NATIONAL MARINE FISHERIES SERVICE REPORT ON GROUNDFISH MANAGEMENT

National Marine Fisheries Service (NMFS) Northwest Region will briefly report on recent regulatory developments relevant to groundfish fisheries and issues of interest to the Council including an update on the development of monitoring program alternatives for the shore-based Pacific whiting fishery. Because establishing a permanent monitoring program for the shore-based whiting fishery will not be possible prior to the start of the 2005 fishery, NMFS will again require an exempted fishing permit (EFP) for participation in the 2005 shore-based whiting fishery. Terms and conditions of the whiting EFP will be developed over the winter months. As in 2004, the EFP will continue to evaluate monitoring tools appropriate for the shore-based whiting fishery. The Council is scheduled to consider final EFP applications for 2005, including an EFP application submitted for the shore-based Pacific whiting fishery, under Agenda Item E.3.

NMFS Northwest Fisheries Science Center will briefly report on groundfish-related science and research activities including a summary of the stock assessment workshops held this year and a report on a planned cost-earnings survey of the trawl fishery.

Council Task:

Discussion.

Reference Materials:

1. Agendum Item E.1.a, Amendment 17 Letter: letter from Dr. McIsaac to Mr. Lohn; Council recommendation for modifying the *Pacific Coast Groundfish Fishery Management Plan* amendatory language adopted under Amendment 17.
2. Agendum Item E.1.b, NMFS Science Report: Commercial Cost-Earnings Survey of the Limited Entry Trawl Fleet.

Agenda Order:

a. Regulatory Activities — Steve Freese
b. Science Center Activities — Elizabeth Clarke
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. Council Discussion

PFMC
10/15/04

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

CHAIRMAN
Donald K. Hansen

EXECUTIVE DIRECTOR
Donald O. McIsaac

Telephone: 503-820-2280
Toll Free: 866-806-7204
Fax: 503-820-2299
www.pcouncil.org

October 13, 2004

Mr. Robert Lohn
Regional Administrator
National Marine Fisheries Service
Northwest Region
7600 Sand Point Way NE, Bin C15700
Seattle, WA 98115-0070

Re: Council recommendation for modifying the *Pacific Coast Groundfish Fishery Management Plan* amendatory language adopted under Amendment 17.

Dear ~~Mr. Lohn~~ Bob:

The Pacific Fishery Management Council (Council) met September 13-17, 2004 in San Diego, California to consider, among other matters, Pacific Coast groundfish fishery management plan (FMP) amendatory language approved under Amendment 17. The Council wished to revisit the final Council action on Amendment 17 taken at its November 2002 meeting, as it did not appear the FMP amendatory language approved by the Secretary of Commerce (Secretary) accurately reflected what the Council had adopted.

The portion of Amendment 17 in question concerned the policy and process for considering potential modifications of specified optimum yields during a biennial management cycle. Throughout the developmental process for Amendment 17, there had been concern there may be a need to modify optimum yields based on new groundfish stock assessments or rebuilding analyses that become available midway through a biennial management cycle. The Council reviewed the original motion language, associated reference documents available at the November 2002 Council meeting, the Council transmittal letter, as well as the National Marine Fisheries Service (NMFS) approval letter and approved Amendment 17 language.

The Council confirmed the original action was to allow consideration of both decreases and increases of optimum yields due to new stock assessments for any species of concern to the Council. The language considered for Secretarial approval, and ultimately approved, only applied to potential decreases in optimum yields previously specified for overfished species, which was not recommended by the Council. Under Section 304(a)(3) of the Magnuson-Stevens Fishery Conservation and Management Act, the Secretary shall either approve, partially approve, or disapprove a Council recommendation, not add features the Council did not recommend. Therefore, it follows the associated amendment language that was actually approved by Secretarial action concerning adjustments to pre-specified optimum yields is null. Please acknowledge the attached language in brackets and gray highlight from FMP Section 5.7.1 is not in effect.

The Council discussed moving forward to create an appropriate mid-cycle adjustment process to accommodate new scientific information. It is the Council's intent to develop the criteria, thresholds, mechanisms, and policy for considering mid-process optimum yield adjustments by early next year, prior to the next round of adopting groundfish stock assessments for management decision making. The Council tasked Council staff with beginning the process of developing the criteria and thresholds, and mechanisms for such mid-process adjustments, with general direction that adjustments be a rare event. Council staff will arrange for initial technical analyses and schedule a meeting of the Council's Ad Hoc Groundfish Information Policy Committee after the November 2004 Council meeting. A two-Council meeting process with an appropriate Environmental Assessment analysis is envisioned.

Should you have any questions on these matters, please don't hesitate to contact me.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

JDD:kla

Enclosure

c: Council Members
Dr. Steve Freese
Ms. Eileen Cooney

EXCERPT FROM THE PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

5.7 Inseason Procedures for Establishing or Adjusting Specifications and ~~Apportionments~~ (previously 5.9)

5.7.1 Inseason Adjustments to ABCs, OYs, HGs, and Quotas

Under the biennial specifications and management measures process, stock assessments for most species will become available every other year, prior to the November Council meeting that begins the three-meeting process for setting specifications and management measures. The November Council meeting that begins that three-meeting process will be the November of the first fishing year in a biennial fishing period. [If the Council determines that any of the ABCs or OYs set in the prior management process are not adequately conservative to meet rebuilding plan goals for an overfished species, harvest specifications for that overfished species and/or for co-occurring species may be revised for the second fishing year of the then current biennial management period.] ~~Occasionally, new stock assessment information may become available inseason that supports a determination that an ABC no longer accurately describes the status of a particular species or species group. However, adjustments will only be made during the annual specifications process and a revised ABC announced at the beginning of the next fishing year.~~

~~The only exception is in the case where the ABC announced at the beginning of the fishing year~~ **Beyond this process, ABCs, OYs, HGs, and quotas may only be modified in cases where a harvest specification announced at the beginning of the fishing period** is found to have resulted from incorrect data or from computational errors. If the Council finds that such an error has occurred, it may recommend the Secretary publish a notice in the *Federal Register* revising the ~~ABC~~ **incorrect harvest specification** at the earliest possible date.

NOTE: Gray highlight added for emphasis.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic Atmospheric Administration
National Marine Fisheries Service
Sustainable Fisheries Division
7600 Sand Point Way N. E., Building. 1, Bin C15700
Seattle, WA 98115-0070

DATE: October 25, 2004

TO: DISTRIBUTION

FROM: F/NWR2 -Becky Renko

SUBJECT: PRELIMINARY Report #9 -- 2004 Pacific Whiting Fishery

This report consolidates preliminary state, federal, and tribal data for the 2004 Pacific whiting fishery off Washington, Oregon, and California. Due to concerns about the incidental catch of canary and darkblotched rockfish, NMFS closed the mothership fishery on October 1, 2004. NMFS also intends to close the catcher processor fishery if the the total catch or darkblotched rockfish reaches 9.5 mt for all sectors of the whiting fishery or if the total catch of canary rockfish reaches 6.2 mt for all sectors of the whiting fishery. Through October 24, 2004, 8.11 mt of darkblotched rockfish and 5.95 mt of canary rockfish had been taken.

	Allocation		Catch* (mt)	Thru [date]	Status	Percent of allocation taken
	Percentages	Metric Tons				
California (south of 42 N lat.)	(5% shore alloc'n; included in WOC shore allocation)	4,526	4,589	--	CA season began April 1; temporary closure from May 22 to June 15	
Oregon	--	NA	58,637	--		
Washington	--	NA	25,659	--		
WOC shore-based	42% commercial OY	**90,510**	88,885	8/14	Began June 15; ended 1600 August 14	98.2%
Mothership (n. of 42 N. lat.)	24% commercial OY	**51,720**	24,102	6/12	Began May 15	46.6%
Catcher/processor (n. of 42 N. lat.)+-`	34% commercial OY	**73,270**	68,830	10/24	Began May 15	94.0%
Total nontribal	commercial OY	215,500	181,825	--	--	84.4%
Tribal (Makah)		**32,500**	28,648	8/15	Began May 20	88.1%
Total directed fishing		248,000	210,473	--	--	84.9%
Other (research & incidental catch in non-groundfish fisheries)		**2,000**	unknown at this time			--
Total	OY=optimum yield	250,000	--	--	--	--

* Catch includes discards from at-sea processors; weigh-backs from shore-based catcher vessels; and small amounts landed under the trip limit between the seasons. The data for at-sea processing (catcher/processors and motherships) are preliminary and are based on reports from NMFS-trained observers. Data for shore-based processors also are preliminary and are provided by each State to NMFS for the purpose of monitoring the fishery. Preliminary data for the Makah fishery are from NMFS-trained observers or state fish tickets. All weights are round weight (the weight of the whole fish before processing) or round-weight equivalents. One metric ton is 2,204.6 pounds.

National Marine Fisheries Service
Science Report to the November 2004 Meeting of the
Pacific Fishery Management Council

Commercial Cost-Earnings Survey of the Limited Entry Trawl Fleet

The National Marine Fisheries Service (NMFS), in cooperation with the Pacific States Marine Fisheries Commission (PSMFC), will be conducting a cost-earnings survey of the west coast's limited entry trawl fleet. Data collected by the survey will be used for economic analysis of fisheries management policies.

This survey is needed because existing cost-earnings data are incomplete. Economic analysis of many key issues, such as vessel profitability and fleet efficiency, requires data on both vessel earnings and vessel costs. PacFIN provides excellent data on earnings from landings in Washington, Oregon, and California. However, data are generally not available on other sources of earnings such as landings in Alaska or at-sea deliveries. Cost data is also generally not available. As a result of these data gaps, much of the quantitative economic analysis needed to support sound fisheries management cannot currently be performed.

This survey seeks to minimize the burden on survey respondents while collecting the most essential data needed for economic analysis of fishery management policies. In support of this objective, the survey does not request information that can be reliably obtained from existing data sources. Experience gained from the 1999 limited entry trawl fleet cost-earnings survey has been incorporated into the design of this survey. While the 1999 survey provided data on some vessels, the overall response rate was insufficient for purposes of fleet-wide economic analysis. As a result, the length of this survey is considerably shorter than the 1999 survey. The current survey focuses on collecting four types of data --- information on annual costs for major cost categories, information on annual earnings for major earnings categories not provided by PacFIN, information on vessel characteristics (physical characteristics and fuel usage rates), and crew compensation methods. Information on cost and earnings categories will be collected on an annual rather than seasonal basis in order to minimize the burden on survey respondents.

The survey will contact all owners of commercial fishing vessels that have limited entry permits and trawl gear endorsements. Owners of these vessels will first be contacted by mail. This initial mailing will contain information about the survey as well as the survey questionnaire. This initial mailing will be followed by a telephone call to schedule an in-person interview. Discussions with fleet members have indicated that in-person interviews will yield a higher response rate than mail or telephone interviews. The survey will be fielded during the first quarter of 2005.

The success of this survey depends entirely upon cooperation between industry and science. Over the past decade, the fishing industry has frequently called upon the Council and NMFS to improve the economic analysis of proposed management actions. However, the ability of analysts to predict or document the economic effects of management change is directly dependent upon the reliability and completeness of the data available to them. This is true for major structural shifts, such as implementing Individual Quotas, as well as for more routine management changes. With a sufficient response rate, this survey will greatly improve our ability to provide reliable economic analysis to support sound fisheries management.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Cost/Earning Survey

Dr. Carl Lian (NMFS Northwest Fisheries Science Center [NWFSC]) gave an oral report to the Scientific and Statistical Committee (SSC) on a planned survey of 2003 cost and earnings by the limited entry trawl fleet. The survey, which will be administered during the first quarter of 2005, will provide a snapshot of annual cost and earnings by the limited-entry trawl fleet prior to the trawl buyback program. Previous attempts to collect cost information have not been very successful. To improve the response rate compared to the most recent previous survey, conducted in 1999, the new survey will have a simpler questionnaire and will be administered by means of a personal interview. It is anticipated that the survey will be repeated at three-year intervals. SSC members noted that the simplified questionnaire would not allow the survey to distinguish West Coast fishing activities from those conducted elsewhere and would not measure such costs as debt-financing or other measures of vessel value.

Off-Year Science Activities:

Recreational Catch Per Unit Effort (CPUE) Workshop Report

The SSC received a written report and an oral summary by Dr. Steve Ralston on the Recreational CPUE Statistics Workshop that was held in Santa Cruz, California during June 2004. The report makes suggestions that are relevant for several of the assessments that will be developed during 2005 for several West Coast groundfish stocks, including approaches for CPUE data analyses and bag-limit adjustments. The SSC endorses the report and its recommendations, particularly the recommendation that the Recreational Fishery Information Network (RecFIN) develop a vessel-level database to facilitate recovering CPUE data by trip. The SSC Groundfish Subcommittee chair will work with the RecFIN Technical Committee to facilitate producing the new database.

Stock Assessment Data Workshop Report

Ms. Stacey Miller (NWFSC) distributed a written report on the Stock Assessment Data Workshop that was held in Seattle, Washington during July 2004. The draft report will be circulated to all participants of the workshop and finalized soon. The SSC will review the written report of the workshop at the March 2005 Council meeting.

Stock Assessment Modeling Workshop

Ms. Stacey Miller (NWFSC) gave an oral report to the SSC on the Stock Assessment Modeling Workshop that was held in Seattle, Washington during the last week of October 2004. A written report on the workshop will be included in the Briefing Book for the March 2005 Council meeting. The SSC suggests that the summary recommendations from the workshop should be circulated soon to all workshop participants and the teams that will develop the 2005 stock assessments.

Reviewers from the Center for Independent Experts (CIE) attended both the Recreational CPUE Statistics Workshop and the Stock Assessment Modeling Workshop. The SSC again requests that the reports from the CIE reviewers be included in the public record of the workshops, as has been done with CIE review reports elsewhere in the country.

The SSC commends staff at the NWFSC for organizing and facilitating the suite of successful stock assessment workshops that occurred during 2004. At some future meeting the Council and its advisory committees may wish to formally review the off-year science activities and provide guidance concerning the process for planning such activities for 2006.

Vermillion Rockfish Stock Assessment in 2005

Dr. Alec MacCall presented a brief summary of the data currently available for conducting a stock assessment of vermillion rockfish. Patterns evident in the available size-composition data suggest that any stock assessment model consistent with these data would require considerable complexity or would be based on tenuous assumptions. The SSC concurs with Dr. MacCall's opinion that considerable resources would be required to explore additional data sources and to carry out the analysis, but the likelihood is small that an assessment suitable for management advice would result. The SSC recommends that Dr. MacCall compile the available information, including the southern California commercial passenger fishing vessel observer data and the California set gillnet logbook data, and develop an informational report for review during 2005 by a Stock Assessment Review Panel and inclusion in the 2005 Stock Assessment and Fishery Evaluation document. The SSC anticipates that an assessment for vermillion rockfish may be developed during the 2007 stock assessment cycle.

PFMC
11/02/04

TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND STOCK ASSESSMENT REVIEW PANELS

The Council has annually considered updates to the Scientific and Statistical Committee's (SSC's) Terms of Reference for developing and reviewing groundfish stock assessments. Now, with the multi-year management process in place, stock assessments will be conducted every other year. In 2005, 23 groundfish stock assessments are planned, which will require a significant overhaul of the Terms of Reference for the Groundfish Stock Assessment and Review (STAR) Process for 2005-2006 (Agenda Item E.2.a, Attachment 1). Additionally, the Groundfish Management Team (GMT) and the National Marine Fisheries Service Northwest Region staff have requested complete estimation and reporting of all necessary management parameters and reference points in groundfish stock assessments. Initial review of this Terms of Reference occurred at the September Council meeting. The SSC and GMT statements detailing their recommendations from the September meeting are included as Agenda Item E.2.a, Attachment 2 and Agenda Item E.2.a, Attachment 3, respectively for this agendum. One of the Council tasks under this agendum is to adopt a final Terms of Reference for the Groundfish Stock Assessment and Review Process for 2005-2006.

The SSC's Terms of Reference for Groundfish Rebuilding Analyses was developed by the SSC in 2001 and adopted by the Council in April 2001 (Agenda Item E.2.a, Attachment 4). This Terms of Reference has guided authors of groundfish rebuilding analyses, which are critical for developing rebuilding plans for overfished groundfish stocks. Groundfish Fishery Management Plan Amendment 16-1, which set the process and standards by which the Council specifies rebuilding plans for overfished groundfish stocks, provided for the development of species-specific standards for determining when progress has been adequate for each rebuilding plan. The SSC, other advisors, and the Council should consider additions or modifications to the SSC Terms of Reference for Groundfish Rebuilding Analyses to incorporate species-specific standards for rebuilding plan reviews. The Council task is to provide guidance to the SSC for finalizing the Terms of Reference for Groundfish Rebuilding Analyses that will guide authors on how to incorporate formal rebuilding plan reviews in their rebuilding analyses. Additionally, the Council should resolve the schedule for final adoption of this Terms of Reference.

Council Tasks:

1. **Adopt a final Terms of Reference for the Groundfish Stock Assessment and Review Process for 2005-2006.**
2. **Provide Guidance to the SSC on Finalizing the Terms of Reference for Groundfish Rebuilding Analyses.**

Reference Materials:

1. Agenda Item E.2.a, Attachment 1: Draft Groundfish Stock Assessment and Review Process for 2005-2006.

2. Agenda Item E.2.a, Attachment 2: Supplemental SSC Report from the September 2004 meeting on Terms of Reference for Groundfish Rebuilding Plan Review and Stock Assessment Review Panels.
3. Agenda Item E.2.a, Attachment 3: Supplemental GMT Report from the September 2004 meeting on Terms of Reference for Groundfish Rebuilding Plan Review and Stock Assessment Review Panels.
4. Agenda Item E.2.a, Attachment 4: SSC Terms of Reference for Groundfish Rebuilding Analyses.

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 Final Terms of Reference for STAR Panels

PFMC
10/14/04

GROUNDFISH STOCK ASSESSMENT AND REVIEW PROCESS FOR 2005-2006

Introduction

The purpose of this document is to help the Council family and others understand the groundfish stock assessment review process (STAR). Parties involved are the National Marine Fisheries Service (NMFS); state agencies; the Council and its advisors, including the Scientific and Statistical Committee (SSC), Groundfish Management Team (GMT), Groundfish Advisory Subpanel (GAP), Council staff; and interested persons. The STAR process is a key element in an overall process designed to make timely use of new fishery and survey data, to analyze and understand these data as completely as possible, to provide opportunity for public comment, and to assure that the results are as accurate and error-free as possible. The STAR process is designed to assist in balancing these somewhat conflicting goals of timeliness, completeness and openness.

STAR Goals and Objectives

The goals and objectives for the groundfish assessment and review process[†] are:

a) Ensure that groundfish stock assessments provide the kinds and quality of information required by all members of the Council family.

b) Satisfy the Magnuson-Stevens Sustainable Fisheries Act (SFA) and other legal requirements.

c) Provide a well-defined, Council oriented process that helps make groundfish stock assessments the "best available" scientific information and facilitates use of the information by the Council. In this context, "well-defined" means with a detailed calendar, explicit responsibilities for all participants, and specified outcomes and reports.

d) Emphasize external, independent review of groundfish stock assessment work.

e) Increase understanding and acceptance of groundfish stock assessment and review work by all members of the Council family.

f) Identify research needed to improve assessments, reviews, and fishery management in the future.

g) Use assessment and review resources effectively and efficiently.

Shared Responsibilities

All parties have a stake in assuring adequate technical review of stock assessments. NMFS must determine that the best scientific advice has been used when it approves fishery management recommendations made by the Council. The Council uses advice from the SSC to determine whether the information on which it will base its recommendation is the "best available" scientific advice. Fishery managers and scientists providing technical documents to the Council for use in management need to assure that the work is technically correct. Program reviews, in-depth external reviews, and peer-reviewed scientific publications are used by federal and state agencies to provide quality assurance for the basic scientific methods used to produce stock assessments. However, the time-frame for this sort of review is not suited to the routine examination of assessments that are, generally, the primary basis for a harvest recommendation.

[†] In this document, the term "stock assessment" includes activities, analyses, and management recommendations, beginning with data collection and continuing through to the development of management recommendations by the Groundfish Management Team and information presented to the Council as a basis for management decisions.

The review of current stock assessments requires a routine, dedicated effort that simultaneously meets the needs of NMFS, the Council, and others. Leadership, in the context of the stock assessment review process for groundfish, means consulting with all interested parties to plan, prepare terms of reference, and develop a calendar of events and a list of deliverables. Coordination means organizing and carrying out review meetings, distributing documents in a timely fashion, and making sure that assessments and reviews are completed according to plan. Leadership and coordination involve costs, both monetary and time, which have not been calculated, but are likely substantial.

The Council and NMFS share primary responsibility to create and foster a successful STAR process. The Council will sponsor the process and involve its standing advisory committees, especially the Scientific and Statistical Committee. NMFS will provide a coordinator to oversee and facilitate the process. Together they will consult with all interested parties to plan, prepare terms of reference, and develop a calendar of events and a list of deliverables. NMFS and the Council will share fiscal and logistical responsibilities.

The STAR process is sponsored by the Council because the Federal Advisory Committee Act (FACA) limits the ability of NMFS to establish advisory committees. FACA specifies a procedure for convening advisory committees that provide consensus recommendations to the federal government. The intent of FACA was to limit the number of advisory committees, ensure that advisory committees fairly represent affected parties, and ensure that advisory committee meetings, discussions, and reports are carried out and prepared in full public view. Under FACA, advisory committees must be chartered by the Department of Commerce through a rather cumbersome process. However, the SFA exempts the Council from FACA *per se*, but requires public notice and open meetings similar to those under FACA.

NMFS Responsibilities

NMFS will work with the Council, other agencies, groups, or interested persons that carry out assessment work to organize Stock Assessment Teams (STAT Teams) and STAR Panels, and make sure that work is carried out in a timely fashion according to the calendar and terms of reference. NMFS will provide a senior scientist to coordinate these tasks with assistance from Council staff. To initiate the assessment cycle, NMFS will convene data and modeling workshops so that STAT teams and interested parties (e.g., the GMT) can discuss upcoming stock assessments, external reviews, data sources, and modeling approaches. To promote consistency, representatives from each STAT team are expected to attend both the data and modeling workshops.

The Stock Assessment coordinator, in consultation with the SSC, will select STAR Panel chairs, and will coordinate the selection of external reviewers following criteria for reviewer qualifications, nomination, and selection. The public is welcome to nominate qualified reviewers. Following any modifications to the stock assessments resulting from STAR panel reviews and prior to distribution of the stock assessment documents and STAR panel reports to GMT, the coordinator will review the stock assessments and panel reports for consistency with the terms of reference, especially completeness of the stock assessment Executive Summary. Inconsistencies will be identified and the authors requested to make appropriate revisions in time for the GMT meeting at which ABC and OY recommendations are developed.

Individuals (employed by NMFS, state agencies, or other entities) that conduct assessments or technical work in connection with groundfish stock assessments are responsible for ensuring their work is technically sound and complete. The Council's review process is the principal means for review of complete stock assessments, although additional in-depth technical review of methods and data is desirable. Stock assessments conducted by NMFS, State agencies, or other entities must be completed and reviewed in full accordance with the Terms of Reference (Appendices B and C) at the times specified in the calendar (Appendix A).

GMT Responsibilities

The GMT is responsible for identifying and evaluating potential management actions based on the best available scientific information. In particular, the GMT makes ABC and OY recommendations to the Council based on estimated stock status, uncertainty about stock status, and socioeconomic and ecological factors. The GMT will use stock assessments, STAR Panel reports, and other information in making their recommendations. The GMT's preliminary ABC recommendation will be developed at a meeting that includes representatives from the SSC, STAT Teams, STAR Panels, and GAP. A representative(s) of the GMT will serve as a liaison to each STAR Panel, but will not serve as a member of the Panel. The GMT will not seek revision or additional review of the stock assessments after they have been reviewed by the STAR Panel. The GMT chair will communicate any unresolved issues to the SSC for consideration. Successful separation of scientific (i.e., STAT Team and STAR Panels) from management (i.e., GMT) work depends on stock assessment documents and STAR reviews being completed by the time the GMT meets to discuss preliminary ABC and OY levels. However, the GMT can request additional model projections, based on reviewed model scenarios, in order to develop a full evaluation of potential management actions.

GAP Responsibilities

The chair of the GAP will appoint a representative to track each stock assessment and attend the STAR Panel meeting. The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor.

The GAP representative, along with STAT and SSC representatives, will attend the GMT meeting at which ABC recommendations are made. The GAP representative will also attend subsequent GMT, Council, and other necessary meetings where the assessment is discussed.

The GAP representative will provide appropriate data and advice to the STAR Panel and GMT and will report to the GAP on STAR Panel and GMT meeting proceedings.

SSC Responsibilities

The Scientific and Statistical Committee (SSC) will participate in the stock assessment review process and will provide the GMT and Council with technical advice related to the stock assessments and the review process. The SSC will assign one member from its Groundfish Subcommittee to act as chairman of each STAR Panel. This member is not only expected to attend the assigned STAR Panel meeting, but also the GMT meeting at which ABC recommendations are made (should the need arise), and the Council meetings when groundfish stock assessment agenda items are discussed (see calendar in Appendix A). Specifically, if requested the SSC representative ~~on the STAR Panel~~ will present the STAR Panel report to the ~~at~~ GMT if the Team requires assistance in interpreting the results of a stock assessment. In addition, the SSC representative on a STAR panel will present the Panel's report at SSC and ~~at~~ Council meetings. The SSC representative will also communicate SSC comments or questions to the GMT ~~and STAR Panel chair~~ and other Council advisory bodies. It is the SSC's responsibility to review and endorse any additional analytical work requested by the GMT after the stock assessments have been reviewed by the STAR Panels. In addition, the SSC will review and advise the GMT and Council on projected ABCs and OYs.

The SSC, during their normally scheduled meetings, will serve as arbitrator to resolve disagreements between the STAT Team, STAR Panel, or GMT. The STAT Team and the STAR Panel may disagree on technical issues regarding an assessment. In this case, a complete stock assessment must include a point-by-point response by the STAT Team to each of the STAR Panel recommendations.

Council Staff Responsibilities

Council Staff will prepare meeting notices and distribute stock assessment documents, stock summaries, meeting minutes, and other appropriate documents. Council Staff will help NMFS and the state agencies in coordinating stock assessment meetings and events. Staff will also publish or maintain file copies of reports from each STAR Panel (containing items specified in the STAR Panel's term of reference), the outline for groundfish stock assessment documents, comments from external reviewers, SSC, GMT, and GAP, letters from the public, and any other relevant information. At a minimum, the stock assessments (STAT Team reports, STAR Panel reports, and stock summaries) should be published and distributed in the Council's annual SAFE document.

Stock Assessment Priorities

Stock assessments for West Coast groundfish are conducted periodically to assess abundance, trends, and appropriate harvest levels for these species. Assessments use statistical population models to analyze and integrate a variety of survey, fishery and biological data. Due to the large number of groundfish species that have never been assessed, it is the goal of the Council to increase substantially the number of assessed stocks. A constraint on reaching that objective, however, is that a multi-year management regime has recently been adopted, which limits assessment activities to odd years only (e.g., 2005). Nonetheless, for the upcoming assessment cycle an ambitious list of 23 stocks will be evaluated, including at least five species that have never been assessed.

In establishing stock assessment priorities an number of factors are considered, including:

1. Assessments should take advantage of new information, especially indices of abundance from fishery-independent surveys.

2. Overfished stocks that are under rebuilding plans should be evaluated to ensure that progress towards achieving stock recovery is adequate.

3. ~~Generally, no more than 2 assessments will be reviewed by a STAR Panel when these assessments involve new types of data or assessment methods.~~ In general no more than 2 full assessments will be reviewed by a STAR Panel, although in exceptional circumstances this number may be exceeded, if in consultation the SSC and NMFS stock assessment coordinator conclude that it is advisable and/or necessary to do so.

4. The SSC encourages attempts to study previously un-assessed stocks, but recognizes that often such efforts will not produce a comprehensive understanding of population dynamics. Even so, updates or reports that fall short of a full assessment are still desirable, in order to summarize whatever information exists that may be useful to the Council in making management decisions.

5. Any stock assessment that is considered for use in management should be submitted through normal Council channels and reviewed at STAR Panel meetings.

6. The proposed stocks for assessment should be discussed by the Council at least a year in advance to allow sufficient time for assembly of relevant assessment data and for arrangement of STAR panels.

Terms of Reference for STAR Panels and Their Meetings

The principal responsibility of the STAR Panel is to carry out these terms of reference according to the calendar for groundfish assessments. Most groundfish stocks are assessed infrequently and each assessment and review should result in useful advice to the Council. The STAR Panel's work includes:

1. reviewing draft stock assessment documents and any other pertinent information (e.g.; previous assessments and STAR Panel reports, if available);
2. working with STAT Teams to ensure assessments are reviewed as needed;
3. documenting meeting discussions; and
4. reviewing summaries of stock status (prepared by STAT Teams) for inclusion in the SAFE document.

STAR Panels normally include a chairman, at least one "external" member (i.e., outside of the Council family and not involved in management or assessment of West Coast groundfish), and one SSC member. The total number of STAR members should be at least "n+2" where n is the number of stock assessments and "2" counts the chair and external reviewer. In addition to Panel members, STAR meetings will include GMT and GAP advisory representatives with responsibilities laid out in their terms of reference. STAR Panels normally meet for one week.

The number of assessments reviewed ~~per~~ by a STAR Panel should not exceed two except in unusual circumstances (see item 3 above).

The STAR Panel is responsible for determining if a stock assessment document is sufficiently complete according to Appendix B: Outline for Groundfish Stock Assessments. It is the Panel's responsibility to identify assessments that cannot be reviewed or completed for any reason. The Panel's decision that an assessment is complete should be made by consensus. If a Panel cannot reach agreement, then the nature of the disagreement must be described in the Panel's report.

For some species the data will be insufficient to calculate reliable estimates of F_{msy} (or its proxy), B_{msy} (or its proxy), ending biomass or unfished biomass, etc. Results of these data-poor assessments typically will not meet the requirements of a full assessment and, in those instances, each STAR Panel should consider what inferences can be drawn from the analysis presented by the STAT Team. The panel should review the reliability and appropriateness of any methods used to draw conclusions about stock status and exploitation potential and either recommend or reject the analysis on the basis of its ability to introduce useful information into the management process.

The STAR Panel's terms of reference solely concern technical aspects of the stock assessment. It is therefore important that the panel should strive for a risk neutral perspective in its reports and deliberations. Assessment results based on model scenarios that have a flawed technical basis, or are implausible on other grounds, should be identified by the panel and excluded from the set upon which management advise is to be developed. It is recognized that some of these implausible results may need to be reported in the STAT Team document in order to better define the scope of the accepted model results. The STAR panel should comment on the degree to which the accepted model scenarios describe and quantify the major sources of uncertainty, and the degree to which the probabilities associated with these scenarios are technically sound. The STAR panel may also provide qualitative comments on the probability of various model results, especially if the panel does not believe that the probability distributions calculated by the STAT capture all major sources of uncertainty.

Recommendations and requests to the STAT Team for additional or revised analyses must be clear, explicit and in writing. A written summary of discussion on significant technical points and lists of all STAR Panel recommendations and requests to the STAT Team are required in the STAR Panel's report. This should be completed (at least in draft form) prior to the end of the meeting. It is the chair and Panel's responsibility to carry out any follow-up review work that is required.

The primary goal of the STAR Panel is to complete a detailed evaluation of the results of a stock assessment, which puts the Panel in a good position to advance the best available scientific information to the Council. Under ideal circumstances, the STAT Team and STAR Panel should strive to reach a mutual consensus on a single base model, but it is essential that uncertainty in the analysis be captured and transmitted to managers. A useful way of accomplishing this objective is to bracket the base model along what is deemed to be the dominant dimension of uncertainty (e.g., spawner-recruit steepness, natural mortality rate, survey catchability, year-class strength, etc.). Once a base model has been bracketed on either side by alternative model scenarios, which capture the overall degree of uncertainty in the assessment, a 2-way decision table analysis (states-of-nature versus management action) is the preferred way to present the repercussions of uncertainty to management. Bracketing of assessment results could be accomplished in a variety of ways, including ambiguity in the data, statistical precision, or model specification uncertainty, but as a matter of practice the STAR Panel should strive to identify a single preferred model when possible, so that averaging of extremes doesn't become the *de facto* choice of management.

To the extent possible additional analyses required in the stock assessment should be completed during the STAR Panel meeting. It is the obligation of the STAR Panel chairperson, in consultation with other Panel members, to prioritize requests for additional STAT Team analysis. If follow-up work by the STAT Team is required after the review meeting, then it is the Panel's responsibility to track STAT Team progress. In particular, the chair is responsible for communicating with all Panel members (by phone, e-mail, or any convenient means) to determine if the revised stock assessment and documents are complete and ready to be used by managers in the Council family. If stock assessments and reviews are not complete at the end of the STAR Panel meeting, then the work must be completed prior to the GMT meeting where the assessments and preliminary ABC levels are discussed.

The STAR Panel, STAT Team, and all interested parties are legitimate meeting participants that must be accommodated in discussions. It is the STAR Panel chair's responsibility to manage discussions and public comment so that work can be completed.

STAT Teams and STAR Panels are likely to disagree on certain technical issues. If the STAR Panel and STAT Team disagree, the STAR Panel must document the areas of disagreement in its report. The STAR Panel may also request additional analysis based on an alternative approach. However, the STAR Panel's primary duty is to conduct a peer review of the assessment that is presented. In the course of this review, the Panel may ask for a reasonable number of sensitivity runs, additional details of existing assessments, or similar items from the STAT team. However, the STAR Panel is not authorized to conduct an alternative assessment representing its own views that are distinct from those of the STAT Team, nor can it impose an alternative assessment on the Team. Rather, if the Panel finds that an assessment is inadequate, it should document and report that opinion and, in addition, suggest remedial measures that could be taken by the STAT team to rectify whatever perceived shortcomings may exist. Where fundamental differences of opinion remain between the STAR Panel and STAT Team, which cannot be resolved by mutual discussion, the SSC will review the dispute and will issue its own recommendation.

The SSC representative on the STAR Panel is expected to attend GMT and Council meetings where stock assessments and harvest projections are discussed to explain the reviews and provide other technical information and advice. The chair is responsible for providing Council staff with a camera ready and suitable electronic version of the Panel's report for inclusion in the annual SAFE report.

Suggested Template for STAR Panel Report

1. Minutes of the STAR Panel meeting containing
   A. Name and affiliation of STAR Panel members; and
   B. List of analyses requested by the STAR Panel.
2. Comments on the technical merits and/or deficiencies in the assessment and recommendations for remedies.
3. Explanation of areas of disagreement regarding STAR Panel recommendations:
   A. among STAR Panel members (majority and minority reports), and
   B. between the STAR Panel and STAT Team
4. Unresolved problems and major uncertainties, e.g.; any special issues that complicate scientific assessment, questions about the best model scenario.
5. Prioritized recommendations for future research and data collection

Terms of Reference for Groundfish STAT Teams

The STAT Team will carry out its work according to these terms of reference and the calendar for groundfish stock assessments.

Each STAT Team will appoint a representative who will attend any data and modeling workshops. STAT Teams are encouraged to also organize independent meetings with industry and interested parties to discuss issues, questions, and data.

Each STAT Team will appoint a representative to coordinate work with the STAR Panel and attend the STAR Panel meeting.

Each STAT Team will appoint a representative who will attend the GMT meeting and Council meeting where preliminary acceptable biological catch (ABC) and optimum yield (OY) levels are discussed. In addition, a representative of the STAT Team should attend the GMT and Council meeting where final ABC and OY levels are discussed, if requested or necessary. At these meetings, the STAT Team member shall be available to answer questions about the STAT Team report.

The STAT Team is responsible for preparing three versions of the stock assessment document: 1) a "draft" for discussion at the stock assessment review meeting; 2) a revised "complete draft" for distribution to the GMT, SSC, GAP, and Council for discussions about preliminary ABC and OY levels; 3) a "final" version published in the SAFE report. Other than authorized changes, only editorial and other minor changes should be made between the "complete draft" and "final" versions. The STAT Team will distribute "draft" assessment documents to the STAR Panel, Council, and GMT and GAP representatives at least two weeks prior to the STAR Panel meeting.

The STAT Team is responsible for bringing computerized data and working assessment models to the review meeting in a form that can be analyzed on site. STAT Teams should take the initiative in building and selecting candidate models and should have several complete models ready to present to the STAR Panel and be prepared to discuss the merits of each.

The STAT Team is responsible for producing a complete draft of the assessment by the end of the STAR Panel meeting. In the event that a complete draft is not completed, the Team is responsible for completing the work to the satisfaction of the STAR Panel as soon as possible, but within at least one week before the GMT meets to discuss the results of the assessment.

The STAT Team and the STAR Panel may disagree on technical issues regarding an assessment, but a complete stock assessment must include a point-by-point response by the STAT Team to each of the STAR Panel's recommendations. Estimates and projections representing all sides of the disagreement need to be presented, reviewed, and commented on by the SSC.

For stocks which are projected to fall below overfished thresholds, the STAT Team must complete a rebuilding analysis according to the SSC's Terms of Reference for Groundfish Rebuilding Analyses[2]. It is recommended that this analysis be conducted using the rebuilding software developed by Dr. Andre Punt (aepunt@u.washington.edu). However, authors are also encouraged to present alternative approaches (where appropriate), along with clear justification for why the alternative may be an improvement over the approach described in the SSC's Terms of Reference. The STAT Team is also responsible for preparing a document that summarizes the results of the rebuilding analysis. .

Electronic versions of final assessment documents, rebuilding analyses, parameter files, data files, and key output files will be sent to the Stock Assessment Coordinator for inclusion in a stock assessment archive.

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[2]SSC Terms of Reference for Groundfish Rebuilding Analyses (Final Draft). Exhibit F.7, Supplemental SSC Terms of Reference, April 2001. Available from the PFMC, 7700 NE Ambassador Place, Suite 200, Portland, OR, 97220-1384, (503) 820-2280.

Appendix A: 2005-2006 Stock Assessment Review Calendar

July 26-30, 2004	Data Workshop (AFSC, Seattle)
Oct. 25-29, 2004	Modeling Workshop (NWFSC, Seattle)
Nov. 1-5, 2004	PFMC adoption of Stock Assessment Terms of Reference (Portland)
Feb. 1-3, 2005	STAR Panel #1: Pacific whiting
April 18-22, 2005	STAR Panel #2: English sole, petrale sole, starry flounder
May 2-6, 2005	STAR Panel #3: California scorpionfish, vermilion rockfish, cowcod
May 16-20, 2005	STAR Panel #4: Pacific ocean perch, darkblotched rockfish, gopher rockfish, cabezon
June 20-24, 2005	STAR Panel #5: sablefish, Dover sole, longspine thornyhead, shortspine thornyhead
Aug. 1-5, 2005	STAR Panel #6: widow rockfish, bocaccio, blackgill rockfish, kelp greenling
Aug. 15-19, 2005	STAR Panel #7: lingcod, canary rockfish, yelloweye rockfish, yellowtail rockfish
Sept.-Oct., 2005	Mop-up STAR Panel (if needed)
Sept., 2005	GMT meeting
Sept. 18-23, 2005	PFMC preliminary adoption of ABCs and OYs (Portland)
Nov. 1-4, 2005	PFMC continued adoption of ABCs and OYs (San Diego)
April 3-7, 2006	PFMC preliminary adoption of management measures for 2007-2008 (California)
June 12-16, 2006	PFMC final adoption of management measures for 2007-2008 (????)

Appendix B: Outline for Groundfish Stock Assessment Documents

This is an outline of items that should be included in stock assessment reports for groundfish managed by the Pacific Fishery Management Council. The outline is a working document meant to provide assessment authors with flexible guidelines about how to organize and communicate their work. All items listed in the outline may not be appropriate or available for each assessment. In the interest of clarity and uniformity of presentation, stock assessment authors and reviewers are encouraged (but not required) to use the same organization and section names as in the outline. It is important that time trends of catch, abundance, harvest rates, recruitment and other key quantities be presented in tabular form to facilitate full understanding and followup work.

a. Title page and list of preparers – the names and affiliations of the stock assessment team (STAT) either alphabetically or as first and secondary authors

b. Executive Summary (see attached template and example in Appendices C and D). This also serves as the STAT summary included in the SAFE.

c. Introduction
   1. Scientific name, distribution, stock structure, regional differences in life history or other biological characteristics, management units
   2. Important features of life history that affect management (e.g., migration, sexual dimorphism, bathymetric demography)
   3. Important features of current fishery and relevant history of fishery
   4. Management history (e.g., changes in mesh sizes, trip limits, optimum yields)
   5. Management performance – a table or tables comparing acceptable biological catches, optimum yields, landings, and catch (i.e., landings plus discard) for each area and year

d. Assessment
   1. Data
      a. Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g.; growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.
      b. Sample size information for length and age composition data by area, year, gear, market category, etc., including both the number of trips and fish sampled.
   2. History of modeling approaches used for this stock – changes between current and previous assessment models
   3. Model description
      a. Complete description of any new modeling approaches.
      b. Assessment program with last revision date (i.e., date executable program file was compiled).
      c. List and description of all likelihood components in the model.
      d. Constraints on parameters, selectivity assumptions, natural mortality, assumed level of age reader agreement or assumed ageing error (if applicable), and other assumed parameters.
      e. Description of stock-recruitment constraints or components.
      f. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0, stable age structure, etc.).
      g. Critical assumptions and consequences of assumption failures.
   4. Model selection and evaluation
      a. Evidence of search for balance between model realism and parsimony.
      b. Use nested models where possible (e.g.; asymptotic vs. domed selectivities, constant vs. time varying selectivities).
      c. Do parameter estimates make sense, are they credible?
      d. Residual analysis (e.g.; residual plots, time series plots of observed and predicted values, or other approach).
      e. Convergence status and convergence criteria for the base-run model.

    f. Randomization run results or other evidence of search for global best estimates.

