it must be stressed that the more complex the allocations and the basis used for dividing those allocations among participants, the more difficult it could be to defend under an arbitrary and capricious standard and the more costly it would be for the National Marine Fisheries Service to implement.

cc: Meredith J. Jones
Jay S. Johnson
Margaret F. Hayes

Attachment

North Pacific Fishery Management Council

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MEMORANDUM

TO: Lisa Lindeman
NOAA General Counsel

FROM: Chris Oliver
Deputy Director

DATE: August 13, 1993

SUBJECT: Processor Quota Shares

Per your request of this morning, I will try to summarize the intent of the Council's proposal to consider Individual Processor Quotas (IPQs) as part of the comprehensive limited entry plan. I will also try to summarize the Council's concerns regarding the legalities of this proposal.

First, there has been discussion of allocating processors a portion of the harvesting QS, based on the argument that they have an equal investment in the fisheries. Though it is no secret that this proposal has little or no chance of happening, the Council does want to know if there is a legal basis for doing so. Is there anything in the Magnuson Act or National Standards which would preclude them from doing so? What kind of justification would be necessary for such a proposal to be approved? Would allocation of harvesting privileges to foreign owned processing entities be a problem?

Secondly, there has been proposed the 'two-pie' system whereby separate processor shares (IPQs) would be created which would mirror the harvesting shares. Under this system harvest shares would not be diluted but it would, theoretically at least, balance the playing field so that the processing sector would not be unfairly disadvantaged as they would (again, theoretically) under the original proposal. The theory is that they would be at a competitive disadvantage and would eventually be driven out of business as the at sea processing sector drove the price of fish up. The way the program would work is still fairly unclear. For example, whether the IPQs would be species-specific has not been discussed. The mechanism for initial allocation to processors of those shares has not been discussed very fully, though it would likely be based on relative processing activities during some specified period of time in the past. What is sure is that each processor would have a specific amount, and harvesters could only deliver their fish to a processor if that processor had adequate IPQ to cover that delivery. The harvesting sector is not completely enamored with this idea as it could dictate, to some extent, where they deliver their fish.

I guess the fundamental question to be answered is whether the Magnuson Act allows the Council the authority to create IPQs. The Act specifically addresses <u>fishing</u> activities and mandates, for example, consideration of past participation, current participation, and dependence on the fishery of the participants in the fisheries. Does this include processors? To the extent that the inshore/offshore amendment mandates a set percentage of fish be delivered onshore, would this be an extension of that logic? Would the Council (i.e., analysts) be required to quantify net benefits related to the IPQ proposal?

I believe the Council is concerned that we not go down a road of pursuing this proposal and then find out down the line that it is something they cannot do for legal reasons. Finally, there is considerable concern that even if IPQs themselves are legal, would it be a problem to allocate them to foreign owned entities? I think this about covers it Lisa, though I realize it may seem a bit vague at this point. Please call me after you review this memo.

Exhibit C.10.a
Supplemental Attachment 3
September 2003

U.S. DEPARTMENT OF JUSTICE
Antitrust Division

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August 27, 2003

James R. Walpole
General Counsel
United States Department of Commerce
National Oceanic and Atmospheric Administration
Washington D.C. 20230

Dear Mr. Walpole:

You have asked for the assistance of the Department of Justice Antitrust Division ("Department") in identifying antitrust issues associated with a price arbitration system that was proposed as part of a rationalization plan to manage crab fisheries in the Bering Sea and Aleutian Islands ("BSAI").[1] The plan was developed by the North Pacific Fishery Management Council ("Council") at the request of Congress to replace the current management program.[2] The NOAA General Counsel's Office, Alaska Region, also has asked the Department to comment on the likely effects on competition of the entire rationalization plan. The Department submits these comments in response to your January 9, 2003 letter and NOAA's request.

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[1] A fishery means "(1) one or more stocks of fish that can be treated as a unit for purposes of conservation and management and that are identified on the basis of geographic, scientific, technical, recreational, or economic characteristics, or method of catch; or (2) any fishing for such stocks." 50 C.F.R. 600.10.

[2] The Council is one of eight Regional Fishery Management Councils established pursuant to 16 U.S.C. 1852. Its region covers the States of Alaska, Washington and Oregon, and it has authority over the fisheries in the Arctic Ocean, Bering Sea and Pacific Ocean seaward of Alaska. 16 U.S.C. 1852(a)(1)(G). The functions of the Council include preparing for the Secretary of Commerce a fishery management plan for each fishery, conducting public hearings on fishery management plans, and reviewing processing in each fishery. 16 U.S.C. 1852(h). The Council was directed by the Consolidated Appropriations Act of 2001 (Pub. L. No. 106-554) to determine whether rationalization is needed in its fisheries and to analyze individual fishing quotas, processor quotas, fishermen cooperatives and quotas held by communities.

EXECUTIVE SUMMARY

The Department supports implementation of a new fishery management plan that would end the "race to fish" inherent in the current derby-style management plan. Under the current derby-style program, the season ends as soon as the total allowable catch has been fished, producing an undesirable "race to fish" among harvesters. The race to fish is economically inefficient for both harvesting and processing and likely dangerous to the participants. The Department therefore recommends that NOAA support individual fishing quotas ("IFQ") for harvesters, a reform that will end the race to fish. Provided that IFQ are easily transferable, the gains in efficiency from ending the race to fish – reducing overcapitalization and improving safety – are likely to outweigh the harm of any loss of competition among harvesters.[3] The Department recommends that the plan allow easy transferability of IFQ shares; otherwise the incentive for market participants to make efficient investment decisions will be reduced.

The Department further recommends that NOAA oppose individual processor quotas ("IPQ"), because IPQ will likely reduce beneficial competition among processors with no countervailing efficiency benefit. This lost competition could deter the development of new processed crab products, reduce the incentives for processors to make efficient investment decisions and reduce welfare for consumers of processed crab products. While harvester quotas should eliminate the harmful race to fish, processor quotas are not justified by any such beneficial competitive purpose.

If the goal of using IPQ is to compensate processors for overcapitalization, we urge NOAA to consider advocating more direct solutions, such as a program to buy excess processor equipment. We also understand that there are concerns with social goals such as preserving jobs in historic fishing villages. To the extent NOAA agrees with these goals, we recommend it consider advocating more direct solutions.

The Department also urges NOAA to oppose any form of sanctioned price arbitration. Allowing an arbitrator, rather than the market, to set price may distort the incentive of processors and harvesters to make efficient investments. Further, processors and harvesters must be cautious not to use the arbitration program as a way to agree on price with their competitors, which could violate the antitrust laws.

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[3] The Department of Justice has supported individual fishing quotas in the past. See, e.g. *Comments of the Department of Justice* in Proposed Rulemaking: Amendment 18 to the Fishery Management Plan for Alaska Groundfish Fisheries in the Bering Strait and Aleutian Islands, Docket No. 911215-1315 (Transferrable individual fishing rights would result in an efficient allocation of limited fishery rights.); Business Review Letter to the Pollock Conservation Cooperative, February 29, 2000 (The Department is not presently inclined to initiate an enforcement action against cooperative that allocated amongst itself the fixed quota of the BSAI pollock TAC.)

The binding arbitration proposal specifies that each processor will participate in arbitration individually and not collectively. Processors' independent participation in binding arbitration will not violate the antitrust laws. In contrast, competing processors that agree on the price they will pay harvesters would be engaged in price fixing that violates the Sherman Act. Liability cannot be avoided by having a third party arbitrator set the actual price to be paid. Similarly, competing processors that agree to use the non-binding benchmark arbitration price to set ex-vessel prices (or even as a starting point for ex-vessel price negotiations) could also be liable under the antitrust laws.

Harvesters that go beyond the contemplated arbitration program and agree among themselves to sell at the arbitrated price could violate the antitrust laws. However, harvesters would be immune under the Fishermen's Cooperative Marketing Act ("FCMA") if all participants in the arbitration are members of an eligible fishing cooperative.

Finally, the arbitration plan contemplates an exchange of competitively sensitive information which, if not handled properly, could raise antitrust concerns. Voluntary exchange of the information among competing harvesters and/or processors could violate the Sherman Act if it reduces competition. Harvesters and processors should be cautious in participating in any form of voluntary price arbitration or information exchange.

The Department's analysis here considers only the effects on competition of the proposals and whether participation in the program could result in antitrust violations. We have not considered other factors generally outside the purview of the antitrust laws, such as the social goal of protecting jobs in historic fishing villages or balancing the regulatory effects evenly among harvesters and processors. The Department is not in position to evaluate such interests. In making the ultimate recommendations, NOAA and the Council may wish to take such goals into account and balance them against the competition issues discussed here.

BACKGROUND

In developing its recommendations, the Department reviewed the rationalization plan, interviewed industry participants and examined economic research on rationalization programs. It is our understanding that the current derby-style system of fishery management works as follows: Each year, under joint management with the Council and NOAA Fisheries, the State of Alaska sets the total allowable catch ("TAC") for each fishery for the year. Once the fishing season is opened, harvesters are permitted to fish until projections determine that the TAC is reached. The fishing season is then closed. The season varies by fishery but can be very short, as little as 2 to 3 days at the fishery with the shortest season. A natural result of this system is that a "race to fish" developed, which led to over capitalization among harvesters and processors and to behavior that is dangerous to harvesters and results in less precise stock management.

In 2001, Congress directed the Council to determine whether rationalization of the fisheries under its management was needed. The Council was asked to analyze, among other things, the effects of IFQ and IPQ.

The Council detailed its proposal for rationalization of BSAI crab fisheries in its August 2002 Report to Congress and its May 6, 2003, letter to Congress.[4] Under the proposed plan, crab harvesters would be allocated IFQ "shares" for 100% of the TAC in a fishery. Ninety percent of these shares would be Class A shares that must be processed by a processor within that fishery who holds IPQ. Ten percent would be Class B shares, which could be processed by any processor.[5] The amount of IFQ issued to a particular harvester would be based on that harvester's historical catch in a fishery, computed over a qualifying period. IFQ shares would be fully transferable to anyone meeting certain requirements, subject to a limit on the number of shares that can be held by an IFQ holder.[6] The shares would be leasable by any IFQ holder for the first five years of the program and thereafter leasable only within harvester cooperatives.

Similarly, processors in each rationalized fishery would be allocated IPQ shares. IPQ shares would be issued for 90% of the allocated harvest, corresponding to harvester Class A shares. The amount of IPQ issued to a particular processor would be based on that processor's historical processing activity, computed over a qualifying period. No processor would be allowed to hold more than 30% of the IPQ in its fishery. The proposed rationalization plan includes a number of community protection provisions that limit the liquidity of processor shares.

The proposal includes a plan for binding arbitration to determine the price paid by a processor to harvesters for raw crabs, the ex-vessel price,[7] if the parties cannot reach mutually

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[4]The Council plan would apply to eight fisheries, which constitute all the large Alaskan Crab fisheries.

[5]The Council also proposes creating Class C shares to distribute 3% of the TAC to fishing vessel captains. This 3% will be allocated first, with the remaining 97% of the TAC being allocated to the remaining harvesters. For the first three years fishing vessel captains may sell their catch to anyone they wish. After three years, the captains must sell 90% of their 3% to IPQ holders, and may sell the other 10% of their 3% to any processor

[6]To be eligible to purchase IFQ a person would have to be a U.S. citizen and have at least 150 days of sea time as a harvester in a U.S. fishery. Share limits vary by fishery and are between 1% and 10% of the TAC. However, various methods exist to allow IFQ holders to combine shares. For example, subject to vessel caps, more than one IFQ holder may fish off of a single boat. In addition, there is no limit to the amount of IFQ that can be controlled by a cooperative.

[7]The "ex-vessel" price is the price paid for fish offloaded directly from the fishing vessel.

agreeable terms. The Council's preferred arbitration method is a "last best offer plan" under which the arbitrator's primary goal is to set a price that preserves the historical division of revenues between harvesters and processors.[8] The Council also proposes a pre-season, non-binding fleet-wide arbitration to develop and announce a guideline ex-vessel price for each fishery[9] that will "inform price negotiations between the parties, as well as the Last Best Offer arbitration in the event of failed price negotiations."[10]

ANALYSIS

I. INDIVIDUAL FISHING QUOTAS

The current derby-style management of the crab fisheries has led to a race to fish. With the TAC fixed, harvesters must fish quickly to maximize their share of the harvest, and thus they overinvest in crew, equipment and boats, and they engage in behavior that is dangerous to harvesters and makes product management more difficult. Similarly, because the catch is spoilable, processors overcapitalize so that they can accept and process the catch in a very short amount of time. This overcapitalization by harvesters and processors is economically inefficient.

The source of the overinvestment problem for both harvesters and processors is the incentive to race for the crabs. One way to solve these kinds of problems is to create permanent property rights in the harvest, as in the proposed IFQ program. Such programs have demonstrably lengthened the harvesting season and reduced capacity in many other fisheries, for example, in the halibut and sablefish markets.[11]

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[8]Our understanding of the Council's binding arbitration proposal is based on the February 2, 2003, Council Motion on Crab Rationalization.

[9]On April 5, 2003, in a Council Motion on C-2 Crab Rationalization, the Council added the proposal for pre-season non-binding arbitration. Our understanding of the non-binding arbitration is based on the April 5, 2003 Council Motion on C-2 Crab Rationalization, the April 2003 Council *News and Notes*, and the May 6, 2003 Council letter to Congress. It is unclear from the language in those documents whether the non-binding arbitration will produce one benchmark price for all crab fisheries or whether it will produce a separate benchmark price for each fishery.

[10]April 5, 2003 Council Motion on C-2 Crab Rationalization. In the May 6, 2003, letter to Congress the purpose of non-binding arbitration is described as follows: "The non-binding price formula is intended to provide a benchmark price that will be a starting point for negotiations and minimize the number of price disputes as negotiations progress."

[11]General Accounting Office, Individual Fishing Quotas (GAO-03-159, December 2002) at 20.

If the race to fish were ended, harvesters (and processors) would be left with an excess of capital investments. Endowing harvesters with tradeable shares would compensate them for these investments. Each harvester would receive a permanent property right to fish based loosely on his investment in capital. Those harvesters who leave the market could sell their shares and therefore receive compensation.[12]

The Council has proposed to allocate IFQ to harvesters based on a harvester's historical participation in a fishery. We have no reason to believe that such allocation will result in an unreasonably inefficient distribution of IFQ. If shares are made transferable, so that they could be sold or leased to more efficient harvesters, any inefficiencies in the initial distribution should be temporary.

IFQ programs have the potential to reduce capital investments below the optimal level. Ideally, a rationalization program would preserve the competition that incentivizes participants to make optimal investments and remove the incentive to overinvest. However, in a quota program, participants may inefficiently underinvest in capital, since they no longer can increase their profits by competing shares away from others. Efficiency can be preserved by creating a liquid market for quota shares. In other words, the ability to buy and sell IFQ freely guarantees that the most efficient market participants will harvest the catch. Rather than taking share from competitors, a firm buys (or leases) shares from less efficient firms, allowing the market to realize the efficiency gains. As the market for quota becomes less liquid, such as restrictions on leasing or absentee owner provisions, inefficiencies will arise.[13]

The proposed rationalization plan has provisions limiting liquidity, such as the prohibition on leasing IFQ outside of cooperatives after the fifth year. To the extent NOAA supports goals other than economic efficiency, it should weigh those goals against the potential for reducing economic efficiency and urge that those goals be accomplished in a manner least harmful to the market.

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[12]The Department offers no view on whether harvesters (or, as we discuss later, processors) should be compensated for overcapitalization, but urges NOAA to consider the effects on economic efficiency of the compensation plan. For example, auctioning the initial shares instead, which would not compensate harvesters, could improve efficiency. In addition, an auction would capture for the public some of the value from the scarce resource, which could be used for public purposes. The proceeds could, for example, be reinvested in the fisheries, used to fund conservation programs or used to partially compensate harvesters and/or processors for overcapitalization.

[13]The market would also not function efficiently if harvesters had strategic reasons for holding shares, for example to prevent entry.

II. INDIVIDUAL PROCESSOR QUOTAS

The second part of the proposed rationalization plan is to issue IPQ, which no fishery in the United States to date has implemented. Using IPQ likely will reduce competition among processors, which could discourage efficient investments, limit new product development, and undercut competition in selling processed crab products. With IFQ, any efficiency losses are balanced against efficiency gains – eliminating incentives for harvesters *and* processors to overcapitalize as well as improving stock management and safety. In contrast, there are no such IPQ benefits. Thus, we urge NOAA to oppose processor quotas, because of their anticompetitive effect, and to accomplish the program's other goals in ways that do not limit competition.

A. Effect on Competition of IPQ

1. Inefficient investment

In a market without IPQ, when a processor invests in technology to lower its costs, it can increase profits by offering harvesters a slightly higher ex-vessel price and thereby win a greater share of the catch. Under an IPQ program, the same investment may not be profitable because it will lower costs only on the processor's quota share of the market. The processor cannot earn further profits by taking share from other processors. Thus, some efficiency enhancing investments that would have been profitable in the absence of IPQ may not be made under this proposed program.

The current proposal also does not take full advantage of ways to mitigate these inefficiencies. First, the creation of Class B IFQ shares could preserve some of the investment incentives for processors. However, preserving competition for the small percentage of the harvest represented by Class B shares is unlikely to preserve fully the incentive to make optimal investments. Second, these inefficiencies could be mitigated by making the market for IPQ as liquid as possible. However, the current plan appears to impose significant restrictions on the liquidity of IPQ. We understand that many of the limitations are designed to protect the historic interests of fishing communities. NOAA and the Council should address these conflicting goals.

2. Fewer new products

IPQ could also stifle new product development. What new products might appear under different regulations is difficult to predict, but some markets changed to IFQ-only programs have developed in positive ways. For example, ending the race to fish in the halibut fisheries may have contributed to an expansion in the delivery of fresh halibut.

Market participants expect similar product innovations in processed crab. But issuing IPQ could curtail the creation of such new products. First, new entrants that might to develop new products may have difficulty acquiring IPQ, either because of the limitation imposed on their transferability or because existing processors want to deter entry. Only the 10 percent of the market covered by Class B shares is fully available to competition. Second, some existing processors might be better positioned to create new products, but limited by their endowed IPQ and constraints on acquiring additional shares. Third, any processor's incentives to make investments in new products is limited by its endowed share of IFQ and constraints in the market for IPQ. While increasing the liquidity of IPQ could mitigate some of these concerns, we see no countervailing efficiency benefit from IPQ to justify these potential problems.

3. Less competition

Crab processors produce multiple products for different consumers using different techniques. Market participants we interviewed stated that ending the race to fish would only increase product differentiation because processors would have more time to work with the crabs. The likely result is that more of the harvest will be devoted to higher value products and that prices of these products will fall. Endowed processor shares and transferability limits might reduce this competition by altering processors' incentives to invest in capital that would lower their costs, a benefit that could be passed to consumers, or by altering product mix.

B. Arguments by IPQ Proponents

Proponents seem to make two arguments in favor of implementing IPQ. First, they argue that, if harvesters are to be endowed with IFQ to compensate them for stranded capital, then processors should also be compensated by endowing them with IPQ. They state that overcapitalized processors will bid up the ex-vessel price, shifting economic rents from processors to harvesters. In response, it is likely that overcapitalization is a short-run problem,[14] and thus creating a permanent property right to compensate processors is an inefficient solution. If NOAA believes that processors should be compensated, a direct one-time buyback of capital from processors would be more desirable.

Second, IPQ proponents argue that any rationalization plan must make all participants no worse off than under the current regime. Undoubtedly, some participants will benefit from changes while other will not, but the experience of other fisheries suggests that long run winners and losers are hard to predict. For example, the GAO concluded that the halibut IFQ-only program had a varied effect on processors; some were better off and some worse off.[15]

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[14]Without compensation, many processors will likely be worse off in the time it takes for processors to remove unprofitable capital from the crab markets. How quickly capital adjusts to its optimal level will depend on the ex-vessel price and the value of alternative uses of that capital.

[15]General Accounting Office, Individual Fishing Quotas (GAO-03-159, December 2002) at 4.

III. ARBITRATION AND INFORMATION EXCHANGE

You have specifically asked us whether the system of binding arbitration as described in the Council Motion on Crab Rationalization, dated February 2, 2003, would violate the antitrust laws if it were not legislated but instead were instituted by agreement among harvesters and processors. Below we address the legality of participating in the binding and non-binding arbitration, the economic effects of the proposed arbitration, and whether sharing the information submitted to the arbitrator among harvesters and processors could violate the antitrust laws.

Based on the documents cited in footnotes 9 and 10, we understand that the arbitration process will work as follows: Prior to the harvesting season, harvesters and processors in each crab fishery will jointly appoint a market analyst/arbitrator to review harvester and processor data and market conditions and announce a pre-season formula for setting a non-binding ex-vessel price. The stated purpose of developing a non-binding price is to guide the individual negotiations between processors and harvesters and later to guide the arbitrator in the binding arbitration process. After the non-binding price is announced, processors and harvesters may then negotiate contracts, subject to the amount of IPQ and IFQ they hold. Harvesters can make joint or individual bids. Harvesters that are unable to make a contract with a processor through negotiation may choose to use binding arbitration (or wait and later use the price that is developed in others' arbitrations). In the arbitrations that do proceed, separate and independent arbitration using a "last best offer" method is conducted for each processor.[16] All harvesters who entered arbitration with a processor will receive that processor's arbitrated price.[17] Harvesters who earlier waited and did not arbitrate can then choose a processor and will receive the price that was developed in the binding arbitration conducted with other harvesters.[18]

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[16] If several groups of IFQ holders have matched with an IPQ holder, each may make a last best offer.

[17] The Council's recommended arbitration proposal charges the arbitrator with establishing a price that "preserves the historic division of revenues in the fisheries" while considering elements including current ex vessel prices; consumer and wholesale product prices for the processing sector; innovations, developments, efficiency and productivity of the different sectors; and the interest of maintaining financial health of the different sectors.

[18] Of course, harvesters may choose a processor only until that processor's IPQ is filled. It is not clear how harvesters who did not arbitrate will be matched to processors with remaining IPQ. If the ex-vessel price developed in arbitration for one processor is high, there may be excess demand by harvesters to opt into this arbitrated price. How that excess demand will be rationed is unclear.

A. Legality of Participating in Arbitration

As we understand the proposed arbitration program, participation by harvesters and processors is voluntary. For a harvester and processor to independently choose to use arbitration to develop the price at which they will agree to trade crabs would not violate the antitrust laws. However, if processors agree among themselves to use arbitration or to adhere to a price developed in arbitration, that agreement likely would violate the antitrust laws. The same is true for harvesters, except that harvesters may have immunity under the FCMA. These liability and immunity questions are discussed below

1. Horizontal Agreements on Price

An agreement by a group of harvesters or processors to trade crabs at a price set by an arbitrator could be viewed as a naked agreement not to compete on price and thus an automatic or "per se" violation of Sherman Act §1, 15 U.S.C. §1. It is well established that an agreement for the purpose of "raising, depressing, fixing, pegging, or stabilizing" price is illegal per se. *United States v. Socony-Vacuum Oil Co.*, 310 U.S. 150, 223 (1940).[19] Even if the agreed price is set by a third party such as an arbitrator, all that matters for liability is that competitors agreed to charge that same price. In addition, liability here would extend to harvesters that agree among themselves to participate in the arbitration process and harvesters who later join that agreement by opting in once the arbitrator sets a price; they too would be fixing the ex-vessel price by agreeing with their competitors to abide by the arbitrator's decision.

Harvesters or processors may violate the antitrust law even if they agree with competitors only to use the pre-season benchmark price as a starting point for negotiations.[20] If ex-vessel prices were affected by the non-binding arbitration (as the rationalization plan intends), a court could reasonably infer that the non-binding arbitration was part of an illegal price fixing agreement.

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[19] In some limited circumstances, an agreement to set price could be examined under a "rule of reason," which requires the court to "assess and balance a restraint's harms benefits and alternatives". VII Phillip E. Areeda & Herbert Hovenkamp Antitrust Law ¶1508a (2nd ed. 2003) For a discussion of analyzing agreements among competitors, *see* Antitrust Guidelines for Collaborations Among Competitors (Federal Trade Commission & U.S. Department of Justice, April 2000).

[20] *Plymouth Dealers' Association of Northern California v. United States*, 279 F.2d 128, 132 (9th Cir. 1960) ("The competition between the Plymouth dealers and the fact that the dealers used the fixed uniform list price in most instances only as a starting point, is of no consequence. It was an agreed starting point; it had been agreed upon between competitors; it was in some instances in the record respected and followed; it had to do with, and had its effect upon, price." [footnote omitted]).

Under the proposed binding arbitration, processors will not violate the antitrust laws so long as each participates individually, as required by the Council's arbitration proposal. Harvesters will not violate the antitrust laws so long as each participates individually or as part of an FCMA cooperative.[21]

2. Antitrust immunity for fishermen's cooperatives

Harvesters can avoid antitrust liability for the conduct described above by joining a fisherman's cooperative. Under the Fishermen's Cooperative Marketing Act, 48 Stat. 1213 (1934), 15 U.S.C. §521, harvesters that join a cooperative and set prices in a manner consistent with the FCMA will be exempt from of the antitrust laws with respect to that price setting. *United States v. Maryland & Va. Milk Producers Assn.*, 362 U.S. 458, 466-467 (1960).[22] However, the cooperatives participating in arbitration must include only members who are eligible for immunity under the statute; if a cooperative includes members who are not eligible for antitrust immunity under the FCMA, the entire cooperative loses its immunity. *National Broiler Mktg. Ass'n v. United States*, 436 U.S. 816, 828-829 (1978); *Case-Swayne Co. v. Sunkist Growers, Inc.*, 339 U.S. 384 (1967); *Hinote*, 823 F. Supp. at 1354.

a. Vertically integrated harvester-processors

An important issue is whether a harvester that is vertically integrated with a processor can be a member of an FCMA fishermen's cooperative. The Supreme Court explicitly declined to decide this issue in *National Broiler*, U.S. 436 at 828, n. 21. The *Hinote* court found that vertically integrated catfish processors were not exempt from the antitrust laws for conspiring to fix the prices of catfish products. However, the activity challenged in the case was not the processors' conduct as farmers but their conduct in selling finished catfish products. *Hinote*, 823 F. Supp. at 1358 -1359. Under *Hinote* it still is possible that a vertically integrated harvester could join an FCMA cooperative and be exempt from antitrust liability with respect to its activities as a harvester, making an agreement to set the ex-vessel price of crabs. In determining whether a vertically integrated harvester can be a cooperative member without causing a cooperative to lose its immunity, a court is likely to look at a variety of factors, including the nature of its harvester and processor activities, the extent to which its activities are integrated, and the precise nature of the challenged agreement among cooperative members. *See id.*

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[21] Although processors do not have immunity under the FCMA, a processor that participates in arbitration solely as a buyer should have no antitrust liability even if a group of harvesters with whom the processor negotiates are found to have engaged in non-immune price fixing.

[22] The *Maryland* case, as well as other cases concerning cooperative exemptions was decided under the Capper-Volstead Act of 1922, 42 Stat, 388 (1922), 7 U.S.C. §291 which provides for the same kinds exemptions as the FCMA. Cases decided under Capper-Volstead are precedent for cases under the FCMA. *U.S. v. Hinote*, 823 F. Supp. 1350 (S.D. Miss. 1993).

b. Agreements between cooperatives and non-members

Under the FCMA, cooperatives may not combine with non-cooperatives or "restrain trade by combining with nonexempt parties to set either resale prices for the coöperative's products or purchase prices paid to their nonmember competitors." IA Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶1508a (2nd ed. 2000) Thus, it is possible that all harvesters in a cooperative could lose their Capper-Volstead immunity if the cooperative and non-member harvesters agreed to participate in binding arbitration with the same processor.

We are unaware of any direct authority on whether a cooperative can act collectively with persons who are eligible to join but have not done so. Of course, legal immunities are narrowly construed, and antitrust immunity under the FCMA in particular has been strictly interpreted.[23] One reason that the immunity might not be read to allow agreement with non-members is that non-members are not subject to regulatory oversight. Both the FCMA and Capper-Volstead allow regulators to challenge conduct otherwise immune from the antitrust laws if the regulator believes that the price of an agricultural product is "unduly enhanced" by the activities of the cooperative.[24] A harvester that is not a member of a cooperative would not be subject to this oversight. Thus, it would be inconsistent with the intent of the statute to allow harvesters to enjoy the antitrust immunity afforded cooperative members.

3. Legality of information exchanges

We understand that processors and harvesters participating in binding arbitration wish to have access to all information used by the arbitrators, including information from arbitrations between other harvesters and other processors.[25] Thus, each harvester and processor would see the data submitted to the arbitrator by every other harvester and processor. Such exchange of competitive information could violate the antitrust laws.

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[23]*See, e.g., Hinote*, 423 F. Supp. at 1354 (In order to have antitrust immunity under the FCMA defendant must establish that not only was the cooperative entitled to FCMA protection, but that all entities with which defendant allegedly conspired were entitled to protection.), *Case-Swayne*, 339 U.S. at 393 (Capper-Volstead Act is a special exception to a general legislative plan and therefore Court is not justified in expanding the Act's coverage.).

[24]The FCMA regulator is the Secretary of Commerce. 15 U.S.C. §522. The Capper-Volstead Act regulator is the Secretary of Agriculture. 7 U.S.C. §292.

[25]The February 2, 2003, Council Motion on Crab Rationalization states "Subject to limitations of antitrust laws and the need for proprietary confidentiality, all parties to an arbitration proceeding shall have access to all information provided to the arbitrator(s) in that proceeding." We have been informed by NOAA staff and Council staff that processors and harvesters would be given data from arbitrations that they did not participate in.

Information exchanges can be procompetitive, and therefore they are not automatically illegal but are examined under a rule of reason. *United States v. Citizens & Southern National Bank*, 422 U.S. 86, 113 (1975). An agreement among competitors to exchange information can be a violation of the Sherman Act if it is found to have an anticompetitive effect. *Todd v. Exxon Corp.*, 275 F.3d 191, 198-199 (2nd Cir., 2001), even without an agreement to adhere to a particular price.[26]

We cannot say that the transfer of any particular type of data would be benign. When price, capacity and cost data are shared among competitors, the ability to monitor a collusive agreement for "cheating" can improve significantly; thus, if the inability to monitor collusion is a significant factor in preventing an agreement, data transfers can make an agreement possible. Similarly, when firms interact repeatedly in a market, exchanges of price data can help them reach a collusive price even without an explicit agreement; thus, if processors are exchanging wholesale crab product price data, they may be able to use that exchange to reach an implicit agreement on prices for those products.[27]

The information that would be disseminated here includes data on historical distribution of wholesale crab product revenues between harvesters and processors,[28] the pre-season market report (the outcome of the non-binding arbitration), other data on market prices and completed arbitrations, and data voluntarily submitted by IFQ and IPQ holders. If that data were

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[26]*United States v. Container Corp. of America*, 393 U.S. 333, 1336 (1969) ("exchange of price information seemed to have the effect of keeping prices within a fairly narrow ambit."); *see also United States v. United States Gypsum Company*, 438 U.S. 422 (1978), ("exchanges of current price information, of course, have the greatest potential for generating anticompetitive effects and although not per se unlawful have consistently been held to violate the Sherman Act").

[27]In some cases, disseminating information to buyers and sellers can be pro-competitive if that information facilitates efficient trading. This procompetitive need for market information usually creates strong financial incentives for independent third parties to step in and provide that information. While we may be concerned that a market report could facilitate price fixing no matter who provides the information, when the competing market participants themselves organize to do it, those concerns are heightened. In the case of the market for raw crabs, the absence of third parties providing (or attempting to provide) this service currently makes us skeptical that informational problems are causing market failure; nor does the rationalization plan itself appear to create new informational problems. Finally, the benchmark price developed during non-binding arbitration does not appear to address any kind of market failure: With a stated purpose of reducing price disputes and guiding the decision of the arbitrator in the binding arbitration process, the benchmark price appears to be intended to facilitate an agreement to set prices.

[28]February 2, 2003, Council Motion on Crab Rationalization at 4.

disseminated to processors, it could facilitate agreements to fix prices or limit capacity for processed crab products, newly developed crab products, or crabs delivered by holders of Class B shares. The shared data could also effectively suppress price competition for processed crab products even without a direct agreement. For example, if a new product is developed and processors learn each others' capacity for that product, then that knowledge could soften price competition for that product.

We have been told that some price data is already largely public, but the quality of that information is not clear.[29] If disseminating the data provides no new, improved or more accessible information to processors, then it likely is not problematic. However, if the exchange of data increases the quality or reliability of already public data, antitrust concerns could arise.

We were told in interviews that harvesters and processors want access to all data used by the arbitrator so that they can insure that the data is accurate. This might justify only very limited information exchanges that facilitate the arbitration process.[30]

C. Economic Effects of the Proposed Arbitration

One likely outcome of implementing either an IFQ-only or an IFQ-IPQ program is that bargaining power of harvesters and processors in negotiating ex-vessel prices will change, resulting in a new division of the economic rents created by crab harvesting and processing. Some argue that an IFQ-only program will shift bargaining power towards harvesters. Others argue that an IFQ-IPQ program will shift it towards processors.[31]

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[29]If that data is largely "word of mouth," as we understand it is, the arbitration process could significantly improve the quality of information about prices.

[30]The arbitration proposal does not state whether data would be disseminated as it is received by the arbitrator or only after he has announced the price. If the data submitted in a given arbitration will be disseminated to participants in that arbitration as it is received, it could serve a purpose by enabling harvesters or processors to submit "rebuttal" data. However, we see no justification for harvesters or processors seeing data from arbitrations other than the ones in which they are participating. If the data is disseminated after the arbitrator has made his decision, the absence of a right of appeal of the decision appears to mean that there is no remedy available to a harvester or processor who believes that an arbitration decision was made on the basis of incorrect data and thus no need for the data to be disseminated.

[31]Because the Council proposes endowing IFQ and IPQ, rather than selling them, we assume these endowments are designed, at least in part, to compensate market participants for overcapitalization. If issuing both IFQ and IPQ rendered IFQ worthless because all bargaining power would accrue to processors (as some believe), then the compensation scheme would fail.

The Council has made it an explicit goal of the rationalization plan to preserve the historic division of revenues between processors and harvesters, and it has chosen the binding and non-binding arbitrations as its method for preserving that division.[32] Apart from the antitrust concerns, arbitration to preserve the historic division of rents has the potential to inefficiently affect processor and harvester investment decisions. For example, processors could be deterred from making efficient investments because the arbitrator may, in the name of maintaining the historic division of revenues, transfer too much of the benefits from that investment to harvesters by setting the ex-vessel price too high. Conversely, setting the ex-vessel price too low could similarly deter harvesters from making efficient investments. When the division of rents is set by market mechanisms, the optimal investment decisions are preserved. In addition, this arbitration scheme is complex and could have many unpredictable and undesirable consequences as market participants learn how the system can be manipulated. For example, market participants have an incentive to manipulate the data they submit to the arbitrator to affect the perceived historic division of revenues or to distort (in their favor) the price required to meet this goal. Thus, there is no guarantee that arbitration can even meet its stated goal of preserving the historic division of revenues.[33]

CONCLUSION

The Department endorses the proposed IFQ program. The current race to fish causes overcapitalization by harvesters and processors and results in market inefficiencies, danger to harvesters and difficulty in managing the crab population. The benefits from a system of readily tradeable IFQ in eliminating these externalities are likely to outweigh any negative effects of eliminating competition among harvesters.

The Department urges NOAA to oppose IPQ. Processor shares could deter product innovation, reduce the incentive for processors to make optimal investment decisions and raise prices for processed crab products, all without countervailing efficiency benefits.

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[32]Because of the difficulties of measuring the division of economic rents, the Council recommends maintaining the historic division of revenues as a proxy for rents. However, some of the criteria the arbitrator is directed to consider, such as innovations and efficiencies, make it clear that the goal is to divide economic rents. BSAI Crab Rationalization Program Trailing Amendments, Community Protection Binding Arbitration, April 2002 at 21-23.

[33]We do not advocate substituting regulatory rate-making for market forces. We do note, however, that where legislators have chosen to have rates set by regulation they have instituted procedural rules that allow the quality of data used by the regulator to be tested and provide a right to appeal the regulator's decision. In the case of the proposed arbitration system no such safeguards exist.

The Department urges NOAA to oppose the proposed non-binding and binding arbitration. The proposed arbitration could be used to facilitate price fixing agreements, and participants in the arbitration who are not immune from the antitrust laws because of membership in a FCMA cooperative could be in violation of those laws. Arbitration is not a substitute for market forces and may distort the incentives of processors and harvesters to make efficient investments. It is also unwieldy and complex, and thus subject to manipulation or significant error.

Based on the competition and antitrust law concerns that we have discussed, we urge NOAA to request that the Council develop a rationalization plan that does not include IPQ or arbitration.

Sincerely,

R. Hewitt Pate

Agenda Item C.5.d
Public Comment
June 2005

Pacific Marine Conservation Council

April 27, 2005

Ginny Goblirsch
Committee Representative, Trawl IQ Committee
PO Box 9
Otter Rock, OR 97369

Dear Ginny,

Pacific Marine Conservation Council (PMCC) has on a number of occasions expressed serious concerns about both the process and substance of the development of a trawl-only IFQ program for the west coast groundfish fishery. This letter is not intended to rehash concerns which have been fairly well documented in the scoping documents. Rather, we would like to make inquiry as to specific ways that the TIQC proposes to minimize adverse effects from IFQs on fishing communities.

For example, consolidation resulting from concentration of control of quota shares could have extremely undesirable impacts on some communities; in the worst case loss of the entire commercial fishing fleet, processing capacity and other shoreside support. How does the Committee propose to limit and enforce caps on control of quota shares?

Distributed quota would theoretically be converted to pounds of fish available for harvest each year based on scientifically acceptable criteria. These fish are important not only to the quota holders but also to coastal communities as a vital part of their economy. What provisions does the Committee propose to include in the IFQ program to ensure that quota shares are fished and not just held for investment or as a means of reducing the mortality of individual species?

We are interested in evaluating any proposals the committee may offer to address community concerns. However, we believe that it essential that a separate process be developed to explore a full range of community-based management solutions. This work needs to take place prior to allocations to support a trawl-only IFQ program. If these alternatives are not allowed to be developed, premature allocation decisions could preclude innovative solutions that could better serve both the marine environment and coastal communities.

Sincerely,

Peter Huhtala
Senior Policy Director

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April 27, 2005

Ginny Goblirsch
Committee Representative, Trawl IQ Committee
PO Box 9
Otter Rock, OR 97369

Dear Ginny,

We as members of West Coast fishing communities are concerned that development of the Trawl IQ program is moving forward at a pace that is not allowing for proper public participation and outreach to communities.

Recognizing that the trawl IQ committee has a very specific charge, we request that an additional committee be convened to analyze allocation options including community quota systems. This committee should be working on a parallel path to the trawl IQ committee and providing information to the allocation committee. We appreciate the effort you made to meet in April in Port Orford and discuss some of these concerns.

We are particularly concerned about issues relating to marine and human community impacts resulting from a trawl IQ program. We are also concerned that allocation decisions driven solely by the development of a trawl IQ program will limit the opportunity for development of alternative programs. We feel strongly that significant and meaningful outreach must be done to fishing communities to discuss dedicated access program options and a clear vision of the future structure of the groundfish fishery developed by all sectors of the fishing industry. Communities not interested in, or eligible for, quota through the trawl IQ program should have the flexibility of developing community management alternatives not constrained by allocations that were driven by the development of a trawl IQ program.

Given our concerns outlined above, we respectfully request that the Council convene a separate entity to review community-based options at the same time the allocation committee is doing its work.

Sincerely,

Leesa Cobb, POORT Communication Coordinator Port Orford, OR
Gary Anderson, Port of Port Orford, Manager
Bob Francis, Port Townsend, WA
Jim Hie, Bodega Bay, CA

Environmental Defense Testimony On Trawl Individual Quota Program Development

Eighteen months ago, the Council took an historic step toward reforming groundfish management by initiating development of Individual Quota program options for the trawl groundfish fishery. Your unanimous vote to implement your Strategic Plan (2000) to manage fishing capacity showed a commitment to moving to a more sustainable and productive management regime that fundamentally changes incentives to the benefit of the resource as well as of the fishing industry.

Since that time, you have completed the EIS public scoping process. Council staff, NMFS staff, and other experts have provided the Trawl Individual Quota Committee (TIQC) with background information on how various design issues have been dealt with in other multi-species programs around the world, as well as providing some preliminary analysis. Using their collective understanding of the dynamics of the trawl groundfish fishery, the TIQC members engaged in productive deliberations, bringing to bear this information and public comments. The result is an excellent range of alternatives for your consideration. The Enforcement Committee and an Independent Experts Panel have also applied their expertise to the information now before you.

We urge you to adopt the unanimous recommendation of the TIQC committee and move the recommended range of alternatives forward for further analysis. Empirical evidence from around the world, including from multi-species groundfish fisheries, supports our belief that a well-designed IFQ program is a critical component of an effective management strategy. With appropriate sideboards, IFQs can help address environmental concerns including bycatch reduction and provide for a sustainable and economically viable fishery that supports healthy coastal communities.

We believe that the range of alternatives developed by the TIQC, when analyzed, will provide the Council with the information needed to evaluate the trade-offs between alternative program designs in terms of addressing the biological economic and social objectives of the plan. With this information the Council will then be able to choose a preferred alternative and send the completed package out for public review.

We'd like to highlight a few issues and related design issues that we believe are particularly important:

Species Groups and Management Tools (TIQC Decision Table A)

Our preference is to allocate IFQ for all OY species, including incidentally caught species. Sectoral bycatch caps should be established for incidentally caught species, including rebuilding rockfish species and prohibited species. Our preference is for transferable individual incidental species IFQs and prohibited species IBQs (e.g., for halibut), as we believe this will maximize individual accountability. However, we recognize that at very low OYs, pooled management may be preferable. Both should be evaluated to determine the best method to maximize flexibility and minimize bycatch and discards.

Area Allocation of OY/ IFQs (TIQC Decision Table B)

IFQs should be stock-based, not necessarily coastwide. During the analysis phase of the EIS, a group of stock assessment scientists, managers, and fishermen with local knowledge should be convened to evaluate whether or not sub-stock based area management will improve stock assessments, sustainability and overall yield. Serious consideration should be given to area allocation on a smaller than INPFC area basis using area distributions that are consistent with catch history, survey data and habitat. **We recommend that the Council approve Process Option 2.**

Methods to monitor for localized depletion on a on-going basis using fishery independent and dependent data sources should be developed. Should localized depletion occur, there should be a procedure to adjust area-specific IFQs or take other remedial action.

IFQ Program Design Alternatives (TIQC Option Table C-1)

Initial Allocation

We do not have a complete preferred initial allocation option at this time but believe that initial allocation must ultimately be perceived as equitable. Further, analysis should assess whether allocation rules maintain the flexibility in the harvesting and delivery of fish that is at the heart of a catch share system and must not result in anti-competitive effects.

We believe that the range of alternatives developed by the TIQC, combined with the Community Stability Hold-back, recognizes contribution to, and dependence upon, the fishery of harvesters, processors and coastal communities and should be analyzed to assess the trade-offs between varying options.

Community Provisions

The Magnuson-Stevens Act requires that any IFQ program (or other management regime) take into account the importance of fisheries to coastal communities to provide for their continued participation and minimize adverse impacts.

We support analysis of the “Community Hold-back” option that has been proposed by the coastal community representative on the TIQC. We suggest that a group including coastal community representatives and others be convened to further develop appropriate criteria for ranking proposals and refine the operational aspects of this provision.

Transfer and Use Rules

We believe that relatively unrestricted transferability, subject to accumulation limits, is an essential component of a multi-species IFQ program, necessary to achieve the efficiency objectives and to facilitate a reduction in discards.

In order to provide flexibility and improve the ability to match quota holdings to an individual's mix of catch, as well as facilitate crew and others to invest incrementally in the fishery, we support highly divisible quota shares, and quota pounds divisible to the pound.

Program Monitoring and Administration

Tracking IFQ, Monitoring Landings and Enforcement: An effective tracking, monitoring, and enforcement program, coupled with strong sanctions for violations is an essential component of an effective IFQ program. As discussed before, we believe that unless a video-monitoring system with full retention can be shown to be sufficient for at-sea monitoring, 100% observer coverage will be needed. In addition, shore-side monitoring, and an effective electronic landings and IFQ tracking system will be needed.

Cost Recovery: We support the recovery of the incremental costs of administering, monitoring and enforcing the program, at a minimum, from share holders. As the IFQ program matures and revenues increase, we recommend that even more costs are recovered in return for the allocation of these valuable privileges to profit from the public trust.

Program Review

A mandatory program review is essential to the IFQ program. We support monitoring discard mortality annually as discussed at the last Committee meeting. Measurable performance indicators should be developed for each objective and guiding principle-related criteria. Actions should also be identified which may be taken if specific performance criteria are not met.

Summary

Many conservation, social, and economic benefits will flow from the IFQ program that you ultimately adopt. However, completely unconstrained market forces can result in undesirable levels of consolidation and dislocation. Much has been learned in recent years about how to engineer IFQ systems to ease the transition from open or limited access to IFQs. While caps on consolidation, area allocations, holdbacks for communities, and other measures intended to soften impacts may result in some loss of economic efficiency, IFQ systems are robust enough to generate substantial benefits even with these constraints. We believe that full analysis of the range of options that have been recommended will enable the Council to ultimately implement an IFQ program that effectively balances among conservation, economic, and social objectives for the greatest benefit to the resource, the fishing industry, the region and the nation as a whole.

June 7, 2005

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220

Re: Agenda Item C-5

Dear Dr. McIsaac and PFMC members,

The purpose of this letter is to encourage the council to continue its work on developing and analyzing a trawl groundfish IFQ program.

We are the operators of the fishing vessel Muir Milach, with which we entered the whiting fishery in 1979. We currently deliver whiting to a processor in Illwaco Washington. Along with many other participants in the whiting fishery, we believe that a rationalized fishery would offer the tools to address bycatch issues which threaten our ability to harvest the whiting TAC.

We appreciate the work that has been done by the Council's TIQC committee. The most recent meeting was productive and resulted in more focused alternatives for the management of whiting and other trawl groundfish.

It is important that the Council continue on its path to analyze the impacts of the various approaches to structuring a rationalization program. It is particularly important to do so in a forum governed by the National Standards of the Magnuson-Stevens Act, where all stakeholders have the opportunity to participate in an open and transparent process.

We have lobbied our congressional representatives and the NMFS to make funds available for the Council to continue its analytical work. When i last spoke to Dr. Hogarth about the need to fund the Council's analysis, he assured me that the agency was committed to supporting the Council's work on this.

However, we are concerned that the uncertainty about the Council's commitment and ability to continue this process has lent an air of legitimacy to attempts by some to bypass the Council process and go directly to Congress with draft legislation for the whiting fishery.

We believe that the Council should retain the lead role in this process. If the Council analysis ultimately results in recommendations that require Congressional action, at least the development of those recommendations will have occurred in a forum where all stakeholders have access to the process and opportunity for input.

When programs are developed in secrecy and taken to Washington DC, those with full time lobbyists have a far greater role in determining the outcome. If we are truly concerned with impacts on trawl groundfish vessel owners, skippers and crew, as well as impacts on processors, communities and those involved in non-trawl fisheries, the Council is the best available arena for all impacted stakeholders to participate.

Failure of the Council to maintain its leadership role in this issue will place it in the position of implementing Congressional mandates that will detract from other Council priorities. It will lend support to the notion that Regional Councils are not the appropriate way to manage fisheries, but rather that fisheries management should be centralized in Washington DC.

We have recently heard it said that the only way to move forward to rationalize whiting fisheries is to "align yourself with raw political power." While that may be the fastest way, we believe it is neither the only way, nor the best and fairest way.

Please stay the course, and send a clear message to Congress that this Council is not abdicating its role as the body charged under the Sustainable Fisheries Act with developing management programs for fisheries under its jurisdiction.

On behalf of my partners, and our skipper and crew, we thank you for considering our comments.

dave fraser

FV Muir Milach
P. O. Box 771
Port Townsend, WA 98368

Text for presentation to Pacific Fisheries Management Council, June 16 2005.

Management benefits of moving to dedicated access.

Ray Hilborn
School of Aquatic and Fishery Sciences
University of Washington

Introduction

I am here to make a presentation on behalf of WWF to describe the benefits of dedicated access mechanisms such as ITQs for fisheries management. I base this testimony on 30 years of experience in working in commercial, recreational, subsistence and aboriginal fisheries, primarily in the U.S., Canada, New Zealand and Australia. I have worked in many fisheries that use ITQs or other forms of dedicated access including the Canadian sablefish fishery, the Canadian groundfish trawl fishery, most New Zealand fisheries, and a number of fisheries in Australia. I served on the scientific advisory board of the Presidents Commission on Ocean Policy, on the Ocean Studies Board of the National Research Council. I chaired the NRC panel on Cooperative Research with the National Marine Fisheries Service, and served on panels on Stock Assessment Methods, and New England Groundfish.

This experience has provided me with a number of illustrations of how dedicated access provides improvements in fisheries management.

The Potential of Fisheries

Fisheries should be a source of enormous wealth to nations, Iceland maintains one of the highest standards of living in the world with fishing and fish products dominating its economy. They have done so by concentrating on making their fisheries profitable by using dedicated access … largely ITQs. The Falkland Islands fisheries authority returns $100,000 per person from access fees charged to foreign fleets. When managed well fisheries should provide jobs and income for families, and revenue for national economies. As you well know this is not the case in most U.S. fisheries, where jobs and income for families are declining, and the government subsidizes fisheries by paying for almost all data collection, research and management costs.

The key to making fisheries profitable and sustainable is to remove the incentives for more and bigger boats, and instead to provide incentives to increase recovery rates, product quality and sustainability of the resource. The economic success of the coops for Pacific hake and Bering sea pollock, and the ITQ fisheries for groundfish, halibut and sablefish in Canada and for black cod and halibut in Alaska are evident to everyone.

In these forms of "dedicated access" fishermen make more money by striving to reduce costs and improve quality, rather than catching the fish before someone else. I believe it is now almost universally accepted that limiting the "race-to-fish" is the key to economic viability of fisheries, the debate comes over what form of dedicated access to use, and who should enjoy the economic benefits of dedicated access.

However, this is well known to most of you and today I want to emphasize the management and conservation benefits of dedicated access. In my experience there are five obvious benefits.

More overlap between environmental protection and economics of the industry

Economists have long recognized that profit is maximized by fishing at lower effort and subsequent higher average stock biomass than when fishing to maximize total yield. At lower fishing mortality rates the CPUE is higher, the costs of fishing are lower and the price is higher. As it happens lower fishing mortality and higher average stock size are also characteristics that are generally thought to be better for sustainability and minimizing impacts on ecosystems. Moving to dedicated access provides incentives for commercial fishing industries to fish less and reduce pressure on ecosystems

Funding of research by the fishing industry

When fisheries are profitable the fishing industry often pays for the management costs, either by legislation or voluntarily. In Australia and New Zealand almost all management expenses are paid out of annual license fees. Chile and Iceland also recover most management costs. These include research, management, monitoring and enforcement. A major benefit is that in these systems fisheries managers are able to determine what research needs to be done, rather than being at the mercy of the political process and Congressional line items.

Even when research funding is not mandated, it is very frequently volunteered. In western Canada the sablefish, groundfish and herring fisheries all provide very significant funding, about $10 million per year (compared to about $4 million per year spent by Government). Why do they do this – because it is in their financial interest to do so.

Active participation of fishermen in collecting data and increasing knowledge

When fishermen have a large financial stake in the sustainability of the resource through their asset values in ITQ systems, there are great incentives to assure sustainability by better data collection and cooperation with the scientific process. The Canadian Sablefish Association operates an annual survey and tagging program, paying for Government staff to participate and evaluate the results.

In New Zealand the lobster fishermen operate an intensive monitoring system for catch rates and length frequency that is the backbone of the stock assessment and management for their resource. The New Zealand hoki fishing fleet has a catch sampling program for size and age in every tow operated by crewmen, with industry paid scientists conducting the training sessions and collating the data.

Reduced discarding

In a recent Ph.D. and paper in Marine Policy, Trevor Branch examined the changes in behavior in the B.C. groundfish fishery after ITQ's were introduced. He found that there is no significant discarding of commercially valuable species and discarding overall is very low. In comparison to the U.S. west coast groundfish fleet discard rates are much less.

"In the B.C. fishery, discards were reduced to low levels by implementing near-100% observer coverage, and deducting the assumed mortality of marketable discards from catch limits. The introduction of ITQs (while continuing full observer coverage) further reduced both total discards and marketable discards for most species, contrary to some previous studies which have suggested that ITQs would tend to increase discards."

Reduced total area fished – more flexibility with respect to environmental objectives

Groundfish fishermen in Canada, working under ITQs do almost all of their fishing in a few fishing locations. They know how many fish of each species they have to capture and they know, from experience where to get them. They plan their annual fishing pattern to fish specific spots when and where they know they will get the right mix of species, and they can test each site with a short tow to make sure the catch mix is correct. The result of this predictability is that they fish very few places. The average fishermen does almost all his fishing in a few dozen defined tows.

The net result of this is that only a small fraction of the bottom is fished, the best estimates are 5-10% of the total bottom is trawled each year, and it is the same 5-10% each year. This means that 90% of the bottom is untouched by trawl gear.

This provides considerable opportunity for environmental protection in the sighting of no-trawl areas, MPA's or other forms of management. The orderly and predictable nature of a fishery with dedicated access allows the fleet more ability to accommodate social concerns about ecosystem protection.

Summary

Most of the discussion of ITQs and other forms of dedicated access have concentrated on economic benefits and benefits. In addition there are considerable benefits to fisheries managers and those interested in environmental protection. Moving to a new fishery management system is always difficult and painful, but based on my experience in a range of other fisheries the benefits are great. The process should be thought of as an investment. By investing the time now to restructure the fishery the payoffs will continue to happen over all of the future.

Agenda Item C.5
Situation Summary
June 2005

TIQ PROGRAM DEVELOPMENT

The Council entered into considering an individual fishing quotas (IFQ) system for the trawl fishery at its September 2003 meeting and received summaries of the public scoping results at its September and November 2004 meetings. At this meeting the Council is scheduled to formally conclude the NEPA scoping process with the adoption of a set of alternatives for analysis in the draft IFQ environmental impact statement (EIS). The Council will also be asked when to initiate public scoping for an EIS on intersector allocations. Figure 2 at the end of Attachment 1 shows an overview of the IFQ decision process.

On Monday, there will be an informational briefing on the trawl IFQ program under Agenda Item C.1, which will not be repeated under this agenda item. Figure 1 of Attachment 1 provides the Council with a guide to the decisions needed to complete the Council tasks on this agenda item. In addition to the primary task of adopting a set of alternatives, Council members should identify impacts they would like addressed in the EIS that are not already covered near the end of Attachment 1 (Task V) and decide on a schedule for formally announcing scoping and intent to prepare an intersector allocation EIS (Task VI). In addition to its utility in for an IFQ program, such allocational analyses are needed for implementation of the programmatic bycatch EIS (upcoming Amendment 18 to the groundfish plan) and could be used to support the future biennial groundfish specifications processes.

The conclusion of the TIQC report (attached as Agenda Item C.5.b, TIQC Report) provides a comprehensive set of recommendations on the large volume of materials, with the exception of whether or not there are additions to the list of impacts that should be covered (Task V) and timing for the formal announcement of scoping for the intersector allocation EIS (Task VI).

Funding for further work on the groundfish TIQ EIS, beyond Council staff coordination functions and NMFS staff contributions to the Analytical Team, is not now available. However, Council planning should proceed with the presumption that additional funding will be forthcoming. If no further funding is forthcoming, progress on the TIQ program development will essentially stall or be substantially delayed after collation of the June Council meeting decisions.

Council Decision:

1. Specify alternatives for analysis in an EIS and identify any impacts that should be addressed not already covered in Section 2.2 of Attachment 2.
2. Decide on timing for the initiation of public scoping for an EIS on intersector allocations.

Reference Materials:

1. Guide to Council Decision Process for Trawl IFQs (June 2005 Meeting) (C.5.a, Attachment 1)
2. Overview of IFQ Program Design Elements (C.5.a, Attachment 2)
3. National Environmental Policy Act Scoping Results Document: *Individual Fishing Quotas (A Kind of Dedicated Access Privilege) And Other Catch Control Tools For The Pacific Coast Limited Entry Trawl Groundfish Fishery* (C.5.a, Attachment 3)
4. Appendices H (Background Analysis) and I (Summary of Public Comment) of the Scoping Results Document (on CD)

5. Ad Hoc Trawl Individual Quota Committee Report (C.5.b, TIQC Report)
6. Groundfish Management Team Report (C.5.c, Groundfish Management Team Report)
7. Ad Hoc Allocation Committee Minutes (C.5.c, Allocation Committee Report)
8. Scientific and Statistical Committee Report (C.5.c, SSC Report)
9. Public Comment (C.5.d, Public Comment)

Agenda Order:

a. Agenda Item Overview — Jim Seger
b. Report of the Ad Hoc Groundfish TIQ Committee
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Approve a Range of Alternatives for Analysis and Public Review

F:\!PFMC\MEETING\2005\June\Groundfish\C5_TIQ\C5_!sitsum_IFQ_development.wpd

4.5.3.3 Process for Development and Approval of Rebuilding Plans

Upon receiving notification that a stock is overfished, the Council will identify one or more individuals to draft the rebuilding plan. A draft of the plan will be reviewed and preliminary action taken (tentative adoption or identification of preferred alternatives), followed by final adoption at a subsequent meeting. The tentative plan or alternatives will be made available to the public and considered by the Council at a minimum of two meetings, unless stock conditions suggest more immediate action is warranted. Upon completing its final recommendations, the Council will submit the proposed rebuilding plan or revision to an existing plan to NMFS for concurrence. A rebuilding plan will be developed following the standard procedures for considering and implementing an FMP amendment under the Magnuson-Stevens Act and other applicable law.

The following elements in each rebuilding plan will be incorporated into the FMP in Section 4.5.4:

1. A brief description of the status of the stock and fisheries affected by stock rebuilding measures at the time the rebuilding plan was prepared.

2. The methods used to calculate stock rebuilding parameters, if substantially different from those described in Section 4.5.2.

3. An estimate at the time the rebuilding plan was prepared of:
   - unfished biomass ($B_{unfished}$) and target biomass (B_{MSY});
   - the year the stock would be rebuilt in the absence of fishing (T_{MIN});
   - the year the stock would be rebuilt if the maximum time period permissible under National Standard Guidelines were applied (T_{MAX}) and the estimated probability that the stock would be rebuilt by this date based on the application of stock rebuilding measures; and
   - the year in which the stock would be rebuilt based on the application of stock rebuilding measures (T_{TARGET}).

4. A description of the harvest control rule (e.g., constant catch or harvest rate) and the specification of this parameter. The types of management measures that will be used to constrain harvests to the level implied by the control rule will also be described (see also Section 4.5.3.4). These two elements, the harvest control rule and a description of management measures, represents the rebuilding strategy intended to rebuild the stock by the target year.

It is likely that over time the parameters listed above will change. It must be emphasized that the values enumerated in the FMP represent estimates at the time the rebuilding plan is prepared. Therefore, the FMP need not be amended if new estimates of these values are calculated. The values for these parameters found in the FMP are for reference, so that managers and the public may track changes in the strategy used to rebuild an overfished stock. However, any new estimates of the parameters listed above will be published in the SAFE documents as they become available.

4.5.3.4 Updating Key Rebuilding Parameters

In addition to an initial specification in the FMP, the target year (T_{TARGET}) and the harvest control rule (type and numerical value) will also be specified in regulations. If new information indicates a need to change the value of either of these two parameters, such a change will be accomplished through full (notice and comment) rulemaking as described in Section 6.2 of this FMP. The target year is the year by which the stock would be rebuilt to its target biomass. Therefore, if a subsequent analysis identifies an earlier target year for the current fishing mortality rate (based on the harvest control rule), there is no obligation to change in regulations either the target year (to the computed earlier year) or the harvest control rule (to delay rebuilding to the original target year). Since the target year is a key rebuilding parameter, it should only be changed after careful deliberation. For example, the Council might recommend that the target year be changed if, based on new information, they determine that the existing target year is later than the recomputed maximum rebuilding time (T_{MAX}) or if a recomputed harvest control rule would result in such a low optimum yield as to cause substantial socioeconomic impacts. These examples are not definitive: the Council may elect to change the target year because of other circumstances. However, any change to the target year or harvest control rule must be supported by commensurate analysis.

4.5.3.5 Implementation of Actions Required Under the Rebuilding Plan

Once a rebuilding plan is adopted, certain measures required in the rebuilding plan may need to be implemented through authorities and processes already described in the FMP. Management actions to achieve OY harvest, and objectives related to rebuilding requirements of the Magnuson-Stevens Act and goals and objectives of the FMP (each of which may require a slightly different process) include: automatic actions, notices, abbreviated rulemaking actions, and full rulemaking actions. (These actions are detailed in Section 4.6, Chapter 5, and Section 6.2.) Allocation proposals require consideration as specified in the allocation framework (see Section 6.2.3.1). Any proposed regulations to implement the rebuilding plan will be developed in accordance with the framework procedures of this FMP.

Any rebuilding management measures that are not already authorized under the framework of the existing FMP, or specified in the FMP consequent of rebuilding plan adoption, will be implemented by further FMP amendments. These plan amendments may establish the needed measures or expand the framework to allow the implementation of the needed measures under framework procedures.

The Council may designate a state or states to take the lead in working with its citizens to develop management proposals to achieve stock rebuilding.

4.5.3.6 Periodic Review of Rebuilding Plans

Rebuilding plans will be reviewed periodically, but at least every two years, although the Council may propose revisions to an adopted rebuilding plan at any time. These reviews will take into account the goals and objectives listed in Section 4.5.3.1, recognizing that progress towards the first goal, to achieve the population size and structure that will support MSY within the specified time period, will only be evaluated on receipt of new information from the most recent stock assessment. In evaluating progress towards achieving target biomass, the Council will use the standard identified in the rebuilding plan. When drafting a rebuilding plan one of the following standards, or a standard similar in kind to the following, may be chosen:

- If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below 50% (the required minimum value), then progress will be considered inadequate.

- If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below the value identified in the rebuilding plan, then progress will be considered inadequate.

- The Council, in consultation with the SSC and GMT, will determine on a case-by-case basis whether there has been a significant change in a parameter such that the chosen management target must be revised.

If, based on this review, the Council decides that the harvest control rule or target year must be changed, the procedures outlined in Section 4.5.3.3 will be followed. Regardless of the Council's schedule for reviewing overfished species rebuilding plans, the Secretary of Commerce, through NMFS, is required to review the progress of overfished species rebuilding plans toward rebuilding goals every two years, per Magnuson-Stevens Act at 16 U.S.C. §304(e)(7).

Establishing Quantitative Criteria for Assessing Adequacy of Progress Towards Rebuilding Overfished West Coast Groundfish Stocks.

Summary of a meeting held at the SWFSC, Santa Cruz Laboratory, November 16-17, 2004 (participants: Steve Ralston, Alec MacCall, Andre Punt, Xi He, Marc Mangel, Anand Patil, Steve Munch, Rick Methot)

A number of west coast groundfish stocks have been declared overfished and rebuilding plans have been implemented to restore these populations to levels that can support productive, sustainable fisheries. These include: bocaccio (*Sebastes paucispinis*), cowcod (*S. levis*), canary rockfish (*S. pinniger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomelas*), yelloweye rockfish (*S. ruberrimus*) and lingcod (*Ophiodon elongatus*). In 2004 the Pacific Fishery Management Council (PFMC) adopted rebuilding plans for these species in the form of Amendments 16-2 and 16-3 to the groundfish FMP, which were approved by NMFS. All these stocks are currently being managed under very restrictive harvest guidelines that have severely constrained the entire west coast groundfish fishery. Moreover, each of these 8 species will be re-assessed in 2005 and, as a consequence, there will be an opportunity to determine whether or not stocks have responded to recovery efforts.

In developing the rebuilding plans, rebuilding analyses were conducted that were designed to meet the requirements of the NOAA Fisheries National Standard 1 Guidelines for implementing the 1996 Sustainable Fisheries Act. Specifically, these analyses determined the relationship between a rebuilding fishing mortality rate (**F**) and the probability (**P**) that a stock would recover to a population size capable of supporting maximum sustainable yield ($\mathbf{B_{msy}}$) within the maximum time allowable ($\mathbf{T_{max}}$). Under the NS1 Guidelines, $\mathbf{T_{max}}$ has been defined to be equal to $\mathbf{T_{min}}$ plus one mean generation time, where $\mathbf{T_{min}}$ is equal to the minimum amount of time a stock needs to rebuild (i.e., if fishing mortality were reduced to zero)[1]. Moreover, based upon Amendment 11 to the groundfish FMP, the Council adopted a value of $\mathbf{B_{40\%}}$ as a proxy for $\mathbf{B_{msy}}$, which is 40% of the population size that would be expected to occur if there were no fishing.

For ease of comparison among stocks and to standardize the basis of rebuilding calculations, it is useful to express any specific fishing mortality rate in terms of its effect on Spawning Potential Ratio (**SPR** = spawning/recruit relative to the unfished condition). Given fishery selectivity patterns and basic life history parameters, there is a direct inverse relationship between **F** and **SPR** (Figure 1). When there is no fishing, each new female recruit is expected to achieve 100% of its spawning potential. As fishing intensity increases, expected lifetime reproduction declines due to this added source of mortality. Conversion of **F** into the equivalent **SPR** has the benefit of standardizing for differences in growth, maturity, fecundity, natural mortality, and fishery selectivity patterns and, as a consequence, we recommend it be used routinely.

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[1]An exception occurs for stocks that are able to rebuild within 10 years (e.g., lingcod), wherein the Guidelines require rebuilding within that period, although most groundfish stocks are incapable of doing so.

For each of the eight overfished groundfish stocks the Council adopted a **P** value as a policy decision, which established a target harvest rate and implied spawning potential ratio during rebuilding. Note that in all cases the probability of rebuilding within T_{max} exceeded 0.5, ranging between 0.6 and 0.9. As shown in Figure 2, there is a direct tradeoff between the probability of recovery on or before $\mathbf{T_{max}}$ and rebuilding harvests, i.e., given a policy choice on **P**, the harvest rate is determined, which can then be used to calculate the allowable catch each year as the stock rebuilds.[2]

Given that the initial policy decision made by the PFMC was to select a value of **P**, we suggest that when an updated stock assessments becomes available, the most logical standard to invoke, when evaluating whether a stock is rebuilding at an adequate pace, is to re-calculate **P** as it depends on **SPR** = *f*(**F**), using all the new information available, and to compare the existing and updated probabilities at the prevailing target **SPR**[3]. More explicitly, if a rebuilding analysis exists that has been used to set a rebuilding policy, we denote $\mathbf{P_0}$ to be the nominal probability of stock rebuilding that was adopted by the Council (e.g., 0.60 for widow rockfish) and we denote $\mathbf{SPR_t}$ to be the existing spawning potential ratio being used to rebuild the fishery. Then, if an update occurs at time ***t+1*** we re-estimate the general relationship between **SPR** and probability of rebuilding (i.e., $\mathbf{SPR_{t+1}}$ and $\mathbf{P_{t+1}}$) and determine $\mathbf{P_{t+1}}$ given $\mathbf{SPR_t}$ ($\mathbf{P_{t+1} \mid SPR_t}$). Depending on the relationship between ($\mathbf{P_{t+1} \mid SPR_t}$) and $\mathbf{P_0}$, we envision four possible scenarios. These are:

Case A (see Figure 3): ($\mathbf{P_{t+1} \mid SPR_t}$) > $\mathbf{P_0}$ – the new information indicates that the likelihood of rebuilding the stock by $\mathbf{T_{max}}$ at the current target spawning potential ratio ($\mathbf{SPR_t}$) is greater than the initial policy choice. In this instance, maintain the current target ratio to rebuild the stock as quickly as possible and/or to build a cushion against adverse conditions that may arise in the future.

Case B (see Figure 4): 0.5 < ($\mathbf{P_{t+1} \mid SPR_t}$) ≤ $\mathbf{P_0}$ – the new, updated information indicates that the likelihood of rebuilding at the current spawning potential ratio is less than the initial policy choice but is still more likely than not (i.e., greater than a 50:50 proposition). In this instance,

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[2]Although the relationship between P{rebuilding by T_{max}} and SPR = *f*(F) is represented graphically in a simple deterministic way, in fact there is much uncertainty that is not depicted. That uncertainty is attributable to multiple sources, including: (1) measurement error, (2) process error, and (3) model specification error. The first of these can be overcome by simply increasing the number of simulated trajectories (N) used to calculate the median time to rebuild under any particular fishing rate, given the current state of knowledge. The second, which for example includes uncertainty in stock recruitment variability (σ_r) can be expected to change over time as our knowledge and understanding of stock dynamics improves. The third may also change, but may depend on falsification of assumed population dynamics. In any event, representing the P{recovery by T_{max}} = *f*(SPR) as a simple line on a graph is simplification that overstates our understanding of what we know.

[3]Note that when first applied the conversion SPR =*f*(F) for Bayesian rebuilding analyses should be based on the posterior mode.

because stock rebuilding involves the realization of a sequence of chance events, the current spawning potential ratio could be maintained.

Case C (see Figure 5): $0.0 \leq (\mathbf{P_{t+1}} \mid \mathbf{SPR_t}) \leq 0.5$ – the update suggests that rebuilding is seriously lagging and the biomass target is unlikely to be reached before $\mathbf{T_{max}}$ if the current spawning potential ratio is maintained. When this occurs the spawning potential ratio should be increased (F reduced, $\mathbf{SPR_{t+1}} > \mathbf{SPR_t}$) to insure that $0.5 < \mathbf{P_{t+1}}$.

Case D (see Figure 6): $\mathbf{P_{t+1}} < 0.5$ for all **SPR** – the update indicates that it is unlikely the stock will rebuild to the target stock size by $\mathbf{T_{max}}$, even if fishing is completely eliminated. When this situation arises the entire rebuilding plan may need to be redone and $\mathbf{T_{max}}$ re-estimated.

The group discussed some of the possible reasons why a stock may not rebuild as quickly as initially forecast. Obviously, chance recruitment events during rebuilding may have a very significant influence on the speed of recovery, and that is why rebuilding projections are based on stochastic simulations involving many hundreds or thousands of "realizations." However, another problem that has the potential to retard stock recovery occurs when harvests exceed the calculated allowable catch (i.e., overages). Hence, in order to evaluate how important this issue is, the group suggested that the relationship of $\mathbf{SPR_{t+1}}$ and $\mathbf{P_{t+1}}$ be calculated in two different ways (Figure 7). In the first case, these quantities would be determined using all of the available information, including the actual catches that occurred during the period between **t** and **t+1**. In the second case, the allowable catches that were estimated at time **t** would be substituted for the actual catches that occurred. Thus, any difference in the relationship between $\mathbf{SPR_{t+1}}$ and $\mathbf{P_{t+1}}$ would be attributable to insufficient constraints on fishing, which may then trigger a more aggressive reduction in harvest rate than if there were no appreciable difference in **P** values.

Another factor that should be considered, and may provide some flexibility to the Council, is the effect of a change in the estimate of exploitable biomass from assessments conducted at times **t** and **t+1**. Even if the target **SPR** rate has been achieved and actual catches have been equal to projected catches, the total allowable catch (TAC) may change markedly if there is a change in the estimate of exploitable biomass.

Recommendation:

- We recommend that a series of simulations be conducted to evaluate the stability and performance of the management system relative to the choice of $\mathbf{P_0}$, i.e., the initial rebuilding policy established by the Council. Obviously, conservative management (selection of a high $\mathbf{P_0}$) will require less adjustment to the target **SPR** rate (Cases C and D) and would be expected to rebuild stocks more quickly, but will require a greater reduction in catch in the short-term. The simulations should: (1) explore the relationship between $\mathbf{P_0}$ and the frequency of occurrence of the 4 cases described above and (2) estimate the optimal increase in SPR (i.e., reduction in fishing) when appropriate (i.e., optional in Case B, required in Cases C and D).

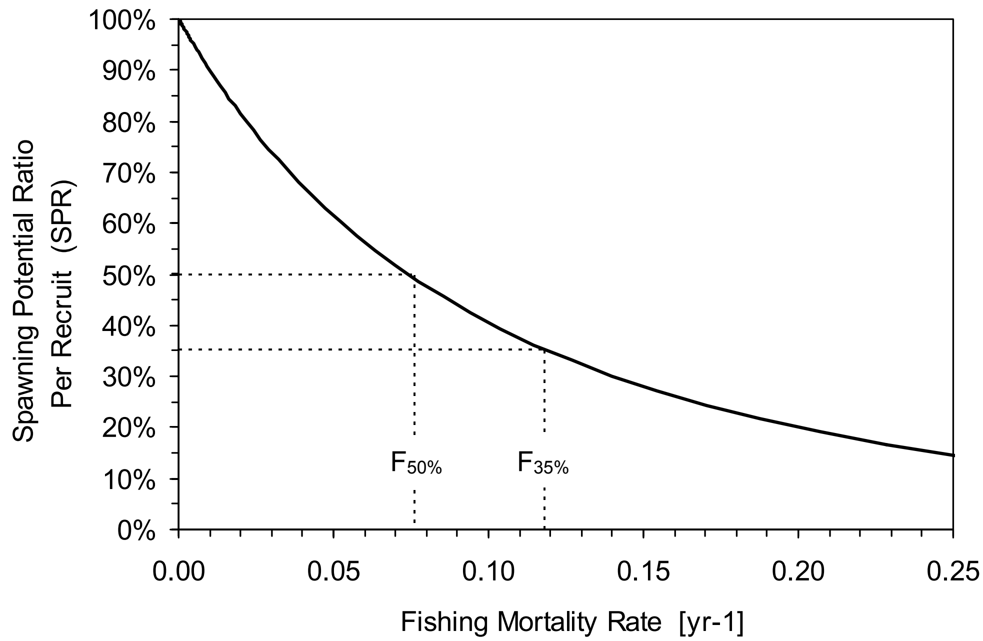

Figure 1. Relationship between spawning potential ratio (SPR) and instantaneous fishing mortality for a hypothetical rockfish.

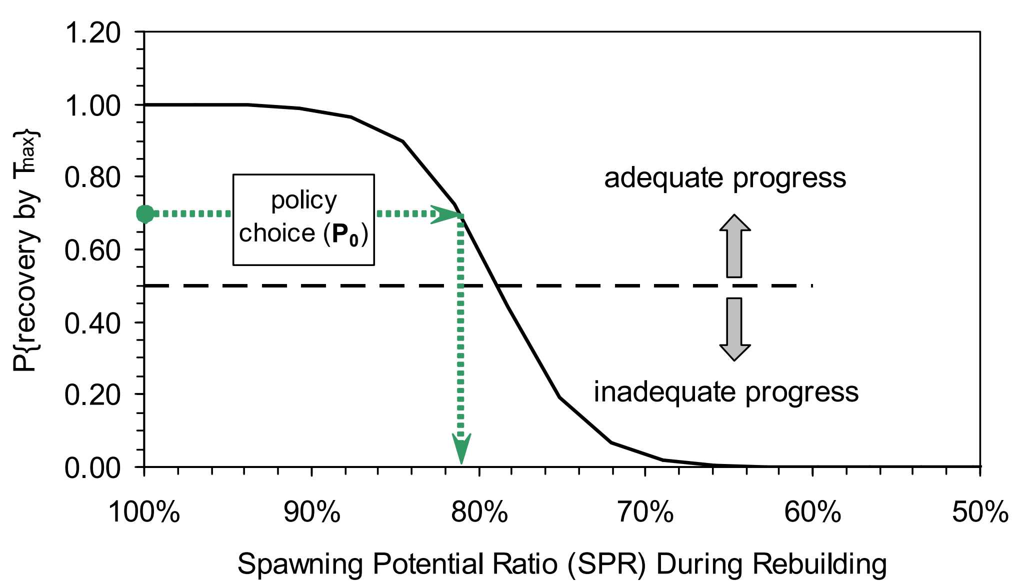

Figure 2. How management policy defines harvest rate during the rebuilding period. The more certain rebuilding, the lower the harvest rate. Minimally, there must be at least a 50% probability of rebuilding within T_{max}.

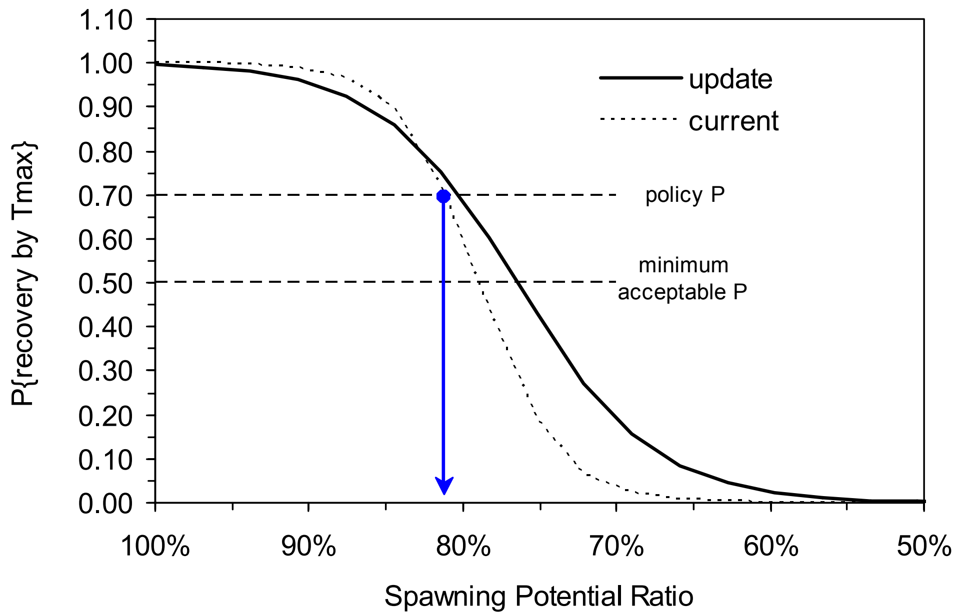

Figure 3. Case A: $(\mathbf{P_{t+1}} \mid \mathbf{SPR_t}) > \mathbf{P_0}$ – Status improves and rebuilding is more certain if catches are based on the current harvest rate.

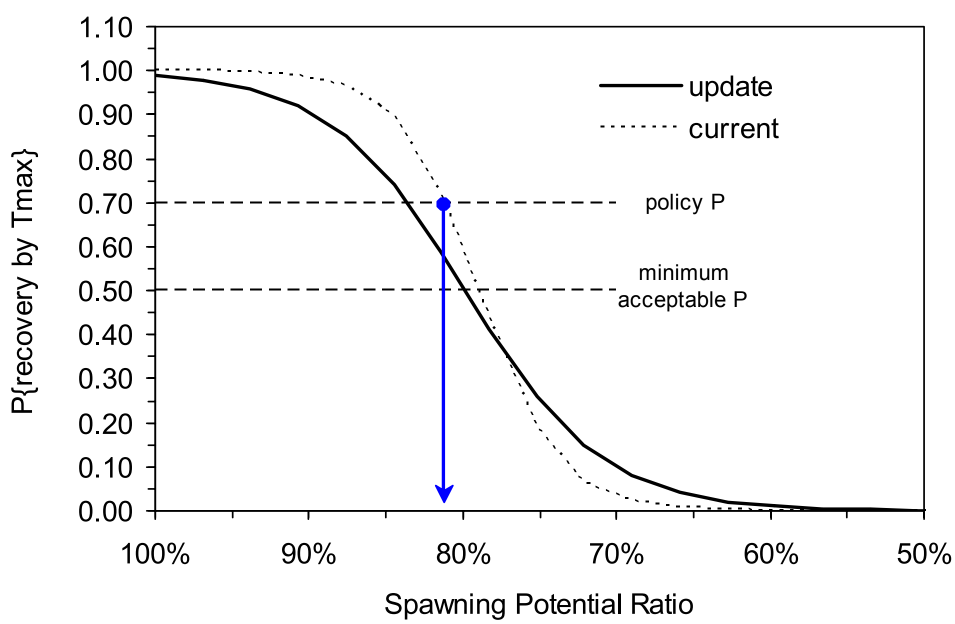

Figure 4. Case B: $0.5 < (\mathbf{P_{t+1}} \mid \mathbf{SPR_t}) \leq \mathbf{P_0}$ – Status deteriorates but rebuilding is still likely to occur if catches are based on the current harvest rate.

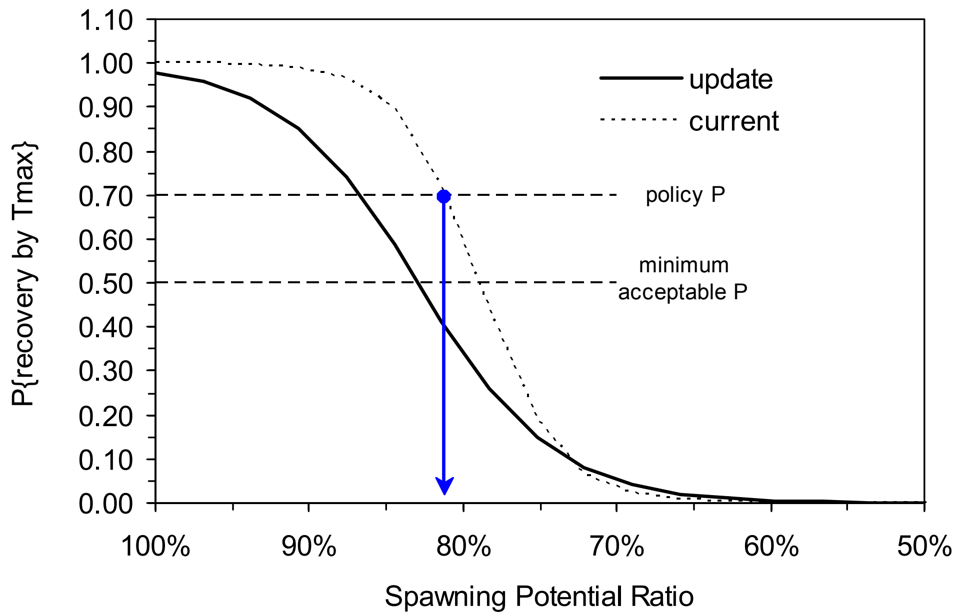

Figure 5. Case C: $0.0 \leq (\mathbf{P_{t+1}} \mid \mathbf{SPR_t}) \leq 0.5$ – Status deteriorates and stock rebuilding is deemed to be inadequate – harvest rate must be lowered.

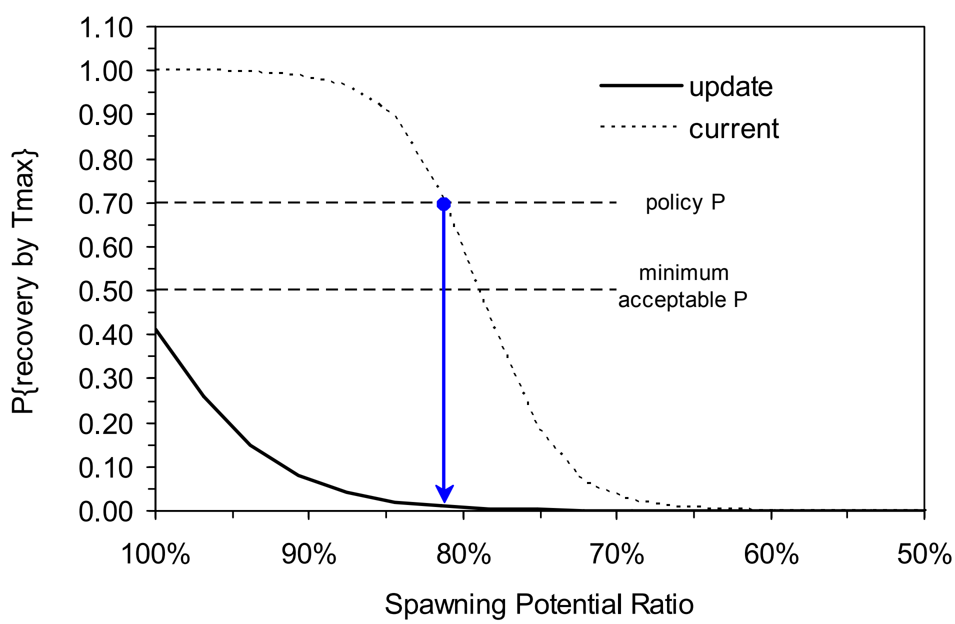

Figure 6. Case D: $\mathbf{P_{t+1}} < 0.5$ for all **SPR** – Rebuilding is unlikely to occur even if harvest rate is reduced to zero.

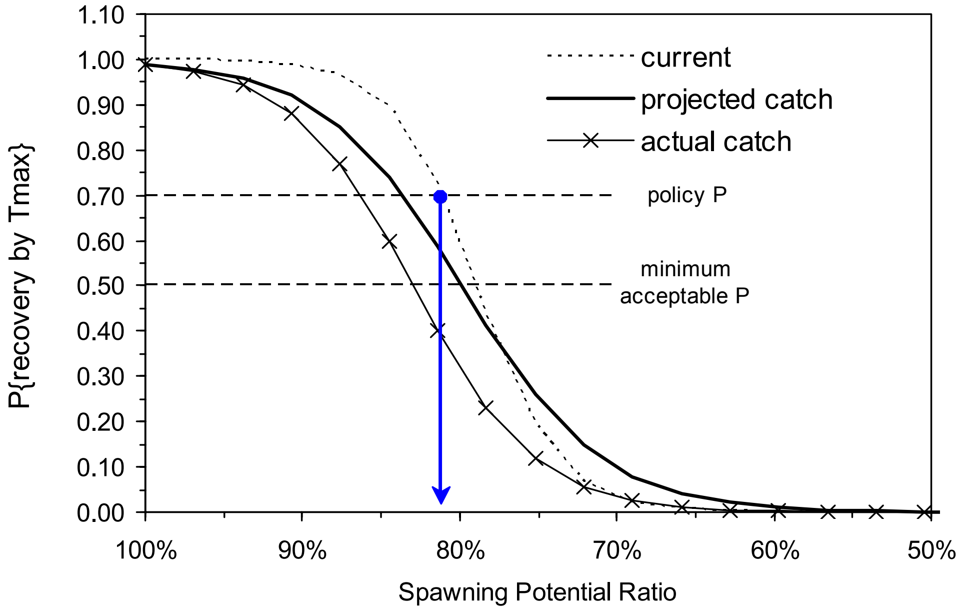

Figure 7. Evaluating the effect of actual catches versus projected catches on rebuilding success. In this example, if projected catches had actually occurred the stock would be recovering at an acceptable pace. However, because actual catches exceeded the allowable catch, recovery has been retarded to the extent that a change in SPR is warranted.

Evaluating Rebuilding Revision Rules for Assessing Progress Towards Rebuilding of OverFished West Coast groundfish

André E. Punt[1] Steve Ralston[2] Richard D. Methot[3] Alec MacCall[2]

1. Introduction

Eight west coast groundfish stocks have been declared overfished and rebuilding plans have been implemented to restore them to levels that can support productive, sustainable fisheries. These stocks are: bocaccio (*Sebastes paucispinis*), cowcod (*S. levis*), canary rockfish (*S. pinniger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomelas*), yelloweye rockfish (*S. ruberrimus*) and lingcod (*Ophiodon elongatus*)[4].

The Pacific Fishery Management Council (PFMC) adopted rebuilding plans for these species in 2004 in the form of Amendments 16-2 and 16-3 to the groundfish FMP, which were approved by NMFS. All these stocks are currently being managed under very restrictive harvest guidelines that have severely constrained the entire west coast groundfish fishery. Moreover, each of these eight stocks will be re-assessed during 2005 and, as a consequence, there will be an opportunity to determine whether or not they have responded to recovery efforts and are on track to rebuild as previously projected.

In developing the rebuilding plans, rebuilding analyses were conducted that were designed to meet the requirements of the NOAA Fisheries National Standard 1 (NS1) guidelines for implementing the 1996 Sustainable Fisheries Act. Specifically, these analyses determined the relationship between a rebuilding fishing mortality rate (F) and the probability (P_0) that a stock would recover to the spawning output capable supporting Maximum Sustainable Yield (SB_{MSY}) within the maximum time allowable (T_{MAX}). Under the NS1 Guidelines, for stocks that cannot rebuild within 10 years, T_{MAX} has been defined to be equal to T_{MIN} plus one mean generation time, where T_{MIN} is the minimum amount of time a stock needs to rebuild (i.e. if fishing mortality were reduced to zero). Moreover, the Council adopted a value of $SB_{40\%}$, equal to 40% of the spawning output that would be expected to occur if there were no fishing, as a proxy for SB_{MSY} based upon Amendment 11 to the groundfish FMP.

It is to be expected that the results of the 2005 groundfish assessments will not conform exactly with the results expected based on the previous assessments (e.g. due to recruitment not being equal to that expected, the consequences of changes to parameter values, and the impact of new data). The question that arises then is whether the fishing mortality rate used to set harvest guidelines specified as part of the rebuilding plan should be changed, and if so how. A further consideration is that data now available may show that the original basis for the rebuilding plan is no longer valid (e.g. because the values assumed for natural mortality or stock recruitment

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[4] A ninth stock, Pacific whiting (*Merluccius productus*), also declined into an overfished state, then quickly recovered

steepness have changed markedly). Although guidelines exist regarding how rebuilding analyses are to be conducted (PFMC, 2001), there no guidelines to determine whether (and to what extent) rebuilding plans are to be updated given new information.

The objectives of this document are to outline: a) a set of possible “rebuilding revision rules” which could be used to measure progress towards rebuilding (and make appropriate adjustments to rebuilding plans as needed), and b) a framework (often referred to as Management Strategy Evaluation or MSE – Smith (1994)) which uses simulation to provide a quantitative means to compare various rebuilding revision rules in terms of their effectiveness at correctly (and adequately) making adjustments to rebuilding plans. The focus of this work is on the consequences of changes to assessments caused by the addition of new data; it being taken for granted that major changes to the assessment (e.g. a change to the stock structure assumption underlying the assessment) will lead to the need for revision to the rebuilding plan.

2. Methods

2.1 Measures of fishing mortality

For ease of comparison among stocks, and to standardize the basis of rebuilding calculations, it is useful to express any specific fishing mortality rate in terms of its effect on Spawning Potential Ratio (SPR = spawning output-per-recruit relative to that in an unfished state), as is being done for the stock assessments to be conducted during 2005. Given fishery selectivity patterns and basic life history parameters, there is a direct inverse relationship between F and SPR. When there is no fishing, each new female recruit is expected to achieve 100% of its spawning potential. As fishing intensity increases, expected lifetime reproduction declines due to this added source of mortality. Conversion of F into the equivalent SPR has the benefit of standardizing for differences in growth, maturity, fecundity, natural mortality, and fishery selectivity patterns.

2.1 The Simulation Protocol

The performances of the various rebuilding revision rules are evaluated by means of simulation. The basic situation being modeled is outlined in Figure 1. A resource is declared overfished based on the results of a stock assessment. As a result, there is a need to develop a Rebuilding Plan based on the results of the assessment[5] and input from the Council (the latter in the form of a value for P_0, the probability of rebuilding to 0.4 SB_0 by T_{MAX}), which, if P_0 is greater than 0.5, is equivalent to choosing a target year to rebuild that is sooner than T_{MAX}.

The stock assessment is updated / revised at some time in the future to include new information. The results of this updated assessment form the input to rules that determine whether progress is adequate. The possible outcomes from these rules are: a) progress is adequate so the harvest guidelines for the forthcoming years can be set based on the SPR in the latest version of the rebuilding plan (it is possible that the SPR was revised between when the rebuilding plan was originally developed and when the current assessment is being undertaken), and b) progress is inadequate. If progress is inadequate, it may be possible to still achieve rebuilding by T_{MAX} with probability of at least 0.5 by adjusting the SPR upwards (F downwards). As stated earlier, if the assessment had led to a major revision to the understanding of the dynamics of the stock, the status of the stock relative to 40% of SB_0, or the productivity of the resource, it may be necessary to revise the Rebuilding Plan completely (including, for example, changing T_{MIN} and T_{MAX}).

[5] The Rebuilding Plan developed when the stock was first declared overfished is referred to as the “original” Rebuilding Plan.

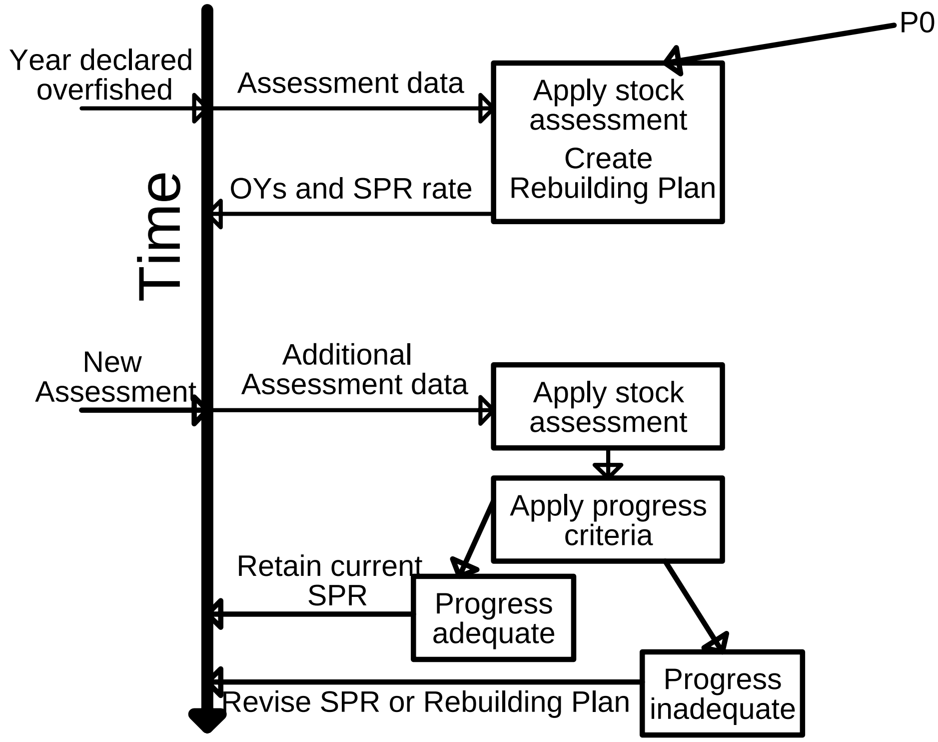


Figure 1. The conceptual basis for the simulations.

The conceptual schema in Figure 1 can be captured within a "Management Strategy Evaluation" (MSE) framework. The MSE framework considered for the analyses of this document is similar to that of Punt (2003). It consists of two components: a) an "operating model" (which mimics the "true" dynamics of the resource and generates the data available for assessment purposes) and b) a "management strategy" which includes how data are used to conduct a stock assessment, how rebuilding analyses are conducted, and the rules used to evaluate progress.

The annual steps when using the MSE approach to evaluate a management strategy are:

a. Generation of the data available for assessment purposes using the operating model.
b. Application of a method of stock assessment to the generated data to determine key assessment-related quantities (e.g. current age-structure, spawning output relative to target and limit levels, historical trends in recruitment) and any other model outputs needed to determine harvest guidelines.
c. Application of the rebuilding revision rules to determine whether it is necessary to revise the rebuilding plan, and to determine a harvest guideline.
d. Determination of the biological implications of this harvest guideline by setting the catch for the 'true' population represented in the operating model based on it. It is assumed that the catch equals the harvest guideline for the purposes of this study.

The operating model used for the analyses of this document is essentially identical to that used by Punt (2003). It includes an age- and sex-structured population dynamics model in which recruitment is governed by a Beverton-Holt stock-recruitment relationship with lognormal deviations ($\sigma_R = 0.6$), natural mortality is independent of age and equal to 0.15yr^{-1}, there is a single fishery, and selectivity is time-invariant and domed shaped. The values for the biological and technological parameters are based (somewhat loosely) on the situation for widow rockfish off the west coast of the U.S. (Williams *et al*., 2000). Figure 2 summarizes selectivity-, weight-and fecundity-at-age and the catches for the years prior to when the stock is first declared overfished and the original Rebuilding Plan is developed.

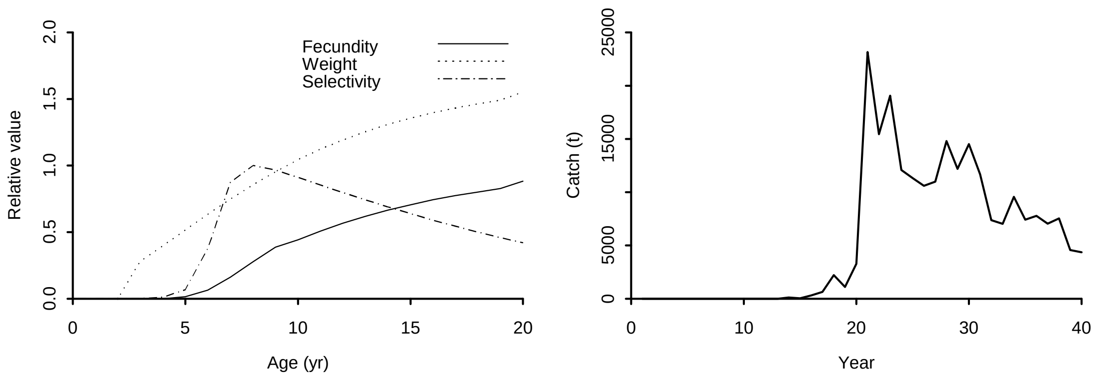


Figure 2 : The biological parameters (left panel) and catch history (right panel) in the operating model.

The data available for assessment purposes are the catches and weight- and fecundity-at-age (assumed known exactly), natural mortality (assumed known exactly for the bulk of the analyses), catch-rate-based indices of abundance, survey indices of abundance, catch age-composition data, and survey age-composition data. The surveys are assumed to be available tri-annually from year 13 (survey CV = 0.5; effective sample size for survey age-composition data = 100) while the catch-rate indices and the catch age-composition data are assumed to be available for all years for which the catch is non-zero. The coefficient of variation for the catch-rate indices is set to 0.4 and the effective sample size for the catch age-composition data is set to 100. These specifications correspond to a “data rich” stock.

Table 1 summarizes the six scenarios related to the values for the parameters of the operating model. These scenarios are based on specifying the depletion when the Rebuilding Plan is first developed (year 41 – either 0.1 SB_0, 0.15 SB_0 or 0.2 SB_0), the steepness of the stock-recruitment relationship (h=0.4 or h=0.7), whether recruitment is auto-correlated or not, and the value of M on which stock assessments prior to year 70 are based.

The harvest guideline is not updated every year in the simulations of this document, but rather every 4th year. This reflects a realistic frequency with which regular assessments for West Coast groundfish species are likely to be conducted. The frequency with which assessments are updated is another factor that could be considered within the framework of an MSE. Each simulation trial (i.e. each combination of an operating model variant and candidate management strategy) involves 10 simulations of an 80-year management period.

2.2 The stock assessment

The method of stock assessment is a statistical catch-at-age analysis (e.g. Fournier and Archibald (1982)). The underlying population dynamics model is essentially identical to the biological component of the operating model. The estimable parameters of the stock assessment model are the annual recruitments, and the parameters of the selectivity function. The values for these parameters are estimated by minimizing an objective function in which the catch rate data and the survey indices of abundance are assumed to be lognormally distributed and the catch and survey age-composition data are assumed to be multinomially distributed. For simplicity, the stock assessment assumes the correct effective sample sizes and coefficients of variation for the data.

2.3 The Rebuilding Revision Rules

Several sets of rules ("options") have been identified based on the intent of a rebuilding plan, as outlined in Section 1. All of the options are based on a value for P_0 (the target probability of rebuilding by $T_{\max}$). Furthermore, it is assumed that a formal stock assessment (see Section 2.2) is conducted every fourth year and forms the basis for the application of the rules. The outcomes from the stock assessment are: a) an estimate of the ratio of the spawning output at the start of year n+1 divided by the pre-fishery spawning output, SB_{n+1}/SB_0, where n is the last year for which catch data are available, and estimates of the spawning output and recruitment time-series. For the purposes of this document, the estimate of SB_{n+1}/SB_0 forms the basis for the harvest guidelines for year n+1 and beyond. In reality, there is a longer time lag between the last year for which data are available and the first year in which the harvest guideline would be changed.

It is assumed that a rebuilding plan was developed in year 41 which led to values for P_0, T_{MAX}, T_{MIN}, and the target SPR (denoted T_{MAX} (current), T_{MIN} (current) and $\mathrm{SPR}_{\mathrm{current}}$) on which harvest guidelines were based. For the purposes of the analyses of this document, T_{MAX} is defined as T_{MIN} + one mean generation time irrespective of whether T_{MIN} is estimated to be less than ten years or not.