5. Base-run(s) results
    a. Table listing all parameters in the stock assessment model used for base runs, their purpose (e.g.; recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.
    b. Population numbers at age × year.
    c. Time-series of total and spawning biomass, depletion relative to B_0, recruitment and fishing mortality or exploitation rate estimates (table and figures).
    d. Selectivity estimates (if not included elsewhere).
    e. Stock-recruitment relationship.
6. Uncertainty and sensitivity analyses. The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation. Important factors to consider include:
    a. Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles of important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs by an appropriate methods (e.g., bootstrap, Bayesian approaches, or MCMC).
    b. Sensitivity to data set choice and weighting schemes (e.g., emphasis or λ factors), which may also include a consideration of recent patterns in recruitment.
    c. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.
    d. Retrospective analysis.
    e. Historical analysis (plot of actual estimates from current and previous assessments).
    f. Decision table analysis.
    g. Subjective appraisal of the magnitude and sources of uncertainty.
    h. If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each.
    i. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

e. <u>Rebuilding parameters</u> –
1. Determine B_o as the product of spawners per recruit (SPR) in unfished state multiplied by the average recruitment expected while the stock is unfished. This typically is estimated as the average recruitment during early years of fishery. According to the 1999 SAFE report (PFMC 1999, p. 24)[3], the values for spawners are preferably measured as total population egg production, but female spawning biomass is a common proxy.
2. $B_{msy} = 0.4\ B_o$;
3. Mean generation time; and
4. Forward projection using a Monte Carlo re-sampling of recruitments expected to occur as the stock rebuilds, where future recruitments typically are taken from the recent time series of estimated recruitments or recruits per spawner. Alternatively, if a credible stock-recruitment relationship can be estimated, it could be used to project population growth. Either approach can be conducted using the Punt rebuilding software (see above).

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[3]Pacific Fishery Management Council. 1999. Status of the Pacific Coast Groundfish Fishery Through 1998 and Recommended Biological Catches for 2000: Stock Assessment and Fishery Evaluation. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 2130 SW Fifth Avenue, Suite, 224, Portland, Oregon 97201.

f. Reference Points (biomass and exploitation rate)

g. Harvest projections and decision tables

   a. Harvest projections and decision tables (i.e., a matrix of states of nature versus management action) should cover the plausible range of uncertainty about current biomass and the full range of candidate fishing mortality targets used for the stock or requested by the GMT. These should at least include calculation of the ABC based on F_{msy} (or its proxy) and the OY that is implied under the Council's 40:10 harvest policy. Ideally, the alternatives described in the decision table will be drawn from a probability distribution which describes the pattern of uncertainty regarding the status of the stock and the consequences of alternative future management actions. Where alternatives are not formally associated with a probability distribution, the document needs to present sufficient information to guide assignment of approximate probabilities to each alternative.
   b. Information presented should include biomass and yield projections of ABC and OY for ten years into the future, beginning with the first year for which management action could be based upon the assessment.

8. Research needs (prioritized).

9. Acknowledgments-include STAR Panel members and affiliations as well as names and affiliations of persons who contributed data, advice or information but were not part of the assessment team.

10. Literature cited.

11. Complete parameter and data in the native code of the stock assessment.

Appendix C: Template for Executive Summary Prepared by STAT Teams

Stock: species/area

Catches: trends and current levels-include table for last ten years and graph with long term data

Data and assessment: date of last assessment, type of assessment model, data available, new information, and information lacking

Unresolved problems and major uncertainties: any special issues that complicate scientific assessment, questions about the best model scenario, etc.

Reference points: management targets and definition of overfishing

Stock biomass: trends and current levels relative to virgin or historic levels, description of uncertainty-include table for last 10 years and graph with long term estimates

Recruitment: trends and current levels relative to virgin or historic levels-include table for last 10 years and graph with long term estimates

Exploitation status: exploitation rates (i.e., total catch divided by exploitable biomass) – include table for last 10 years and graph with long term estimates.

Management performance: catches in comparison to ABC and OY values for the most recent 10 years (when available), overfishing levels, actual catch and discard

Forecasts: ten forecasts of catch, biomass, and depletion

Decision table:

Research and data needs:

Rebuilding Projections: principal results from rebuilding analysis if the stock is overfished

Appendix D: Example a Complete Stock Assessment Executive Summary

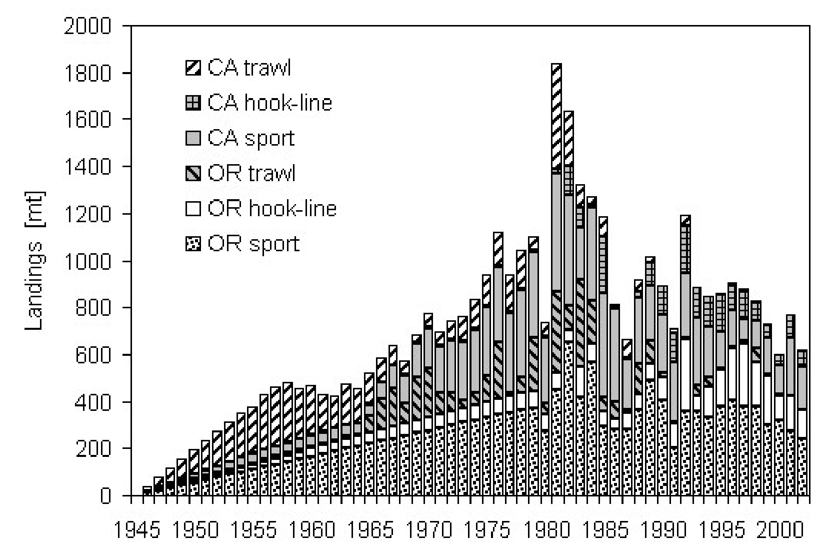
Executive Summary

Stock: This assessment pertains to the black rockfish (*Sebastes melanops*) population resident in waters located off northern California and Oregon, including the region between Cape Falcon and the Columbia River. Genetic information is presented that indicates black rockfish within that area represent a single homogeneous unit. A separate analysis of black rockfish off the coast of Washington and Oregon north of Cape Falcon was conducted by Wallace *et al*. (1999).

Catches: Catches of black rockfish from Oregon and California were classified into 6 distinct fisheries, i.e., the recreational, commercial hook-and-line, and trawl sectors from each State. Since 1978, when consistent catch reporting systems began, landings have ranged from 602–1,836 mt. From 1978-2002 recreational catches have been reasonably consistent and have predominated. Concurrently, hook-and-line landings have increased as trawl landings have decreased. For this assessment, catches from 1945-77 were estimated from fragmented data and were ramped up by linear interpolation to known values in 1978. Discard rates of black rockfish are thought to be negligible, so the catch was assumed equal to the landings.

Recent black rockfish catch statistics [mt] by fishery

	Oregon			California			
Year	Sport	Hook	Trawl	Sport	Hook	Trawl	Total
1993	360.8	65.7	43.7	284.0	129.1	2.2	885.5
1994	330.0	131.2	43.4	210.0	130.9	1.1	846.6
1995	377.4	158.5	4.3	158.0	156.9	2.7	857.8
1996	401.3	225.6	7.7	154.0	103.4	10.5	902.5
1997	375.9	267.6	17.1	91.0	112.8	14.1	878.5
1998	375.2	191.6	58.6	117.0	78.6	6.3	827.3
1999	301.6	207.7	2.3	162.0	49.0	3.9	726.5
2000	320.7	105.6	0.6	129.0	43.7	2.3	601.9
2001	275.4	146.2	0.2	248.0	96.6	2.1	768.5
2002	241.6	125.2	1.2	179.7	67.0	2.0	616.7

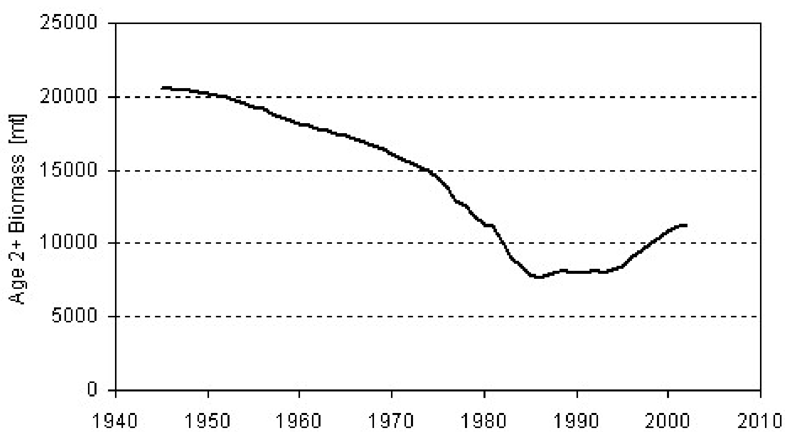


Data and Assessment: A variety of data sources was used in this assessment including: (1) recreational landings, age, and size composition data from the Oregon Department of Fish and Wildlife (ODF&W), (2) recreational landings (all California and Oregon shore-based modes) from the RECFIN data base, (3) Oregon commercial landings (trawl and hook-and-line) from the PACFIN data base, (4) size compositions for the commercial fisheries in Oregon from ODF&W, (5) California commercial landings and length compositions from the CALCOM database, (6) a recreational catch-per-unit-effort (CPUE) statistic developed from information provided by ODF&W, (7) recreational CPUE statistics for each State derived from the RECFIN data base, and (8) a recreational CPUE statistic developed from the CDF&G central California CPFV data base. These multiple data sources were combined in a maximum likelihood statistical setting using the length-based version of the Stock Synthesis Model (Methot 1990, 2000).

Unresolved Problems and Major Uncertainties: The major sources of uncertainty in this stock assessment include: (1) the amount of historical landings that occurred prior to the 1978, (2) the assumed natural mortality rate, and (3) the steepness of the spawner-recruit curve.

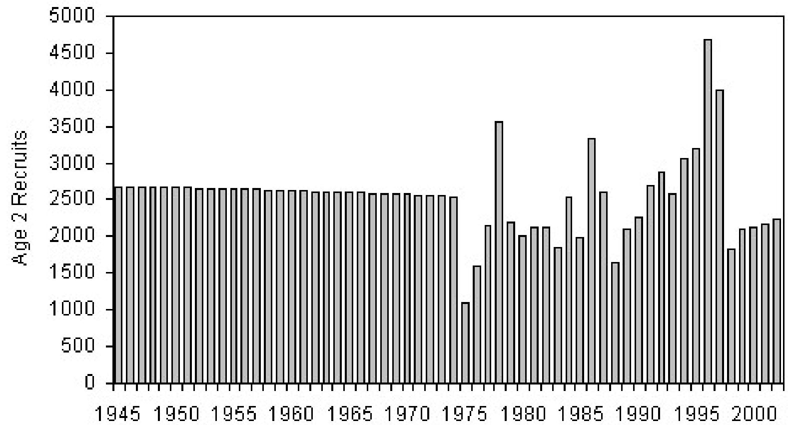
Reference Points: Based on the Pacific Fishery Management Council's current default harvest rate policy for *Sebastes*, the target harvest rate for black rockfish is $F_{50\%}$. Given the life history of the species, and the prevailing mix of fisheries in 2002 (predominately recreational with some commercial hook-and-line catches), this corresponds to an exploitation rate of about 7.7%. Moreover, the Council's current target biomass level for exploited groundfish stocks is $B_{40\%}$, i.e., the spawning output of the stock is reduced to 40% of that expected in the absence of fishing. For black rockfish that corresponds to spawning output of 1.258×10^9 larvae.

Stock Biomass: The biomass of age 2+ black rockfish underwent a significant decline from a high of 20,510 mt in 1945 to a low of 7,702 mt in 1986, representing a 62% decline. Since that time, however, the stock has



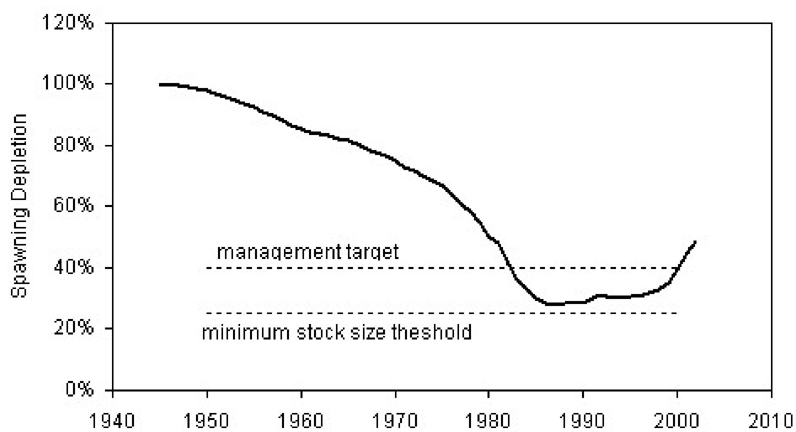
increased and is currently estimated to be 11,232 mt. Most of the population's growth occurred after 1995, due to several large recruitment events, including especially the 1994 and 1995 year-classes.

Recruitment: In the assessment recruitment was treated as a blend of deterministic values (i.e., 1945-1974 & 1999-2002) and stochastic values (i.e., 1975-1998). The Beverton-Holt steepness parameter (***h***) was fixed at a value of 0.65, based upon on a profile of goodness-of-fit and results from a prior meta-analysis of rockfish productivity. During the 1975-1998 period there was a significant increasing trend in recruitment, even as spawning output declined. That trend culminated with the recruitment of the 1994 and 1995 year-classes, which were about twice as large as expected, based on the predicted value from the spawner-recruit curve.



Exploitation Status: The northern California-Oregon stock of black rockfish is in healthy condition, with 2002 spawning output estimated to be 49% of the unexploited spawning level. This places the stock well above the management target level of $B_{40\%}$. Likewise, age 2+ biomass in 2002 is estimated to be 11,232 mt, which is 55% of that expected in the absence of fishing.

Management Performance: Black rockfish in the southern area (Eureka & Monterey INPFC areas) have historically been managed as part of the "Other Rockfish" category, with no explicit ABC or OY designated. For 2001 the ABC of all species within that group was 2,702 mt. In contrast, in the northern area (Vancouver & Columbia INPFC areas) black rockfish is managed within the "Remaining Rockfish" category, with a designated 2001 ABC of 1,115 mt.



Forecasts: A forecast of stock abundance and yield was developed under the base model. In this projection there was no 40:10 reduction in OY from the calculated ABC because the stock is estimated to be above the management target ($B_{40\%}$) and annual yields were calculated using an $F_{50\%}$ exploitation rate (see above). Results are shown in the following table:

	Age 2+	Spawning		ABC Exploitation	Yield [mt]	
Year	Biomass	Output	Recruits	Rate	ABC	= OY
2003	11,342	1.63E+09	2,307	7.60%	802	802
2004	11,217	1.66E+09	2,353	7.45%	775	775
2005	11,082	1.65E+09	2,386	7.34%	753	753
2006	10,938	1.62E+09	2,394	7.29%	736	736
2007	10,802	1.57E+09	2,392	7.28%	725	725
2008	10,700	1.53E+09	2,381	7.29%	719	719
2009	10,621	1.50E+09	2,366	7.30%	715	715
2010	10558	1.48E+09	2,354	7.32%	713	713
2011	10505	1.47E+09	2,343	7.34%	711	711
2012	10459	1.46E+09	2,335	7.35%	708	708

Decision Table: The amount of historical catch prior to 1978 was considered a major source of uncertainty in this assessment. Although some catch estimates were available prior to that time, which were not inconsequential, no continuous time series of catches from the sport and trawl fisheries in Oregon and California could be identified. Therefore, the catch record was assumed to begin in 1945, with no historical catches prior to that year. Catches were then made to ramp up to 1978, using whatever external data were available and linear interpolations to fill missing values. To bracket uncertainty in these catches and their effect on the management system: (1) high and low catch scenarios were created, (2) the base assessment model was refitted to each series, and (3) 10-year yield projections run. Results show that if historical catches were lower than in the base model the calculated OY (= ABC) is reduced. Conversely, if historical catches were higher than modeled the OY would be higher. For purposes of comparison, total catches for 2000, 2001, and 2002 were 602, 768, and 617 mt, respectively.

	Low Catch Scenario		Base Model		High Catch Scenario	
Year	OY [mt]	Depletion	OY [mt]	Depletion	OY [mt]	Depletion
2003	757	54.2%	802	51.9%	886	48.1%
2004	729	54.9%	775	52.7%	861	49.0%
2005	706	54.5%	753	52.5%	842	48.9%
2006	688	53.3%	736	51.4%	828	48.2%
2007	676	51.7%	725	50.0%	820	47.1%
2008	668	50.3%	719	48.8%	817	46.2%
2009	663	49.2%	715	47.9%	816	45.6%
2010	660	48.3%	713	47.2%	816	45.1%
2011	657	47.7%	711	46.7%	816	44.9%
2012	654	47.2%	708	46.3%	816	44.7%

Research and Data Needs: The black rockfish review panel identified certain gaps in the available information that hindered the stock assessment. These were: (1) a fishery-independent survey should be developed to monitor changes in black rockfish population abundance, (2) the California CPFV data set should be more thoroughly investigated to ascertain whether or not serial depletion of fishing sites has artificially kept catch rates high [see Appendix 1], (3) a standard approach to historical catch reconstructions should be developed, (4) the possibility of time-varying growth should be investigated, and (5) the calculation of the RECFIN catch-per-unit-effort statistic should be more thoroughly analyzed and verified.

Rebuilding Projections: The assessment indicates that black rockfish is well above the limit overfished threshold ($B_{25\%}$). Therefore, no rebuilding calculations were conducted.

Appendix E: History of STAR process

In 1995 and earlier years, stock assessments were examined at a very early stage during *ad hoc* stock assessment review meetings (one per year). SSC and GMT members often participated in these meetings and provided additional review of completed stock assessments during regular Council meetings. There were no terms of reference or meeting reports from the *ad hoc* meetings. NMFS provided leadership and coordination by setting up meetings. Each agency or Council paid their own travel costs. Council staff distributed meeting announcements and some background documents. The Council paid for publication of assessments as appendices to the annual Stock Assessment and Fishery Evaluation (SAFE) document.

A key event occurred in July 1995 when NMFS convened an independent, external review of West Coast groundfish assessments.[1] The report concluded that: 1) uncertainties associated with assessment advice were understated; 2) technical review of groundfish assessments should be more structured and involve more outside peers; and 3) the distinction between scientific advice and management decisions was blurred. Work to develop a process to review groundfish stock assessments was aimed at resolving these problems.

For 1996, the groundfish stock assessment review process was expanded to include: 1) terms of reference for the review meeting; 2) an outline for the contents of stock assessments; 3) external anonymous reviews of previous assessments; and 4) a review meeting report.[2] Plans were developed during March and April Council meetings and NMFS convened a week long review meeting in Newport, Oregon where preliminary groundfish stock assessments were discussed. The expanded process itself was reviewed by the Council family at an evaluation meeting at the end of the year. Leadership and planning responsibilities were shared by the SSC Groundfish Subcommittee, NMFS, GMT, GAP, and persons who participated in planning discussions during the March and April Council meetings. There was no formal coordination except for the review meeting terms of reference, organization of the review meeting by NMFS, and as provided by Council staff for publication of documents. Costs were shared as in previous years.

The review process for 1997 was further expanded based on a planning meeting in December 1996.[3] It was agreed that agencies (including NMFS and state agencies) conducting stock assessments were responsible for making sure assessments were technically sound and adequately reviewed. A Council-oriented review process was developed that included agencies, the GMT, GAP, and other interested members of the Council family. The process was jointly funded by the Council and NMFS, with NMFS hosting the Stock Assessment Review (STAR) Panel meetings and paying the travel expenses of the external reviewers, and the Council paying for travel expenses of the GAP representative and non-federal GMT and SSC members.

The process for 1997 included: 1) goals and objectives; 2) three STAR Panels, including external membership; 3) terms of reference for STAR Panels; 4) terms of reference for Stock Assessment (STAT) Teams; 5) a refined outline for stock assessments; 6) external anonymous reviews; 7) a clearer distinction between science and management; and 8) a calendar of events with clear deliverables, dates and well defined responsibilities. For the first time, STAR Panels and STAT Teams were asked to provide “decision table” analyses of the effects of uncertain management actions and to provide information required by the GMT in choosing harvest strategies. In addition, STAR Panels were asked to prepare “Stock Summaries” that described the essential elements of stock assessment results in a concise, simple format.

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[1]Anon. 1995. West coast groundfish assessments review, August 4, 1995. Pacific Fishery Management Council. Portland, OR.

[2] Brodziak, J., R. Conser, L. Jacobson, T. Jagielo, and G. Sylvia. 1996. Groundfish stock assessment review meeting - June 3-7, 1996 in Newport, Oregon. *In*: Status of the Pacific coast groundfish fishery through 1996 and recommended acceptable biological catches for 1997. Pacific Fisheries Management Council. Portland, OR.

[3]Meeting Report, Proposals and Plans for Groundfish Stock Assessment and Reviews During 1997 (May 8, 1997). Pacific Fishery Management Council, 2130 SW Fifth Avenue, Suite 224, Portland, OR 97201.

At the end of 1997, participants met to discuss events and make recommendations for 1998.[4] Participants concluded that objectives were, to varying degrees, achieved during 1997. A notable shortfall was in "increasing acceptance and understanding by all members of the Council family." The most significant issues seemed to be the nature of the STAR Panels' responsibilities, communicating uncertainty to decision makers, workload, and inexperience in conducting the review process.

In retrospect, there was no formal coordination and leadership except for the terms of reference and the calendar. As in previous years, Council staff coordinated distribution of meeting announcements and distribution of documents. Costs increased substantially due to travel for external experts, increased number of review meetings (three instead of one), and distribution of larger and additional reports. NMFS paid travel and other costs for external members of STAR Panels. Other costs were distributed as in 1996. It was not possible for the Council to copy and distribute all of the stock assessments because of limited funds.

In 1998, the stock assessment process was similar to that in 1997, including the 8 elements listed above. In November, a joint session of the SSC, GMT, and GAP was held to review events in 1998 and make recommendations for 1999. Several topics were discussed, including policy issues related to the 1998 terms of reference and operational issues related to how the terms of reference were implemented in 1998. This meeting produced a list of recommended changes for 1999, including:

- increasing the SSC's involvement in the process;
- clarify/modify the participant roles;
- limit the number of assessments, especially the difficulty caused by the late addition of assessments (e.g., sablefish and shortspine thornyhead in 1998);
- increase the involvement of external participants;
- timeliness in completing and submitting assessments; and
- duration of STAR Panel meetings, and the time required to adequately reviewing assessments.

Accordingly, the terms of reference were amended to include a cut-off date of November by which anyone proposing to present an assessment for review in the following year must notify the stock assessment coordinator. This change will ensure there is adequate time for formation and planning of STAR Panel meetings. The terms of reference were also changed to clarify the SSC's role in the process as "editor" and "arbiter;" the SSC will hear reports from all STAR Panels at its September meeting and will be involved in any unresolved issues between the STAT Teams, STAR Panels, or the GMT. Other issues were raised that had no quick solutions, such as how to incorporate socioeconomic information into the process, and how to present the decision tables to GMT and Council members.

Other than the changes noted above, the 1999 STAR process was similar to 1997 and 1998. As in previous years, a joint meeting of the SSC, GAP, and GMT was convened to review and evaluate the stock assessment process and to recommend modifications for 2000. There were relatively few concerns about the process in 1999, and they centered mainly around the difficulty of recruiting sufficient (external and internal) reviewers. Participants did not recommend departing from the current terms of reference regarding STAR panel composition, although they seemed to regard it more as a goal than a strict requirement. A notable continuing concern was the timeliness of STAT team reports prior to the STAR panel meetings.

Requirements for stock rebuilding analyses and monitoring of rebuilding progress and their relationship to the STAR process were also discussed. The group agreed that the terms of reference should be modified to require additional values (e.g., B_{msy}) be tabulated and included in STAT Team report related to an overfished species. There was general agreement that the STAR process should be used to review assessments of overfished species,

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[4] Jacobson, L.D. (ed.). 1997. Comments, issues and suggestions arising from the groundfish stock assessment and review process during 1997. Report to the Pacific Fishery Management Council (Revised Supplemental Attachment B.9.b, November 1997).

which are still likely to be on a 3-year cycle. However, the STAR process is not the appropriate process for the "monitoring" reports (required every 2 years), when they are out of phase with the assessment cycle.

Additionally, it was agreed that certain additional values should be consistently tabulated in the STAT team report in order to build a long-term computerized database of key parameters. The group noted that this would not impose additional work for the STAT team, but would simply require these values to be reported consistently.

The 2000 STAR process was reviewed during a joint meeting of the GAP, GMT, and SSC at the November 2000 meeting. There were relatively few recommendations for improvement to the terms of reference for 2001, although concerns about the long-term future for the STAR process were raised. It was agreed that the future of the STAR process would be evaluated during 2001, but the STAR process in 2001 would proceed similarly to past years. For the 2001 STAR process, participants at the review meeting recommended that greater efforts be made to produce and distribute documents in a timely manner and to assure their completeness and consistency with the terms of reference. In addition, the SSC agreed that its groundfish subcommittee would meet in concert with the GMT during the August 2001 meeting to identify issues, if any, with the assessments or STAR panel reviews that may require additional consideration by the SSC.

At the March 2001 PFMC meeting, the SSC provided recommendations for integrating rebuilding analyses and reviews into the STAR process for 2001.

Appendix F: Terms of Reference for Expedited Stock Assessment Updates

While the ordinary STAR process is designed to provide a general framework for obtaining a comprehensive, independent review of a stock assessment, in other situations a less rigorous review of assessment results is desirable. This is especially true in situations where a "model" has already been critically examined and the objective is to simply update the model by incorporating the most recent data. In this context a model refers not only to the population dynamics model *per se*, but to the particular data sources that are used as inputs to the model, the statistical framework for fitting the data, and the analytical treatment of model outputs used in providing management advice, including reference points, the allowable biological catch (ABC) and optimum yield (OY). When this type of situation occurs, it is an inefficient use of scarce personnel resources to assemble a full STAR Panel for a whole week to evaluate an accepted modeling framework. These terms of reference establish a procedure that can accommodate an abbreviated form of review for stock assessment models that fall into this latter category. However, it is recognized that what in theory may seem to be a simple update, may in practice result in a situation that is impossible to resolve in an abbreviated process. In these cases, it may not be possible to update the assessment – rather the assessment may need to be revised in the next full assessment review cycle.

Qualification

The Scientific and Statistical Committee (SSC) will determine when a stock assessment qualifies for an expedited update under these terms of reference. To qualify, a stock assessment must carry forward its fundamental structure from a model that was previously reviewed and endorsed by a full STAR panel. In practice this means similarity in: (a) the particular sources of data used, (b) the analytical methods used to summarize data prior to input to the model, (c) the software used in programming the assessment, (d) the assumptions and structure of the population dynamics model underlying the stock assessment, (e) the statistical framework for fitting the model to the data and determining goodness of fit, (f) the procedure for weighting of the various data components, and (g) the analytical treatment of model outputs in determining management reference points, including F_{msy}, B_{msy}, and B_0. It is the SSC's intention to employ an expedited stock assessment update in situations where no significant change in these 7 factors has occurred, other than extending time series of data elements within particular data components used by the model, e.g., adding information from a recently completed survey with an update of landings. In practice there will always be valid reasons for altering a model, as defined in this broad context, although, in the interests of stability, such changes should be resisted when possible. Instead, significant alterations should be addressed in the next subsequent full assessment and review. In principle, an expedited update is reserved for stock assessments that maintain fidelity to an accepted modeling framework, but the SSC does not wish to prescribe in advance what particular changes may or may not be implemented. Such a determination will need to be made on a case by case basis.

Composition of the Review Panel

The groundfish subcommittee of the SSC will conduct the review of an expedited stock assessment update. A review panel chairman will be designated by the chairman of the groundfish subcommittee from among its membership and it will be the panel chairman's responsibility to ensure the review is completed properly and that a written report of the proceedings is produced. Other members of the subcommittee will participate in the review to the extent possible, i.e., input from all members will not be required to finalize a report. In addition, the groundfish management team (GMT) and the groundfish advisory panel (GAP) will designate one person each to participate in the review, although the GMT and GAP panelists will serve in an advisory capacity only.

Review Format

Typically, a physical meeting will not be required to complete an expedited review of an updated stock assessment, but usually one would be the most efficient way to conduct the review. Rather, if a meeting is not held, materials can be distributed electronically. STAT and panel representatives will largely be expected to interact by email and telephone. A conference call will be held to facilitate public participation in the review.

The review process will be as follows. Initially, the STAT team that is preparing the stock assessment update will distribute to the review panelists a document that summarizes the team's findings. In addition, Council staff will provide panelists with a copy of the last stock assessment reviewed under the full STAR process, as well as the previous STAR panel report. Each panelist will carefully review the materials provided. A conference call will be arranged by the panel chairman, which will provide an opportunity to discuss and clarify issues arising during the review, as well as provide for public participation. Notice of the conference call and a list of public listening stations will be published in the *Federal Register* (generally, 23 days in advance of the conference call) and a Meeting Notice will be distributed (generally, 14 days in advance). A dialogue will ensue among the panelists and the STAT team over a period of time that generally should not exceed one week. Interested members of the public may request access to the discussions (typically email), which would be the facilitated of Council staff. Upon completion of the interactive phase of the review, the panel chairman may, if necessary, convene a second conference call to reach a consensus among panel members and will draft a report of the panel's findings regarding the updated assessment. The whole process should be scheduled to occur within a two week period and the STAT team and panelists should be prepared to complete their work within that time frame. It will be the chairman's responsibility to insure that the review is completed in a timely manner.

STAT Team Deliverables

It is the STAT team's responsibility to provide a description of the updated stock assessment to the panel at the beginning of the review. To streamline the process, the team can reference whatever material it chooses, which was presented in the previous stock assessment (e.g., a description of methods, data sources, stock structure, etc.). However, it is essential that any new information being incorporated into the assessment be presented in enough detail, so that the review panel can determine whether the update satisfactorily meets the Council's requirement to use the best available scientific information. Of particular importance will be a retrospective analysis showing the performance of the model with and without the updated data streams. Likewise, a decision table that highlights the consequences of mis-management under alternative states of nature would be useful to the Council in adopting annual specifications. Similarly, if any minor changes to the "model" structure are adopted, above and beyond updating specific data streams, a sensitivity analysis to those changes may be required.

In addition to documenting changes in the performance of the model, the STAT team will be required to present key assessment outputs in tabular form. Specifically, the STAT team's final update document should include the following:

- Title page and list of preparers
- Executive Summary (see Appendix C)
- Introduction
- Documentation of updated data sources
- Short description of overall model structure
- Base-run results (largely tabular and graphical)
- Uncertainty analysis, including retrospective analysis, decision table, etc.
- 10 year harvest projections under the default harvest policy

Review Panel Report

The expedited stock assessment review panel will issue a report that will include the following items:

- Name and affiliation of panelists
- Comments on the technical merits and/or deficiencies of the update
- Explanation of areas of disagreement among panelists and between the panel and STAT team
- Recommendation regarding the adequacy of the updated assessment for use in management

Agenda Item E.2.a
Attachment 2
November 2004

Agendum C.8.c
Supplemental SSC Report
September 2004

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND STOCK ASSESSMENT REVIEW PANELS

The Scientific and Statistical Committee (SSC) discussed the Terms of Reference for stock assessment review (STAR) panels and groundfish rebuilding plan review. The SSC recognizes that 2005 will clearly be an exceptional year, due to the much higher workload than usual, due to the implementation of the new biennial (multi-year) stock assessment and management process. Thus, some of the historical terms of reference may be impracticable; in particular, those that concern the number of stock assessment reviewers and the thoroughness of the stock assessment reviews. The SSC recommends the Terms of Reference be revisited after completion of the first multi-year management cycle.

Regarding the STAR panel process, the SSC suggested that: (1) for reasons of continuity and efficiency, it may be useful if the SSC representatives on STAR panels would also typically serve as STAR panel chairs, (2) SSC representatives on STAR panels should continue to convey STAR panel findings to the Council, but should attend the post-STAR panel meeting only if requested.

Regarding the Terms of Reference for groundfish rebuilding plan review, the SSC recognizes the Council has been requested by the National Marine Fisheries Service to establish a process to monitor and respond to rebuilding progress. The SSC will work with the Council to develop a set of guidelines and tools to evaluate rebuilding status. Such guidelines should be in place by April 2005, so they could be used for the 2005 stock assessment cycle.

PFMC
09/15/04

GROUNDFISH MANAGEMENT TEAM REPORT ON TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND STOCK ASSESSMENT REVIEW PANELS

Under the Terms of Reference, "the Groundfish Management Team (GMT) is responsible for identifying and evaluating potential management actions based on the best available scientific information." To that end, the GMT endorses the request from the Washington Department of Fish and Wildlife and the Northwest Indian Fisheries Commission to include in the Terms of Reference direction to evaluate regional stock differences or identify the information needed to make such an evaluation. The GMT believes that carrying forward through the assessment process any regional biological differences in stocks where they might exist could assist us in crafting appropriate management measures.

The assessment should include a precise summary of the key elements of the assessment and all of the required management parameters in the executive summary. This would not only greatly facilitate the work of the GMT, but could also reduce the need to have members of the Scientific and Statistical Committee (SSC) or stock assessment review (STAR) panels walk the GMT through stock assessments in which this information is either obscure or missing. Given the number of stock assessments that are to be dealt with in this cycle, a clear summary is crucial in order to be effective and successful. At a minimum, this summary should include:

- Acceptable biological catch (ABC) and optimum yield (OY) projections for ten years.
- Projections of spawning biomass and exploitable biomass for the same time frame.
- Estimates of appropriate F rates.
- Past management performance.
- For rebuilding species:
  - Estimates of P_{MAX} at F =0.
  - F rate and P_{MAX} at T_{TARGET}.
  - Projections of management specifications (i.e., ABC, OY), and estimates of the F rate, T_{MAX}, and T_{MIN} under rebuilding likelihoods ranging from P_{MAX} = 50% to the P_{MAX} under F=0.
  - Progress toward rebuilding.

Since a number of data sources are undergoing revision, the date of data extraction should be included with data tables.

The GMT feels that the STAR panel process, in which the full suite of data for a species is being considered by analysts, reviewers, industry and management advisors, is the most reasonable forum to identify the preferred model describing the status of a stock. However, if that is not possible, then the Terms of Reference should require that decision tables and sensitivity analyses be forwarded for all models that are considered plausible.

PFMC
09/15/04

Agendum E.2.b
Attachment 4
November 2004

SSC Terms of Reference for Groundfish Rebuilding Analyses

Final Draft

April 2001

Introduction

Amendment 11 to the Groundfish Fishery Management Plan (FMP) established a harvest control rule for determining optimum yields (OY). The 40:10 policy was designed to prevent stocks from falling into an overfished condition. Part of the amendment established a default overfished threshold equal to 25% of the unexploited population size[1] (B_0). By definition, groundfish stocks falling below that level are overfished ($B_{25\%} = 0.25 \times B_0$). To prevent stocks from deteriorating to that point, the policy also specifies a precautionary threshold equivalent to 40% of B_0. At stock sizes less than $B_{40\%}$ the policy requires that OY, when expressed as a fraction of the allowable biological catch (ABC), be progressively reduced. Because of this linkage, $B_{40\%}$ has sometimes been interpreted to be a proxy measure of B_{MSY}, i.e., the stock biomass that results when a stock is fished at F_{MSY}. In fact, theoretical results support the view that a robust biomass-based harvesting strategy would be to simply maintain stock size at about 40% of the unfished level (Clark 1991, In review). In the absence of a credible estimate of B_{MSY}, which can be very difficult to estimate (MacCall and Ralston, In review), $B_{40\%}$ is a suitable proxy to use as a rebuilding target.

There are a number of ways that one could proceed in modeling stock rebuilding, but they fundamentally reduce to two basic kinds of approaches. These are: (1) an empirical evaluation of spawner-recruit estimates and (2) fitting spawner-recruit estimates to a theoretical model of stock productivity (e.g., the Beverton-Holt or Ricker curves). To date, however, rebuilding plans have largely been based on analyses of the former type (e.g., bocaccio, lingcod, POP#1, canary rockfish). Similarly, the cowcod rebuilding analysis involved an empirical evaluation of annual estimates of surplus production. Thus far, the only rebuilding analysis that has been based on the fit of spawner-recruit data to a theoretical model is the analysis presented in the last stock assessment of Pacific ocean perch (POP#2; Ianelli *et al.* 2000).

Presented here are guidelines for conducting a basic groundfish rebuilding analysis that meets the minimum requirements that have been established by the Council's Scientific and Statistical Committee (SSC). These basic calculations are required of all rebuilding analyses in order to provide a standard set of base case computations, which can then be used to compare and standardize rebuilding analyses among stocks. However, the SSC also encourages rebuilding analysts to explore alternative calculations and projections that may more accurately capture uncertainties in stock rebuilding, and which may better represent stock-specific concerns. In the event of a discrepancy between the generic calculations presented here and a stock-specific result developed by an individual analyst, the SSC groundfish subcommittee will review the issue and recommend which projections to use.

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[1] The absolute abundance of the mature portion of a stock is loosely referred to here in a variety of ways, including: population size, stock biomass, stock size, spawning stock size, spawning biomass, spawning output; i.e., the language used in this document is sometimes inconsistent and/or imprecise. However, the best fundamental measure of population abundance to use in establishing a relationship with recruitment is spawning output, defined as the total annual output of eggs (or larvae in the case of live-bearing species). Although spawning biomass is often used as a surrogate measure of spawning output, for a variety of reasons a non-linear relationship often exists between these two quantities (Rothschild and Fogarty 1989; Marshall *et al.* 1998). Spawning output should, therefore, be used to measure the size of the mature stock when possible.

Estimation of B_0

For the purpose of estimating B_0 empirically, analysts have selected a sequence of years, wherein recruitment is believed to be reasonably representative of the natality from an unfished stock. These recruitments, in association with growth, maturity, fecundity, and natural mortality estimates, can then be used to calculate equilibrium unfished spawning output. In selecting the appropriate temporal sequence of recruitments to use, investigators have generally utilized years in which stock size was relatively large, in recognition of the paradigm that groundfish recruitment is positively related to spawning stock size (Myers and Barrowman 1996). Moreover, due to the temporal history of exploitation in the west coast groundfish fishery (see Williams, In review), this has typically led to a consideration of the early years from an assessment model time series[2]. Thus, for example, in the case of bocaccio the time period within which recruitments were selected was 1970-79 and for canary rockfish it was 1967-77.

An alternative view of the recruitment process is that it depends to a much greater degree on the environment than on adult stock size. For example, the decadal-scale regime shift that occurred in 1977 (Trenberth and Hurrell 1994) is known to have strongly affected ecosystem productivity and function in both the California Current and the northeast Pacific Ocean (Roemmich and McGowan 1995; MacCall 1996; Francis *et al.* 1998; Hare *et al.* 1999). With the warming that ensued, west coast rockfish recruitment was probably affected adversely (Ainley *et al.* 1993; Ralston and Howard 1995). Thus, if recruitment was environmentally forced, it would be more sensible to use the full time series of recruitments from the stock assessment model to estimate B_0. Given that these two explanatory factors are highly confounded, i.e., generally high biomass/favorable conditions prior to 1980 and low biomass/unfavorable conditions thereafter, using all recruitments to estimate B_0 will usually result in a lower reference point than the situation where an abbreviated series taken from early in the time series is utilized.

At this time there is no incontrovertible information with which to distinguish between these two alternatives. If oceanic conditions along the west coast have shifted to a productive cold regime following the La Niña event of 1999, we may soon have observations of recruitment produced during a favorable environmental period from groundfish stocks at low spawning biomass. If the environmental and density-dependent effects are additive, it would then be possible to determine the relative importance of each of the two factors (e.g., Jacobson and MacCall 1995). In the interim, however, it would be prudent to favor calculations of B_0 that are based on an abbreviated time series of recruitments taken from a period when the stock was at a relatively high biomass and to favor the density-dependent hypothesis. Both theoretical and observational considerations support the belief that groundfish recruitment will decline as stock size dwindles (e.g., Myers and Barrowman 1996; Brodziak *et al.* 2001). Still, it would be informative to contrast the density-dependent/stock size based reference point with an estimate of

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[2] Individual recruitments estimated from age-structured stock assessment models do not all exhibit the same precision or accuracy. Recruitments estimated at the very beginning of the modeled time period may suffer from mis-specification of the initial condition of the population (e.g., an assumed equilibrium age structure). Likewise, recruitments estimated at the end of the sequence may be imprecise due to partial recruitment of recent year-classes. Thus it may be advisable to trim the beginning and/or ending years classes to address this problem.

B_0 based on the entire time series of recruitments (i.e., the environmental hypothesis). This was, in fact, discussed as a possible alternative in the Panel Report produced by the West Coast Groundfish Harvest Rate Policy Workshop sponsored by the SSC in March, 2000. With both numbers available it would be possible to evaluate the implication of each hypothesis on the calculation of stock reference points. As a refinement, for each of these two methods the actual distribution of B_0 can be approximated by re-sampling recruitments, from which the probability of observing any particular stock biomass can be examined under each hypothesis. This approach was taken in the original bocaccio rebuilding analysis, where it was concluded that the first year biomass was unlikely to have occurred if the entire sequence of recruitments were used to determine B_0.

It is also possible to estimate B_0 by fitting spawner-recruit models to the full time series of spawner-recruit data (see Ianelli *et al.* 2000; Ianelli, In review). However, this approach is subject to the criticism that stock productivity is constrained to behave in a pre-specified manner according to the particular model chosen and there are different models to choose from, including the Beverton-Holt and Ricker. These two models can produce strongly contrasting management reference points (e.g., B_{msy} and SPR_{msy}) but are seldom distinguishable statistically. Moreover, there are statistical reasons to be suspect of resulting parameter estimates, including time series bias (Walters 1985), the "errors in variables" problem (Walters and Ludwig 1981), and non-homogeneous variance and small sample bias (MacCall and Ralston, In review). Consequently, analyses that derive stock management reference points by estimating a spawner-recruitment relationship shoulder a greater burden of proof. Thus, any such an analysis should attempt a balanced comparison of alternative spawner-recruit models, with explicit consideration of the estimation problems highlighted above. Moreover, in situations where a spawner-recruit meta-analysis is available (e.g., Dorn, In review), those results should be evaluated and considered. Ideally, reference points obtained by fitting a spawner-recruitment model (e.g., B_0, B_{MSY}, and F_{MSY}) should also be compared with values obtained by empirical analysis of the data, similar to that suggested above. Such a comparison would help delineate the overall degree of uncertainty in these quantities.

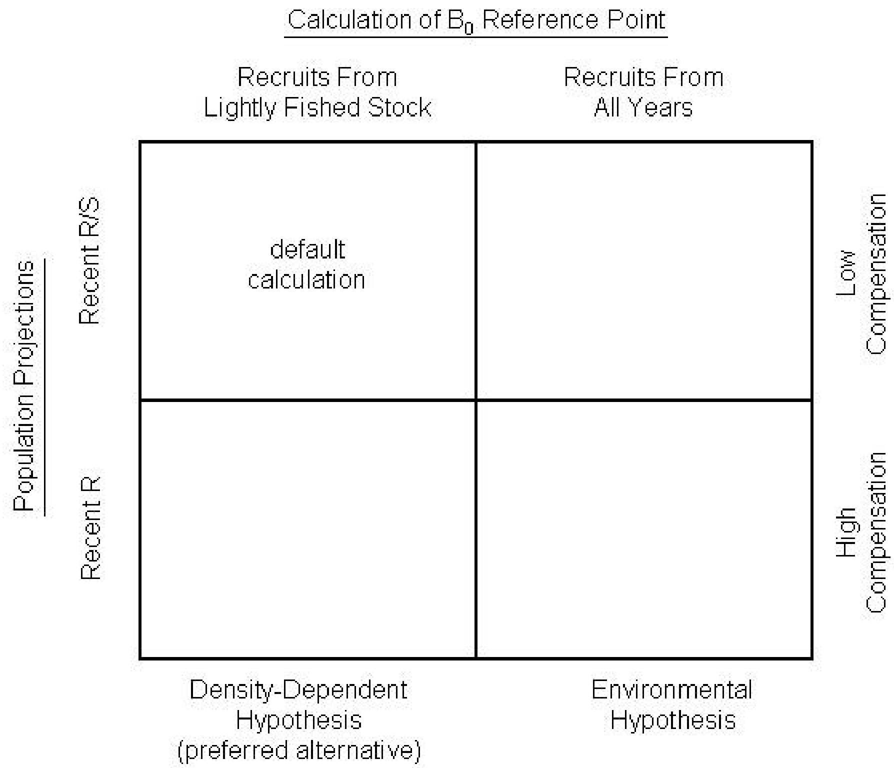
Population Projections During Rebuilding

Given the population initial conditions from the last stock assessment (terminal year estimates of numbers at age and their variances) and the rebuilding target ($B_{40\%}$), one can project the population forward once renewal has been specified. For most rebuilding calculations that have been conducted thus far, two different approaches have been taken, both of which utilize contemporary recruitment estimates at the tail end of the time series (i.e., the most recent figures). For bocaccio, canary rockfish, and POP#1, recent recruitment was standardized to the size of the adult population (recruits per spawner = R/S_i), which was then randomly resampled to determine annual reproductive success. Annual R/S_i is then multiplied by S_i to obtain year-specific stochastic estimates of R_i. The population is then projected forward in time, with no fishing mortality, until S_i hits the rebuilding target. The process is repeated many times, until a distribution of the times to rebuild in the absence of fishing is obtained. Note that use of R/S_i as the basis for projecting the population forward ties recruitment values in a directly proportional manner to stock size; if stock size doubles, resulting recruitment will double, all other things being equal. As the stock rebuilds this becomes an increasingly untenable assumption because there is no reduction in reproductive success at very high stock sizes, which is to say there is no compensation (i.e., steepness = 0.20)[3].

Another way of projecting the population forward is to use recent recruitments, rather than recruits per spawner, as was done in the lingcod analysis. This approach, however, errs in the opposite direction. Namely, recruitment does not increase as stock size increases, as would be expected of most rebuilding stocks. This type of calculation effectively implies perfect compensation (spawner-recruit steepness = 1.00). Thus, these two ways of projecting the population forward, by using re-sampled R_i or re-sampled R/S_i, includes a range of alternatives that is likely to encompass the real world.

Because stocks that have declined into an overfished condition are more likely to be unproductive (i.e., low spawner-recruit steepness), in the absence of any other information, rebuilding projections based on re-sampling recruits-per-spawner are generally to be favored over projections based on absolute recruitment. Note that the implied lack of compensation in rebuilding projections using this method is not likely to be a serious liability over the long term because it is based on re-sampling contemporary recruits-per spawner. As progress toward rebuilding is evaluated in the future, the set of R/S_i will be revised based on a new set of recent recruitments obtained from the latest stock assessment. If the stock actually demonstrates a compensatory response during the course of rebuilding the R/S_i series will tend to a lower mean value. Although projections based on R/S_i represent a standard default way of proceeding, projections that use absolute recruitments (R_i) would be quite useful in establishing the overall uncertainty in the rebuilding analysis by providing an alternative model specification scenario. Moreover, a credible argument that a stock is relatively productive, as evidenced perhaps by observed high recruitment at low spawning biomass, may serve as a basis for favoring projections that utilize recent absolute recruitments (see figure).

[3]The "steepness" of a spawner-recruit curve is related to the slope at the origin and is a measure of a stock's productive capacity. It typically is expressed as the proportion of virgin recruitment that remains when a stock has been reduced to $B_{20\%}$.



Once the median time to rebuild in the absence of fishing is determined (τ_0), whether using the R/S_i or the R_i, the total allowable rebuilding time frame is fixed (τ_{max}). Namely, if τ_0 is less than 10 years then τ_{max} = 10 years. On the other hand, if $\tau_0 \geq$ 10 years then $\tau_{max} = \tau_0$ + one mean generation time. Mean generation time has been calculated as the mean age of the net maternity function.

Harvest During Rebuilding

Of course it will be the Council's prerogative to establish yields during the rebuilding period, as long as the stock recovers to the target ($B_{40\%} \approx B_{msy}$) within the specified time period (τ_{max}). Nonetheless, the simplest rebuilding harvest policy to simulate and implement is a constant harvest rate or fixed F policy. All rebuilding analyses should, therefore, calculate the maximum fixed fishing mortality rate during the rebuilding time period that will achieve the target biomass, with a 0.50 probability of success ($F_{0.50}$). In addition, calculations representing a profile of different fixed F values that are incrementally less than $F_{0.50}$ (e.g., $F_{0.60}$, $F_{0.70}$, and $F_{0.80}$) are needed for the Council to implement a precautionary reduction in the $F_{0.50}$ value to increase the probability of rebuilding success. Note that selecting a probability greater than 0.50 for successful rebuilding within τ_{max} is equivalent to electing to rebuild sooner than τ_{max} with probability equal to 0.50. In addition, based on its interpretation of Amendment 12 to the groundfish FMP, the National Marine Fisheries Service requires the expected time course of yield during recovery as a formal part of all rebuilding calculations.

Many other harvest policies could be implemented by the Council, based on whatever circumstances may mitigate against a constant harvest rate approach. For example, the canary rockfish rebuilding plan calls for a constant fixed yield over the entire period of rebuilding. Thus, as the stock rebuilds, the exploitation rate must decline, which makes bycatch avoidance a serious concern. For this reason the SSC recommends that the Council generally favor constant harvest rate policies over constant catch policies for all groundfish rebuilding plans. This would alleviate the problem of accelerating bycatch producing accelerated discard, an undesirable attribute of constant catch policies. Similarly, the Council may wish to implement some other form of variable rate harvest policy, e.g., a 40:10 adjustment similar to the default policy currently in use. Consequently, researchers conducting rebuilding analyses should be prepared to respond to requests by the Council for stock-specific projections on an individual case-by-case basis.

Documentation

It is important for analysts to document their work so that any rebuilding analysis can be repeated by an independent investigator at some point in the future. Therefore, all stock assessments and rebuilding analyses should include tables containing specific data elements that are needed to adequately document the analysis. Namely, information is needed on: (1) the time course of population spawning output and recruitment, (2) biological data on life history characteristics, and (3) initial values for projecting the stock into the future under exploitation. Therefore, two tables should include:

Table 1. Stock Population Trajectory

1. Year
2. Summary/Exploitable Biomass
3. Spawning Output
4. Recruits
5. Catch
6. Landings
7. Total Exploitation Rate

For each year in this table, entries 2 through 7 should include the expected value, a measure of uncertainty, and the appropriate units. The latter may require development of a standard electronic format for the simulation results that characterize the uncertainty, e.g., the results of each Monte Carlo replication from the stochastic population projection.

Table 2. Age-specific Population Characteristics.

1. Age
2. Natural mortality rate (♀ and ♂)
3. Individual weight (♀ and ♂)
4. Maturity (♀ only)
5. Fecundity (♀ only)
6. Terminal year (or other) composite selectivity (♀ and ♂)
7. Population numbers in terminal year (♀ and ♂)

In a similar manner, for each age in the table, entries 2 through 7 should ideally include measures of uncertainty. Uncertainty in table entry 7 (population numbers in terminal year), in particular, should be available from most age-structured assessment models.

In addition, all linkages with the most recent stock assessment document should be clearly delineated. This is important because assessments often present multiple scenarios that usually have important implications with respect to stock rebuilding. In such instances, a decision table analysis would be a useful way to express the implications of uncertainty in model specification. In addition, one scenario may be preferred by the assessment authors, while another may preferred by the STAR Panel. Clear specification of the exact assessment scenario(s) used as the basis for rebuilding analysis is essential. Further, all post-assessment analyses needed to produce the inputs for rebuilding analyses must be fully documented, e.g., the choice of selectivity estimates used for projections that are based on some composite of historical selectivities from the assessment.

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SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND STOCK ASSESSMENT REVIEW PANELS

The Scientific and Statistical Committee (SSC) primarily considered the Terms of Reference (TOR) for stock assessment review (STAR) panels under this agendum. To a limited degree, review of groundfish rebuilding plans was also discussed.

The SSC recognizes that 2005 will be an exceptional year due to the large number of stocks being assessed in support of the new, multi-year stock assessment and management process. Modifications to the Council's long-standing STAR TOR were discussed in light of these changes. The SSC recommends that:

1. The principal process and document content recommendations from the Recreational Catch Per Unit Effort (CPUE) Workshop (June 2004) and Stock Assessment Modeling Workshop (October 2004) be incorporated into the TOR.

2. A minimum of four reviewers should serve on each STAR panel. For panels that review more than three stock assessments, the number of reviewers assigned to a STAR panel should, if at all possible, follow an "n+1" rule of thumb, where n is the number of stock assessments under review by the panel.

3. For reasons of continuity and efficiency, the SSC representatives on STAR panels should also typically serve as STAR panel chairs. SSC representatives on STAR panels should continue to convey STAR panel findings to the Council.

Otherwise, aside from updating text, references, etc., the SSC recommends the TOR with the above revisions should be used for this assessment cycle. However, immediately after completion of the first multi-year management cycle, experiences from the new process should be evaluated. The SSC is willing to initiate this evaluation by organizing an informal evening session in conjunction with the November 2005 Council meeting; and then to follow-up with further SSC deliberations on the TOR.

Notwithstanding these recommendations, the SSC considered the Groundfish Management Team's (GMT's) suggestions for TOR modifications regarding the (i) evaluation of regional stock differences and (ii) inclusion of rebuilding parameters in the executive summary of stock assessment documents (*cf*. Supplemental GMT Report C.8, September 2004). The SSC agrees that (i) would be desirable for some stocks, but adding it to the TOR – applicable to all stocks – would be overly burdensome for both stock assessment authors and the assessment review process. Instead, the SSC suggests the GMT request such evaluations from assessment authors on a case-by-case basis, as required for GMT deliberations.

With regard to GMT suggestion (ii), the SSC continues to recommend that the STAR process and the process for reviewing rebuilding plans should be separate, sequential steps in the Council's management cycle. As such, many stock-specific rebuilding parameters will not be available for inclusion in documents prepared for the STAR process. However, these parameters could be delineated in the executive summary of the SSC-proposed rebuilding analysis document in order to meet the GMT's needs.

Regarding the TOR for groundfish rebuilding plan review, the SSC recognizes the Council has been requested by the National Marine Fisheries Service to establish a process to monitor and respond to rebuilding progress. The SSC will work with the Council to develop a set of guidelines and tools for evaluating rebuilding status. Such guidelines should be available for review and consideration by April 2005.

PFMC
11/02/04

**GROUNDFISH ADVISORY SUBPANEL STATEMENT ON
TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND
STOCK ASSESSMENT REVIEW PANELS**

The Groundfish Advisory Subpanel (GAP) reviewed the modifications to the Terms of Reference for Stock Assessment Review (STAR) Panels and agreed they should be accepted as written.

The GAP also made assignments for GAP participation in STAR Panels for 2005 as follows:

February (Seattle)	Mr. Rod Moore
April (Seattle)	Mr. Marion Larkin
May (Long Beach)	Mr. Gerry Richter
May (Seattle)	Mr. Rod Moore
June (Newport)	Mr. Rod Moore
August (Santa Cruz)	Mr. Tom Ghio
August (Seattle)	Mr. Rod Moore

PFMC
11/02/04

GROUNDFISH MANAGEMENT TEAM REPORT ON TERMS OF REFERENCE FOR GROUNDFISH REBUILDING PLAN REVIEW AND STOCK ASSESSMENT REVIEW PANELS

The Groundfish Management Team (GMT) continues to support the exploration of area management in instances where the biology or exploitation of the species in question indicate the approach makes sense. This was expressed in Supplemental GMT Report C.8.c presented at the September meeting (included in the November briefing book). The proposed revision to the stock assessment terms of reference requests assessment authors to describe in the introduction section (C.1) "...distribution, stock structure, regional differences in life history or other biological differences, management units..." The GMT assumes that it is implicit in this direction where regional differences are found to be significant, they would be carried through the process of model development in order to provide area management advice to the Council. The GMT notes that the example stock assessment executive summary in the briefing book, black rockfish, represents an area management approach.

PFMC
11/02/04

EXEMPTED FISHING PERMITS FOR 2005

Exempted fishing permits (EFPs) provide a process for testing novel fishing gears and strategies to substantiate methods for prosecuting sustainable and risk-averse fishing opportunities. Because the EFP fisheries harvest or impact a portion of the overall available harvest, preliminary Council approval and harvest set asides for EFPs in 2005 and 2006 were adopted along with 2005-2006 management measures at the June Council meeting.

Sponsors of EFPs approved in June have had the opportunity to revise their applications in response to input received at the June Council meeting and submit final applications at the November Council meeting. Under this Agenda Item, the Council will review and approve EFP applications for 2005. Council-approved applications are then submitted by the applicants to NMFS for permit development and issuance.

Because establishing a permanent monitoring program for the shore-based whiting fishery will not be possible prior to the start of the 2005 fishery, NMFS will again require an EFP for participation in the 2005 shore-based whiting fishery. Terms and conditions of the whiting EFP will be developed over the winter months. As in 2004, the EFP will continue to evaluate monitoring tools appropriate for the shore-based whiting fishery. NMFS is scheduled to update the Council on the development of monitoring program alternatives for the shore-based Pacific whiting fishery under Agenda Item E.1.

Council Action:

Review and approve final EFP applications for 2005.

Reference Materials:

1. Agenda Item E.3.b, WDFW Report.
2. Agenda Item E.3.b, ODFW Report: Joint ODFW, WDFW, CDFG Application for Issuance of an Exempted Fishing Permit to Allow Retention on Incidentally Caught Species in the Shore-based Pacific Whiting Fishery.
3. Agenda Item E.3.b, CDFG Report 1: Application for Issuance of an Exempted Fishing Permit to Test a Selective Flatfish Trawl (including Scottish Seine) in and area otherwise closed to fishing, 2005.
4. Agenda Item E.3.b, CDFG Report 2: 2002-2003 Shelf Flatfish Exempted Fishing Permit Reports

Agenda Order:

a. Agenda Item Overview — Mike Burner
b. Recommendations of the States, Tribes, and Federal Agencies
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Final Approval of EFP Applications for 2005.

PFMC
10/15/04

Application for Issuance of an Exempted Fishing Permit to Test a Selective Flatfish Trawl (including Scottish Seine) in an area otherwise closed to fishing, 2005

A. **Date of application:** July 12, 2004 *(updated October 12, 2004)*

B. **Applicant Contact**

California Department of Fish and Game
4665 Lampson Avenue, Suite C
Los Alamitos, CA 90720

Contact: Primary: Steve Wertz (562) 342-7184
Secondary: Susan Ashcraft (650) 631-6786

C. **Statement of purpose and goals of the experiment, for which an EFP is needed, including a general description of the arrangements for the disposition of all species harvested under the EFP:**

The purpose of this exempted fishing activity is to collect data on the rate at which unintended species (particularly overfished shelf rockfish such as bocaccio and canary rockfish), are taken by commercial fishers targeting shelf flatfish and California halibut in federal waters off the state of California. Fishers will be required to use an experimental small footrope trawl net and will be restricted to areas outside of 3 miles. The experimental net, which was designed by Oregon Department of Fish and Wildlife (ODFW), was specifically designed to be more selective in the harvest of flatfish species than the trawl net configurations that are currently used in the fishery. Testing of this modified trawl in California was first conducted in 2003 in the area south of 40°10' N latitude; however, only one vessel participated, over a narrow geographic range. In order to draw conclusive results for management consideration over a broader geographic range, this experiment requires additional years of data to be collected. A second year of study engaging two vessels is scheduled for October through December 2004. A continuation of the study in 2005 may be required to collect necessary data to determine the effectiveness of modified small footrope trawl gear in minimizing impacts on overfished shelf rockfish species when accessing healthy flatfish stocks on the shelf.

Pacific Coast groundfish are managed by the Pacific Fishery Management Council (PFMC) under a federal fishery management plan (FMP) for the west coast. The management goals of the FMP are to:

- Prevent overfishing by managing for appropriate harvest levels and prevent any net loss of the habitat of living marine resources.

- Maximize the value of the groundfish resource as a whole.

- 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.

The experiment conducted through an EFP will assist the PFMC in achieving the goals set forth in the FMP while collecting bycatch data on overfished stocks and evaluating the effectiveness of specific trawl gear modifications in reducing bycatch of overfished stocks. In particular, this EFP expands the applicability of equivalent gear tested off the coasts of Oregon and Washington in EFP studies over the past two years, which are being developed into regulations to be implemented in 2005 for the area north of 40°10' N latitude. Further evaluation in the area south of 40°10' N latitude is needed before results may be applied coastwide.

The specific goals of the experiment are:

- To evaluate the effectiveness of modified trawl gear (see Section I below for modified trawl gear specifications) to catch shelf flatfish while minimizing take of overfished rockfish species in all depths.

- To measure bycatch rates of overfished rockfish and groundfish species that may be associated with the small footrope trawl shelf flatfish fishery using the modified trawl gear with no depth restrictions through an at-sea observer program.

- To provide fishermen with an incentive to modify their gear by giving them the opportunity to take shelf flatfish in areas that are otherwise closed.

Disposition of the species harvested under the EFP will be as follows:

- Species caught within the normal current trip limits may be retained and sold by the vessel.

- All rockfish caught while targeting shelf flatfish during the EFP must be retained and offloaded. Overages of rockfish must be surrendered, and proceeds from these species in excess of trip limits will be forfeited to the State of California.

D. **Valid justification explaining why issuance of an EFP is warranted:**

Since 1998, the PFMC has initiated rebuilding plans for several species, including bocaccio and canary rockfish. Conservation areas have since been established and closed to groundfish fishing in order to prevent harvest of the overfished stocks in multi-species fisheries. Critical to these rebuilding plans and to the overall improvement of groundfish management, is the need for more and better scientific data. There are more than 90 species of groundfish covered under the FMP, and at present, there is little or no data on a large number of these species. There is a need for comprehensive, timely, and credible data for priority species to aid in the conservation and rebuilding efforts for these stocks.

The shelf flatfish are an extremely important group of groundfish in the California groundfish fisheries. These stocks are believed to be healthy, and California fishermen and processors have worked aggressively to develop strong markets for these species. A component of the California trawl fleet and processors are heavily dependent upon these flatfish.

A depth closure was enacted from July 1 to December 31, 2002 to reduce the take of overfished shelf rockfish in the primary depths of their range, which applied to all trawlers, including vessels targeting shelf flatfish using small footrope trawl. An EFP was approved for use inside the closed area to observe rockfish bycatch rates of unmodified shelf flatfish trawl gear targeting shelf flatfish. Results from the 2002 EFP indicated that the incidental take of bocaccio and other sensitive rockfish species was minimal in depths to 70 fathoms (fm) using conventional flatfish trawl gear. Access to depths below 70 fm was not granted due to the increased likelihood of incidental take of bocaccio rockfish, canary rockfish, and other sensitive species in deeper waters. Although results of the experiment to 70 fm were promising, the question remained if a shelf flatfish fishery could be successfully prosecuted in deeper waters where shelf rockfish abundance increases.

In 2003 and 2004, EFPs were issued to California to conduct a follow-up fishery experiment in deeper waters, out to 100 fm (in 2003) and to unrestricted depths (in 2004), where the likelihood of incidental take of bocaccio and other shelf rockfish is higher. An important condition added under these EFPs was a requirement to use a modified shelf flatfish trawl design. The design follows the net configuration used in an ODFW research and EFP project to evaluate the bycatch rates of overfished shelf rockfish species while targeting flatfish with the modified trawl. Results from the ODFW experiment with the modified trawl net showed a reduction in the bycatch rate of canary rockfish. The application of a similar trawl design was applied in the 2003 California EFP to test the effectiveness of the gear in minimizing the bycatch of not only canary, but also of bocaccio, which is an overfished stock in coastal California. While the Oregon results were significant enough to lead to a proposal to move the experimental net design into regulations north of 40°10' N latitude in 2005, the 2003 California EFP results are inconclusive at this time because only one vessel in a narrow geographic range participated in the experiment. To draw sound conclusive results, this experiment requires additional data to be collected from a larger pool of vessels. A continuation of the study has been approved to commence in October 2004, and is due to be completed December 2004. The results of the 2004 study are not available at the time of this application, and it is therefore not possible to evaluate whether 2004 EFP results will be sufficient for purposes of considering management applications. Therefore, this application proposes the continuation of the study for a third and final year in 2005 should it be necessary.

E. **A statement of whether the proposed experimental fishing has broader significance than the applicant's individual goals.**

The applicant of this EFP believes that the information collected during this experiment will have significance, broader than the applicant's individual goals, applicable to fisheries throughout California and the West Coast.

- The experiment will produce data on the amount and location of overfished groundfish bycatch in the shelf flatfish fishery using this trawl, and provides samples of these species from areas otherwise closed to groundfish fishing.

- Results indicating that overfished groundfish bycatch rates are minimized while using this modified trawl could lead to a management tool that allows the Council to maximize sustainable access to healthy shelf flatfish stocks while overfished groundfish stocks are rebuilt.

- This EFP complements a series of EFP experiments conducted off the west coast to evaluated the effectiveness of modified trawl gear to avoid overfished groundfish. Since 2002, both Oregon and Washington have tested the effectiveness of modified trawl gear to avoid overfished groundfish while fishing for healthy groundfish stocks. In California, comparable testing of the same modified trawl gear over shelf waters in California is in progress, commencing with a single participant in the 2003 study, and continuation of the study with two participants in 2004. Regulations based on the successful EFP results in Oregon are being crafted for implementation north of 40°10' N. lat. during the 2005-06 Council management cycle. The thorough evaluation of the modified trawl gear in California, where there are differences in the composition of shelf species relative to the northern area, may result in the opportunity to extend this regulatory provision to flatfish trawl fishermen off the entire coast of California.

F. **Vessels covered under the EFP:**

Vessels covered under the EFP will include those which have historically participated in the targeted shelf flatfish fishery off California according to criteria used in the 2002, 2003, and 2004 flatfish EFPs:

- Vessels must have landed into California ports at least 10,000 pounds of shelf flatfish (California halibut, Pacific sanddab, English sole, sand and rock sole, starry flounder, and unspecified flatfishes) taken with trawl gear in at least two of six years from 1998 to 2003.

- Vessels must have a valid California delivery permit.

Vessels identified as qualifiers in the 2004 EFP process will qualify for this pool of applicants.

A letter of inquiry will be sent to the owners of each of the qualifying vessels requesting a statement of interest to be returned by a specified closing date.

A maximum of **six** vessels will be selected to participate throughout the EFP fishing period, with a goal of issuing permits to two vessels per California port group along the central California coast from Point Conception and Cape Mendocino. Potential port complexes are Morro Bay/Avila, Monterey/Moss Landing, and Half Moon Bay/San Francisco/Bodega Bay.

Applications received will be selected at random following the closing date if more vessels apply than can be accommodated by observers.

Any EFP may be canceled and made available to another vessel if the permitted vessel: 1) does not follow the terms and conditions of the permit; 2) fails to follow federal or State fishing regulations; 3) does not prosecute shelf flatfish using a modified small footrope trawl gear as specified in the EFP; or 4) does not reasonable accommodate the observer or cooperate with the applicant.

A permitted vessel may withdraw once from the EFP program and resume participation the following month.

G. **A description of the species (target and incidental) to be harvested under the EFP and the amount(s) of such harvest necessary to conduct the experiment:** The target species are collectively referred to as *shelf flatfish* and include sanddabs, English sole, rock and sand sole, unspecified flatfish, and California halibut which is not a federally managed groundfish. The maximum expected landed catch per vessel for all species will be the normal trip limits in place for periods 5 and 6. That allowable trip limit for other flatfish is 110,000 pounds per two months of which no more than 42,000 pounds may be petrale sole. EFP participants will be exempted from routine in-season closures or reductions in allowable trip limits during the EFP study period. Trip limits for EFP participants will be increased to match any increases in federal trip limits resulting from in-season adjustments. Note that California halibut is not included in the trip limit and is estimated later in this section. Total harvest of target species for the EFP fishery is as follows:

Species/Species Group	(Vessels) x (no. periods) in EFP[1]	Cumulative limit per two months (lbs)	Maximum allowable catch (lbs)	Maximum allowable catch (mt)
Other flatfish	6 x 2 = 12	110,000; no more than 42,000 pounds may be petrale sole	1,320,000; no more than 504,000 may be petrale sole	599 mt; no more than 229 mt may be petrale sole

[1] A maximum of 6 vessels will be operating for the entire EFP period, encompassing 2 cumulative trip limits periods.

The program requires full retention of rockfish. All rockfish species will be landed to enhance biological sampling and to document the actual rockfish mortality and discard rates, with catch thresholds in place for overfished rockfish species to ensure that take remains below allocated bycatch caps. The EFP thresholds for incidental take of bocaccio, cowcod, canary, and yelloweye rockfish will be applied as follows:

- Monthly per species threshold: An individual vessel will be constrained to a maximum of 1,000 pounds of bocaccio, and 50 pounds each of canary, yelloweye and cowcod rockfish per fishing month. If these amounts are exceeded for any of the four species, then all fishing by that vessel will be terminated for the balance of the month, but may resume for the following month.

- Monthly cumulative threshold: The cumulative amount of bocaccio harvested by all vessels fishing under the EFP must not exceed 6,000 pounds in a fishing month. The cumulative amount of canary, cowcod, or yelloweye rockfish harvested by all vessels fishing under the EFP must not exceed 300 pounds in a fishing month. If that amount is exceeded for any of the four species by all vessels combined, then all EFP fishing will be terminated for the remainder of the month, but may resume for the following month.

- EFP threshold: The cumulative amount of bocaccio rockfish harvested by all vessels fishing under the EFP must not exceed 22,000 pounds (10 mt) at any time. Additionally, the cumulative amount of canary, cowcod, or yelloweye rockfish must not exceed 1,000 pounds (0.5 mt) at any time. If the cumulative EFP threshold amount is exceeded for any of the four species, then all EFP fishing will be terminated for the remainder of the year.

- EFP threshold for lingcod: The maximum amount of total lingcod that may be taken by all participating vessels fishing under this EFP is 20 mt. If the limit for this species is reached, the EFP will be terminated for the remainder of the year.

Estimates of expected total fishing mortality are based on bycatch rates from our 2002 EFP experiment, except that estimated take of overfished rockfish species is based on the EFP species thresholds contained in this proposal. Actual bycatch rates of these overfished rockfish species during the 2002 EFP were well below these thresholds, with bycatch rates of 0.0001 for bocaccio, 0.0002 for cowcod rockfish, <0.0001 for canary, and zero yelloweye rockfish. Although 2002 NMFS West Coast Groundfish Observer Program (WCGOP) data indicate that in waters deeper than 100 fm proposed for access in this study, the probability of bocaccio catch increases significantly when using unmodified conventional flatfish trawl gear, it is anticipated that the use of the selective flatfish trawl during this EFP period will reduce the take of overfished rockfish, including bocaccio. Therefore, the total estimated fish mortality in metric tons for overfished rockfish species (including lingcod) for this EFP is as follows:

Threshold Species	EFP Landing Threshold/ Estimated Total Catch (mt)
Bocaccio Rockfish	10.0
Canary Rockfish	0.5
Cowcod Rockfish	0.5
Yelloweye Rockfish	0.5
Lingcod	20.0

Based on bycatch rates calculated from our EFP program in 2002, the total 2005 EFP bycatch of species and species groups additional to target flatfish and overfished rockfish species is projected below. Note that the bycatch listed below reflects both retained and discarded species, and as such does not reflect total mortality.

Species/Species Group	Bycatch Rate[1] (2002)	Expected Catch (landed and discarded)[2] (lbs)	Expected Catch [2] (mt)
California Halibut	0.074	97,680	44.3
Nearshore Rockfish	0.001	1,320	0.6
Shelf Rockfish	0.010	11,880	5.3
Slope Rockfish	<0.000	40	<0.0
Lingcod	0.006	7,920	3.6
Pacific hake	0.003	3,960	1.8
Sablefish	0.009	9,240	4.2
Sharks	0.017	22,440	10.2
Skates and Rays	0.071	93,720	42.5

1 Bycatch is defined as the total landed and discarded pounds of a species relative to the total landed target species (shelf flatfish).

2 There are six vessels that will be operating for the entire 4 months of the EFP, encompassing 2 periods of cumulative trip limits. Expected bycatch is equal to the (bycatch rate) x (flatfish 2-month trip limit;110,000 lbs) x (6 vessel) x (2 landing limit periods).

H. **For each vessel covered by the EFP, the approximate time(s) and place(s) fishing will take place:**

- The test fishery will be conducted from August through November 2005.
- The EFP will be valid in those Pacific Ocean waters adjacent to the California coast seaward of 3 miles and south of 40° 10' N latitude. While the allowable depth exceeds the eastern boundary for the non-trawl rockfish conservation area (RCA) (100 fm during the proposed study period), the removal of a depth restriction is necessary to test the modified trawl gear in areas with a history of bocaccio bycatch, and to allow for fishing at depths where target flatfish species may be distributed.

I. All participating vessels under the authority of the EFP:

- Must exclusively employ legal selective flatfish trawl gear which is a type of small footrope gear as defined in current federal regulation.

- Must apply and submit a net plan for approval. Net plans must meet specifications utilized by the 2003 Oregon Flatfish EFP, and by the 2003 and 2004 California Flatfish EFPs, which specified that:

    - *The selective flatfish trawl net must be a two-seamed net and its breastline may not be longer than 3 ft in length.*

    - *There may be no floats along the center third of the selective flatfish trawl net's headrope, except for Scottish seine, for which there must be no floats along the middle 25% of the headrope.*

    - *The selective flatfish trawl net must have a headrope at least 30% longer than the footrope.*

    - *Selective flatfish trawl gear may not have a footrope that is longer than 105 ft in length.*

    - *The headrope must be wide in the center, not a narrow V-shape that creates shoulders that would trap ascending fish.*

- Must carry a National Marine Fisheries Service-trained observer onboard all trips using the selective flatfish net in the NTZ. A total of three observers are necessary to execute the EFP. Vessels participating in the program must share observer time.

- Must land all fish caught under the authority of the EFP into the State of California.

- Must sign a contract with the State of California detailing the vessel's responsibility for the EFP fishery. Failure to abide by the conditions in the contract or to follow provisions in the EFP will result in revocation of the contract and of the EFP for the year.

J. Signature of the applicant:

____

California Department of Fish and Game

State of California – The Resources Agency
ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93940
805.568.1235

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PFMC

September 24, 2004

Dr. Steve Freese, Interim Assistant Regional Administrator
National Marine Fisheries Service-Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, Washington 98115-0070

Re: Shelf Flatfish Exempted Fishing Permit Reports

Dear Dr. Freese:

Enclosed are copies of our 2002 and 2003 Exempted Fishing Permit (EFP) reports. These summarize the results of our studies to test the selectivity of small footrope trawl including Scottish seine to catch shelf flatfish while avoiding rockfish in the coastal waters of central California, south of 40° 10' N latitude.

The primary purpose of the 2002 study was to estimate bycatch rates for overfished rockfish and non-target groundfish species associated with small footrope trawl gear used in water depths shallower than 70 fm. The results of this study showed nominal bycatch rates for overfished rockfish per pound of target species (zero to 0.0003).

The primary purpose of the 2003 study was to determine whether a shelf flatfish fishery can be conducted within the Trawl Rockfish Conservation Area (RCA) using modified trawl gear designed to minimize the bycatch of overfished rockfish species. The results of this study also showed nominal bycatch rates for overfished rockfish per pound of target species (zero to 0.0001). Only one vessel, deploying a modified Scottish seine over a narrow geographic range, participated in the study.

If you have any questions about the attached EFP reports, please contact Mr. Steve Wertz, Associate Biologist in the Department's Marine Region, by telephone 562.342.7184 or by email at swertz@dfg.ca.gov.

Sincerely,

Marija Vojkovich

Marija Vojkovich
Offshore Ecosystem Coordinator

Enclosure(s)

cc: See Page 2

cc: Dr. Donald McIsaac, Executive Director
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Mr. Steve Wertz, Associate Biologist
Department of Fish and Game
Los Alamitos, California 90720

Estimates of Discard and Bycatch in the Central California Shelf Flatfish Fishery for Small Footrope Trawl Gear (Including Scottish Seine) Under a Federal Exempted Fishing Permit in 2002

Prepared By
Marine Region
California Department of Fish and Game
September 24, 2004

Summary

The California Department of Fish and Game (CDFG) conducted an Exempted Fishing Permit (EFP) study in collaboration with the central California trawl fleet to estimate bycatch and discard rates for overfished shelf rockfish caught in the targeted shelf flatfish fishery in waters less than 70 fm. Six vessels participated, with 100% observer coverage from October to December 2002, resulting in 30 trips and 100 tows. The results of the study are as follows:

- Participating vessels caught 191,324 pounds of groundfish;
- The targeted flatfish species accounted for 96% by weight of the total groundfish catch and 87% by weight of the retained catch;
- The total catch weight for bocaccio, canary, cowcod, and widow rockfish combined was 70 pounds, no yelloweye rockfish were observed; and
- The bycatch rates for bocaccio, canary, cowcod, widow, and yelloweye rockfish per pound of retained target or retained groundfish ranged from zero to 0.0003.

The CDFG intends to support continued testing of modified trawl net configurations in 2003 to find configurations that enhance that gears' selectivity for shelf flatfish while minimizing impacts to overfished rockfish.

Introduction

On July 1, 2002, the US Secretary of Commerce closed the eastern Pacific continental shelf south of 40° 10' N latitude to trawl fishing, based on an inseason recommendation from the Pacific Fishery Management Council (PFMC) to protect bocaccio, cowcod, canary, and yelloweye rockfish which had been declared overfished by the National Marine Fisheries Service (NMFS). This action precluded fishing access to healthy flatfish stocks that are distributed on the continental shelf.

Shelf flatfish are an extremely important group of groundfish in the California seafood industry. These stocks are believed to be healthy and California fishermen and fish processors have worked aggressively to develop strong markets for these species, especially on the central California coast. A component of California's trawl fleet and processors are heavily dependent upon these flatfish. Vessels using trawl gear including Scottish seine were prohibited from landing flatfish caught on the shelf from July 1, 2002 until the end of the year. However, fishermen using these gears to catch shelf flatfish prior to that date testified before the PFMC that they can pursue this fishery with minimal or no bycatch of overfished rockfish.

Since 1998, the PFMC has initiated rebuilding plans for several species of groundfish, including overfished shelf rockfish. Critical to these rebuilding plans and to the overall improvement of groundfish management is the need for more and better scientific data to achieve the goals of the West Coast Groundfish Fishery Management Plan (Groundfish FMP). There are more than 90 species covered under the Groundfish FMP, and at present there are little or no data on a large number of these species. There is a need for comprehensive, timely, and credible data for overfished groundfish species harvested in fisheries such as the trawl flatfish fishery to aid in conservation and rebuilding efforts for these stocks.

The purpose of CDFG's EFP is to assist the PFMC in achieving the goals of the Groundfish FMP by documenting the at-sea catch of shelf flatfish to measure bycatch and discard rates for overfished rockfish (bocaccio, canary, cowcod, yelloweye, and widow rockfish) and non-target groundfish species while permitting a small amount of fishing activity using otherwise prohibited gear. This study may also provide for informed management decisions for setting appropriate depth-based closures for California's small footrope trawl fleet fishing south of 40° 10' N latitude.

Methods

Scope of Exempted Fishing Permit for Shelf Flatfish Fishery

In cooperation with the small footrope trawl fleet and fish processors on the central California coast, the CDFG received an EFP from NMFS to:
1) document at-sea bycatch for overfished rockfish and non-target groundfish species in shelf flatfish fishery south of 40° 10' N latitude using a small footrope trawl (including Scottish seine). For this report, bycatch is the total amount of unintended catch that is retained, and discard is the amount of unintended catch which is not retained on the vessel;
2) measure bycatch rates for overfished rockfish and discard rates for non-target groundfish species caught in small footrope trawl gear in the shelf flatfish fishery;
3) collect biological data that are otherwise not available from the landed catch; and
4) document at-sea catch data for rockfish to evaluate the full retention of rockfish in the trawl fishery as a management tool.

The permit was valid from October 18, 2002 to December 31, 2002, in Pacific Ocean waters adjacent to California to a maximum water depth of 70 fathoms (fm), south of 40° 10' N latitude. This project was funded with federal/state Groundfish Disaster Relief funds and contracted through the Pacific States Marine Fisheries Commission.

Vessel Selection Process

To identify an initial pool of vessels eligible to participate under the permit, the CDFG developed qualification criteria based on historical participation in the targeted shelf flatfish fishery in the coastal waters of central California. To qualify for the permit eligible vessels were required to have landed at least 10,000 pounds of shelf flatfish (sanddab spp., California halibut, English sole, petrale sole, and other flatfish; California halibut is not a federally managed groundfish) taken by small footrope trawl gear in at least two of three years from 1998 to 2000 in California ports, and the vessel operator was required to hold a current valid California commercial fishing license. Twenty vessels met the criteria and ten vessel owners expressed an interest in participating in the program. Six vessels total, three per port group, were randomly selected from port groups San Francisco and Monterey. One of the six vessels deployed a Scottish seine during the permit period. The Code of Federal Regulations includes Scottish seine gear within its definition of bottom trawl gear (50CFR660.302).

Observers
All participating vessels were required to carry a state-contracted fisheries observer or federal observer when fishing for shelf flatfish under the terms of the permit. The state-contracted observers successfully completed NMFS West Coast Groundfish Observer Program (WCGOP) training. The WCGOP prepared them for monitoring and collecting data on commercial fishing vessels, while following the protocols of the program manual (NWFSC 2004).

Bycatch Thresholds
As part of the permit agreement with the participating vessels, bycatch thresholds (i.e., landing caps) were established for overfished rockfish (bocaccio, cowcod, canary, and yelloweye rockfish) that may co-occur with shelf flatfish species, which, if reached, would terminate fishing under the EFP. Monthly per vessel thresholds, monthly cumulative thresholds, and total EFP thresholds were established as follows:

1) Monthly per Species Threshold: An individual vessel was not permitted to catch more than 100 pounds each of bocaccio, canary, or yelloweye rockfish per fishing month, or more than 50 pounds of cowcod rockfish. If either the 100 pounds threshold for bocaccio, canary, or yelloweye rockfish or the 50 pounds threshold for cowcod rockfish was reached by an individual vessel, then all EFP fishing by that vessel would be terminated for the balance of the month, but could resume the following month.