The rebuilding revision rules in Table 2 are variants of a "reference" rebuilding revision rule. The reference rule attempts to capture the idea that performance is adequate as long as the probability of rebuilding to T_{MAX} remains above 0.5 and that there is a need to revise the entire rebuilding plan if there is no SPR for which the probability of rebuilding to T_{MAX} is at least 0.5. The value of P_0 is 0.6 for the "reference" rule. The rule operates as follows (the algorithm is based on an update to the stock assessment in year n+v).

a. If $SB_{n+v}/SB_0 > 0.4$, the resource has rebuilt so rebuilding is completed[6].
b. Project the population from year n+v until T_{MAX}(current) using $\mathrm{SPR}_{\mathrm{current}}$ to determine future harvest guidelines and to compute the probability, P_{rec}, that the spawning output will rebuild to $0.4SB_0$ at least once by T_{MAX}(current).
c. If P_{rec} is larger than a critical value, P_{critical}, progress is considered to be adequate and the harvest guidelines for the next four years are based on $\mathrm{SPR}_{\mathrm{current}}$. The value of P_{critical} will always lie between 0.5 and P_0.
d. If P_{rec} is less than P_{critical}, progress is inadequate and some measures need to be taken to reduce fishing mortality to improve the chances of achieving the recovery objective. The following represents the specific rules considered in the "reference" rule:
    1. Determine the SPR so that the probability of rebuilding to $0.4SB_0$ from the current state of the stock by T_{MAX}(current) is P_{critical} (this SPR is denoted SPR_1).
    2. If $\mathrm{SPR}_1 < 1$ then set $\mathrm{SPR}_{\mathrm{current}}$ to SPR_1 and base the harvest guidelines for the next four years on SPR_1.
    3. If there is no SPR so that the probability of recovery to $0.4SB_0$ from the current state of the stock by T_{MAX}(current) is at least P_{critical}, a new rebuilding plan is needed. This involves redefining T_{MIN} and T_{MAX} and hence $\mathrm{SPR}_{\mathrm{current}}$ based on starting the new rebuilding plan from the stock size in year n+v with a probability of rebuilding by the revised T_{MAX} of P_0. If the new $\mathrm{SPR}_{\mathrm{current}}$ is less than the previous one (so that the fishing mortality would be higher), $\mathrm{SPR}_{\mathrm{current}}$ is left unchanged.

[6] Note that because this appraisal is based on the results of a stock assessment, the "true" resource may or may not have rebuilt to $0.4SB_0$.

The seven options (Table 2) are constructed from the "reference" rule as follows:

1. "No change". This option involves not revising the rebuilding plan but rather sticking with the SPR set when the original rebuilding analysis was conducted. While not necessarily a viable rebuilding revision rule, it sets a standard against which the other options can be compared.
2. "At least P_0". This option involves setting P_{critical} equal to P_0, i.e. the SPR on which future harvest guidelines are based is increased if the probability of rebuilding drops below P_0 (rather than 0.5).
3. "Attain P_0". This option involves adjusting the SPR every time a new assessment is conducted so that the probability of rebuilding is always estimated to be P_0. This option differs from the "At least P_0" option because the SPR can be decreased if the probability of rebuilding exceeds P_0 (P_{high} in Table 2)
4. "MAX-SPR-1". This option involves determining the SPR so that the probability of rebuilding to $0.4SB_0$ by T_{MAX}(current) from the state of the stock in the year the current rebuilding plan started is P_{floor} (this SPR is denoted $\text{SPR}_{\text{floor}}$). $\text{SPR}_{\text{floor}}$ is therefore the SPR which would have been set when the rebuilding plan was originally developed had the information available in year $n+v$ been available in year n). Calculate $\text{SPR}_{\text{MAX}} = \text{SPR}(\text{P}_{\text{floor}}) + \phi[1\text{-SPR}(\text{P}_{\text{floor}})]$. If $\text{SPR}_1 > \text{SPR}_{\text{MAX}}$ then recovery is highly unlikely. In this case, a new rebuilding plan is needed. Note that the "reference" option corresponds to ϕ=1.
5. "MAX-SPR-2". This option involves not allowing the SPR to be increased to more than 0.5+0.5 $\text{SPR}_{\text{current}}$ (i.e. halfway between $\text{SPR}_{\text{current}}$ and 1). If the probability of rebuilding corresponding to $0.5+0.5\text{SPR}_{\text{current}}$ is less than P_{critical} a new rebuilding plan is needed.
6. "P_0=0.8". This option is identical to the "reference" option, except that P_0=0.8.
7. "With phase". This option involves not revising a rebuilding plan between years T_{MAX}-τ and T_{MAX} to avoid making large changes to SPR (and hence catches) when a stock is believed to be close to the target level.

At present, these seven options and the "reference" option are simply technical constructions. They have not been evaluated in terms of their conformance with the current NS1 Guidelines or the draft revisions circulated in 2004.

2.4 Summarizing performance

Three plots (*sensu* Figures 3, 4 and 5) have been developed to summarize the results of a set of simulations.

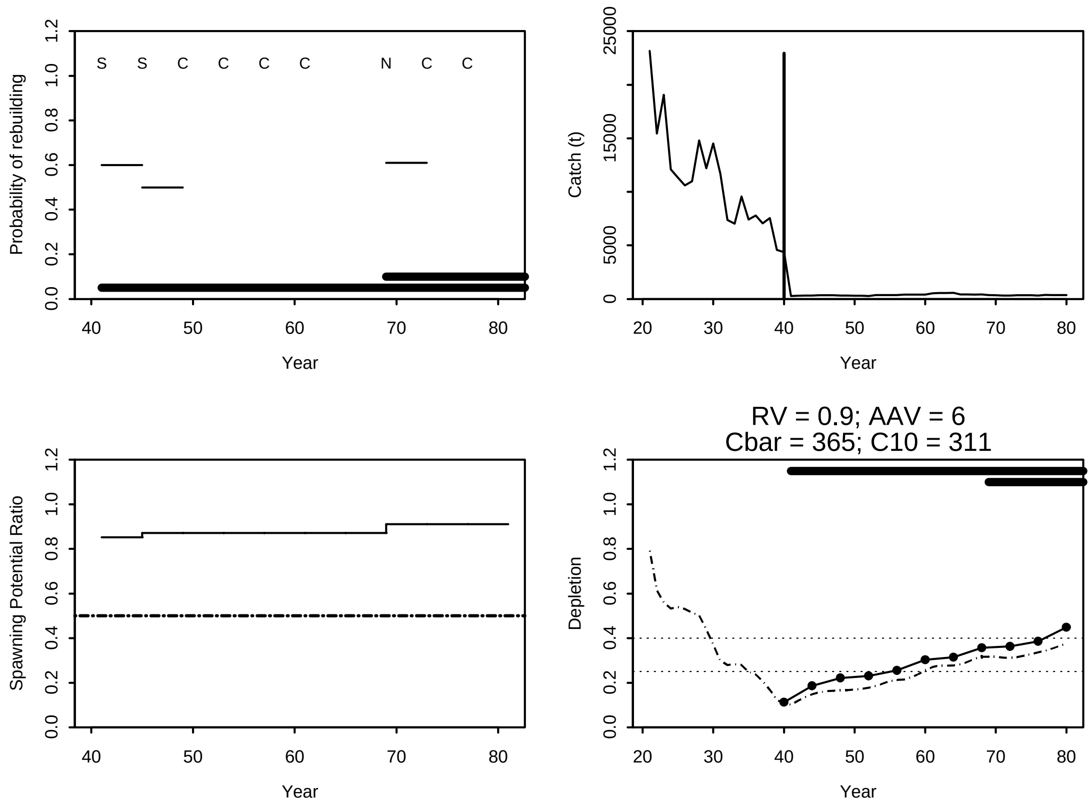


Figure 3. Plot summarizing the detailed results of a single simulation.

A 'detailed plot' (e.g. Figure 3) consists of four panels:

Upper left. The behavior of the rebuilding revision rule.

- The wide horizontal bars indicate the duration of the rebuilding plan(s). There may be multiple wide horizontal bars if the original rebuilding plan needed to be revised during the time period considered.
- The narrow horizontal lines indicate the probability of rebuilding each time it is necessary to change the SPR on which the harvest guideline is based (this will occur when the resource is first declared overfished, if it is necessary to change the SPR because the probability of rebuilding by $T_{\max}$ is less than P_{critical}, or if rebuilding is assessed to be highly unlikely and a new rebuilding plan is required). The gaps between these lines are the years when progress appears satisfactorily.
- An "S" at the top of the panel indicates that the **S**PR needed to be increased to achieve a probability of rebuilding of at least P_{critical}.
- A "N" at the top of the panel indicates that a **N**ew rebuilding plan was needed.
- A "C" at the top of the panel indicates that progress was evaluated and found to be adequate. The SPR used to set future harvest guidelines is **C**ontinued at $\text{SPR}_{\text{current}}$.

Upper right. Catches over time. The vertical line indicates when the stock was declared overfished and the first rebuilding analysis (based on P_0) was conducted.

Lower left. This panel shows the SPRs on which the annual harvest guidelines are based. The dashed line indicates the overfishing level for rockfish species of SPR=50%.

Lower right. The "true" depletion of the population over time (dot-dashed line) and the estimate of the depletion of the resource (as perceived from an assessment conducted every four years) (solid line with dots). The rebuilding revision rule is, of course, based on perceived reality. The two horizontal dotted lines are the overfishing level (0.25) and the target level (0.40). The wide horizontal bars again indicate the duration of the rebuilding plan(s).

The numbers in the title summarize various aspects of the results:

1. RV - the ratio of the number of years before the stock was assessed to have rebuilt divided by the number of years that it was expected that rebuilding would take based on the original rebuilding plan.
2. AAV - a measure of the variability of the catches, defined as:

$$AAV = \frac{\sum_y |C_y - C_{y+1}|}{\sum_y C_y} \tag{1}$$

   where C_y is the catch during year y.

3. Cbar - the average catch during the years when the resource was under a rebuilding plan.
4. C10 - the average catch during the first ten years of the period during which the resource was under a rebuilding plan

The x-axis in each of the panels is limited to the years that the resource is considered to be under rebuilding (i.e. the years during which the assessment indicates that the spawning biomass is less than $0.4B_0$).

A 'summary plot' (e.g. Figure 4) consists of 16 panels. The 1st and 2nd rows show the time-trajectories of SPR and the 3rd and 4th rows show the bottom right plots from a detailed plot. These plots provide the results for the eight rebuilding revision rules when they are applied to one simulation (i.e. the "true" situation as represented in the operating model is the same for all eight option).

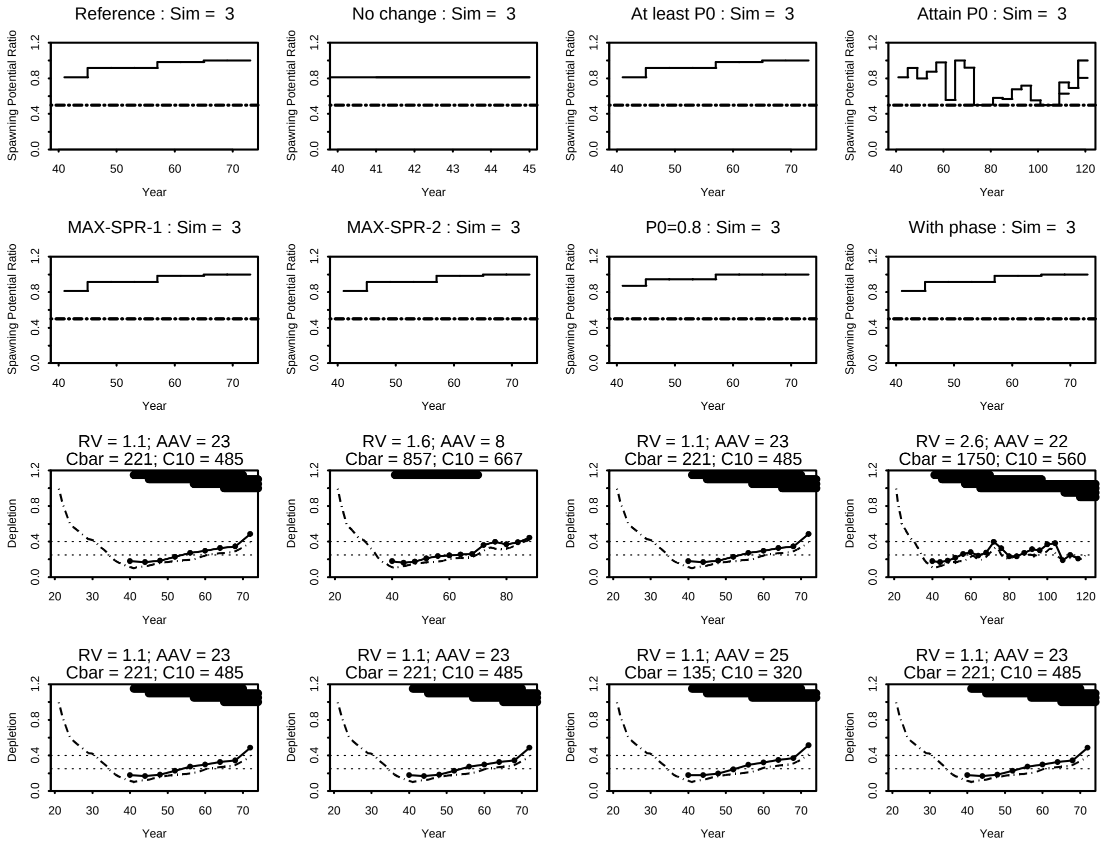


Figure 4. Summary plot for one simulation for operating model A.

The final type of plot (e.g. Figure 5) attempts to summarize the performance of the rebuilding revision rules across all the simulations in terms of three statistics:

- The average catch during the years when the resource was under a rebuilding plan.
- The ratio of the number of years before the stock was assessed to have rebuilt divided by the number of years that it was expected that rebuilding would take based on the original rebuilding plan (solid dots).
- The number of times that the SPR had to be altered during the rebuilding period (open dots; for improved clarity values larger than eight are set to eight and represented in the form of open triangles).

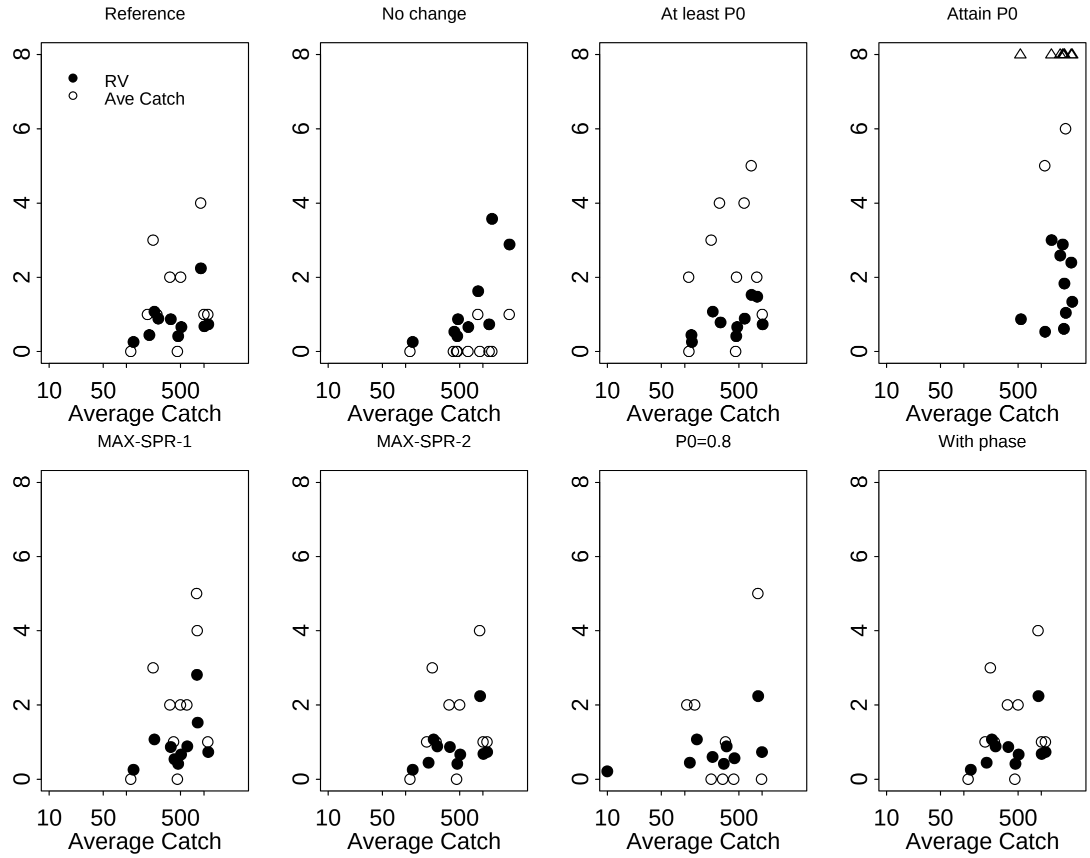


Figure 5. Comparison of the performances of the eight rebuilding revision rules for operating model A.

3. Results and discussion

3.1 Interpreting the plots

The properties of an ideal rebuilding revision rule are that: a) the spawning output rebuilds to $0.4B_0$ in as short a time as possible (the exact rate of rebuilding will depend on the productivity of the resource and the value assumed for P_0), b) catches are relatively stable (or increasing steadily) during the rebuilding period, c) the SPRs on which future harvest guidelines are based are stable, and d) the probability of needing to revise the entire rebuilding plan during the rebuilding period is low.

3.2 Results for the "base case" operating model

Figure 5 provides a summary of the overall performances of the eight rebuilding revision rules for the "base case" operating model while Figure 6 shows summary plots for two of the ten simulations for this operating model.

The "reference" option is able to recover the resource faster than anticipated when the first rebuilding analysis is conducted (the time to rebuild the resource to 0.4 SB_0 is 70% of that anticipated when the first rebuilding analysis is conducted). The median (across simulations) average catch during the rebuilding period is 365t (8.3% of the catch for the year prior to the resource being declared overfished) for this option and the median value of the AAV statistic across simulations is 10%. There is no need to change the SPR determined from the original rebuilding analysis in two of the simulations (e.g. simulation six – Figure 6a), but the number of changes in SPR can be far higher (e.g. simulation one – Figure 6b).

Not modifying the SPR no matter what the monitoring data indicate (the "no change" option) leads (as expected) to longer rebuilding times than those for the "reference" option. However, catches are higher and less variable, and recovery for the "no change" option can occasionally occur as fast as for the "reference" option (e.g. simulation 6). The "at least P_0" option leads, as expected, to shorter rebuilding times (e.g. for simulation 1), but at the expense of the need for more revisions to the SPR on which harvest guidelines are based compared to the "reference" option (Figure 5).

Modifying the SPR each time a new assessment is conducted so that there is always a perceived probability of rebuilding by T_{MAX} of P_0 (the "attain P_0" option) leads to higher average catches, but much more frequent changes to the SPR. This variability in SPR is perhaps most evident for the cases in which sticking to the original SPR would allow rebuilding by T_{MAX} (e.g. simulation 6 in Figure 6). Apart from the administrative disruption caused by changing the SPR every fourth year, the "attain P_0" option would also lead to large inter-annual variation in harvest guidelines (18% compared to 10% for the "reference" option).

The two MAX-SPR options are qualitatively similar, although the "MAX-SPR-1" option leads to more frequent changes to the SPR used to set harvest guidelines. Increasing P_0 from 0.6 to 0.8 leads to shorter rebuilding times, fewer changes to SPR values (because there is a larger "buffer" between the original probability of rebuilding of 0.8 and the "critical" value of 0.5), but lower catches (the median average catch for the "P_0=0.8" option is 85% of that for the "reference" option).

The results for "with phase" option are identical to those for the "reference" option. This result should be considered fortuitous. This would not have been the case had the idea of not changing the SPR when the resource is close to $0.4SB_0$ been combined with, say, the "attain P_0" option.

3.3 Sensitivity to alternative operating model parameters values

Figures 7 - 10 summarize the results for operating models C – G (Table 1). Results are not shown for operating model B because the resource is correctly detected to be depleted to below 0.25 SB_0 (and rebuilding initiated) in only a few simulations when the true spawning output is 20% of SB_0. This is a consequence of the structure of the assessment procedure selected (and the uncertainty associated with the data) and not of the form of the rebuilding revision rules.

The performance of all eight options is generally "better" (fewer changes in SPR, more rapid rebuild and larger average catches) if steepness is 0.7 (rather than 0.4 as is the case for the "base case" operating model) (Figure 7). The "attain P_0" option is again very variable. Unlike the case for "base case" operating model, even the "no change" option always allows rebuilding to occur when steepness is 0.7.

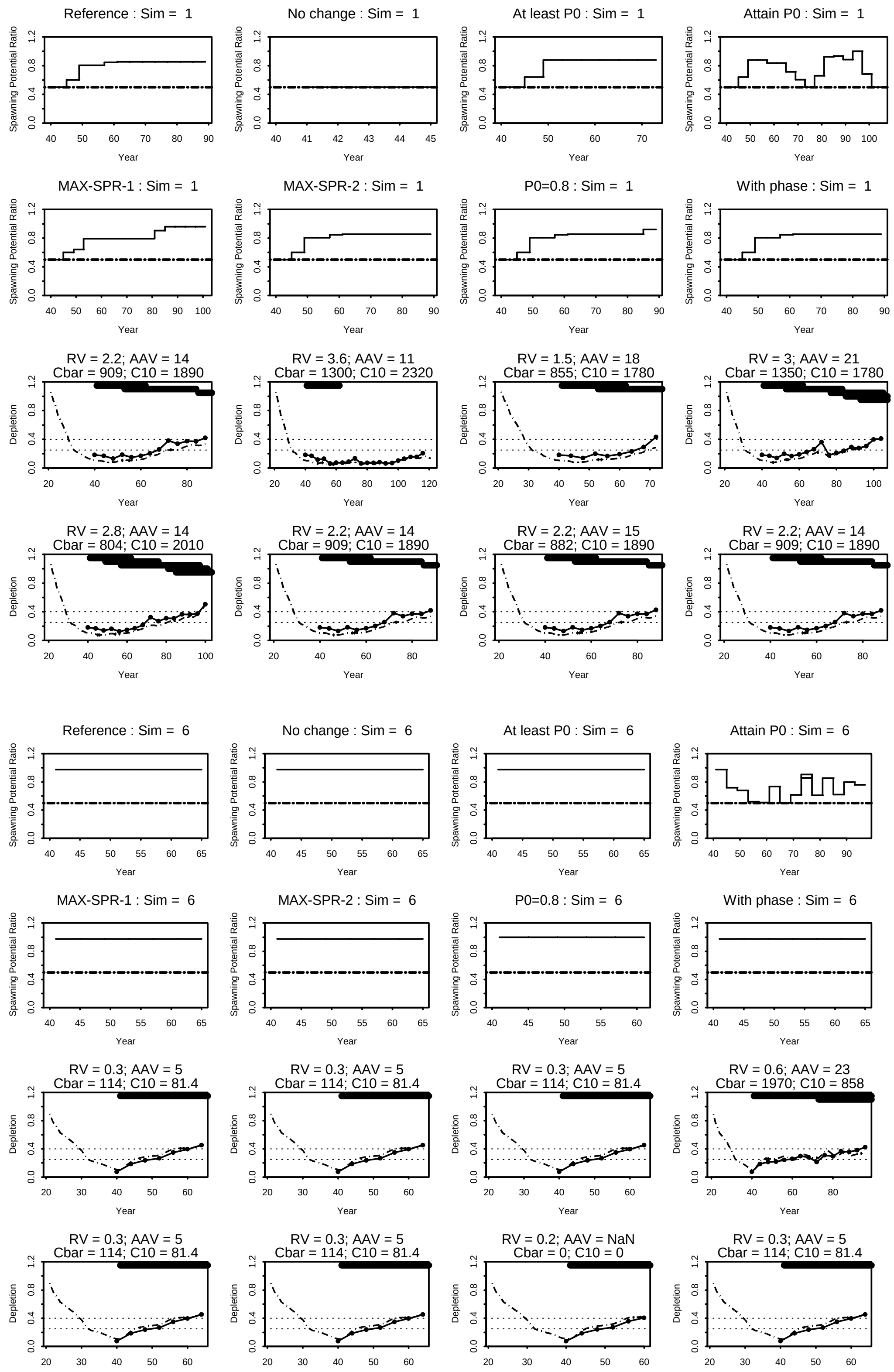


Figure 6. Summary plots for simulations 1 and 6 for operating model A.

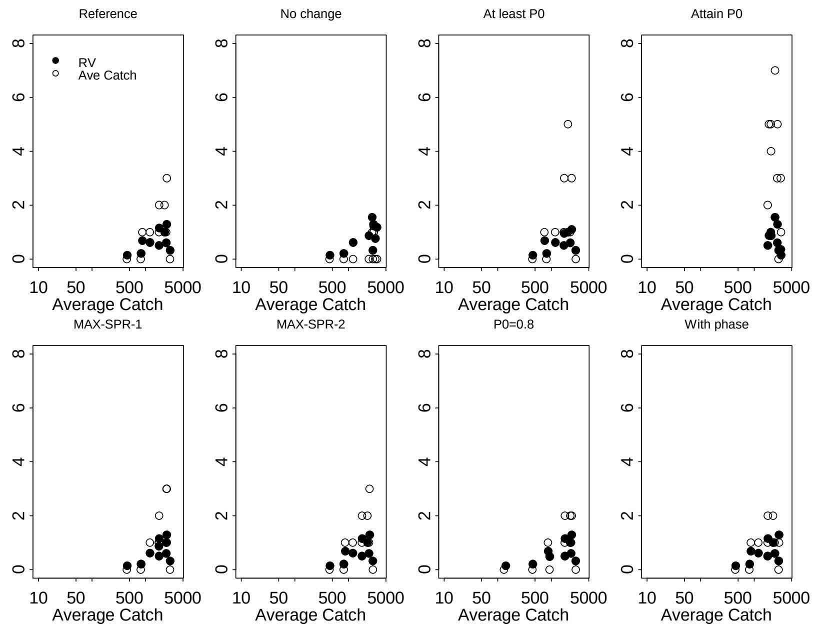


Figure 7. Comparison of the performances of the eight rebuilding revision rules for operating model C.

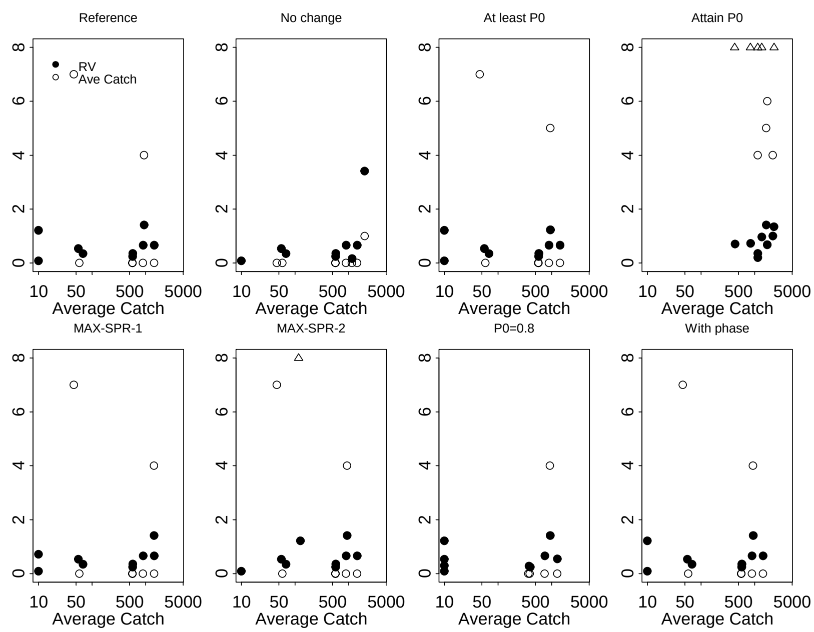


Figure 8. Comparison of the performances of the eight rebuilding revision rules for operating model D.

Allowing for temporal auto-correlation in recruitment (operating model D; Figure 8) increases the time to rebuild (compared to that expected when the original rebuilding analysis was conducted) in a sub-set of the simulations. This results in a substantial increase to the number of times the SPR needs to be adjusted in these simulations. Unfortunately, this problem affects almost all the options equally; a noteworthy exception is the “P_0=0.8” option, presumably because the “buffer” between P_0 and P_{critical} created by selecting a high P_0 increases the robustness to auto-correlation in recruitment. However, the “P_0=0.8” option leads to near zero (<10t) average catches for this operating model for several simulations.

The results for the operating models in which the value of M on which assessments are based is wrong during years 41-70 (operating models E and F; Figure 9), while substantially different from those for the “base case” operating model do not perhaps behave as expected. Specifically, major changes to the rebuilding plan often do not occur in year 70. This is because: a) the resource may have rebuilt by then anyway, and b) the probability of being rebuilt by T_{MAX} for $\mathrm{SPR}_{\mathrm{current}}$ may still be larger than P_{critical} even with the change to M (this is supported by the fact that the SPR was changed eight or more times in almost all simulations for the “attain P_0” option).

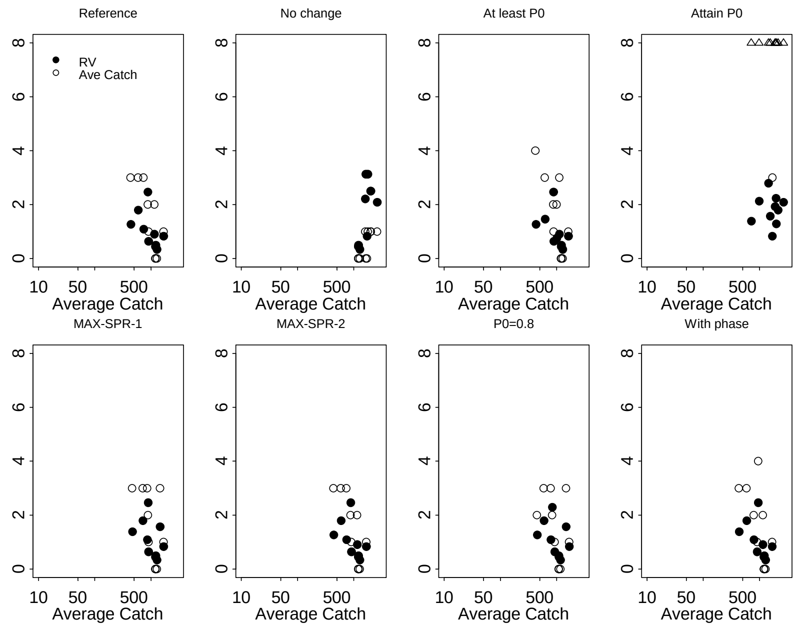
The results for the operating model in which the resource is depleted to 15% of SB_0 (Figure 10) are not noticeably different from those for the “base case” operating model.

3.4. Conclusions / observations

The selection among the options is clearly a policy decision. However, there are some factors which should be taken into account when selecting among the options:

- The structure and viability of the options depends on how NS-1 will be revised. The final wording of NS-1 (and the interpretation of the wording) is not yet final. Changes to NS-1 may preclude some of the options considered in this document.
- Results are only shown for situations in which the “true” status of the stock in year 41 is 0.15 SB_0 or less. This is primarily because the assessment procedure considered in this study was often unable to correctly detect that a stock depleted to (say) 0.2 SB_0 was actually depleted to below 0.25 SB_0. This is almost certainly a consequence of the structure of the assessment procedure selected for this work. This study also did not consider scenarios involving “false positives” (i.e. the stock is assessed to overfished when it isn’t).
- The options are all variants of the “reference” option – it is possible that changes to the “reference” option may lead to the performances of the options changing in ways that cannot necessarily be predicted well from the results presented in Figures 5-10.
- Changes to SPR (and revisions to entire rebuilding plans) are likely to be frequent during the rebuilding period – such changes are needed to ensure rebuilding proceeds at a reasonable rate.

(a) M=0.1 yr^{-1} for years 41-70



(b) M=0.2 yr^{-1} for years 41-70

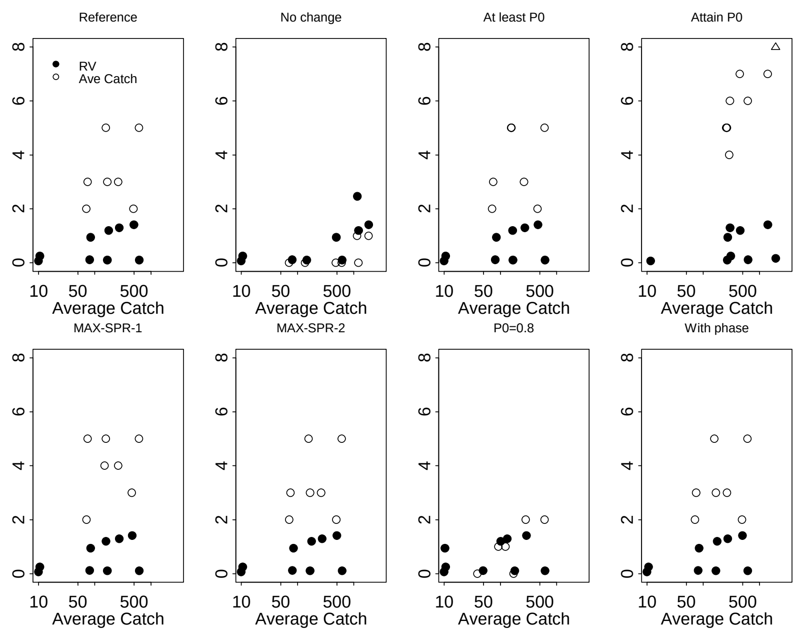


Figure 9. Comparison of the performances of the eight rebuilding revision rules for operating models E and F (upper and lower panels respectively).

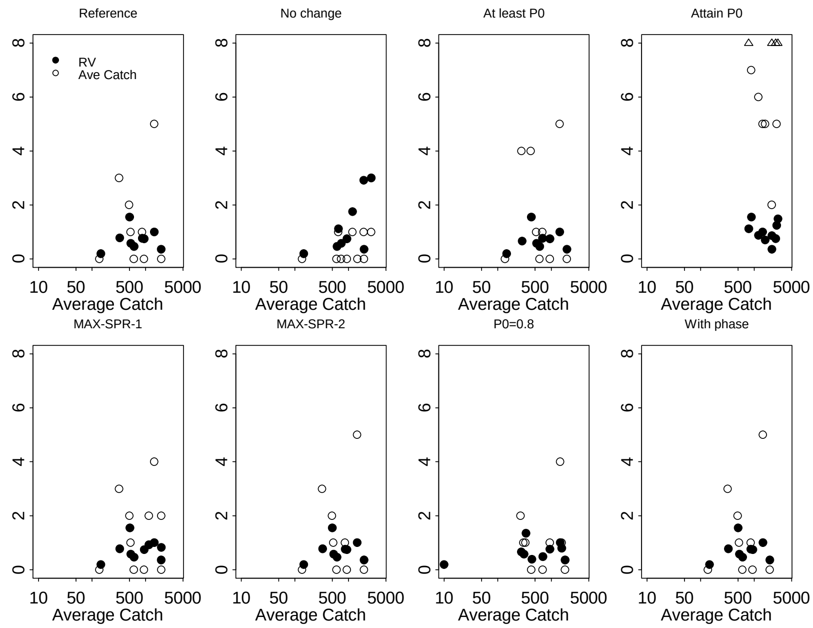


Figure 10. Comparison of the performances of the eight rebuilding revision rules for operating model G.

- The "attain P_0" option tends to follow noise rather than signal, and leads to frequent changes to SPR and hence harvest guidelines. Although average catches are larger for this option, the resource tends to be under rebuilding for longer.
- There were no notable benefits associated with the two SPR-MAX options even though these were more complicated than the "reference" option.
- Setting a "high" P_0 when developing a rebuilding plan can mitigate against uncertainty because there is then a "buffer" between P_0 and the minimum probability of rebuilding to T_{MAX} (P_{critical}=0.5).

4. References

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Table 1. The specifications that define the alternative "true" scenarios considered in the simulations.

Scenario	True biomass in year 41	Steepness	Auto-correlation in recruitment	M for years 1-70 used in assessments
A – Base case	0.1 SB_0	0.4	0	0.15yr^{-1}
B – Less depletion	0.2 SB_0	0.4	0	0.15yr^{-1}
C – Higher steepness	0.1 SB_0	0.7	0	0.15yr^{-1}
D – With auto-correlation	0.1 SB_0	0.4	0.707	0.15yr^{-1}
E – Low M in assessment	0.1 SB_0	0.4	0	0.10yr^{-1}
F – High M in assessment	0.1 SB_0	0.4	0	0.20yr^{-1}
G – Less depletion	0.15 SB_0	0.4	0	0.15yr^{-1}

Table 2. The specifications of the eight rebuilding revision rules.

Abbreviation	P_0	P_{critical}	P_{floor} / ϕ	P_{high}	Impose Max SPR	τ
0 – Reference	0.6	0.5	N/A	N/A	No	0
1 – No change	0.6	N/A	N/A	N/A	No	0
2 – At least P_0	0.6	0.6	N/A	N/A	No	0
3 – Attain P_0	0.6	0.6	N/A	0.6	No	0
4 – MAX-SPR-1	0.6	0.5	0.5 / 0.5	N/A	No	0
5 – MAX-SPR-2	0.6	0.5	N/A	N/A	Yes	0
6 – P_0=0.8	0.8	0.5	N/A	N/A	No	0
7 – With phase	0.6	0.5	N/A	N/A	No	5

Towards Developing a Policy on Revising Groundfish Rebuilding Plans

Stephen Ralston
and Andre Punt

Scientific & Statistical Committee
Pacific Fishery Management Council

Some Background Basics

Under the Groundfish FMP a review of adequacy of Rebuilding Plan Progress can occur at any time, but must occur at least every two years, even if new approved assessments are not available

Sections 4.5.3.3. through 4.5.3.6 specify process for … updating key rebuilding parameters, implementation of actions, periodic review of plans

Section 4.5.3.6. states "The Council, in consultation with the SSC and GMT, will determine on a case-by-case basis whether there has been a significant change in a parameter such that the chosen management target must be revised."

More Background…

To complete an analysis we need to estimate:
- unfished biomass ($B_{unfished}$)
- target biomass (B_{msy})
- year rebuilt if no fishing T_{min}
- year rebuilt in maximum time allowable (T_{max})
- for a given harvest:
  - the probability of rebuilding by T_{max} (P_{max})
  - the expected year of rebuilding (T_{target})

If new information indicates a need to change…, such a change will be accomplished through full (notice and comment) rulemaking…

The FMP need not be amended if new estimates of the values are calculated.

Still More Background…

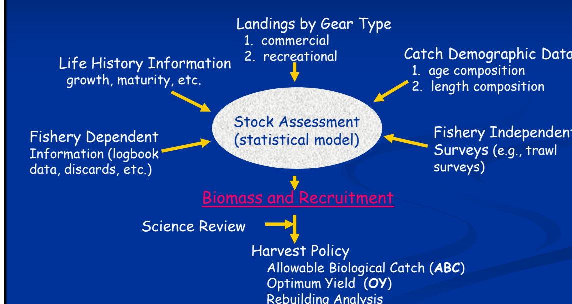
Option A

"If the probability of achieving the target biomass within the maximum permissible time period (T_{max}) falls below 50% (the required minimum), then progress will be considered inadequate."

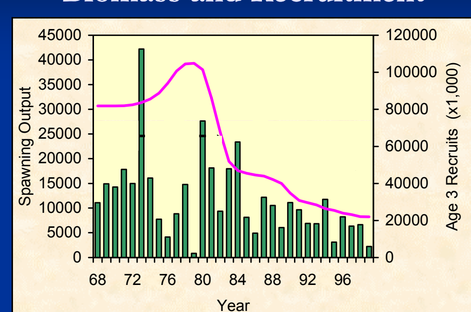
Option B

"If the probability of achieving the target biomass within the maximum permissible time period (T_{max}) falls below the value identified in the rebuilding plan, then progress will be considered inadequate."

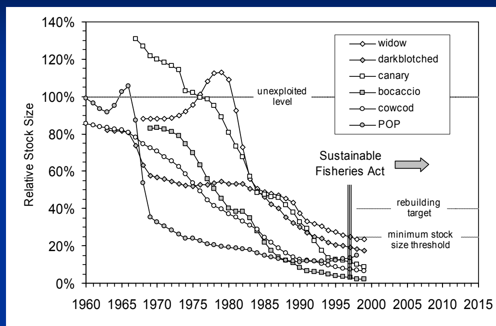
Stock Assessment is Basis of Science-Based Management



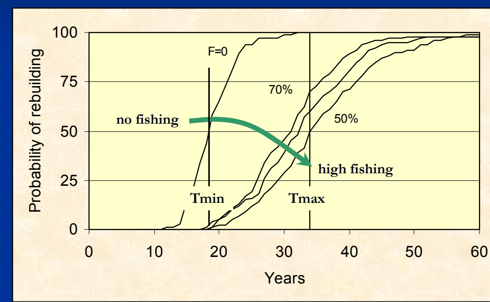
Stock Status Depends on Trends in Biomass and Recruitment



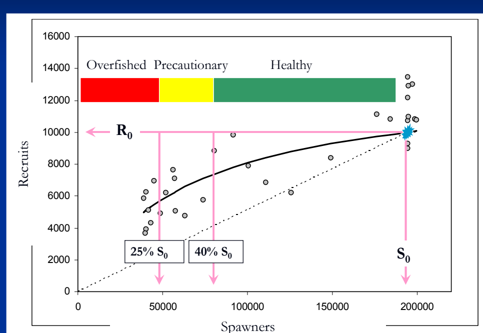
The Groundfish Problem



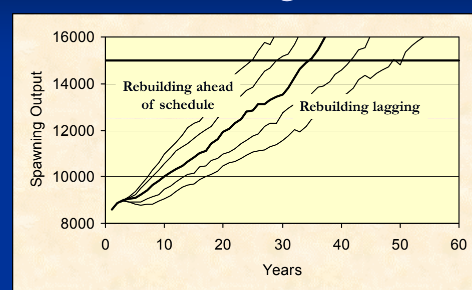
As Harvest Rate Increases, the Probability of Rebuilding Decreases



Management Target and Threshold for PFMC Groundfish



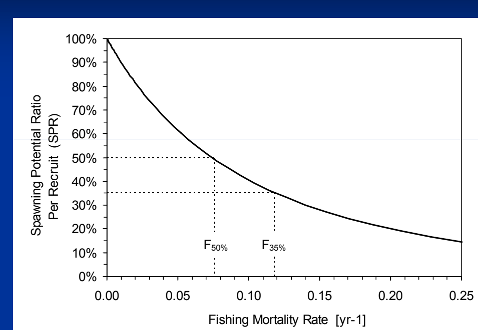
Because Future Reproductive Success is Uncertain, Rebuilding is Probabilistic



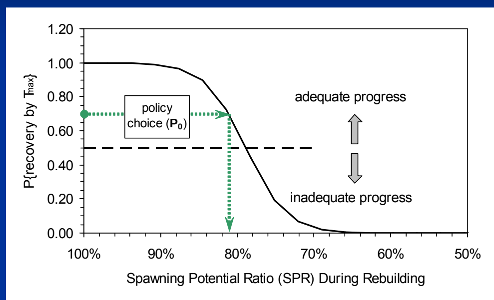
Rules for Rebuilding Analysis

- Project the stock forward assuming there is no fishing and determine how long it takes to recover to the target ($S_{40\%}$)
- For most groundfish, add one mean generation time: that defines T_{max}
- Project the stock forward under a variety of harvest rates and determine the probability of recovering to $S_{40\%}$ by T_{max}

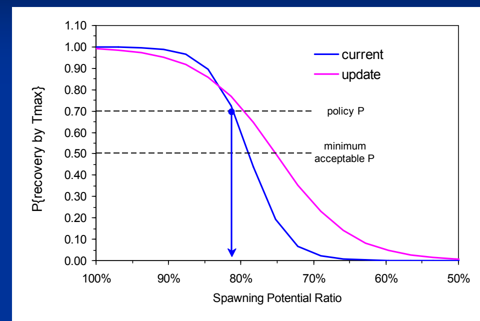
Fishing Mortality versus SPR



The Procedure Thus Far…



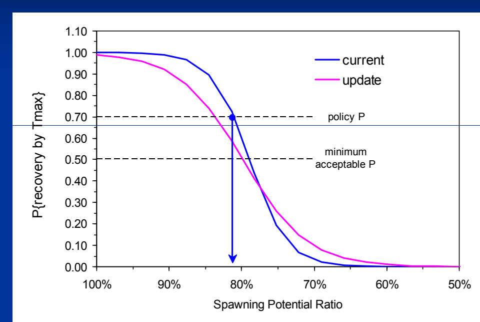
Faster Than Originally Projected



Different Stocks have had Different Rebuilding Criteria Applied

- Bocaccio 70%
- Canary Rockfish 60%
- Widow Rockfish 60%
- Pacific Ocean Perch 70%
- Darkblotched Rockfish >90%
- Yelloweye Rockfish 92%
- Cowcod 60%

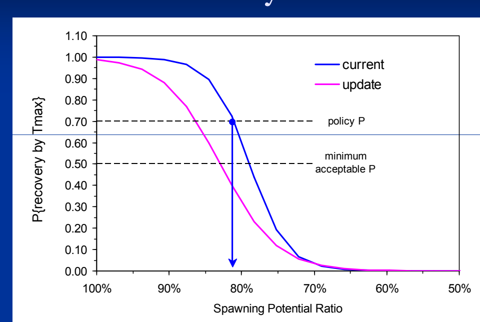
Slower Than Thought But More Likely Than Not



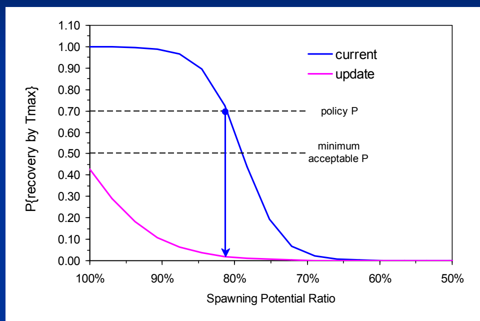
Four Possibilities to Consider During an Update

- Rebuilding is occurring faster than originally projected
- Rebuilding is slower than originally projected, but is still more likely than not (> 50%)
- Rebuilding is slower than originally projected and is unlikely to occur by T_{max} at the prevailing harvest rate
- Rebuilding is unlikely to occur by T_{max} even if fishing is stopped altogether

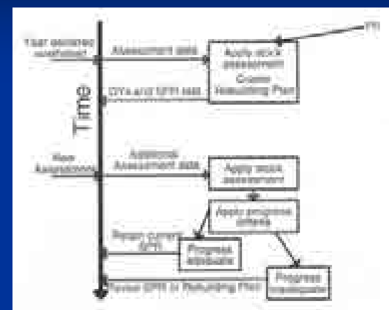
Slower Than Thought and Less Likely Than Not



Unlikely, Even if Fishing is Stopped Altogether



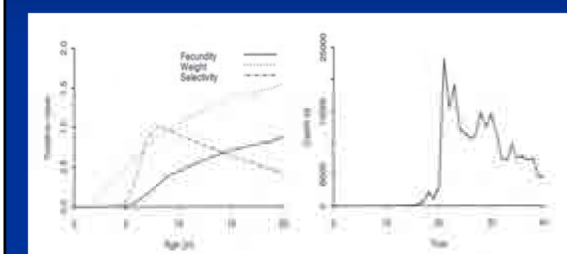
Flow Chart for the Management Strategy Evaluation



What to do?

- Case 1: rebuilding faster than projected ☞ maintain current harvest rate
- Case 2: rebuilding slower than projected, but still likely ☞ ? (P_{crit})
- Case 3: rebuilding slower than projected and unlikely ☞ reduce harvest rate (raise SPR) to achieve what?
- Case 4: rebuilding unlikely even with no fishing ☞ recalculate everything, including T_{max}, and start over -- use the same *P*?

Characteristics of the Simulated "Widow Rockfish" Stock



Management Strategy Evaluation

- Simulate a fish population (widow rockfish)
- Generate simulated data with observational error
- Apply a standard stock assessment to the simulated data
- Apply a harvest control rule (which may include a rebuilding analysis) based on results of the assessment
- Repeat and evaluate the effectiveness of the harvest control rule relative to

Simulated "States of Nature"

- Base case: 10% depletion, low productivity, moderate natural mortality
- Less depletion (15% and 20%)
- More productive (steepness = 0.7)
- Correlated recruitments (regime like)
- Higher or lower natural mortality

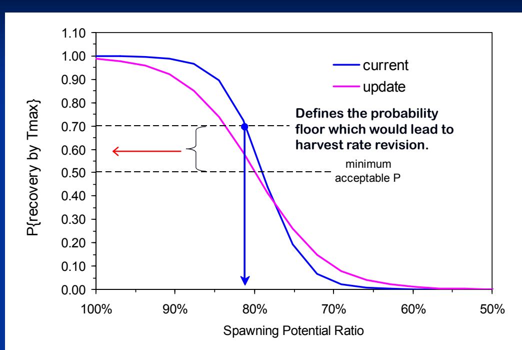
Example Control Rule

- What was the initial probability of rebuilding by T_{max} selected by the Council (e.g., for canary rockfish P_0 =0.60)
- Use this value as a standard to gauge adequacy of progress towards rebuilding
- If $P_{current} > P_0$ progress is adequate
- If $P_{current} < 0.50$ progress is inadequate and a new harvest rate (SPR) needs to be defined
- If $0.50 < P_{current} < P_0$ there is a new policy decision governed by P_{crit}

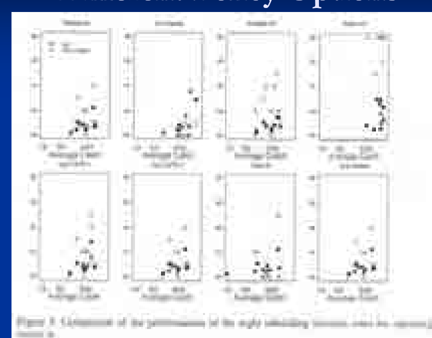
Revision Policies Considered

- Base case: $P_0 = 0.60$, $P_{crit} = 0.50$ (simplest adjustment policy)
- No change: maintain the same SPR harvest rate throughout ("no action"??)
- Track P_0: constantly adjust SPR to attain the original P_0 ("status quo"?)
- Higher certainty: $P_0 = 0.80$
- At least P_0: $P_0 = 0.60$, $P_{crit} = P_0$

What is P_{crit}?