2) Monthly Cumulative Threshold: The cumulative amount harvested by all participants fishing under this permit for bocaccio, canary, or yelloweye rockfish, could not exceed 500 pounds in a fishing month, or 250 pounds for cowcod rockfish at any time. If the 500 pounds threshold was reached for any one of these species, all EFP fishing would be terminated for the remaining days of the month, but could resume the following month.

3) Exempted Fishing Permit Threshold: The cumulative amount harvested by all participants fishing during the EFP period could not exceed 1,000 pounds for bocaccio, canary, or yelloweye rockfish or 250 pounds for cowcod rockfish any time. If either the 1,000 pounds threshold for bocaccio, canary, or yelloweye rockfish or the 250 pounds threshold for cowcod rockfish was reached, then all EFP fishing would be terminated for the remainder of the year.

Full Retention of Rockfish
Vessel operators were required to retain all rockfish species (*Sebastes spp.*) caught during an EFP trip; hence, provisions were drafted to allow retention of rockfish in excess of trip limits published in the Federal Register for trawl vessels using small footrope trawl gear on the shelf south of 40° 10' N latitude. This requirement is intended to provide information for evaluation of a broader scale full retention program in the groundfish fleet. Proceeds from the sale of rockfish landed in excess of the published trip limits would be forfeited to the CDFG.

Trip Limit Provisions

In addition to the bycatch thresholds and the full retention of rockfish provision in the permit, all participating vessels were required to stay within the trip limit provisions published in the Federal Register for trawl vessels using small footrope gear (including Scottish seine) on the shelf south of 40° 10' N latitude. The 2-month cumulative trip limit provision for shelf flatfish was 70,000 pounds, no more than 40,000 pounds of which could be a species other than sanddabs and of the 40,000 pounds no more than 15,000 pounds could be petrale sole. The permit was valid only for landings made at processing plants specifically designated by CDFG as participants in this program. Landing receipts were monitored over the course of the EFP period to insure bycatch thresholds and trip limits were not exceeded.

Catch Documentation

Three independent data sources were integrated to accurately estimate the catch and calculate bycatch and discard rates for the six participating EFP vessels:
1) Pacific Fisheries Information Network (PacFIN) landing receipt data;
2) vessel trawl log data; and
3) at-sea observer data.

1. PacFIN data: were used for documenting the landed catch for observed trips. Landing receipt data were assumed to be accurate due to the legal requirement to document actual weights, not estimated weights. All trawl logs were matched to landing receipts and the species weights for each tow were estimated from landing receipts. The following steps were used to estimate tow-level weights reported in the logs:
   - (i) If a landed species was listed on both the trawl log and landing receipt and the summed log and receipt pounds were not equal:
     - a. Calculate the ratio between the total landing receipt's pounds and the total trawl log pounds for that species;
     - b. Multiply the trawl log species pounds by the ratio for every tow that had the species to create the final landing receipt pounds for the tow.
   - (ii) If a landed species was recorded on the trawl log but not on the landing receipt, receipt pounds was assumed to be zero, hail pounds was unchanged.
   - (iii) If the landed species was recorded on the landing receipt but not on the trawl log, receipt pounds were added to each tow of the trip trawl logbook data base. The total pounds were divided equally between all tows within the acceptable depth range for the landed species.

2. Trawl log data: provided fishing location and effort information at the tow-level; and
3. Observer data: provided for at-sea bycatch and discard weight estimates.

Analytical Procedures

The analyses for this report were designed to parallel the methodologies described in the Northwest Fisheries Science Center's WCGOP report (NWSC 2003) for calculating bycatch and discard rates for the west coast groundfish fleet when possible and appropriate. For this report, "groundfish" are those species found in the federal Groundfish FMP, and the designation "groundfish group" represents unspecified market categories (e.g., other flatfish).

PacFIN market receipt, trawl log, and observer data sets were merged to allow for tow-level analyses of discard and bycatch rates for 19 groundfish species/groups and California halibut during the EFP study. Three different measurements were used to calculate ratio estimators for discard:
1) discard pounds per hour towed;
2) discard pounds per pound of retained target strategy; and
3) discard pounds per pound of retained groundfish.

The target strategy denominator consisted of all marketable shelf flatfish (sanddab spp., English sole, petrale sole, other flatfish, and California halibut) caught per tow, while the groundfish denominator consisted of all federally managed groundfish caught per tow. Bycatch estimates for overfished groundfish were also derived using both the target and groundfish denominators. These estimates were stratified by 2-month cumulative landing limit periods: September/October and November/December.

Results

Temporal Distribution of Observations

Under the terms of the EFP, the six vessels conducted normal fishing operations for shelf flatfish with 100% observer coverage over two 2-month landing limit periods from October 18, 2002 to December 12, 2002. Due to funding limitations, only three observers were available for the permit period, so the sampling protocol required an observer to ride on more than one vessel during the study. Observers went on a total of 30 EFP trips, documented fishing activities and catch, and collected biological samples from 100 tows. Fishing effort occurred south of 40° 10' N latitude from port groups San Francisco to Monterey (Table 1).

Table 1. Number of at-sea trips observed by port group per 2-month landing limit period for all six vessels that participated in the shelf flatfish exempted fishing permit study.

	Observed Trips in each Port Group					
	September - October		**November - December**		**Total for Permit Period**	
Port Group	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**
San Francisco	2	18%	9	47%	11	37%
Monterey	9	82%	10	53%	19	63%
Total	11	100%	19	100%	30	100%

Trawl log data showed fishing effort ranged in depth ranged from 17 fm to 70 fm, for an overall average tow depth of 43 fm. Table 2 shows the number of tows and average depth per 2-month period.

Table 2. Number of at-sea tows observed and average depth fished per 2-month landing period for all six vessels that participated in the shelf flatfish exempted fishing permit study.

Number of Observed Tows and Depth						
September - October		**November - December**		**Total for Permit Period**		
Tow Number	**Average Depth (fm)**	**Tow Number**	**Average Depth (fm)**	**Tow Number**	**Average Depth (fm)**	**Depth Range (fm)**
37	45	63	43	100	43	17 to 70

Catch, Discard and Bycatch Estimates

Amounts of discard, retained, and total catch for 19 groundfish species/group and California halibut are summed in (Table 3). Overfished rockfish are presented first, followed by rockfish, lingcod, flatfish, roundfish, sharks, and skates and rays. A total of 191,324 pounds of groundfish including California halibut was caught during the permit period by the six participating vessels. Eighty-seven percent of the total catch was retained and 13% was discarded at-sea. The target fishery (shelf flatfish) comprised a majority (96%) of the retained catch weight, followed by shelf rockfish (3%), and skates and rays (1%), and all other groundfish species/groups comprised the remainder of the retained catch weight (Table 3). The percent weight calculation for shelf rockfish included bocaccio, canary, cowcod, chilipepper, yellowtail, widow rockfish, and the market category "other shelf rockfish." The total catch weight for bocaccio, canary, cowcod, and widow rockfish amounted to only 70 pounds for the entire permit period; no yelloweye rockfish were taken during this EFP. A list of all the groundfish species caught during the study is shown in (Table 4).

Estimates of discarded pounds per hour towed, discard pounds per pound of target strategy, and discarded pounds per pound of groundfish was also calculated for 19 groundfish species/group and California halibut (Table 5). All three ratio estimators for discard showed the market category "other flatfish" and skates and rays had the highest discard rates for both the September/October and November/December landing limit periods when compared to the other 17 groundfish species/group and California halibut (Table 5). The primary reasons noted for at-sea discard were prohibited species, size, and lack of market demand. The full retention of all rockfish eliminated discard estimates for these species. However, there were a few exceptions when some rockfish were discarded at sea accidentally.

Bycatch rate estimates for five overfished rockfish species (bocaccio, canary, cowcod, yelloweye, and widow rockfish) are shown in (Table 6). The bycatch rate estimates were nominal, ranging from zero to 0.0003 per pound of retained target or per pound retained groundfish during the study period.

Discussion

Unlike the WCGOP, California's EFP was focused on one target strategy (shelf flatfish) over a relatively small area when compared to the entire west coast. The data shown in this report indicate small footrope trawl and Scottish seine gears had nominal bycatch of overfished rockfish when used to target shelf flatfish. However, the data also show there is some bycatch and discard of non-target groundfish species which is inherent in the trawl fishery. Although fishing behavior may have been modified with an observer onboard, the data in this report supports the fleet's contention that small footrope trawl gear can be fished in waters less than 70 fm for shelf flatfish with minimal bycatch of overfished rockfish south of 40° 10' N, from October through December.

To maximize the potential of the shelf flatfish fishery while having minimal impacts on overfished groundfish, the CDFG recommends NMFS issue another EFP for 2003 to continue the documentation of bycatch of overfished rockfish taken by small footrope trawl gear in deeper waters, out to 100 fm in depth. In addition, the CDFG intends to support testing modified trawl nets in 2003 to find net configurations that enhance the selectivity for shelf flatfish while minimizing impacts to overfished groundfish.

Literature Cited

Northwest Fisheries Science Center (NWFSC). 2003. West Coast Groundfish Observer Program. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington, 98112.

Northwest Fisheries Science Center (NWFSC). 2004. West Coast Groundfish Observer Manual. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington, 98112.

Table 3. Summary of discarded, retained, and total catch (pounds) for 19 groundfish species/groups and California halibut in the shelf flatfish exempted fishing permit study.

Species	Fish Disposition	Pounds	Percent Disposition
Bocaccio Rockfish	Discarded	0	0%
	Retained	21	100%
	Total Catch	21	
Cowcod Rockfish	Discarded	0	0%
	Retained	16	100%
	Total Catch	16	
Canary Rockfish	Discarded	5	45%
	Retained	6	55%
	Total Catch	11	
Widow Rockfish	Discarded	0	0%
	Retained	27	100%
	Total Catch	27	
Yelloweye Rockfish	Discarded	0	0%
	Retained	0	0%
	Total Catch	0	
Chilipepper Rockfish	Discarded	223	8%
	Retained	2,623	92%
	Total Catch	2,846	
Other Nearshore Rockfish	Discarded	8	4%
	Retained	173	96%
	Total Catch	181	
Other Shelf Rockfish	Discarded	85	5%
	Retained	1,481	95%
	Total Catch	1,566	
Other Slope Rockfish	Discarded	5	100%
	Retained	0	0%
	Total Catch	5	

Table 3. Summary of discarded, retained, and total catch (pounds) for 19 groundfish species/groups and California halibut in the shelf flatfish exempted fishing permit study.

Species	Fish Disposition	Pounds	Percent Disposition
Lingcod	Discarded	844	93%
	Retained	63	7%
	Total Catch	907	
Arrowtooth Flounder	Discarded	<1	100%
	Retained	0	0%
	Total Catch	<1	
Dover Sole	Discarded	<1	100%
	Retained	0	0%
	Total Catch	<1	
California Halibut	Discarded	1,749	15%
	Retained	10,094	85%
	Total Catch	11,843	
Petrale Sole	Discarded	11	1%
	Retained	2,102	99%
	Total Catch	2,113	
Other Flatfish	Discarded	7,769	5%
	Retained	147,542	95%
	Total Catch	155,311	
Pacific Hake	Discarded	457	100%
	Retained	0	0%
	Total Catch	457	
Sablefish	Discarded	1,149	83%
	Retained	236	17%
	Total Catch	1,385	
Roundfish other than Sablefish and P. Hake	Discarded	134	23%
	Retained	452	77%
	Total Catch	586	

Table 3. Summary of discarded, retained, and total catch (pounds) for 19 groundfish species/groups and California halibut in the shelf flatfish exempted fishing permit study.

Species	Fish Disposition	Pounds	Percent Disposition
Sharks	Discarded	2,529	93%
	Retained	188	7%
	Total Catch	2,717	
Skates and Rays	Discarded	9,790	86%
	Retained	1,541	14%
	Total Catch	11,331	

Table 4. List of all target flatfish species and groundfish species caught during the exempted fishing permit study.

Target Species	Groundfish Species
California Halibut	Arrowtooth Flounder
Curlfin Turbot	Bocaccio Rockfish
English Sole	Blue Rockfish
Petrale Sole	Brown Rockfish
Rock Sole	Cabezon
Sanddab spp.	Canary Rockfish
Sand Sole	California Skate
Starry Flounder	Chilipepper Rockfish
	Cowcod Rockfish
	Curlfin Turbot
	Dover Sole
	English Sole
	Flatfish Unspecified
	Greenblotched Rockfish
	Greenspotted Rockfish
	Greenstriped Rockfish
	Halfbanded Rockfish
	Kelp Greenling
	Leopard Shark
	Lingcod
	Longnose Skate
	Pacific Hake
	Petrale Sole
	Ratfish
	Rex Sole
	Rock Sole
	Sablefish
	Sanddab spp.
	Sand Sole
	Sharks
	Shortbelly Rockfish
	Skate Unspecified
	Soupfin Shark
	Spiny Dogfish Shark
	Splitnose rockfish
	Starry Flounder
	Widow Rockfish
	Yellowtail Rockfish

Table 5. Estimates of discarded pounds for 19 groundfish species/groups and California halibut per 2-month landing limit period in the shelf flatfish exempted fishing permit study.

Species	Period	Number of Tows	Discarded lbs-per-hr lb/hr	Discarded lbs-per-lb Target	Discarded lbs-per-lb Groundfish
Arrowtooth Flounder	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000
Bocaccio Rockfish	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000
California Halibut	Sep. - Oct.	37	4.18	0.0144	0.0133
	Nov. - Dec.	63	4.60	0.0101	0.0098
Canary Rockfish	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.03	0.0001	0.0001
Chilipepper Rockfish	Sep. - Oct.	37	1.07	0.0037	0.0034
	Nov. - Dec.	63	0.08	0.0002	0.0002
Cowcod Rockfish	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000
Dover Sole	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000
Lingcod	Sep. - Oct.	37	1.17	0.0040	0.0037
	Nov. - Dec.	63	3.01	0.0066	0.0064
Nearshore Rockfish	Sep. - Oct.	37	0.02	0.0001	0.0001
	Nov. - Dec.	63	0.02	0.0000	0.0000
Other Flatfish	Sep. - Oct.	37	24.40	0.0840	0.0774
	Nov. - Dec.	63	14.98	0.0328	0.0319
Pacific Hake	Sep. - Oct.	37	1.97	0.0068	0.0063
	Nov. - Dec.	63	0.38	0.0008	0.0008
Petrale Sole	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.05	0.0001	0.0001

Table 5. Estimates of discarded pounds for 19 groundfish species/groups and California halibut per 2-month landing limit period in the shelf flatfish exempted fishing permit study.

Species	Period	Number of Tows	Discarded lbs-per-hr lb/hr	Discarded lbs-per-lb Target	Discarded lbs-per-lb Groundfish
Roundfish other than Sablefish and P. Hake	Sep. - Oct.	37	0.69	0.0024	0.0022
	Nov. - Dec.	63	0.01	0.0000	0.0000
Sablefish	Sep. - Oct.	37	1.41	0.0049	0.0045
	Nov. - Dec.	63	4.27	0.0093	0.0091
Sharks	Sep. - Oct.	37	4.36	0.0150	0.0138
	Nov. - Dec.	63	8.23	0.0180	0.0175
Shelf Rockfish	Sep. - Oct.	37	0.44	0.0015	0.0014
	Nov. - Dec.	63	0.10	0.0002	0.0002
Skates and Rays	Sep. - Oct.	37	23.75	0.0818	0.0753
	Nov. - Dec.	63	25.41	0.0557	0.0542
Slope Rockfish	Sep. - Oct.	37	0.03	0.0001	0.0001
	Nov. - Dec.	63	0.00	0.0000	0.0000
Widow Rockfish	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000
Yelloweye Rockfish	Sep. - Oct.	37	0.00	0.0000	0.0000
	Nov. - Dec.	63	0.00	0.0000	0.0000

Table 6. Estimates of bycatch for five overfished rockfish species per pound of retained target or per pound retained groundfish in the shelf flatfish exempted fishing permit study.

Species	Period	Species Catch per Pound Retained: Target Species	Species Catch per Pound Retained: Groundfish Species
Bocaccio Rockfish	Sep. - Oct	0.0001	0.0000
	Nov. - Dec	0.0002	0.0002
Canary Rockfish	Sep. - Oct	0.0000	0.0000
	Nov. - Dec	0.0001	0.0001
Cowcod Rockfish	Sep. - Oct	0.0000	0.0000
	Nov. - Dec	0.0002	0.0002
Widow Rockfish	Sep. - Oct	0.0000	0.0000
	Nov. - Dec	0.0003	0.0003
Yelloweye Rockfish	Sep. - Oct	0.0000	0.0000
	Nov. - Dec	0.0000	0.0000

Estimates of Discard and Bycatch for Modified Scottish Seine Gear in the Central California Shelf Flatfish Fishery Under a Federal Exempted Fishing Permit in 2003

Prepared By
Marine Region
California Department of Fish and Game
September 24, 2004

Summary

The California Department of Fish and Game (CDFG) conducted an Exempted Fishing Permit (EFP) study to observe and document the at-sea bycatch of overfished rockfish and non-target species in shelf flatfish fishery south of 40° 10' N latitude using a modified trawl net (Scottish seine). One vessel participated using a modified Scottish seine net, with 100% observer coverage from September to December 2003, resulting in 13 trips and 37 tows. The results of the study are as follows:

- The participating vessel caught 85,970 pounds of groundfish;
- The targeted flatfish species accounted for 92% by weight of the total groundfish catch and 96% by weight of the retained catch;
- The total catch weight for bocaccio and cowcod rockfish was 9 pounds, no canary, widow, or yelloweye rockfish were observed; and
- Bycatch estimates for bocaccio and cowcod rockfish per pound of retained target or retained groundfish ranged from zero to 0.0001.

The CDFG intends to support continued testing of modified trawl and Scottish seine net configurations in 2004 to enhance the gears' selectivity for shelf flatfish while minimizing impacts to overfished rockfish.

Introduction

On July 1, 2002, the US Secretary of Commerce closed the eastern Pacific continental shelf south of 40° 10' N latitude to retention of shelf groundfish species, based on an inseason recommendation from the Pacific Fishery Management Council (PFMC) to protect bocaccio, cowcod, canary, and yelloweye rockfish declared overfished by the National Marine Fisheries Service (NMFS). By 2003, this developed into a depth-based area closure based on the primary depth distribution of overfished species, and named the Trawl Rockfish Conservation Area (RCA). This action precluded trawl fishing access to healthy flatfish stocks that occur on the shelf.

Shelf flatfish are an extremely important group of groundfish in the California seafood industry. These stocks are believed to be healthy and California fishermen and fish processors have worked aggressively to develop strong markets for these species, especially on the central California coast. A component of California's trawl fleet and processors are heavily dependent upon these flatfish. Vessels using small footrope trawl gear including Scottish seine were prohibited from landing shelf flatfish from July 1, 2002 through the end of the year. In 2003, landings of shelf species were again permitted; however, the Trawl RCA depth boundaries excluded access to a significant portion of the primary shelf flatfish trawling grounds. Fishermen using trawl gear to catch shelf flatfish prior to that date testified before the PFMC that they can pursue this fishery over the shelf with minimal or no bycatch of overfished rockfish distributed in depths excluded by the trawl RCA.

In 2002, NMFS issued an EFP to CDFG to allow for normal trawl fishing operations for shelf flatfish within the RCA to estimate the bycatch of overfished rockfish. Fishing operations were conducted in Pacific Ocean waters adjacent to California to a maximum water depth of 70 fathoms (fm), south of 40° 10' N latitude from port groups San Francisco to Monterey. Results from the 2002 EFP showed that the bycatch rate of bocaccio, canary, cowcod, and widow rockfish was nominal ($\leq$0.0003); no yelloweye rockfish was observed.

The purpose of California's 2003 EFP is to measure discard and bycatch rates of unintended groundfish species, particularly bocaccio, canary, cowcod, widow, and yelloweye rockfish and lingcod taken by commercial fishermen using small footrope trawl gear (including Scottish seine) modified to reduce bycatch of non-target groundfish species, while harvesting shelf flatfish within the RCA south of 40° 10' N latitude to a maximum depth of 100 fm. Information from this study will allow for informed management decisions for setting appropriate depth-based closures for the small footrope trawl fleet fishing south of 40° 10' N latitude. It will also allow determination of the effectiveness of the modified trawl gear configuration for selective harvest of shelf flatfish.

Methods

Scope of Exempted Fishing Permit for Shelf Flatfish Fishery

The CDFG received an EFP from NMFS to conduct cooperative research with up to six small footrope trawl vessels on the central California coast to:
1) document at-sea bycatch for overfished rockfish and non-target groundfish species in the shelf flatfish fishery using a modified small footrope trawl gear. For this report, bycatch is the total amount of unintended catch that is retained, and discard is the amount of unintended catch which is not retained on the vessel;
2) calculate bycatch rates for overfished rockfish and discard rates for non-target groundfish species caught in the modified small footrope trawl;
3) collect biological data that are otherwise not available from the landed catch; and
4) document catch at-depth data for overfished rockfish to evaluate current depth-based management.

The permit was valid from September 1, 2003 to November 15, 2003, in Pacific Ocean waters adjacent to California to a maximum water depth of 100 fathoms (fm), south of 40° 10' N latitude. This project was funded with federal/state Groundfish Disaster Relief funds and contracted through the Pacific States Marine Fisheries Commission.

Vessel Selection Process

The intent of the program was to randomly pick six vessels from a pool of qualified trawl vessels to participate in the program. To qualify for the EFP, vessels were required to have landed at least 10,000 pounds of shelf flatfish (sanddab spp., California halibut, English sole, petrale sole, and other flatfish; California halibut is not a federally managed groundfish) taken by small footrope trawl gear (including Scottish seine) in at least two of three years from 1998 to 2000 in California ports, and the vessel operator was required to hold a current valid California commercial fishing license. Twenty vessels qualified for the program; however, only one vessel owner/operator expressed an interest and participated. The qualified vessel operated out of port group San Francisco and fished a Scottish seine modified according to gear specifications provided in the EFP. The Code of Federal Regulations includes Scottish seine gear within its definition of bottom trawl gear (50CFR660.302).

Observers

The participating vessel was required to carry a state-contracted fisheries observer or federal observer when fishing for shelf flatfish under the terms of the permit. The state-contracted observers successfully completed NOAA-Fisheries West Coast Groundfish Observer Program (WCGOP) training. The WCGOP prepared them for monitoring and collecting data on commercial fishing vessels, while following the protocols of the program manual (NWFSC 2004).

Bycatch Thresholds

As part of the permit agreement with the participating vessel, bycatch thresholds (landing caps) were established to minimize fishing mortality of overfished rockfish (bocaccio, cowcod, canary, and yelloweye rockfish) that can occur with the healthy shelf flatfish species, which, if reached, would terminate fishing under the EFP. The participating vessel was not permitted to catch more than 100 pounds each of bocaccio, canary, or yelloweye rockfish per fishing month, or more than 50 pounds of cowcod rockfish. If either the 100 pounds threshold for bocaccio, canary, or yelloweye rockfish, or the 50 pounds threshold for cowcod rockfish was reached by the vessel, all EFP fishing would be terminated for the balance of the month, but could resume the following month.

Full Retention of Rockfish

The permit required retention of all rockfish species (*Sebastes spp.*) caught during a trip; hence, provisions were drafted to allow retention of rockfish in excess of published trip limits in the Federal Register for trawl vessels using small footrope gear (including Scottish seine) south of 40° 10' N latitude. This requirement was expected to provide information to evaluate a future broader scale retention program in the groundfish fleet. Proceeds from the sale of rockfish landed in excess of the published trip limits were forfeited to the CDFG.

Trip Limit Provisions

The participating vessel was required to stay within the routine trip limit provisions published in the Federal Register for trawl vessels deploying small footrope gear (including Scottish seine) south of 40° 10' N latitude. Landing provisions allowed up to 70,000 pounds per 2-month cumulative period for shelf flatfish, no more than 40,000 pounds of which could be a species other than sanddabs and of the 40,000 pounds no more than 15,000 pounds could be petrale sole, taken in federal waters and east of the 100 fm depth contour, to be sold for profit. The permit was valid only for landings made at processing plants specifically designated by CDFG as participants in this program. Over the course of the EFP study, landing receipts were monitored to insure bycatch thresholds and trip limits were not exceeded.

Net Design

As part of the permit agreement, the participating vessel operator was required to fish legal trawl gear (Scottish seine) as defined in the CFR (50CFR660.302), except that modification of the headrope was required. The modifications included:
1) Headrope to footrope ratio of at least 1.30 (i.e., 30% longer headrope);
2) The center of the headrope could not rise more than 5 ft above the footrope;
3) No floats along the middle 50% of the headrope", except for Scottish seine, for which there must be no floats along the middle 25% of the headrope.; and
4) Wing tip height of not more than 30 meshes.

Catch Documentation

Three independent data sources were integrated to accurately measure bycatch and discard rates for overfished rockfish and non-target groundfish species caught in a modified Scottish seine used to target shelf flatfish during the EFP study:
1) Pacific Fisheries Information Network (PacFIN) landing receipt data;
2) vessel trawl log data; and
3) at-sea observer data.

1. PacFIN data: were used for documenting the landed catch for observed trips. Landing receipt data were assumed to be accurate due to the legal requirement to document actual weights, not estimated weights. All trawl logs were matched to landing receipts and the species weights for each tow were estimated from landing receipts. The following steps were used to estimate tow-level weights reported in the logs:
   - (i) If a landed species was listed on both the trawl log and landing receipt and the summed log and receipt pounds were not equal:
     - a. Calculate the ratio between the total landing receipt pounds and the total trawl log pounds for that species;
     - b. Multiply the trawl log species pounds by the ratio for every tow that had the species to create the final landing receipt pounds for the tow.
   - (ii) If a landed species was recorded on the trawl log but not on the landing receipt, receipt pounds were assumed to be zero, hail pounds were unchanged.
   - (iii) If the landed species was recorded on the landing receipt but not on the trawl log, receipt pounds were added to each tow of the trip trawl logbook data base. The total pounds were divided equally between all tows within the acceptable depth range for the landed species.

2. Trawl log data: provided fishing location and effort information at the tow-level, and

3. Observer data: provided for at-sea bycatch and discard weight estimates.

Analytical Procedures

Analyses for this report attempt to parallel the methodologies described in the Northwest Fisheries Science Center's WCGOP report (NWSC 2003) for estimating bycatch and discard rates for the west coast groundfish fleet when possible and appropriate. For this report, "groundfish" are those species found in the federal West Coast Groundfish Fishery Management Plan, and the designation "groundfish group" represents unspecified market categories (e.g., other flatfish).

PacFIN market receipt, trawl log, and observer data sets were merged to allow for tow-level analyses of discard and bycatch rates for 16 groundfish species/group during the EFP. Three different measurements were used to calculate ratio estimators for discard:
1) discard pounds per hour towed;
2) discard pounds per pound of retained target strategy; and
3) discard pounds per pound of retained groundfish.

The target strategy denominator consisted of all marketable shelf flatfish species (sanddab spp., English sole, petrale sole, and other flatfish) caught per tow, while the groundfish denominator consisted of all federally managed groundfish caught per tow. Bycatch estimates were also derived using both the target or groundfish denominators for overfished rockfish. These estimates were stratified by 2-month landing limit periods: September/October and November/December.

Results

Temporal Distribution of Observations

Under the terms of the EFP, one vessel deploying a Scottish seine conducted normal fishing operations for shelf flatfish with 100% observer coverage over two 2-month landing limit periods from September 8, 2003 to November 4, 2003. Observers went on a total of 13 EFP trips, documented fishing activity and catch, and collected biological samples from 37 tows. Fishing effort occurred south of 40° 10' N latitude near the port group San Francisco. The number of observed trips are summed by 2-month landing limit periods in (Table 1).

Table 1. Number of at-sea trips observed per 2-month landing limit period during the shelf flatfish exempted fishing permit study.

	Observed Trips in each Port Group					
	September - October		**November - December**		**Total for Permit Period**	
Port Group	**Number**	**% of Total**	**Number**	**% of Total**	**Number**	**% of Total**
San Francisco	11	85%	2	15%	13	100%

Trawl log data showed fishing effort ranged in depth from 40 fm to 98 fm, for an overall average tow depth of 74 fm. The number of tows and average depth per 2-month landing limit period are shown in (Table 2).

Table 2. Number of at-sea tows observed and the average tow depth per 2-month landing limit period during the exempted fishing permit study.

Number of Observed Tows and Depth						
September - October		November - December		Total for Permit Period		
Tow Number	Average Depth (fm)	Tow Number	Average Depth (fm)	Tow Number	Depth Range (fm)	Average Depth (fm)
31	72	6	81	37	40 to 98	74

Catch, Discard and Bycatch Estimates

Amounts of discard, retained, and total catch for 17 groundfish species/groups are summed in (Table 3). Overfished rockfish are presented first, followed by rockfish, lingcod, flatfish, roundfish, sharks, and skates and rays. A total of 85,970 pounds of groundfish was caught during the permit period by the participating vessel. Seventy-seven percent of the total catch was retained and 23% was discarded at-sea. The target fishery (shelf flatfish) comprised a majority (96%) of the retained catch weight, followed by skates and rays (2%), shelf rockfish (1%), and all other groundfish species/group comprised the remainder of the retained catch weight (Table 3). The percent weight calculation for shelf rockfish included bocaccio, cowcod, chilipepper rockfish, and the market category "other shelf rockfish." The total catch weight for bocaccio and cowcod rockfish was only 9 pounds for the entire permit period, well below the thresholds established for this EFP. No canary, widow, or yelloweye rockfish were taken during the EFP. A list of groundfish species caught during the study is shown in (Table 4).

Estimates of discarded pounds per hour towed, discard pounds per pound of target strategy, and discarded pounds per pound of groundfish were calculated for 17 groundfish species/groups (Table 5). All three ratio estimators for discard showed the market category "other flatfish" and skates and rays had the highest discard rates for both the September/October and November/December landing limit periods when compared to other 14 groundfish species/groups (Table 5). The primary reasons noted for discard were species prohibited, size, and no market demand. The full retention of all rockfish eliminated discard estimates for these species.

Bycatch estimates for the five overfished rockfish species (bocaccio, canary, cowcod, yelloweye, and widow rockfish) caught during the study are shown in (Table 6). Catches were nominal, and bycatch rates ranged from zero to 0.0001 per pound of retained target or per pound retained groundfish during the study period.

Discussion

The data shown in this report indicate one vessel deploying a modified Scottish seine to target shelf flatfish had nominal bycatch of overfished rockfish. Because this study was limited in scope, the results are inconclusive for gear selectivity or depth-based management consideration. In order to develop sound results for management consideration, the number of participating vessels needs to be increased, and the study area expanded to cover a broader geographic range along the central California coast.

The CDFG intends to support future EFP studies to test modified small footrope trawl net configurations on a broader scale south of 40°10' N latitude to evaluate their selectivity for shelf flatfish while minimizing impacts to overfished groundfish.

Literature Cited

Northwest Fisheries Science Center (NWFSC). 2003. West Coast Groundfish Observer Program. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington, 98112.

Northwest Fisheries Science Center (NWFSC). 2004. West Coast Groundfish Observer Manual. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington, 98112.

Table 3. Summary of discarded, retained, and total catch (pounds) for 17 groundfish species/groups in the shelf flatfish exempted fishing permit study.

Species	Fish Disposition	Pounds	Percent Disposition
Bocaccio Rockfish	Discarded	0	0%
	Retained	6	100%
	Total Catch	6	
Canary Rockfish	Discarded	0	0%
	Retained	0	0%
	Total Catch	0	
Cowcod Rockfish	Discarded	0	0%
	Retained	3	100%
	Total Catch	3	
Widow Rockfish	Discarded	0	0%
	Retained	0	0%
	Total Catch	0	
Yelloweye Rockfish	Discarded	0	0%
	Retained	0	0%
	Total Catch	0	
Chilipepper rockfish	Discarded	226	22%
	Retained	817	78%
	Total Catch	1,043	
Other Nearshore Rockfish	Discarded	1	100%
	Retained	0	0%
	Total catch	1	
Other Shelf Rockfish	Discarded	13	12%
	Retained	100	88%
	Total Catch	113	
Other Slope Rockfish	Discarded	7	21%
	Retained	27	79%
	Total Catch	34	

Table 3. Summary of discarded, retained, and total catch (pounds) for 17 groundfish species/groups in the shelf flatfish exempted fishing permit study.

Species	Fish Disposition	Pounds	Percent Disposition
Lingcod	Discarded	124	93%
	Retained	9	7%
	Total Catch	133	
Dover Sole	Discarded	100	100%
	Retained	0	0%
	Total Catch	100	
Petrale Sole	Discarded	301	2%
	Retained	14,040	98%
	Total Catch	14,341	
Other flatfish	Discarded	15,292	24%
	Retained	48,971	76%
	Total Catch	64,263	
Pacific Hake	Discarded	82	100%
	Retained	0	0%
	Total Catch	82	
Sablefish	Discarded	673	75%
	Retained	220	25%
	Total Catch	893	
Sharks	Discarded	1,088	100%
	Retained	0	0%
	Total Catch	1,088	
Skates and Rays	Discarded	2,277	59%
	Retained	1,593	41%
	Total Catch	3,870	

Table 4. List of all target and groundfish species caught during the exempted fishing permit study.

Target Species	Groundfish Species
Curlfin Turbot	Bocaccio Rockfish
English Sole	Brown Rockfish
Sanddab spp.	California Skate
Petrale Sole	Chilipepper Rockfish
	Cowcod Rockfish
	Curlfin Turbot
	Dover Sole
	English Sole
	Greenspotted Rockfish
	Greenstriped Rockfish
	Halfbanded Rockfish
	Longnose Skate
	Pacific Hake
	Petrale Sole
	Ratfish
	Rex Sole
	Sablefish
	Sanddab spp.
	Skate Unspecified
	Slender Sole
	Spiny Dogfish Shark

Table 5. Estimates of discarded pounds for 17 groundfish species/groups per 2-month landing limit period in the shelf flatfish exempted fishing permit study.

Species	Period	Number of Tows	Discarded lbs-per-hr lbs/hr	Discarded lbs-per-lb Target	Discarded lbs-per-lb Groundfish
Bocaccio Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.00	0.0000	0.0000
Canary Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.00	0.0000	0.0000
Chilipepper Rockfish	Sep. - Oct.	31	0.01	0.0000	0.0000
	Nov. - Dec.	6	20.56	0.0453	0.0413
Cowcod Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.03	0.0001	0.0001
Dover Sole	Sep. - Oct.	31	1.62	0.0017	0.0017
	Nov. - Dec.	6	0.00	0.0000	0.0000
Lingcod	Sep. - Oct.	31	1.97	0.0021	0.0020
	Nov. - Dec.	6	0.18	0.0004	0.0004
Nearshore Rockfish	Sep. - Oct.	31	0.02	0.0000	0.0000
	Nov. - Dec.	6	0.00	0.0000	0.0000
Other Flatfish	Sep. - Oct.	31	238.52	0.2549	0.2452
	Nov. - Dec.	6	45.77	0.1009	0.0920
Pacific Hake	Sep. - Oct.	31	1.32	0.0014	0.0014
	Nov. - Dec.	6	0.00	0.0000	0.0000
Petrale Sole	Sep. - Oct.	31	4.85	0.0052	0.0050
	Nov. - Dec.	6	0.00	0.0000	0.0000
Sablefish	Sep. - Oct.	31	7.05	0.0075	0.0072
	Nov. - Dec.	6	21.42	0.0472	0.0431
Sharks	Sep. - Oct.	31	17.46	0.0187	0.0179
	Nov. - Dec.	6	0.55	0.0012	0.0011
Shelf Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	1.22	0.0027	0.0024

Table 5. Estimates of discarded pounds for 17 groundfish species/groups per 2-month landing limit period in the shelf flatfish exempted fishing permit study.

Species	Period	Number of Tows	Discarded lbs-per-hr lbs/hr	Discarded lbs-per-lb Target	Discarded lbs-per-lb Groundfish
Skates and Rays	Sep. - Oct.	31	29.99	0.0321	0.0308
	Nov. - Dec.	6	37.93	0.0836	0.0763
Slope Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.65	0.0014	0.0013
Widow Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.00	0.0000	0.0000
Yelloweye Rockfish	Sep. - Oct.	31	0.00	0.0000	0.0000
	Nov. - Dec.	6	0.00	0.0000	0.0000

Table 6. Estimates of bycatch for five overfished rockfish species per pound of retained target or per pound retained groundfish in the shelf flatfish exempted fishing permit study.

Species	Period	Number of Tows	Target	Groundfish
Bocaccio Rockfish	Sep. - Oct	31	0.0001	0.0001
	Nov. - Dec	6	0.0000	0.0000
Canary Rockfish	Sep. - Oct	31	0.0000	0.0000
	Nov. - Dec	6	0.0000	0.0000
Cowcod Rockfish	Sep. - Oct	31	0.0000	0.0000
	Nov. - Dec	6	0.0001	0.0001
Widow Rockfish	Sep. - Oct	31	0.0000	0.0000
	Nov. - Dec	6	0.0000	0.0000
Yelloweye Rockfish	Sep. - Oct	31	0.0000	0.0000
	Nov. - Dec	6	0.0000	0.0000

October 1, 2004

D. Robert Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115

Dear Robert:

Enclosed is a joint ODFW, WDFW and CDFG application for an exempted fishing permit (EFP) for your review and approval. The EFP is requested to allow legal retention, delivery and temporary possession of incidentally caught Pacific salmon and Pacific halibut in the shoreside Pacific hake fishery, and potentially to allow for overages of other groundfish species caught while target fishing for hake. It is our opinion that accurate enumeration of the incidental catch in this fishery continues to be needed. During 2004, 100% of the catch was enumerated. In addition, the minimum observation rate of 10% of all trips was achieved with such observations being conducted shoreside. We also included collection of biological data for bycatch of key groundfish species. Participating processors allowed us to achieve a 100% observation rate for salmon and halibut bycatch by setting aside all salmon and halibut encountered during offloads, regardless of whether the landing was observed or not. An EFP for the "shoreside" processing sector of the Pacific hake fishery continues to be the only means available to estimate the bycatch of prohibited species and groundfish.

Under this program, permitted vessels would be required not to sort their catch at-sea so that the entire catch can be sampled. Shoreside observers enumerate prohibited species and groundfish bycatch for 10 to 15% of all shoreside deliveries, and also collect biological information on hake and bycatch species. An allowance for overages of groundfish catch continues to be needed for calculating the groundfish bycatch rate and to facilitate collection of valuable biological data (age, sex, weight and length) for bycatch groundfish species (e.g. sablefish, yellowtail rockfish and widow rockfish). These biological samples will be used to support stock assessment work. The shoreside hake industry, in cooperation with state fishery managers, has dramatically reduced the bycatch rates for rockfishes (60% from late 1990’s levels). This is in addition to new methods for predicting and reducing salmon and sablefish bycatch in this fishery. Any prohibited species and proceeds from groundfish overages will be forfeited to the State of landing.

We have not yet determined how many vessels will participate in the fishery next year, but expect less than 30 vessels. We will generate a participating vessels list as soon as possible and forward it to you.

Sincerely,

Patricia M. Burke
Marine Resources Program Manager

attachment

EXPERIMENTAL FISHING PERMIT APPLICATION

1. Date of Application

   October 1, 2004

2. Applicant Name(s)

   Washington Department of Fish and Wildlife
   48A Devonshire Road
   Montesano, WA 98563-9618
   Attention: Brian Culver (360)249-1205

   Oregon Department of Fish and Wildlife
   2040 SE Marine Science Drive
   Newport, OR 97365-5294
   Attention: Steve Parker (541)867-4741

   California Department of Fish and Game
   619 Second Street
   Eureka, CA 95501
   Attention: Mike Fukushima (707) 441-5797

3. Purposes and Goals of the Proposed Experiment

   The goal of the exempted fishery is to implement an observation program at the request of the Pacific Fishery Management Council to enumerate the bycatch in hake harvests delivered to shoreside processing plants for 10 – 15 percent of all EFP deliveries. Hake must be handled quickly to ensure quality, and as a result many vessels dump tows directly into the hold and are unable to sort their catch. The purpose of the EFP is to allow delayed sorting from mid-water trawl catches of Pacific hake until the catch is unloaded at a shoreside processing plant. In addition, in order to sample unsorted total catch shoreside, the EFP may need to include provisions to allow for potential overages in groundfish trip limits as well as the retention of prohibited species (e.g. salmon and halibut) until offloading. The amounts of groundfish which exceed the trip limits set for the year will be forfeited to the state in which the delivery is made and port price paid. Current groundfish regulations at 50 CFR 663.7(b) stipulate that prohibited species must be returned to the sea as soon as practicable with a minimum of injury when caught and brought aboard. The EFP is necessary to authorize retention of prohibited species until shoreside delivery by vessels participating in the observation program. The EFP would be valid only for landings by permitted vessels at processing plants that have been designated by the States of Washington, Oregon or California as participants in the observation program. Designated processing plants will have signed agreements with their state and agree to set aside prohibited species for biological sampling and disposition, and allow sampling of hake landings and groundfish bycatch.