Performance Measures for Different Policy Options



Performance Criteria To Evaluate Revision Rules

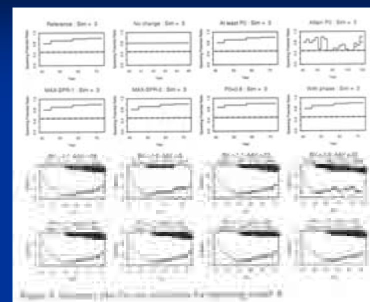
- Average catch during rebuilding
- Variability in catch during rebuilding
- Frequency of harvest rate revisions
- Probability of recovery by the original T_{Target} (years to rebuild / predicted years to rebuild)

Some Conclusions

- There were no obvious problems with the base case
- As expected, the no change option led to longer rebuilding times suggesting there is a need for some form of Rebuilding Revision Rule
- Tracking P_0 leads to many revisions to the rebuilding harvest rate
- Performance is better for a productive stock

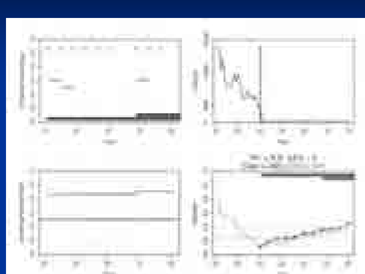
Some Parting Thoughts

- The Council will be presented with updated rebuilding information for 8 overfished stocks
- A consistent policy is desired on
  - how to evaluate progress towards rebuilding
  - how to respond to inadequate progress
- A variety of policy options can be simulated
- Performance criteria frequently contradict one another (high catch conflicts with management stability)



What's Next?

- The Council, GAP, and GMT should discuss these issues and provide direction on establishing revision policy
  - Options for "adequacy of progress" (e.g. P_{crit})
  - Options for "how to respond to adequate / inadequate progress".
- Policy determination regarding is required for STAT teams to conduct rebuilding analyses for overfished stocks (reviewed in late September by the SSC)
- Preliminary direction and/or range of options should be discussed at this meeting
- Create a working group with members from advisory bodies to evaluate options for



SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON REBUILDING PLAN REVISION RULES

A total of 23 groundfish stock assessments will be conducted during 2005. Eight of the groundfish species are currently designated to be in an overfished state, and rebuilding plans have been developed for them. These rebuilding plans for each species include the maximum possible time to rebuild to the proxy for B_{MSY}, T_{MAX}, and the probability of rebuilding by T_{MAX} originally selected by the Council; P_0. Table 1 lists the values of P_0 for each of the overfished species.

The Council is required to periodically review the adequacy of progress in rebuilding. Such review can occur at any time, but must occur at least every two years and could lead to changes in harvest rates and values for rebuilding parameters such as T_{MAX}, and T_{MIN}. Assessment authors for stocks currently under rebuilding plans will conduct revised rebuilding analyses, which will be presented to the Council in November 2005. These authors require guidance regarding standards for defining progress towards rebuilding and on the calculations that need to be conducted if progress is deemed to be adequate or inadequate. This guidance depends on policy decisions by the Council and is not simply a technical matter.

A joint meeting between the Council, Scientific and Statistical Committee (SSC), Groundfish Advisory Subpanel (GAP), and Groundfish Management Team (GMT) led by Dr Steve Ralston was held on Monday, June 13, to clarify the need for and progress towards developing a framework and policy for revising rebuilding plans. The joint meeting highlighted a Management Strategy Evaluation approach, which could be used to contrast different standards for defining progress towards rebuilding and control rules that depend on whether progress is adequate or inadequate.

There are presently no formal rules to define whether progress is adequate and how rebuilding plans need to be modified given that progress is deemed to be adequate or inadequate, although there are many ways to define such formal rules given the standards in Amendment 16-1 of the groundfish fishery management plan (FMP). Rebuilding plans for several species (e.g., widow rockfish, Pacific ocean perch) have been updated in the past, but this has involved a largely *ad hoc* process, with each species treated separately on a case-by-case basis.

The SSC identifies the following standard for defining adequacy of progress and rules for modifying rebuilding plans, which it considers the simplest that is consistent with National Standard 1 and involves a small number of decision points (see Attached Figure). The steps below also reflect the intent underlying Amendment 16-1 to the groundfish FMP, that revisions to rebuilding plans be based on changes to the harvest control rule (or harvest rate) rather than to rebuilding parameters such as T_{MAX}.

1. Progress is deemed to be adequate if the probability of rebuilding under the current harvest rule, P_{current}, exceeds 0.5. This value is selected because it is the lowest probability such that rebuilding is more likely than not a standard included in Amendment 16-1 to the Groundfish FMP.

2. The current harvest rate is maintained to calculate future OYs if progress is deemed to be adequate.
3. If progress is deemed inadequate, a new, lower, harvest rate is calculated, such that rebuilding under the new rate is expected to occur with probability P_0. If even a zero harvest will not allow rebuilding, then a new rebuilding plan, wherein T_{MAX} is recalculated, and a new T_{TARGET} is chosen, should be used to determine the harvest rate used to calculate future OYs.

The above specifications do not represent the SSC's recommendation on this matter, nor do these specifications necessarily represent the default; rather they represent the simplest set of specifications that can be modified in several ways based on policy trade-off considerations, as outlined below.

i) Should the probability at which progress is deemed to be inadequate be larger than the minimum of 0.5? Increasing this probability from 0.5 would be more conservative, in that harvest rates would be reduced before the probability of recovery drops as low as 0.5. However, this may increase the number of changes in harvest rate during the rebuild period.
ii) Should the harvest rate be increased if the probability of recovery is estimated to be much larger than P_0? Increasing the harvest rate would increase the OY beyond that which would occur simply due to larger stock biomass. This could be used to share accelerated population growth, when it occurs, between reducing rebuild time and increasing the OY. However, increasing the harvest rate will lengthen the rebuild time compared to maintaining the current harvest rate.
iii) When progress is deemed inadequate, should a standard other than P_0 be used to revise the harvest rate? A lower probability may be appropriate, for example, if a high P_0 was chosen initially to account for uncertainty, but will result in longer rebuild times.
iv) Should updates to rebuilding plans be suspended if the stock is predicted to reach the target level soon? The simple rule could result in very large changes in harvest rate if recruitments at the end of the rebuilding period are low.
v) Should a major revision to rebuilding parameters occur if a very substantial reduction in harvest rate is needed to rebuild with probability P_0? The simple rule could lead to cases in which rebuilding to P_0 is possible, but only if the harvest rates are reduced to near-zero levels.
vi) Should the rules be species-specific to some extent? For example, the probability at which progress is deemed to be inadequate could be different for constraining and non-constraining species

The SSC notes that any proposed rules could be evaluated using the Management Strategy Evaluation framework. The SSC Groundfish Subcommittee is willing to work with members of the Council, GAP, and GMP between the June and September meetings to discuss policy issues and the trade-offs implied by different policy choices. However, the SSC cautions that it may not be possible to define and fully evaluate alternative rules adequately by the September Council meeting, given the complex nature of this problem. Finally, the SSC cautions that revisions to the National Standard 1 guidelines will include aspects related to progress to rebuilding. These revisions are not yet finalized, but could constrain the options available to the Council.

Table 1.

Species	P_0
Bocaccio	70%
Canary Rockfish	60%
Widow Rockfish	60%
Pacific Ocean Perch	70%
Darkblotched Rockfish	>90%
Yelloweye Rockfish	92%
Cowcod	60%
Lingcod	60%

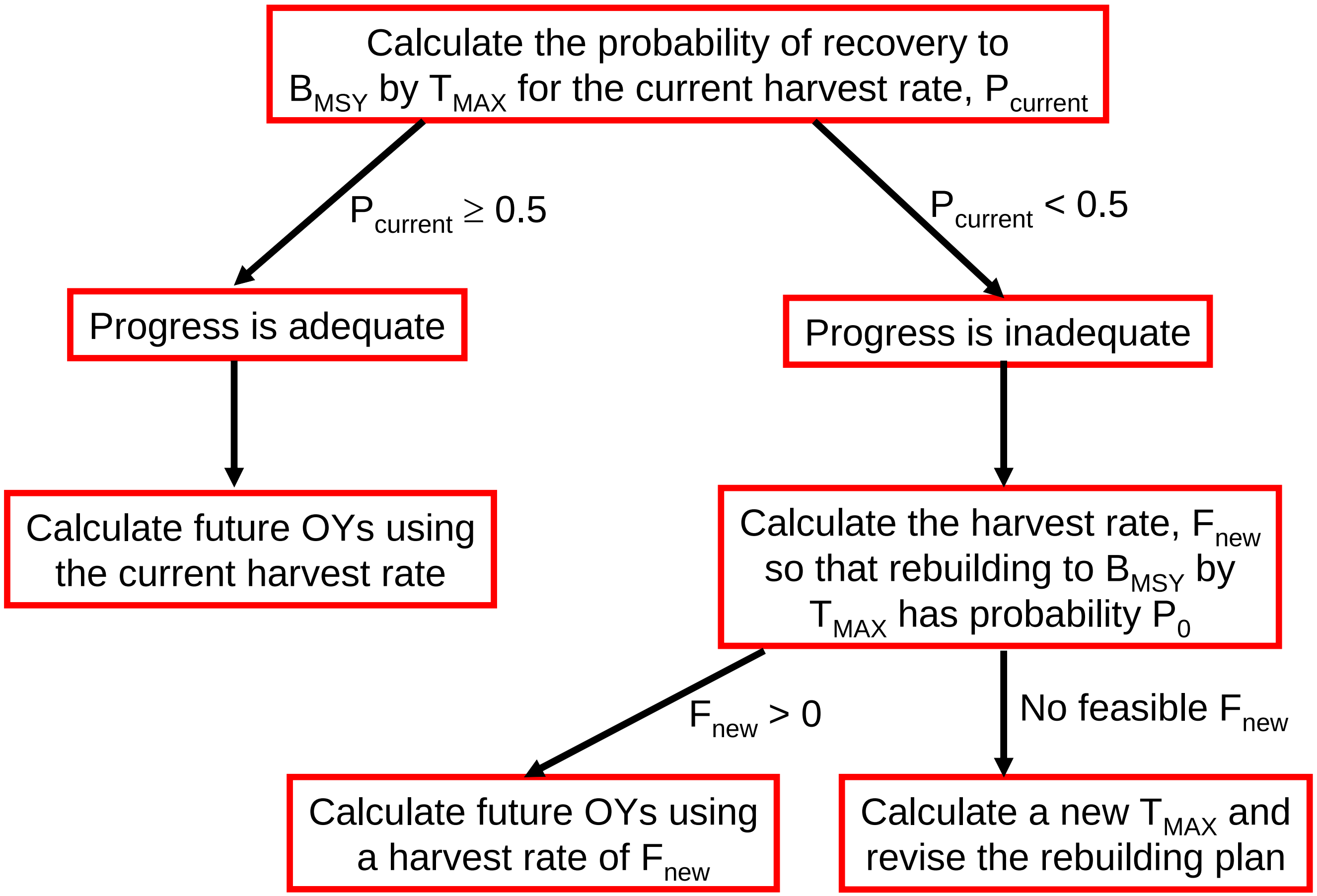


Figure – The simple standard for defining adequacy of progress and rules for modifying rebuilding plans.

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON REBUILDING PLAN REVISION RULES

The Groundfish Advisory Subpanel (GAP) reviewed the information provided on rebuilding plan revision rules and makes the following comments.

The GAP examined how to address the four possible cases listed on pages 2 and 3 of Agenda Item C.6.a, Attachment 2. We appreciate the technical assistance provided by Dr. John Field and Ms. Yvonne de Reynier of NMFS in stepping through this exercise. The GAP suggests the following options:

1. If the probability of rebuilding is more than 7.5% above the probability assumed under the existing rebuilding schedule, then the Council should revise the rebuilding harvest rate, so the excess can be applied to total catch.

2. If the probability of rebuilding is no more than 7.5% below the probability assumed under the existing rebuilding schedule, then the existing schedule should be retained.

3. If the probability of rebuilding is more than 7.5% below the probability assumed under the existing rebuilding schedule, **or** the rebuilding probability falls below 50%, then the Council will take appropriate action to change the rebuilding rate or modify the rebuilding plan.

4. If we cannot rebuild even at zero fishing, then we need to completely investigate the failure and determine whether necessary changes should be applied to other rebuilding plans to avoid similar failures.

The GAP chose the 7.5% tolerance figure because it is in between the standard probability for rebuilding advocated by the GAP (P=60%) and the minimum allowed under law (P=50%).

PFMC
06/15/05

GROUNDFISH MANAGEMENT TEAM REPORT ON REBUILDING PLAN REVISION RULES

The GMT believes that it would be highly advantageous to have criteria in place for evaluating the adequacy of progress in rebuilding for the November 2005 Council meeting. Aside from the legal requirement that the probability (P) of rebuilding by T_{MAX} be greater than 0.5, there are currently no criteria for assessing the adequacy of progress. This is despite the expectation that in new rebuilding analyses, the probability of rebuilding by T_{MAX} ($P_{current}$) can be expected to vary from the rebuilding probabilities established in individual rebuilding plans (P_0). The GMT recognizes that establishing these criteria is a policy decision for the Council. We have identified several options for the Council's consideration and have the following comments:

$P_{critical}$ (P_{crit}):

The GMT is supportive of the concept of a Council-designated value for P_{crit}, which would be the probability floor that would lead to a harvest rate revision. Currently the effective value for P_{crit} is 0.5 based on legal precedent. However, the GMT notes that the Council has adopted a de facto policy of setting rebuilding probabilities no lower than 0.6 in approving rebuilding plans. This would suggest that 0.6 may be a reasonable value for P_{crit}.

Scenario 1 - Rebuilding Probabilities Less Than Target Rebuilding Probabilities

For the cases where new rebuilding probabilities ($P_{current}$) are less than P_0, the GMT has identified options which include the concept of a buffer to reduce the need to frequently revise harvest rates in response to small deviations around the target rebuilding probabilities. As described in the Management Strategy Evaluation (MSE) framework, there would be advantages with regard to maintaining rebuilding trajectories and reducing management complexity in minimizing the frequency in which harvest rates are altered in response to new information.

The GMT would also like to clarify that the intent of a buffer would not be to reset P_0, but rather to allow for small movement around P_0 that might result from recruitment variability and estimation uncertainty. The GMT also considered that if a buffer were adopted, the Council might want to reserve the ability to revise a harvest rate if sequential assessments indicated that a stock was likely to be below P_0, yet within the buffer.

Option 1
Establish a buffer of 5% for those stocks with P_0 values less than 0.7 and a buffer of 10% for those stocks with P_0 values greater than or equal to 0.7 (e.g., a stock with a P0 value of 0.6 would have a buffer of 0.55).

Option 2
Establish a buffer of 10% for all stocks, regardless of P_0 value.

The GMT notes that for four of the eight overfished species (canary and widow rockfish, cowcod, and lingcod), P_0 has been set at 0.6. If P_{crit} were set at 0.6, there is some question to how such a value would work in conjunction with the concept of a buffer around which harvest rates would not be revised. The GMT discussed several approaches that might allow the two concepts to work together:

Option 3
Adopt one of the buffer options (Option 1 or 2) as well as a P_{crit} of 0.6, such that P_{crit} would trump the buffer for stocks in which the current P_0 was 0.6.

Option 4
Adopt a P_{crit} that operated on a sliding scale. For example, set P_{crit} to 0.6 or 5% below P_0, whichever is lower, such that the effective P_{crit} for stocks in which P_0 is equal to 0.6 would be 0.55.

Option 5
Adopt a buffer and Option 3 or 4, and require future rebuilding plans include P values of 0.65 or greater, so the resulting P is at least 5% greater than P_{crit}.

If the probability of rebuilding ($P_{current}$) is below either the buffer option adopted or below P_{crit}, but the stock could be rebuilt with additional harvest rate reductions, then a reasonable option is:

Option 6
Adjust the harvest rate to be no less than that which would maintain the original P_0 as a default target.

If a new analysis suggests that no feasible reduction in harvest rate (including F=0) would result in achieving P=0.5 by T_{MAX}, the only alternative is to amend the FMP to revise the rebuilding plan. If this happens, the GMT suggests that any revision be accompanied by a critical analysis of where the approach for rebuilding stocks failed, in order to determine whether the problem resulted in a fundamental failure in our understanding of stock dynamics and productivity, or whether the problem resulted from a failure to properly implement the rebuilding plan.

Scenario 2 – Rebuilding Probabilities Greater Than Target Rebuilding Probabilities

The GMT also discussed those scenarios in which $P_{current}$ may be greater than P_0 in a revised rebuilding analysis. The GMT supports a de facto policy of maintaining target harvest rates to allow for increased performance in rebuilding in order to accelerate the rebuilding process and account for the substantial uncertainty in both assessment and rebuilding models. However we recognize that where stocks are rebuilding faster than expected, the Council may wish to consider increasing the harvest rate in order to reduce the constraints on fisheries for co-occurring healthy stocks. The GMT recognizes a responsibility to be precautionary in management without unduly constraining fishery opportunities, and consequently discussed possible options for doing so.

Option 7
Establish a buffer of 5 to 10% above P_0, above which the Council would consider liberalizing harvest rates on a case-specific basis.

Estimated Total Mortality Impacts As a Result of Proposed Inseason Adjustments - June 2005 Council Meeting

06/16/06 17:45

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	Lingcod	POP	Widow	Yelloweye		
Limited Entry Trawl- Non-whiting b	51.6	8.0	0.9	157.3	151.7	69.3	1.3	0.3		
Limited Entry Trawl- Whiting										
At-sea whiting motherships				7.6	3.1	1.3		0.0		
At-sea whiting cat-proc		4.7		10.5	0.9	0.6	200.0	0.0		
Shoreside whiting				4.2	2.3	2.4		0.0		
Tribal whiting		3.0		0.0	0.4	1.3	10.0	0.0		
Tribal										
Midwater Trawl		1.3		0.0	0.1	0.0	40.0	0.0		
Bottom Trawl		0.5		0.0	9.0	0.0	0.0	0.0		
Troll		0.5		0.0	1.0	0.0		0.0		
Fixed gear		0.3		0.0	15.0	0.0	0.0	2.3		
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	20.0	0.4	0.5	2.9		
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	100.0	0.1	0.1	3.0		
Open Access: Incidental Groundfish										
CA Halibut	0.1	0.1		0.0	2.0	0.0				
CA Gillnet c/	0.5			0.0		0.0	0.0			
CA Sheephead c/				0.0		0.0	0.0	0.0		
CPS- wetfish c/	0.3									
CPS- squid d/										
Dungeness crab c/	0.0		0.0	0.0		0.0				
HMS c/		0.0	0.0	0.0						
Pacific Halibut c/	0.0		0.0	0.0		0.0	0.0	0.5		
Pink shrimp	0.1	0.1	0.0	0.0	0.5	0.0	0.1	0.1		
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	0.0	0.2		
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Spot Prawn (trap)										
Recreational Groundfish e/										
WA		8.5			206.0			6.7		
OR							2.4			
CA	60.0	9.3	0.4		422.0		9.4	3.7		
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.									17.8	0.380
	2.0	3.0	0.1	3.8	5.5	3.6	0.9	1.0		
Non-EFP Total	138.9	45.1	1.6	184.9	939.8	79.0	264.7	20.8		
EFPs f/									24.4	0.521
CA: NS FF trawl	10.0	0.1	0.5		20.0			0.5	42.2	0.901
EFP Subtotal	10.0	0.1	0.5	0.0	20.0	0.0	0.0	0.5	3.0	
TOTAL	148.9	45.2	2.1	184.9	959.8	79.0	264.7	21.3	45.2	2
2005 OY	307	46.8	4.2	269	2,414	447	285	26		
Difference	158.1	1.6	2.1	84.1	1,454.2	368.0	20.3	4.7	26.0	
comm canary residual g/										
rec canary residual g/										
Percent of OY	48.5%	96.6%	50.0%	68.7%	39.8%	17.7%	92.9%	81.8%		
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data								

a/ South of 40°10' N. lat.

b/ The 8.0 mt harvest guideline of canary rockfish includes a buffer against the uncertainty of predicting impacts using the new selective flatfish trawl gear. The point estimate of canary rockfish impacts is 5.6 mt.

c/ Mortality estimates are not hard numbers; based on the GMT's best professional judgement.

d/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

e/ Values for lingcod and yelloweye in California represent specified harvest guidelines.

f/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early.

g/ In June 2004, the Council apportioned the canary residual on a 50/50 basis between the recreational and commercial sectors. When the final regulations were enacted this residual was 1.25 for each sector.

Option 8
Establish an additional minimum P value (e.g., 0.7), above which increasing the harvest rate could be considered.

Option 9
Split the difference between $P_{current}$ and P_0, such that half (for example) of the increased probability of rebuilding was applied to an accelerated rebuilding rate, and half could be considered for harvest rate liberalization.

The GMT refrains from recommending any such options without evaluating the potential risk in adopting such policies using the MSE modeling tool. The GMT notes that the GAP has recommended a buffer approach of 7.5% (0.075) in both the upwards and downwards direction, and believes that this would also be a reasonable option to evaluate using the MSE modeling tool. Finally, the GMT recommends that in the event the Council did consider any liberalization of harvest rates, such considerations be limited to increased incidental catches in fisheries targeting healthy stocks. Any targeting of overfished species should be avoided.

GMT RECOMMENDATIONS

The GMT supports the concept of a P_{crit} value, as well as the concept of a lower buffer.

The GMT recommends that the Council select a subset of the above options as policy choices to be evaluated using the MSE modeling tool, and considered in more detail in the September Council meeting. Considering the extensive analysis associated with MSE modeling, the Council is advised to significantly limit the number of options to be analyzed.

REBUILDING PLAN REVISION RULES

The Council is obligated under the Pacific Coast Groundfish Fishery Management Plan (FMP) to periodically review the adequacy of progress in rebuilding plans for overfished species as new assessments are conducted and approved for management use. Under the FMP, this review of adequacy of rebuilding plan progress can occur at any time, but must occur at least every two years, even if new approved assessments are not available. Sections 4.5.3.3 through 4.5.3.6 of the FMP specify the process for development and approval of rebuilding plans, provisions for updating key rebuilding parameters, implementation of actions required under the rebuilding plan, and provisions for periodically reviewing rebuilding plans (Agenda Item C.6.a, Attachment 1). In section 4.5.3.6, the FMP states, "The Council, in consultation with the SSC and GMT, will determine on a case-by-case basis whether there has been a significant change in a parameter such that the chosen management target must be revised."

It is expected that rebuilding plans will be evaluated for adequacy of progress when new rebuilding analyses are considered and approved through the Council process every other year. Rebuilding analyses provide the information and implications of a new stock assessment and estimated fishery impacts relative to the previous rebuilding trajectory. All new rebuilding analyses are anticipated to be approved at the November 2005 Council meeting. This would be when the SSC, Groundfish Management Team (GMT), and Council will formally review affected rebuilding plans and determine on a case-by-case basis whether rebuilding/management targets need to be revised.

The Council is now challenged with developing a framework and policy for revising each rebuilding plan, termed rebuilding revision rules, in advance of the November 2005 meeting. Members of the SSC and the West Coast scientific community have collaborated to address management strategy evaluation techniques for species under rebuilding (Agenda Item C.6.a, Attachment 2) and management implications of alternative rebuilding revision rules (Agenda Item C.6.a, Attachment 3). Furthermore, Dr. Steve Ralston will be giving a joint presentation at the June Council meeting (scheduled for 10:30 A.M., Monday, June 13) to explain these techniques and analyses and to clarify implications of alternative rebuilding revision rules. The Council task under this agenda item is to adopt, for public review, draft rebuilding revision rules for overfished species managed under an adopted rebuilding plan. The proposed final adoption of rebuilding revision rules is September 2005, prior to final approval of rebuilding analyses and specification of a range of optimum yields for these stocks in November 2005.

Council Action:

Adopt draft rebuilding plan revision rules for public review.

Reference Materials:

1. Agenda Item C.6.a, Attachment 1: Sections 4.5.3.3 – 4.5.3.6 of the Pacific Coast Groundfish Fishery Management Plan.
2. Agenda Item C.6.a, Attachment 2: Establishing Quantitative Criteria for Assessing Adequacy of Progress Towards Rebuilding Overfished West Coast Groundfish Stocks.
3. Agenda Item C.6.a, Attachment 3: Evaluating Alternative Rebuilding Revision Rules for Assessing Progress Towards Rebuilding of Overfished West Coast Groundfish.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. SSC Report — Kevin Hill
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt Policy Alternatives for Public Review

PFMC
05/24/05

GROUNDFISH MANAGEMENT TEAM REPORT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

Following the initial consideration of inseason adjustments, the Groundfish Management Team (GMT) evaluated the inseason trigger mechanism, adjusting the trawl Rockfish Conservation Area (RCA) boundary north of 40º 10', yellowtail rockfish cumulative limits in the limited entry trawl fishery, and projected catch against optimum yields (OYs) and harvest guidelines (HGs).

As part of the 2005–2006 specifications and management measures process, a commercial HG of 90.9 mt was set for darkblotched rockfish. After projected research catch (3.8 mt) and the commercial HG were subtracted from the darkblotched rockfish optimum yield (OY), a residual of 174.3 mt was left over to be used as necessary during the fishing year. The GMT anticipates that the commercial HG will likely be achieved sometime this summer or early fall. Because darkblotched is an important slope species, and constraining the fishery to the darkblotched HG would result in large economic consequences, the GMT has been and recommends continuing using some of the 174.3 mt residual to allow for continued fishing seaward of the RCA throughout the year. The GMT does not anticipate such action will result in exceeding the ABC/OY.

LIMITED ENTRY TRAWL

Inseason Trigger Mechanism

The GMT discussed several ways of implementing an inseason trigger as described in the initial inseason GMT statement, and believes that while an inseason trigger may be a worthwhile mechanism for ensuring that catch levels do not exceed intended amounts, at this time an inseason trigger is not ripe for use given existing data systems, administrative burdens, and management and enforcement concerns.

RCA Boundary North of 40º 10'

Based on the concern over an inseason trigger mechanism, the GMT does not recommend moving the seaward boundary of the trawl RCA from 200 fathoms to 180 fathoms north of 40º 10' during period 4.

Yellowtail Rockfish

The GMT analyzed yellowtail rockfish catch and limit attainment in the trawl fisheries during 2003, 2004, and 2005 and under the selective flatfish trawl exempted fishing permit (EFP). Analysis of prior years shows that yellowtail catch levels are generally higher during the summer and fall months. The GMT also analyzed the correlation of yellowtail and flatfish catches this year, but (due to data limitations) was unable to determine whether yellowtail targeting was occurring or whether yellowtail is purely incidental to targeting of flatfish or other species.
The GMT compared SFFT EFP data to inseason landings of yellowtail rockfish. While some vessels have bycatch rates and landed amounts of yellowtail that are more than five times the amount observed in the EFP, the aggregate bycatch rate of yellowtail to flatfish in the 2005

fishery is approximately 26 percent higher than the aggregate rate observed in the EFP. The GMT notes that the difference in yellowtail bycatch rates in the EFP versus those observed in this year's fishery may shed light on how the fishery is actually performing with respect to overfished species (e.g., that bycatch of overfished species may be higher than what is being estimated for the year). While the GMT is still concerned that a 2,000 lb per 2 month cumulative limit may encourage targeting of yellowtail rockfish and that such targeting may increase the mortality of canary rockfish associated with yellowtail, available bycatch data suggests that a 2,000 lb per 2 month limit is not inappropriate if limit attainment is purely incidental.

Slope Rockfish and Splitnose Between 40º 10' and 38º

The GMT recommends increasing slope rockfish and splitnose limits from 8,000 pounds per 2 months to 20,000 pounds per 2 months for period 4 and since an inseason trigger mechanism cannot be implemented at this meeting, returning to 8,000 lbs per 2 months for the remainder of the year. The GMT will evaluate whether an additional increase is possible at the September meeting.

LIMITED ENTRY FIXED GEAR SOUTH OF 34º 27'

The GMT discussed a request to increase shelf rockfish limits to 5,000 pound per 2 months. The GMT is concerned with potential cowcod catch between 40 fm and 60 fm and the lack of observer data in that area. Therefore, the GMT recommends increasing shelf rockfish limits from 2,000 lbs per 2 months to 3,000 lbs per 2 months.

OPEN ACCESS SOUTH OF 34º 27'

The GMT received a request to increase shelf rockfish limits for the open access fishery south of 34º 27' from 500 pounds per 2 months to 1,000 pounds per 2 months. The GMT considered increasing shelf rockfish limits for the open access fishery south of 34º 27', and it was generally agreed that an increase in open access cumulative limits from 500 lbs per 2 months to 750 lbs per 2 months (a similar percentage increase as for limited entry) was not likely to result in a conservation concern. However given the high value of the nearshore species, small changes in cumulative limits could result in unanticipated changes in effort. Consequently, the inability to predict the behavior of the open access fleet constrains our ability to fully evaluate the potential consequences of this action. Consequently, the GMT believes that this more moderate increase is more risk averse than the initial request.

LIMITED ENTRY FIXED GEAR AND OPEN ACCESS NORTH OF 40º 10'

Due to low catches of black rockfish, the GMT recommends an increase in minor nearshore rockfish from 5,000 lb per 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish to 6,000 lb per 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish.

RECREATIONAL FISHERIES

The GMT does not recommend any recreational inseason management actions at this time.

BYCATCH SCORECARD UPDATE

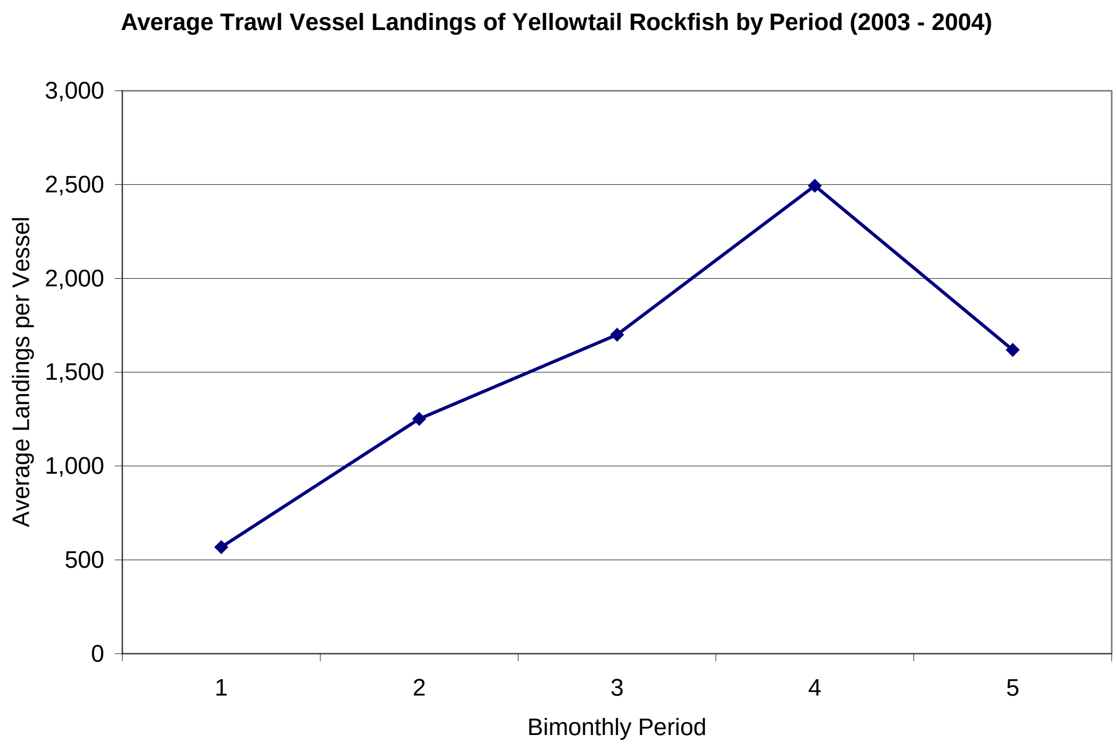
In 2004 the Council elected to split the canary remainder where 50 percent of the remainder was set aside for recreational fisheries and 50 percent was set aside for commercial fisheries. During the March Council meeting, new data was incorporated into the management system along with inseason adjustments. This resulted in revised projections of canary rockfish, and these new projections resulted in a change in the calculated remainder of canary rockfish. The recreational remainder increased from 1.3 mt to 1.5 mt, and the commercial remainder increased from 1.3 mt to 2.5 mt. During the April Council meeting, new data and catch projections resulted in a revised canary rockfish remainder, and instead of attributing savings to the appropriate sector, the GMT split the remainder in half, giving both the commercial and recreational sectors 2.0 mt. The GMT has corrected this issue in the scorecard and has attributed the remainder to the appropriate sectors.

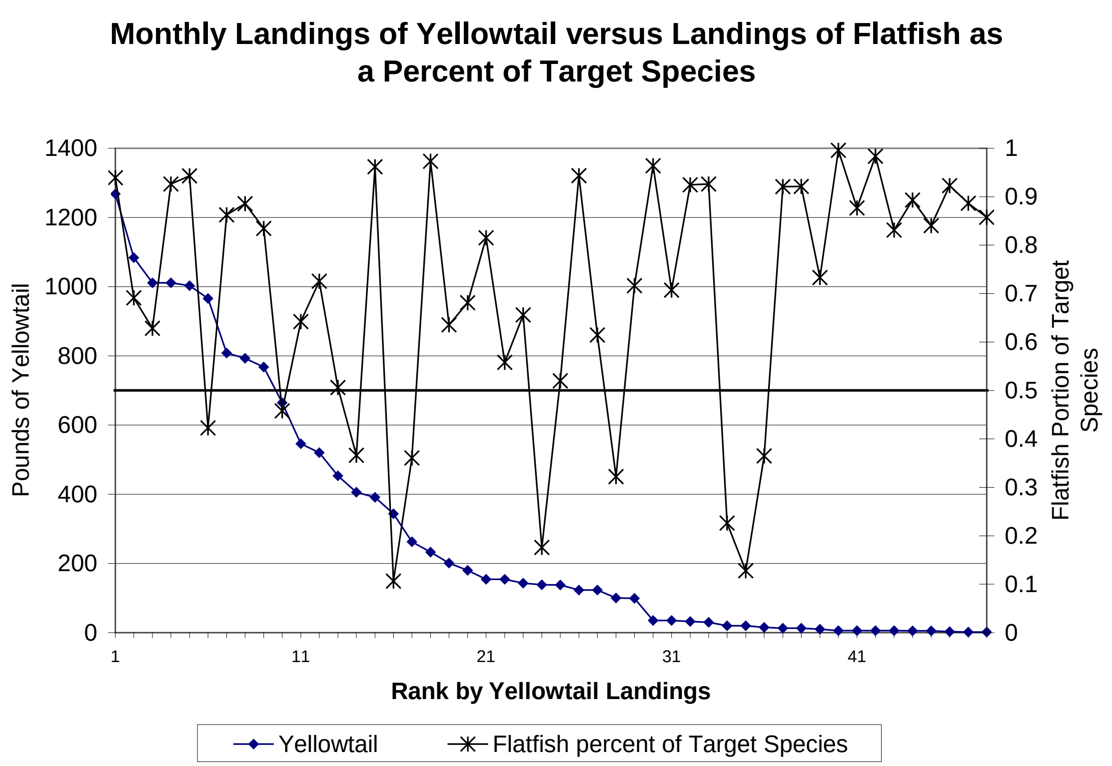
At this meeting, the GMT revised the bycatch scorecard with updated projections of bycatch associated with the whiting fishery, updated catch in the California and Oregon recreational fisheries, updated projections of research catch, and updated model projections of catch in the open access fishery.

GMT RECOMMENDATIONS

The attached trip limit tables and revised scorecard are based on the following:

1. Increase limited entry trawl cumulative limits for longspine, shortspine, sablefish, and slope rockfish as indicated in the attached trip limit tables.
2. Increase open access shelf rockfish (including shortbelly, widow, and chilipepper rockfish) cumulative limits south of 34º 27’ from 500 pounds per 2 months to 750 pounds per 2 months for the remainder of the year.
3. Increase limited entry fixed gear shelf rockfish cumulative limits south of 34º 27’ from 2,000 pounds per 2 months to 3,000 pounds per 2 months for the remainder of the year.
4. Increase limited entry fixed gear and open access cumulative limits for minor nearshore rockfish and black rockfish north of 40º 10’ from 5,000 pounds per 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish to 6,000 pounds per 2 months, no more than 1,200 lb may be species other than black or blue rockfish between for the remainder of the year.
5. Increase limited entry trawl slope rockfish and splitnose limits between 40º 10’ and 38º from 8,000 pounds per 2 months to 20,000 pounds per 2 months for period 4.


Average Trawl Vessel Landings of Yellowtail Rockfish by Period (2003 - 2004)
Average Landings per Vessel
3,000
2,500
2,000
1,500
1,000
500
0
1
2
3
4
5
Bimonthly Period


Monthly Landings of Yellowtail versus Landings of Flatfish as a Percent of Target Species
Pounds of Yellowtail
1400
1200
1000
800
600
400
200
0
Flatfish Portion of Target Species
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
11
21
31
41
Rank by Yellowtail Landings
Yellowtail
Flatfish percent of Target Species

Estimated Bottom Trawl Total Catch vs. April Scorecard and Harvest Guidelines

Option A: 180 fathom outline in period 4 in North

		Proj Catch	April Scorecard	HG
Rebuilding Species	Lingcod	152.0	152.0	
	Canary	5.8	8.0	
	POP	71.1	67.3	
	Darkblotche	157.4	157.5	
	Widow	1.3	1.3	
	Bocaccio	52.0	58.2	
	Yelloweye	0.3	0.3	
	Cowcod	0.9	1.1	
Target Species	Sablefish	2,652		3,505.0
	Longspine	1,086		2,450.0
	Shortspine	724		995.0
	Dover	6,979		7,445.0
	Arrowtooth	3,319		5,800.0
	Petrale	2,547		2,762.0
	O Flat	2,166		4,909.0
	Sl Rock N	140		1,160.0
	Sl Rock S	394.0		639.0

Total Mortality in LE Trawl as a Result of GMT Preferred Option

		Projection	April Scorecard	HG
Rebuilding Species	Lingcod	151.5	152.0	
	Canary	5.7	8.0	
	POP	69.3	67.3	
	Darkblotch	156.6	157.5	
	Widow	1.3	1.3	
	Bocaccio	51.4	58.2	
	Yelloweye	0.3	0.3	
	Cowcod	0.9	1.1	
Target Species	Sablefish	2,644.3		3,505
	Longspine	1,085.8		2,450
	Shortspine	722.1		995
	Dover	6,969.7		7,445
	Arrowtooth	3,314.7		5,800
	Petrale	2,545.7		2,762
	O Flat	2,159.9		4,909
	Sl Rock N	133.4		1,160
	Sl Rock S	323.4		639

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Estimated Total Mortality Impacts As a Result of Proposed Inseason Adjustments - June 2005 Council Meeting

06/16/06 17:45

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	Lingcod	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting b/	51.6	8.0	0.9	157.3	151.7	69.3	1.3	0.3
Limited Entry Trawl- Whiting								
At-sea whiting motherships		4.7		7.6	3.1	1.3	200.0	0.0
At-sea whiting cat-proc				10.5	0.9	0.6		0.0
Shoreside whiting				4.2	2.3	2.4		0.0
Tribal whiting		3.0		0.0	0.4	1.3	10.0	0.0
Tribal								
Midwater Trawl		1.3		0.0	0.1	0.0	40.0	0.0
Bottom Trawl		0.5		0.0	9.0	0.0	0.0	0.0
Troll		0.5		0.0	1.0	0.0		0.0
Fixed gear		0.3		0.0	15.0	0.0	0.0	2.3
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	20.0	0.4	0.5	2.9
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	100.0	0.1	0.1	3.0
Open Access: Incidental Groundfish								
CA Halibut	0.1	0.1		0.0	2.0	0.0		
CA Gillnet c/	0.5			0.0		0.0	0.0	
CA Sheephead c/				0.0		0.0	0.0	0.0
CPS- wetfish c/	0.3							
CPS- squid d/								
Dungeness crab c/	0.0		0.0	0.0		0.0		
HMS c/		0.0	0.0	0.0				
Pacific Halibut c/	0.0		0.0	0.0		0.0	0.0	0.5
Pink shrimp	0.1	0.1	0.0	0.0	0.5	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.3	0.0	0.0	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)								
Recreational Groundfish e/								
WA		8.5			206.0			6.7
OR							2.4	
CA	60.0	9.3	0.4		422.0		9.4	3.7
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.								
	2.0	3.0	0.1	3.8	5.5	3.6	0.9	1.0
Non-EFP Total	138.9	45.1	1.6	184.9	939.8	79.0	264.7	20.8
EFPs f/								
CA: NS FF trawl	10.0	0.1	0.5		20.0			0.5
EFP Subtotal	10.0	0.1	0.5	0.0	20.0	0.0	0.0	0.5
TOTAL	148.9	45.2	2.1	184.9	959.8	79.0	264.7	21.3
2005 OY	307	46.8	4.2	269	2,414	447	285	26
Difference	158.1	1.6	2.1	84.1	1,454.2	368.0	20.3	4.7
comm canary residual g/								
rec canary residual g/								
Percent of OY	48.5%	96.6%	50.0%	68.7%	39.8%	17.7%	92.9%	81.8%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data						

a/ South of 40°10' N. lat.

b/ The 8.0 mt harvest guideline of canary rockfish includes a buffer against the uncertainty of predicting impacts using the new selective flatfish trawl gear. The point estimate of canary rockfish impacts is 5.6 mt.

c/ Mortality estimates are not hard numbers; based on the GMT's best professional judgement.

d/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

e/ Values for lingcod and yelloweye in California represent specified harvest guidelines.

f/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early.

g/ In June 2004, the Council apportioned the canary residual on a 50/50 basis between the recreational and commercial sectors. When the final regulations were enacted this residual was 1.25 for each sector.

Table 3 (North) to Part 660, Subpart G -- 2005-2006 Trip Limits for Limited Entry Trawl Gear North of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]: North of 40°10' N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm				75 fm - modified 200 fm [7/]
	Selective flatfish trawl gear is required shoreward of the RCA; all trawl gear (large footrope, selective flatfish trawl, and small footrope trawl gear) is permitted seaward of the RCA. Midwater trawl gear is permitted only for vessels participating in the primary whiting season.						
	See § 660.370 and § 660.381 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[2/] & Darkblotched rockfish**	4,000 lb/ 2 months					
2	**Pacific ocean perch**	3,000 lb/ 2 months					
3	**DTS complex**						
4	Sablefish						
5	large & small footrope gear	9,500 lb/ 2 months		17,000 lb/ 2 months	18,000 lb/ 2 months		13,000 lb/ 2 months
6	selective flatfish trawl gear	1,500 lb/ 2 months	10,000 lb/ 2 months		15,000 lb/ 2 months		10,000 lb/ 2 months
7	multiple bottom trawl gear [8/]	1,500 lb/ 2 months	9,500 lb/ 2 months	10,000 lb/ 2 months	15,000 lb/ 2 months		10,000 lb/ 2 months
8	Longspine thornyhead						
9	large & small footrope gear	15,000 lb/ 2 months		23,000 lb/ 2 months			15,000 lb/ 2 months
10	selective flatfish trawl gear	1,000 lb/ 2 months			8,000 lb/ 2 months		2,000 lb/ 2 months
11	multiple bottom trawl gear [8/]	1,000 lb/ 2 months			8,000 lb/ 2 months		2,000 lb/ 2 months
12	Shortspine thornyhead						
13	large & small footrope gear	3,500 lb/ 2 months		4,900 lb/ 2 months	5,200 lb/ 2 months		3,700 lb/ 2 months
14	selective flatfish trawl gear	1,000 lb/ 2 months		3,000 lb/ 2 months	4,000 lb/ 2 months		2,000 lb/ 2 months
15	multiple bottom trawl gear [8/]	1,000 lb/ 2 months		3,000 lb/ 2 months	4,000 lb/ 2 months		2,000 lb/ 2 months
16	Dover sole						
17	large & small footrope gear	69,000 lb/ 2 months		30,000 lb/ 2 months			22,000 lb/ 2 months
18	selective flatfish trawl gear	20,000 lb/ 2 months	35,000 lb/ 2 months	35,000 lb/ 2 months			8,000 lb/ 2 months
19	multiple bottom trawl gear [8/]	20,000 lb/ 2 months	35,000 lb/ 2 months	30,000 lb/ 2 months			8,000 lb/ 2 months

TABLE 3 (North)

Table 3 (North). Continued

20	**Flatfish** (except Dover sole)					
21	Other flatfish [3/], English sole & Petrale sole					
22	large & small footrope gear for Other flatfish[3/] & English sole	110,000 lb/ 2 months	110,000 lb/ 2 months, no more than 42,000 lb/ 2 months of which may be petrale sole.	110,000 lb/ 2 months, no more than 40,000 lb/ 2 months of which may be petrale sole.	80,000 lb/ 2 months, no more than 60,000 lb/ 2 months of which may be petrale sole.	TABLE 3 (North) con't
23	large & small footrope gear for Petrale sole	Not limited				
24	selective flatfish trawl gear	100,000 lb/ 2 months, no more than 25,000 lb/ 2 months of which may be petrale sole.	100,000 lb/ 2 months, no more than 35,000 lb/ 2 months of which may be petrale sole.	90,000 lb/ 2 months, no more than 35,000 lb/ 2 months of which may be petrale sole.	75,000 lb/ 2 months, no more than 15,000 lb/ 2 months of which may be petrale sole.	
25	multiple bottom trawl gear [8/]	100,000 lb/ 2 months, no more than 25,000 lb/ 2 months of which may be petrale sole.	100,000 lb/ 2 months, no more than 35,000 lb/ 2 months of which may be petrale sole.	90,000 lb/ 2 months, no more than 35,000 lb/ 2 months of which may be petrale sole.	75,000 lb/ 2 months, no more than 15,000 lb/ 2 months of which may be petrale sole.	
26	Arrowtooth flounder					
27	large & small footrope gear	Not limited	150,000 lb/ 2 months		80,000 lb/ 2 months	
28	selective flatfish trawl gear	70,000 lb/ 2 months				
29	multiple bottom trawl gear [8/]	70,000 lb/ 2 months				
30	**Whiting**	Before the primary whiting season: 20,000 lb/trip -- During the primary season: mid-water trawl permitted in the RCA. See §660.373 for season and trip limit details. -- After the primary whiting season: 10,000 lb/trip				
31	**Minor shelf rockfish[1/], Shortbelly, Widow & Yelloweye rockfish**					
32	midwater trawl for Widow rockfish	Before the primary whiting season: CLOSED -- During primary whiting season: In trips of at least 10,000 lb of whiting, combined widow and yellowtail limit of 500 lb/ trip, cumulative widow limit of 1,500 lb/ month. Mid-water trawl permitted in the RCA. See §660.373 for primary whiting season and trip limit details. -- After the primary whiting season: CLOSED				
33	large & small footrope gear	300 lb/ 2 months				
34	selective flatfish trawl gear	300 lb/ month		1,000 lb/ month, no more than 200 lb/ month of which may be yelloweye rockfish	300 lb/ month	

Table 3 (North). Continued

36	**Canary rockfish**			
37	large & small footrope gear	CLOSED		
38	selective flatfish trawl gear	100 lb/ month	300 lb/ month	100 lb/ month
39	multiple bottom trawl gear [8/]	CLOSED		
40	**Yellowtail**			
41	midwater trawl	Before the primary whiting season: CLOSED -- During primary whiting season: In trips of at least 10,000 lb of whiting: combined widow and yellowtail limit of 500 lb/ trip, cumulative yellowtail limit of 2,000 lb/ month. Mid-water trawl permitted in the RCA. See §660.373 for primary whiting season and trip limit details. -- After the primary whiting season: CLOSED		
42	large & small footrope gear	300 lb/ 2 months		
43	selective flatfish trawl gear	2,000 lb/ 2 months		
44	multiple bottom trawl gear [8/]	300 lb/ 2 months		
45	**Minor nearshore rockfish & Black rockfish**			
46	large & small footrope gear	CLOSED		
47	selective flatfish trawl gear	300 lb/ month		
48	multiple bottom trawl gear [8/]	CLOSED		
49	**Lingcod** [4/]			
50	large & small footrope gear	500 lb/ 2 months		
51	selective flatfish trawl gear	800 lb/ 2 months	1,000 lb/ 2 months	800 lb/ 2 months
52	multiple bottom trawl gear [8/]	500 lb/ 2 months		
53	**Other Fish [5/] & Pacific cod**	Not limited		

TABLE 3 (North) con't

1/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish.
2/ Splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
7/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.
8/ If a vessel has both selective flatfish gear and large or small footrope gear on board during a cumulative limit period (either simultaneously or successively), the most restrictive cumulative limit for any gear on board during the cumulative limit period applies for the entire cumulative limit period.

To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 3 (South) to Part 660, Subpart G -- 2005-2006 Trip Limits for Limited Entry Trawl Gear South of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
	40°10' - 38° N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm	100 fm - 150 fm			75 fm - 150 fm
	38° - 34°27' N. lat.	75 fm - 150 fm	100 fm - 150 fm				
	South of 34°27' N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands				75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands

Small footrope gear is required shoreward of the RCA; all trawl gear (large footrope, midwater trawl, and small footrope gear) is permitted seaward of the RCA.

See § 660.370 and § 660.381 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).

State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
1	**Minor slope rockfish[2/] & Darkblotched rockfish**						
2	40°10' - 38° N. lat.	4,000 lb/ 2 months		8,000 lb/ 2 months	20,000 lb/ 2 months	8,000 lb/ 2 months	
3	South of 38° N. lat.	40,000 lb/ 2 months					
4	**Splitnose**						
5	40°10' - 38° N. lat.	4,000 lb/ 2 months		8,000 lb/ 2 months	20,000 lb/ 2 months	8,000 lb/ 2 months	
6	South of 38° N. lat.	40,000 lb/ 2 months					
7	**DTS complex**						
8	Sablefish	14,000 lb/ 2 months			16,000 lb/ 2 months		
9	Longspine thornyhead	19,000 lb / 2 months					
10	Shortspine thornyhead	4,200 lb/ 2 months			4,600 lb/ 2 months		
11	Dover sole	50,000 lb/ 2 months		40,000 lb/ 2 months			35,000 lb/ 2 months
12	**Flatfish** (except Dover sole)						
13	Other flatfish[3/] & English sole	110,000 lb/ 2 months	Other flatfish, English sole & Petrale sole: 110,000 lb/ 2 months, no more than 42,000 lb/ 2 months of which may be petrale sole				110,000 lb/ 2 months
14	Petrale sole	No limit					100,000 lb/ 2 months
15	Arrowtooth flounder	No limit	10,000 lb/ 2 months				20,000 lb/ 2 months
16	**Whiting**	Before the primary whiting season: 20,000 lb/trip -- During the primary whiting season: mid-water trawl permitted in the RCA. See §660.373 for season and trip limit details. -- After the primary whiting season: 10,000 lb/trip					

TABLE 3 (South)

Table 3 (South). Continued

17	**Minor shelf rockfish[1/], Chilipepper, Shortbelly, Widow, & Yelloweye rockfish**			
18	large footrope or midwater trawl for Minor shelf rockfish & Shortbelly	300 lb/ month		
19	large footrope or midwater trawl for Chilipepper	2,000 lb/ 2 months	12,000 lb/ 2 months	8,000 lb/ 2 months
20	large footrope or midwater trawl for Widow & Yelloweye	CLOSED		
21	small footrope trawl	300 lb/ month		
22	**Bocaccio**			
23	large footrope or midwater trawl	300 lb/ 2 months		
24	small footrope trawl	CLOSED		
25	**Canary rockfish**			
26	large footrope or midwater trawl	CLOSED		
27	small footrope trawl	100 lb/ month	300 lb/ month	100 lb/ month
28	**Cowcod**	CLOSED		
29	**Minor nearshore rockfish & Black rockfish**			
30	large footrope or midwater trawl	CLOSED		
31	small footrope trawl	300 lb/ month		
32	**Lingcod[4/]**			
33	large footrope or midwater trawl	500 lb/ 2 months		
34	small footrope trawl	800 lb/ 2 months	1,000 lb/ 2 months	800 lb/ 2 months
35	**Other Fish[5/] & Cabezon**	Not limited		

TABLE 3 (South) con't

1/ Yellowtail is included in the trip limits for minor shelf rockfish.
2/ POP is included in the trip limits for minor slope rockfish
3/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ Other fish are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Pacific cod is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
7/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 4 (North) to Part 660, Subpart G -- 2005-2006 Trip Limits for Limited Entry Fixed Gear North of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

TABLE 4 (North)

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
	North of 46°16' N. lat.	shoreline - 100 fm					
	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish [2/] & Darkblotched rockfish**	4,000 lb/ 2 months					
2	**Pacific ocean perch**	1,800 lb/ 2 months					
3	**Sablefish**	300 lb/ day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/ 2 months					
4	**Longspine thornyhead**	10,000 lb/ 2 months					
5	**Shortspine thornyhead**	2,000 lb/ 2 months					
6	**Dover sole**	5,000 lb/ month South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
7	**Arrowtooth flounder**						
8	**Petrale sole**						
9	**English sole**						
10	**Other flatfish[1/]**						
11	**Whiting**	10,000 lb/ trip					
12	**Minor shelf rockfish[2/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
13	**Canary rockfish**	CLOSED					
14	**Yelloweye rockfish**	CLOSED					
15	**Minor nearshore rockfish & Black rockfish**	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]			6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]		
16	**Lingcod[4/]**	CLOSED		800 lb/ 2 months			CLOSED
17	**Other fish[5/] & Pacific cod**	Not limited					

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
2/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lb or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 4 (South) to Part 660, Subpart G -- 2005-2006 Trip Limits for Limited Entry Fixed Gear South of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[2/] & Darkblotched rockfish**	40,000 lb/ 2 months					
2	**Splitnose**	40,000 lb/ 2 months					
3	**Sablefish**						
4	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/ 2 months					
5	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
6	**Longspine thornyhead**	10,000 lb / 2 months					
7	**Shortspine thornyhead**	2,000 lb/ 2 months					
8	**Dover sole**	5,000 lb/ month When fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
9	**Arrowtooth flounder**						
10	**Petrale sole**						
11	**English sole**						
12	**Other flatfish[1/]**						
13	**Whiting**	10,000 lb/ trip					
14	**Minor shelf rockfish[2/], Shortbelly, & Widow rockfish**						
15	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
16	South of 34°27' N. lat.	2,000 lb/ 2 months		2,000 lb/ 2 months	3,000 lb/ 2 months		
17	**Chilipepper rockfish**	2,000 lb/ 2 months, this opportunity only available seaward of the nontrawl RCA					
18	**Canary rockfish**	CLOSED					
19	**Yelloweye rockfish**	CLOSED					
20	**Cowcod**	CLOSED					
21	**Bocaccio**						
22	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months	300 lb/ 2 months		
23	South of 34°27' N. lat.	300 lb/ 2 months		300 lb/ 2 months			
24	**Minor nearshore rockfish & Black rockfish**						
25	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
26	Deeper nearshore						
27	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
28	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
29	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months
30	**Lingcod[3/]**	CLOSED		800 lb/ 2 months			CLOSED
31	**Other fish[4/] & Cabezon**	Not limited					

TABLE 4 (South)

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
2/ POP is included in the trip limits for minor slope rockfish. Yellowtail is included in the trip limits for minor shelf rockfish.
3/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Pacific cod is included in the trip limits for "other fish."
5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 5 (North) to Part 660, Subpart G -- 2005-2006 Trip Limits for Open Access Gears North of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
	North of 46°16' N. lat.	shoreline - 100 fm					
	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[1/] & Darkblotched rockfish**	Per trip, no more than 25% of weight of the sablefish landed					
2	**Pacific ocean perch**	100 lb/ month					
3	**Sablefish**	300 lb/ day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/ 2 months					
4	**Thornyheads**	CLOSED					
5	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb (0.45 kg) of weight per line are not subject to the RCAs.					
6	**Arrowtooth flounder**						
7	**Petrale sole**						
8	**English sole**						
9	**Other flatfish[2/]**						
10	**Whiting**	300 lb/ month					
11	**Minor shelf rockfish[1/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
12	**Canary rockfish**	CLOSED					
13	**Yelloweye rockfish**	CLOSED					
14	**Minor nearshore rockfish & Black rockfish**	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]			6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]		
15	**Lingcod[4/]**	CLOSED		300 lb/ month			CLOSED
16	**Other Fish[5/] & Pacific cod**	Not limited					
17	**PINK SHRIMP NON-GROUNDFISH TRAWL**	*(not subject to RCAs)*					
18	North	**Effective April 1 - October 31:** groundfish 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/month (minimum 24 inch size limit); sablefish 2,000 lb/month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.					
19	**SALMON TROLL**						
20	North	Salmon trollers may retain and land up to 1 lb of yellowtail rockfish for every 2 lbs of salmon landed, with a cumulative limit of 200 lb/month, both within and outside of the RCA. This limit is within the 200 lb per month combined limit for minor shelf rockfish, widow rockfish and yellowtail rockfish, and not in addition to that limit. All groundfish species are subject to the open access limits, seasons and RCA restrictions listed in the table above.					

TABLE 5 (North)

1/ Bocaccio, chilipepper and cowcod rockfishes are included in the trip limits for minor shelf rockfish.
Splitnose rockfish is included in the trip limits for minor slope rockfish.
2/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lbs or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
4/ The size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.
Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 5 (South) to Part 660, Subpart G -- 2005-2006 Trip Limits for Open Access Gears South of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 062005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[1/] & Darkblotched rockfish**						
2	40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
3	South of 38° N. lat.	10,000 lb/ 2 months					
4	**Splitnose**	200 lb/ month					
5	**Sablefish**						
6	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 900 lb, not to exceed 3,600 lb/ 2 months					
7	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
8	**Thornyheads**						
9	40°10' - 34°27' N. lat.	CLOSED					
10	South of 34°27' N. lat.	50 lb/ day, no more than 1,000 lb/ 2 months					
11	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to 1 lb of weight per line are not subject to the RCAs.					
12	**Arrowtooth flounder**						
13	**Petrale sole**						
14	**English sole**						
15	**Other flatfish[2/]**						
16	**Whiting**	300 lb/ month					
17	**Minor shelf rockfish[1/], Shortbelly, Widow & Chilipepper rockfish**						
18	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
19	South of 34°27' N. lat.	500 lb/ 2 months		500 lb/ 2 months	750 lb/ 2 months		
20	**Canary rockfish**	CLOSED					
21	**Yelloweye rockfish**	CLOSED					
22	**Cowcod**	CLOSED					
23	**Bocaccio**						
24	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months		200 lb/ 2 months	
25	South of 34°27' N. lat.	100 lb/ 2 months		100 lb/ 2 months			
26	**Minor nearshore rockfish & Black rockfish**						
27	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
28	Deeper nearshore						
29	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
30	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
31	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months
32	**Lingcod[3/]**	CLOSED		300 lb/ month, when nearshore open			CLOSED

TABLE 5 (South)

Table 5 (South). Continued

34	**PINK SHRIMP NON-GROUNDFISH TRAWL GEAR** *(not subject to RCAs)*				
35	South	**Effective April 1 - October 31:** Groundfish 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/ month (minimum 24 inch size limit); sablefish 2,000 lb/ month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.			
36	**RIDGEBACK PRAWN AND, SOUTH OF 38°57.50' N. LAT., CA HALIBUT AND SEA CUCUMBER NON-GROUNDFISH TRAWL**				
37	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for CA Halibut and Sea Cucumber:**				
38	40°10' - 38° N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm	100 fm - 150 fm	75 fm - 150 fm
39	38° - 34°27' N. lat.	75 fm - 150 fm	100 fm - 150 fm		
40	South of 34°27' N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands		75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands
41	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for Ridgeback Prawn:**				
42	40°10' - 38° N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm	100 fm - 150 fm	75 fm - 150 fm
43	38° - 34°27' N. lat.	75 fm - 150 fm	100 fm - 150 fm		
44	South of 34°27' N. lat.	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands			
45		Groundfish 300 lb/trip. Trip limits in this table also apply and are counted toward the 300 lb groundfish per trip limit. The amount of groundfish landed may not exceed the amount of the target species landed, except that the amount of spiny dogfish landed may exceed the amount of target species landed. Spiny dogfish are limited by the 300 lb/trip overall groundfish limit. The daily trip limits for sablefish coastwide and thornyheads south of Pt. Conception and the overall groundfish "per trip" limit may not be multiplied by the number of days of the trip. Vessels participating in the California halibut fishery south of 38°57'30" N. lat. are allowed to (1) land up to 100 lb/day of groundfish without the ratio requirement, provided that at least one California halibut is landed and (2) land up to 3,000 lb/month of flatfish, no more than 300 lb of which may be species other than Pacific sanddabs, sand sole, starry flounder, rock sole, curlfin sole, or California scorpionfish (California scorpionfish is also subject to the trip limits and closures in line 31).			

TABLE 5 (South) con't

1/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
2/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
3/ The size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Pacific cod is included in the trip limits for "other fish."
5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
6/ The "modified 200 fm" line is modified to exclude certain petrale sole areas from the RCA.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) has reviewed the analysis and revised inseason adjustments presented by the Groundfish Management Team (GMT).

The GAP wants to make clear that the concern about targeting on yellowtail rockfish is unnecessary. Yellowtail continue to be highly abundant and available to fishermen on the grounds, and thus, unavoidable as incidental catch. The testimony from the public indicated the selective flatfish trawl is working, and yellowtail are only taken because there are so many of them.

The GAP supports the groundfish inseason changes recommended by the GMT.

PFMC
06/17/05

FINAL CONSIDERATION OF INSEASON ADJUSTMENTS, IF NECESSARY

Consideration of inseason adjustments to ongoing groundfish fisheries is a two-step process at this meeting. The Council will meet on Wednesday and consider advisory body and public advice on inseason adjustments under Agenda Item C.4. If the Council elects to make final inseason adjustments under Agenda Item C.4, then the Council task under this Agenda Item is to clarify and/or confirm these decisions. Otherwise, the Council task under this agenda item is to consider advisory body advice and public comment on the status of ongoing fisheries and recommended inseason adjustments prior to adopting final changes as necessary.

Council Action:

1. **Consider information on the status of ongoing fisheries.**
2. **Consider and adopt inseason adjustments as necessary.**

Reference Materials: None.

Agenda Order:

a.	Agenda Item Overview	John DeVore
b.	Report of the Groundfish Management Team	Susan Ashcraft
c.	Reports and Comments of Advisory Bodies	
d.	Public Comment	
e.	**Council Action:** If Necessary, Adopt or Confirm Final Inseason Adjustments for the 2005 Groundfish Fishery	

PFMC
05/24/05

SALMON TECHNICAL TEAM REPORT ON IDENTIFICATION OF STOCKS NOT MEETING CONSERVATION OBJECTIVES

The Salmon Technical Team (STT) is responsible for identifying natural salmon stocks that have failed to achieve their escapement objectives for the past three years. Amendment 14 identifies three exceptions to the application of the overfishing criteria, (1) hatchery stocks; (2) natural stocks with low impacts from Council fisheries; and (3) Endangered Species Act (ESA) listed stocks. Hatchery stocks are excepted, because they generally do not need the protection of overfishing criteria and special Council rebuilding programs. Natural stocks with minimal Council impacts are excepted, because the Council's ability to directly affect the escapements of these stocks through harvest restrictions is virtually nil. ESA-listed stocks are exempted, because the Council considers the jeopardy standards and recovery plans developed by NMFS to be interim rebuilding plans. Attachment 1, Table C-2, (reproduced from Table I-3 from Preseason Report I) shows that no chinook stocks meet the criteria for overfishing in 2005. The Klamath River fall chinook stock, however, failed to meet the conservation objective in 2004. For 2005, the Klamath stock is not classified as a conservation alert because all options being considered by the Council are projected to meet the escapement floor in 2005.

Queets River spring/summer chinook have not met their conservation objectives in the most recent two years assessed, and Quillayute spring/summer chinook have not met their conservation objective in the most recent year assessed (2004). However, these two stocks are exceptions under the Overfishing Concern criteria since historic harvest impacts are estimated to be less than 5% in Council-area fisheries.

PFMC
04/05/05

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON IIDENTIFICATION OF STOCKS NOT MEETING CONSERVATION OBJECTIVES

Mr. Dell Simmons reported to the Scientific and Statistical Committee (SSC) on salmon stocks not meeting escapement objectives. Three stocks failed to meet conservation objectives in 2004: Klamath fall chinook, Queets River spring/summer chinook and Quillayute spring/summer chinook. The Queets stock also failed to meet its objective in 2003. The Queets and Quillayute stocks are exceptions to the Council's overfishing criteria because estimated harvest in Council fisheries is less than 5%.

This is the first year since 1999 that Klamath fall chinook have failed to meet the escapement floor of 35,000 natural spawners. The SSC notes that the target escapement for 2005 is 35,000 spawners (i.e.; the floor). If the target is the floor there is a 50% chance of failing to achieve the escapement objective for a second consecutive year.

PFMC
04/05/05

SALMON MANAGEMENT OPTION HEARING SUMMARY

Date:	March 28, 2005	Hearing Officer:	Mr. Mark Cedergreen
Location:	Chateau Westport Westport, WA	Other Council Members:	Phil Anderson Jim Harp
		NMFS:	Peter Dygert
Attendance:	25	Coast Guard:	Darren Wallace
Testifying:	8	Salmon Team Member:	Doug Milward
		Council Staff:	Kit Dahl
Organizations Represented: Washington Trollers Association, Oregon Trollers Association, Westport Charterboat Association, Willapa Bay Gillnetters Association			

Synopsis of Testimony

Of the 8 people testifying:

- 2 commented primarily on the commercial troll fishery.
- 2 commented primarily on the recreational (charterboat) fishery.
- 3 commented primarily on the gillnet fishery.
- 1 commented primarily on the private recreational fisheries.

Special Opening Remarks

Mr. Doug Milward reviewed options for the commercial and sport salmon seasons.

Commercial Troll Comments

- Emphasize opportunity for all Washington trollers.
- Support for landing in area requirements in Option II, noting that efforts being made on measures to enforce at sea.
- Presentation of preferences for Westport trollers (see attached).
- Notes that South of Cape Falcon, Klamath River issue charges ocean harvesters with an impossible task in terms of reducing impacts to compensate for in-river impacts. Recommends exceeding limits for one year and then rebuilding fish stocks.

Recreational Comments

- Treaty tribes are taking too many fish.
- Many unmarked hatchery fish end up classified as wild fish, overstating impacts.
- Support for Option I, especially the June 26th opening, 5-day week, bag limit and 24" size limit for Chinook.
- There is enough quota under Option II to make a June 26th opening feasible.

Commercial Gillnet Comments

- North of Falcon and PFMC processes allocating to many fish to ocean fisheries, with severe impacts to gillnetters.
- Lower the Chinook harvest by ocean fisheries.
- Ocean fisheries having severe impacts on local stocks.
- Provide for summer (dip-in) fishery (two commenters).

Written Statements (Attached)

Washington Trollers Association–Westport Chapter
Willapa Bay Gillnetters Association

PFMC
3/31/05

Washington Trollers Association
Westport Chapter
Agenda – March 27, 2005

2005 Season
- Review winter activities
- Proposed coastal zoning
- Proposed spring harvest dampeners
- All gear coho
- Review options
- Outlined preferred opening requirements
- PFMC Hearing – March 28, 7PM Chateau Westport

Season outline work sheet:

May 1 – days open- 3 -100 fish landing limit. Reopen May 6 Landing limit per opener 125- Days of the week open, Fri thru Mon(4days) Zoning- Yes

Possible end of June opener – days open-4days, Min. landing limit 30 salmon, Days of the week – June 26 thru June 29

Summer opener – Opening date- July 8, Landing limit per opener- 125 (first opening may be 75 depending on predicted effort) Days open per week- Friday through Mon. Reduce to minimum landing limit of 30 if necessary in August. Coho opening in Area one(Columbia River) starts on ?, Gear for coho Opener- no restriction, Landing limits for coho ? Prefer 6" plugs or larger prior to Coho opener and 6" plugs or larger North of Leadbetter Point after Area 1 Coho all gear opener.

Doug Fricke

WILLAPA BAY GILLNETTERS ASSOIATION

PO BOX 26
GRAYLAND, WA.
98547
Phone 360/267-5244
Fax 360/267-5244

FISHING SCHEDULE PREPOSAL FOR 2005 WILLAPA BAY SUMMER/ DIP-IN GILLNET SEASON.

July 5, 2005 – August 15, 2005

This season is for the harvest of local and non-local Chinook salmon with a quota of 3,000 and the opportunity to harvest white sturgeon.

SALMON MANAGEMENT OPTION HEARING SUMMARY

Date:	March 28, 2005	Hearing Officer:	Mr. Ralph Brown
Location:	Red Lion Hotel Coos Bay, Oregon	Other Council Members:	
		NMFS:	Mr. Chris Wright
Attendance:	105	Coast Guard:	LT Mike Holmes
Testifying:	26	Salmon Technical Team:	Mr. Craig Foster
		Council Staff:	Mr. Chuck Tracy
Organizations Represented: Port of Brookings Harbor, Klamath Zone Coalition.			

Synopsis of Testimony

Of the 26 people testifying:

- 16 commented primarily on the commercial troll fishery.
- Four commented primarily on the recreational fishery.
- Five commented primarily on both recreational and commercial fisheries or other economic aspects of the fisheries.
- One commented on issues associated with Klamath River water management issues.

Special Opening Remarks

Mr. Brown gave a brief overview of the meeting process and objectives of the fisheries. Mr. Foster provided a summary of the recreational and commercial options.

Commercial Troll Comments

Most of those testifying felt that all of the options were too restrictive and did not support any of them. There were four supporters of Option I for the Cape Falcon to Humbug Mt. and Oregon KMZ fishery, three of which requested a 30 fish per day landing limit rather than the 65 fish per day limit for the Oregon KMZ fishery beginning September 1. One person supported a 26 inch size limit for the Oregon KMZ fishery, and requested the 4-spread regulation be lifted in time/area strata when coho were not abundant. One person supported Option II for the Cape Falcon to Humbug Mt. fishery and a 27 inch minimum size limit May 1, and including the requirement that all fish caught in the area must be landed in Oregon.

Recreational Comments

Option I for the Cape Falcon to Humbug Mt. and Oregon KMZ fishery was supported by all those testifying except one, who felt that all of the options were too restrictive and did not support any of them.

Other Comments

Six people supported either implementing emergency regulations to allow fisheries that would result in escapement below the spawning escapement floor for Klamath River fall chinook, or reevaluating the objective to see if a lower floor was appropriate. Almost all of those testifying expressed frustration with the water management situation in the Klamath Basin.

Written Statements (Attached)

Jim McCarthy – Earth Justice
Mike Hague

PFMC
03/31/05

JIM MCCARTHY -- EARTHJUSTICE

A troller said to me he thinks the federal government is not being fair to salmon fishermen. He's right. Here's why.

The 2005 commercial salmon fishing season will be cut back by about 50 percent due to low numbers of four year Klamath fish.

On the one hand the federal government is actively choking the life out of the Klamath River by diverting much of its waters to agriculture. What's left in the river for the fish isn't enough to keep them alive. Low flows in the spring of 2002 killed the juveniles that year which is what got us into this year's mess.

After choking the river to death, the federal government then turns around and tells the commercial fishermen they'll have to pay the price by fishing less so they don't catch the few surviving Klamath fish. To make matters worse, the government is still choking the river, which guarantees we'll have more disastrous, shortened seasons down the road.

We've seen this before. The government and irrigators diverted and dammed the Sacramento River to the point where winter run salmon almost went extinct. Then they turned around and told the fishermen they'd have to shorten their salmon season in order to help bring the fish back. The fishermen weren't the ones who drove the winter run to near extinction yet they were made to pay.

What's happening this season is very similar. The government kills the fish and then turns around and tells the fishermen they are the ones that have to pay the price. By anyone's measure, this is unfair. What are we going to do about it?

Many fishermen may not know there are farmers in the Klamath irrigation project who have signaled an interest in selling their land and retiring their water rights if the price is right.

Such a deal almost happened back in 2002. It was killed by a local politician acting under pressure from local business interests who feared their customer base would shrink if some farmers sold out. Local business interests in the Klamath Basin are the main reason this problem wasn't addressed back in 2002. Because they killed the water buyback program, we continue to stare future disastrous years in the face. How long are we going to put up with this?

This is a political problem and needs a political solution. Such a solution will only come if enough fishermen and their coastal neighbors who know the value of having a commercial salmon fishery, demand their politicians to fix this problem. That means that fishermen and business people, as well as ordinary citizens in Bodega Bay, Ft. Bragg, Eureka and Crescent City all need to let their senators, congressman, governor and local elected officials know that action is needed now.

The same is true for trollers in Oregon. Every county commissioner, state and federal elected official should hear from the coast in no uncertain terms that higher Klamath flows are needed for the sake of coastal communities.

Coastal people should also know that Klamath farmers pump water all over with dirt-cheap electricity they get because of a sweetheart deal struck 100 years ago when some of the dams went in. This power subsidy is set to expire next year. The farmers are fighting to extend it, which is basically unfair to all other ratepayers who pay their fair share. There is a chance some water will free up for salmon if this subsidy is allowed to expire. Again, all coastal people, fishermen, small business owners, retirees and everyone else needs to let their politicians know cheap juice for the farmers means more dead fish in the Klamath River.

To Whom it may concern,

None of the options for this years salmon season are acceptable. We need an option that allows us to have at least the same season as last year.We had plenty of restrictions then.

How can anyone come up with a realistic economic impact prediction when most of the data being used is from the 70's and 80's with 2004 tossed in? Is that the only way you could make the numbers say what you want them too?!

The economic impact predictions are way low as far as I can see.The options presented will devestate the entire oregon coast.Not just fishermen and their families, but every business in every coastal town will feel the effects of the severely restricted season.

The food value of salmon is just as important as the crops farmers grow from the ground.Only we can't drill wells to get the water needed for the fish to survive and be harvestable. The PFMC needs to take a more active roll in seeing that there is enough water for the fish too.We also need to hatch more fish. There used to be more hatcheries, we need them back!Take out the iron gate dam for starters.

The size limit increase that seems to get into the regulations every year is a poorly thought out idea by some biologist and has a large impact on the fish we catch. It is very wasteful on your part ,increasing the incidental mortality rate. If we went to the 26 inch limit we could feed a lot more consumers. It seems like a better use of those fish to me.

About the VMS If approved it would put even more financial hardship on all of the fishermen.How are we going to be expected to pay for this when we are not allowed to fish enough to make the money. If this vms is forced on us we should not have to pay for it too.I don't believe that it is our citizens that need monitoring.Especially under the guise of homeland security. This is all going to far.

Mike Hague, Charleston

We need more gear in the water
The 4 spread rule is obsolete.
It was implemented to help The cohos. They Are not present All The Time. June - July + August Are usually coho times.

SALMON MANAGEMENT OPTION HEARING SUMMARY

Date:	March 29, 2005	Hearing Officer:	Mr. Rober Thomas
Location:	Fort Bragg Town Hall Fort Bragg, California	Other Council Members:	Mr. Eric Larson
		NMFS:	Mr. Craig Heberer
Attendance:	38	Coast Guard:	Rick Loster
Testifying:	13	Salmon Technical Team:	Mr. Allen Grover
		Council Staff:	Mr. Chuck Tracy
Organizations Represented: Salmon Trollers Marketing Association.			

Synopsis of Testimony

Of the five people testifying:

- 10 commented primarily on the commercial troll fishery.
- One commented on both the recreational and commercial fisheries.
- Two commented on economic or other aspects of the fisheries.

Special Opening Remarks

Mr. Thomas gave a brief overview of the meeting process and objectives. Mr. Allen Grover gave a brief overview of the recreational and commercial options.

Commercial Troll Comments

Most of those testifying felt that all of the options were too restrictive and did not support any of the options. One person supported Option I for the KMZ, San Francisco and Monterey areas, and Option II for the Fort Bragg area. One person requested consideration of flexibility to structure openings in south of Point Arena to best meet market conditions, to have the area from Pigeon Point to Point Arena closed while having Pigeon Point to Point Sur open sometime in the May1 to July 31 period, and to require all fish caught in California landed in California. Four people requested consideration of a nearshore fishery for the Fort Bragg or Bodega Bay area.

Recreational Comments

Option I was supported by all those testifying.

Other Comments

Four people supported implementing emergency regulations to allow fisheries that would result in escapement below the spawning escapement floor for Klamath River fall chinook. Almost all of those testifying expressed frustration with the water management situation in the Klamath Basin.

Written Statements (Attached)

Dave Bitts
Dan Platt
A fishy democracy

PFMC
03/31/05

March 29, 2005

Mr. Don Hansen, Chair
Pacific Fishery Management Council
Portland, OR

Dear Chairman Hansen:

On behalf of the Pacific Coast Federation of Fishermen's Associations I'd like to offer the following variations on the commercial salmon fishing options that came out of the March 2005 PFMC meeting.

1. In option I, we would like the flexibility to schedule the roughly 40 open fishing days available from May 1 through July 31 in the most expeditious manner possible, for the purpose of maintaining a continuous (though diminished!) flow of fish to market. We might want to fish 3 days per week in May and 2 days per week in June, for example, or we might want to concentrate our fishing time in front of the four big marketing weekends in those three months. We engage to do our best not to drive the technical team completely batty with infinite or ridiculous proposals, and to settle on a preferred option within the flow of the April meeting process.

2. In option II, we would like to be able to consider opening the season from Pigeon Pt. to Point Sur while leaving it closed above Pigeon Pt. for some period during May 1—July 31.

3. If it is legal to require that fish caught off a state be landed in that state, we would like to see that requirement apply to California as well as Oregon.

We have discussed the relative merits of options I (the market option) and II (the production option) at some length, and we've concluded that there is no possibility of a good option this year. It's my impression that most fishermen would prefer to spread our limited opportunity over as many weeks as possible, rather than concentrating it in one or two bursts, for the purpose of maintaining the flow of fish to market.

Sincerely,

Dave Bitts

Dave Bitts

Dan Platt

9

DEAR DAN, 3/29/05

BILL FORKNER & I WENT TO THE OPTIONS PUBLIC HEARING IN COOS BAY LAST NIGHT & CAME AWAY WITH THESE IDEAS. WE'D APPRECIATE IT IF YOU COULD DISCUSS THEM AT THE ASSOCIATION MTG. TODAY AND HOPEFULLY HAVE THIS READ INTO THE RECORD TONIGHT SINCE WE CAN'T BE THERE IN PERSON. THANKS.

(1) WE BELIEVE WE SHOULD BE UNIFIED WITH OREGON TROLLERS & LOCAL BUSINESSES IN CLEARLY STATING THAT <u>NONE</u> <u>OF THIS</u> <u>YEAR'S</u> <u>OPTIONS</u> <u>ARE</u> <u>ACCEPTABLE</u>. WE ARE SIMPLY VERY UNLIKELY TO BE ABLE TO MAKE A LIVING IF THIS MUCH TIME & OCEAN AREA IS UNAVAILABLE TO FISH.

(2) WE ~~BELIEVE~~ AGREE WITH MANY OF THE PEOPLE WE HEARD TESTIFY LAST NIGHT THAT: THE COUNCIL SHOULD ADOPT EMERGENCY MEASURES THIS YEAR

IN ORDER TO ALLEVIATE THE PROBABLE OUTCOME OF ALL THESE CLOSURES. WE ARE IN A CRISIS SITUATION. THE FLOOR ON THE KLAMATH'S 35,000 NATURAL SPAWNERS CAN BE LOWERED THIS YEAR, AS IT HAS BEEN PROVEN THAT RUNS AS SMALL AS 19,000 HAVE PRODUCED THE LARGEST OCEAN RUNS. FURTHERMORE, IF MORE RIVER FLOW IS NOT ACHIEVE, SOON & PERMANENTLY -- IT WILL NOT MATTER HOW MANY FISH RETURN WHICH IS WHY WE'RE IN THIS SITUATION NOW.

(3) THIS LEADS US TO ANOTHER POINT: WE WOULD LIKE TO SEE THE COUNCIL BECOME <u>PROACTIVE</u> ON KLAMATH WATER & FISH ISSUES. WE WOULD LIKE TO SEE THEM <u>MANAGE</u> OUR FISHERY AS IF IT'S HEALTH & FUTURE WERE AS IMPORTANT TO THEM AS US. RIGHT NOW IT APPEARS TO MANY

FIRST HAND DURING THIS EARLY OREGON SEASON, WHICH HAS BEEN OPENED + CLOSED + OPENED AGAIN -- MUCH LIKE THE CALIFORNIA OPTIONS -- AND CUT-BACK IN DAYS CONSIDERABLY.

THIS "DERBY" STYLE FISHING MAY BE SUITABLE FOR THE LARGEST BOATS, WHO CAN FISH IN MUCH WORSE WEATHER THAN THE AVERAGE TROLLER, WHICH ~~ARE~~ SIZED BETWEEN 30' AND 45' FEET. THE AVERAGE TROLLER, MYSELF + BILL INCLUDED, MAKES OUR SEASON BY BEING ABLE TO SAFELY FISH AS MANY DAYS AS POSSIBLE OVER A FIVE TO SIX MONTH SEASON BETWEEN OREGON + CALIFORNIA. THIS YEAR'S OPTIONS WILL ALL ENCOURAGE FISHERMEN IN SMALLER BOATS TO TAKE TOO MANY CHANCES. AN ALREADY DANGEROUS OCCUPATION

OF US THAT THE CURRENT SYSTEM IS DESIGNED TO "MANAGE" OUR INDUS-TRY OUT OF BUSINESS.

(4) WE MUST FIND ANOTHER MANAGEMENT MODEL THAT IS NOT BOUND BY "WEAK STOCK MANAGEMENT." PRESENTLY, TROLLERS ARE THE MOST THREATENED SPECIES IN THE MODEL. WE UNDERSTAND THE REASONS FOR WEAK STOCK MANAGEMENT, BUT IT IS OBVIOUS THAT IF WE CONTINUE WITH THIS APPROACH, OUR DAYS MAY BE NUMBERED -- AS THEY LITERALLY ARE UNDER THIS YEAR'S OPTIONS. IT IS TIME TO "THINK OUTSIDE THE BOX" IF THE COUNCIL WISHES TO HELP SAVE OUR FISHERY.

(5) ~~ONE~~ MY ~~LAST~~ NEXT POINT IS SOMETHI[NG] THAT BILL + I ARE EXPERIENCING

WILL BECOME MORE DANGEROUS FOR MANY. WE FEAR THE POSSIBLE OUTCOMES OF THIS SCENARIO.
IN A NORMAL SEASON WITH FULL OPPORTUNITY SOMEWHERE, AT LEAST SOUTH OF PT. ARENA OR SHELTER COV. WE DO NOT FEEL PRESSURED TO ~~FE~~ LEAVE PORT IN BAD WEATHER. WE KNOW WE WILL MAKE UP THE TIME LOST TO WEATHER.

(6) MY LAST POINT IS THAT THESE CLOSURES WILL BE EVEN MORE DIFFICULT TO BEAR FOR THE SMALLER BOATS THAN HISTORICALLY BECAUSE: WE NO LONGER HAVE OTHER FISHERIES TO PURSUE. BLACKCOD IS BARELY A SUBSISTENCE FISHERY FO. "OPEN ACCESS" BOATS. ROCKCOD, LINGCO AND NEARSHORE ROCKFISH ARE EITHE CLOSED OR EXTREMELY LIMITED. TUNA IS MORE VIABLE FOR LARGER BOA

CRAB IS CLOSED BY MID-SUMMER, AND EVEN DURING THE PEAK SEASON IT IS QUICKLY BECOMING TOUGH FOR SMALLER BOATS TO COMPETE IN OUR DISTRICT.

I HOPE THAT YOU FIND THESE COMMENTS USEFUL. BILL + I BOTH AGREE THAT THESE OPTIONS LEAVE US ~~NO~~ LITTLE OR NO POSSIBILITY OF A VIABLE 2005 SALMON SEASON.

Sincerely,
Ben Platt
BEN PLATT, F/V "KAY BEE", NOYO CA.

(with input by BILL FORKNER, F/V "Audrey"), NOYO, CA.

3/28 Charleston Oregon.

TO, Pacific Fishery Management Council March 29, 2005

A FISHY DEMOCRACY

Over fishing has never been a problem when we had 4,000 boats and a 5 ½ month fishing season. The Pacific Fishery Management Council began the elimination of 3,000 of California salmon trollers by season closures so they could overload the Klamath River with spawning salmon. This started 20 years ago. This has created massive die off of adult salmon because of the lack of river flow. Juvenile salmon going to sea are dying by the millions from starvation due to lack of river flows that do not supply sufficient nutrition for survival

A smaller number of juvenile going to sea have a higher survival rate and are more healthy. This can be proven by looking at records of annual number of spawners and their survival rate of 3 and 4 year olds returning to spawn.

The fishery biologists are finally recognizing the die off of adults and juveniles over the last four years and now the PFMC, under the National Fisheries Service, wants to eliminate the remaining salmon seasons, because of the die off they caused ,in the first place, by season closures . What is strange is in every news release, fish managers blame the low flows for the fish kills and not one of them is willing to admit too many salmon returning to the river, is the real cause

Hatcheries were built to mitigate to the fishery when the dams were built. Any industry in a democracy, the government cannot just shut down a business, without compensating those damaged, especially just to give it to someone else.

The logic behind the latest season closures is to achieve 35,000 natural spawners without counting hatchery fish, when both major forks on the Klamath are dammed and have mitigation hatcheries, this can only be an attempt to cover up destruction to the natural habitat caused by the dams and make sure the die off continues. The Klamath contribution to the ocean catch is between l and 9 percent, meaning when the numbers are low in the ocean chances of catching them are slim, making season closures ridiculous. With the low water flows, the entire Klamath River cannot support more than 35,000 spawning salmon, including the hatchery salmon, without causing more die off.

The PFMC and the NMFS must be held accountable for the lives they have destroyed and total disregard for our constitutional right to pursue a business. There has to be a reason as to why the NMFS is willing to keep hundreds of thousands of harvestable salmon from other rivers off the market, at the same time ignoring the financial ruin of fishing families, many going back 100 years in the industry.

Fort Bragg has already lost 90% of its commercial salmon fleet from fishing season closures. Now, the NMFS wants to make sure they eliminate the rest .WHY?

How do you hold this government agency accountable when we are supposed to have a government by the people and for the people?

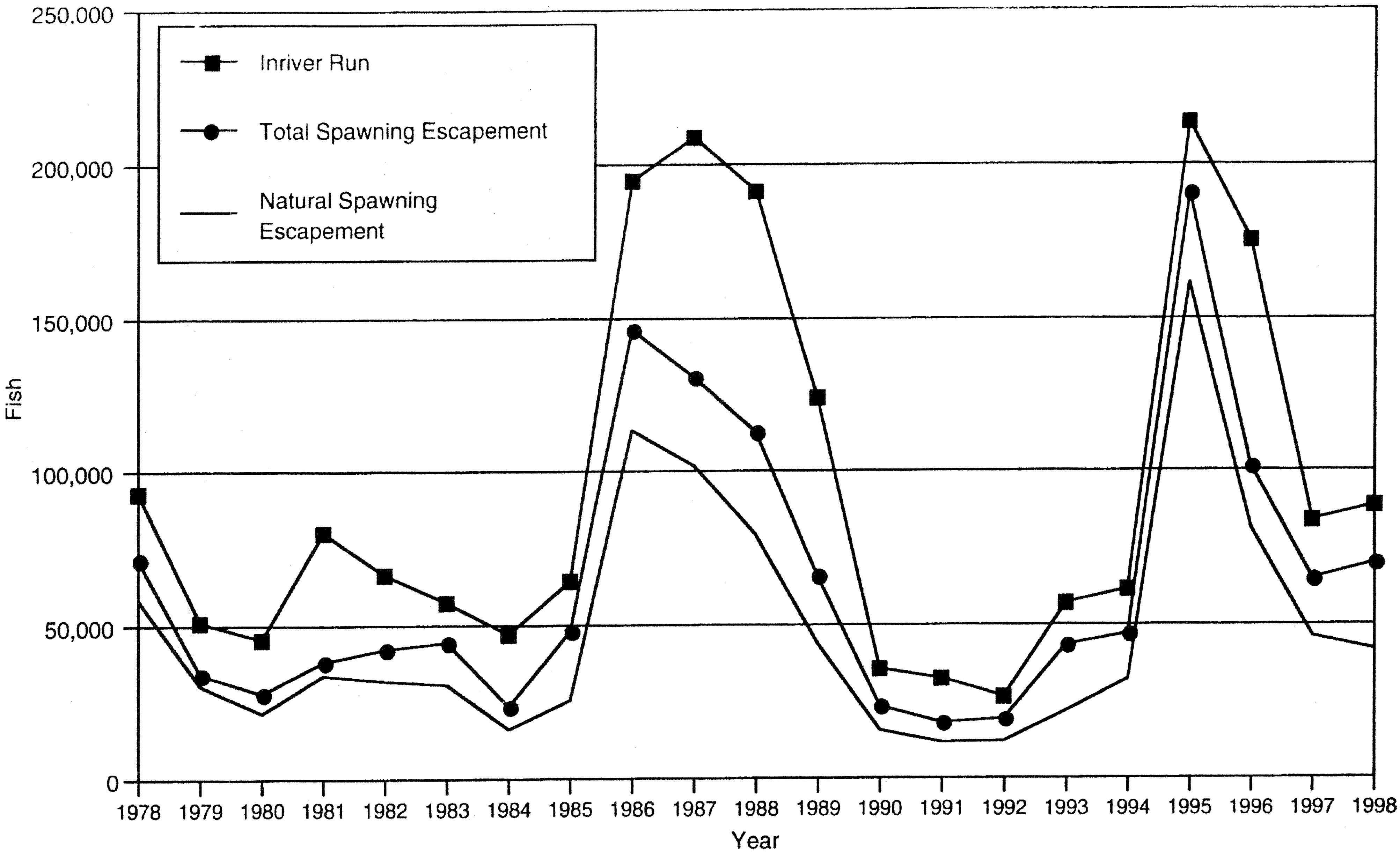

FIGURE II-2. Klamath River fall chinook salmon inriver run and spawning escapements, 1978-1998.

Agenda Item C.2.d
Supplemental PSC Report
April 2005

Jim Harp
04-05-05 8:42 AM

PACIFIC SALMON COMMISSION Report

The 2005 Co-manager Meeting between the U.S. and Canadian membership on the Pacific Salmon Commission's Southern Panel was postponed.

The scheduled March 15th meeting was cancelled due to a delay in the development of 2005 stock abundance forecasts by Canada.

Subsequently, there have been several exchanges by our respective technical representatives on stock abundance forecasts and anticipated fishing levels. The chinook forecasts have undergone several modifications.

In general, the abundance forecasts for Canadian stocks and their subsequently fishing patterns are expected to be similar to last year.

The report by the Salmon Technical Team will provide the details of where these values stand this week.

The Interjurisdictional Fisheries Act

Section 308(b): Commercial fishery failure or serious disruption affecting future production due to a fishery resource disaster from natural or undetermined causes.

Section 308(d): Alleviate harm caused by a fishery resource disaster from hurricanes or any other natural causes.

The Magnuson-Stevens Fishery Conservation and Management Act

Section 312(a): A commercial fishery failure caused by a fishery resource disaster due to natural or undetermined causes, or man-made causes beyond the control of fisheries managers to mitigate.

Assistance must restore fishery or prevent future failure and assist the affected fishing community, and must not expand the size or scope of the failure.

Authorizing Legislation for Disaster Assistance

Act	Section	# of Requests	Yes	No	Pending
IFA	308(b)	2	2	--	--
	308(d)	4	4	--	--
MSA	312(a)	14	10*	1	3**

*A single request from Gulf of Mexico covered flooding and red tide. NMFS made determination for flooding, but red tide did not meet requirements of 312(a).

**Governor of Washington and Lummi Indians each requested determination for sockeye salmon; NMFS plans to address as one request.

Disaster Relief Process

1. Governor of affected state or fishing community may consult with NMFS for advice regarding disaster determination request.

2. Governor of affected state or fishing community requests disaster determination of Secretary of Commerce, or Secretary may act without a state or community request.

3. NMFS determines whether a commercial failure/fishery resource disaster has occurred according to the requirements of the IFA or MSA.

4. SDIA/NMFS consults with stakeholders to identify needs and develop assistance programs.

5. SDIA/NMFS collaborates with other Federal agencies as appropriate. Fisheries assistance has been provided directly by EDA, HHS, USDA, Labor, and SBA and FEMA, using existing funds or special appropriations.

6. NMFS makes its appropriated funds available to implement assistance program, subject to funds availability and statutory requirements, e.g., cost share.

7. NMFS delivers its assistance through other Federal agencies, states, or communities where appropriate.

Determinations

- Made on a case-by-case basis
- Consider available information on:
  - fishery (size, value, number of participants, and environmental, economic, and landings data)
  - community impacts
  - degree of dependence on fishery/alternative opportunities
  - documented decline in landings
  - documented decline in the resource
  - environmental/weather data
- **Causes of disasters have been undetermined (9) or natural (7)**

Disaster Assistance

Approach

Provide short-term relief while contributing to long-term sustainability of the fishery

6

Summary of How Federal Disaster Funds Were Spent (Approximate $M)

CATEGORY	AMOUNT
Permit or Vessel Buybacks	52
Research/Development	59
Training/Alternative Employment	8
Infrastructure Planning & Development	48
Trade Adjustment	5
Loans (including FCRA costs, SBA, EDA revolving loans)	17
Direct Assistance (assistance centers, direct compensation, health care, outreach, etc.)	42
Compensation for Lost Equipment/Fishing Time	6
Habitat Restoration	11
NOAA Administration Costs	3
TOTAL	**251**

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Assistance Provided by Fishery (1994-2002)

FISHERY	FEDERAL SHARE ($M)
NE Groundfish	91
NW Salmon	29
Gulf of Mexico Fisheries	15
LA/MS Brown Shrimp	2
AK Salmon (Bristol Bay, Yukon, Kuskokwim, and Norton Sound	75
Monroe County, FL, Trap Fisheries	5
NC Fisheries	5
LI Sound Lobster	14
Bering Sea Snow Crab	10
Pacific Groundfish	5
TOTAL	**251**

(8)

Assistance under Other Appropriations/Authorizations

NW salmon hatchery flood damage	$19.2 M
Gulf of Mexico red tide	$ 1.5 M
Alaska steller sea lions	$30.0 M
Hawaii longliners/sea turtles	$ 3.0 M
Oregon groundfish	$ 2.5 M

<u>Fishery Disaster Assistance Authorization</u>

Interjurisdictional Fisheries Act ***(IFA)***
Section 308 (b)

Agency: Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS).

Assistance Provided: Project Grants, Guaranteed/Insured loans, Dissemination of Technical Information, Training.

Objectives: To provide funds to states determined by the Secretary of Commerce to have been affected by a commercial fishery failure or serious disruption affecting future production due to a fishery resource disaster arising from natural or undetermined causes. Section 308 (b) reads, in part, as follows:

"**(b) Additional appropriations**

(1) In providing funds to States under this subsection, the Secretary shall give a preference to those States regarding which the Secretary determines there is a commercial fishery failure or serious disruption affecting future production due to a fishery resource disaster arising from natural or undetermined causes, and any sums made available under this subsection may be used either by the States or directly by the Secretary in cooperation with the States for any purpose that the Secretary determines is appropriate to restore the fishery affected by such a failure or to prevent a similar failure in the future;

(2) the funds authorized to be appropriated under this subsection shall not be available to the Secretary for use as grants for chartering fishing vessels; and

(3) the Federal share of the cost of any activity carried out with an amount appropriated under the authority of this subsection shall be 75 percent of the cost of that activity."

Examples of Previous Assistance Programs: In March of 1994, the Secretary of Commerce declared a fishery disaster in New England. This declaration made $30 million available to assist New England fishermen adversely affected by the disaster. The funds were administered by two agencies within the Department of Commerce: $18 million by the Economic Development Administration (EDA) and $12 million by the National Marine Fisheries Service (NMFS).

EDA used the funds to implement economic development and assistance programs for the fishing industry and communities affected by the fishery disaster. NMFS used $9 million to provide direct grants to the fishing industry to support alternative markets and on-shore infrastructure for fish in New England ports affected by the disaster. NMFS also established Family Assistance Centers to serve those affected by the disaster as clearinghouses for all potential Federal assistance. The remaining $1 million was used by NMFS for fishing vessel obligation guarantees to provide loan guarantees for the financing or refinancing of fisheries production equipment, including on-shore facilities and retrofitting of vessels.

Eligibility: States determined by the Secretary of Commerce to have been affected by a commercial fishery failure or serious disruption affecting future production due to a fishery resource disaster arising from natural or undetermined causes. Section 253.20 of IFA defines a commercial fishery failure as "...a serious disruption of a fishery resource affecting present or future productivity due to natural or undetermined causes. It does include either: (1) The inability to harvest or sell raw fish or manufactured and processed fishery merchandise; or (2) Compensation for economic loss suffered by any segment of the fishing industry as the result of a resource disaster."

Contact: Chief, Financial Services Division, NMFS, NOAA, 1315 East West Highway, Silver Spring, MD 20910. Telephone: (301) 713-2390.

CFDA Number: 11.452

Interjurisdictional Fisheries Act *(IFA)*
Section 308 (d)

Agency: Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS).

Assistance Provided: Project Grants

Objectives: IFA Section 308 (d), Assistance to commercial fishermen, enables the Secretary of Commerce to "(1)...help persons engaged in commercial fisheries, either by providing assistance directly to those persons or by providing assistance indirectly through state and local government agencies and nonprofit organizations, for projects or other measures to alleviate harm determined by the Secretary to have been incurred as a direct result of a fishery resource disaster arising from Hurricane Hugo, Hurricane Andrew, Hurricane Iniki, or any other natural disaster."

Examples of Previous Assistance Programs: On August 2, 1995, the Secretary of Commerce declared fisheries disasters in the Pacific Northwest, New England and the Gulf of Mexico under the authority of Subsection (d). Consequently, assistance programs have been, or are currently being, conducted to address these disasters. The Fishing Capacity Reduction Initiative addressed the Northeast groundfish stock collapse through the buyout of 78 fishing vessels and 474 associated fishing permits for approximately $24 million through a competitive program. The Gulf of Mexico Fisheries Disaster Program made $5 million available to commercial fishermen in this region who suffered uninsured losses of, or damage to, commercial fishing vessels and fishing gear as a direct result of hurricanes and floods, and their aftereffects, occurring between August 23, 1992 and December 31, 1995. In the Northwest Region, $13 million was made available to alleviate the affects of the Salmon Fishery Disaster by conducting a salmon fishing permit buyout program, a habitat restoration jobs program, and a data collection jobs program. This provided financial assistance and temporary employment to fishers affected by the Northwest salmon fishery disaster.

Eligibility: Eligibility information is stated in Subsection (d), Assistance to commercial fishermen, as follows:

"(2) The Secretary shall determine the extent, and the beginning and ending dates, of any fishery resource disaster under the subsection.

(3) Eligibility for direct assistance to a person under this subsection shall be limited to any person that has less than $2 million in net revenues annually from commercial fishing.

(4) (A) Assistance may not be provided under this subsection as part of a fishing capacity reduction program in a fishery unless the Secretary determines that adequate conservation and management measure are in place for that fishery...

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(5) The Secretary shall establish, after notice and opportunity for public comment, appropriate limitations, terms, and conditions for receiving assistance under this subsection.

(6) As used in this subsection, the term 'person' means any individual or any corporation, partnership, trust, association, or other nongovernmental entity."

Contact: Chief, Financial Services Division, NMFS, NOAA, 1315 East West Highway, Silver Spring, MD 20910. Telephone: (301) 713-2390.

CFDA Number: 11.452

Magnuson-Stevens Fisheries Conservation and Management Act
Section 312 (a)

Agency: Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS).

Assistance Provided: Project Grants

Objectives: Financial assistance may be made available to States and fishing communities affected by a commercial fishery failure resulting from a fishery resource disaster as determined by the Secretary of Commerce. Subsection (a) of Section 312 reads, in part, as follows:

"(a) Fisheries Disaster Relief

(1) At the discretion of the Secretary or at the request of the Governor of an affected State or a fishing community, the Secretary shall determine whether there is a commercial fishery failure due to a fishery resource disaster as a result of:

(A) natural causes;

(B) man-made causes beyond the control of fishery managers to mitigate through conservation and management measures; or

(C) undetermined causes.

(2) Upon determination under paragraph (1) that there is a commercial fishery failure, the Secretary is authorized to make sums available to be used by the affected State or fishing community for assessing the economic and social effects of the commercial fishery failure, or any activity that the Secretary determines is appropriate to restore the fishery or prevent a similar failure in the future and to assist a fishing community affected by such failure....."

Assistance depends on the appropriation of funds, and the Federal share of such assistance is limited to 75%. Per Section 312(a)(2), funds may be used for "assessing the economic and social effects of the commercial fishery failure, or any activity that the Secretary determines is appropriate to restore the fishery or prevent a similar failure in the future and to assist a fishing community affected by such failure." However, the Secretary must first determine that the assistance activity "will not expand the size or scope of the commercial fishery failure in that fishery or into other fisheries or other geographic regions."