There are two options for disposal of incidentally caught prohibited species brought ashore: (1) donate to a local food share or other appropriate charitable organization, or (2) reduction in the fish meal plant. Option 1 is preferred, but salmon caught by trawls are often in poor condition, and they are also very perishable.

In addition to enumerating each prohibited species, other data to be collected include length, sex, and weight. Salmon snouts will be collected for coded wire tags from appropriately marked fish.

Another goal is to document the bycatch rate of other groundfish species encountered while target fishing for Pacific hake. Biological data (age, weight, length, otoliths, and sex) will be collected for Pacific hake, sablefish, yellowtail rockfish, widow rockfish, Pacific mackerel, and jack mackerel.

4. Justification

The EFP is requested so that an accurate count of incidentally caught salmon can be generated, and estimates of groundfish bycatch rates can be obtained from shoreside deliveries of Pacific hake. An EFP provides legal protection for trawlers and processors that have possession of incidentally caught prohibited species, and also provides legal protection from overages of groundfish resulting from targeted fishing trips for hake.

5. Statement of Project Significance

Enumeration of incidentally caught species is the primary purpose for this EFP. Monitoring the bycatch of salmon in the hake fishery also is a requirement of an ESA Section 7 consultation. Estimation of groundfish bycatch rates and collection of biological information to support stock assessment work is a secondary purpose. Results from this project will be needed to project bycatch if regulation changes should occur (e.g. modification of prohibited species) to allow this fishery to operate without the need for an EFP each year.

6. Vessels to be covered by the EFP

List to be provided at a later date.

7. Species and Amounts to be Harvested

The target species to be harvested is Pacific hake (*Merluccius productus*). The preliminary U.S. Pacific hake harvest guideline in 2005 will be determined at the March 2005 council meeting based on the February assessment. In 2004, the whiting fishery was allocated 250,000 mt. The corresponding shore-based allocation would be approximately 90,510 mt. Based on bycatch information from our EFP program during 1992-2004, the following catches of salmon, sablefish, widow rockfish, yellowtail rockfish, and other species would be expected if the bycatch rates were the same as in 2004:

Species/Species Group	Bycatch Rate (no/mt.)	Expected Bycatch (number)
Chinook salmon	0.0469	4210
Halibut	0.0006	50

Species/Species Group	Expected Bycatch (kilograms)
Sablefish	114,391
Widow Rockfish	28,856
Yellowtail Rockfish	115,713
Canary Rockfish	836
Yelloweye Rockfish	10
Darkblotched Rockfish	742
Boccacio Rockfish	23
Lingcod	3,735
POP	756
*Misc. Rockfish	24,866
Mackerel	109,096
Walleye Pollock	7,462
American shad	47,138
Pacific herring	62,681
Spiny dogfish	30,029
**Other Misc. Fish	4,501

*Misc rockfish includes market categories of nearshore, shelf, and slope rockfish, and shortbelly rockfish, and chilipepper rockfish.

**Other misc. fish include: Pacific cod, shark, squid, octopus, flatfish (other than halibut), and skates.

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8. Conduct of Fishing Experiment

Fishing will occur in the EEZ in the INPFC Eureka, Columbia and Vancouver areas. Ports of interest are Ilwaco and Westport, WA; Astoria, Newport and Charleston, OR; and Crescent City and Eureka, CA. Trawls, which conform to current legal requirements for midwater trawls, will be used to capture the target species. The season will open June 15, 2004 (April 1 off northern California), and will likely run through August 2005. The EFP should be valid for through the end of December 2005, to allow for any delay in shore-based allocation attainment.

The program will continue to rely on industry funding to pay for: observers, part of the salary for a coordinator and data analysis assistant, supplies, and travel to processing plants and meetings. Processors will pay into a PSMFC fund based on their projected relative landings of hake in the 2005 fishery.

STATUS OF ODFW 2005 EXEMPTED FISHING PERMIT APPLICATION

The Oregon Department of Fish and Wildlife has decided not to pursue an exempted fishing permit for 2005 and has withdrawn the draft application studying bottom trawl selectivity. The department's research priorities have shifted, and any planned at-sea research work in 2005 would be appropriately conducted under a normal Letter of Agreement process.

PFMC
11/02/04

Agenda Item E.3.b
WDFW Report
November 2004

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW) REPORT ON EXEMPTED FISHING PERMITS FOR 2005

<u>Exempted Fishing Permits (EFPs)</u>

At the June meeting, the Council approved two WDFW-sponsored EFPs for public review-- a continuation of the Spiny Dogfish Longline EFP and a continuation of the Arrowtooth Flounder Trawl EFP. After reviewing the data collected in the Spiny Dogfish Longline EFP in 2003 and 2004, we believe that sufficient data exists to move this EFP into federal regulations. EFP data demonstrate that two small, discrete areas near the 100-fm curve could be open as dogfish "hotspots" for a portion of the year with very minimal impacts to yelloweye rockfish. As such, we do not believe that another EFP needs to be conducted in 2005 and we would like to pursue converting this EFP into federal regulations which would be effective in 2006. WDFW staff will prepare a report for the November Council meeting which would describe our proposal in more detail.

As for the Arrowtooth Flounder EFP–again, in reviewing the data collected primarily in 2003 and 2004 when specific gear restrictions were in place, we believe that sufficient data has been collected to demonstrate gear-specific bycatch rates, particularly of canary rockfish. The resulting bycatch rates, however, appear to be higher than those currently being used in the bycatch model for selective flatfish trawl gear; therefore, we do not think that moving the Arrowtooth EFP gear into regulation at this time would be prudent. If, though, federal observer data demonstrate that the actual bycatch rates for the selective flatfish trawl gear are higher than those being used in the model, and are comparable to the Arrowtooth EFP gear, then we would likely pursue using the EFP data to add Arrowtooth EFP gear to the list of legal gears to be used shoreward of the trawl RCA. In order to facilitate collecting the data on the selective flatfish trawl gear, we would not be conducting the Arrowtooth EFP in 2005. Washington arrowtooth fishers would then use selective flatfish trawl gear while fishing in the shoreward area and would be subject to federal observer coverage.

By not conducting any EFPs in 2005, the following amounts of overfished species would be freed up in the bycatch scorecard:

Canary rockfish - 1.85 mt
Darkblotched rockfish - 3.5 mt
Lingcod - 6.5 mt
POP - 26.5 mt
Widow rockfish - 6.0 mt
Yelloweye rockfish - 1.5 mt

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON EXEMPTED FISHING PERMITS FOR 2005

The Groundfish Advisory Subpanel (GAP) reviewed the proposed exempted fishing permits (EFPs) being submitted for Council approval. The GAP believes the Oregon EFP on whiting and the California EFP on the use of selective flatfish trawls should move forward. The Oregon EFP is needed as an interim step to provide an additional year of testing on full retention monitoring mechanisms. The California EFP will extend southward the work already done in Oregon and California and will help refine gear that can be used to minimize bycatch.

The GAP recognizes that Washington's decision not to seek an additional year's EFP on selective arrowtooth trawls will provide a savings in canary impacts that can be allocated to other fisheries. However, the GAP is concerned the valuable data on bycatch reduction not be lost. It may be reasonable for Washington to continue the arrowtooth EFP one additional year in order to compare the bycatch reduction capability of this gear with that of the selective flatfish trawl that will now be used shoreward of the Rockfish Conservation Area.

PFMC
11/02/04

Agenda Item E.3.c
Supplemental GMT Report
November 2004

GROUNDFISH MANAGEMENT TEAM REPORT ON
EXEMPTED FISHING PERMITS FOR 2005

The Groundfish Management Team (GMT) supports the two exempted fishing permits (EFPs) proposed for Council consideration (California Selective Flatfish Trawl/Scottish Seine EFP and Whiting EFP) be approved for implementation in 2005.

The GMT appreciates the reports from California Department of Fish and Game (CDFG) on their EFPs from 2002 and 2003 on the use of Scottish seine gear in the California shelf fishery. CDFG conducted the Selective Flatfish Trawl/Scottish seine EFP in 2004 as well, and had one participant who used Scottish seine gear. Based on the Scottish seine data collected in 2002-2004, the GMT believes a sufficient amount of data has been collected to demonstrate the bycatch rates from using the modified Scottish seine gear within the area fished and is unsure of what useful data would be collected by repeating this experiment for a fourth year in 2005.

In addition, with regard to Scottish seine gear, the GMT notes that the data collected through these EFPs has been the result of one participant fishing in the area local to San Francisco, California. The GMT believes that when these data are used to provide this fishery in federal regulations, the geographic scope of this fishing opportunity should be constrained to the area in which the data have been collected (i.e., a region encompassing the San Francisco area using management lines at 36° and 38°) as the data have been collected from only one vessel and non-EFP data are not available.

Also, the GMT is concerned that there has not been much participation in these EFPs with fishers using selective flatfish trawl gear (no participants in 2003, and one participant in 2004). The GMT believes there are incentives not to participate in the EFP (i.e., fishers would have to convert their trawl nets at a cost and would be required to carry at-sea observers and adhere to bycatch caps). To the extent that trawl fishers are able to be successful under existing federal regulations, there are little benefits to participating in the EFP which would outweigh these costs.

The GMT discussed the merits of implementing selective flatfish trawl gear. While only limited testing has been conducted to date south of 40°10', and bycatch rates for species such as bocaccio rockfish have not been calculated, there is more than sufficient data that supports its ability to selectively harvest flatfish while reducing rockfish impacts. As this gear has been demonstrated to be more selective than small footrope gear, the GMT advocates its use. The GMT notes that data were sparse for the use of this gear north of Destruction Island, Washington, but the data collected in the research and EFP conducted by the Oregon Department of Fish and Wildlife were sufficient to support using this gear north of 40°10' to the U.S./Canada border. The understanding is that bycatch data would be collected through the NMFS observer program during 2005 while this gear was being used in this area. The GMT believes a similar approach south of 40°10' may have merit even in the absence of EFP data for this area.

GMT Recommendations

The GMT recommends moving forward with implementing the use of both Scottish seine gear and selective flatfish trawl gear in federal regulations, beginning in 2006, regardless of whether data have been collected through the CDFG selective flatfish trawl EFP.

PFMC
11/02/04

INITIAL CONSIDERATION OF STATUS OF FISHERIES AND INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) is scheduled to review the status of 2004 groundfish fisheries and meet with the Groundfish Advisory Subpanel (GAP) to discuss issues and analyses relative to inseason adjustments on Monday, November 1 (see Ancillary A, GAP Agenda and Ancillary B, GMT Agenda). This agenda item was scheduled to provide the GMT and the GAP an opportunity to pose any key policy questions that would substantially facilitate further GMT analysis on inseason adjustments. Council guidance on these matters is intended to focus GMT analyses of proposed inseason adjustments prior to final Council action, scheduled for Thursday afternoon, November 4 (Agenda Item E.8).

Council Task:

Consider the comments/questions of the GMT and the GAP, as well as comments of other advisory bodies and the public, and provide guidance, if necessary.

Reference Materials:

None.

Agenda Order:

a.	Agendum Overview	Mike Burner
b.	GMT/GAP Comments/Questions	Michele Culver/Rod Moore
c.	Reports and Comments of Advisory Bodies	
d.	Public Comment	
e.	Council Guidance	

PFMC
10/13/04

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON INITIAL CONSIDERATION OF STATUS OF FISHERIES AND INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) met with the Groundfish Management Team (GMT) to discuss potential inseason adjustments for the groundfish fishery. The GAP and the GMT also jointly heard a presentation from the Coos Bay Trawlers Association regarding their concerns on closure of petrale grounds in November and December.

Based on data provided by the GMT regarding the projected year-end catch of canary rockfish, the GAP examined potential fishery modifications that would keep total canary catch - both recreational and commercial - below the canary optimum yield. The GAP was unable to identify any changes - including complete closures of most fisheries - that would provide the necessary changes. The trawl fishery has already been moved deeper than canary habitat. The recreational fishery in California is closed, and no new data has been provided on recreational catch of canary to date. The nearshore fisheries are being conducted shallower than known canary presence. The GMT was unable to quantify any savings that would result from closure of recreational fisheries in Oregon and Washington, or closure of the daily trip limit fishery for sablefish.

At this time, the GAP recommends that no inseason action be taken by the Council.

PFMC
11/02/04

GROUNDFISH MANAGEMENT TEAM REPORT ON INITIAL CONSIDERATION OF STATUS OF FISHERIES AND INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) reviewed the recreational and commercial catch estimates and updated the bycatch scorecard (estimated impacts that have been updated are highlighted in bold) and have identified two significant issues for inseason consideration.

Canary Rockfish

In September, the GMT estimated the total mortality of canary rockfish in the directed groundfish commercial fisheries (limited entry trawl, limited entry fixed gear, and open access) would be 18.3 mt for the year. Through mid-October, the GMT estimates the total limited entry trawl canary catch is 17.1 mt, based on the amount of landed catch and applying the estimated discard proportion from 2003 (60%). In addition, the limited entry fixed gear and open access fisheries are expected to harvest 1.9 mt during the entire year for a total directed groundfish commercial mortality estimate of 19.0 mt. Added to the other fisheries in the scorecard produces a total mortality through December of 48.3 mt, which is 1.0 mt over the optimum yield (OY) of 47.3 mt.

This projected OY overage is calculated based on the preseason estimates for California recreational fisheries. As California recreational catch estimates are not available for 2004, it is difficult to determine whether restricting fishing opportunity for any fishery in December is necessary to stay within the canary OY (or reduce the projected overage). As the limited entry trawl fishery is currently closed shoreward of the deeper trawl Rockfish Conservation Area (RCA) boundary (250 fm north of 38°; 200 fm between 38° and 36°; 150 fm south of 36°) to protect darkblotched and canary rockfish, further restricting the trawl fishery for the month of December would not result in canary rockfish savings.

Also in September, the Council reduced the canary rockfish bycatch cap for the whiting fisheries from 7.3 mt to 6.2 mt. To date, the whiting fisheries have caught 6.0 mt of canary. The catcher-processor sector is currently fishing and is scheduled to close next week; if the full bycatch cap is not reached, there would be a minimal amount of canary savings (0.2 mt).

The current fisheries scheduled for December which could impact canary rockfish include the daily trip limit fisheries for sablefish outside of 100 fm north of 40°10' and 150 fm south of 40°10'. During the winter months, effort in these fisheries drops off considerably, and there is very little anticipated canary catch associated with them. From 34°27' to the Oregon/California border (42°), nearshore rockfish fisheries remain open inside of 30 fm. South of 34°27', nearshore fishing can occur out to 60 fm. However, as the GMT's estimates for canary rockfish mortality in these fisheries are produced on an annual basis, the GMT cannot quantify the canary rockfish savings which would result from restricting these limited entry and open access fisheries (but estimates it would be about 0.1 mt). Also, fishers may achieve two-month cumulative limits in November if additional restrictions are anticipated for December.

The GMT did discuss proposals to increase the minor nearshore and black rockfish trip limits for limited entry fixed gear and open access between 40°10' and 42° because catches of black rockfish and minor nearshore are projected to be substantially below their respective harvest guidelines for that area. However, the GMT cannot quantify the expected additional canary rockfish impacts resulting from these proposals. Given that current fisheries are projected to exceed the canary rockfish OY, we do not believe these trip limit increases can be accommodated.

As a reminder, the canary rockfish OY is calculated based on the amounts harvested by the commercial and recreational fishing sectors (i.e., a higher proportion caught by the commercial sector produces a higher OY). Based on the new commercial catch estimates, the GMT recalculated what the resulting OY would be with the new commercial/recreational split. The resulting OY would be 50.8 mt (70% commercial; 30% recreational). Carrying these proportions forward results in a commercial OY of 35.7 mt (compared to a current commercial catch estimate of 34.2 mt) and a recreational OY of 15.1 mt (compared to a recreational catch estimate of 14.5 mt). Therefore, if the revised OY were used for management, both the commercial and recreational sectors would be underachieving their respective OYs, and this approach would not jeopardize rebuilding of canary rockfish.

Darkblotched Rockfish

In September, the GMT estimated the total mortality of darkblotched rockfish in the limited entry trawl fishery would be 268.1 mt by the end of September (for the remainder of the year). Based on the landings through the end of September, and applying the estimated discard proportion, the GMT's updated estimate is 293.4 mt. Combined with the estimated mortalities in the other fisheries and research, this produces a total mortality estimate of 307.8 mt (which is 67.8 mt over the acceptable biological catch (ABC) of 240 mt).

The GMT discussed an industry proposal to consider reopening the trawl petrale areas in December, which would require moving the deeper trawl RCA boundary from 250 fm to 150 fm north of 38°. The GMT reviewed the available NMFS observer data for Period 6, and estimates an additional darkblotched impact of 3 mt to 20 mt resulting from reopening these petrale areas. However, as the ABC has already been exceeded, the potential impacts to darkblotched rockfish resulting from this proposal cannot be accommodated.

GMT Recommendations

The GMT would appreciate Council guidance on (1) whether inseason action to address the projected canary rockfish overage is warranted; and (2) if so, which fisheries should be restricted.

PFMC
11/02/04

Attachment 1. Estimated Impacts Prior to Inseason Adjustments at the September Council Meeting

11/2/2004 14:21

Fishery	Bocaccio *a/*	Canary	Cowcod	Dkbl	Lingcod	POP	Widow	Yelloweye
Limited Entry Groundfish								
Trawl- Non-whiting	47.4		0.4		104.7	95.0	2.5	0.2
Fixed Gear	13.4	**19.0**	0.1	**293.4**	20.0	0.3	0.5	2.5
Open Access: Groundfish directed	10.6		0.1		70.0	0.1		0.6
Whiting								
At-sea whiting motherships				3.0	0.8	0.1	11.4	0.0
At-sea whiting cat-proc		6.2		5.8	0.4	10.1	84.6	0.4
Shoreside whiting				0.7	0.7	0.7	28.6	0.0
Tribal whiting				0.0	0.0	0.2	1.6	0.0
Open Access								
CA Halibut	0.1	0.1		0.0	2.0	0.0		
CA Gillnet b/	0.5			0.0		0.0	0.0	
CA Sheephead b/				0.0		0.0	0.0	0.0
CPS- wetfish b/	0.3							
CPS- squid c/								
Dungeness crab b/	0.0		0.0	0.0		0.0		
HMS b/		0.0	0.0	0.0				
Pacific Halibut b/	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)								
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
Recreational Groundfish								
WA		1.7			71.7			3.4
OR /e		4.3			109.7		1.4	3.2
CA	62.8	8.5	1.8		268.9		8.2	3.7
Research: Based on 2 most recent NMFS trawl shelf and slope surveys, the IPHC halibut survey, and LOAs with expanded estimates for south of Pt. Conception.								
	2.0	3.1		4.0	3.0	3.0	0.5	1.0
Non-EFP Total	137.5	47.2	2.4	306.9	677.8	109.5	179.4	18.1
EFPs d/								
CA: NS FF trawl	10.0	0.1	0.5		20.0			0.5
OR: DTS		0.0		0.2		0.6		0.0
WA: AT trawl		1.0		0.7	0.8	4.0	0.0	0.0
WA: dogfish LL		0.0		0.0	0.5	0.0	0.0	0.0
WA: pollock		0.0					0.0	0.0
EFP Subtotal	10.0	1.1	0.5	0.9	21.3	4.6	0.0	0.5
TOTAL	147.5	48.3	2.9	307.8	699.1	114.1	179.4	18.6
2004 OY	250	47.3	4.8	240	735	444	284	22
Difference	102.5	-1.0	1.9	-67.8	35.9	329.9	104.6	3.4
Percent of OY	59.0%	102.1%	60.4%	128.3%	95.1%	25.7%	63.2%	84.7%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.						

a/ South of 40°10' N. lat.

b/ Mortality estimates are not hard numbers; based on the GMT's best professional judgement.

c/ 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.

d/ 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.

e/ Canary rockfish impacts through September 5 in all Oregon recreational fisheries (3.5 mt), plus impacts from remaining halibut fishery dates in Sept. and Oct. (0.4 mt), plus impacts from fishery shoreward of 40 fm through December (0.1 mt), plus fishery seaward of 40 fm in October with yellowtail rockfish retention (0.4 mt).

Agenda Item E.5
Situation Summary
November 2004

BYCATCH PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

On September 24, 2004 (69 FR 57277), the Environmental Protection Agency published a notice of availability for the Pacific Coast Groundfish Fishery Management Plan Bycatch Mitigation Program Final Environmental Impact Statement (Bycatch Program FEIS). This EIS addresses the remand of groundfish Amendment 13 due to a 2000 order from the U.S. District Court (N.D. California) in *Pacific Marine Conservation Council* v. *Evans* (200 F.Supp.2d 1194, 2002 WL 827423 [N.D. Cal.]). In its conclusion, the court found as follows: (1) Amendment 13 failed to establish an adequate bycatch assessment methodology; (2) The National Marine Fisheries Service (NMFS) did not comply with its duty to minimize bycatch and bycatch mortality; (3) NMFS violated the National Environmental Policy Act (NEPA) by not taking a "hard look" at the environmental consequences of Amendment 13; and (4) the Environment Assessment NMFS performed in conjunction with Amendment 13 failed to consider a reasonable range of alternatives and environmental consequences, in violation of NEPA.

The Bycatch Program FEIS contains the preferred alternative, Alternative 7, identified by the Council at their April 2004 meeting. (Attachment 1 excerpts the description of this alternative from Chapter 2 of the FEIS and summarizes the catch cap component.) Alternative 7 contains elements from three of the alternatives described in the draft EIS. These elements may be summarized as follows:

1. Amend the fishery management plan (FMP) to require the use of current bycatch minimization measures.

2. Amend the FMP to fully describe the current standardized bycatch reporting methodology.

3. Amend the FMP to incorporate the Groundfish Strategic Plan goal of reducing overcapacity in all commercial fisheries.

4. Implement a sector-specific bycatch accounting methodology.

5. Support the future use of individual fishing quota (IFQ) programs for appropriate fishery sectors.

6. Authorize the use of sector-specific total catch cap programs to reduce bycatch of overfished (depleted) species in appropriate sectors of the fishery. These programs could include monitoring standards, full retention programs, and individual vessel incentives for exemption from caps.

The Bycatch Program FEIS states "The proposed action would set groundfish bycatch mitigation policies and future program directions. The Council is expected to immediately undertake preparation of a new groundfish FMP amendment that will include the conservation and management measures necessary to minimize bycatch and minimize the mortality of bycatch that cannot be avoided, to the extent practicable." Therefore, these items must be addressed in an FMP amendment incorporating "bycatch mitigation policies and future program directions." This amendment would be Amendment 18 to the groundfish FMP.

Attachment 2 provides draft recommendations from Council and NMFS staff on where the FMP might be amended to incorporate the Council's preferred alternative from the Bycatch Program FEIS. Staff expect that Amendment 18 would primarily affect FMP Chapter 6, "Management Measures." This FMP chapter has not been reviewed or revised for its overall structure and organization since Amendment 4, in 1990. More recent piecemeal amendatory language to Chapter 6 has made that chapter somewhat confusing in its organization. Staff recommend the Council also consider a re-organization and update of Chapter 6 as part of Amendment 18.

In addition to providing guidance on amendatory language establishing bycatch monitoring and mitigation policies and program direction, and describing current program elements, the Council may wish to consider the relationship between Amendment 18 and future processes to implement program elements. Two other actions—the Trawl Individual Quota (TIQ) EIS and an associated EIS evaluating inter-sectoral allocations—could eventually implement components of the bycatch mitigation program. (At this meeting, under Agenda Item E.6, the Council will adopt a preliminary range of alternatives for the TIQ EIS. In addition to ITQs, sectoral and vessel-specific catch caps are options under consideration.) While these actions may involve FMP amendments and could implement bycatch program elements, their scopes and time lines make them inappropriate venues for incorporating broad bycatch policy and program direction elements into the FMP, which instead would be accomplished by Amendment 18. Nonetheless, the Council may wish to consider how these and other processes, such as future regulatory amendments, may be used to implement components of the bycatch mitigation program identified in the Bycatch Program FEIS preferred alternative.

In determining next steps in implementation, the Council may wish to provide guidance on:

- Subjects covered in and content of the amendment.

- A time line for preparation of draft amendment language, Council review, and submission to NMFS for Secretarial approval. (It is important to note that the NEPA requirements have been met; the time line only needs to satisfy Magnuson-Stevens Act requirements.)

- Future actions to implement bycatch mitigation program elements, such as sectoral and vessel-specific catch caps, and any interrelation with ongoing actions, such as the TIQ EIS.

Council Action:

Determine next steps in implementation.

Reference Materials:

1. Agenda Item E.5.a, Attachment 1: *Alternative 7 (The Preferred Alternative)* excerpted from the Bycatch Program EIS and *Summary Description of The Catch Cap Component of The Preferred Alternative*.
2. Agenda Item E.5.a, Attachment 2: *Fishery Management Plan Elements Potentially Addressed by the Bycatch Program Amendment (Amendment 18)*.

Agenda Order:

a. Agenda Item Overview Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Determine Next Steps in Implementation.

PFMC
10/15/04

Agenda Item E.5.a
Attachment 1
November 2004

2.2.7 Alternative 7 (The Preferred Alternative)

The Council approved the following motion at its April 2004 meeting as its 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 Alternative 1 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.*

Alternative 7 would continue most of the current bycatch reduction measures and would reduce bycatch by expanding the defining catch or mortality limits for overfished species. *CATCH LIMITS* or caps for overfished groundfish species would be established for each fishing sector. All vessels in a sector would be required to stop fishing when a catch limit for that sector is reached. The inseason catch monitoring or verification program would be upgraded to ensure sector catch limits are not exceeded. Larger retention limits for non-overfished groundfish would be made available to vessels carrying an approved monitoring system (observer or other method).

In order to prevent sector catch limits from becoming a series of derby fisheries, methods to restrict individual vessels will continue to be necessary. The most effective way to do this without increasing groundfish (discard) bycatch would be to establish individual vessel catch limits in addition to the sector caps. However, in the short term this will not be feasible with the current monitoring and catch verification system. Until greatly expanded monitoring is available, the primary means of slowing the rate of fishing will continue to be trip (retention) limits. However, individual vessels may take an observer at their own expense in order to gain exemption from their sector catch limits. Such vessels could be assigned individual catch limits for designated species, and they would agree to stop fishing for all groundfish upon reaching any catch limit. These vessel caps would not be transferable between vessels and would expire at the end of the specified period.

In the short term, vessel trip limits for each sector would be continued, and landings of target species would be monitored throughout the season as they are now. Catch of overfished species by each sector would be estimated during the season based on assumed co-occurrence rates for each sector. Those rates would be adjusted from year to year based on updated observer data. In the longer term, the observer program will be upgraded to provide inseason catch data on overfished species. At that time, catch of overfished species will no longer have to be estimated based on target species landings, and each sector will be managed based on current information.

Eight commercial fishery sectors are identified under the current regulations: limited entry trawl; limited entry longline; limited entry pot; three whiting sectors (catcher/processor, mothership and shore-based); open access; and tribal. The recreational fishery is also a recognized sector. Additional sectors could be established by subdividing any of these sectors. Under this alternative, each sector would be monitored separately with stratified, partial observer coverage. Catch rates and closure dates for each sector would be projected based on observer reports. If individual commercial vessel caps were adopted, every vessel would need to be monitored.

This alternative would modify the definition of trip limits to include catch (mortality) limits and would also establish catch (mortality) caps for each sector. Vessels would no longer be required to discard overfished groundfish species, although they could choose to discard them. Non-overfished groundfish would be managed the same as under the status quo (no action) alternative, except that vessels carrying an observer (or other approved monitoring system, if any) would be eligible for larger trip (retention) limits for non-overfished species. However, they would still be required to stop fishing upon reaching a catch limit. The NOAA Fisheries West Coast Groundfish Observer Program would monitor each sector by placing observers on a portion of the vessels in each sector. Catch rates of overfished/restricted species would be projected to all unobserved vessels operating in the sector. Vessels not carrying a NOAA Fisheries-funded observer could carry an observer at their own expense in order to be eligible for the larger trip limits and to gain exemption from the sector caps. An electronic monitoring (video) option may be available if NOAA Fisheries determines such a program would provide the necessary catch/mortality information. This could require increased retention of certain species.

Economic bycatch could also be addressed under this alternative by prohibiting discard or limiting the amount of groundfish that may be discarded. If allowed, discard would be measured by onboard observers (or electronic monitoring). If discard were prohibited, economic (non-regulatory) bycatch of groundfish would be greatly reduced.

The option of creating more sectors could reduce the need for other controls to limit fishing activities. To accomplish this, vessels would be assigned to one or more sectors, perhaps through an endorsement attached to the limited entry permit. When a sector limit is reached, further fishing by those vessels would be prohibited or severely curtailed. Alternatively, sectors might be defined by target fisheries that would be closed when a catch limit is reached. Bycatch (discard) under such an approach could be controlled by requiring *FULL RETENTION* or placing limits on discards.

SUMMARY DESCRIPTION OF THE CATCH CAP COMPONENT OF THE PREFERRED ALTERNATIVE

The description of the preferred alternative focuses on the implementation of sectoral and vessel-specific catch caps. Elements of this component of the alternative include:

- Sectoral total catch caps are established for overfished groundfish species. Eight current regulatory-based sectors are identified; additional sectors could be added.

- In the short term, the current cumulative trip limit regime would continue.

- Vessels carrying an "approved monitoring system" (e.g., at-sea observer) would fish under larger retention limits (cumulative trip limits) for non-overfished species.

- Vessels could opt out of sectoral catch caps by voluntarily carrying a fisheries observer (or approved monitoring system). These vessels would be eligible for nontransferable vessel-specific catch caps. Vessels could carry an observer at their own expense in order to become eligible for these vessel-specific catch caps.

- In the short term, total catch of overfished species will be estimated using current methods of modeling the relationship between landings and total catch. With future improvements in the monitoring program, total catch could be estimated directly.

- Once a sector has reached the total catch cap for any overfished species, all vessels in the sector must stop fishing, except for those vessels that have qualified for vessel-specific caps. They could fish until any of their caps were reached.

- Retention requirements could be a feature of this bycatch mitigation program. The FEIS does not describe the specifics of such a feature, such as to which species, or in what circumstances, a retention requirement would apply.

FISHERY MANAGEMENT PLAN ELEMENTS POTENTIALLY ADDRESSED BY THE BYCATCH PROGRAM AMENDMENT (AMENDMENT 18)

In addition to incorporating language describing the Council's policies and program direction for bycatch monitoring and mitigation, Amendment 18 could also update and reorganize the fishery management plan (FMP), so it better reflects the current management regime. These changes would be categorically excluded from further National Environmental Policy Act analysis, pursuant to NAO 216-6 §6.03a.3(b).

Chapter 1, *Introduction*: Update introduction language, so it includes references to recent FMP amendments.

Chapter 2, *Goals and Objectives*: Review FMP goals and objectives and revise as necessary to be consistent with the Council's preferred alternative from the Bycatch Program EIS. Add Strategic Plan goal on capacity reduction, per the preferred alternative. Review definitions, and update as needed.

Chapter 5, *Periodic Specification and Apportionment of Harvest Levels*: Revise FMP language from Amendment 17, per Council's recommendations from September 2004 meeting on "red light/green light" process.

Chapter 6, *Management Measures*: Per the Council's preferred alternative: revise sections on bycatch, observers, and standardized reporting methodologies; revise section on allocation and add section on discard cap programs; revise section on permits to reference individual fishing quota (IFQ) program development as requiring bycatch-reduction measures; add section on the use of Rockfish Conservation Areas (RCAs) as a management tool for reduction of overfished species bycatch. Update and re-organize chapter to reflect Council's current practices and procedures for recommending new management measures and regulatory programs; remove references to foreign fishing. Integrate any management measures from Chapter 11 that are still relevant to today's fisheries into this chapter.

Chapter 7, *Experimental Fisheries*: Remove references to development of domestic fisheries as primary reason for exempted fishing permits (EFPs). Update with Council's current EFP policies, and cite promotion of gear development for bycatch reduction as a Council-supported use of EFPs. Also, add a requirement that recipients of EFPs report on their total catch of overfished species as a condition of issuance of EFPs.

Chapter 8, *Scientific Research*: Add requirement for reporting on total catch of overfished species as a condition of Secretarial acknowledgment of scientific research.

Chapter 11, *Management Measures that Continue in Effect with Implementation of Amendment 4*: Integrate measures from this chapter that are still relevant to the fisheries into Chapter 6, and remove Chapter 11 from the FMP.

No changes are planned for other parts of the FMP, except for minor editorial corrections.

PFMC
10/15/04

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON BYCATCH PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The Groundfish Advisory Subpanel (GAP) received a briefing from Council staff on the current status of the Bycatch Programmatic Environmental Impact Statement (EIS) process.

The GAP is concerned that the Council not create confusion and inefficiency in dealing with measures to address bycatch. The Council potentially will have before it the proposals of the Ad Hoc Groundfish Trawl Individual Quota (IQ) Committee, which will affect bycatch; inter-sector allocation decisions associated with any IQ plan; biennial management specifications; and any separate proposals that grow out of the Programmatic EIS. Unless a clear road map is developed, the Council could find itself simultaneously working on several separate - and possibly even contradictory - bycatch proposals. The GAP urges the Council to develop that road map before moving forward on a plan amendment reflecting the preferred alternatives of the Programmatic EIS.

PFMC
11/03/04

GROUNDFISH MANAGEMENT TEAM REPORT ON BYCATCH PROGRAMMATIC ENVIRONMENTAL STATMENT

The Groundfish Management Team (GMT) received a presentation from Dr. Kit Dahl on the status of the Bycatch Programmatic Environmental Impact Statement (EIS). The GMT notes that elements within the bycatch EIS overlap with elements in other efforts moving forward within the Council process such as trawl individual quotas and the allocation EIS. The GMT encourages coordination of these efforts to avoid redundancies and to ensure goals and timelines are not in conflict, but recommends the Council begin implementing substantive measures to address bycatch as soon as possible. The GMT would appreciate the opportunity to provide input as the Groundfish Fishery Management Plan and regulatory amendments to implement the bycatch EIS are developed.

PFMC
11/02/04

TRAWL INDIVIDUAL QUOTAS

Overall Process

In September 2003, the Council began focusing attention on the topic of a potential dedicated access privilege program of individual quotas for the groundfish trawl fishery. Agenda Item E.6.a, Attachments 1 and 2, detail major events in the overall process to date, including such matters as the control date adoption, the issuance of a Notice of Intent to prepare an environmental impact statement (EIS), and various advisory body meetings. At this meeting, the Council is scheduled to provide guidance on the development, refinement, and analysis of alternatives to be considered in the next step of the process. Between the November 2004 and March or April 2005 Council meetings, a preliminary analysis of alternatives will be prepared. At the March or April 2005 Council meeting, the Council task will be to specify the alternatives for comprehensive analysis in a draft EIS (DEIS). If this is done by the November 2005 Council meeting, it should be possible to provide a draft DEIS that could be approved for public review. Final Council action on a preferred alternative would then occur at the April 2006 Council meeting.

Council Tasks at this Council Meeting

The highest priority task for the Council at this meeting is to provide guidance that will assist in analysis of alternatives over the coming winter. Closely related are potential actions to refine the goals, objective and scope for action, and the definition of status quo. A specialized document has been prepared to guide Council members through the large number of complicated decisions that could potentially be made at this meeting. The document, Agenda Item C.6.a, Attachment 3, is designed to allow for sequential, step by step decision making and includes key information relative to each decision.

An individual quota (IQ) program is a complicated and complex endeavor, as were the Groundfish Limited Entry and Fixed Gear Permit Stacking programs adopted by the Council and currently in effect. The potential decisions at this Council meeting are not only complex, but also voluminous in nature; additionally, some individual decisions could involve lengthy Council discussion leading to a decision. For example, there are 27 potential decision topics alone in the category of individual fishing quota (IFQ) design elements, for such details as transferability rules, eligibility qualifying criteria, and area restrictions (see Agenda Item E.6.a, Attachment 4). Since there is the potential for an even lengthier Council floor discussion than envisioned at the September Council meeting, the Council may wish to consider a different mechanism to work through the entirety of the potential decisions at hand.

One possible mechanism would be to establish a subcommittee of Council members and delegate to them the task of dealing with some of the more complicated decisions after the November Council meeting. If the Council wishes to move in this direction, it should consider having this subcommittee meet in conjunction with the Ad Hoc Groundfish Trawl IQ Committee (TIQC) so as to benefit from their advisory opinions. Such a mechanism of a Council member subcommittee with specialized advisors is currently in effect to deal with Channel Islands National Marine Sanctuary marine reserve issues, and has worked well in terms of saving time on the Council floor debating potential motions.

Therefore, the Council may proceed with the tasks at hand in one of several ways. Possibilities include:

1. Work through all potential decisions for guidance, as described in the six sections outlined on page 1 of the Decision Step Summary, including all IFQ design issues contained in Appendix A of the Decision Step Summary.
2. Work through none of the potential decisions for guidance, but establish a subcommittee of Council members to meet and provide the necessary guidance to the analysts, such that a formal range of alternatives for DEIS analysis can be considered by the Council at the March or April 2005 Council meeting.
3. An intermediate approach, whereby the Council deals with part of the overall task at this Council meeting and delegates the remaining part to a subcommittee arrangement that occurs after the November Council meeting. For example, the Council could work through the first three sections of the Decision Step Summary, or could work through these first three sections and some of the key alternatives in the IFQ design elements and delegate the remaining decisions to a Council member subcommittee.

Advisory Body Reports

There are several reports from specialized advisory bodies dedicated to consideration of TIQs. The Ad Hoc TIQ Independent Experts Panel report recommends the Council consider some respecification of its goals and objectives. An Ad Hoc TIQ Analytical Team Report is provided to assist the Council in evaluating a few central issues such as the definition of the status quo alternative, the need to explore area management, and the specification of some elements of the qualifying requirements. The Ad Hoc TIQ Enforcement Group has met on two occasions and developed a report on enforcement efforts related to an IFQ program. The Ad Hoc TIQC will have met October 25 and 26 and is expected to have a supplemental report for the Council.

Reports from the Scientific and Statistical Committee, Groundfish Management Team, and Groundfish Advisory Subpanel are also possibilities for Council consideration under this agenda item.

Council Action:

This agenda item has been spread across two days because of the amount of detail that may be encompassed within the final action. The break will provide Council staff an opportunity to write-up the proposed action and ensure its completeness and clarity prior to final Council consideration the following day.

Council Task:

Part I, scheduled for Wednesday afternoon - tentatively refine the range of initial alternatives for further development and preliminary analysis.

Council Action:

Part II, scheduled for the second agenda item Thursday - refine further if necessary and adopt a range of alternatives for further development and preliminary analysis.

Reference Materials:

1. Agenda Item E.6.a, Attachment 1: Record of Major Activity on Trawl IQ Considerations.
2. Agenda Item E.6.a, Attachment 2: Trawl IQ Process: Phase I through 1st Steps of Phase II.
3. Agenda Item E.6.a, Attachment 3: Decision Step Summary.
4. Agenda Item E.6.a, Attachment 4: Decision Steps Appendix A: IFQ Design Elements.
5. Agenda Item E.6.a, Attachment 5: Scoping Results on Dedicated Access Privileges for the Pacific Coast Limited Entry Trawl Groundfish Fishery.
6. Agenda Item E.6.a, Attachment 6: Formal Scoping Period Comments on Dedicated Access Privileges (Individual Quotas) For the Pacific Coast Limited Entry Trawl Groundfish Fishery.
7. Agenda Item E.6.b, Ad Hoc TIQ Independent Experts Panel Report.
8. Agenda Item E.6.b, Ad Hoc TIQ Analytical Team Report.
9. Agenda Item E.6.b, Ad Hoc TIQ Enforcement Group Report.
10. Agenda Item E.6.d, Public Comment.
11. Agenda Item E.6.b, Supplemental Ad Hoc TIQC Report.

Agenda Order:

Wednesday

6. Trawl Individual Quotas (TIQ) - Part I
    a. Agenda Item Overview — Jim Seger
    b. Ad Hoc TIQ Advisory Body Reports
        i. Independent Experts Panel Report — Panel Member
        ii. Analytical Team Report — Kate Quigley
        iii. Enforcement Group Report — Dayna Matthews
        iv. Ad Hoc TIQ Committee Report — Dave Hanson
    c. Reports and Comments of Advisory Bodies
        d. Public Comment
        e. Tentative Refinement of a Range of Alternatives for Preliminary Analysis

Thursday

6. Trawl Individual Quotas (TIQ) - Part II
    e. Agenda Item Update Jim Seger
    f. **Council Action:** Refine Alternatives for Preliminary Analysis

PFMC
10/22/04

Agenda Item E.6.a
Attachment 1
November 2004

RECORD OF MAJOR ACTIVITY ON TRAWL IQ CONSIDERATIONS

2003

Sept. 11	The Council unanimously agreed to the appointment of the Ad Hoc Groundfish Trawl Individual Quota Committee (TIQC).
Oct.28-29	The TIQC met to begin preliminary scoping individual fishing quota (IFQ) alternatives.
Nov. 6	The Council adopted the TIQC report calling for development of a TIQ environmental impact statement (EIS), recommended November 6, 2003 be published as a control date for fishing and processing individual quota programs, and tasked the staff with preparing and pursuing a detailed plan and budget for IQ program development.
Dec.	Staff presented a budget of $2.1 million over the course of four years for a full EIS on both the trawl IQ fishery and allocation among trawl and nontrawl sectors. About 15% of the full need has been made available to initiate activity.

2004

Jan. 9	NMFS published a control date for IFQs, but not individual processor quotas.
Feb. 9	NMFS/Council staff internal work group session convened to begin preliminary scoping of the analytical tasks.
Feb. 18-20	NMFS Northwest Region convened an internal work session with the staff of the Alaska Region Restricted Access Management Program to begin identifying tracking and monitoring and enforcement issues associated with IQ programs (attended by Council staff).
Feb. 24	NMFS/Council staff internal work group session met again to continue preliminary scoping of the analytical tasks.
March 18-19	TIQC meeting to continue initial scoping of IQ alternatives.
May 7	The Advisory Committee for the California Groundfish Fishery Disaster Relief Program made funding the Council IFQ process its first priority for surplus funds. No funds received to date.
May 21	Panel of independent experts appointed as an unpaid review body.
May 24	Notice of intent to produce an EIS was published in the *Federal Register*- formal public scoping period initiated.
May 25-26	Ad Hoc TIQ Enforcement Group met to scope enforcement issues.
June 8-9	Ad Hoc TIQ Analytical Team met with Independent Experts Panel and contractors to scope analytical tasks.
June 13	Scoping hearing: Foster City, California.
July 1-2	Ad Hoc TIQ Analytical Team met to plan analysis based on generic IFQ issues.
July 20	Scoping hearing: Seattle, Washington.
July 27	Scoping hearing: Newport, Oregon.
Aug. 2	Formal NEPA public scoping period ended.
Sept. 7-8	Ad Hoc TIQ Analytical Team met to review progress on analytical tasks and

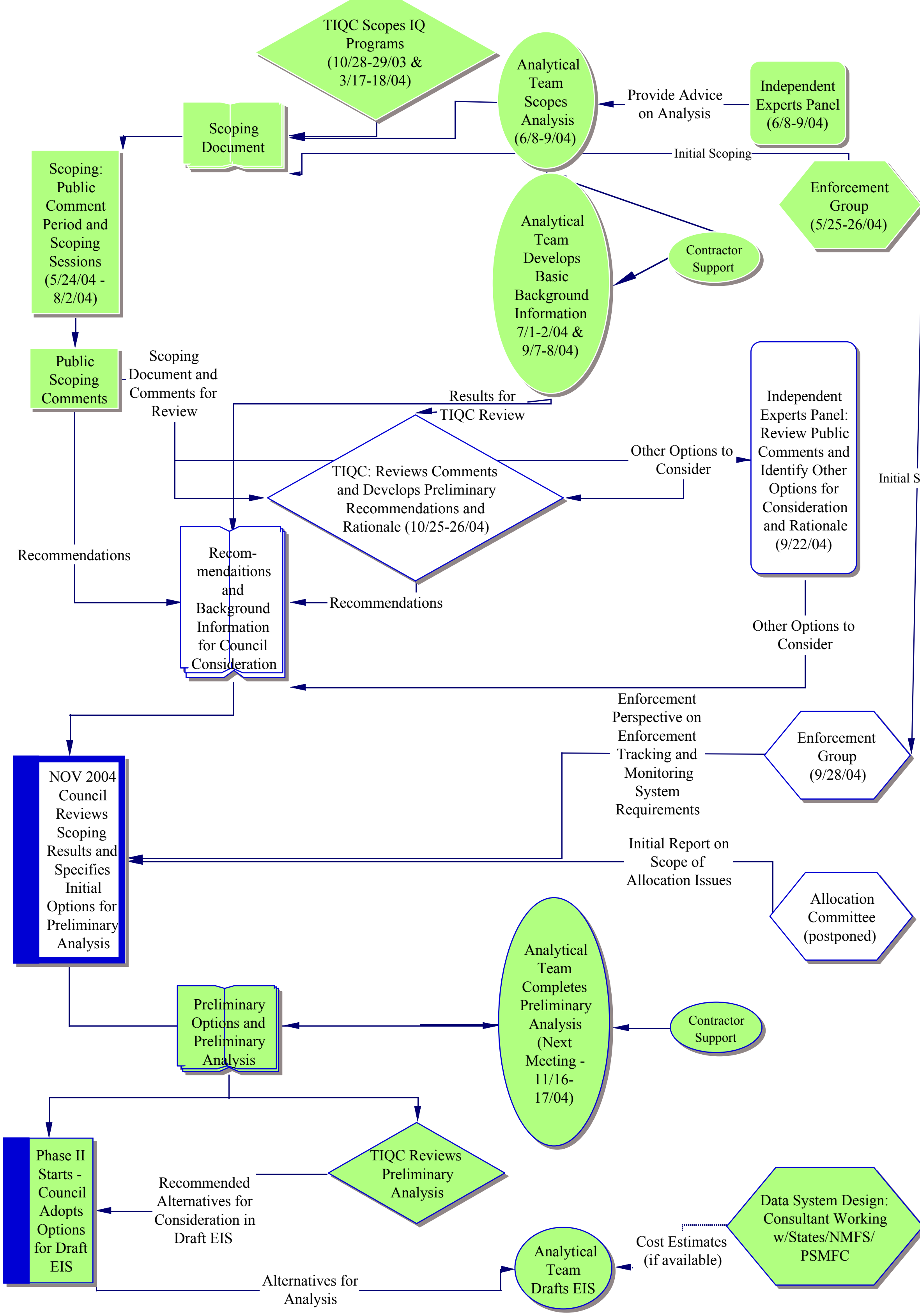
discuss the organization of its first report.

Sept. 17	Council reviewed NEPA scoping results, considered additional scoping under Magnuson-Stevens Act, and added six nonvoting TIQ advisors to the Ad Hoc Allocation Committee.
Sept. 22	Ad Hoc TIQ Independent Experts Panel met to review scoping results.
Sept. 28	Ad Hoc TIQ Enforcement Group met to review scoping results and develop cost estimates.
Oct. 25-26	TIQC to meet to review scoping results and develop alternatives for Council consideration.

PFMC
10/19/04

Agenda Item C.6.a
Attachment 2 - Process Diagram
November, 2004

TRAWL IQ PROCESS: PHASE I THROUGH 1ST STEPS OF PHASE II



DECISION STEP SUMMARY

The following is an outline of the choices before the Council in the Trawl IFQ scoping results document. A full description of each decision choice together with explanatory text and some analysis is provided in the scoping results document.

There are three main issues to be covered:

- Design of Alternative Management Tools
- The Species to Which Each Tool Will be Applied
- Resolution of Within Trawl Sector Allocations Necessary to Apply the Tools

Leading up to the main issues are consideration of

- Goals and Objectives for the Proposed Action
- Definition of the Status Quo and Baselines That Will Be Used to Assess Impacts, and
- Evaluation of Whether the List of Alternative Management Tools Is Complete.

The following is an overview of the steps the Council will need to take and reference materials:

EIS Decision	Summary Page	Scoping Results Document	November 2004 Tasks [a/]
1. Goals and Objectives and Scope for Action	2	1.2.3	Review and Revise as Necessary
2. Definition of Status Quo and Baseline	4	2.1.1	Provide Guidance on Status Quo and Baseline for Use in the Analysis
3. Alternative Tools	6	2.1.1	Is the list of main alternatives for consideration complete?
4. Tool Design			
a. IFQs (potential decisions in 27 sections and subsections)	7 & Appdx A (Ex E.6.a Attach 4)	2.1.1 and Appendix A	Identify options for full development. Accept or modify alternatives recommended by TIQC Identify principles for constructing alternatives
b. Cumulative Catch Limits	8	2.1.1	Identify options for full development.
c. Pooled Species Caps (Sector Catch Caps)	10	2.1.1	Identify options for full development.
d. Other Tools • 3-, 4- 6-month, 1-year Lndng Limits • Permit Stacking • Other	10	2.1.1	Identify options for full development.
5. Specify the Species to Which Each Tool Applies	14	2.1.2	Additional Guidance (Optional)
6. Resolve Any Allocations Needed Among Trawl Sectors	16	2.1.3	Identify options for full development.

a/ Options identified for "full development" will also be the primary focus for analysis over the winter.

This document provides an outline of all the decision steps organized in a structure parallel to that of the scoping results document. It includes the options from preliminary scoping by the TIQ Committee and TIQ Enforcement Group as well as options recommended for consideration during the scoping process. The scoping document provides more complete discussion along with some analysis. There are blank columns and rows provided for Council member notes, including, in particular, notations on options included in the TIQ Committee's recommendations coming out of the TIQC's October 25-26 meeting that were not available for inclusion in this document.

Goals Objectives and Scope of Action

Review and Revise as Necessary

The TIQ independent experts panel has recommended a revision to the goals and objectives (IEP Report). A table on the following page shows the current goals and objectives and those proposed by the IEP.

Related to the goals and objectives for this action is the scope of the problem which the Council is addressing under this process. While the scope has initially been restricted to the groundfish trawl fishery, public comment was received requesting that the recreational fishery be included in the IFQ program.

The EIS in which the IFQ Program is considered will not cover intersector allocation issues. Such issues will be covered under a related but separate process.

Public comments:

Include recreational fisheries and allow cross sector transfers. A hard allocation guaranteeing catch for one sector is unfair.	UASC

Some Key Issues and Information

Carefully defined goals and objectives will help analysts efficiently focus on providing the most relevant information to support Council decisions.

Expansion of the IFQ program to other sectors might be achieved through full inclusion of those sectors (conversion to management under IFQs in other sectors) or by allowing participants in other sectors to acquire IFQ and thereby individually or as a group, augment their fishing opportunity. The means for individually augmenting fishing opportunity would have to be determined. Alternatives might include expansion of trip limits or providing opportunities to fish during periods that might otherwise be closed. If individual opportunity is augmented, tracking and monitoring system would have to be extended to cover other fisheries. If the other sectors are not under full IFQ programs there is a possibility that the costs of exending the tracking and monitoring system will not cover the benefits. If a means were provided for trawl IFQ to be transferred to a nontrawl sector as a whole, then fishing opportunity for the group might be expanded without the need to incur additional tracking and monitoring costs.

Potential Council Action:

1. *Determine whether or not to revise goals and objectives.*
2. *Consider whether or not to adjust the scope of action to extend beyond the trawl fishery.*

Reference Materials:

Independent Experts Panel Report
Section 1.2.1 and 1.2.3 of the Scoping Results Document
TIQC Report

Currently Stated	***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 including:* *Provide for a vialbe and efficient groundfish fishery* *Increase net benefits that arise from the fishery* *Provide for a fair and equitable distribution of fishery benefits* *Provide for a safe fishery* *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.	***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 ~~while taking the available harvest.~~(previously Obj 2) *(The panel's perspective is that the clause "while taking the available harvest" can be assumed.)* 3. Reduce discard mortality ~~bycatch and discard.~~ (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. ~~Encourage sustainable fishing practices.~~ (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 ~~bycatch~~ discards). (previously Obj 6) 6. ~~Provide~~ Increase ~~certainty/~~stability for business ~~economic~~ planning (previously Obj 9) 7. ~~Provide~~ Increase operational flexibility. (previously Obj 10) 8. Minimize adverse effects from IFQs on fishing communities to the extent practical. (previously Obj 11) 9. ~~Promote economic and employment benefits through the seafood catching, processing, and distribution elements of the industry.~~ (previously Obj 12) *Remove as an objective and address as narrative under the goal.*
13. Provide efficient and effective monitoring and enforcement. 14. Design a responsive review and modification mechanism.	***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)

Status Quo and Baseline

Provide Guidance on Status Quo and Baseline for Use in the Analysis

There are two general categories of information that are useful in the decision process.

1. For each alternative what is the <u>change as compared to the present situation (a baseline)</u>? As an example, the present year conditions can be used to provide a reference point that illustrates the additional industry investment or agency funding that will be required under whichever alternative is chosen, as compared to current levels.
2. For each alternative what is the <u>change as compared to status quo</u>? This comparison illustrates the real choices available (maintaining baseline conditions is often not a choice). In a deteriorating situation all choices may be worse than the baseline but better or worse relative to one another, or all choices may be better than the baseline but better or worse relative to one another.

<u>Some Key Issues and Information:</u>

The present situation baseline is what exists and generally there are no policy decisions to make on that issue. The 2003 fishing year is being used as the baseline because nearly complete information is generally available for that year, so the needed comparisons can be made. The cumulative impacts analysis will take into account changes from the recent past as well as concurrent and future events and actions that are not accounted for under the specification of the status quo alternative.

The Council's programmatic bycatch EIS and commitments entailed therein have a significant bearing on the projection of status quo. The IFQ EIS will evaluate for the trawl fishery 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	30%	50% (for example)
Harvest Levels	Current (2003)	Projected (see Analytical Team Report)

Potential Council Action:

1. *Provide guidance on projections of status quo management to be used for analysis in the IFQ EIS.*

Reference Materials:

Analytical Team Report section on definition of status quo.
Enforcement Group Report
Section 2.1 of the Scoping Results Document

Alternative Tools

Is the list of main alternatives for consideration complete?

The following are the tools in the scoping information document and related provisions for the Council recommended alternative from the programmatic bycatch EIS. Details of the design elements for each tool are addressed in subsequent sections of this document. The question here is: "Is this list complete with respect to the purpose and need for the proposed action?"

Tools	Council Recommended Bycatch Alternative (Alt 7)
Status Quo (Trip Landing Limits and Seasons)	"establishing landings limits for target species based on co-occurrence ratios with overfished stocks"
IFQs	" future use of IFQ programs for appropriate sectors of the fishery" "incorporate the Strategic Plan's goal of reducing overcapacity in all commercial fisheries"
Trip Catch Limits	[a potential element of the sector specific catch option]
Sector Limits	"sector-specific caps for overfished and depleted groundfish species"
Permit Stacking and Extended Trip Limit Periods ***(from Sept 2004 Council Meeting)***	
NEW (recommendations from advisors)	

Public comments.

Community Development Quotas	CJC, POORT, ED, Survey (ED)
CDQs Opposed	Individual (1)
Individual Processor Quotas	
IPQs Opposed	Individual (1)
Trip Landing 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)

Potential Council Action:

1. *Identify any other management tools which might address the purpose and need for action (Sections 1.2.1 and 1.2.3 of the Scoping Results Document).*

Reference Materials:

Section 1.2.1 and 2.1 of the Scoping Results Document

Tool Design

The following sections go through each of the management tools and address design issues that will need to be resolved in the development of these alternatives.

IFQs

Identify options for full development.
Accept or modify alternatives recommended by TIQC in their supplemental report (Nov 2004)
Identify principles for constructing alternatives

The details of the IFQ design elements are covered in **Appendix A** (Exhibit E.6.a, Attachment 4 - Decision Step Summary Appendix) to this document (which corresponds to Appendix A of the scoping results summary). In Appendix A, there is a brief explanation of each design element issue along with options identified by the TIQC during preliminary scoping, options identified by the public, and a listing of some potential Council guidance on the issue. **Blank rows and columns are provided to record results from the TIQC report (that may be provided in supplemental materials) and for Council members to make notes.**

The TIQC is expected to provide the Council with its tentative recommendations on IFQ program alternatives. The Council may wish to work through Appendix A by

1. Identifying whether there are options not included in the TIQC alternatives that the Council would like to see considered.
2. Providing other possible guidance as identified at the end of each section.

After identifying the full suite of options it would like to consider, it is proposed that the Council identify some general principles around which it would like to see alternatives developed to incorporate options not included in the TIQC recommendations. Over the winter, staff and analysts would then work with the general principles and options not included in the TIQC alternatives to develop some additional IFQ program alternatives for consideration by the Council and its advisors. The intial structuring of the alternatives would be done in such a way as to enable analysis that would illustrate key trade-offs among types of design features.

Examples of general principles:

Provide substantial opportunity for community influence over the geographic distribution of IFQ landings
Provide maximum opportunity for fleet rationalization.

Potential Council Action:

1. *Provide guidance on the design elements, as noted in each section of Appendix A.*
2. *Decide whether or not to accept for preliminary analysis the alternatives developed by the TIQC.*
3. *Provide general principles that might be used to develop new alternatives that include design options not included in the TIQC alternatives as modified by Council action.*

Reference Materials:
Section 2.1 of the Scoping Results Document
Appendix A of this document and the Scoping Results Document

Cumulative Catch Limits

Cumulative catch limits apply to vessels and would replace cumulative trip landing limits. Under vessel catch limits a vessel would stop harvesting when the limit is reached. Under the current trip limit system vessels continue to harvest but discard fish taken in excess of the limit.

Vessel catch caps were part of Alternative 4 of the programmatic bycatch EIS and were adopted for consideration as part of the Council's final action on the programmatic EIS (Alternative 7). Under the programmatic bycatch EIS, vessel cumulative catch limits were to be applied only to control harvest taken under sector catch caps, and sector catch caps would be developed for overfished species. It was anticipated that observers or other at-sea monitoring systems would be required to ensure compliance with catch limits. Here cumulative catch limits will be considered for other groundfish species, as well as for overfished species.

Cumulative catch limits may be used to control harvest rates with status quo management targets, such as those reflected in the annual scorecard for overfished species and the OY table for nonoverfished species, or they may be used to control the rate at which sector caps are reached (if a sector cap type management tool is implemented).

Cumulative Catch Limit Design Elements	Options
Vessel Caps	Consider time periods other than the current 2-month periods use for cumulative vessel landing limits.
Tracking and Monitoring	
At-Sea	Option 1: At-sea Compliance Monitors (100%) Option 2: Full retention and Video Camera
Shoreside	Option 1: Spot enforcement presence and Audits Option 2: Shoreside Compliance Monitors (100%)
Data Reporting	Upgrade reporting of at-sea catch data 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

<u>Some Key Issues and Information:</u>

Adequate monitoring would be required to ensure that catch is recorded into a tracking system. The monitoring, and enforcement issues would be similar to those that are anticipated for IFQs except that each vessel to which the catch limits apply would have the same limit. Whatever level of at-sea monitoring is determined to be needed for an IFQ program would also be needed for a cumulative catch limit system. This is reflected in the proposal in the programmatic bycatch EIS that would allow vessels to opt out of management under sector caps to fish under a vessel cumulative catch limit, but only on the condition that they comply with an approved monitoring program, which would likely include observer presence or video monitoring.

Thus the main difference in program administrative costs, as compared to an IFQ program, would be the lack of a need to track IFQ holdings. Catch information would not need to be any more timely than under the current cumulative limit landing system. The main difference in program benefits would be the lack of improvement in fleet efficiency as compared to an IFQ alternative.

An option for shore-side monitoring was not included in the programmatic bycatch EIS but was added here. Inclusion of this design option will help evaluate the need for this element of the monitoring program under either vessel cumulative limits or IFQs.

The effect of alternative time periods (longer than 2 months) will be discussed in the section on extension of the current cumulative landing limits to a longer time period.

Public comments:

● 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
Sector Bycatch Caps - Nontransferable	PMCC
Sector Bycatch Caps - Transferable	ED

The last two comments may be intended to reference vessel cumulative limits for incidentally caught overfished species (as opposed to bycatch as specified under the Magnuson Stevens [1/]).

Potential Council Action:

1. *Consider whether there are any additional details which should be added to the specification of this management tool.*

Reference Materials:

Section 2.1 of the Scoping Results Document

1/ Magnuson Stevens Act definition of bycatch: "The term 'bycatch' means fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

Pooled Species Caps (Sector Catch Caps or Incidental Catch Allowances)

Identify options for full development.

Various names have been applied to the sector catch caps of the type identified in the programmatic bycatch EIS, including pooled species caps and incidental catch allowances (ICAs). All would be based on specific annual limits on the amounts of groundfish that could be caught by the trawl sector.

Sector catch caps were part of Alternative 4 of the programmatic bycatch EIS and were adopted for consideration as part of the Council's final action on the programmatic EIS. Under the programmatic bycatch EIS sector catch caps were to be applied only to overfished species. It was anticipated that sector catch caps would be monitored with stratified, partial observer coverage. Catch rates and closure dates for each sector would be projected based on observer reports. However, to the degree that individual vessel catch caps were employed, every vessel fishing under such a vessel cap would be monitored while fishing. This EIS includes consideration of sector catch limits for overfished as well as other groundfish species when taken by trawl gear.

Sector Catch Cap Design Elements

Sector Catch Cap Design Elements	Options
Tracking and Monitoring At-Sea	Stratified, partial observer coverage
Data Reporting	Upgraded inseason catch monitoring and verification program to ensure limits are not exceeded.

TIQC Preference

Public comments:

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

These comments are likely using the term bycatch to refer to incidental catch rather than only to discards (bycatch as defined under the M-S Act).

Potential Council Action:

1. *Consider whether there are additional details which should be added to the specification of this management tool.*

Reference Materials:

Section 2.1 of the Scoping Results Document

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Permit Stacking and Extended Trip Limit Periods

Identify options for full development.

Permit Stacking

A permit stacking program for the limited entry sectors of the groundfish fishery would allow a vessel to land more than the monthly or bimonthly trip limit by assigning and using two or more permits on the same vessel.

In 2002, the Council's Trawl Permit Stacking Committee identified four major approaches to determining the size of the stacked trip. The options are briefly described as follows.

Option	
1A	Whole Trip Limit for Additional Permits. In this approach, a vessel would need one permit endorsed for the size of the vessel. Additional permits could be for any size vessel. Each additional permit would allow a vessel to harvest an additional whole trip limit. This approach is simple, but with substantial participation would lead to reductions in per-permit limits.
1B	Fixed Fractional Trip Limit for Additional Permits. This option is a variation on Option 1A. A permit of any length could be stacked with a suitable primary permit, but a single stacked permit would not carry a full additional limit. The percentage of an additional limit provided would be invariant with permit length, but could conceivably be expressed as a function of a variable, such as groundfish abundance, that would vary over time.
2	Same Size Requirement. Another approach is to require that all stacked permits be endorsed for the size of the vessel on which they are used. From a regulatory standpoint, this approach 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. A full additional limit would be provided for each stacked permit, but with substantial participation per-permit limits would decline.
3	Additional Fractional Trip Limit Linked to Size Endorsement or Fishing Power Points of Stacked Permit. This approach would establish a formula that links the magnitude of additional landing limits to the size endorsement of the permits that are stacked. Additional permits could be for any size vessel. Thus, a vessel could operate with fractional limits depending on the size endorsements of the stacked permits. This approach would give vessel operators greater flexibility to obtain a desired level of monthly landings.

The most apparent means of implementing a length-based program would be to utilize the fishing power formula ("points" system) defined in the implementation of Amendment 6.

In evaluating options, the following are some of the key trade-offs to be considered.

> Key Trade-off 1: When a permit is stacked, if the harvest of a species or species group taken under the permit is greater than the harvest of the species or species group taken under the permit prior to when it was stacked, the cumulative limit for that species or species group would need to be reduced in order to keep the fleet within the annual harvest (within the OY).
>
> Key Trade-off 2: If permits are allowed to move between segments of the groundfish fishery, there will be a greater likelihood opportunity that per-permit cumulative limits would have to be reduced in the segments to which permits are moved.

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 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 provide 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.

Extended Trip Limit Period

The current trip limits are for two month periods. The limit periods might be extended to 3, 4, 6, or 12 month period. As the length of the management periods are extended, opportunity for inseason actions effective at the start of the subsequent cumulative limit period is reduced, and the potential need for mid period correction could lead to more derby type fishing. In the extreme, with a 12 month period, cumulative limits would either have to be set such that they represent vessel quotas, or set 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 close through inseason action.

Potential Council Action:

1. *Determine whether the list of alternative management tools is now complete.*
2. *Consider whether or not full option development and analysis is desirable for each of the identified options.*

Reference Materials:

Section 2.1 of the Scoping Results Document

Decide on the Species to Which the Tools Apply

Additional Guidance (Optional)

The overriding question before the Council is one of how to best control total catch, including bycatch, of the limited entry trawl fleet. Different management tools may be used for different species. Different combinations of management measures and species are used to structure alternatives. To stimulate discussion and bring issues into focus, the TIQC constructed a number of initial alternatives for public consideration during the scoping process.

Nonwhiting Sector Management Alternatives

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 Only for Primary Trawl Targets).

- IFQ management for groundfish species that are primarily trawl targets with minimal harvest by other sectors (whiting split by sector, DTS, slope rockfish, nearshore flatfish) and target species for which there is already trawl allocation, i.e. sablefish.
- Vessel cumulative catch limit management for other species with OYs, except those with extremely low OYs. Vessel limits would be transferable only within the cumulative limit period. Transfers would be temporary. Trawl shares for would be determined as under status quo.
- Monitoring only for other species.
- Sector catch caps for nonIFQ species with extremely low OYs (threshold criteria to be determined). Harvest rates controlled through nontransferable vessel catch limits. Other measures to keep bycatch rates low remain in place (e.g. RCAs).
- Pacific halibut, salmon, crab. Prohibited species status stays in place.

Alternative 3

Same as Alternative 2, except

- IFQ applied for all species with OYs, and
- Cumulative catch limits applied to control harvest of other species (those without OYs).
- Sector catch caps apply to any species for which the OY is extremely low (under such circumstances, IFQ management would be suspended and the low OY species would be managed with sector catch caps instead of IFQ).

Alternative 4

Same as Alternative 2, except

- Total IFQ management. IFQ applied for all groundfish species (catch limits would be established even for those species without OY).
- Pacific halibut bycatch would be managed with individual bycatch quota (IBQ). A suboption will be considered that allows retention of IBQ when taken by gear legal for that species.

Whiting Sector Management Alternatives

Alternative 1 (Status Quo).

Season management for Pacific whiting and bycatch monitoring for other species with possible season closure on attainment of any bycatch allowance established for OY species.

Alternative 2 (IFQ Only for Primary Trawl Targets).

- IFQ for whiting.
- Sector catch caps for nonwhiting groundfish with OYs. Managed as a pool with sector closure on cap attainment. Allow transfer of caps between whiting sectors and allow expansion of fleet caps through the purchase of IFQ from the nonwhiting sector. Maintain the current seasonal sequence of fishing opportunity.
- Monitoring for nonOY species.

Alternative 3

Same as Alternative 2, except

- IFQ applied for all species with OYs. Individuals would be allowed to form a coop and pool their IFQs if they desired to do so. IFQ could not be transferred between whiting and nonwhiting sectors.

Alternative 4

Same as Alternative 3, except

- Transfer of IFQ between whiting and nonwhiting sectors would be allowed.

Management of prohibited species with respect to the whiting fishery has not been addressed by the TIQC.

Public comments:

Bycatch caps for overfished species	ED, PMCC (see Bycatch Cap Design Elements)
IFQ for All species	WCSPA

<u>*Potential Council Action:*</u>

1. *Consider whether there are additional options or if provided options need refining; or defer action until an initial report is received from the allocation committee.*

Reference Materials:

Section 2.1.2 of the Scoping Results Document

Whiting and Nonwhiting Sectors

Thus far, one approach for allocating between whiting sectors has been suggested:

One of the principles on which the following allocation approach is based is to not reward individuals or sectors that have historically had higher incidental catch rates than other individuals or sectors.

1. Establish an incidental catch rate for the whiting fishery as a whole. This rate would be established by determining the incidental rate for each year of the allocation period, and then determining the average of the annual incidental rates. Annual incidental rates would be calculated by summing the estimated catch of incidental species for all whiting sectors and dividing by the sum of whiting catch for all whiting sectors.

2. To establish the whiting fishery allocation of a nonoverfished incidental species in any particular year, multiply the incidental rate from Step 1 by the nontribal directed whiting sector OY. For overfished species a set-aside would be determined by the Council.

3. Allocate the incidental catch species among the three whiting sectors (catcher processors, vessels delivering to motherships and vessels delivering shoreside) based on the formula used to allocate whiting between these sectors (i.e. shoreside 34%, catcher-processor 42%, motherships 24%).

A policy call will need to be made as to whether to use only landings/deliveries or to include estimated discarded catch in the landings history for purpose of allocation. Some additional allocation decisions may be needed with respect to crediting sectors with landings history accounted for by permits removed by the buyback program.

TIQC Preference*:*
NEW OPTION (IF ANY)   **<u>use another sheet of paper, as necessary</u>**

Between LE Trawl Vessels Fishing with Groundfish Trawl and LE Trawl Vessels Fishing with Open Access Gear

The need for this allocation depends on a decision on the scope of the IFQ program. This decision is covered under Section A.1 of the appendix. If IFQ is to cover all catch taken by LE trawl vessels, no allocation decision will need to be made. If IFQ is to cover only that catch taken with trawl gear then the trawl allocation will have to be split and the portion of the allocation taken by LE trawl vessels with open access gear either managed separately or managed jointly with some other sector (LE fixed gear or open access). In either case an decision will be needed on how to split the current trawl allocation. (If the decision is to manage the open access gear catch by LE trawl vessels jointly with some other group, consideration should be given to referring the matter to the allocation committee where there is broader representation of the groundfish sectors than on the TIQC. This issue is addressed in Section A.1.)

Potential Council Action:

1. *Provide any additional guidance on options based on TIQC Report recommendations, if any.*

Reference Materials:

Section 2.1.3 of the Scoping Results Document

DECISION STEPS APPENDIX A: IFQ DESIGN ELEMENTS

This is the appendix to Agenda Item E.6.a Attachment 3 and covers design elements for an IFQ program.

A.1.0 Portion of the LE Trawl Fleet Allocation for Which IFQs are Required

The issue here is how to treat landings by LE trawl vessels using open access gears. Should they be required to hold IFQ to cover these landings or not. Under current catch accounting rules, any groundfish catch by trawl vessels is counted against the limited entry allocation, regardless of gear used.

Summary of Options from Public Information Document:

		TIQC Pref
IFQ Program Scope - Option 1: Require IFQ for all catch by LE trawl vessels. For LE trawl vessel landings with OA gear		
SubOption A	Apply open access fishery cumulative limit and other harvest regulations.	
SubOption B	**Allow landings in excess of open access fishery cumulative limits, so long as landings are completely covered by IFQ.**	
IFQ Program Scope - Option 2: Require IFQ only for groundfish trawl catch by LE trawl vessels		
SubOption A	• Split the trawl allocation between IFQ and nonIFQ harvest • Manage groundfish harvest by trawl vessels using open access gears to stay within the suballocation.	
SubOption B	• Maintain the same LE allocation • Change the accounting system such that catch by LE trawl vessels using open access gears counts against the open access allocation. • Determine whether or not to make similar changes with respect to LE longline and fishpot vessels.	
SubOption C	• Re-allocate a portion of the LE allocation • Change the accounting system such that catch by LE trawl vessels using open access gears counts against the open access allocation. • Determine whether or not to make similar changes with respect to LE longline and fishpot vessels.	
NEW		

Public Comments: None

Some Key Issues and Information:

If the scope of the program

includes LE trawl vessel landings with open access gears

- such landings will need to be made in compliance with the IFQ monitoring program (this could mean that trawlers need to carry observers when participating in any fishery that might take groundfish as bycatch).
- the opportunity could be provided for trawl vessels to switch all of their groundfish landings to nontrawl gear (depending on suboptions selected).

does not include trawl vessel landings with open access gears

- accounting and management measures (including inseason tracking and adjustments) will be needed for OY taken by trawl vessels using open access gears, or such activities will need to be merged and managed jointly with some other sector (e.g. trawl vessel landings with open access gear managed jointly with limited entry fixed gear or open access vessel landings).

Data for 1998 and 2003 indicate that 80 and 16 LE trawl vessels landed a total of 280 thousand and 54 thousand pounds, respectively, of groundfish using open access gears (see Analytical Team Report for more information).

Potential Council Action

1. *Narrow the set of options based on information provided.*
2. *Based on narrowed set of options decide whether to assign this issue to the Allocation Committee for further deliberation.*

Reference Materials:

Analytical Team Report
Section A.1 of the Scoping Results Document

A.2.0 Area Restrictions

Area restrictions on IFQ can be applied to area of catch or area of landing. Which type of restriction is applied, if any, probably depends on whether the primary concern is regional stock depletion or the geographic distribution of benefits. However, area of catch restrictions would likely assist in preventing geographic concentration of landings and area of landings restrictions would likely assist in preventing regionalized depletion. Area restrictions may also lead to increased local control and stewardship since regional participants would have an increased investment in the health and longevity of stocks.

Summary of Options from Public Information Document:

		TIQC Pref
Option 1:	Area restrictions based solely on the need to address stock conservation concerns. Suboption: If some IFQ are to be catch area specific, all landings should occur in ports within the catch area, unless catch is kept separate and monitored at-sea.	
NEW		

The TIQC recommended not adopting IFQs with landing area restrictions.

Public Comments:

Landing or catch area specific IFQ based on biological and socio-economic need	ED, Survey (ED)

Some Key Issues and Information:

Sufficient stock information to provide definitive answers on the need for area management for many species will not likely be available (see Analytical Team Report). At its September 2004 meeting, the Council included in the Terms of Reference to stock assessment authors direction to evaluate regional stock differences or identify the information needed to make such an evaluation The key question in deciding on whether to implement area management for an IFQ system will likely based on risk trade-off and the cost of error recovery. If it turns out that area management was needed but not implemented, error recovery costs would be both in the form of recovery from biological damage and the costs of modifying the program IFQs after IFQs have been issued. Costs associated with area management are reduced flexibility, increased management and monitoring complexity and the loss of potential operational efficiency gains from the program.

The distribution of effort in the trawl fishery will likely be driven, in part, by the value derived from the complex of species that is available for harvest. If CPUE for a complex is high, effort may stay focused in an area even if some components of the complex are regionally depleted.

The reduced CPUE resulting from regionalized depletion of an individual species does not necessarily mean that IFQ for that species will flow to other areas.

There does appear to be reason to believe that IFQs could create conditions under which there will be a greater potential for shift in the geographic distribution of landings as compared to the status quo license limitation program (Analytical Team Report).

Depending on the at-sea monitoring system needed to ensure that all catch is accurately reported, landing area based IFQ may be less expensive to enforce than catch area restrictions.

Potential Council Action

Determine whether options for area specific IFQs should be developed.
If so,

a. *Should the primary focus be on catch area or landing area, or both (as a combined option)?*
b. *Can one of the types of area IFQs be tentatively set aside (catch area or landing area)?*

Note: any option set aside will be discussed as part of the analysis and may be restored at a later date if information is brought to bear warranting such reconsideration.

Reference Materials:

Analytical Team Report
Section A.2 of the Scoping Results Document

A.3.0 IFQ and LE Permit Holding Requirements

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Register IFQ to the vessel - vessels must cover the species with IFQ at the time of landing.	
Option 2	Register IFQ to the vessel - vessels must cover the species within 24 the time of landing.	
Option 3	Register IFQ to the vessel - vessels must cover the species with IFQ within 30 days of landing - no more fishing until covered.	
NEW		

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. The TIQC recommended not adopting an option that would require that all IFQ needed to cover a landing be held prior to departing from a port.

Public Comments: None

Some Key Issues and Information:

Requiring that a IFQ be fished only from vessels with LE trawl permits will reduce enforcement costs but could potentially prevent the most efficient outcome.

The decision on when to require that IFQ be held has implications for likely program benefits and enforcement and monitoring costs.

	Basic Choice	
	Sufficient IFQ to Cover Catch Must Be Held Prior to Landing	IFQ Can Be Acquired After Offloading Completed
Industry		
Enforcement and Monitoring	Violations can be detected by hold inspections of returning vessels.	No opportunity for determination of a violation prior to offloading. System must rely on accurate recording of catch.

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A.4.0 Transfer Rules

A.4.1 Transfer of IFQ or IBQ to a Different Sector for Use

IFQ might be issued under sector-specific allocation rules (Section 13.0) but could be freely transferable among trawl sectors or specific to a particular trawl sector. For example, there could be a single type of IFQ for darkblotched rockfish or there may be a separate type of darkblotched IFQ for each of the whiting sectors and the nonwhiting sector. Similarly there might be a single category or separate categories for each sector (including the shoreside nonwhiting fishery).

Transfer might also be allowed to nontrawl sectors, if an adequate tracking and monitoring system is in place. The following are the sectors and subdivisions for which sector specific IFQs might be considered.

Trawl	Whiting	At Sea	Catcher Processors
			Motherships
		Shoreside	
	Nonwhiting		
Nontrawl			

<u>Summary of Options from Public Information Document</u>:

		TIQC Preference
IFQ Option 1	IFQ must be used within the trawl sector for which it was issued (e.g. establish separate IFQ classes for the whiting and nonwhiting fleets).	
IFQ Option 2	IFQ may be traded between trawl sectors managed under the IFQ program.	
NEW		

IQ might also be established for bycatch species such as halibut. If halibut is a prohibited species the IQ would be termed IBQ.

IBQ Option 1	Prohibit transfers outside the trawl sector.
IBQ Option 2	Allow transfers to gears that are legal for the species and allow those gears to retain catch taken under IBQ when operating in compliance with the IBQ program.

Public Comments:

Include recreational fisheries and allow cross sector transfers.	UASC

Some Key Issues and Information:

The more transferability that is allowed the more efficient the use of the resource. Restrictions on sector transfers may be desirable to maintain the character of the fishery.

If IBQ were created for halibut consultation with the IPHC would be required. If the program were to allow transfer of the IBQ to another gear type that could legally retain the halibut, there would need to be a downward adjustment in the amount of halibut represented by the IBQ. For halibut taken by the trawl sector there is an assumed bycatch discard mortality rate that is less than 100%. Obviously, mortality would be 100% in a retention fishery, hence the need for a downward adjustment. 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) 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.”

Any provisions for transfer of trawl IFQ to groups outside the trawl fishery will have to include design of an adequate quota and catch tracking and monitoring system and harmonization of the rules for use of the trawl IFQ with rules controlling nontrawl catch such that it results in additional harvest opportunity and can be adequately enforced. Administration, tracking and monitoring costs would likely increase with the extension. Gross benefits from harvest might increase if the trawl quota could be used to generate greater value in another sector.

Potential Council Action

1. *Determine whether or not to pursue development of options that would manage the whiting sectors under an IFQ system segregated from the nonwhiting sectors.*
2. *Determine whether or not to pursue options that*
    a. *would allow the transfer of halibut IBQ to fisheries in which it could be legally retained.*
    b. *create IBQ for other prohibited species, such as salmon or crab.*
3. *Determine whether to consider options to allow the transfer of trawl IFQ for use by nontrawl groups.*

Reference Materials:

Section A.4.1 of the Scoping Results Document

A.4.2 Eligible Owners/Holders (Who May Own/Hold)

Initial allocation of IFQ generally determines how windfall benefits will be distributed (Section 13.0). The question of who will be allowed to own IFQ is one of future control over benefits from the fishery.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Anyone eligible to own a US documented vessel.	
Option 2	Stakeholders: include owners and lessees of LE permits or vessels, skippers/crew, processors, buyers, communities. *(NOTE: If ownership is restricted to these classes, criteria will need to be established to identify membership in these groups.)*	
NEW		

Public Comments:

Allow communities to form nonprofits and acquire IFQs	ED

Some Key Issues and Information:

From Section 4.2.2 of the Scoping Results Document:

> Some groups with social concern can be accommodated at least in part through the scope of eligible owners. For example, communities 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.
>
> In general the more participants and more types of participants in the IFQ market the more likely it is that the IFQ will be used by those able to generate the greatest self-benefit from use of the IFQ and the higher the likely trading price for the IFQ.

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. 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.

Potential Council Action

1. *Determine whether or not to consider options that would restrict the class of persons eligible to own IFQ. If so, identify classes to be considered for inclusion or exclusion under such an option.*

Reference Materials:
Section A.4.2 of the Scoping Results Document

A.4.3 Duration of Transfer - *Leasing and Sale Prohibition*

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. One of the primary concerns associated with leasing is the potential for absentee ownership.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Permanent transfers only - leasing prohibited.	
Option 2	Leasing and permanent transfers. Suboption: Prohibit all permanent transfers (leasing only) during the first year of the program.	
NEW		

Public Comments:

Compel quota holders who have historically leased their permits to others to continue to lease their IFQ to those individuals.	Survey (ED)

Some Key Issues and Information:

From Section 4.3.2 of scoping document.

> 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 prohiting 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, if a permit is transferable private contractual agreements provide many opportunities to circumvent the intended effect of such prohibitions.

Potential Council Action

1. *Determine whether or not to consider options that would restrict the leasing or sale of IFQs.*

Reference Materials:

Section A.4.3 of the Scoping Results Document

A.4.4 Time of Sale

Restricting when quota shares may be transferred could simplify tracking IFQ. A restriction in place on transfers at the end of the year (not a listed option) might be an administrative necessity that facilitates the issuance of quota pounds for the following year. The transfer embargo is proposed as an enforcement measure.

Summary of Options from Public Information Document:

Time of Year

		TIQC Preference
Option 1	Allow transfers of quota shares any time during year.	
Option 2	Allow transfers of quota shares only at the end of year.	
NEW		

Transfer Embargo

		TIQC Preference
Option	Quota shares should not be transferred from any account for which there is a deficit of quota pounds (i.e. any account for which landings exceed quota pounds for at least one species.	
NEW		

Public Comments: None

Some Key Issues and Information:

Need and costs for restrictions on the time of year of transfer will likely become more apparent as the program is further developed.

Potential Council Action

1. *None. Wait until more information is available on administrative constraints and potential costs.*

Reference Materials:
Section A.4.4 of the Scoping Results Document

A.4.5 Divisibility

Blocking quota share combined with a limit on stacking has been suggested as a means to preserve opportunity for small operations.