Examples of Previous Assistance Programs: In November 1997, the Bristol Bay/ Kuskokwim River area commercial salmon fishery was determined to have failed in 1997 due to a fishery resource disaster of undetermined causes. In March 1998, $7 million was obligated to the State of Alaska to assist communities affected this disaster. The State provided $2.3 million in required matching funds toward the disaster assistance. The State will use the money to fund community grants; an individual loan program; economic planning grants; and grants for fisheries research, education, and training.

Eligibility: States and fishing communities affected by a commercial fishery failure due to a fishery resource disaster as determined by the Secretary of Commerce.

Contact: Chief, Financial Services Division, NMFS, NOAA, 1315 East West Highway, Silver Spring, MD 20910. Telephone: (301) 713-2390.

CFDA Number: 11.477

Statement of Jim Harp
On the Tentative Adoption of 2005 Management Measures
By the Pacific Fishery Management Council
April 5, 2005

Mr. Chairman, I would like to make a brief statement regarding the *tentative* adoption of quotas for the ocean Treaty troll fishery.

- Several coho stocks are generally abundant this year. We are aware of the need to keep the U.S. fisheries to the levels in the Pacific Salmon Treaty coho agreement.

- For chinook, we have a difficult task of meeting the very low exploitation rate objectives defined in our Comprehensive Chinook Harvest Plan for Puget Sound chinook.

- We also have to be aware of the impact from our fishery on Columbia River chinook stocks of concern.

- The western Washington tribes have been in the process of establishing, cooperatively with the Washington Department of Fish and Wildlife, a package of fisheries that will ensure acceptable levels of impact on natural stocks of concern as well as providing opportunity to harvest hatchery stocks. In many cases, agreement has been reached on specific 2005 management measures and terminal area fisheries agreements. Further, the tribes are continuing to work cooperatively with WDFW in hopes of finding successful outcomes for the remaining regions and terminal area fisheries.

For the ocean Treaty troll fishery, I would like to offer the following Treaty troll management measures for *tentative* adoption and for analysis by the Salmon Technical Team:

a chinook quota of 50,000; and,

a coho quota of 50,000.

This would consist of a May/June chinook only fishery and a July/August/September all species fishery. The chinook will be split into each fishery (26,000 in May/June and 24,000 in all species). Gear restrictions, size limits and other appropriate regulations would be as stated in previous Salmon Technical Team analysis.

TESTIMONY OF
THE COLUMBIA RIVER TREATY TRIBES
BEFORE PACIFIC FISHERIES MANAGEMENT COUNCIL
April 5, 2005
Tacoma, WA

Good afternoon Mr. Chairman and members of the Council. My name is Bruce Jim. I am a member of the Fish and Wildlife Committee of the Confederated Tribes of the Warm Springs Reservation of Oregon and a treaty fisherman on the Columbia River. I am here today to provide Testimony on behalf of the four Columbia River treaty tribes: the Yakama, Warm Springs, Umatilla and Nez Perce tribes.

Meeting the conservation objectives for key stocks is a critical task of the Council. The Columbia River tribes remind the Council of the need to meet the Snake River Fall Chinook Index of 0.7 with the package of ocean fishery recommendations. We do not think it appropriate for the state of Washington to implement a selective sport fishery for Chinook in Areas 5 and 6 of the Strait of Juan de Fuca. This fishery handles too many unmarked fish and presents too great of a risk to the Coded Wire Tag system. Selective fisheries are not an appropriate way to encourage conservation and rebuilding.

While the tribes continue to urge the Council to use conservatism in recommending ocean fisheries that impact Columbia River stocks, we would also like to discuss an issue with more long term implications for fisheries. The tribes are very concerned about the 2005 Columbia River water supply conditions and the federal government's plan for river management of the Federal Columbia River Power System for the 2005 salmon migrations. Low flows are expected to have adverse effects on outmigrating salmon which will in turn affect future fisheries. While 2005 water supplies are short, there are measures that the federal operators can and should implement to increase Columbia River salmon stock survivals and decrease water particle and fish migration times through the hydrosystem. These include provision for additional spill at all federal dams, and acquisition of additional water from upper basin storage to augment flows, especially during the peaks of the spring and summer migrations. The Council should encourage the federal hydrosystem operators to provide as much flow and spill as possible to benefit outmigrating fish in 2005.

We have previously told the federal hydrosystem operators about our concerns with respect to load following cycles that result in flow fluctuations that entrap and strand juvenile salmon, particularly in the Hanford Reach. For example, an estimated over 2 million fall chinoook juveniles were lost in the Hanford Reach in 2001 from these operations. Fluctuations in the Hanford Reach should be substantially reduced or eliminated, particularly over the next 6 weeks in order to protect Hanford fall Chinook, a stock of critical to ocean and in-river fisheries.

This concludes my statement. Thank You.

Agenda Item C.2.j
Supplemental SAS Report
April 2005

SALMON ADVISORY SUBPANEL

PROPOSED 2005 NON-INDIAN OCEAN SALMON MANAGEMENT MEASURES FOR TENTATIVE ADOPTION

April 5, 2005

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 89,000 chinook and 145,000 marked coho.
   Trade: None.
2. Non-Indian commercial troll TAC: 44,500 chinook and 24,650 marked coho.
3. Treaty Indian commercial ocean troll quotas of: 55,000 chinook (22,500 in May and June; 20,000 for all-salmon season July through Sept. 15 with no rollover allowed from chinook season); and 55,000 coho.

U.S./Canada Border to Cape Falcon

- May 1 through earlier of June 30 or 29,800 chinook quota.

Open May 1-3 with a 75 chinook per vessel landing and possession limit for the three day open period; open May 6-9 with a 100 chinook per vessel landing and possession limit for the four day open period; beginning May 13, open Friday through Monday with a 125 chinook possession and landing limit for each of the subsequent four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 26-30 open period with a per vessel landing and possession limit to be determined inseason. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Vessels must land their fish within 24 hours of any closure of this fishery. All landings must meet state requirements for delivery and reporting of catch on a state fish receiving ticket. All fish caught north of Leadbetter Point must be landed north of Leadbetter Point. South of Leadbetter Point, vessels must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their catch in Garibaldi, Oregon. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

U.S./Canada Border to Cape Falcon

- July 7 through earlier of Sept. 15 or 14,700 preseason chinook guideline (C.8) or a 24,650 marked coho quota.

Open Thursday through Monday prior to August 3, and Wednesday through Sunday thereafter. Landing and possession limit of 75 chinook per vessel for the July 7-11 and July 14-18 open periods, and 100 chinook landing and possession limit for subsequent five-day open periods. Landing and possession limit of 75 coho per five day open period beginning August 10 in the area between Cape Falcon and Leadbetter Point. All salmon except no chum retention north of Cape Alava, Washington in August and September (C.7). All retained coho must have a healed adipose fin clip, **except an inseason conference call may occur to consider allowing retention of all legal sized coho no earlier than September 1**. Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3), except no special gear restrictions beginning August 10 in the area between Cape Falcon and Leadbetter Point. Cape Flattery and Columbia Control Zones closed (C.5). Vessels must land their fish within 24 hours of any closure of this fishery. All landings must meet state requirements for delivery and reporting of catch on a state fish receiving ticket. All fish caught north of Leadbetter Point must be landed north of Leadbetter Point. South of Leadbetter Point, vessels must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their catch in Garibaldi, Oregon. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

South of Cape Falcon

Supplemental Management Information:

1. Klamath River recreational fishery allocation:15%.

Cape Falcon to Florence South Jetty

- March 15-25; April 1-15; May 1-3; 8-10; 15-17; 22-24; 29-30. June 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All fish caught in the area must be landed in the state of Oregon. See gear restrictions and definitions (C.2, C.3) and Oregon State regulations for a description of special regulations at the mouth of Tillamook Bay.

In 2006, the season will open March 15 for all salmon except coho, with a 27 inch chinook minimum size limit.

A. SEASON DESCRIPTION (Continued)

Florence South Jetty to Humbug Mt.

- March 15-25; April 1-15; May 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All fish caught in the area must be landed in the state of Oregon.

In 2006, the season will open March 15 under 2005 regulations.

Humbug Mt. to OR/CA Border

- March 15-25; April 1-15
- September 1 through the earlier of September 30 or a 3,000 chinook quota (C.9)

All salmon except coho. Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length September 1 through 30. Possession and landing limit of 30 fish per day per vessel in September. See gear restrictions and definitions (C.2, C.3). Vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2006 the season will open March 15 under 2005 regulations.

OR/CA Border to Humboldt South Jetty

- September 1 through earlier of September 30 or 6,000 chinook quota.

All salmon except coho. Chinook minimum size limit of 28 inches total length. Possession and landing limit of 30 fish per day per vessel. All fish caught in this area must be landed within the area. See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.). See California state regulations for additional closures adjacent to the Smith and Klamath rivers. When the fishery is closed between the OR-CA border and Humbug Mt. and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon, prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival.

Horse Mt. to Point Arena (Fort Bragg)

*
- September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

Duncan

Pt. Arena to Pigeon Pt. (San Francisco)

- July 1 through September 30.

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

Pt. Reyes to Pigeon Point

- June ~~1~~15-30 7 15-30

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)

- October 3-14.

Open Monday through Friday. All salmon except coho. Chinook minimum size limit 26 inches total length. See gear restrictions and definitions (C.2, C.3).

Pigeon Point to U.S./Mexican Border (Monterey)

- May 1 through September 30.

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

B. MINIMUM SIZE (Inches) (See C.1)

Area (when open)	Chinook		Coho		Pink
	Total	Head-off	Total	Head-off	
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to OR/CA Border					
Prior to April 16, 2005 and beginning March 15, 2006	27.0	20.5	-	-	None
May 1 to October 31,	28.0	21.5	-	-	None
OR/CA Border to Horse Mt.	28.0	21.5	-	-	None
Horse Mt. To Pt. Arena	27.0	20.5	-	-	None
Pt. Arena to U.S./Mexico Border					
Prior to October 1	27.0	20.5	-	-	None
Beginning October 1	26.0	19.5	-	-	None

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

C.2. Gear Restrictions:

a. Single point, single shank, barbless hooks are required in all fisheries.

b. *Cape Falcon, Oregon to the OR/CA border*: No more than 4 spreads are allowed per line.

c. *OR/CA border to U.S./Mexico border*: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

a. *Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

b. *Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel. In that portion of the fishery management area (FMA) off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.

c. *Spread defined*: A single leader connected to an individual lure or bait.

d. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48°23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to 48°10'00" N. lat. and east of 125°05'00" W. long.

b. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south, by 41°26'48" N. lat. (approximately six nautical miles south of the Klamath River mouth).

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate amount of salmon (by species) on board, and the estimated time of arrival.

C.7. Incidental Halibut Harvest: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 44,554 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

Beginning May 1, license holders may land no more than one Pacific halibut per each three chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be avoided for salmon trolling. NMFS and the Council request salmon trollers voluntarily avoid this area in order to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:

48°18' N. lat.; 125°18' W. long.;
48°18' N. lat.; 124°59' W. long.;
48°11' N. lat.; 124°59' W. long.;
48°11' N. lat.; 125°11' W. long.;
48°04' N. lat.; 125°11' W. long.;
48°04' N. lat.; 124°59' W. long.;
48°00' N. lat.; 124°59' W. long.;
48°00' N. lat.; 125°18' W. long.;
and connecting back to 48°18' N. lat.; 125°18' W. long.

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

c. At the March 2005 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2004).

C.9. Consistent with Council management objectives, the State of Oregon may establish additional late-season, chinook-only fisheries in state waters. Check state regulations for details.

C.10. For the purposes of California Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 89,000 chinook and 145,000 marked coho.
   Trade: None.
2. Recreational TAC: 44,500 chinook and 120,350 marked coho.
3. No Area 4B add-on fishery.
4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of marked ? coho in August and ? marked coho in September.
5. All retained coho must have a healed adipose fin clip.

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U.S./Canada Border to Cape Alava (Neah Bay Area) 12,667 - Jim Olson

- July 1 through earlier of Sept. 18 or ~~15,080~~ marked coho subarea quota with a subarea guideline of 5,800 chinook.

Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, except no chum retention August 1 through Sept. 18, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Beginning August 1, chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Cape Alava to Queets River (La Push Area) 3,167 - Jim Olson

- July 1 through earlier of September 18 or ~~3,670~~ marked coho subarea quota with a subarea guideline of 1,900 chinook;
- Sep. 24 through Oct. 9 or 100 marked coho quota or 100 chinook quota: In the area north of 47° 50'00 N. Lat. and south of 48°00'00" N. Lat. (C.5).

Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin. See gear restrictions (C.2). Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Queets River to Leadbetter Point (Westport Area) 45,066 - Jim Olson

- June 26 through earlier of Sept. 18 or ~~53,650~~ marked coho subarea quota with a subarea guideline of 28,700 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. clip. See gear restrictions and definitions (C.2, C.3). Grays Harbor Control Zone closed (C.4.b) Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Leadbetter Point to Cape Falcon (Columbia River Area) 60,900 - Jim Olson

- July 3 through earlier of Sept. 30 or ~~72,500~~ marked coho subarea quota with a subarea guideline of 8,000 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, 2 fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug.1. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

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C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

South of Cape Falcon

Supplemental Management Information:

1. Klamath River recreational fishery allocation:15%.

....

Cape Falcon to Humbug Mt.

- Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6).

All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3).

In 2006 the season will open March 15 for all salmon except coho. Two fish per day (C.1). Same gear restrictions as in 2005.

<u>Selective fishery</u>: **Cape Falcon to OR/CA Border**

- June 18 through earlier of July 31 or a landed catch of 40,000 marked coho, except that the area south of Humbug Mt. will close July 5-31, concurrent with the KMZ season listed below.

Open seven days per week, all salmon, two fish per day (C.1). All retained coho must have a healed adipose fin clip. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of August 1 or attainment of the coho quota.

Humbug Mt. to Horse Mt. (Klamath Management Zone)

- Except as provided above during the selective fishery, the season will be May 21 through July 4; and August 14 through September 11 (C.6).

All salmon except coho, except as noted above in the coho selective fishery, chinook minimum size limit 24 inches total length. Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California state regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.

A. SEASON DESCRIPTION (Continued)

Horse Mt. to Point Arena (Fort Bragg)

- February 12 through July 10; July 16-17; July 23 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, season opens February 18 (nearest Saturday to February 15) for all salmon except coho. Two fish per day (C.1), chinook minimum size limit 20 inches total length and the same gear restrictions as in 2005.

Point Arena to Pigeon Point (San Francisco)

- April 2 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), 20-inch total length minimum size limit and the same gear restrictions as in 2005.

Pigeon Point to U.S./Mexico Border

- April 2 through September 25.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), chinook 20-inch total length minimum size limit and the same gear restrictions as in 2005.

....

B. MINIMUM SIZE (Total Length in Inches) (See C.1)

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24.0	16.0	None
Cape Falcon to Humbug Mt.	20.0	16.0	None
Humbug Mt. to Horse Mountain	24.0	-	None, except 20.0 off CA
Horse Mt. to U.S./Mexico Border: Beginning	20.0	-	20.0

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

Ocean Boat Limits: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

C.2. Gear Restrictions: All persons fishing for salmon, and all persons fishing from a boat with salmon on board, must meet the gear restrictions listed below for specific areas or seasons.

a. *U.S./Canada Border to Point Conception, California*: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]

b. *Cape Falcon, Oregon to Point Conception, California*: Anglers must use no more than two single point, single shank, barbless hooks.

c. *Horse Mt., California to Point Conception, California*: Single point, single shank, barbless circle hooks (below) must be used if angling with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

C.3. Gear Definitions:

a. *Recreational fishing gear defined*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended. Weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Point Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.

b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Control Zone Definitions:

a. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 36'00" N. lat., 124°10'51" W. long.).

c. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and, on the south, by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

d. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°28'00" N. lat., 124°45'00" W. long.), then in a straight line to Bonilla Point (48°35'30" N. lat., 124°43'00" W. long.) on Vancouver Island, British Columbia.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

e. *Stonewall Bank Groundfish Conservation Area*: The area defined by the following coordinates in the order listed:
44° 37.46 N. lat.; 124° 24.92 W. long.;
44° 37.46 N. lat.; 124° 23.63 W. long.;
44° 28.71 N. lat.; 124° 21.80 W. long.;
44° 28.71 N. lat.; 124° 24.10 W. long.;
44° 31.42 N. lat.; 124° 25.47 W. long.;
and connecting back to 44° 37.46 N. lat.; 124° 24.92 W. long.

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing. NMFS may transfer coho inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the SAS recreational representatives north of Cape Falcon. NMFS may also transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington and Oregon may establish limited seasons in state waters. Oregon State-water fisheries are limited to chinook salmon. Check state regulations for details.

SUMMARY OF WRITTEN PUBLIC COMMENT

Of the eight letters received:

- Two commented primarily on the commercial troll fishery.
- Four commented primarily on the recreational fishery.
- Two commented on both recreational and commercial fishery options.

Commercial Troll Comments

One letter requested the Cape Falcon to Florence South Jetty fishery be structured four days open, three days closed for the month of May.

Klamath Management Zone (KMZ): One letter supported a modified option for the Oregon portion of the KMZ with a landing limit of 30 fish per trip in September.

Fort Bragg: One letter supported additional consideration of nearshore opportunity between Fort Ross and Point Reyes.

Recreational Comments

KMZ: One letter supported Option I, and one letter recommended a one fish bag limit as a way to reduce the July and August closure.

Cape Falcon to Oregon/California Border mark-selective coho fishery: One letter supported Option I, and one letter recommended the season open in August rather than June, when coho are smaller.

North of Cape Falcon: One letter recommended a bag limit of two salmon, only one of which may be a chinook, and only one of which may be an un-marked coho. The intent of the recommendation was to reduce hooking mortality on un-marked coho.

Other Comments

One letter suggested there was no harvestable surplus of Klamath fall Chinook, and all ocean fisheries impacting that stock be closed.

One letter recommended the Council and the National Marine Fisheries Service (NMFS) review the Klamath fall chinook spawning escapement floor conservation objective and consider replacing it with a harvest-rate based conservation objective.

One letter recommended against Option I for fisheries north of Cape Falcon or any option that did not meet NMFS Endangered Species Act consultation standards.

PFMC
04/1/05

-------- Original Message --------
Subject: FW: Misc. comments for 2005 season
Date: Wed, 9 Mar 2005 18:27:12 -0800
From: Everett & Robyne Baldwin <robyne@seanet.com>
To: <Chuck.Tracy@noaa.gov>

Dear Mr. Tracy:

I was going to send a separate commentary pertaining to just the ocean fisheries, but the two are so intertwined, that I thought I would just go ahead and send along a copy of the North of Falcon comments I made to WDFW.
Thanks for your consideration of my remarks.

Sincerely,
Everett E. Baldwin
Ph. (360) 533-0178

From: Everett & Robyne Baldwin [mailto:robyne@seanet.com]
Sent: Wednesday, March 09, 2005 5:32 PM
To: 'NorthofFalcon@dfw.wa.gov'
Subject: Misc. comments for 2005 season

Dear Ladies & Gentlemen of the WDFW:

I have some commentary on the fisheries for Grays Harbor and tributaries that I would like to submit into the North of Falcon process.

1. Retention of Chinook in Grays Harbor. Unless the tribal fishers agree to use 45 minute soak times, attend nets at all times, and net with tangle nets at non-peak Chinook run times on Grays Harbor tributaries, I as a sport fisherman, and all of the others that I know, will not agree to the closure of G.H. to the taking of Chinook Salmon this fall. One Chinook per angler, just like last year. This is a major economic impact to the sport fishing community and until we see not only some enforcement, but diligent enforcement by tribal law enforcement, and adherence to the above rules and same take quotas as the sport fishers, then we feel the Chinook season should go forward, regardless of predicted run return size. This is a question of equity, and the resource allocation has gone totally insane, to keep sport fishers off the Chinook in G.H., only to have them hit tribal gill nets in the tributaries is a waste of time and money.

2. Earlier return date on punch cards. It's incredible that with the North of Falcon process ongoing, here we are in March, without a clue as to what last year's catch was. There isn't a sport salmon season worth spit in G.H. after January 1st, and punch cards should be required to be turned in by then, and if not, a new one will not be issued. This will enable everyone to have better real numbers to work with when the NFP starts in early spring.

3. In season openers. Pay more attention to fish sampling, and do more fish sampling. We docked at a private berth in the Westport Marina last year and were checked only about 1 trip in 10, if that. It's time to start managing the fish on better "guestimates" and then perhaps create some more sport

fishing opportunity as a result. Run sizes and predictions are only that, just predictions, and more information is needed on a timely basis to perhaps create those new opportunities.

4. Tribal seasons, if impacts are so critical this year, to be quota based, same as sport fishers, not season based. We don't need a 7 months out of the year, open season with gill nets on the fish, and the small predicted Chinook run this year makes this especially critical.

5. In the ocean: Sport fishing. Allow one Coho to be a wild fish, to reduce hook mortality issues. Bag limit then would be, 1 Chinook, and 1 wild or hatchery Coho, or 1 wild Coho and 1 hatchery Coho.

6.* This is an important one! Do not push back the G.H. opener to Oct. 1st as some idiots have suggested. That is a small boat fishery out there, and October has serious weather and therefore safety issues, along with conflicts with gill-netters. A Sept. 15th opener in the minimum and frankly, most of us would like to see it open Sept. 1st as it used to a few years ago. The later openers are just a tactic to squelch the G.H. sport fishery, and keep us off the fish, and we will not stand for that. Back to that equity issue again, and that is an issue rooted in the applicable law.

7. Work with Coast Guard to require proper safety equipment and identification lights on tribal boats. This includes the legally required identification numbers, to enable violators to be identified. Very few of them have all of the foregoing. Also, in observing tribal fishers for over 10 years in the Chehalis River system, I've not once seen a tribal enforcement boat out there checking those guys. Not once. Neither has anyone else I've talked to, including employees at the Weyerhaeuser Mill who observe that fishery frequently.

8. Tribal fishers when they get close to their quotas on the Chehalis have been observed starting their "egg industry" up, and gutting salmon, the carcasses of which they throw back to avoid filling their quota. However they continue to kill fish and take the eggs. This has to stop.

9. It seems that WDFW wants people to buys licenses and tags, so their jobs will be secure, but recreation sportsmen don't see WDFW working to promote equal & fair access to the resource. In other words, rather than using it's legal authority to deal with conservation issues with the tribes, it simply lets them take more, and then dribbles out whatever's left to the people who pay to support and run the system, and this isn't right, it's been going on too long.

10. In conclusion, I was at the 7:00p.m. meeting at Montesano High School for the coastal fisheries, and I would like to thank WDFW personnel for being there to take our comments and to host the meeting.

Thank you for your consideration of my remarks.

Sincerely,

Everett E. Baldwin
27 Meander Way
Aberdeen, WA 98520
Ph. (360) 533-0178

--
Chuck Tracy

RCD
SHASTA VALLEY
RESOURCE CONSERVATION DISTRICT
215 Executive Court, Suite A
Yreka, CA 96097
(530) 842-6121 ext 106
www.svrcd.org

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March 17, 2005

Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Subject: Harvest Planning for Salmon from the Shasta River Fish and near-by portions of the Klamath River.

Dear Council Members,

For the last several years researchers have been following extremely worrisome trends in juvenile salmon survival in the Klamath River at several locations below Iron Gate Dam. The best currently available information strongly suggests that the natural production of juvenile salmon in 2002, 2003 and 2004 from most of the area upstream of the confluence of the Klamath and Scott Rivers has been extremely poor to non-existent, due to a very high incidence of *Ceratamyxa shasta*, a lethal parasitic infection found in the Klamath River and to which juvenile salmon are extremely susceptible.

<u>Because of this near-total age class failure spanning multiple years, we believe that every effort must be made to protect adult spawner numbers, and as a consequence we believe that there is no harvestable surplus of salmon available from the Shasta River, nor from much of the rest of the upstream portions of the Klamath, and that responsible harvest management and NEPA and CEQA assessment must reflect this very unfortunate reality.</u>

Last year 2,490,000 healthy juvenile fall chinook salmon exited the Shasta and entered the Klamath River. At Kinsman Creek, 31 miles downstream, a screw trap operated by USFWS/USGS found that approximately 85% of the juvenile salmon passing that point (including those from the Shasta) were so badly infected with *c.shasta* that death was imminent, and with additional mortality likely as the disease progressed over time in more lightly infected fish. This 80+% mortality is in addition to other mortality resulting from predation, poor water quality, other disease, etc. occurring elsewhere in the mainstem of the Klamath River or the ocean. If this mortality level continues, which appears almost certain since no measures are at hand to reduce it and indications are that in the coming drought year will be even worse than prior years, the continuing loss of successive juvenile cohorts will result in disastrously low returning adult numbers in future years.

We believe we are at risk of losing salmon genetics and production from some of the most productive areas of the Klamath Basin forever.

The Shasta Valley RCD recognizes the disaster implications for the coastal communities and commercial fishing industry due to low harvest numbers and has endorsed the attached letter requesting disaster relief in these communities.

The Shasta Valley RCD recognizes that we can not know with certainty the consequence that will result on Klamath Basin salmon populations if any harvest is allowed on the already depleted adult numbers. We worry that ESA listings of Klamath fall chinook may be likely to occur in the near future if the above mortality cannot be reversed. Given the magnitude of the multiple-cohort juvenile risk, and the already-known minimal adult numbers potentially available for harvest, we cannot see any way to justify putting the future at greater risk than it already is.

Thank you,

Amy Hansen
by aH

Amy Hansen
Shasta Valley RCD
District Manager

Oregon
South
Coast
Fishermen
P. O. Box 2709 ■ Harbor, OR 97415

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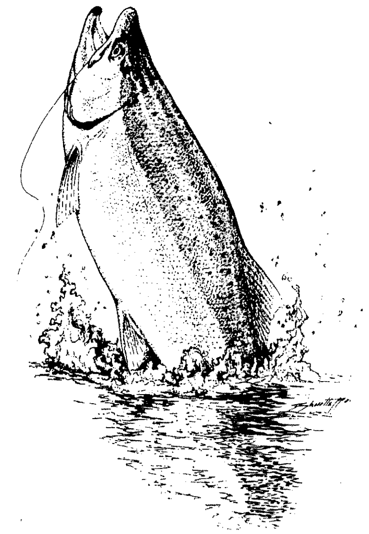

March 16, 2005

Mr. Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR. 97220-1384

Dear Mr. Hanson,

The Oregon South Coast Fishermen have reviewed the proposed options for the ocean recreational salmon season in the Klamath Management Zone and support Option 1; May 14 through July 4; and August 14 through September 11, for Chinook salmon, minimum size of 24 inches total length. In addition, we support the proposed selective Coho salmon season proposal of June 18 through July 4; adipose fin clipped Coho salmon, minimum size of 16 inches total length. We agree that Oregon should be "held harmless" by the irresponsible proposal of the California Fish and Game Commission to increase the in-river recreational allocation for the Klamath – Trinity Rivers. We hold that proposal to be irresponsible given the minimal increase to the in-river sportsmen at the expense of opportunity in the ocean to harvest abundant Sacramento River Chinook stocks, at the expense of California recreational and commercial fishermen.

Having endorsed those options, we note with great irony the impact of Klamath River natural spawning escapement goals on salmon fishing opportunities. In a year with an unprecedented abundance of central California Chinook salmon and relatively good abundance of other Chinook stocks, we are being substantially reduced in our opportunities to effectively manage salmon harvest because of Klamath River minimum escapement goals. While we are committed to helping restore the Klamath River system, we feel the Pacific Fisheries Management Council (P.F.M.C.), the National Marine Fisheries Service and the Klamath River tribes, should review the minimum natural spawning escapement goal. We would recommend thorough exploration of options that would replace the "floor" of 35,000 adults with a minimum escapement goal that is based on a proportion (i.e. 33%, 40%, 50% or whatever proportion the managers feel is reasonably necessary) of the estimated four year cohort expected to return to the river. We feel the guiding principle should be the long term survival of fall run Klamath Chinook and not fishing opportunity, but we are convinced that the long term survival depends primarily on habitat improvement and securing increased water flow to the Klamath -Trinity system for the benefit of anadramous fish. Our concern is based not just on the dismal forecast for 2005, but on the certainty of this scenario repeating itself in future years and the realization that the Klamath River will continue to negatively influence the ability of the Pacific Fisheries Management Council to manage the ocean salmon fisheries for optimum yield. With that dilemma in mind, we feel managing for a proportional number is more realistic. At the same time, we strongly recommend that P.F.M.C. and the Department of Commerce become actively involved in the Federal Energy Regulatory Commission relicensing of the Klamath River hydro-electric dams and water management in the Klamath Basin by consulting with the Bureau of Reclamation.

Thank you for your consideration of our recommendations.

Sincerely,

LeRoy Ellingson, President
Oregon South Coast Fishermen

March 22,2005

Pacific Fishery Management Council
Don Hansen, Chairman

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Dear Sir,

The following are points that may not have been factored into the models for our coming 2005 Salmon Season.

Looking over the various options I am of course confused. And after attending the Calif. Fish & Game meeting in Oakland April 18, 2005 with the commission present, I'm even more confused. Without getting into a lot of detail of which were all familiar, allow me to bring up a couple of points that may have been overlooked.

First, I've been told that the results of a 3 year test fishery (*between Fort Ross and Point Reyes, Ca. and out to six miles) had not given a serious enough weighting when the current models were structured. Because this is probably the only multiple year hard open ocean data that exists, I can't imagine why it wasn't valued higher. The only thing I've heard was that it didn't go out in the ocean far enough. Well, these boundary perimeters were set by the National Marine Fishery Service and were followed precisely. The results of course are well known, and they were that the take of Klamath stocks in this area over a three year period were infinitesimal as were winter run Sacramento System Salmon. The results after these three long years was that the coast was opened the next year May 1st to September 31 from Point Arena south. The fact that they were closed in the first place is obviously the result of a wild guess. A wild guess that was wrong and cost our fishermen and associated infrastructures millions of dollars. And of course no apologies were ever received for the mistake.
*Years 1998, 1999 & 2000.

On the good side we remaining fishermen had one of our best seasons in 2004. Not only did we catch and produce a top quality product, we were able to re-establish a number of important previously lost markets. Infact there is now a demand for our California Kings and the price is more promising than in years. The fact we now have a chance to complete effectively with the farmed product is most encouraging.

By shutting us down again, a second consideration that has apparently been overlooked is the increased escapement entering the Sacramento River-System. Over the last few years, we've heard horror stories of the Salmon that can't get into the hatcheries because the hatcheries are plugged and the gates are shut. With the new 2005 options and less fish taken by fishermen the numbers of returning salmon will add significantly to the excess thousands already trying to spawn on top of each other near the hatcheries. The results are two fold.
(1) There is no production from these thousands of fish and (2) their rotting carcasses may deprive released fry enough oxygen in the water for them to survive. Or lice and other fungi picked up may cause them to die in the ocean. With 2 to 3 times the numbers of spawning salmon headed for the same fate, it could become an environmental problem and cause a further mess.

Please review the results of the valid and expensive test fishery records and hopefully re-evaluate. And also try to envision our concerns about over polluting the Sacramento System with tons of dead fish (or rotting garbage) in the best King Salmon System in the world. Don't let this great resource be ruined for any reason!

Thank You,

George Boos

George Boos
Fishermen, Bodega Bay (30 years)
P.O. Box 754 - 94923

Subject: [Fwd: Summer ocean salmon season]
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Thu, 24 Mar 2005 11:11:48 -0800
To: Chuck Tracy <Chuck.Tracy@noaa.gov>

-------- Original Message --------
Subject: Summer ocean salmon season
Date: Thu, 24 Mar 2005 06:57:24 -0800
From: Carl Kopacek <CKopacek@jrcpa.com>
To:<pfmc.comments@noaa.gov>

Gentlemen:
Why open the silver season in June when the fish are small? The quota will surely be caught, so why open so soon? Why not harvest a quota of 9 lb fish instead of 6 lb fish. The charter boats will still be able to catch the same number of fish, whether the season begins in June or August. You people are idiots for allowing the season to open so soon!!

Don't think I don't love to fish because I do. But let's use some common sense.
Sincerely,
Carl Kopacek

Craig Foster

From: spirit.spirit@verizon.net
Sent: Friday, March 25, 2005 1:01 PM
To: Craig Foster
Subject: Public Hearing in Coos Bay
Importance: High

Hi Craig

When you go to Coos Bay next week, you might read into the record:

1) John Fraser from Brookings would like a 30 fish/day possession and landing limit in the K)September opportunity

2) Newport Trollers would like to modify their May opporutnity as it is not the complete month to a 4 on and 3 day off series starting on May 1, 2005

See ya

Don

Subject: July & August closure
From: georgemrose@webtv.net (George Rose)
Date: Sun, 27 Mar 2005 07:24:34 -0800
To: Chuck.Tracy@noaa.gov

Why not limit the daily bag limit for salmon in the southern Oregon coastal area to l salmon per day, rather than close the season for July and half of August? It would seem to accomplish the same goal, and provide some sport fishing for all, and do less damage to the local economies. Thank you,
George Rose

SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1

Providing quality water, power and service at a competitive price that our customers value

April Council Agenda
Agenda Item C.6

March 29, 2005

VIA facsimile (503) 820-2299
and via email [by copy to Chuck.Tracy@noaa.gov]

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place
Suite 200
Portland, OR 97220-1384

Re: Snohomish County PUD's Comments Regarding Pacific Fisheries Management Council 2005 Management Options

Dear Chairman Hansen and members of the Council:

Snohomish County PUD appreciates the opportunity to comment on this year's proposed Council salmon management options, and we appreciate the increased transparency of the Council's salmon harvest decision-making. However, we object to the Council's proposed 2005 options and request the Council to restrict ocean salmon harvest in order to (a) prevent ocean harvest impacts on endangered or threatened species ESA stocks, and (b) reduce the economic impact of ocean harvest on citizens who are not in the commercial fishing industry. The Council regulates a mixed stock fishery. The inevitable result of the Council-authorized ocean salmon harvest, is a taking of ESA endangered or threatened salmon that cannot be considered "incidental" or "accidental."

Snohomish County PUD's Interest

Snohomish County PUD is the largest public utility district in the Northwest, providing electric service to over 670,000 citizens in Snohomish County and Camano Island in Washington. Snohomish County PUD is also the largest single power customer of the Bonneville Power Administration ("BPA"), purchasing approximately ten percent of all BPA marketed power. Each year Snohomish County PUD customers pay over $70 million dollars of BPA's annual $700 million fish and wildlife costs (both direct and indirect costs and foregone revenue). This is one of the PUD's largest annual costs, exceeding its total annual payroll and is over two times what we pay BPA for transmission services. BPA's fish and wildlife costs and lost revenues have a direct and significant adverse impact on the customers and businesses we serve.

The Council Options Allow Improper Levels of Harvest on ESA Salmon

One thing is clear in the controversy over ESA listed Northwest salmon: Continued ocean harvest by the commercial fishing industry will delay or prevent recovery of threatened or endangered salmon. Allowing continued ocean harvest of listed salmon violates both the Endangered Species Act and the Magnuson-Stevens Act (whether the ocean harvest is called "overfishing" or "bycatch").

NOAA Fisheries Consultation Standards Are Too Lax

NOAA Fisheries (formerly called NMFS) applies the wrong test to allow continued ocean salmon harvest on listed species. The current NOAA test is to allow ocean harvest if it does not "substantially impede recovery." This reflects an ocean harvest bias that may be the result of NOAA Fisheries' conflicting roles as both an ESA protector and a fisheries/commerce promoter. NOAA Fisheries incorrectly asserts that its hands are tied by treaty and Magnuson-Stevens Act requirements. But there is no legal obligation to allow ocean harvest of threatened or endangered species any more than there is an obligation to allow the killing and sale of eagles, whales or other listed species.

If fish are threatened with extinction and recovery is the goal, then no one should be permitted to continue to intentionally catch and kill them in large numbers for commercial sale. The July 2000 "Recommendations of the Governors of Idaho, Montana, Oregon and Washington for the Protection and Restoration of Fish in the Columbia River Basin" addressed the question diplomatically (at p. 11):

> [H]arvest rates must ensure sufficient escapement to rebuild declining stocks. With in river harvest rates ranging up to 31 percent for one of the listed stocks, we are not convinced that current practices are compatible with rapid recovery. . . .

NOAA Fisheries' Salmon Recovery Science Review Panel was more blunt:

> Apparently substantial harvest of listed ESUs continues to be permitted by NMFS, e.g. up to about 50% per year for components of the Lower Columbia Chinook and Snake River Fall Chinook. . . .
>
> NMFS personnel involved in setting allowable harvests . . . indicated that allowable harvests are set so as not to substantially impede recovery. Substantial was never defined quantitatively in this context. It appears to us that NMFS personnel involved in setting allowable harvest rates use subjectivity and legalism, and their inability to promote a transition to terminal fisheries to justify biologically unsustainable harvest rates on several listed ESUs. . . . Furthermore, it

> appears that harvest decisions are never connected with other factors in an overall restoration and recovery plan. . . .
>
> We recommend that NMFS carefully reexamine the procedures by which allowable harvests are suggested and approved. Legal and policy constraints under which NMFS operates (Indian treaty rights and the Magnuson-Stevens Act) in its management of listed ESUs should also be carefully reexamined to determine whether they are superseded by the Endangered Species Act. . . . Finally, the procedures for setting allowable harvests should be integrated with other aspects of restoration and recovery so that harvest impacts can be compared to other factors affecting population viability. . . .
>
> We were frustrated . . . to hear discussion of optimal harvesting strategies, as if no other factors were involved . . . . Indeed, it was our view that it was this isolation that led to some counterintuitive recommendations, such as to continue the harvesting of declining populations. . . .
>
> NMFS should develop a rational policy that does not demean scientific common sense.

Quotes from Salmon Recovery Science Review Panel, Report for the meeting held August 27-29, 2001, pp. 7-12. (Available at research.nwfsc.noaa.gov/trt/RSRP_Aug01.pdf).

Snake River Fall Chinook Harvest: A Case Study

According to the Council's summary of 2004 Ocean Fisheries, (at p. 43):

> In the *Proposed Recovery Plan for Snake River Salmon*, NMFS has proposed a delisting goal for Snake River fall chinook that provides for an eight-year (approximately two generation) geometric mean of at least 2,500 natural spawners in the mainstem Snake River annually; the eight-year mean through 2003 is 1,271.

NOAA Fisheries' current "consultation standard" for Snake River fall chinook ocean harvest impacts apparently permits ocean harvest that is not more than 70% of the average ocean harvest of those stocks between 1988 and 1993. (It would be helpful for the Council to specify what percentage of the run is taken in ocean harvest.) Mainstem Columbia fisheries are then apparently allowed to catch up to 31% of the Snake River fall chinook that escape ocean harvest. The combination of Southeast Alaska, Canadian and Council ocean fisheries and mainstem harvest permitted by NOAA Fisheries' "consultation standard" appears to allow harvest of about 40% to 50% of the ESA listed Snake River fall stock annually. These are fish that have fully matured and are ready to return to the Snake River to reproduce.

Assuming that there had been no ocean harvest of Snake River fall chinook instead of the ocean harvest allowed by NOAA Fisheries over the past eight years, the eight year geometric mean escapement of these fish would be much closer to much closer to reaching NOAA Fisheries' proposed recovery goal for Snake River fall chinook. If the 50% harvest did not occur, the NOAA Fisheries proposed delisting goal could be achieved (1,271 X 2 = 2,542).

The salmon recovery costs that are being borne by BPA customers and Snohomish citizens as a result of this continued ocean harvest are staggering. For example, in the last two years, BPA customers have called for the suspension of "summer spill" for a test and evaluation of the cost and benefits. The estimated value in suspending summer spill in those two years would have allowed the generation of over $200 million worth of power at the cost of the loss of less than 100 listed Snake River fall chinook.

In contrast, the Council's estimated value of the *entire* North of Cape Falcon non-Indian commercial troll council fishery, under "Option I" (which the Council has acknowledged is likely to violate even the NOAA Fisheries consultation standard for Snake River fall chinook) is less than $2 million, and the estimated "Coastal Community Income Impacts" of the Council's North of Falcon recreational ocean fishery is estimated to be $7,625,000. As a result, BPA customers including Snohomish County PUD are paying millions of dollars to protect a few listed fish from accidental loss from the effects of the federal hydro system, only to have the Council allow those same fish to be killed intentionally in ocean commercial harvests.

Recommendations Regarding 2005 Council Fisheries – Reject Option I and Develop an Ocean Harvest Option that Protects Listed Species

The Council should reject Option I and any proposal to harvest more Snake River fall chinook than the NOAA Fisheries consultation standard allows. The Council also should work with other harvest managers to shape ocean harvest levels so that the stocks of concern meet escapement goals. These include reducing the ocean harvest in Council fisheries of Columbia Lower River Natural Tules (threatened), Columbia Lower River Wild chinook (threatened), Snake River Fall chinook (threatened), and Sacramento River Winter chinook (endangered). The Council should also work with other co-managers to ensure that other listed stocks (e.g., Puget Sound chinook salmon) also receive more aggressive protection. The Council's failure to do so would violate not only violate the Endangered Species Act, but also the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson Act"), as amended by the Sustainable Fisheries Act, P.L. 104-297, 110 Stat. 3559 (codified at 16 U.S.C. § 1801 et seq.), the Endangered Species Act ("ESA"), 16 U.S.C. § 1531 et seq., the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4331, Regulatory Flexibility Act, 5 U.S.C. §§ 601 et seq., and the Administrative Procedure Act ("APA"), 5 U.S.C. § 551 et seq.

Snohomish County PUD urges the Council to take immediate steps to end or significantly reduce the ocean harvest of salmon listed as threatened or endangered under the ESA. Thank you again for the opportunity to comment.

Very truly yours,

Public Utility District No. 1 of Snohomish County

By: ______________________________

Steve Marshall, Assistant General Manager

Comments by Bill Houston
President of the Point Arena Salmon Trollers Association

I have been a commercial salmon troller in Point Arena since 1983 and represent this group. Although my heart has always been with the salmon, I've had to be a university professor to make a living. After 37 years as a professor (17 years at UC Berkely and 20 years at Arizona State University) I retired last spring to do full time fishing. In my capacity as a professor I conducted dozens of state and federally sponsored research projects and published over 100 technical papers and reports. I analyzed data and constructed models similar to those used by the California Department of Fish and Game (CA DFG) and the PFMC.

Although I am qualified to judge the quality of these models, I have had very limited time to study the data and the predictive models which resulted. Nevertheless, based on a brief review of the data, I have concluded that the correlations are weak and the predictions are therefore very uncertain. This is not to suggest that the scientists and technicians who have developed the models have done a poor job. The quality of the predictive models may well be the best that is achievable – given the quality and amount of data available for construction of the models. Further, the modelers were given certain premises, assumptions, and constraints as a beginning point for their work. When the available data scatter widely, as shown schematically in Figure 1 below, it is always possible to construct a best-fit curve through the data – which may later be used as a part of a predictive model.

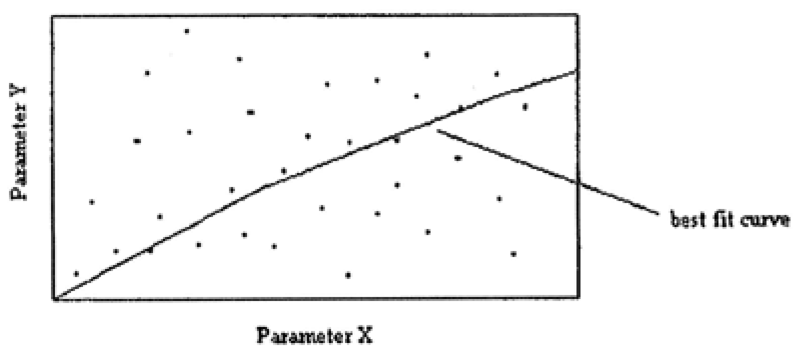

Figure 1

However, in some cases the best that can be said about this curve is that it is unbiased; that is, that it is no more likely to be high than it is to be low. For the schematic depicted in Figure 1 we would also have to say that the probability that the "best fit curve" is substantially correct is very low – thus the probability of being substantially wrong is very high. The models being used by the CA DFG are actually modestly biased to the conservative side, meaning that they tend to over predict the perceived Klamath River salmon shortage problem. But even more serious than this modest bias is the scatter in the data which render the predictions very uncertain.

I wish to question some of the premises the modelers were required to start from and to point out certain items and facts which were not included in the predictive models:

Item 1 – In 1998, 1999, and 2000 a study was conducted by the CA DFG under the auspices of the NMFS off the CA coast near Bodega Bay, out 6 miles. For each of these 3 years a quota of 4000+ fish was caught beginning July 1. The fish were sampled and searched for Klamath River fish and a total of 3 Klamath River salmon were found. These data show essentially no impact on Klamath River fish within this 6-mile belt and these data are not considered in this years models.

Item 2 – When a fish buyer fills out the block where the fish are caught, he essentially never queries the fisherman as to where the fish were caught. He puts his own local block number on the landing receipt. This practice has persisted for at least decades and it tends to bias the database. If a fisherman fishes a couple of days up north, catches a few Klamath River fish and then delivers to SanFrancisco, a distorted picture results.

Item 3 – We all tend to assume that a large run of salmon up the river means more salmon spawned and more fingerlings down the river and a big run 4 years hence. However, statistics have been gathered which show that sometimes a large run begets a small run 4 years hence and a small run begets a large run 4 years hence. This reverse correlation was reported by Sonny Maahs of Fort Bragg and others. It is explained by variable amounts of water and oxygen in the river. With small amounts of oxygen most of a large run can die before spawning or when coming down the river as fingerlings. This result seems logical, if not obvious, when we consider the extreme example of a huge 200,000 fish run up a little 12 ft. wide creek. We would expect that there would be insufficient water and oxygen to allow survival of many of the fish. What this tells us is that good management entails matching the size of the run to the capacity of the river, year by year. So far in 2005 the federal government has allowed only about half of the flows recommended as minimum flows to sustain the salmon run. With continued drought it is more than likely that this year will be another oxygen shortage year. Therefore, it is also quite likely this is a year in which a small run into the river would maximize the total number of fish returning to the ocean. The 2005 CA DFG models assume adequate oxygen supply and therefore do not take these facts into account.

Item 4 – This last item is not exactly an omission from the models, but rather a challenge to the premise on which the fishery management is based. Even though the hatchery fish in the Klamath River have been well established for quite some time and should be a highly valued subset of the species, they are not counted in any way. The genetic differences between the hatchery and wild fish are reportedly very small indeed and probably smaller than the genetic differences between you and me. Any criticism of the hatchery fish for lack of diversity may not be well founded, and if it were, it could be easily answered by milking 50 times more males and females and taking less from each. If the hatchery fish are counted there is no danger to the species. It is relevant to note that all statistics on Klamath River salmon are gathered from tagged hatchery fish. Inherent in this practice is the assumption that the hatchery and wild fish swim together and school together, which is inconsistent with the notion that the hatchery fish are so different that they should not be counted in any way. Furthermore, it is not entirely valid to devise a policy based solely on concern about shortage of a single year class.

Economic Impact – If 2005 were a full season and a good year like 2004, the salmon trollers would gross about $50,000,000 and the fish would retail for around $150 million. At a glance it is obvious that the economic impact of eliminating 7 weeks from the heart of the season is going to be huge for the trollers and for the economy of California. Further, it is impossible to classify as good management a policy which results in killing up to about 1 million salmon in the Sacramento River as is now predicted. The PFMC has an obligation to consider the needs and well-being of numerous groups and entities including: 1) The Klamath River farmers 2) The Klamath River Native Americans 3) Sport Fishermen 4) Commercial Trollers 5) Salmon Wholesalers/Retailers and others affected economically and 6) Environmentalists. It is poor management policy to consider only the voices of that subset of the environmentalists who place value only on the wild salmon.

Our Plea – In view of all of these factors I have discussed and the omissions from the predictive models, I would be amazed if the probability of significantly damaging the Klamath River salmon species were more than 2% or 3%, if option II were adopted. If so, this would mean that the probability of no significant damage to the species would be about 97%. If option II were modified to give us another month – that is change July 21 to June 21 – the probability of damaging the species would go up of course. But, in my judgment, only to 5% or 10%, particularly when one considers the very likely reverse correlation due to low river flows in 2005. This would mean that the probability of no significant damage would still be at least 90% or better.

Because the drastic cuts in the season are not justified in view of the omissions from the 2005 models and the questionable basic beginning premises, we implore you to give us the extra month (compared to option II). We would be happy to be constrained to within 6 miles of the shore if necessary.

I assure you that I could put together a panel of expert witnesses who would confirm the reasonableness of what I have said here today, but there is not time.

Respectfully,

W N Houston

W. N. Houston

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON METHODOLOGY REVIEW PROCESS AND PRELIMINARY TOPIC SELECTION FOR 2005

The Scientific and Statistical Committee (SSC) met with Mr. Dell Simmons and other members of the Salmon Technical Team (STT) to identify, discuss, and prioritize methodology reviews for 2005. Current issues include three unresolved items from 2004 and two new items. The SSC places highest priority on the first two items below.

<u>Chinook and Coho Fishery Regulation Assessment Model Documentation.</u> The Model Evaluation Workgroup (MEW) is completing detailed documentation of the Fishery Regulation Assessment Model (FRAM). In April 2004 the SSC advised that this item be given highest priority for review in 2004. Again, the SSC recommends that the FRAM documentation be the highest priority item for 2005. This is a necessary prerequisite for review of the model.

<u>FRAM Validation/Calibration Exercise.</u> As part of its routine review of the chinook FRAM, the STT during 2005 will develop estimates of base-period data for new fish stocks (e.g., Sacramento fall chinook) and calibrate and validate the revised model. The SSC requests the STT include in the FRAM documentation a technical description of the calibration/validation process and results from its application in 2005.

<u>Oregon Coastal Natural Management Matrix.</u> The Oregon Department of Fish and Wildlife is developing a technical appendix to the Oregon Coastal Natural Work Group matrix. The SSC is prepared to review this work at the November Council meeting as a Technical Amendment to the fishery management plan.

<u>Klamath Ocean Harvest Model - Contact Rates and Catch Projections.</u> Contact rates for Klamath River fall chinook were much higher in 2004 than previously observed, and this stock will significantly constrain several Council salmon fisheries in 2005. The SSC understands that documentation of model performance in 2004 is being prepared. An exploration of potential factors that led to the unusual Klamath contact rates in 2004 could help prevent a recurrence.

<u>Columbia River Fall Chinook Ocean Abundance Predictors</u>. The SSC was told that ocean abundance predictors for Columbia River fall chinook are likely to be available for review in 2005.

PFMC
04/05/05

SALMON TECHNICAL TEAM COMMENTS ON METHODOLOGY REVIEW PROCESS AND PRELIMINARY TOPIC SELECTION FOR 2005

Chinook and Coho Fishery Regulation Assessment Model (FRAM) Documentation

The Salmon Technical Team (STT) and Scientific and Statistical Committee (SSC) should review the detailed technical documentation of the Chinook and Coho FRAMs upon completion this fall by the Model Evaluation Workgroup (MEW).

Review of Klamath Ocean Harvest Model (KOHM) Contact Rates and Catch Projections

The STT suggests the SSC review the National Marine Fisheries Service analysis of the performance of the KOHM in projecting effort as part of the agency=s review of consultation standards for California coastal chinook.

Oregon Coastal Natural Work Group Technical Appendix

At its November 2000 meeting, the Council recommended the Oregon Department of Fish and Wildlife prepare a technical analysis supporting the Oregon Coastal Natural Coho Work Group matrix. The SSC and STT should review the analysis prior to considering its adoption in a fishery management plan amendment.

Chinook FRAM Validation/Calibration

The Washington co-managers and appropriate MEW members intend to conduct a calibration and validation of the Chinook FRAM during the summer of 2005. The STT also recommends several significant modifications to the existing FRAM be considered during this process, including modeling of the West Coast Vancouver Island (WCVI) troll fishery to reflect changes from historical fishing patterns, conversion of preseason forecasts to ocean abundance projections, and representation of stocks that are not presently included in the model, particularly California and Oregon stocks that contribute to fisheries off Washington and the WCVI.

PFMC
04/05/05

ENFORCEMENT CONSULTANTS REPORT ON CLARIFY COUNCIL DIRECTION ON 2005 SALMON MANAGEMENT MEASURES

The Enforcement Consultants have reviewed the information relating to the salmon management proposals and have the following comments:

In relation to the recreational fishery open periods for the area identified as Horse Mountain to Point Arena (Fort Bragg):

For a recreational fishery it is difficult to enforce a 10-day closure with a 2-day open period in the middle of the closure. This creates additional complexities in regulations, public awareness of open periods, and support through the courts in prosecuting violations. As a general practice, the Enforcement Consultants are opposed to this kind of management practice due to enforcement concerns.

PFMC
04/06/05

Agenda Item C.5.b
Supplemental STT Report
April 2005

SALMON TECHNICAL TEAM

PRELIMINARY ANALYSIS OF TENTATIVE 2005 OCEAN SALMON FISHERY MANAGEMENT MEASURESS

April 6, 2005

TABLE 1. Tentative **non-Indian commercial troll** management measures analyzed by the STT for ocean salmon fisheries, 2005.
(Page 1 of 4) *April 6, 2005 (1:56pm)*

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 86,500 chinook and 145,000 marked coho.
   Trade: None.
2. Non-Indian commercial troll TAC: 43,250 chinook and 23,200 marked coho.
3. Treaty Indian commercial ocean troll quotas of: 48,000 chinook (25,000 in May and June; 23,000 for all-salmon season July through Sept. 15 with no rollover allowed from chinook season); and 50,000 coho.

U.S./Canada Border to Cape Falcon

- May 1 through earlier of June 30 or 29,000 chinook quota.

Open May 1-3 with a 75 chinook per vessel landing and possession limit for the three day open period; open May 6-9 with a 100 chinook per vessel landing and possession limit for the four day open period; beginning May 13, open Friday through Monday with a 125 chinook possession and landing limit for each of the subsequent four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 26-30 open period with a per vessel landing and possession limit to be determined inseason. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Vessels must land their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land their fish north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

U.S./Canada Border to Cape Falcon

- July 7 through earlier of Sept. 15 or 14,250 preseason chinook guideline (C.8) or a 23,200 marked coho quota.

Open Thursday through Monday prior to August 3, and Wednesday through Sunday thereafter. Landing and possession limit of 75 chinook per vessel for the July 7-11 and July 14-18 open periods, and 100 chinook landing and possession limit for subsequent five-day open periods. Landing and possession limit of 75 coho per five day open period beginning August 10 in the area between Cape Falcon and Leadbetter Point. All salmon except no chum retention north of Cape Alava, Washington in August and September (C.7). All retained coho must have a healed adipose fin clip, **except an inseason conference call may occur to consider allowing retention of all legal sized coho no earlier than September 1** (C.8.d). Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3), except no special gear restrictions beginning August 10 in the area between Cape Falcon and Leadbetter Point. Cape Flattery and Columbia Control Zones closed (C.5). Vessels must land their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land their fish north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. State regulations require Oregon licensed limited fish sellers and fishers intending to transport and deliver their catch outside the area notify ODFW one hour prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

South of Cape Falcon

Supplemental Management Information:

1. Klamath River recreational fishery allocation:15%.

Cape Falcon to Florence South Jetty

- March 15-25; April 1-15; May 1-3; 8-10; 15-17; 22-24; 29-30. June 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All fish caught in the area must be landed in the state of Oregon. See gear restrictions and definitions (C.2, C.3) and Oregon State regulations for a description of special regulations at the mouth of Tillamook Bay.

In 2006, the season will open March 15 for all salmon except coho, with a 27 inch chinook minimum size limit.

A. SEASON DESCRIPTION (Continued)

Florence South Jetty to Humbug Mt.

- March 15-25; April 1-15; May 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All fish caught in the area must be landed in the state of Oregon.

In 2006, the season will open March 15 under 2005 regulations.

Humbug Mt. to OR/CA Border

- March 15-25; April 1-15
- September 1 through the earlier of September 30 or a 3,000 chinook quota (C.9)

All salmon except coho. Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length September 1 through 30. Possession and landing limit of 30 fish per day per vessel in September. See gear restrictions and definitions (C.2, C.3). Vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2006, the season will open March 15 under 2005 regulations.

OR/CA Border to Humboldt South Jetty

- September 1 through earlier of September 30 or 6,000 chinook quota.

All salmon except coho. Chinook minimum size limit of 28 inches total length. Possession and landing limit of 30 fish per day per vessel. All fish caught in this area must be landed within the area. See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.). See California state regulations for additional closures adjacent to the Smith and Klamath rivers. When the fishery is closed between the OR-CA border and Humbug Mt. and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon, prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival.

Horse Mt. to Point Arena (Fort Bragg)

- September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 under 2005 regulations. This opening could be modified following Council review at its March 2006 meeting.

Pt. Arena to Pigeon Pt. (San Francisco)

- July 4 through August 29; September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length in September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)

- October 3-14.

Open Monday through Friday. All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

Pigeon Point to Pt. Sur (Monterey)

- May 1-31; July 4 through August 29; September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length in May and September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

Pt. Sur to U.S./Mexican Border (Monterey)

- May 1 through September 30.

All salmon except coho. Chinook minimum size limit 27 inches total length in May, June, and September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

TABLE 1. Tentative **non-Indian commercial troll** management measures analyzed by the STT for ocean salmon fisheries, 2005.
 April 6, 2005 (2:17pm)

B. MINIMUM SIZE (Inches) (See C.1)

Area (when open)	Chinook Total	Chinook Head-off	Coho Total	Coho Head-off	Pink
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to OR/CA Border					
Prior to April 16, 2005 and beginning March 15, 2006	27.0	20.5	-	-	None
May 1 to October 31,	28.0	21.5	-	-	None
OR/CA Border to Horse Mt.	28.0	21.5	-	-	None
Horse Mt. To Pt. Arena	27.0	20.5	-	-	None
Pt. Arena to U.S./Mexico Border					
Prior to July 1and after August 31	27.0	20.5	-	-	None
July 1-August 31	28.0	21.5	-	-	None

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

C.2. Gear Restrictions:

a. Single point, single shank, barbless hooks are required in all fisheries.

b. *Cape Falcon, Oregon to the OR/CA border*: No more than 4 spreads are allowed per line.

c. *OR/CA border to U.S./Mexico border*: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

a. *Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

b. *Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel. In that portion of the fishery management area (FMA) off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.

c. *Spread defined*: A single leader connected to an individual lure or bait.

d. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48°23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to 48°10'00" N. lat. and east of 125°05'00" W. long.

b. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south, by 41°26'48" N. lat. (approximately six nautical miles south of the Klamath River mouth).

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate amount of salmon (by species) on board, and the estimated time of arrival.

C.7. Incidental Halibut Harvest: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 44,554 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

Beginning May 1, license holders may land no more than one Pacific halibut per each three chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be avoided for salmon trolling. NMFS and the Council request salmon trollers voluntarily avoid this area in order to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:

48°18' N. lat.; 125°18' W. long.;
48°18' N. lat.; 124°59' W. long.;
48°11' N. lat.; 124°59' W. long.;
48°11' N. lat.; 125°11' W. long.;
48°04' N. lat.; 125°11' W. long.;
48°04' N. lat.; 124°59' W. long.;
48°00' N. lat.; 124°59' W. long.;
48°00' N. lat.; 125°18' W. long.;
and connecting back to 48°18' N. lat.; 125°18' W. long.

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

c. At the March 2006 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2005).

d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

C.9. Consistent with Council management objectives, the State of Oregon may establish additional late-season, chinook-only fisheries in state waters. Check state regulations for details.

C.10. For the purposes of California Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 86,500 chinook and 145,000 marked coho.
   Trade: None.
2. Recreational TAC: 43,250 chinook and 121,800 marked coho.
3. No Area 4B add-on fishery.
4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of marked 9,600 coho in August and 2,400 marked coho in September.
5. All retained coho must have a healed adipose fin clip.

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U.S./Canada Border to Cape Alava (Neah Bay Area)

- July 1 through earlier of Sept. 18 or 12,667 marked coho subarea quota with a subarea guideline of 4,300 chinook.

Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, except no chum retention August 1 through Sept. 18, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Beginning August 1, chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Cape Alava to Queets River (La Push Area)

- July 1 through earlier of September 18 or 3,067 marked coho subarea quota with a subarea guideline of 1,900 chinook;
- Sep. 24 through Oct. 9 or 100 marked coho quota or 100 chinook quota: In the area north of 47°50'00 N. Lat. and south of 48°00'00" N. Lat. (C.5).

Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin. See gear restrictions (C.2). Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Queets River to Leadbetter Point (Westport Area)

- June 26 through earlier of Sept. 18 or 45,066 marked coho subarea quota with a subarea guideline of 28,750 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. clip. See gear restrictions and definitions (C.2, C.3). Grays Harbor Control Zone closed (C.4.b) Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Leadbetter Point to Cape Falcon (Columbia River Area)

- July 3 through earlier of Sept. 30 or 60,900 marked coho subarea quota with a subarea guideline of 8,200 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, 2 fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug.1. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

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C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

South of Cape Falcon

Supplemental Management Information:
1. Klamath River recreational fishery allocation:15%.

Cape Falcon to Humbug Mt.

- Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6).

All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3).

In 2006 the season will open March 15 for all salmon except coho. Two fish per day (C.1). Same gear restrictions as in 2005.

Selective fishery: **Cape Falcon to OR/CA Border**
- June 18 through earlier of July 31 or a landed catch of 40,000 marked coho, except that the area south of Humbug Mt. will close July 5-31, concurrent with the KMZ season listed below.

Open seven days per week, all salmon, two fish per day (C.1). All retained coho must have a healed adipose fin clip. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of August 1 or attainment of the coho quota.

Humbug Mt. to Horse Mt. (Klamath Management Zone)

- Except as provided above during the selective fishery, the season will be May 21 through July 4; and August 14 through September 11 (C.6).

All salmon except coho, except as noted above in the coho selective fishery, chinook minimum size limit 24 inches total length. Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California state regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.

Horse Mt. to Point Arena (Fort Bragg)

- February 12 through July 10; July 16-17; July 23 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, season opens February 18 (nearest Saturday to February 15) for all salmon except coho. Two fish per day (C.1), chinook minimum size limit 20 inches total length and the same gear restrictions as in 2005.

Point Arena to Pigeon Point (San Francisco)

- April 2 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), 20-inch total length minimum size limit and the same gear restrictions as in 2005.

Pigeon Point to U.S./Mexico Border (Monterey)

- April 2 through September 25.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), chinook 20-inch total length minimum size limit and the same gear restrictions as in 2005.

B. MINIMUM SIZE (Total Length in Inches) (See C.1)

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24.0	16.0	None
Cape Falcon to Humbug Mt.	20.0	16.0	None
Humbug Mt. to Horse Mountain	24.0	-	None, except 20.0 off CA
Horse Mt. to U.S./Mexico Border: Beginning	20.0	-	20.0

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

Ocean Boat Limits: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

C.2. Gear Restrictions: All persons fishing for salmon, and all persons fishing from a boat with salmon on board, must meet the gear restrictions listed below for specific areas or seasons.

a. *U.S./Canada Border to Point Conception, California*: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]

b. *Cape Falcon, Oregon to Point Conception, California*: Anglers must use no more than two single point, single shank, barbless hooks.

c. *Horse Mt., California to Point Conception, California*: Single point, single shank, barbless circle hooks (below) must be used if angling with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

C.3. Gear Definitions:

a. *Recreational fishing gear defined*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended. Weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Point Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.

b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Control Zone Definitions:

a. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 36'00" N. lat., 124°10'51" W. long.).

c. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and, on the south, by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

d. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°28'00" N. lat., 124°45'00" W. long.), then in a straight line to Bonilla Point (48°35'30" N. lat., 124°43'00" W. long.) on Vancouver Island, British Columbia.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

e. *Stonewall Bank Groundfish Conservation Area*: The area defined by the following coordinates in the order listed:
44° 37.46 N. lat.; 124° 24.92 W. long.;
44° 37.46 N. lat.; 124° 23.63 W. long.;
44° 28.71 N. lat.; 124° 21.80 W. long.;
44° 28.71 N. lat.; 124° 24.10 W. long.;
44° 31.42 N. lat.; 124° 25.47 W. long.;
and connecting back to 44° 37.46 N. lat.; 124° 24.92 W. long.

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing. NMFS may transfer coho inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the SAS recreational representatives north of Cape Falcon. NMFS may also transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington and Oregon may establish limited seasons in state waters. Oregon State-water fisheries are limited to chinook salmon. Check state regulations for details.

TABLE 3. **Treaty Indian** ocean troll salmon fishery management measures analyzed by the STT, 2005. (Page 1 of 1)
April 6, 2005 (2:18pm)

A. SEASON OPTION DESCRIPTIONS

1. Treaty Indian Troll TAC; 48,000 chinook and 50,000 coho
2. May-June: chinook only; 25,000 chinook quota. If the chinook quota for the May/June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the chinook quota is exceeded, the excess will be deducted from the later all-salmon season.
3. July 1-Sept 15. All-salmon; chinook quota 23,000; coho quota: 50,000.
4. If the treaty Indian troll catch taken from Areas 4-4B is projected inseason to exceed 47,286 coho, the total treaty Indian troll quota will be adjusted to ensure that the exploitation rate impact of the treaty Indian troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment.

B. MINIMUM SIZE (Inches)

	Chinook		Coho		
Area (when open)	Total	Head-off	Total	Head-off	Pink
North of Cape Falcon	24.0	18.0	16.0	12.0	None

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

1. Tribe and Area Boundaries. All boundaries may be changed to include such other areas as may hereafter be authorized by a Federal court for that tribe's treaty fishery.

S'KLALLAM - Washington State Statistical Area 4B (All)

MAKAH - Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.

QUILEUTE - That portion of the FMA between 48°07'36" N. lat. (Sand Pt.) and 47°31'42" N. lat. (Queets River) and east of 125°44'00" W. long.

HOH - That portion of the FMA between 47°54'18" N. lat. (Quillayute River) and 47°21'00" N. lat. (Quinault River) and east of 125°44'00" W. long.

QUINAULT - That portion of the FMA between 47°40'06" N. lat. (Destruction Island) and 46°53'18"N. lat. (Point Chehalis) and east of 125°44'00" W. long.

2. Overall quotas may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of final preseason catch and abundance expectations for Canadian and Alaskan Fisheries.

3. The quotas include troll catches by the S'Klallam and Makah tribes in Washington State Statistical Area 4B from May 1 through September 15. The Quileute Tribe will continue a ceremonial and subsistence fishery during the time frame of September 15 through October 15 in the same manner as in 2003; fish taken during this fishery are to be counted against treaty troll quotas established for the 2005 season (estimated harvest during the October ceremonial and subsistence fishery: 100 chinook; 200 coho):

4. The area within a 6 nautical mile radius of the mouths of the Queets River (47°31'42" N. lat.) and the Hoh River (47°45'12" N. lat.) will be closed to commercial fishing. A closure within 2 nautical miles of the mouth of the Quinault River (47°21'00" N. lat.) may be enacted by the Quinault Nation and/or the State of Washington and will not adversely affect the Secretary of Commerce's management regime.

TABLE 4. Tentative chinook and coho **harvest quotas and guidelines (*)** for ocean salmon fishery management measures analyzed by the STT, 2005. (Page 1 of 1)

Fishery or Quota Designation	Chinook	Coho
NORTH OF CAPE FALCON		
TREATY INDIAN COMMERCIAL TROLL[a/]	48,000	50,000[b/]
NON-INDIAN COMMERCIAL TROLL		
U.S./Canada Border to Cape Falcon (All Except Coho)	29,000	-
U.S./Canada Border to Cape Falcon (All Species)[c/]	14,250	23,200
Subtotal Non-Indian Commercial Troll	43,250	23,200
RECREATIONAL[c/]		
U.S./Canada Border to Cape Alava[c/]	4,300*	12,667
Cape Alava to Queets River[c/]	2,000*	3,167
Queets River to Leadbetter Point[c/]	28,750*	45,066
Leadbetter Point to Cape Falcon[c/]	8,200*	60,900
Subtotal Recreational[d/]	43,250	121,800
TOTAL NORTH OF CAPE FALCON	134,500	195,000
SOUTH OF CAPE FALCON		
COMMERCIAL TROLL (all except coho)		
Humbug Mt. to OR/CA border (June through September)	3,000	-
OR/CA Border to Humboldt S. Jetty (September)	6,000	-
Subtotal Troll	9,000	-
RECREATIONAL		
Cape Falcon to OR/CA Border[c/]	-	40,000
TOTAL SOUTH OF CAPE FALCON	9,000	40,000

a/ For the Makah encounter rate study, legal sized fish retained in open periods will be included in the tribal quota.

b/ If the treaty Indian troll catch taken from areas 4/4B is projected inseason to exceed 47,286 coho, the total treaty Indian troll quota will be adjusted to ensure the exploitation rate impact of the treaty Indian troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment.

c/ The coho quota is a landed catch of coho with a healed adipose fin clip, except that in the north of Cape Falcon commercial fishery and the Cape Alava to Queets River recreational fishery, there are provisions for a potential non-selective coho fishery in September. See Tables 1and 2 for details.

d/ Does not include Buoy 10 fishery (9,600 coho in August; 2,400 coho in September).

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for tentative ocean fishery regulations, 2005.[a/] (Page 1 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted	
		CHINOOK	
Elwha Summer/Fall	4.4%	≤10%	Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Dungeness Spring	4.8%	≤10%	Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Mid-Hood Canal Summer/Fall	12.3%	≤12%	Preterminal Southern U.S. CERC (NMFS ESA consultation standard)
Skokomish Summer/Fall	12.4%	≤15%	Preterminal Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Nooksack Spring	5.9%	≤7%	Southern U.S. CERC, not to exceed in four out of five years (NMFS ESA consultation standard)
Skagit Summer/Fall	42.5%	≤50%	Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Skagit Spring	29.5%	≤38%	Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Stillaguamish Summer/Fall	13.1%	≤15%	Southern U.S. CERC (NMFS ESA consultation standard)
Snohomish Summer/Fall	**15.9%**	≤15%	Southern U.S. CERC (NMFS ESA consultation standard)
Lake Washington Summer/Fall	10.0%	≤15%	Preterminal Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Green River Summer/Fall	10.0%	≤15%	Preterminal Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
White River Spring	**20.1%**	≤20%	Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Puyallup Summer/Fall	**56.7%**	≤50%	Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Nisqually River Summer/Fall	1.171	≥1.100	Spawning escapement goal (NMFS ESA consultation standard)
Columbia Upriver Brights	399.5	57.3	Minimum ocean escapement to attain 46.0 adults over McNary Dam, with normal distribution and no mainstem harvest.
Mid-Columbia Brights	101.4	16.6	Minimum ocean escapement to attain 5.75 adults for Bonneville Hatchery and 2.0 for Little White Salmon Hatchery egg-take, assuming average conversion and no mainstem harvest.
Columbia Lower River Hatchery Tules	78.4	31.1	Minimum ocean escapement to attain 14.1 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest.
Columbia Lower River Natural Tules (threatened)	44.2%	≤49.0%	ESA guidance met by a total adult equivalent fishery exploitation rate on Coweeman tules (NMFS ESA consultation standard).
Columbia Lower River Wild (threatened)	21.4	5.7	MSY spawner goal for North Lewis River fall chinook (NMFS ESA consultation standard).
Spring Creek Hatchery Tules	115.8	11.1	Minimum ocean escapement to attain 7.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest.
Snake River Fall (threatened) SRFI	69.8%	≤70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
Klamath River Fall	35.0	35.0	Minimum number of adult spawners to natural spawning areas.
Federally recognized tribal harvest	50%	50.0%	Equals 8.3 (thousand) adult fish for Yurok and Hoopa tribal fisheries.
Age 4 ocean harvest rate	7.7%	≤16.0%	NMFS ESA consultation standard for threatened California coastal chinook.
KMZ sport fishery share	17.1%	-	None specified for 2005.
CA:OR troll fishery share	50:50	51:49	2004 KFMC recommendation; **none specified for 2005.**
River recreational fishery allocation	15.0%	15.0%	2005 California Fish and Game Commission specification. Equals 1.2 (thousand) adult fish for recreational inriver fisheries.

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for tentative ocean fishery regulations, 2005.[a/] (Page 2 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted
		CHINOOK (continued)
Sacramento River Winter (endangered)	yes	Recreational season between Point Arena and Pigeon Point shall open no earlier than the first Saturday in April and close no later than the second Sunday in November; the recreational season between Pigeon Point and the U.S./Mexico Border shall open no earlier than the first Saturday in April and close no later than the first Sunday in October. The minimum size limit shall be at least 20 inches total length. Commercial seasons between Point Arena and the U.S./Mexico border shall open no earlier than May 1 and close no later than September 30, with the exception of an October season conducted Monday through Friday between Point Reyes and Point San Pedro, which shall end no later than October 15. The minimum size limit shall be at least 26 inches total length. (NMFS ESA consultation standard).
Sacramento River Fall	∞	122.0-180.0 Sacramento River fall natural and hatchery adult spawners.
		COHO
Interior Fraser (Thompson River)	9.8%(4.3%)	≤10.0% Total exploitation rate for all U.S. fisheries south of the U.S./Canada border based on 2002 PSC coho agreement.
Skagit	35%(3.8%) 48.4	≤35% 2004 total exploitation rate ceiling based on 2002 PSC coho agreement[c/] 30.0 MSP level of adult spawners Identified in FMP.
Stillaguamish	43%(5.3%) 41.8	≤50% 2004 total exploitation rate ceiling based on 2002 PSC coho agreement[c/] 17.0 MSP level of adult spawners Identified in FMP.
Snohomish	40%(5.3%) 178.3	≤60% 2004 total exploitation rate ceiling based on 2002 PSC coho agreement[c/] 70.0 MSP level of adult spawners Identified in FMP.
Hood Canal	35%(4.0%) 79.6	≤65% 2004 total exploitation rate ceiling based on 2002 PSC coho agreement[c/] 21.5 MSP level of adult spawners Identified in FMP.
Strait of Juan de Fuca	12%(4.0%) 18.6	≤40% 2004 total exploitation rate ceiling based on 2002 PSC coho agreement[c/] 12.8 MSP level of adult spawners Identified in FMP.
Quillayute Fall	16.1	6.3-15.8 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Hoh	6.4	2.0-5.0 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Queets Wild	14.1	5.8-14.5 MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Queets Supplemental	1.5	-

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for tentative ocean fishery regulations, 2005.[a/] (Page 3 of 3)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted	
COHO (continued)			
Grays Harbor	78.5	35.4	MSP level of adult spawners. Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Oregon Coastal Natural (threatened)	11.1%	≤15.0%	Marine and freshwater fishery exploitation rate.
Northern California (threatened)	5.5%	≤13.0%	Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).
COLUMBIA RIVER:			
Lower Columbia River Natural (Proposed threatened; Oregon state endangered)	10.0%	≤15.0%	Marine fishery exploitation rate (NMFS guidance).
Upper Columbia	68%	50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	166.7	38.7	Minimum ocean escapement to attain hatchery egg-take goal of 16.0 early adult coho, with average conversion and no mainstem or tributary fisheries.
Columbia River Hatchery Late	26.7	15.2	Minimum ocean escapement to attain hatchery egg-take goal of 9.7 late adult coho, with average conversion and no mainstem or tributary fisheries.

a/ Projections in the table assume a WCVI mortality for coho of the 2004 observed level; Southeast Alaska 2005 ceiling of 416,400 PST treaty chinook; North Coast BC 2005 ceiling of 246,600 chinook; WCVI troll ceiling of 188,200 chinook (includes chinook caught in the fall of 2004); the WCVI outside sport 2004 observed level.

b/ Ocean escapement is the number of salmon escaping ocean fisheries and entering freshwater with the following clarifications. Ocean escapement for Puget Sound stocks is the estimated number of salmon entering Area 4B that are available to U.S. net fisheries in Puget Sound and spawner escapement after impacts from the Canadian, U.S. ocean, and Puget Sound troll and recreational fisheries have been deducted. Numbers in parentheses represent Council area exploitation rates for Puget sound coho stocks. For Columbia River early and late coho stocks, ocean escapement represents the number of coho after the Buoy 10 fishery. Exploitation rates for OCN coho include impacts of freshwater fisheries.

c/ Annual management objectives may be different than FMP goals, and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders. Total exploitation rate includes Alaskan, Canadian, Council area, Puget Sound, and freshwater fisheries and is calculated as total fishing mortality divided by total fishing mortality plus spawning escapement. These total exploitation rates reflect the initial base package for inside fisheries developed by state and tribal comanagers. It is anticipated that total exploitation rates will be adjusted by state and tribal comanagers during the preseason planning process to comply with stock specific exploitation rate constraints.

Agenda Item C.6.b
Supplemental STT Report
April 2005

SALMON TECHNICAL TEAM

ANALYSIS OF TENTATIVE 2005 OCEAN SALMON FISHERY MANAGEMENT MEASURES

April 7, 2005

TABLE 1. **Non-Indian commercial troll** management measures analyzed by the STT for ocean salmon fisheries, 2005. (Page 1 of 4) *April 7, 2005 (3:00pm)*

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 86,500 chinook and 145,000 marked coho. Trade: None.
2. Non-Indian commercial troll TAC: 43,250 chinook and 23,200 marked coho.
3. Treaty Indian commercial ocean troll quotas of: 48,000 chinook (25,000 in May and June; 23,000 for all-salmon season July through Sept. 15 with no rollover allowed from chinook season); and 50,000 coho.

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U.S./Canada Border to Cape Falcon

- May 1 through earlier of June 30 or 29,000 chinook quota.

Open May 1-3 with a 75 chinook per vessel landing and possession limit for the three day open period; open May 6-9 with a 100 chinook per vessel landing and possession limit for the four day open period; beginning May 13, open Friday through Monday with a 125 chinook possession and landing limit for each of the subsequent four-day open periods. If insufficient quota remains to prosecute openings prior to the June 24-27 open period, the remaining quota will be provided for a June 26-30 open period with a per vessel landing and possession limit to be determined inseason. All salmon except coho (C.7). Cape Flattery and Columbia Control Zones closed (C.5). See gear restrictions and definitions (C.2, C.3). Vessels must land their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land their fish within the area north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. Oregon state regulations require all fishers landing salmon into Oregon from any fishery between Leadbetter Point, Washington and Cape Falcon, Oregon, must notify ODFW within one hour of delivery or prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, port of landing and location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

U.S./Canada Border to Cape Falcon

- July 7 through earlier of Sept. 15 or 14,250 preseason chinook guideline (C.8) or a 23,200 marked coho quota.

Open Thursday through Monday prior to August 3, and Wednesday through Sunday thereafter. Landing and possession limit of 75 chinook per vessel for the July 7-11 and July 14-18 open periods, and 100 chinook landing and possession limit for subsequent five-day open periods. Landing and possession limit of 75 coho per five day open period beginning August 10 in the area between Cape Falcon and Leadbetter Point. All salmon except no chum retention north of Cape Alava, Washington in August and September (C.7). All retained coho must have a healed adipose fin clip, **except an inseason conference call may occur to consider allowing retention of all legal sized coho no earlier than September 1** (C.8.d). Gear restricted to plugs 6 inches (15.2 cm) or longer (C.2, C.3), except no special gear restrictions beginning August 10 in the area between Cape Falcon and Leadbetter Point. Cape Flattery and Columbia Control Zones closed (C.5). Vessels must land their fish within 24 hours of any closure of this fishery. Under state law, vessels must report their catch on a state fish receiving ticket. Vessels fishing north of Leadbetter Point must land their fish within the area north of Leadbetter Point. Vessels fishing south of Leadbetter Point must land their fish within the area south of Leadbetter Point, except that Oregon permitted vessels may also land their fish in Garibaldi, Oregon. Oregon state regulations require all fishers landing salmon into Oregon from any fishery between Leadbetter Point, Washington and Cape Falcon, Oregon, must notify ODFW within one hour of delivery or prior to transport away from the port of landing by calling 541-867-0300 Ext. 271. Notification shall include vessel name and number, number of salmon by species, port of landing and location of delivery, and estimated time of delivery. Inseason actions may modify harvest guidelines in later fisheries to achieve or prevent exceeding the overall allowable troll harvest impacts (C.8).

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South of Cape Falcon

Supplemental Management Information:

1. Klamath River recreational fishery allocation:15%.

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Cape Falcon to Florence South Jetty (Newport)

- March 15-25; April 1-15; May 1-3; 8-10; 15-17; 22-24; 29-30; June 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All vessels fishing in the area must land their fish in the state of Oregon. See gear restrictions and definitions (C.2, C.3) and Oregon State regulations for a description of special regulations at the mouth of Tillamook Bay.

In 2006, the season will open March 15 for all salmon except coho, with a 27 inch chinook minimum size limit.

A. SEASON DESCRIPTION (Continued)

Florence South Jetty to Humbug Mt. (Coos Bay)

- March 15-25; April 1-15; May 1-30; September 1-23; October 1-31 (C.9).

All salmon except coho (C.7). Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length thereafter (B). All vessels fishing in the area must land their fish in the state of Oregon.

In 2006, the season will open March 15 under 2005 regulations.

Humbug Mt. to OR/CA Border (Oregon KMZ)

- March 15-25; April 1-15
- September 3-~~6, 9-12, 15-~~30, or a 3,000 chinook quota (C.9) by Curt Melcher

All salmon except coho. Chinook 27 inch total length minimum size limit through April 15, and 28 inches total length September 1 through 30. Possession and landing limit of 45 fish per day per vessel in September. See gear restrictions and definitions (C.2, C.3). Vessels must land their fish in Gold Beach, Port Orford, or Brookings, Oregon, and within 24 hours of closure. State regulations require fishers intending to transport and deliver their catch to other locations after first landing in one of these ports notify ODFW prior to transport away from the port of landing by calling 541-867-0300 Ext. 271, with vessel name and number, number of salmon by species, location of delivery, and estimated time of delivery.

In 2006, the season will open March 15 under 2005 regulations.

OR/CA Border to Humboldt South Jetty (California KMZ)

- September ~~4~~ 3 through earlier of September 30 or 6,000 chinook quota. – Eric

All salmon except coho. Chinook minimum size limit of 28 inches total length. Possession and landing limit of 30 fish per day per vessel. All fish caught in this area must be landed within the area. See compliance requirements (C.1) and gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed (C.5.). See California state regulations for additional closures adjacent to the Smith and Klamath rivers. When the fishery is closed between the OR-CA border and Humbug Mt. and open to the south, vessels with fish on board caught in the open area off California may seek temporary mooring in Brookings, Oregon, prior to landing in California only if such vessels first notify the Chetco River Coast Guard Station via VHF channel 22A between the hours of 0500 and 2200 and provide the vessel name, number of fish on board, and estimated time of arrival.

Horse Mt. to Point Arena (Fort Bragg)

- September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length. See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 under 2005 regulations. This opening could be modified following Council review at its March 2006 meeting.

Pt. Arena to Pigeon Pt. (San Francisco)

- July 4 through August 29; September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length in September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

Pt. Reyes to Pt. San Pedro (Fall Area Target Zone)

- October 3-14.

Open Monday through Friday. All salmon except coho. Chinook minimum size limit ~~27~~ 26 inches total length. See gear restrictions and definitions (C.2, C.3). Eric

Pigeon Point to Pt. Sur (Monterey)

- May 1-31; July 4 through August 29; September 1-30.

All salmon except coho. Chinook minimum size limit 27 inches total length in May and September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

Pt. Sur to U.S./Mexican Border (Monterey)

- May 1 through September 30.

All salmon except coho. Chinook minimum size limit 27 inches total length in May, June, and September; 28 inches in July and August. See gear restrictions and definitions (C.2, C.3).

TABLE 1. **Non-Indian commercial troll** management measures analyzed by the STT for ocean salmon fisheries, 2005. (Page 3 of 4) *April 7, 2005 (11:37am)*

B. MINIMUM SIZE (Inches) (See C.1)

Area (when open)	Chinook Total	Chinook Head-off	Coho Total	Coho Head-off	Pink
North of Cape Falcon	28.0	21.5	16.0	12.0	None
Cape Falcon to OR/CA Border					
Prior to April 16, 2005 and beginning March 15, 2006	27.0	20.5	-	-	None
May 1 to October 31,	28.0	21.5	-	-	None
OR/CA Border to Horse Mt.	28.0	21.5	-	-	None
Horse Mt. To Pt. Arena	27.0	20.5	-	-	None
Pt. Arena to U.S./Mexico Border					
Prior to July 1and after August 31	27.0	20.5	-	-	None
July 1-August 31	28.0	21.5	-	-	None

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size or Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

C.2. Gear Restrictions:

a. Single point, single shank, barbless hooks are required in all fisheries.

b. *Cape Falcon, Oregon to the OR/CA border*: No more than 4 spreads are allowed per line.

c. *OR/CA border to U.S./Mexico border*: No more than 6 lines are allowed per vessel, and barbless circle hooks are required when fishing with bait by any means other than trolling.

C.3. Gear Definitions:

a. *Trolling defined*: Fishing from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

b. *Troll fishing gear defined*: One or more lines that drag hooks behind a moving fishing vessel. In that portion of the fishery management area (FMA) off Oregon and Washington, the line or lines must be affixed to the vessel and must not be intentionally disengaged from the vessel at any time during the fishing operation.

c. *Spread defined*: A single leader connected to an individual lure or bait.

d. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Transit Through Closed Areas with Salmon on Board: It is unlawful for a vessel to have troll or recreational gear in the water while transiting any area closed to fishing for a certain species of salmon, while possessing that species of salmon; however, fishing for species other than salmon is not prohibited if the area is open for such species, and no salmon are in possession.

C.5. Control Zone Definitions:

a. *Cape Flattery Control Zone* - The area from Cape Flattery (48°23'00" N. lat.) to the northern boundary of the U.S. EEZ; and the area from Cape Flattery south to 48°10'00" N. lat. and east of 125°05'00" W. long.

b. *Columbia Control Zone* - An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat.,124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long.), and then along the north jetty to the point of intersection with the Buoy #10 line; and, on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

c. *Klamath Control Zone* - The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and on the south, by 41°26'48" N. lat. (approximately six nautical miles south of the Klamath River mouth).

C.6. Notification When Unsafe Conditions Prevent Compliance with Regulations: If prevented by unsafe weather conditions or mechanical problems from meeting special management area landing restrictions, vessels must notify the U.S. Coast Guard and receive acknowledgment of such notification prior to leaving the area. This notification shall include the name of the vessel, port where delivery will be made, approximate amount of salmon (by species) on board, and the estimated time of arrival.

C.7. Incidental Halibut Harvest: During authorized periods, the operator of a vessel that has been issued an incidental halibut harvest license may retain Pacific halibut caught incidentally in Area 2A while trolling for salmon. Halibut retained must be no less than 32 inches in total length, measured from the tip of the lower jaw with the mouth closed to the extreme end of the middle of the tail, and must be landed with the head on. License applications for incidental harvest must be obtained from the International Pacific Halibut Commission (phone: 206-634-1838). Applicants must apply prior to April 1 of each year. Incidental harvest is authorized only during May and June troll seasons and after June 30 if quota remains and if announced on the NMFS hotline (phone: 800-662-9825). ODFW and Washington Department of Fish and Wildlife (WDFW) will monitor landings. If the landings are projected to exceed the 44,554 pound preseason allocation or the total Area 2A non-Indian commercial halibut allocation, NMFS will take inseason action to close the incidental halibut fishery.

Beginning May 1, license holders may land no more than one Pacific halibut per each three chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 halibut may be landed per trip. Pacific halibut retained must be no less than 32 inches in total length (with head on).

A "C-shaped" yelloweye rockfish conservation area is an area to be avoided for salmon trolling. NMFS and the Council request salmon trollers voluntarily avoid this area in order to protect yelloweye rockfish. The area is defined in the Pacific Council Halibut Catch Sharing Plan in the North Coast subarea (Washington marine area 3), with the following coordinates in the order listed:

48°18' N. lat.; 125°18' W. long.;
48°18' N. lat.; 124°59' W. long.;
48°11' N. lat.; 124°59' W. long.;
48°11' N. lat.; 125°11' W. long.;
48°04' N. lat.; 125°11' W. long.;
48°04' N. lat.; 124°59' W. long.;
48°00' N. lat.; 124°59' W. long.;
48°00' N. lat.; 125°18' W. long.;
and connecting back to 48°18' N. lat.; 125°18' W. long.

C.8. Inseason Management: In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Chinook remaining from the May through June non-Indian commercial troll harvest guideline north of Cape Falcon may be transferred to the July through September harvest guideline on a fishery impact equivalent basis.

b. NMFS may transfer fish between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

c. At the March 2006 meeting, the Council will consider inseason recommendations for special regulations for any experimental fisheries (proposals must meet Council protocol and be received in November 2005).

d. If retention of unmarked coho is permitted in the area from the U.S./Canada border to Cape Falcon, Oregon, by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

C.9. Consistent with Council management objectives, the State of Oregon may establish additional late-season, chinook-only fisheries in state waters. Check state regulations for details.

C.10. For the purposes of California Department of Fish and Game (CDFG) Code, Section 8232.5, the definition of the KMZ for the ocean salmon season shall be that area from Humbug Mt., Oregon, to Horse Mt., California.

TABLE 2. **Recreational** management measures analyzed by the STT for ocean salmon fisheries, 2005. (Page 1 of 4) *April 7, 2005 (3:03pm)*

A. SEASON DESCRIPTION

North of Cape Falcon

Supplementary Management Information:

1. Overall non-Indian TAC: 86,500 chinook and 145,000 marked coho.
   Trade: None.
2. Recreational TAC: 43,250 chinook and 121,800 marked coho.
3. No Area 4B add-on fishery.
4. Buoy 10 fishery opens Aug. 1 with an expected landed catch of marked 9,600 coho in August and 2,400 marked coho in September.
5. All retained coho must have a healed adipose fin clip.

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U.S./Canada Border to Cape Alava (Neah Bay Area)

- July 1 through earlier of Sept. 18 or 12,667 marked coho subarea quota with a subarea guideline of 4,300 chinook.

Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, except no chum retention August 1 through Sept. 18, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Beginning August 1, chinook non-retention east of the Bonilla-Tatoosh line (C.4.d) during Council managed ocean fishery. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Cape Alava to Queets River (La Push Area)

- July 1 through earlier of September 18 or 3,067 marked coho subarea quota with a subarea guideline of 1,900 chinook. Tuesday through Saturday, except: there may be a conference call no later than July 27 to consider opening seven days per week.
- Sep. 24 through Oct. 9 or 100 marked coho quota or 100 chinook quota: In the area north of 47°50'00 N. Lat. and south of 48°00'00" N. Lat. (C.5). Seven days per week.

All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin, **except inseason action may occur to consider allowing retention of all legal sized coho beginning September 24** (C.5.d). See gear restrictions (C.2). Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Queets River to Leadbetter Point (Westport Area)

- June 26 through earlier of Sept. 18 or 45,066 marked coho subarea quota with a subarea guideline of 28,750 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, two fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions and definitions (C.2, C.3). Grays Harbor Control Zone closed (C.4.b) Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

Leadbetter Point to Cape Falcon (Columbia River Area)

- July 3 through earlier of Sept. 30 or 60,900 marked coho subarea quota with a subarea guideline of 8,200 chinook.

Sunday through Thursday, except: there may be a conference call no later than July 27 to consider opening seven days per week. All salmon, 2 fish per day, no more than one of which may be a chinook (chinook 24-inch total length minimum size limit) (B). All retained coho must have a healed adipose fin clip. See gear restrictions (C.2). Columbia Control Zone closed (C.4.a). Closed between Cape Falcon and Tillamook Head beginning Aug.1. Inseason management may be used to sustain season length and keep harvest within the overall chinook recreational TAC for north of Cape Falcon (C.4).

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C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

South of Cape Falcon

Supplemental Management Information:

1. Klamath River recreational fishery allocation:15%.

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Cape Falcon to Humbug Mt.

- Except as provided below during the selective fishery, the season will be March 15 through October 31 (C.6).

All salmon except coho. Two fish per day (C.1). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open March 15 for all salmon except coho. Two fish per day (C.1). Same gear restrictions as in 2005.

Selective fishery: **Cape Falcon to OR/CA Border**

- June 18 through earlier of July 31 or a landed catch of 40,000 marked coho, except that the area south of Humbug Mt. will close July 5-31, concurrent with the KMZ season listed below.

Open seven days per week, all salmon, two fish per day (C.1). All retained coho must have a healed adipose fin clip. Fishing in the Stonewall Bank groundfish conservation area restricted to trolling only on days the all depth recreational halibut fishery is open (**see F.R. 50..., and call the halibut fishing hotline 1-800- ...for additional dates**)(C.3, C.4.e). Open days may be adjusted inseason to utilize the available quota (C.5). All salmon except coho seasons reopen the earlier of August 1 or attainment of the coho quota.

Humbug Mt. to Horse Mt. (Klamath Management Zone)

- Except as provided above during the selective fishery, the season will be May 21 through July 4; and August 14 through September 11 (C.6).

All salmon except coho, except as noted above in the coho selective fishery, chinook minimum size limit 24 inches total length. Seven days per week, two fish per day (C.1). See gear restrictions and definitions (C.2, C.3). Klamath Control Zone closed in August (C.4.c). See California state regulations for additional closures adjacent to the Smith, Klamath, and Eel rivers.

Horse Mt. to Point Arena (Fort Bragg)

- February 12 through July 10; July 16-17; July 23 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, season opens February 18 (nearest Saturday to February 15) for all salmon except coho. Two fish per day (C.1), chinook minimum size limit 20 inches total length and the same gear restrictions as in 2005.

Point Arena to Pigeon Point (San Francisco)

- April 2 through November 13.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), 20-inch total length minimum size limit and the same gear restrictions as in 2005.

Pigeon Point to U.S./Mexico Border (Monterey)

- April 2 through September 25.

All salmon except coho. Two fish per day (C.1). Chinook minimum size limit 20 inches total length (B). See gear restrictions and definitions (C.2, C.3).

In 2006, the season will open April 1 for all salmon except coho. Two fish per day (C.1), chinook 20-inch total length minimum size limit and the same gear restrictions as in 2005.

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B. MINIMUM SIZE (Total Length in Inches) (See C.1)

Area (when open)	Chinook	Coho	Pink
North of Cape Falcon	24.0	16.0	None
Cape Falcon to Humbug Mt.	20.0	16.0	None
Humbug Mt. to Horse Mountain	24.0	-	None, except 20.0 off CA
Horse Mt. to U.S./Mexico Border: Beginning	20.0	-	20.0

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

C.1. Compliance with Minimum Size and Other Special Restrictions: All salmon on board a vessel must meet the minimum size or other special requirements for the area being fished and the area in which they are landed if that area is open. Salmon may be landed in an area that is closed only if they meet the minimum size or other special requirements for the area in which they were caught.

Ocean Boat Limits: Off the coast of Washington, Oregon, and California, each fisher aboard a vessel may continue to use angling gear until the combined daily limits of salmon for all licensed and juvenile anglers aboard has been attained (additional state restrictions may apply).

C.2. Gear Restrictions: All persons fishing for salmon, and all persons fishing from a boat with salmon on board, must meet the gear restrictions listed below for specific areas or seasons.

a. *U.S./Canada Border to Point Conception, California*: No more than one rod may be used per angler; and single point, single shank, barbless hooks are required for all fishing gear. [Note: ODFW regulations in the state-water fishery off Tillamook Bay may allow the use of barbed hooks to be consistent with inside regulations.]

b. *Cape Falcon, Oregon to Point Conception, California*: Anglers must use no more than two single point, single shank, barbless hooks.

c. *Horse Mt., California to Point Conception, California*: Single point, single shank, barbless circle hooks (below) must be used if angling with bait by any means other than trolling, and no more than two such hooks shall be used. When angling with two hooks, the distance between the hooks must not exceed five inches when measured from the top of the eye of the top hook to the inner base of the curve of the lower hook, and both hooks must be permanently tied in place (hard tied). Circle hooks are not required when artificial lures are used without bait.

C.3. Gear Definitions:

a. *Recreational fishing gear defined*: Angling tackle consisting of a line with no more than one artificial lure or natural bait attached. Off Oregon and Washington, the line must be attached to a rod and reel held by hand or closely attended; the rod and reel must be held by hand while playing a hooked fish. No person may use more than one rod and line while fishing off Oregon or Washington. Off California, the line must be attached to a rod and reel held by hand or closely attended. Weights directly attached to a line may not exceed four pounds (1.8 kg). While fishing off California north of Point Conception, no person fishing for salmon, and no person fishing from a boat with salmon on board, may use more than one rod and line. Fishing includes any activity which can reasonably be expected to result in the catching, taking, or harvesting of fish.

b. *Trolling defined*: Angling from a boat or floating device that is making way by means of a source of power, other than drifting by means of the prevailing water current or weather conditions.

c. *Circle hook defined*: A hook with a generally circular shape and a point which turns inward, pointing directly to the shank at a 90° angle.

C.4. Control Zone Definitions:

a. *Columbia Control Zone*: An area at the Columbia River mouth, bounded on the west by a line running northeast/southwest between the red lighted Buoy #4 (46°13'35" N. lat., 124°06'50" W. long.) and the green lighted Buoy #7 (46°15'09' N. lat., 124°06'16" W. long.); on the east, by the Buoy #10 line which bears north/south at 357° true from the south jetty at 46°14'00" N. lat., 124°03'07" W. long. to its intersection with the north jetty; on the north, by a line running northeast/southwest between the green lighted Buoy #7 to the tip of the north jetty (46°14'48" N. lat., 124°05'20" W. long. and then along the north jetty to the point of intersection with the Buoy #10 line; and on the south, by a line running northeast/southwest between the red lighted Buoy #4 and tip of the south jetty (46°14'03" N. lat., 124°04'05" W. long.), and then along the south jetty to the point of intersection with the Buoy #10 line.

b. *Grays Harbor Control Zone* - The area defined by a line drawn from the Westport Lighthouse (46° 53'18" N. lat., 124° 07'01" W. long.) to Buoy #2 (46° 52'42" N. lat., 124°12'42" W. long.) to Buoy #3 (46° 55'00" N. lat., 124°14'48" W. long.) to the Grays Harbor north jetty (46° 36'00" N. lat., 124°10'51" W. long.).

c. *Klamath Control Zone*: The ocean area at the Klamath River mouth bounded on the north by 41°38'48" N. lat. (approximately six nautical miles north of the Klamath River mouth); on the west, by 124°23'00" W. long. (approximately 12 nautical miles off shore); and, on the south, by 41°26'48" N. lat. (approximately 6 nautical miles south of the Klamath River mouth).

d. *The Bonilla-Tatoosh Line*: A line running from the western end of Cape Flattery to Tatoosh Island Lighthouse (48°23'30" N. lat., 124°44'12" W. long.) to the buoy adjacent to Duntze Rock (48°28'00" N. lat., 124°45'00" W. long.), then in a straight line to Bonilla Point (48°35'30" N. lat., 124°43'00" W. long.) on Vancouver Island, British Columbia.

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS (Continued)

e. *Stonewall Bank Groundfish Conservation Area*: The area defined by the following coordinates in the order listed:
44° 37.46 N. lat.; 124° 24.92 W. long.;
44° 37.46 N. lat.; 124° 23.63 W. long.;
44° 28.71 N. lat.; 124° 21.80 W. long.;
44° 28.71 N. lat.; 124° 24.10 W. long.;
44° 31.42 N. lat.; 124° 25.47 W. long.;
and connecting back to 44° 37.46 N. lat.; 124° 24.92 W. long.

C.5. Inseason Management: Regulatory modifications may become necessary inseason to meet preseason management objectives such as quotas, harvest guidelines, and season duration. In addition to standard inseason actions or modifications already noted under the season description, the following inseason guidance is provided to NMFS:

a. Actions could include modifications to bag limits, or days open to fishing, and extensions or reductions in areas open to fishing.

b. Coho may be transferred inseason among recreational subareas north of Cape Falcon to help meet the recreational season duration objectives (for each subarea) after conferring with representatives of the affected ports and the SAS recreational representatives north of Cape Falcon.

c. Chinook and coho may be transferred between the recreational and commercial fisheries north of Cape Falcon if there is agreement among the representatives of the SAS.

d. If retention of unmarked coho is permitted in the area from the Capa Alava to Queets River by inseason action, the allowable coho quota will be adjusted to ensure preseason projected mortality of critical stocks is not exceeded.

C.6. Additional Seasons in State Territorial Waters: Consistent with Council management objectives, the States of Washington and Oregon may establish limited seasons in state waters. Oregon State-water fisheries are limited to chinook salmon. Check state regulations for details.

TABLE 3. **Treaty Indian** ocean troll salmon fishery management measures analyzed by the STT, 2005. (Page 1 of 1)
April 7, 2005 (11:41am)

A. SEASON OPTION DESCRIPTIONS

1. Treaty Indian Troll TAC; 48,000 chinook and 50,000 coho
2. May-June: chinook only; 25,000 chinook quota. If the chinook quota for the May/June fishery is not fully utilized, the excess fish cannot be transferred into the later all-salmon season. If the chinook quota is exceeded, the excess will be deducted from the later all-salmon season.
3. July 1-Sept 15. All-salmon; chinook quota 23,000; coho quota: 50,000.
4. If the treaty Indian troll catch taken from Areas 4-4B is projected inseason to exceed 47,286 coho, the total treaty Indian troll quota will be adjusted to ensure that the exploitation rate impact of the treaty Indian troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment.