Summary of Options from Public Information Document:

Elements of Divisibility Provisions (Separate Options Not Identified)		TIQC Preference
1.	Quota Shares: nearly unrestricted divisibility - "many decimal points."	
2.	Quota Pounds: divisible to the single pound	
NEW		

Public Comments:

Blocked quota shares	ED-Survey

Some Key Issues and Information:

Putting quota in small blocks and placing limits on the number of blocks that could be stacked (plus a requirement that those holding blocked quota could not hold unblocked quota) could make quota available at a lower per unit price. Individuals entering the fishery would have a choice of acquiring blocks (likely available at a lower price per unit of quota) or divisible quota in what ever size increment they could afford.

Because of the multispecies nature of the West Coast fishery, blocking quota shares may make it more difficult for fishers to match their holdings to catch. Difficulty in matching catch to quota holdings may increase the incentive to discard or underreport landings or result in lower catch levels (more unused quota).

The Alaskan blocked quota share system has been repealed.

Potential Council Action

1. *Consider whether or not to pursue development of an option to block quota shares.*

Reference Materials:

Section A.4.5 of the Scoping Results Document

A.4.6 Liens

The Magnuson-Stevens Act includes creation of a lien registry system, but none has been implemented to date. Lenders have expressed concern that liens on IFQ might be passed on to IFQ purchasers without the purchasers 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.

Summary of Options from Public Information Document: No special provisions recommended. The TIQC believed pledging IFQs as collateral is a matter of private contract, independent of the government program.

NEW

Public Comments: None

Some Key Issues and Information:

The ability for new entrants to acquire financing for 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.

Potential Council Action

1. *No options have been identified for further consideration.*

Reference Materials:

Section A.4.6 of the Scoping Results Document

A.4.7 Accumulation Caps

Summary of Options from Public Information Document:

Options for IFQ concentration caps.

	Non-Whiting Groundfish			TIQC Preference	Whiting Fishery			TIQC Preference
	Owner ship	Control	Use by a Vessel		Owne rship	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%	
NEW								

The TIQC recommended not adopting an option that would require persons receiving an initial allocation in excess of the caps to divest themselves of the excess.

Public Comments:

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

Some Key Issues and Information:

NMFS guidance on limiting accumulation is expected to be forthcoming.

The Analytical Team report contains some information on concentration of harvest among permits and buyers/processors in recent years. A review of the historic concentration of harvest in any single year may provide the Council with some guidance for policies that may limit the concentration of ownership of IFQs.

For any allocation formula it will be possible to project the largest shares that might be allocated for a single permit or vessel. However, projection of the size of shares allocated to a given person based on permits or vessel history will be more difficult, and limited by the available ownership information.

For buyers and processors, tracking ownership history is more difficult because buyer/processor identification numbers sometimes change (and sometimes do not change) with changes in ownership. Additionally, in some situations identification numbers may change although there is no change in ownership. Finally, ownership information for buyers or processors is not as readily available as it is for vessel and permit owners.

One issue imbedded in the options pertaining to ownership and control is the degree of ownership or control required for the IFQ to count against the ownership or control cap. For the sablefish tier program, any interest in the ownership or control of a permit counts as complete ownership or control of the 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 owner) even if the vessel has been leased to someone else for use. Thus if a person has the maximum (three permits) for his or her vessel and he or she also has a partial interest in a second vessel, no permits could be fished from the second vessel. No specific options pertaining to alternative ways of defining ownership or control have been presented for consideration at this time.

Potential Council Action

1. Consider adjusting the existing cap options, possibly adding the no-cap option.

Reference Materials:

Independent Experts Panel Report
Section A.4.6 of the Scoping Results Document

A.4.8 Vertical Integration Limit

Vertical integration occurs through the control of multiple levels of the production chain (for example, the same ownership interest controlling both fish harvesting and processing operations).

<u>Summary of Options from Public Information Document</u>: No special provisions. The TIQC recommended no limits on vertical integration other than what is provided through the accumulation caps.

TIQC Preference NEW

<u>Public Comments</u>: None

<u>Some Key Issues and Information</u>:

From Section 4.8.2 of scoping document.

> Some degree of vertical integration already exists in the industry through processor control of permits and vessels. The creation of IFQ would involve a redefinition of the privileges conveyed by a limited entry permit. If processors were to be prohibited from owning IFQ vertical integration would be reduced from present levels.
>
> Vertical integration will be limited to some degree by the caps discussed in Section 4.7. Depending on the number and landings history of permits held by processors, the amount (if any) of IFQ allocated among processors, the ownership and control caps may be exceeded by processors under a grandfather clause (as is the case for any permit holder receiving an initial allocation).

Potential Council Action

1. Consider whether to develop special provisions to address the potential for vertical integration.

Reference Materials:
Section A.4.8 of the Scoping Results Document

A.5.0 Rollover (Carryover) to a Following Year

Rollover would allow unused quota pounds to be used in a subsequent year or allow an overage in one year to be covered with quota pounds issued for a subsequent year.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	No rollover.	
Option 2	10% rollover (no rollover allowance for overfished species).	
Option 3	20% rollover (5% rollover allowance for overfished species).	
Option 4	30% rollover (full rollover allowance for overfished species).	
NEW		

Question: If quota pounds have been leased out to a vessel, how would rollover provisions for overages be applied to quota shares?

Public Comments: None

Some Key Issues and Information:

From Section 5.2 of scoping document.

> In deciding whether or how much rollover to allow, consider that if too much rollover is allowed and there are substantial overages for overfished species, fishing in the subsequent year could be seriously constrained. Also, if a fleet overage resulted in the potential for harvest in excess of ABC, other sectors might have to be constrained. While these are possibilities, the Canadian system has a roll-over provision and has not exceeded the quota for a stock in any one year. Consideration might be given to not providing a roll-over for overfished species because the objective for those species is often to minimize harvest, not take full advantage of harvest available.
>
> For some fishers, a rollover could just become another target up to which they will fish. However, if the fishery is fully monitored at-sea, given that IFQ counts against catch, penalties would be incurred for fish caught in excess of the roll-over provisions. For those wishing to avoid such penalties, the roll-over 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.

Potential Council Action

1. *Information is not provided that would help distinguish between Options 2, 3, and 4. The Council may wish to consider whether or not, in general, to maintain an option for a rollover provision and whether there are any other permutations of the rollover options it would like to consider.*

Reference Materials:

Section A.5.0 of the Scoping Results Document

A.6.0 Use-or-Lose Provisions

Use-or-lose provisions would require that if IFQ is not used over a certain period of time it would expire or be revoked and reallocated.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Include use-or-lose provisions (consider how to treat leases, medical exceptions, and partial use).	
Option 2	Do not include use-or-lose provisions.	
NEW		

Several questions have been raised for consideration with respect to use-or-lose provisions:

- *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?*
- *How would it be determined which quota shares had been used and which not used?*
- *If someone failed to utilize the required proportion, what portion of the quota shares in the account would be forfeited?*
- *If there were a requirement that quota shares be used in three out of five years or 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?*
- *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?*
- *How would use-or-lose provisions be applied if part but not all quota shares were transferred from one account to another?*
- *Would the quota shares be reissued or would the value of all remaining quota shares simply be allowed to increase?*

Public Comments: None

Some Key Issues and Information:

Consideration of this proposal is motivated by concern that some might

- acquire IFQ and hold it depriving the industry, community and general public from the benefits of reasonable fishing opportunities, or
- hold IFQ for key species off the market to garner a higher price for it.

If rules can be developed to determine when particular quota shares have been left unused, the proposal might achieve its desired objective. The problem can be 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 “unused” money be tracked if it is transferred from one account to another?

A use-or-lose provision could result in discard of some species if they are caught only to avoid loss of quota shares. This would be more of a problem if IFQ is developed to cover all groundfish species.

Potential Council Action

1. Provide guidance on whether or not to continue development of use-or-lose provisions.

Reference Materials:
Section A.6.0 of the Scoping Results Document

A.7.0 Entry Level Opportunities (*and Other Loan Programs)*

The M-S Act requires that some options be considered for accommodating new entry by entry-level fishermen, small vessel owners, and crew members.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Provide a low interest loan program (qualification factors to be determined).	
Option 2	Provide an opportunity for new entrants to qualify for shares revoked for program violations (qualification factors to be determined).	
NEW		

The TIQC recommended not requiring IFQ holders to give back a small percentage of their IFQ each year for auction, with proceeds from the auction going back to those who gave back the IFQ.

Public Comments:

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)

Some Key Issues and Information:

For the loan program options, the amount of fees collected under IFQ programs is limited to 3% of exvessel value, all of which will likely be needed to cover other program costs, some other funding source would be required.

For the other options, an IFQ source would need to be identified in order to issue 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 developed or implemented. If this option is to be considered, criteria need to be developed for qualifying potential IFQ recipients. There will be administrative costs associated with implementation of such qualifying criteria.

Potential Council Action

1. Consider whether or not to add options based on public comments.
2. Provide guidance on options relevant to the sources of IFQ for annual reissuance (forfeitures and/or mandatory surrender) and development of qualifying criteria for those to whom IFQ would be reissued.

Reference Materials:

Section A.7.0 of the Scoping Results Document

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A.8.0 Tracking, Monitoring, and Enforcement

Numerous possible elements of a tracking and monitoring program have been arrayed into program options by the TIQ Enforcement Group (Table 1).

Summary from Public Information Document:

Elements of Tracking Monitoring and Enforcement System		TIQC Preference
1.	Onboard compliance monitors (20%-100%)	
2.	Dockside compliance monitors (20%-100%)	
3.	Hailing requirements	
4.	Small vessel exemptions for onboard compliance observers	
5.	Video monitoring system	
6.	Full retention requirement	
7.	Bycatch reporting system	
8.	Electronic landings tracking system	
9.	Limited delivery ports	
10.	Limited delivery sites	
11.	Electronic IFQ tracking systems	
12.	Vessel monitoring system (VMS)	
NEW		

Public Comments:

Require VMS and 100% observer coverage - shoreside and at-sea	ED
Analyze limits on number of ports to which deliveries are allowed	WCSPA

Some Key Issues and Information:

In Section A.8 of the Scoping Results Document, enforcement program goals and objectives are provided along with a description of elements of the program. With an adequate tracking and monitoring program the additional cost for enforcement personnel is expected to be minor as compared to an adequately enforced status quo (see Analytical Team Report). Risk levels for enforcement program Options 4 and 5 increase substantially due to substantial opportunity for discarding and underreporting catch. This would likely require the setting aside of OY to cover unreported landings.

To help assess the possibility of limiting the ports in which IFQ landings can be made, the Analytical Team Report also provides information on the ports to which deliveries were being made in recent years.

In order to track catch against IFQ, options that allow discarding at-sea would require the development of a catch reporting system that has the same level of speed and accuracy as the landing/delivery reporting system.

Details of the enforcement program will need to be developed for the EIS in order to complete the impact assessment. However, it is not certain 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. Section A.8.0 of the scoping results document shows the enforcement and tracking and monitoring program language adopted by the NPFMC in their FMP.

Potential Council Action

1. *Determine the degree to which the enforcement program will be part of the amendment or regulatory language considered by the Council.*
2. *Provide guidance on options to be considered.*

Reference Materials:

Section A.8.0 of the Scoping Results Document
TIQ Enforcement Group Report

A.9.0 Cost Recovery/Sharing and Rent Extraction

<u>Summary from Public Information Document</u>:

Elements of Cost Recovery/Sharing Rent Extraction Provisions		TIQC Preference
1.	Landings Fee (max of three percent under current Magnuson-Stevens Act).	
2.	Privatization of Elements of the Management System: Monitoring IFQ Landings (e.g. industry pays for their own compliance monitors) Fishtickets Stock Assessments	
NEW		

<u>Public Comments:</u>

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)

<u>Some Key Issues and Information</u>:

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. The NRC has recommended that Congress increase the cap to above three percent.

Legal counsel opinion is needed on the degree to which privatization of particular functions might be used to transfer a larger portion of program expense to industry. At-sea or dockside monitors may well be part of the future of the fishery whether an IFQ program is adopted, or sector caps and vessel catch caps are adopted to control bycatch. Given this, it is unclear what these costs to attribute to the IFQ program. The TIQ Enforcement Group has indicated that the privatization of responsibility for catch and landings monitoring would require increased enforcement activity to verify that the monitoring program is functioning properly.

Potential Council Action

1. *Provide guidance on whether or not to develop privatization options. Consider requesting legal evaluation of the degree to which portions of the IFQ tracking and monitoring program and other fishery management functions might be privatized.*

Reference Materials:

Section A.9.0 of the Scoping Results Document

A.10 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)

Summary from Public Information Document:

Elements of Provisions Related to Penalties		TIQC Preference
1.	Strong sanctions for violators.	
2.	Illegal overages should forfeited on landings, debited against the IFQ holders account. Additional enforcement action should be taken, as appropriate. Fishing suspended until IFQ has been acquired to cover the overage.	
NEW		

Public Comments: None.

Some Key Issues and Information:

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 be involved 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]

Potential Council Action

1. *Determine whether or not to more fully develop options on this issue.*

Reference Materials:

Section A.10.0 of the Scoping Results Document

A.11 Procedures for Program Performance Monitoring, Review and Revision

The NRC recommends that a monitoring and evaluation program for short- term and long-term impacts be included as part of the initial program design (NRC, 1999, 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 (NRC, 1999, pg. 221).

Summary from Public Information Document:

Elements of Provisions Related to Performance Monitoring, Review and Revision		TIQC Preference
1.	The program should include a review period, built in performance monitoring, and opportunity for adjustments to the program.	
2.	No automatic sunset provisions.	
NEW		

Public Comments:

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

Some Key Issues and Information:

Element 1 needs more development in order to assess the effects. Opportunities to adjust the program are always available through regulatory or FMP amendment process. A time period for performance review and evaluation criteria should be specified. Evaluation criteria will determine what data should be collected to perform the review. Data collection is addressed in Section A.12.

The review period and timing of the review should take into account the two year groundfish management cycle.

Potential Council Action

1. *Refer to GMT or other group for option development.*

Reference Materials:

Section A.11.0 of the Scoping Results Document

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A12.0 Data Collection

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).

The issue of whether industry provision of data should be mandatory or voluntary will likely be addressed under this design element. Mandatory industry compliance is included as part of the data collection provisions under the Alaska crab rationalization program. The Alaska program provisions are specific as to the data elements and include draft survey instruments.

Summary Public Information Document: No data collection requirements identified.

TIQC Preference NEW

Public Comments: None.

Some Key Issues and Information:

Whether mandatory or voluntary, data collection will be necessary to monitor program impacts.

The following are the steps by which a mandatory data collection program was developed for the Bering Sea and Aleutian Island crab rationalization plan.

June 2001:	Council expression of interest in receiving information on objective measures of the success of the crab rationalization program.
	An Inter-Agency Economic Data Collection Workgroup identified objective measures of success based on program objectives identified needed data
Feb 2002:	SSC statement to the NPFMC on the need for mandatory reporting of socioeconomic data to support program evaluation.
April-June 2002:	Informal discussions with agencies and the fishing industry.
June 2002:	Council adopted motion to recommend giving the Council and NMFS authority to implement mandatory data reporting requirements as part of the crab rationalization program:

> A mandatory data collection program shall be developed and implemented as part of the crab rationalization 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 crab rationalization 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 fulfill the Council problem statement requiring a crab rationalization program that would achieve “equity between the harvesting and processing sectors” and to monitor the “…economic stability for harvesters, processors and coastal communities”. Both statutory and regulatory language shall be developed to ensure the confidentiality 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 in the data are found. The intent of this action would be to ensure that accurate data are collected without being overly burdensome on industry for unintended errors.

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.

Potential Council Action

1. *Consider whether or not options should be developed requiring mandatory submission of socio-economic data.*
2. *Refer to GMT or other group for development of options for mandatory or voluntary data requirements.*

Reference Materials:

Section A.12.0 of the Scoping Results Document

A13.0 Initial IFQ Allocation

The NRC recommends that "the councils consider a wide range of initial allocation criteria and allocation mechanisms in designing IFQ program .. . " 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).

The initial issuance of quota share determines a distribution of wealth (distribution of windfall). Over the long term, the initial distribution does not determine how the program will distribute control within the fishing industry, except to the extent that the increase wealth of those receiving the initial allocation can be used to exert more control and influence. Over the long term what will be most important to program performance is the opportunity to acquire IFQ to address concerns over control of fishing activities. The issues of opportunities to acquire are addressed in Section A.4.

Relative to the 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 for 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 existing LE permits due to the separation, redefinition and reallocation of the bundle of fishing privileges previously associated with the permit.

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 within one of the subsections.

Public Comments:

Establish a control date for processors.	1 individual
Don't make the shares so small that opportunity is reduced below current levels	1 individual

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A.13.1 Eligible Groups

The first issue to be addressed is what groups are to receive an allocation and the amount of IFQ to be allocated to each group.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1	Allocate IFQ to Current Permit Owners.	
Option 2	Allocate IFQ to Vessel Owners.	
Option 3	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). *Combinations need to be specified to fully develop options.*	
Option 4	Allocate to High Bidder in Auction (eligibility rules for participation to be developed).	
NEW		

TIQC recommended not adopting options that would give initial allocation to: 1) owners of permit at time of landings; 2) lottery entrants 3); crew/skippers; 4) communities.

Public Comments:

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)

Some Key Issues and Information:

Compensation for potential adverse impacts is one possible basis for determining the appropriate groups to whom an initial allocation of IFQ might be made. The group most directly affected by the IFQ program will be the owners of permits because the value of permits will likely decline substantially. Owners of major capital assets such as vessels and processing/buying facilities may also experience some dislocational effects as a result of changes to the management system. The same is true of experienced crew members, who contribute human capital to the fishery. Methods for qualifying crew members for IFQ are discussed in the Analytical Team Report.

Potential Council Action

1. *Identify the groups for which the Council would like to see allocation options developed.*
2. *Provide guidance on some ranges to be used for the amounts to be allocated to each group, or provide some policy guidance on criteria for determining such ranges.*

Reference Materials:

Section A.13.1 of the Scoping Results Document
Analytical Team Report

A.13.2 Qualifying Criteria: Recent Participation Requirement

A recent participation requirement may be used to increase the emphasis on those currently involved in the fishery, ensuring that current participants (whether permit owners, vessel owners, processor owners, crew members or others) benefit from allocations rather than those who may have left the fishery. Such emphasis may help reduce the disruptive effects of any changes.

Summary of Options from Public Information Document:

		TIQC Preference
Option 1.	No recent participation requirement	
Option 2.	Recent participation (1998-2003) required to be eligible for an initial allocation (number of trips and/or number of yrs required, to be specified).	
Option 3.	Same as Option 2 but the years would be 2000-2003.	
NEW		

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.

Public Comments:

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

Some Key Issues and Information:

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 degree of emphasis on the current participation requirement may be adjusted by limiting the portion of the allocation for which a recent participation requirement applies. Recent participation may be required to receive any allocation, or it may just be required for a portion of the IFQ that is allocated on a certain basis (for example to qualify under the equal allocation portion of the formula, or alternatively, to qualify under the landings history portion of the formula).

The following table, shows that a 2000-2003 (Option 2) one landing recent participation requirement would eliminate 13 permits from qualifying for IFQ, and a 1998-2003 (Option 3) requirement would eliminate 5 permits from qualifying. More permits would be eliminated if more than one landing is needed to meet the recent participation requirement.

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

Permits bought back are not included.

The 2000-2003 recent participation period (Option 2) corresponds to the period when large footrope restrictions were in place. The 1998-2003 recent participation period (Option 3) include time both before and after the imposition of large footrope restrictions, and both before and after the year 2000 declaration of a groundfish disaster.

Potential Council Action

1. *Should a recent participation requirement be used to qualify for any IFQ, or for only certain portions of the allocation formula (e.g. require recent participation to qualify for an equal allocation component but not for the landings history based component of the allocation (or visa versa)?*
2. *Should recent participation be applied to all potential qualifying groups designated in A.13.1?*
3. *Can any of the recent participation requirement options (including the "no requirement" options) be set aside during the next phase of the analysis?*
4. *Can an initial determination be made, or guidance be provided on criteria for determining,the level of recent participation to be required?*

Reference Materials:

Section A.13.2 of the Scoping Results Document
Analytical Team Report

A 13.3 Elements of the Allocation "Formula"

In determining the amount of initial allocation, the NRC report (1999, 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 13.1, IFQ allocation formula would have to be developed for each group.

Summary of Options from Public Information Document:

Options for Vessels/Permits		TIQC Preference
Option 1.	Auction	

Option 2.	Some mix of criteria that might include:
	• Landings history, wt (for certain species, consider allocating a portion based on an estimate of bycatch).
	• Equal sharing
	  • Equally allocate QS (represented by landings history) of those vessels/permits bought back, among those vessels/permits with landings history for the species.
	  • Equally allocate incidental catch species.
	  • Some other equal sharing basis.	

Option 3.	Landings history (wt) only (for certain species, consider allocating a portion based on an estimate of bycatch).	
NEW		

The TIQC recommended not adopting an option that would allocate based on vessel length.

Options for Buyers/Processors		TIQC Preference
Option 1.	1st receiver purchase history of groundfish trawl landings (lbs)	
Option 2.	Auction	
NEW		

Note: Processors may also receive some IFQ based on their ownership of vessels (vertical integration).

Public Comments:

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

Some Key Issues and Information:

Initial allocations determine a distribution of wealth, i.e. the windfall from the initial allocation of IFQ. The fairness and equity of that initial allocation is largely a judgement to be made by the Council, NMFS and, if challenged, the courts. Initial allocation will also affect the level of initial disruption and transition costs.

Auctions

All or a portion of the IFQ could be allocated through auction if necessary changes were made under the Magnuson-Stevens Act.

Equal Allocation

There are a variety of rationales that might be used to support equal allocation. The issue of whether and how much weight to place on any factor is primarily a fairness and equity question.

Landings History

Emphasizing landings history in the allocation formula is one means of reducing transition costs and disruption associated with the move to IFQ. This could be landings history for the permit, vessel, crew, processor, community, etc.

Of particular concern is the use of landings history data for incidental catch species, some of which have become overfished in recent years. Concerns relate to low catch levels, data quality, and rewarding fishermen with high incidental catch rates for overfished species. An alternative might be to allocate certain species based on amounts of target species taken.

To Whom Does Landings History Accrue?

For IFQ issued to permits, based on the precedent set in the limited entry fixed gear sablefish fishery, and absent Council guidance otherwise, it is presumed that landings history would 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 credited for all the landings history of the vessel, or whether vessel owners get credit for landings made only at the time they owned the vessel.

In order to allocate to processors/buyers based on the history of landings received, questions must be addressed that are similar to those for vessel owners but more extensive. The equivalent of the vessel is the processing/buying facility, however these facilities are often owned by companies which are themselves bought and sold.

Potential Council Action

1. *What allocation criteria should be included and what is the Council sense of the range of relative weights that would be appropriate to consider for different criteria?*
2. *Is there Council interest in development of options for the allocation of incidental species based on landings of target species? Based on landings of incidental species?*
3. *If vessel owners are to be considered, provide preliminary indication on whether current owner or owner at the time of landing/delivery should be considered.*
4. *If processors are to be considered provide preliminary guidance on whether options should be developed based on the landings history of a facility (with landings history accruing to the current owner of the facility) or accrue to the ownership of the facility at the time the landings were made. Some guidance might also be provided on whether landings history of a corporation (or other legal entity) would accrue to any entity that subsequently acquired ownership of the corporation.*

Reference Materials:

Section A.13.3 of the Scoping Results Document
The Analytical Team Report

A.13.4 Landings history: Species/Species Groups to be Used for Allocation

Summary of Options from Public Information Document:

		TIQC Preference
Option 1.	Allocate species IFQ based on relative total groundfish catch except whiting, but use whiting to allocate whiting IFQ.	
Option 2.	Allocate species IFQ based on relative catch of each species.	
NEW		

Public Comments: None

Some Key Issues and Information:

The following table reflects the primary tradeoffs between the options listed above:

Option 1	Option 2
a more simple allocation formula	relies on species comp data that is generally not viewed as valid at the vessel level.
an IFQ allocation result that does not match with the species mix of the recipients landings	some method 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 November 2004 Analytical Team Report.

Potential Council Action

1. *Indicate willingness (or lack thereof) to base allocation formulas on species comp information.*

Reference Materials:

Section A.13.4 of the Scoping Results Document

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A.13.5 Landings history: Allocation Period

If allocation is to be based on landings history, a period needs to be specified to determine what landings count toward landings history.

Summary of Options from Public Information Document:

Allocation Period Option	Number of Years in Allocation Period	Number of Worst Years to Drop from Landings history		TIQC Preference (INCLUDE NUMBER OF YEARS TO DROP)
		Option A	Option B	
Option 1. 1994-2003	10	None	2	
Option 2. 1994-1999	6	None	1	
Option 3. 2000-2003	4	None	None	
Option 4. 1998-2003	6	None	1	
NEW				

Consider suboptions

i. Base allocation on a calculation using total pounds summed across all years (a pound in 1994 will qualify an individual for the same amount of quota share as a pound landed in 2003).

ii. Base allocation on a calculation using the percent of total catch of each species in each year (0.005% of the landings in 1994 will qualify an individual for the same amount of quota share as 0.005% of the landings in 2003).

Public Comments: None

Some Key Issues and Information:

Information available which may enable the Council to make preliminary decisions that narrow some of the allocation period options:

- Fairness and equity considerations pertaining to alternative weighting formulas for catch history across years, based on relative fishing opportunity
- Annual total landings data indicating average of weightings among years (roughly 2:1 for a pound in 2003 vs a pound in 1994) (Section 13.5.2 of Scoping Results Document).
- See data quality information in Analytical Team Report for historic variation of landings across years.
- Reduced need for hardship provisions by allowing applicants to drop worst years from catch history (Section 13.5.2 of Scoping Results Document).
- Effect on allocations of from allowing applicants to drop worst years from catch history (vessel catch history example in Section 13.5.2 of Scoping Results Document)
- Data quality concerns and need to rely on species comp information (varies across years, see Analytical Team Report)
- Rationale for choice of start and end years of the allocation period options (Section 13.5.2 of Scoping Results Document)

Potential Council Action

Determine whether options can be narrowed on a preliminary basis using information provided.

1. *Options which do/do not allow applicants to drop worst years of catch history.*
2. *Options based or not based on equally weighting of* ***shares*** *of annual catch across years.*
3. *Options including or not including certain years in the allocation period.*

Reference Materials:

Section A.13.5 of the Scoping Results Document
Analytical Team Report

A.13.6 Landings history: Combined Permits and Other Exceptional Situations

Summary of Options from Public Information Document:

Landings history for Combined Permits		TIQC Preference
Option 1.	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.	
Option 2.	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).	
NEW		

Other categories of catch to be considered for inclusion or exclusion as part of the landings history for purpose of allocation are:

- Illegal catch - do not count toward landings history
- Catch in excess of trip limits, as authorized under an EFP - whether to count these needs to be decided
- Compensation fish (fish taken as payment by vessels assisting in research) - whether to count these needs to be decided

Public Comments: None

Some Key Issues and Information:

Potential Council Action

Reference Materials:

Section A.13.6 of the Scoping Results Document

A 13.7 Initial Issuance Appeals Process

An appeals process may be needed to address disputes between permit applicants and the NMFS Limited Entry Permits office over landings records or other qualification criteria.

Summary of Options from Public Information Document:
No specific recommendations on appeals were identified. The TIQC enforcement group recommended that any proposed revisions to fish tickets undergo review by state enforcement personnel prior to finalization of the revisions.

TIQC Preference NEW

Public Comments: None

Some Key Issues and Information:

An appeals process may be specified using general language deferring development and standards to NMFS, or more detailed guidelines may be developed, as was done for the Amendment 6 license limitation system.

The number of disputes would likely be affected by two factors:

- opportunity to gain additional quota shares by resolving disputed information in the applicant's favor
- the amount to be gained relative to the cost of the appeal.

On the one hand, this would be the first limited entry program the Council has recommended under which every additional pound of groundfish landed could potentially affect the applicant's initial allocation. On the other hand, compared with the license limitation program, sablefish endorsement program and sablefish tier program, the value of the additional IFQ gained from a successful appeal is likely to be smaller than what was at stake in one of the other programs (i.e. reaching a qualification threshold), unless there are large amounts of catch in dispute.

Potential Council Action

Provide guidance on the desired degree of specificity for Council policy on appeals.

Reference Materials:

Section A.13.7 of the Scoping Results Document

A.14.0 Some Other Possible Provisions

The following are other possible provisions that would constitute new design elements for the IFQ program. Most are grouped by the primary interests that would be affected by the provisions.

Public Comments:

Comment	Source	TIQC Preference
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 to set 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 diminishes over time (e.g. annual % reductions)	Survey (ED)	
IFQ processor shares 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 on 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.		
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		

Comment	Source	TIQC Preference
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)	
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 particiaption 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)	
NEW		
NEW		
NEW		
NEW		
NEW		

<u>Some Key Issues and Information</u>:

None.

Potential Council Action

Identify those design elements that the Council would like to see in the form of developed options.

Reference Materials:

Agendum E.6.a, Public Scoping Comments: Formal Scoping Period Comments on Dedicated Access Privileges (Individual Quotas) For the Pacific Coast Limited Entry Trawl Groundfish Fishery (on CD)

Table A-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 (OY held in reserve)
Bycatch Reporting System Comparable to Landing Tracking System	None	System Needed (electronic)	System Needed (electronic)	System Needed (electronic)	None
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 E.6.a
Attachment 5
November 2004

SCOPING RESULTS ON DEDICATED ACCESS PRIVILEGES

FOR THE

PACIFIC COAST LIMITED ENTRY TRAWL GROUNDFISH FISHERY

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384
503-820-2280
http://www.pcouncil.org

OCTOBER 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.

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 required–prohibited species)
- IFQ - Individual Fishing Quota (IQ for fishing, must be held for catch, catch may be retained or discarded at the fisher discretion but once caught it counts against the IFQ regardless of its final disposition)
- IPQ - Individual Processing Quota (IQ for processing, currently prohibited)

- QS - Quota Shares (IQ held as percent of total quota allocated to an individual)
- Quota Pounds - Annual Individual Quota (IQ held as pounds allocated annually based on the quota share held)

1.0 INTRODUCTION

1.1 Process and Organization of this Document

Overview

The policy consideration that is the subject of this scoping process is

> the possible creation of a dedicated access privilege system for the Pacific Coast groundfish limited entry trawl fishery

Dedicated access privileges (DAP) 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." One type of dedicated access privilege with which many people are familiar is individual fishing quotas (IFQs). The primary type of dedicated access privilege proposed thus far is IFQs.

The formal NEPA public scoping period on whether to institute an IFQ program for West Coast, trawl caught groundfish 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 formal NEPA scoping process
- summaries by topic of public comments received through the September 2004 Council meeting
- some initial analysis of IFQ design elements in Appendix A.

Two Decision Stages

If a dedicated access privilege program is to be recommended and implemented, the Council will need to deal with two main issues: first, the design of the program; second, the establishment of allocations of groundfish between the limited entry trawl and other groundfish sectors. Intersector allocation is needed not only to support possible adoption of an IFQ program for the trawl fishery but for the management tools that will be implemented for all other sectors in order to fully implement the preferred alternatives adopted under the programmatic bycatch EIS. The preferred alternatives require consideration of sectors' catch accountability through management tools such as sector caps or IFQs. These two issues (management tools for the trawl fishery and intersector allocation) will be addressed in separate but related EISs.

The scoping process just completed addressed program design issues that will be covered in the DAP EIS. There will be a separate scoping process to address the between sector allocation EIS.

Public scoping for an EIS on the allocation issue is scheduled to begin after a decision has been made on alternatives that will be considered in the draft DAP EIS. While alternative DAP programs are being designed, the Council's allocation committee will engage in some initial discussions on the need for intersector allocations to support a DAP program. Preliminary comments on the between sector allocation issue may be sent to the Council office or e-mailed to pfmc.comments@noaa.gov (enter "Intersector Groundfish Allocation" in the subject line).

Organization of This Document

Dedicated access privileges are being proposed to address the problem statement, goals, and objectives presented in Section 1.2. Alternatives currently being considered are provided in Section 2.0 and those detailed design elements thus far identified for an IFQ program are provided in Appendix A. Recommendations and comments from the public, Trawl Individual Quota Committee, TIQ Independent Experts Panel and TIQ Enforcement Group are summarized and provided in the relevant sections of Chapters 1 and 2 and Appendix A. Public comments pertaining to alternatives and impacts have also been recorded, summarized, and presented separately (November 2004, Exhibit C.6.e, Attachment 6 - Public Scoping Comments).

1.2 Purpose and Need for the Proposed Action

1.2.1 The Proposed Action

The proposed alternatives to the status quo 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 two-month period to a quota system where each quota share could be harvested at any time during an open season. 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.

Public comments:

Include recreational fisheries and allow cross sector transfers. A hard allocation guaranteeing catch for one sector is unfair.	UASC

1.2.2 Statement of Need

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. After reviewing the 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 are amendments to the Fishery Management Plan (FMP) and associated regulations that 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 levels so low that they 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-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: 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-term and long-term), increasing management efficiency, and responding to community concern.

1.2.3 Purpose of the Proposed Action

The purpose of the proposed action is to resolve or ameliorate problems in the fishery related to the current access system by addressing the following goals and objectives.

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.

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.

Design features of the IFQ alternative should be related to these objectives (NRC, 1999, pg 197).

In considering modification to the current rules for access to the fishery and harvest from the fishery, the goals and objectives for the groundfish fishery management plan and the Magnuson-Stevens Act national standards will be considered.

1.3 Background

Council consideration of limited entry programs, such as license limitation and IFQs, has been in response to significant over capacity problems in the harvesting sector of the groundfish fishery. IFQ programs have been under Council discussion since before the 1987 inception of the limited entry committee that designed the West Coast groundfish license limitation program. When the Council adopted the groundfish license limitation program in 1991, it acknowledged that additional capacity control measures would be required. It was anticipated that the license limitation program would limit the growth of harvesting capacity but would not resolve the overcapacity problem. The Council's first effort to develop an IQ program was for the fixed gear sablefish fishery. This effort was cut short in 1996 by a Congressional moratorium on new IQ programs. The groundfish fishery was declared a disaster in the year 2000. The groundfish strategic plan, adopted in October 2000, listed reduction of harvesting capacity as one of its main goals. Given the moratorium on IQs, the plan included 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 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 then activity was suspended while the permit buyback program was developed and other Council workload priorities were addressed. The moratorium on IQ programs expired October 1, 2002, and the buyback program was completed in December of 2003.

The Pacific Groundfish Limited Entry Trawl Buyback Program was designed with the following goals:

- Reduce capacity in the groundfish fishery.
- Increase the remaining harvesters' productivity.
- Financially stabilize the fishery.
- Conserve and manage groundfish.

On December 4, 2003, under the buyback program, 91 trawl vessels and their Pacific Groundfish limited entry trawl permits were permanently retired from the fishery. The buyback program reduced the available pool of limited entry permits for vessels that deliver to shore plants and motherships from 263 permits to 172 permits, excluding the ten permits associated with the catcher-processor fleet. In terms of 2002 groundfish ex-vessel revenues, buyback program vessels accounted for 40% of the $32 million landed by all groundfish trawlers, either on shore or delivered to non-tribal motherships. The buyback program was funded by a $10 million appropriation and a $36 million buyback loan (approved in an industry referendum). This loan will be repaid by members of the participating fleets through landings fees to be collected the next 30 years.

A major concern after completion of the buyback program was that relatively unused permits (latent permits) would be acquired by those who sold their permit under the program and would then be used at higher levels of effort. The Council decided not to take action to address concerns about permit latency. In reaching its decision the Council noted the degree of permit latency in the Pacific Coast program was not as substantial as in other limited entry systems that had been subject to buyback programs. The Council found no need to take remedial action given the relatively low degree of long term latency represented by currently unfished permits and the low level of concern among those bearing the responsibility for repaying the industry loan that largely funded the buyback program. Further, it was stated that moving forward with the IFQ project was a better solution to the issues of overcapacity in the fleet. Such an IFQ program would obviate the need to address any remaining concerns with latent permit issues.

1/ Mandatory permit stacking reduces capacity in the fishery by requiring permit holders to acquire an additional permit to continue fishing.

At its September 2003 meeting, the Council chair was authorized to appoint the TIQC. This committee met October 28 and 29 and began developing an IFQ alternative for consideration. At its November 2003, meeting the Council heard testimony that individual quotas (IQs) 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 acted to:

- Recommend November 6, 2003 be published as a control date for IFQ and individual processing quota (IPQ) programs (Appendix E).
- Identify that additional resources would be required for consideration of a trawl IQ program.
- Task the staff with preparing a detailed draft plan for IQ program development, identifying the necessary budget, and pursuing funding options.

NMFS did not publish the IPQ control date, because of restrictions on consideration of individual processing quota programs. Another meeting of the TIQC was held on March 18-19, 2004 to continue with initial scoping options for an IFQ alternative. A notice of intent to develop an EIS and formally initiate scoping was published in the *Federal Register* on May 24, 2004 (Appendix F). A trawl individual quota enforcement group meeting was held May 25-26 to scope enforcement issues related to IFQs, and a TIQ Analytical Team meeting was held June 8-9 to scope analytical issues.

2.0 ALTERNATIVES AND IMPACTS

2.1 Description of the Alternatives

The policy that is the subject of this scoping process is the possible creation of a dedicated access privilege system for the Pacific Coast groundfish limited entry trawl fishery.

The primary type of dedicated access privilege proposed thus far is IFQs. Specification of an IFQ or other alternatives for the groundfish trawl fishery requires answering three main questions:

1 What would be the specific design elements of the IFQ system and other possible management tools?
2. Which species and species groups would be managed with which types of management tools?
3. What would be the initial intersector allocations of nonwhiting species between whiting and nonwhiting sectors?

For an IFQ program there may also be a limited-entry-trawl/open-access allocation issue that arises if the groundfish catch of trawl vessels with open access gear (e.g. pink shrimp) is not covered by the IFQ program. If an option is chosen which would affect the open access fleet, the allocation itself would be addressed in the allocation EIS (see Section 1.1, Two Decision Stages).

2.1.1 Alternative Harvest Control Tools

There are a number of management tools that may be applied to controlling harvest in the trawl fishery. Potentially, different tools could be applied to different species and areas. The Council will need to make decisions on design elements for the alternative management tools. Design of the IFQ program alternatives will likely require the most attention. The decision on which tools to apply to which species is treated in Section 2.1.2.

Four main alternatives for controlling total harvest were included in the scoping information document. After the Council reviewed public comment at the September 2004 Council meeting, the Council added a fifth alternative: permit stacking with extended cumulative limit periods. Under each alternative, tools such as rockfish conservation areas might or might not remain in place to further control the harvest rates of particular species.

Status Quo Management: cumulative landing limits and season closures are the primary tools.

Trawl Individual Quotas: IFQs and individual bycatch quotas (IBQs). IBQs is the term applied to individual quota used to control the catch of prohibited species. A list of possible types of design elements that may be considered for an IFQ program is provided in this section. Discussion of the design elements and initial recommendations from some Council committees are provided in Appendix A along with a summary of public comment.

Cumulative Catch Limits: Cumulative catch limits apply to the vessel and are like cumulative landing limits, except they would apply to catch rather than landings. When the cumulative catch limit is reached, a vessel would have to cease operations in segments of the fishery where a particular species is caught. Cumulative catch limits might or might not be temporarily transferable between vessels within the designated period to which they apply.

Incidental Catch Allowances: Incidental catch allowances are sector catch caps. They apply to a segment of the fleet and when that segment of the fleet reaches its catch cap for a species the segment would have to stop fishing. Cumulative limits might still be used to control harvest rates.

Permit Stacking and Extended Cumulative Limit Periods: Vessels stacking permits would be allowed some portion of an additional cumulative limit for each permit stacked. If a full cumulative limit were allowed as permits are stacked then the amount of fish that could be taken under each cumulative limit could decline. If partial cumulative limits were allowed for stacked permits then the stacking of permits might not change the basic cumulative limit available to vessels that do not stack permits. The second part of this proposal would extend the duration of the cumulative limit period from the current duration of 2 months to a duration of 3, 4, 6 or 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 took its limit catch targets would be exceeded, the fishery would be managed as a derby.

Public comments on other management tools that should be considered:

Community Development Quotas (CDQs)	CJC, POORT, ED, Survey (ED)
CDQs Opposed	Individual (1)
Individual Processor Quotas	
IPQs Opposed	Individual (1)
Trip Landing 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)

Status Quo Management

Status quo for management measures for the trawl fishery is generally characterized by cumulative landing limits and season management for Pacific whiting. With adoption of the programmatic bycatch EIS, the status quo system should probably be considered to include some follow-on actions. For example, an upgrade of the observer program produce inseason catch data on overfished species.

OYs are also part of the status quo management. The 2003 fishery provides a baseline against which both status quo and the alternatives can be measured.

Cumulative Landing Limits (Cumulative Limits)

Cumulative limits are a kind of trip limit. Trip limits have been a feature of groundfish management since the inception of the FMP; 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[2/]) an individual vessel may land during a fixed time period. Thus 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 owner does not retain more fish than the limit, additional fishing is allowed. Originally, these limits were per trip limits; today the limits are for a two-month cumulative limit period, in order to reduce the likelihood of regulatory discards. Vessels are allowed to make as many individual trips as the fisherman desires. So long as cumulative landing limits are not exceeded additional fishing is allowed. 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. Iin fact, this is one of the key objectives expressed in the groundfish FMP because buyers and processors regard a continuous and consistent supply of fish as essential to maintaining markets. In the last two years managing fisheries to prevent OYs from being exceeded before the end of the year has become increasingly difficult because of the low harvest limits for some overfished species, and some fisheries have been closed early.