B. MINIMUM SIZE (Inches)

	Chinook		Coho		
Area (when open)	Total	Head-off	Total	Head-off	Pink
North of Cape Falcon	24.0	18.0	16.0	12.0	None

C. REQUIREMENTS, DEFINITIONS, RESTRICTIONS, OR EXCEPTIONS

1. Tribe and Area Boundaries. All boundaries may be changed to include such other areas as may hereafter be authorized by a Federal court for that tribe's treaty fishery.

<u>S'KLALLAM</u> - Washington State Statistical Area 4B (All)

<u>MAKAH</u> - Washington State Statistical Area 4B and that portion of the FMA north of 48°02'15" N. lat. (Norwegian Memorial) and east of 125°44'00" W. long.

<u>QUILEUTE</u> - That portion of the FMA between 48°07'36" N. lat. (Sand Pt.) and 47°31'42" N. lat. (Queets River) and east of 125°44'00" W. long.

<u>HOH</u> - That portion of the FMA between 47°54'18" N. lat. (Quillayute River) and 47°21'00" N. lat. (Quinault River) and east of 125°44'00" W. long.

<u>QUINAULT</u> - That portion of the FMA between 47°40'06" N. lat. (Destruction Island) and 46°53'18"N. lat. (Point Chehalis) and east of 125°44'00" W. long.

delete

2. ~~Overall quotas may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, or upon conclusion of negotiations in the North of Falcon forum, or receipt of final preseason catch and abundance expectations for Canadian and Alaskan Fisheries.~~

3. The quotas include troll catches by the S'Klallam and Makah tribes in Washington State Statistical Area 4B from May 1 through September 15. The Quileute Tribe will continue a ceremonial and subsistence fishery during the time frame of September 15 through October 15 in the same manner as in 2003; fish taken during this fishery are to be counted against treaty troll quotas established for the 2005 season (estimated harvest during the October ceremonial and subsistence fishery: 100 chinook; 200 coho):

4. The area within a 6 nautical mile radius of the mouths of the Queets River (47°31'42" N. lat.) and the Hoh River (47°45'12" N. lat.) will be closed to commercial fishing. A closure within 2 nautical miles of the mouth of the Quinault River (47°21'00" N. lat.) may be enacted by the Quinault Nation and/or the State of Washington and will not adversely affect the Secretary of Commerce's management regime.

part of motion #20

TABLE 4. Chinook and coho **harvest quotas and guidelines** (*) for ocean salmon fishery management measures analyzed by the STT, 2005. (Page 1 of 1)

Fishery or Quota Designation	Chinook	Coho
NORTH OF CAPE FALCON		
TREATY INDIAN COMMERCIAL TROLL[a/]	48,000	50,000[b/]
NON-INDIAN COMMERCIAL TROLL		
U.S./Canada Border to Cape Falcon (All Except Coho)	29,000	-
U.S./Canada Border to Cape Falcon (All Species)[c/]	14,250	23,200
Subtotal Non-Indian Commercial Troll	43,250	23,200
RECREATIONAL[c/]		
U.S./Canada Border to Cape Alava[c/]	4,300*	12,667
Cape Alava to Queets River[c/]	2,000*	3,167
Queets River to Leadbetter Point[c/]	28,750*	45,066
Leadbetter Point to Cape Falcon[c/]	8,200*	60,900
Subtotal Recreational[d/]	43,250	121,800
TOTAL NORTH OF CAPE FALCON	134,500	195,000
SOUTH OF CAPE FALCON		
COMMERCIAL TROLL (all except coho)		
Humbug Mt. to OR/CA border (June through September)	3,000	-
OR/CA Border to Humboldt S. Jetty (September)	6,000	-
Subtotal Troll	9,000	-
RECREATIONAL		
Cape Falcon to OR/CA Border[c/]	-	40,000
TOTAL SOUTH OF CAPE FALCON	9,000	40,000

a/ For the Makah encounter rate study, legal sized fish retained in open periods will be included in the tribal quota.

b/ If the treaty Indian troll catch taken from areas 4/4B is projected inseason to exceed 47,286 coho, the total treaty Indian troll quota will be adjusted to ensure the exploitation rate impact of the treaty Indian troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment.

c/ The coho quota is a landed catch of coho with a healed adipose fin clip, except that in the north of Cape Falcon commercial fishery and the Cape Alava to Queets River recreational fishery, there are provisions for a potential non-selective coho fishery in September. See Tables 1and 2 for details.

d/ Does not include Buoy 10 fishery (9,600 coho in August; 2,400 coho in September).

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for ocean fishery regulations, 2005.[a/] (Page 1 of 4)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted
CHINOOK		
PUGET SOUND:		
Elwha Summer/Fall	4.3%	≤10% Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Dungeness Spring	4.7%	≤10% Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Mid-Hood Canal Summer/Fall	12.0%	≤12% Preterminal Southern U.S. CERC (NMFS ESA consultation standard)
Skokomish Summer/Fall	12.1% 1.204	≤15% Preterminal Southern U.S. Rebuilding Exploitation Rate and 1.200 Natural spawning escapement (NMFS ESA consultation standard)
Nooksack Spring	5.8% NA	≤7% Southern U.S. CERC, not to exceed in four out of five years (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Skagit Summer/Fall	39.6% 24.8%	≤50% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Skagit Spring	29.1% 31.2%	≤38% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Stillaguamish Summer/Fall	12.1% 29.9%	≤15% Southern U.S. CERC (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Snohomish Summer/Fall	14.4% 26.0%	≤15% Southern U.S. CERC (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Lake Washington Summer/Fall	9.8% NA	≤15% Preterminal Southern U.S. Rebuilding Exploitation Rate (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
Green River Summer/Fall	9.8% 7.006 34.7%	≤15% Preterminal Southern U.S. Rebuilding Exploitation Rate and 5.800 Natural spawning escapement (NMFS ESA consultation standard) ≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective.
White River Spring	19.9%	≤20% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Puyallup Summer/Fall	49.4%	≤50% Total Rebuilding Exploitation Rate (NMFS ESA consultation standard)
Nisqually River Summer/Fall	1.173	≥1.100 Spawning escapement goal (NMFS ESA consultation standard)
WASHINGTON COAST:		
Hoko Fall	92.7%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Quillayute Fall	123.1%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Hoh Fall	159.9%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Queets Fall	109.6%	≤60.0% ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Grays Harbor Fall	28.7%	≤60.0% ISBM Index (PSC general obligation) for stocks not meeting escapement objective

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for ocean fishery regulations, 2005.[a/] (Page 2 of 4)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted	
		CHINOOK (continued)	
COLUMBIA RIVER:			
Columbia Upriver Summers	74.3%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Columbia Upriver Brights	399.5	57.3	Minimum ocean escapement to attain 46.0 adults over McNary Dam, with normal distribution and no mainstem harvest.
	81.0%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Deschutes River Falls	55.8%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Mid-Columbia Brights	101.4	16.6	Minimum ocean escapement to attain 5.75 adults for Bonneville Hatchery and 2.0 for Little White Salmon Hatchery egg-take, assuming average conversion and no mainstem harvest.
Columbia Lower River Hatchery Tules	78.4	31.1	Minimum ocean escapement to attain 14.1 adults for hatchery egg-take, with average conversion and no lower river mainstem or tributary harvest.
Columbia Lower River Natural Tules (threatened)	44.1%	≤49.0%	ESA guidance met by a total adult equivalent fishery exploitation rate on Coweeman tules (NMFS ESA consultation standard).
Columbia Lower River Wild (threatened)	21.4	5.7	MSY spawner goal for North Lewis River fall chinook (NMFS ESA consultation standard).
	124.0%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Spring Creek Hatchery Tules	115.8	11.1	Minimum ocean escapement to attain 7.0 adults for Spring Creek Hatchery egg-take, assuming average conversion and no mainstem harvest.
Snake River Fall (threatened) SRFI	69.8%	≤70.0%	Of 1988-1993 base period exploitation rate for all ocean fisheries (NMFS ESA consultation standard).
OREGON COAST:			
Nehalem Fall	226.6%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Siletz Fall	127.9%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Siuslaw Fall	274.7%	≤60.0%	ISBM Index (PSC general obligation) not applicable for 2005 because escapement objective met.
Klamath River Fall	35.0	35.0	Minimum number of adult spawners to natural spawning areas.
Federally recognized tribal harvest	50%	50.0%	Equals 8.3 (thousand) adult fish for Yurok and Hoopa tribal fisheries.
Age 4 ocean harvest rate	7.7%	≤16.0%	NMFS ESA consultation standard for threatened California coastal chinook.
KMZ sport fishery share	17.1%	17.0%	2005 KFMC recommendation.
CA:OR troll fishery share	50:50	50:50	2005 Council guidance.
River recreational fishery allocation	15.0%	15.0%	2005 California Fish and Game Commission specification. Equals 1.2 (thousand) adult fish for recreational inriver fisheries.

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for ocean fishery regulations, 2005.[a] (Page 3 of 4)

Key Stock/Criteria	Projected Ocean Escapement[b] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted	
		CHINOOK (continued)	
SACRAMENTO VALLEY:			
Sacramento River Winter (endangered)	yes	Recreational season between Point Arena and Pigeon Point shall open no earlier than the first Saturday in April and close no later than the second Sunday in November; the recreational season between Pigeon Point and the U.S./Mexico Border shall open no earlier than the first Saturday in April and close no later than the first Sunday in October. The minimum size limit shall be at least 20 inches total length. Commercial seasons between Point Arena and the U.S./Mexico border shall open no earlier than May 1 and close no later than September 30, with the exception of an October season conducted Monday through Friday between Point Reyes and Point San Pedro, which shall end no later than October 15. The minimum size limit shall be at least 26 inches total length. (NMFS ESA consultation standard).	
Sacramento River Fall	983.6	122.0-180.0	Sacramento River fall natural and hatchery adult spawners.
		COHO	
PUGET SOUND:			
Interior Fraser (Thompson River)	9.8%(4.3%)	≤10.0%	Total exploitation rate for all U.S. fisheries south of the U.S./Canada border based on 2002 PSC coho agreement.
Skagit	35%(3.8%) 48.4	≤35% 30.0	2005 total exploitation rate ceiling based on 2002 PSC coho agreement[c] MSP level of adult spawners Identified in FMP.
Stillaguamish	43%(5.3%) 41.8	≤50% 17.0	2005 total exploitation rate ceiling based on 2002 PSC coho agreement[c] MSP level of adult spawners Identified in FMP.
Snohomish	40%(5.3%) 178.3	≤60% 70.0	2005 total exploitation rate ceiling based on 2002 PSC coho agreement[c] MSP level of adult spawners Identified in FMP.
Hood Canal	35%(4.0%) 79.6	≤65% 21.5	2005 total exploitation rate ceiling based on 2002 PSC coho agreement[c] MSP level of adult spawners Identified in FMP.
Strait of Juan de Fuca	12%(4.0%) 18.6	≤40% 12.8	2005 total exploitation rate ceiling based on 2002 PSC coho agreement[c] MSP level of adult spawners Identified in FMP.
COASTAL:			
Quillayute Fall	16.1	6.3-15.8	MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Hoh	6.4	2.0-5.0	MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Queets Wild	14.1	5.8-14.5	MSY adult spawner range (not annual target). Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.
Queets Supplemental	1.5	-	
Grays Harbor	78.5	35.4	MSP level of adult spawners. Annual management objectives may be different and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders.

TABLE 5. Projected **key stock escapements** (thousands of fish) or management criteria analyzed by the STT for ocean fishery regulations, 2005.[a/] (Page 4 of 4)

Key Stock/Criteria	Projected Ocean Escapement[b/] or Other Criteria (Council Area Fisheries)	Spawner Objective or Other Comparative Standard as Noted	
		COHO (continued)	
Oregon Coastal Natural (threatened)	11.1%	≤15.0%	Marine and freshwater fishery exploitation rate.
Northern California (threatened)	5.5%	≤13.0%	Marine fishery exploitation rate for R/K hatchery coho (NMFS ESA consultation standard).
COLUMBIA RIVER:			
Lower Columbia River Natural (Proposed threatened; Oregon state endangered)	10.0%	≤15.0%	Marine fishery exploitation rate (NMFS guidance).
Upper Columbia	68%	50%	Minimum percentage of the run to Bonneville Dam.
Columbia River Hatchery Early	166.7	38.7	Minimum ocean escapement to attain hatchery egg-take goal of 16.0 early adult coho, with average conversion and no mainstem or tributary fisheries.
Columbia River Hatchery Late	26.7	15.2	Minimum ocean escapement to attain hatchery egg-take goal of 9.7 late adult coho, with average conversion and no mainstem or tributary fisheries.

a/ Projections in the table assume a WCVI mortality for coho of the 2004 observed level; Southeast Alaska 2005 ceiling of 416,400 PST treaty chinook; North Coast BC 2005 ceiling of 246,600 chinook; WCVI troll ceiling of 188,200 chinook (includes chinook caught in the fall of 2004); the WCVI outside sport 2004 observed level.

b/ Ocean escapement is the number of salmon escaping ocean fisheries and entering freshwater with the following clarifications. Ocean escapement for Puget Sound stocks is the estimated number of salmon entering Area 4B that are available to U.S. net fisheries in Puget Sound and spawner escapement after impacts from the Canadian, U.S. ocean, and Puget Sound troll and recreational fisheries have been deducted. Numbers in parentheses represent Council area exploitation rates for Puget sound coho stocks. For Columbia River early and late coho stocks, ocean escapement represents the number of coho after the Buoy 10 fishery. Exploitation rates for OCN coho include impacts of freshwater fisheries.

c/ Annual management objectives may be different than FMP goals, and are subject to agreement between WDFW and the treaty tribes under U.S. District Court orders. Total exploitation rate includes Alaskan, Canadian, Council area, Puget Sound, and freshwater fisheries and is calculated as total fishing mortality divided by total fishing mortality plus spawning escapement. These total exploitation rates reflect the initial base package for inside fisheries developed by state and tribal comanagers. It is anticipated that total exploitation rates will be adjusted by state and tribal comanagers during the preseason planning process to comply with stock specific exploitation rate constraints.

TABLE 6. Projections of chinook and coho **harvest impacts** for Council adopted ocean salmon fishery management measures, 2005. (Page 1 of 1)

Area and Fishery	2005 Catch Projection	2005 Bycatch Mortality[a/] Projection	2005 Bycatch Projection[b/]	Observed in 2004 Catch	Observed in 2004 Bycatch Mortality
OCEAN FISHERIES:[c/]		**CHINOOK (thousands of fish)**			
NORTH OF CAPE FALCON					
Treaty Indian Commercial Troll	48.0	7.6	17.0	49.2	8.1
Non-Indian Commercial Troll	43.3	13.1	35.9	40.4	11.3
Recreational	43.3	5.6	18.2	26.6	5.3
CAPE FALCON TO HUMBUG MT.					
Commercial Troll	144.5	15.9	36.6	240.0	26.4
Recreational	17.1	1.5	4.6	47.4	4.3
HUMBUG MT. TO HORSE MT.					
Commercial Troll	9.7	1.5	3.8	39.9	6.0[d/]
Recreational	21.0	2.9	11.5	29.6	4.1[d/]
SOUTH OF HORSE MT.					
Commercial	342.2	51.3	133.0	469.3	70.4[d/]
Recreational	242.0	33.9	100.2	197.4	27.6[d/]
TOTAL OCEAN FISHERIES					
Commercial Troll	587.7	89.4	226.3	838.8	122.2
Recreational	323.4	43.9	134.5	301.0	41.3
INSIDE FISHERIES:					
Buoy 10	NA	NA	NA	16.2	NA
		COHO (thousands of fish)			
NORTH OF CAPE FALCON					
Treaty Indian Commercial Troll	50.0	4.1	13.1	61.7	4.2
Non-Indian Commercial Troll	23.2	14.2	45.9	22.1	9.4
Recreational	121.8	29.3	154.3	135.1	28.7
SOUTH OF CAPE FALCON					
Commercial Troll	-	4.3	13.7	-	13.9
Recreational	40.0	17.3	91.0	50.7	16.7
TOTAL OCEAN FISHERIES					
Commercial Troll	73.2	22.6	72.7	83.9	27.5
Recreational	161.8	46.6	245.3	185.9	45.4
INSIDE FISHERIES:					
Area 4B	-	-	-	-	-
Buoy 10	12.0	2.8	14.6	15.3	3.4

a/ The bycatch mortality reported in this table consists of drop-off mortality (includes predation on hooked fish) plus hook-and-release mortality (HRM) of chinook and coho salmon in Council-area fisheries. Drop-off mortality for both chinook and coho is assumed to be equal to 5% of total encounters. The HRM rates used for both chinook and coho are:

Commercial:	26%.
Recreational, north of Point Arena:	14%.
Recreational, south of Point Arena:	23% (based on the expected proportion of fish that will be caught using mooching versus trolling gear, and the HRMs of 42.2% and 14% for these two respective gear types).

b/ Bycatch calculated as dropoff mortality plus fish released.

c/ Includes Oregon territorial water, late season chinook fisheries.

d/ Based on observed sublegal encounter rates.

TABLE 7. Expected coastwide OCN and RK coho **exploitation** rates for ocean fisheries management measures, 2005.
(Page 1 of 1)

FISHERY	Exploitation Rate (Percent) OCN	RK
SOUTHEAST ALASKA	0.0	0.0
BRITISH COLUMBIA	0.2	0.1
PUGET SOUND/STRAITS	0.1	0.0
NORTH OF CAPE FALCON		
Treaty Indian Troll	0.7	0.0
Recreational	2.0	0.0
Non-Indian Troll	0.6	0.0
SOUTH OF CAPE FALCON		
Recreational:		
Cape Falcon to Humbug Mt.	3.2	0.1
Humbug Mt. OR/CA border (KMZ)	0.3	0.5
OR/CA border to Horse Mt. (KMZ)	0.5	1.2
Fort Bragg	0.6	1.3
South of Point Arena	0.6	1.0
Troll:		
Cape Falcon to Humbug Mt.	0.4	0.0
Humbug Mt. OR/CA border (KMZ)	0.0	0.0
OR/CA border to Horse Mt. (KMZ)	0.0	0.2
Fort Bragg	0.0	0.0
South of Point Arena	0.5	0.6
BUOY 10	0.3	0.0
ESTUARY/FRESHWATER	1.1	0.2
TOTAL	11.1	5.5

TABLE 8. Projected **coho mark rates** for 2005 fisheries under base period fishing patterns (% marked). (Page 1 of 1)

Area		Fishery	June	July	August	Sept	2004 Observed
Canada							
	Johnstone Strait	Recreational	-	10%	10%	-	NA
	West Coast Vancouver Island	Recreational	32%	22%	20%	15%	NA
	North Georgia Strait	Recreational	18%	18%	18%	15%	NA
	South Georgia Strait	Recreational	22%	21%	15%	14%	NA
	Juan de Fuca Strait	Recreational	29%	27%	30%	31%	NA
	Johnstone Strait	Troll	28%	17%	11%	14%	NA
	NW Vancouver Island	Troll	25%	22%	25%	25%	NA
	SW Vancouver Island	Troll	33%	32%	34%	35%	NA
	Georgia Strait	Troll	29%	29%	30%	22%	NA
Puget Sound							
	Strait of Juan de Fuca (Area 5)	Recreational	36%	33%	34%	33%	Strait of Juan de Fuca 42%
	Strait of Juan de Fuca (Area 6)	Recreational	34%	31%	35%	31%	
	Strait of Juan de Fuca (Area 7)	Recreational	27%	33%	33%	25%	
	North Puget Sound (Areas 6 & 7A)	Net	-	23%	25%	32%	-
Council Area							
	Neah Bay (Area 4/4B)	Recreational	39%	36%	39%	41%	36%
	LaPush (Area 3)	Recreational	41%	38%	47%	26%	28%
	Westport (Area 2)	Recreational	51%	50%	54%	57%	46%
	Columbia River (Area 1)	Recreational	70%	66%	65%	69%	58%
	Tillamook	Recreational	58%	53%	49%	39%	Cape Falcon to OR/CA Border 48%
	Newport	Recreational	54%	53%	48%	37%	
	Coos Bay	Recreational	47%	47%	37%	22%	
	Brookings	Recreational	45%	34%	31%	15%	
	Neah Bay (Area 4/4B)	Troll	28%	39%	36%	43%	29%
	LaPush (Area 3)	Troll	37%	43%	42%	39%	29%
	Westport (Area 2)	Troll	34%	43%	52%	43%	46%
	Columbia River (Area 1)	Troll	50%	53%	57%	62%	31%
	Tillamook	Troll	52%	50%	53%	49%	-
	Newport	Troll	51%	52%	48%	48%	-
	Coos Bay	Troll	46%	46%	38%	31%	-
	Brookings	Troll	38%	40%	42%	29%	-
Columbia River							
	Buoy 10	Recreational	-	-	-	67%	66%

TESTIMONY OF
THE COLUMBIA RIVER TREATY TRIBES
BEFORE PACIFIC FISHERIES MANAGEMENT COUNCIL
April 7, 2005
Tacoma, WA

Good afternoon Mr. Chairman and members of the Council. My name is Rapheal Bill I am a member of the Fish and Wildlife Committee of the Confederated Tribes of the a Umatilla Indian Reservation of Oregon. I am here today to provide Testimony on behalf of the four Columbia River treaty tribes: the Yakama, Warm Springs, Umatilla and Nez Perce tribes.

As we near the completion of the planning for 2005 ocean fisheries, we would like to remind the Council of some of the issues bringing us where we are now and some of the events outside the Council process that will influence where we will end up in the future.

Salmon returning to the Columbia River run a gauntlet of fisheries from Alaska through Canada and west coast as well as in-river fisheries. If we do not continue to protect Columbia River salmon, all these fisheries will suffer.

Record returns of Snake River fall Chinook have occurred in recent years. While better ocean survival can not be discounted as a contributing factor, the supplementation program can not be denied as the primary reason for this strong increase in run sizes. However, this situation does not eliminate the need for ocean fisheries to be managed conservatively to ensure continued progress towards recovery. Even with this success, the supplementation program is not without critics. The tribes are largely responsible for the initiation of fall Chinook supplementation programs above Lower Granite dam and continue to work cooperatively with our state and federal co-managers to manage this program in ways that benefit both fisheries and recovery of the natural fall Chinook run. The tribes have long supported the appropriate use of hatcheries to support recovery of all salmon stocks throughout the Columbia Basin.

The tribes thank the Council for agreeing to send a letter to the federal hydrosystem managers regarding the Columbia River flows in 2005. It would be a shame if poor river management adversely affects the gains we have made toward recovering Snake River fall Chinook. If spill is eliminated for even one year, there probably will be adverse effects on future fisheries.

This year's ocean fishery planning has involved lots of hard work and very difficult decision making that will hopefully help insure a lot of Snake River fall Chinook are going to reach the spawning grounds. However, because of Federal Government policy, the offspring of these fish we are working to protect face a very uncertain future. While we commend those who have made decisions to reduce their fisheries to protect fish that are so important to the tribes, it is a perfectly natural question for you to ask, "Why are we going through this very difficult exercise when the end result will be that the fish we save will produce offspring that will be simply ground up in the eight Federal dams?"

Another issue that relates both to conservation of fish as well as fishery planning is mass marking of fish with adipose fin clips without coded wire tags. Congressman Norm Dicks is demanding that the number of mass marked fish be dramatically increased including almost all Columbia River fall Chinook. These fish are important components of ocean fisheries. If more of these fish are mass marked it will further degrade the Coded Wire Tag program. We are dependant on this program to measure impacts to various stocks. USFWS has announced that they have already begun mass marking approximately one half of the 2005 release of the Spring Creek tules. Although not unexpected, this was done without notifying the U.S. v. Oregon parties. They have also announced the intention to dramatically increase the number of mass marked Columbia River fall Chinook. This will now necessitate electronic sampling of all Council area ocean Chinook fisheries as well as in-river fall Chinook fisheries. None of the agencies advocating mass marking have indicated where the money for the increased sampling costs will come from. If Canada can not be convinced to electronically sample their Chinook fisheries, enormous uncertainties will be introduced into estimated Chinook impacts in Canadian fisheries. The Columbia River tribes strongly disagree with increased mass marking of Columbia River fall Chinook. Mass marking and selective fisheries goes against the tribes traditional cultural values towards salmon. We do not see this as appropriate co-management either.

We also learned this morning that WDFW is planning on implementing a new selective sport fishery for Chinook in Puget Sound. The Columbia River tribes do not support the implementation of this new fishery at the last minute. As more Columbia River fall Chinook, there will be more and more pressure to implement other new and larger selective Chinook fisheries. The tribes do no support playing with our food. This will in turn put the entire Coded Wire Tag program at risk and make it very difficult to estimate impacts on natural stocks of concern. We will in effect be managing fisheries nearly blind. Increasing selective fisheries will not benefit wild fish in part because of the release mortality rates from handling wild fish in too many fisheries. There will be significant costs from new mass marking and selective fisheries. No one has explained to us how these costs will be paid for. Money being spent on mass marking and selective fisheries would be better spent on salmon recovery.

While clearly many parts of the Federal Government are acting as a drag on fish recovery, there are things that can and are being done to benefit the fish as well as treaty and non-treaty fishermen.

Because of the Tribes' cultural and spiritual connection with salmon, the tribes are extremely focused on the health of the salmon and the water they live in. This is what produces our desire to recover fish populations. The Umatilla Tribe has successfully shown that it is possible to work with private landowners and irrigators and the State of Oregon to re-introduce coho into the Umatilla River. This has led to renewed tribal and sport harvest that is shared in the river. By working cooperatively the tribes have shown that it is possible to make improvements to habitat and water conditions to support salmon. The Nez Perce Tribe has worked successfully with the State of Idaho and the USFWS to reintroduce coho into the Clearwater. The Yakama Nation and the State of Washington have coho programs in the Yakama and Wenatchee. While these programs are all still works in progress, it shows that by working cooperatively with the tribes it is possible to do things that both support salmon recovery and provide fishery benefits for ocean and in-river fisheries. The reason that the Ocean fishery and lower Columbia River fisheries are required to ensure that 50% of the upriver coho reach Bonneville Dam is not just to meet treaty fishery needs but to ensure enough fish return so that these recovery programs can continue to produce larger runs of fish in the future.

The tribes have many other programs and proposals that will assist with recovering all salmon runs to healthy harvestable levels. These include numerous habitat improvement projects in tributaries throughout the basin and an annual water management plan for the Columbia River that proposes flows, temperatures, and spills that will provide benefits to fish while including appropriate allowances for irrigation and power generation. Unlike programs like the flawed barging program, it is these types of positive pro-active programs that need to be implemented in order to recover fish populations to healthy sustainable harvestable levels. The barging program claims to be successful simply because fish are still alive when they let them out of the barge, but the program is not successful because many of these fish do not return as adults. The tribes would like to work cooperatively with the other co-managers to address the sea lion problem on the Columbia.

We also want to mention that tribal representatives to the CTC will be helping coordinate CTC communication with the STT regarding modeling recent changes in Canadian fisheries that effect U.S. stocks.

This concludes my statement. Thank You.

STATEMENT BY JIM HARP TO THE PACIFIC FISHERY MANAGEMENT COUNCIL REGARDING THE 2005 OCEAN TREATY TROLL FISHERY
Thursday, April 7, 2005

Mr. Chairman,

At the appropriate time, I will offer a Motion for Treaty troll chinook and coho quotas. I would like to offer a few comments first.

As I indicated in my previous statements, the tribes have been working on a package of fisheries that meets resource constraints of this year's forecasted abundances and fairly distributes the burden of conservation.

- The fisheries that the tribes have proposed are consistent with this year's resource conditions and take into account the need for each tribe to have some fishing opportunity in its area.

- The Treaty troll quotas represent a balance of the Treaty rights of the coastal tribes, as well as the four Columbia River Tribes and the Puget Sound tribes given the conservation constraints of the many salmon stocks in 2005.

- The proposed quotas for the ocean Treaty Indian troll fishery meets the ESA considerations for Snake River chinook, OCN coho, and Puget Sound Chinook.

- The proposed quotas also meet the commitments made under the Pacific Salmon Treaty.

- The ocean Treaty troll fishery presents an opportunity to exercise our Treaty rights in the ocean this year. One must remember, the Treaty tribes must exercise their Treaty rights in their established Usual & Accustomed (U&A) fishing areas, so the Treaty troll tribes cannot simply move their fisheries to alternative locations in order to reduce impacts.

MOTION
For The Ocean Treaty Troll Fishery
Thursday, April 7, 2005

Mr. Chairman,

For the 2005 salmon fishery in the area from the U.S./Canada border to Cape Falcon, Oregon, I move the following management structure be adopted by the Council for the Treaty Indian ocean salmon troll fisheries:

The Treaty Indian ocean troll fishery would have a quota of 48,000 chinook and 50,000 coho.

The overall chinook quota would be divided into a 25,000-chinook sub-quota for the May 1 through June 30 chinook only fishery and a 23,000-chinook sub-quota for the all species fishery in the time period of July 1 through September 15.

If the treaty troll catch taken from areas 4/4B is projected inseason to exceed 47,286 coho, the total treaty troll quota will be adjusted to ensure that the exploitation rate impact of the treaty troll fishery on Interior Fraser coho does not exceed the level anticipated under the assumptions employed for impact assessment.

If the chinook quota for the May-June fishery were not fully utilized, the remaining fish would <u>not</u> be rolled over into the all species fishery. The Treaty troll fishery would close upon the projected attainment of either of the chinook or coho quota. Other applicable regulations are shown in Table 3 of STT Report Preliminary Analysis of Tentative 2005 Ocean Salmon Fishery Management Measures (April 6, 2005) – Agenda Item C.5.b.

IDENTIFICATION OF STOCKS NOT MEETING CONSERVATION OBJECTIVES

Each year, exclusive of stocks listed under the Endangered Species Act (ESA), the Salmon Technical Team (STT) must identify any of the natural salmon stocks with conservation objectives in Table 3-1 of the salmon FMP that have failed to meet their conservation objective in each of the past three years. For any stock so identified that does not meet the exception criteria, an Overfishing Concern is triggered. An Overfishing Concern requires the Council direct the STT and Habitat Committee (HC) to work with state and tribal fishery managers to complete an assessment of the cause of the conservation shortfalls and provide recommendations to the Council for stock recovery. Based on those recommendations, the Council must take actions within one year of an identified concern to prevent overfishing and begin rebuilding the stock.

In the case of natural stocks which have failed to achieve their conservation objective in each of the past three years, but are exceptions under the salmon FMP overfishing criteria, the STT, HC, and Council should: (1) confirm that harvest impacts in Council fisheries continue to be less than five percent, (2) identify the probable cause of the current stock depression, (3) continue to monitor the status of the stocks, and (4) advocate measures to improve stock productivity.

The salmon FMP states that any stock projected to fall short of its conservation objective triggers a Conservation Alert. A Conservation Alert requires the Council to notify pertinent fishery and habitat managers, request the cause be identified (if possible), and to close salmon fisheries within Council jurisdiction that impact the stock. If the stock in question has not met its conservation objective in the previous two years, the Council shall request the pertinent state and tribal managers to complete a formal assessment of the primary factors leading to the shortfalls and report their conclusions and recommendations to the Council no later than the March meeting prior to the next salmon season.

Table C-1 (Agenda Item C.1.a, Attachment 1) has been extracted from the STT's Preseason Report I and updated with any more recently available information. It indicates that no stock subject to the Overfishing Criteria has failed to achieve its conservation objective in each of the three most recent years; however, Klamath River Fall chinook did not meet the conservation objective in the most recent year assessed (2004). Queets River spring/summer chinook have not met their conservation objectives in the most recent two years assessed (2003, 2004), and Quillayute spring/summer chinook have not met their conservation objective in the most recent year assessed (2004). However, these latter two stocks are exceptions under the Overfishing Concern criteria by virtue of historical harvest impacts of less than five percent in Council-managed ocean salmon fisheries. No FMP stocks are projected to fall short of conservation objectives in 2005.

<u>Council Action</u>:

1. **Identify naturally spawning stocks failing to meet their conservation objectives (exclusive of stocks listed under the ESA).**
2. **Identify naturally spawning stocks projected to not meet their conservation objectives in 2005 (exclusive of stocks listed under the ESA).**
3. **Confirm implementation of the actions required by the Council's Overfishing Concern and Conservation Alert procedures in the salmon FMP. (For stocks that are exceptions to the Overfishing Concerns, these actions involve confirming continued low impacts by Council fisheries, identifying the probable cause of the depression, monitoring the status of the stocks, and advocating measures to improve stock productivity.)**

<u>Reference Materials</u>:

1. Agenda Item C.1.a, Attachment 1: Table C-1.
2. Agenda Item C.1.b, Supplemental STT Report: Report of the Salmon Technical Team

<u>Agenda Order</u>:

a. Agenda Item Overview — Chuck Tracy
b. Report of the Salmon Technical Team (STT) — Dell Simmons
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Identify Any Actions Necessary Under the Council Overfishing Review Procedure

PFMC
03/18/05

TABLE C-1. Achievement of **conservation objectives** for natural stocks listed in Table 3-1 of the Pacific Coast Salmon Plan. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 1 of 2)

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)	Observed or Projected Conservation Achievement (postseason estimates of thousands of spawners or spawners per mile; preseason or postseason impact or replacement rate)									Overfishing Criteria		
	1997	1998	1999	2000	2001	2002	2003	2004[a/]	2005[b/]	Alert[c/]	Concern[d/]	Exception[e/]
CHINOOK												
Sacramento River Fall 122.0 - 180.0 adult spawners	342.9	238.1	386.8	413.8	544.9	775.5	521.2	283.1	>949.0	No	No	No
Klamath River Fall - no less than 35.0 adult natural spawners	46.1	42.5	**18.5**	82.7	77.8	65.6	87.1	**24.2**	35.0	No	No	No
Southern, Central and Northern Oregon Coast Spring and Fall No less than 60 adult spawners/mile[f/]	93.3	87.7	104.4	76.4	165.2	222.4	235.9	175.5	>60.0	No	No	No
Upper Columbia River Bright Fall 43.5 adults over McNary Dam Council area base period impacts <4%	67.1	63.8	78.4	66.4	110.5	141.6	173.7	168.9	>43.5	No	No	Exp. Rate
Columbia River Summer Chinook 80.0 to 90.0 adults over Bonneville Dam Council area base period impacts <2%	**27.9**	**21.4**	**26.2**	**30.6**	**76.2**	127.4	114.8	>80.0	>80.0	No	No	Exp. Rate
In 2004 state and tribal co-managers changed the stock definition from chinook passing Bonneville Dam after May 31 to chinook passing Bonneville Dam after June 14, and the goal changed to 29,000 at the river mouth	**12.3**	**18.3**	**16.3**	**22.3**	**23.2**	54.9	92.8	83.1	65.4	No	No	Exp. Rate
Grays Harbor Fall - 14.6 adult spawners (MSP)	18.2	**12.5**	**10.4**	**9.3**	**9.5**	**11.3**	19.4	NA[g/]	NA[g/]	No	No	Exp. Rate
Grays Harbor Spring - 1.4 adult spawners	4.5	2.3	1.3	2.9	2.9	2.6	1.9	NA[g/]	NA[g/]	No	No	Exp. Rate
Queets Fall - no less than 2.5 adult spawners (MSY)	2.5	4.0	**1.9**	3.6	2.9	**1.9**	5.0	3.5	NA[g/]	No	No	Exp. Rate
Queets Spring/Summer - no less than 0.7 adult spawners	**0.54**	**0.49**	**0.37**	**0.25**	**0.55**	0.74	**0.19**	**0.60**	NA[g/]	Limited[e/]	No	Exp. Rate
Hoh Fall - no less than 1.2 adult spawners (MSY)	1.8	4.3	1.9	1.7	2.6	4.4	1.6	1.8	NA[g/]	No	No	Exp. Rate
Hoh Spring/Summer - no less than 0.9 adult spawners	1.8	1.3	0.9	**0.5**	1.2	2.5	1.2	1.8	NA[g/]	No	No	Exp. Rate
Quillayute Fall - no less than 3.0 adult spawners (MSY)	5.4	6.8	3.3	3.7	5.1	6.1	7.4	3.6	NA[g/]	No	No	Exp. Rate
Quillayute Spring/Summer - 1.2 adult spawners (MSY)	**0.9**	1.6	**0.7**	**1.0**	1.2	**1.0**	1.2	**0.7**	NA[g/]	Limited[f/]	No	Exp. Rate
COHO												
Grays Harbor - 35.4 adult spawners (MSP)	**22.5**	35.6	**33.3**	37.1	79.1	110.7	107.3	64.7	>35.4	No	No	No
Queets - 5.8 to 14.5 adult spawners (MSY range) Includes supplemental adults	**1.9**	**5.5**	**5.3**	8.6	24.9	14.8	9.3	10.8	>5.8	No	No	No
Hoh - 2.0 to 5.0 adult spawners (MSY range)	**1.4**	4.4	4.6	6.8	10.8	9.0	6.3	2.1	>2.0	No	No	No

TABLE C-1. Achievement of **conservation objectives** for natural stocks listed in Table 3-1 of the Pacific Coast Salmon Plan. Bolded numbers indicate a failure to meet the conservation objective. Stocks listed under the Endangered Species Act are not included. (Page 2 of 2)

Stock and Conservation Objective (thousands of spawners; spawners per mile; impact or replacement rate)	**Observed or Projected Conservation Achievement** (postseason estimates of thousands of spawners or spawners per mile; preseason or postseason impact or replacement rate)									**Overfishing Criteria**		
	1997	1998	1999	2000	2001	2002	2003	2004[a/]	2005[b/]	Alert[c/]	Concern[d/]	Exception[e/]
Quillayute Fall - 6.3 to 15.8 adult spawners (MSY range)	**4.6**	13.9	9.4	13.3	18.9	23.0	14.8	10.7	>6.3	No	No	No
Western Strait of Juan de Fuca - 11.9 adult spawners	**4.1**	15.1	**8.0**	16.9	34.3	20.6	12.4	>11.9	>11.9	No	No	No
Eastern Strait of Juan de Fuca - 0.95 adult spawners	1.30	1.94	1.36	2.11	2.6	2.5	2.9	>0.95	>0.95	No	No	No
Hood Canal - 21.5 adult spawners (MSP)	95.8	101.1	**16.6**	27.3	94.7	69.3	170.3	>21.5	>21.5	No	No	No
Skagit - 30.0 adult spawners (MSP)	23.4	73.7	**27.3**	62.9	87.0	56.0	69.2	>30.0	>30.0	No	No	No
Stillaguamish - 17.0 adult spawners (MSP)	**10.9**	27.3	**7.0**	28.3	73.6	27.3	45.7	59.2	>17.0	No	No	No
Snohomish - 70.0 adult spawners (MSP)	**58.2**	150.1	**61.3**	94.2	261.8	161.6	182.7	>70.0	>70.0	No	No	No

a/ Preliminary data.

b/ Preliminary approximations based on preseason abundance projections and either preseason regulation options adopted at the March 2005 Council meeting, or 2004 regulations or season structures.

c/ **Conservation Alert** - triggered during the annual preseason process if a natural stock or stock complex, listed in Table 3-1 of the salmon FMP, is projected to fall short of its conservation objective (MSY, MSY proxy, MSP, or floor in the case of some harvest rate objectives [e.g., 35,000 natural Klamath River fall chinook spawners]).
Actions for Stocks that are not Exceptions (beginning in 2001) - The Council will close salmon fisheries within its jurisdiction which impact the stocks, except in the case of Washington coastal and Puget Sound salmon stocks and fisheries managed under U.S. District Court orders. In these cases, the Council may allow fisheries which meet annual spawner targets developed through relevant U.S. v. Washington, Hoh v. Baldrige, and subsequent U.S. District Court ordered processes and plans, that may vary from the MSY or MSP conservation objectives. For all natural stocks that meet the conservation alert criteria, the Council will notify pertinent fishery and habitat managers, advising that the stock may be temporarily depressed or approaching an overfishing concern (depending on its recent conservation status), and request state and tribal fishery managers identify the probable causes, if known. If the stock in question has not met its conservation objective in the previous two years, the Council will request state and tribal managers to do a formal assessment of the primary factors leading to the shortfalls and report their conclusions and recommendations to the Council no later than the March meeting prior to the next salmon season.

d/ **Overfishing concern** - triggered if, in three consecutive years, the postseason estimates indicate a natural stock, listed in Table 3-1 of the salmon FMP, has fallen short of its conservation objective (MSY, MSP, or spawner floor as noted for some harvest rate objectives).
Actions required for Stocks that are not Exceptions - Within one year, the STT to recommend and the Council to adopt management measures to end the overfishing concern and recover the stock in as short a time as possible, preferably within ten years or less. The HC to provide recommendations for habitat restoration and enhancement measures within a suitable time frame.

e/ **Exception** - strict application of the conservation alert and overfishing criteria and subsequent Council actions do not apply for (1) hatchery stocks, (2) natural stocks with a cumulative adult equivalent exploitation rate limited to less than 5% in ocean fisheries under Council jurisdiction during the FRAM base periods, and (3) stocks listed under the ESA.
Conservation Alert and Overfishing Concern Actions for Natural Stocks that are Exceptions (those with exploitation rates limited to less than 5% in base period Council-area ocean fisheries) - Use the expertise of STT and HC to confirm negligible impacts of proposed Council fisheries, identify factors which have led to the decline or low abundance (e.g., fishery impacts outside Council jurisdiction, or degradation or loss of essential fish habitat) and monitor abundance trends and total harvest impact levels. Council action will focus on advocating measures to improve stock productivity, such as reduced interceptions in non-Council managed fisheries, and improvements in spawning and rearing habitat, fish passage, flows, and other factors affecting overall stock survival.

f/ Based on the sum of south/local and north migrating spawners per mile weighted by the total number of miles surveyed for each of the two components (2.2 miles for south/local and 7.5 miles for northern stocks).

g/ Preseason forecasts are not available for Washington coastal chinook stocks.

TENTATIVE ADOPTION OF 2005 OCEAN SALMON MANAGEMENT MEASURES FOR ANALYSIS

The Council adopted four salmon management options in March, which were published in Preseason Report II and sent out for public review. In action under this agenda item, the Council must narrow the March management options to the final season recommendations. To allow adequate analysis before final adoption, the tentatively-adopted recommendations should resolve any outstanding conflicts and be as close as possible to the final management measures. This is especially important to ensure final adoption is completed on Thursday afternoon.

The Council's procedure provides any agreements by outside parties (e.g., North of Cape Falcon Forum, etc.) to be incorporated into the Council's management recommendations must be presented to the Council in writing prior to adoption of the tentative options. The procedure also stipulates any new options or analyses must be reviewed by the Salmon Technical Team (STT) and public prior to the Council's final adoption.

If necessary, the STT will check back with the Council on Wednesday (Agenda Item C.5) or at other times to clarify any questions or obvious problems with the tentative measures. The Council must settle all such issues on Wednesday to allow time for STT analysis and to meet the final adoption deadline of Thursday afternoon.

Summaries of the testimony presented at public hearings will be provided at the meeting in the supplemental reports noted below (Agenda Item C.2.c). Public comment letters received at the Council office by March 29 are summarized and included in Agenda Item C.2.k.

<u>Council Action</u>:

Adopt tentative treaty Indian commercial and non-Indian commercial and recreational management measures for STT analysis.

<u>Reference Materials</u>:

1. *Preseason Report II Analysis of Proposed Regulatory Options for 2005 Ocean Salmon Fisheries* (mailed prior to the hearings and available at meeting).
2. Agenda Item C.2.c, Supplemental Public Hearing Reports 1 through 3: Summary of Public Hearings.
3. Agenda Item C.2.j, Supplemental SAS Report: Proposed 2005 Ocean Salmon Management Measures For Tentative Adoption.
4. Agenda Item C.2.k, Supplemental Summary of Written Public Comment.

Agenda Order:

a.	Agenda Item Overview	Chuck Tracy
b.	Update on Estimated Impacts of March 2005 Options	Dell Simmons
c.	Summary of Public Hearings	Hearing Officers
d.	Recommendations of the U.S. Section of the Pacific Salmon Commission	J. Harp
e.	Recommendations of the North of Cape Falcon Forum	OR, WA, and Tribes
f.	Recommendations of the Klamath Fishery Management Council	Curt Melcher
g.	NMFS Recommendations	Peter Dygert
h.	Tribal Recommendations	Jim Harp
i.	State Recommendations	P. Anderson/C. Melcher/E. Larson
j.	Reports and Comments of Advisory Bodies	
k.	Summary of Written Public Comment	Chuck Tracy
l.	Public Comment	
m.	**Council Action:** Tentatively Adopt Management Measures for 2005 Ocean Salmon Fisheries	

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03/18/05

Agenda Item C.3
Situation Summary
April 2005

METHODOLOGY REVIEW PROCESS AND
PRELIMINARY TOPIC SELECTION FOR 2005

Each year, the Scientific and Statistical Committee (SSC) completes a methodology review to help assure new or significantly modified methodologies employed to estimate impacts of the Council's salmon management use the best available science. The process normally involves: developing a list of potential topics for review at the April Council meeting; final selection of review topics at the September Council meeting; review of selected topics in October by the SSC Salmon Subcommittee and the Salmon Technical Team (STT); and review by the full SSC at the November Council meeting. This review process is preparatory to the Council's adoption, at the November meeting, of all proposed changes to be implemented in the coming season or, in certain limited cases, providing directions for handling any unresolved methodology problems prior to the formulation of salmon management options in March. Because there is insufficient time to review new or modified methods at the March meeting, the Council may reject their use if they have not been approved the preceding November.

In 2004, the SSC reviewed a report on mark selective chinook fisheries that took place in Washington Areas 5 and 6 during 2003 and 2004.

For 2005 there are at least four issues the Council may want to consider when setting priorities for the methodology review:

1. The Model Evaluation Workgroup (MEW) is scheduled to complete work on the detailed Fishery Regulation Assessment Model (FRAM) documentation this summer, and a review of the documentation would assist the SSC in evaluation of the FRAM and any proposed modifications.

2. For 2003 and 2004, the Council approved use of a revised Chinook FRAM to assess impacts from a mark selective chinook fishery proposed for Washington Marine Areas 5 and 6, provided the fishery did not exceed 41 days during July and August, or a landed chinook quota of 3,500 fish. The Council recommended the chinook FRAM receive additional review prior to implementation of any expanded or additional mark selective chinook fisheries, and formed the MEW to assist in documenting the FRAMs to facilitate such a review. If there are plans to consider expanded mark selective chinook fisheries, the additional chinook FRAM review should occur during this review cycle.

3. At the March 2005 meeting, the SSC recommended the contact rates and catch projection portions of the Klamath Ocean Harvest Model be reviewed in light of recent year performance of age-4 harvest rate forecasts and the implications for Endangered Species Act listed California coastal chinook consultation standards.

4. Oregon Department of Fish and Wildlife (ODFW) is developing a technical appendix to the Oregon coastal natural Work Group matrix as recommended by the Council at its November 2000 meeting, when it accepted the matrix as expert scientific advice. ODFW is considering completing the technical appendix and submitting the matrix as a technical amendment to the salmon fishery management plan (FMP). The salmon FMP allows changes to conservation objectives for natural stocks without formal amendment if "a comprehensive technical review of the best scientific information available provides conclusive evidence that, in the view of the STT, SSC, and the Council, justifies a modification." The salmon FMP also states "Insofar as possible, changes for natural stocks will only be reviewed and approved within the schedule established for salmon estimation methodology reviews (completed at the November meeting prior to the season in which they are effective) and apart from the preseason planning process." Therefore, if ODFW intends to proceed with the technical amendment, the Council should consider including it on the list of methodology review subjects.

The SSC will receive input from the STT and the MEW, and provide recommendations for methodologies to be reviewed in 2005.

Council Task:

1. **Provide guidance to the SSC regarding potential topics and priorities for methodologies to be reviewed in 2005.**
2. **Request affected agencies develop and provide needed materials to the SSC, as appropriate.**

Reference Materials:

1. Agenda Item C.3.b, Supplemental SSC Report: Scientific and Statistical Committee Report on Methodology Reviews for 2005.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Report of the SSC — Pete Lawson
c. Recommendations of the States, Tribes, and Federal Agencies
d. Reports and Comments of Advisory Bodies
e. Public Comment
f. Council Guidance on Potential Methodologies To Be Reviewed in 2005

PFMC
03/18/05

UPDATE ON ESSENTIAL FISH HABITAT REVIEW PROCESS

This Agenda Item has been postponed until a later Council meeting.

Council Task:

None.

Reference Materials:

None.

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03/21/05

Agenda Item C.5
Situation Summary
April 2005

CLARIFY COUNCIL DIRECTION ON 2005 MANAGEMENT MEASURES (IF NECESSARY)

If the Salmon Technical Team (STT) needs clarification of the tentative management measures before completing its analysis, the STT Chairman will address the Council in this agenda item.

Council Task:

If requested, provide any needed guidance to assist the STT in its analysis of the tentative management measures.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Reports and Comments of Advisory Bodies
c. Council Guidance and Direction

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FINAL ACTION ON 2005 SALMON MANAGEMENT MEASURES

The Salmon Technical Team (STT) will briefly review its analysis of the tentative management measures and answer Council questions. Final adoption of management measures will follow the comments of the advisors, tribes, agencies, and public.

This action is for submission to the U.S. Secretary of Commerce, and the final motions must be visible in writing. To avoid unnecessary delay and confusion in proposing final regulations, minor edits may be made to the STT analysis and other documents provided by staff. If major deviations from existing documents are anticipated, Council members should be prepared to provide a written motion that can be projected on a screen or quickly photocopied. Please prepare your motion documents or advise Council staff of the need for, or existence of, additional working documents as early as possible before the final vote.

Council Action:

Adopt final treaty Indian troll, non-Indian commercial, and recreational ocean salmon fishery management measures for submission to the U.S. Secretary of Commerce. *(Motions must be visible in writing prior to vote.)*

Reference Materials:

1. Agenda Item C.6.b, Supplemental STT Report: STT Analysis of Tentative 2005 Ocean Salmon Fishery Management Measures.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. STT Analysis of Impacts — Dell Simmons
c. Comments of the Klamath Fishery Management Council — Curt Melcher
d. Recommendations of the States, Tribes, and Federal Agencies
e. Reports and Comments of Advisory Bodies
f. Public Comments
g. **Council Action:** Adopt Final Measures

PFMC
03/18/05

CLARIFICATION OF FINAL ACTION ON SALMON MANAGEMENT MEASURES (IF NECESSARY)

If the Salmon Technical Team (STT) needs clarification of the final management measures before completing its analysis, the STT Chairman will address the Council in this agenda item.

Council Action:

If necessary, provide clarification to assist the STT in its analysis of the final management measures.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Clarify Final Management Measures ***(If Necessary)***

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