Only one groundfish trawl fishery is 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. The OY is allocated according to fixed percentages between vessels delivering to shore-based processors, at sea motherships, at-sea catcher/processor, and the tribal fleet. 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 the sector has been caught. Before and after the season openings there is some opportunity to retain whiting under a 10,000 pound cumulative landing limit.

Other Measures

There are a number of other status quo management measures for the trawl and other fisheries including closed areas, partial observer coverage, management areas, bycatch caps in EFP fisheries, gear restrictions, VMS, and sorting requirements. A complete list, generated in consultation with the GMT, is provided in Table 1 of the November 2004 Analytical Team Report.

Trawl Individual Quota Management (IFQ and IBQ)

Under IFQs, total harvest is controlled by allocating an amount of quota to individual fishers and holding those individuals responsible for ensuring that their catch does not exceed the amount they are allocated. The Magnuson-Stevens Act defines IFQs as "a Federal permit under a limited access

2/ Many less commercially important or less frequently caught species are combined in stock complexes for the purposes of management. These species may not be differentiated in reported landings and most have not been assessed. These factors make it impossible to manage these species individually. Multi-species complexes currently in use include the minor rockfish (additionally separated into several sub-categories), other flatfish, and other fish categories.

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 catch of others. In contrast, with cumulative limits or season closures, increased participation by other fishers can cause reduction in the cumulative limits or reduction in the season length. Typically IFQs also allow the fishers great flexibility in determining the time and area of catch, and, where IFQs are transferable, the scale of their harvest operation.

The term IFQ applies to fish that may be retained or discarded by a fisherman while IBQ is reserved for fish that must be discarded (prohibited species).

IFQs may be used to control catch or landings. Consistent with the programmatic bycatch EIS, a central design element of the IFQ program alternative being considered here is that it applies to catch rather than landings. The following is a list of other IFQ program design elements covered in Appendix A. The list is based on preliminary work of the TIQC. Additions to the list may be made as a result of public comment and the comments of other Council advisory bodies.

- Portion of the Limited Entry Trawl Fleet Allocation for Which IFQs are Required
- Area Restrictions on IFQ
- IFQ and Limited Entry Permit Holding Requirements
- Transfer Rules
  - Transfer of IFQ to a Different Sector for Use
  - Eligible Owners/Holders (Who May Own/Hold)
  - Leasing - Duration of Transfer
  - Time of Sale
  - Divisibility
  - Liens
  - Accumulation Limits
  - Vertical Integration Limit
- Rollover to a Following Year
- Use-or-Lose Provisions
- Entry Level Opportunities
- Tracking IFQ, Monitoring Landings, and Enforcement
- Cost Recovery/Sharing and Rent Extraction
- Penalties
- Procedures for Program Performance Monitoring, Review and Revision (Magnuson-Stevens Act (d)(5)(A))
- Data Collection
- Initial IFQ Allocation
  - Qualifying Criteria: Membership in an Eligible Group
  - Qualifying Criteria: Recent Participation
  - Allocation "Formula" (Size of Individual Allocations)
  - Landings history: Species/Species Groups to Be Used for Allocation
  - Landings history: Allocation Periods
  - Landings history: Combined Permits and Other Exceptional Situations
  - Initial Issuance Appeals Process

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). The term "alternative" is being reserved for reference to an IFQ program constructed of a set of design elements (e.g. a program composed of a five percent ownership cap, a ten percent rollover provision, a 1999-2003 qualifying period, etc.) Preliminary TIQC recommendations on design options are included as part of Appendix A and public comment is sought on additional design options for consideration.

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) would not count toward an initial allocation of IFQ. To this end, a control data of November 6, 2003 has been published (Appendix E).

Another issue that comes up when IFQs are discussed is whether or not the IFQ 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 and allowing catch taken under the management rules to be converted to private property sometime between when it is caught and 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 might be considered private property. IFQs are an alternative way for the government to control and organize harvest activity. They do so by creating a catch privilege. A catch privilege is different from ownership of the resource. The Magnuson-Stevens Act contains specific language pertaining to the limits to 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.

Cumulative Catch Limits

Vessel catch caps were part of Alternative 4 of the programmatic bycatch EIS and were adopted for consideration as part of the Council's final action on the programmatic EIS. Cumulative catch limits apply to catch rather than landings and require 100% accounting of catch. Under vessel catch limits a vessel would stop harvesting when the limit is reached. Under the current trip limit system, vessels continue to harvest but discard fish taken in excess of the limit. These cumulative catch limits might be specified as temporarily transferable between vessels but could 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).

Under the programmatic bycatch EIS, vessel cumulative catch limits were to be applied only to control harvest taken under sector catch caps and sector catch caps would be developed for overfished species. It was anticipated that observers or other at-sea monitoring systems would be required to ensure compliance with catch limits. This EIS includes consideration of cumulative catch limits for overfished as well as other groundfish species when taken by trawl gear.

Thus far, only a few design elements have been identified for consideration with respect to cumulative catch limits:

Cumulative Catch Limit Design Elements	Options
Vessel Caps	Consider time periods other than the current 2-month cumulative limit periods use for cumulative vessel landing limits.
Tracking and Monitoring	
At-Sea	Option 1: At-sea Compliance Monitors (100%) Option 2: Full retention and Video Camera
Shoreside	Option 1: Spot enforcement presence and Audits Option 2: Shoreside Compliance Monitors (100%)
Data Reporting	Upgrade reporting of at-sea catch data 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

Additional design elements are provided in comments from public scoping:

! 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
Sector Bycatch Caps - Nontransferable	PMCC
Sector Bycatch Caps - Transferable	ED

The last two comments on transferable sector "bycatch" caps may be intended to reference vessel cumulative limits for incidentally caught overfished species (as opposed to bycatch as specified under the Magnuson Stevens Act[3/]).

Pooled Species Caps (Sector Catch Caps or ICAs)

Various names have been applied to the sector catch caps of the type identified in the programmatic bycatch EIS, including pooled species caps and incidental catch allowances (ICAs). All are sector level catch limits and are not allocated to individual vessels. Sector caps differ from status quo sector level landings quotas in that they apply to catch rather than landings. Sector caps would generally be used for incidental species rather than targeted catch, though could be applied for any species. A sector may be kept within its cap by application of season closures, cumulative limits or other mechanisms to slow or stop the fishery. If a sector reaches its cap, all mortality caused by that sector must be halted, usually achieved through a season closure. Fish taken under a sector cap may be retained or discarded, unless full retention rules are in place, or the cap is provided for a prohibited species (in which case discard would be mandatory). Catch caps for prohibited species are often termed prohibited species caps (PSC).

Sector Catch Cap Design Elements	Options
Tracking and Monitoring At-Sea	Stratified, partial observer coverage
Data Reporting	Upgraded inseason catch monitoring and verification program to ensure limits are not exceeded.

Public comments:

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

These comments are likely using the term bycatch to refer to incidental catch rather than only to discards (bycatch as defined under the M-S Act[3/]).

3/ Magnuson Stevens Act definition of bycatch: "The term 'bycatch' means fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

Permit Stacking and Extended Trip Limit Periods

Permit Stacking

A permit stacking program for the limited entry sectors of the groundfish fishery would allow a vessel to land more than the monthly or bimonthly trip limit by assigning and using two or more permits on the same vessel. This voluntary program would allow permit holders who can acquire another permit, or permit holders who already own multiple permits, to acquire fishing opportunity that more closely matches their desired level of operation. This plan would reduce the number of vessels operating with "A" permits and would allow higher trip limits for some vessels.

In 2002, the Council's Trawl Permit Stacking Committee identified four major approaches to determining the size of the stacked trip limit, two of which consider a permit's size endorsement and two of which do not. The options are briefly described as follows.

Option	
1A	Whole Trip Limit for Additional Permits. In this approach, a vessel would need one permit endorsed for the size of the vessel. Additional permits could be for any size vessel. Each additional permit would allow a vessel to harvest an additional whole trip limit. This approach is simple, but with substantial participation would lead to reductions in per-permit limits.
1B	Fixed Fractional Trip Limit for Additional Permits. This option is a variation on Option 1A. A permit of any length could be stacked with a suitable primary permit, but a single stacked permit would not carry a full additional limit. The percentage of an additional limit provided would be invariant with permit length, but could conceivably be expressed as a function of a variable, such as groundfish abundance, that would vary over time.
2	Same Size Requirement. Another approach is to require that all stacked permits be endorsed for the size of the vessel on which they are used. From a regulatory standpoint, this approach 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. A full additional limit would be provided for each stacked permit, but with substantial participation per-permit limits would decline.
3	Additional Fractional Trip Limit Linked to Size Endorsement or Fishing Power Points of Stacked Permit. This approach would establish a formula that links the magnitude of additional landing limits to the size endorsement of the permits that are stacked. Additional permits could be for any size vessel. Thus, a vessel could operate with fractional limits depending on the size endorsements of the stacked permits. This approach would give vessel operators greater flexibility to obtain a desired level of monthly landings.

The most apparent means of implementing a length-based program 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 for determining the percentage of a full limit that would be obtained through stacking. The approach for analyzing impacts that could most easily be accomplished (referred to hereafter as Option 3A) would involve 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 would be determined by the ratio of points for that permit to the 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.

Percentage of permit combination "points", for selected lengths, relative to four reference lengths.					
Permit Length	Market "Points"	Percentage of "points" relative to a permit of:			
		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%

The other approach (referred to hereafter as Option 3B) would set the reference length equal to the length of the primary permit attached to each vessel. As a result, a particular permit could have considerably different value for stacking, depending on the size of the primary permit. As illustrated in the following table, a 45-foot permit stacked with a 60-foot primary permit would yield about half an additional limit, while only 28% of a full limit when stacked with a 75-foot primary permit. Another aspect to note relates to the highlighted values in the last two columns. Two individuals could own identical pairs of permits--one 65-foot, and the other 75-foot--worth precisely the same dollar value in the market, and yet the person with the shorter primary permit--whose vessel might be less than five-feet shorter--would be entitled to two full limits, whereas the other would only receive 1.7 limits. Because of the situationally-dependent value of a permit with this option and our current inability to realistically model the economic factors that underlie the stacking decision-making process, the effects of this option would be extremely difficult to project.

Percentage of an additional limit received, under Option 3B, where the length of the primary permit serves as the reference length.				
Length of Primary permit (relative reference point)	Percentage of an additional full limit received through stacking a permit of length:			
	45 ft.	55 ft.	65 ft.	75 ft.
60 ft.	49%	80%	100%	100%
65 ft.	40%	66%	100%	100%
70 ft.	33%	55%	83%	100%
75 ft.	28%	46%	70%	100%

In evaluating options, the following are some of the key trade-offs to be considered.

Key Trade-off 1: When a permit is stacked, if the harvest of a species or species group taken under the permit is greater than the harvest of the species or species group taken under the permit prior to when it was stacked, the cumulative limit for that species or species group would need to be reduced in order to keep the fleet within the annual harvest (within the OY).

Key Trade-off 2: If permits are allowed to move between segments of the groundfish fishery, there will be a greater likelihood that per-permit cumulative limits would have to be reduced in the segments to which permits are moved.

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 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 provide 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.

Extended Trip Limit Period

The current trip limits are for two month periods. The limit periods might be extended to 3, 4, 6, or 12 month period. As the length of the management periods are extended, opportunity for inseason actions effective at the start of the subsequent cumulative limit period is reduced, and the potential need for mid period correction could lead to more derby type fishing. In the extreme, with a 12 month period, cumulative limits would either have to be set such that they represent vessel quotas, or set 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 close through inseason action.

2.1.2 Choice of Species to Which Harvest Control Measures Will Apply

The overriding question before the Council is how to best control total catch, including bycatch, of the limited entry trawl fleet. Under status quo management, access to the trawl fishery is controlled under a license limitation system and total harvest in the fishery is controlled predominantly using cumulative limit management. IFQs, a kind of direct access privilege, have been proposed as an alternative means for controlling access and managing harvest. Sector caps and cumulative catch limits are other tools being discussed to be applied in concert or in place of IFQs (see Section 2.1.1).

Different management tools may be used for different species. Different combinations of management measures and species are used to structure alternatives. To stimulate discussion and bring issues into focus, the TIQC constructed a number of initial alternatives for public consideration during the scoping process. The following are the guidelines under which the specific alternative mixes of harvest measures were constructed.

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 Only for Primary Trawl Targets). IFQ for groundfish species that are primarily trawl targets with minimal harvest by other sectors (whiting split by sector, DTS, slope rockfish, nearshore flatfish) and target species for which there is already trawl allocation, i.e. sablefish. Transferable cumulative catch limit management or monitoring only for all other groundfish, and status quo prohibited species management.

Alternative 3 (IFQ for OY Species). IFQ for all groundfish species with an OY (with separate types of IFQ for each of the whiting sectors). Transferable cumulative catch limit management or monitoring only for non-OY species, and status quo prohibited species management.

Alternative 4 (IFQ for All Groundfish and IBQ for Selected Prohibited Species) 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 or quotas. IBQ for halibut and possibly other prohibited species.

Table 2.1-1 lists the species and species groups for which the Council currently sets OYs and controls harvest. Each column in the table specifies an alternative by indicating the management approach that would be used for the species listed in the rows, based on the above guidelines. There is more than one row for species or species groups for which area management has been established or for which there is a division of harvest among trawl sectors (Pacific whiting). *At some future point, the Council may wish to specify IFQ types which distinguish between fish delivered for at-sea and shoreside processing*, regardless of whether the processing takes place in the context of the whiting or some other groundfish fishery *(fish dressed and iced at-sea would not be considered processed at-sea and fish frozen at-sea would be considered processed at-sea).*

TIQC recommendations for additional options for the management systems under these alternatives are provided in Table 2.1-2. Some of these details include

- when OYs are set very low due to rebuilding schedules, a provision to switch the management measures to sector caps with catch rates controlled by nontransferable cumulative catch limits (Alternative 2 and 3).
- use of sector caps for bycatch species in the whiting fishery under Alternative 2.
- limits on the transfer of IFQ between whiting and nonwhiting sectors, and among the three whiting sectors (Alternatives 2, 3, and 4).
- allow retention of prohibited species landed with trawl IBQ (i.e. convert the IBQ for prohibited species to IFQ).

Rationale for TIQC recommendations: 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 under an alternative in which not all species would be managed with IFQs. 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 discards.

Vessel cumulative catch limits could lead to difficult situations for some vessels, therefore consideration of transferable cumulative catch limits is recommended. Concern was expressed for the effect of “disaster tows” on the individual. Cumulative catch limits would likely be based on incidental catch rates, derived from averages that reflect 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 that are unlucky enough to experience a high bycatch tow for a species for which there is a low limit could be forced to stop fishing (under the current landing limits system the vessel discards catch in excess of limits and continues to fish). Transferability of catch opportunity (cumulative catch limits) might allow the vessel to be able to continue fishing while still limiting fleet catch to the desired level.

The potential for a disaster tow also led to consideration of management with sector caps. The effects of disaster tows may also be of major concern for a whiting fishery in which incidental harvest is managed with IFQs and for situations where the OYs for IFQ species would be very low, such as for an overfished species. In both cases the concern is that a vessel may have a disaster tow and be forced to stop fishing or bear a substantial financial burden, as no other vessel would be very willing to sell IFQ until it was sure it would be able to take all of its target species without encountering a disaster tow of its own. As a possible means of addressing this concern, the TIQC recommended inclusion of an option under which some species would not be managed with IFQs but would be pooled and managed as a sector cap for the fleet as a whole.

Public comments:

Bycatch caps for overfished species	ED, PMCC
IFQ for All species	WCSPA

2.1.3 Within Trawl Sector Allocation (Excluding Initial IFQ Allocation)

Allocation Between and Among Whiting and Nonwhiting Sectors

The types of IFQ may distinguish between fish subject to processing at-sea and fish delivered for shoreside processing. In the whiting fishery, incidental catch species may be managed differently from the nonwhiting fishery (managed with sector caps instead of IFQs). In either case, an allocation between whiting and nonwhiting sectors and among the whiting sectors may need to be addressed. Thus far, one approach for allocating between sectors has been suggested:

> One of the principles on which the following allocation approach is based is to not reward individuals or sectors that have historically had higher incidental catch rates than other individuals or sectors.

1. Establish an incidental catch rate for the whiting fishery as a whole. This rate would be established by determining the incidental rate for each year of the allocation period, and then determining the average of the annual incidental rates. Annual incidental rates would be calculated by summing the estimated catch of incidental species for all whiting sectors and dividing by the sum of whiting catch for all whiting sectors.

2. To establish the whiting fishery allocation of a nonoverfished incidental species in any particular year, multiply the incidental rate from Step 1 by the nontribal directed whiting sector OY. For overfished species a set-aside would be determined by the Council.

3. Allocate the incidental catch species among the three whiting sectors (catcher processors, vessels delivering to motherships and vessels delivering shoreside) based on the formula used to allocate whiting between these sectors (i.e. shoreside 34%, catcherprocessor 42%, motherships 24%).

A policy call will need to be made as to whether to use only landings/deliveries or to include estimated discarded catch for the purpose of allocation. Some additional allocation decisions may be needed with respect to crediting sectors with landings history accounted for by permits removed by the buyback program.

Trawl Allocation Taken By Trawl Vessels Using Open Access Gears

Current Allocation Accounting Rules

Under the current license limitation program, all groundfish taken by vessels with limited entry permits count against the limited entry groundfish quota, regardless of the gear used. Limited entry vessels may use open access gears in fisheries that target groundfish or harvest groundfish incidental to the harvest of nongroundfish species. For example, directed groundfish catch by limited entry vessels using longline and fishpot gear under open access regulations counts against the limited entry allocation. Additionally, if a vessel with a limited entry trawl permit participates in nongroundfish fisheries, such as pink shrimp or California halibut, and lands groundfish as incidental catch, the landed incidental groundfish catch counts against the limited entry allocation.

Provisions with Possible Impacts on Open Access Sector

The coverage of the IFQ program needs to be reconciled with the current allocation accounting rules (see Section A.1.0 of the appendix). This allocation issue primarily affects the trawl sector but some options that would address this issue may affect the open access fishery. In specifying the scope of the IFQ program, the Council may decide to consider the separation, and possible reallocation to the open access sector, of the portion of the limited entry allocation typically taken by limited entry trawl vessels using open access gears. Such consideration will be needed if the scope of the IFQ program does not include catch by limited entry trawl vessels using directed or incidental open access gears (such catch is currently counted against the limited entry gear allocation).

Two issues affecting the open access fishery may be involved.

> The first issue is whether or not to change the catch accounting rules and make a reallocation between the limited entry trawl and open access fishery. This issue would be addressed as part of this EIS. Additional committee level work on the issue and recommendations to the Council will be developed by the Allocation Committee.
>
> The second issue concerns the amount that would be reallocated. This issue would also be handled by the Allocation Committee but would be addressed as part of the second step of this process and analyzed in the allocation EIS (see Section 1.1, "Two Decision Stages").

2.2 Types of Environmental Impacts for Consideration

One purpose of the public scoping process is to solicit comment on environmental impacts that should be considered. Comments may be aimed at adding to the list or suggesting possible mechanisms of impact that should be evaluated. The following categories of impacts have thus far been identified.

2.2.1 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.
Environmental impacts due to economic, community, and resource management changes.

2.2.2 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.

2.2.3 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

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 2003 and 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) b/	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 c/	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 (INITIAL/ 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)			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	na	CLgrp	IFQ	IFQ	IFQ			
Petrale Sole	2,762	na	CL	IFQ	IFQ	IFQ			
Arrowtooth Flounder	5,800	na	CL	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Other Flatfish	7,700	na	CLgrp	IFQ	IFQ	IFQ	SecCap	SecCap	IFQ
Other Fish	14,700	na	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 = no retention every allowed in the groundfish fishery.
No Lim = harvest monitoring only, other limits have not been necessary to control harvest.

NOTE1: Substantial dog shark are caught in the whiting fishery (2,269 mt in the at-sea portion from 1992-2002)
NOTE2: 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.
NOTE3: TIQC has not reviewed management options for prohibited species under Alternative 4.

Table 2.1-2. Management alternatives recommended for consideration by the TIQC (page of 2).			
	Species Groups to Which Tool Applies and Transfer Rules between Whiting and NonWhiting Fishery		
Management Tools to Be Applied	**Alt 2**	**Alt 3**	**Alt 4**
NonWhiting Fishery			
IFQ	Target Species and Species for Which There is a Trawl Allocation	OY Species (except as noted under sector caps)	All Groundfish Species
Cumulative catch limit • Transferable cumulative catch limit between vessels *within period*. • Trawl share based on biennial Council decision. • Any transfers between vessels are temporary.	Most Other Species with OYs (during initial allocation calculate an IFQ so it would be available for future use)	Species without OYs (non-IFQ species) (same as Alt 2)	Not Applicable
Monitoring Only	Species managed with monitoring only under status quo.	Same as Alt 2	Same as Alt 2
Sector Caps (Collective cap). Managed as a pool. When pool is exhausted fishery shuts down. 100% mortality accounting. Retention allowances may vary based on annual management measure decisions. Harvest rate control measures: • Cumulative catch limit (nontransferable), when a vessel reaches its limit that vessel's operations shut down. • Sector/area caps, when sector reaches cap it shuts down. Other measures to keep bycatch rates low may stay in place (e.g. RCAs).	non-IFQ Species with Extremely Low OYs (such as rebuilding species) (establish a threshold at which point a species would switch from incidental catch management to "Low OY" management) (during initial allocation, calculate an IFQ so it's available for future use)	Species with Extremely Low OYs (rebuilding species)	Not Applicable
Nongroundfish Species: Pacific halibut, salmon crab. (prohibited under status quo management)	Prohibited	Prohibited	IBQ for some (Suboption: Allow retention of IBQ when taken by gear legal for the prohibited species)
(Alt 1 = status quo, primarily cumulative landing limits)			

Table 2.1-2. Management alternatives recommended for consideration by the TIQC (page of 2).			
	Species Groups to Which Tool Applies and Transfer Rules between Whiting and NonWhiting Fishery		
Management Tools to Be Applied	**Alt 2**	**Alt 3**	**Alt 4**
Whiting Fishery			
IFQ	Target Species (Whiting)	Target Species and Incidental Catch Species with OYs	Target Species and Incidental Catch
Sector Caps: collective catch cap managed as a pool. When pool is exhausted sector shuts down. 100% mortality accounting.	Incidental Catch of Other OY Species (NonWhiting Groundfish)	Not applicable, however, individuals could form a co-op and pool their IFQ.	Not applicable, however, individuals could form a co-op and pool their IFQ.
Monitoring Only	Species managed with monitoring only under status quo.	Same as Alt 2	Same as Alt 2
Whiting Nonwhiting Transfer Rules			
Whiting-Nonwhiting Access Privilege Transfer Rules	Roll-over any unused incidental catch from one whiting sector to the next as the year progresses. Allow one sector to buy from another sector's pool (requires establishing a co-op). Allow purchase of IFQ from nonwhiting vessels. Such IFQ would be placed in the pool for whiting vessels.	Do not allow transfer of nonwhiting IFQ between whiting and nonwhiting sectors.	Allow transfer of nonwhiting IFQ between whiting and nonwhiting sectors.
Under Alternatives 3 and 4, allocate incidental catch equally among vessels, see Section A.13. (Alt 1 = status quo, primarily season management)			

APPENDIX A: IFQ PROGRAM ELEMENTS AND ANALYSIS

Appendix A: IFQ Program Elements and Analysis

This appendix describes potential design elements and related options for a trawl IFQ program. These options will be grouped into program alternatives for the main analysis of the EIS (see Section 2.1.1). The EIS impact analysis will draw on the options and specific analysis of this appendix. As the initial recommendations of TIQ advisory groups have been reviewed and incorporated into this document, questions have been identified as to exactly 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 initial recommendations that were 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."

A.1.0 Portion of the LE Trawl Fleet Allocation for Which IFQs are Required

A.1.1 Discussion and Options

Under the allocation accounting system of the 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 harvest groundfish incidental to the harvest of nongroundfish species. For example, 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 nongroundfish 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 coverage of the IFQ program needs to be reconciled with the current allocation accounting rules. If the current accounting rules are used and the IFQ program is to cover all of the LE trawl vessel allocation, LE trawl vessels making groundfish landings in nongroundfish fisheries would have to make those landings in compliance with tracking and monitoring rules for the IFQ program. As a mitigation measure, the possibility might be explored for having somewhat different tracking and monitoring rules when a vessel is using an open access gear. In considering this possibility, the effect on opportunities for noncompliance would have to be taken into account.

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, options might be considered that would not require IFQs when LE trawl vessels use open access gears. Subdividing the trawl allocation brings up issues of how to divide the allocation, the need to modify the catch accounting system to track progress toward taking the allocation, difficulties in managing what may be very small quotas and management responses when such non-IFQ LE trawl quotas are approached by the LE trawl fleet participating in directed or incidental open access fisheries. Options include subdividing the trawl allocation and/or changing the LE catch accounting system. In the following table, Option 2 provides a set of logically complete approaches outlined for a system in which IFQ is not required for groundfish catch by LE trawl vessels using open access gears. To date, no one has advocated Option 2, SubOption B. Changing the accounting system for LE trawl vessels would also bring up the issue of considering such a change for LE fixed gear vessels and treatment of vessels with LE permits for both trawl and fixed gears.

IFQ Program Scope - Option 1: Require IFQ for all Catch by LE Trawl Vessels. Require LE Trawl vessels to make landings in compliance with IFQ tracking and monitoring rules, even when using nontrawl open access gears (examples of directed and incidental gears that may take groundfish include longline, fishpot, shrimp trawl, California halibut trawl, and crab pots).	
SubOption A	Require that landings be made in compliance with open access fishery cumulative limit and other harvest regulations.
SubOption B	Allow landings in excess of open access fishery cumulative limits, so long as landings are completely covered by IFQ.
IFQ Program Scope - Option 2: Require IFQ Only for Groundfish Trawl Catch by LE Trawl Vessels	
SubOption A	• Split the trawl allocation between IFQ and non-IFQ harvest • Manage groundfish harvest by trawl vessels using open access gears to stay within the suballocation.
SubOption B	• Maintain the same LE allocation • Change the accounting system such that catch by LE trawl vessels using open access gears counts against the open access allocation. • Determine whether or not to make similar changes with respect to LE longline and fishpot vessels.
SubOption C	• Reallocate a portion of the LE allocation • Change the accounting system such that catch by LE trawl vessels using open access gears counts against the open access allocation. • Determine whether or not to make similar changes with respect to LE longline and fishpot vessels.

TIQC Recommendations: Option 1 or 2. No consensus has been identified.

Options from Public Comment Period: None.

A.1.2 Initial Analysis

Central Cost Issues

IFQ Required for OA Landings by LE Trawl Vessels	IFQ NOT Required for OA Landings by LE Trawl Vessels
Greater Vessel Costs Vessels must make landings in compliance with the IFQ monitoring program. On the one hand, this could include carrying an at-sea compliance monitor. On the other hand, some adjustment might be made to reduce the compliance burden for LE trawl vessels using open access gear.	Greater Management Costs Either: (a) increased costs associated with separate management of another very small subquota OR (b) costs of reallocating and redefining the limited entry quota accounting rules such that open access catch by these vessels is merged with management of another sector.

Magnitude of Problem

Data for 1998 and 2003 indicate that 80 and 16 LE trawl vessels landed a total of 280 thousand and 54 thousand pounds, respectively, of groundfish using open access gears (see Analytical Team Report for more information).

Possible Equity Considerations Identified to Date

Link to Allocation Rule

If trawl vessel IFQ is allocated based on a landings history that includes groundfish bycatch in the pink shrimp fishery and if LE permitted vessels are then allowed to take groundfish bycatch in the pink shrimp fishery and not use IFQ to do it, then it might be considered double dipping (the vessel would take groundfish as bycatch, in common with other pink shrimp vessels, but also receive an initial allocation of IFQ based on groundfish from the pink shrimp fishery).

Operational Cost Burdens

If vessels must make IFQ landings in compliance with the monitoring system, then the IFQ vessel might have greater shrimp fishing operational costs than other vessels participating in the shrimp fishery.

Question for Further Consideration

What is the implication of this decision for dual endorsement vessels (vessels with LE permits endorsed for both trawl and fixed (fishpot or longline gear)? Presumably the current LE allocation will be split between trawl and fixed gear and the gear used on the trip will determine which quota and requirements apply. If one of these vessels is also using open access gear, what rules will apply for catch accounting?

An Additional Option to Consider

If there is a split of the LE quota between trawl and fixed gear and if the rules for open access gear use by fixed gear vessels do not change (such landings count against the LE fixed gear quota) then Option 2C above might be modified to merge management LE trawl vessel using open access gear with the fixed gear portion of the LE fishery rather than the open access portion (as currently specified in Option 2c).

Other Notes

If LE trawl vessels are required to hold IFQ to cover their catch made with open access gear, a significant new policy option opens up, the potential to allow trawl vessels to convert to the use of other gears (SubOption 1B).

A.2.0 Area Restrictions on IFQ

A.2.1 Discussion and Options

Area restrictions can be applied to IFQs:

- To prevent regional depletion[4/] and set catch levels for areas that correspond to stock assessments.
- To disperse economic benefits of catch along the coast.
- To ensure that certain communities receive economic benefits.

Any of these aims could be pursued through catch area or landing area restrictions. Catch area restrictions would most precisely meet needs to prevent regional stock depletion and would likely keep landings more geographically dispersed than might be the case without catch or landing restrictions. Landing area restrictions would more precisely meet objectives for distributing harvest benefits along the coast (or in particular communities) and would likely serve to keep ocean catch area more dispersed than might be the case without catch or landing restrictions.

Landing area restrictions might be achieved either by putting landing area endorsements on all IFQ or through a policy that allocates some IFQ to communities, similar to Alaskan CDQ programs. Catch area restrictions would most likely be achieved through the use of catch area endorsements. Because CDQs are somewhat different than more general restrictions on area of catch or landing, it is suggested that this issue be taken up in Section A.14 as part of the consideration of a variety of measures that might benefit communities.

Option:	Area restrictions based solely on the need to address stock conservation concerns. Suboption: If some IFQ are to be catch area specific, all landings should occur in ports within the catch area, unless catch is kept separate and monitored at-sea.

TIQC Recommendation: Inclusion of catch area restrictions should be based solely on need to address stock conservation concerns.

Minimizing such restrictions will increase operational flexibility and increase the value of the IFQ. Vessels need maximum flexibility so they can go to areas where they can fish the cleanest. Nothing in the current system prevents vessels from migrating between ports. This is a reality for market driven systems. Where fish should be landed cannot be 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 is not enough groundfish to support processing facilities in every port which has historically

4/ "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.

had such fisheries. The economics of the trawl fishery are such that vessels cannot travel too far from the fishing grounds to make their deliveries.

TIQ Enforcement Group Recommendations: If some IFQ are to be catch area specific, 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 in the same trip. 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 fish.

Options from Public Comment Period:

Landing or catch area specific IFQ based on biological and socio-economic need	ED, Survey (ED)

A.2.2 Initial Analysis

See November 2004 Analytical Team Report for analysis.

Enforcement problems related to transiting and fishing in multiple areas on a single trip would have to be addressed in the design of an enforcement and monitoring program that included catch area restrictions.

If some stocks are and others are not under catch-area endorsed IFQ, there should probably be a method specified 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.

A.3.0 IFQ and LE Permit Holding Requirements

A.3.1 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 enforceability 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 the potential for 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. A program that allows IFQ to be acquired after offloading has been completed provides no opportunity for in-the-field detection of quota busting. 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 makes it more necessary to have 100% at-sea monitoring and/or weigh master presence during offloading operations. Additionally, if there is 100% at-sea and/or shoreside monitoring, the opportunity is substantially reduced for underreporting a landing for which sufficient IFQ is already held (the motive for such underreporting would be to preserve the IFQ for future use). Enforcement program elements are discussed in Section A.8.0.

Option 1	Register IFQ to the vessel - vessels must cover the species with IFQ at the time of landing.
Option 2	Register IFQ to the vessel - vessels must cover the species within 24 the time of landing.
Option 3	Register IFQ to the vessel - vessels must cover the species with IFQ within 30 days of landing - no more fishing until covered.

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: Options 1 and 3 with possible suboptions requiring that some IFQ be held at the time of vessel departure from port. No consensus has been identified. (NOTE: TIQC has not had an opportunity to consider Option 2).

Do not consider an option requiring IFQ be held prior to departure from port. Requiring that IFQ be held prior to departure from port was viewed as overly constraining and would force fishers into situations where they would have to discard catch in excess of IFQ held.

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 as a deficit balance until additional IFQ is acquired.

Options from Public Comment Period: None.

A.3.2 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 adoptions of less detectable methods of noncompliance, for example, under reporting discards rather than attempting to make landings of fish in excess of IFQ.

When IFQ Needs to be Held to Cover Catch	In the Field Detection of Violation	Incentive for Illegal Discard or Underreporting

Time of landing	Detect and cite for excess retained fish at time of landing (no effect on opportunity to detect unreported discards).	Highest incentive for illegal discarding, greatest disincentive decide before reaching port to plan an attempt underreporting a landing.
Within 24 Hours	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 to by IFQ on "spot" market. More opportunity for underreporting if there is no monitoring presence.
Within 30 Days	Same as 24 hours except 30 day delay substantially increases cost of developing enforcement cases.	Lowest incentive for illegal activity. Most time to locate IFQ at best price.

A.4.0 Transfer Rules

Transferability promotes economic efficiency but often the potential structural changes to the fishing industry and fishing communities accompanying 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 rapid downsizing, 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).

A.4.1 Transfer of IFQ or IBQ to a Different Sector for Use

A.4.1.1 Discussion and Options

IFQ might be issued under sector specific allocation rules (Section 13.0) but might be transferable among trawl sectors.

IFQ Option 1	IFQ must be used within the trawl sector for which it was issued (e.g. establish separate IFQ classes for the whiting and nonwhiting fleets).
IFQ Option 2	IFQ may be traded between trawl sectors managed under the IFQ program.

The following are the sectors and subdivisions for which sector specific IFQs might be considered.

Trawl	Whiting	At Sea	Catcher Processor
			Motherships
		Shoreside	
	Nonwhiting		
Nontrawl			

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.

IBQ Option 1	Prohibit transfers outside the trawl sector.
IBQ Option 2	Allow transfers to gears that are legal for the species and allow those gears to retain catch taken under IBQ when operating in compliance with the IBQ program.

TIQC Recommendation:

IFQ Options 1 or 2 should be considered. No consensus has been identified.
IBQ Options 1 or 2 should be considered. No consensus has been identified.

Restricting transfers of IFQ and IBQ between sectors may help preserve existing structure of the fishing industry and communities. It would also prevent one sector from shutting down another by buying up all of the allotment of a critical bycatch species. Allowing the transfer of IFQ between sectors should encourage optimization of the use of the fish resource. Allowing the transfer of IBQ to a sector that would be allowed to harvest and retain the catch represented by the IBQ would likely reduce bycatch and increase utilization of the covered species, so long as the monitoring system in place is adequate to ensure all catch is accounted for.

There has been some discussion in the TIQC about allowing trawl vessels to retain prohibited species where mortality is managed under an IQ program.

Public Comment:

Include recreational fisheries and allow cross sector transfers.	UASC

A.4.1.2 Initial Analysis

In general, within the scope of the IFQ program (in this case the groundfish trawl fishery) the more transferability that is allowed the more efficient the use of the resource covered by IFQ and hence the greater the total economic benefits of the program. Limits on transfers among sectors of the trawl fishery may be used to preserve characteristics of the fishery that are viewed as desirable.

If IFQ is trawl sector specific (not transferable among sectors), rules will be needed for determining when a vessel is participating in a particular sector. Separating the various whiting sectors is relatively easy in this regard. Separating shoreside whiting from shoreside nonwhiting raises certain questions. Some whiting is taken as incidental catch in trawl fisheries directed toward other species. Vessels are allowed to deliver up to 10,000 pounds of whiting outside the whiting season. If there is a separation of the IFQ for species that are bycatch in the whiting fishery (e.g. whiting sector darkblotched rockfish and nonwhiting sector darkblotched rockfish) on which trips delivered shoreside would whiting sector IFQ be needed for bycatch species. Any trip over 10,000 pounds? If so, then would there also need to be a separation of whiting IFQ between directed and targeted trips or could the same shoreside whiting IFQ be used to cover deliveries under 10,000 pounds as for deliveries greater than 10,000 pounds?

Unless the nontrawl sectors are under a fully monitored IFQ program, transfer of IFQ to nontrawl sectors would expand program complexity and compliance and monitoring costs. At the same time, if such transfers were allowed and the IFQ were bid away from the trawl fishery, this would indicate that fishers in the nontrawl fishery were able to use the IFQ to generate more profit than the trawl sector.

If IBQ were created for halibut, consultation with the IPHC would be required. If the program were to allow transfer of the IBQ to another gear type that could legally retain the halibut, there would need to be a downward adjustment in the amount of halibut represented by the IBQ. For halibut taken by the trawl sector there is an assumed bycatch discard mortality rate that is less than 100%. Obviously, mortality would be 100% in a retention fishery, hence the need for a downward adjustment. 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) 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."

Creation of IBQ for salmon would require consideration of the variation in stock composition depending on area of harvest and time of year. Creation of IBQ for crab would require establishing an overall quota for the trawl fishery. Currently crab is managed with season and size restrictions.

A.4.2 Eligible Owners/Holders (Who May Own/Hold)

A.4.2.1 Discussion and Options

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 Council's be permitted to "authorize communities to purchase, hold, manage and sell IFQs" (NRC, 1999, pg. 206). In making this recommendation the NRC states that Council's should determine the qualifying criteria for a community that is permitted to hold quota.

The potential for foreign ownership and control 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, 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 potential groups to consider are 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), any person (including business entities such as corporations).

These options apply to both quota shares (QS) and quota pounds.

Option 1	Anyone eligible to own a US documented vessel.
Option 2	Stakeholders: include owners and lessees of LE permits or vessels, skippers/crew, processors, buyers, communities. *(NOTE: If ownership is restricted to these classes, criteria will need to be established to identify membership in these groups.)*

TIQC Recommendations: Option 1 and Option 2. No consensus has been identified.

The "eligible to own a US documented vessel" option is intended to restrict foreign ownership without disrupting any current ownership structure in the fishery that involves a foreign interest.

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

Options from Public Comment Period:

Allow communities to form nonprofits and acquire IFQs	ED

A.4.2.2 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 future control over benefits from the fishery.

Communities 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.

In general the more participants and more types of participants in the IFQ market the more likely it is that the IFQ will be used by those able to generate the greatest benefit from use of the IFQ and the higher the likely trading price for the IFQ.

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," there is not consistent licensing of crew members among the states. Therefore some system would need to be developed to identify members in this class. 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.

A.4.3 Duration of Transfer - Leasing and Sale Prohibition

A.4.3.1 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).[5/] 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 limiting the proportion of the total quota that 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.

These options apply to both QS and quota pounds (note: quota pound leasing and quota pound sale are equivalent since, once used, quota pounds convey no ongoing harvest opportunity).

Option 1	Permanent transfers only - leasing prohibited.
Option 2	Leasing and permanent transfers. Suboption: Prohibit all permanent transfers (leasing only) during the first year of the program.

<u>TIQC Recommendations:</u> Option 1 and Option 2. No consensus has been identified.

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 to get used to the program so that they might make better business decisions when buying and selling quota shares.

<u>Public Comments</u>:

Compel quota holders who have historically leased their permits to others to continue to lease their IFQ to those individuals.	Survey (ED)

A.4.3.2 Initial Analysis

Participants in the New Zealand fishery 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. This has resulted in a recommendation that consideration be given to prohibiting the permanent transfer of IFQ in the first years of a program (Dewees, 1996, Casey, 1995). In the November 2004 Analytical Team Report, price variability in the first years of an IFQ system declines over time due to learning processes (see section on “Price Dispersion”).

5/ 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.

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, if a permit is transferable private contractual agreements provide many opportunities to circumvent the intended effect of such prohibitions.

A.4.4 Time of Transfer

A.4.4.1 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 for the subsequent year.

Also included in this category is an enforcement provision that 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).

Time of Year

Option 1	Allow transfers of quota shares any time during year.
Option 2	Allow transfers of quota shares only at the end of year.

Quota pounds would be transferable any time during the year.

Transfer Embargo

Option	Quota shares may not be transferred from any account for which there is a deficit of quota pounds (i.e. any account for which landings exceed quota pounds for at least one species.

<u>TIQC Recommendations:</u> Option 1 or 2. No consensus has been identified. The TIQC has not reviewed the transfer embargo proposal.

A restriction on the inseason transfer of quota pounds has not been suggested in order to allow fishermen to adjust their holdings to the composition of their catch.

<u>TIQ Enforcement Group Recommendation</u>: Quota shares should not be transferred from any account for which there is a deficit of quota pounds.

Question: If quota pounds have been leased out to a vessel, is the account that would be restricted that of the vessel, that of the lessor or both? If transfers for the account of the lessor are to be restricted and the vessel's account (lessee's) is the one in deficit if there are multiple lessee's would all be considered in deficit. What if the vessel is using leased quota only, hence has no quota shares against which the transfer restriction would be applied.

<u>Public Comments</u>: None

A.4.4.2 Preliminary Analysis

Need and costs for 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.

A.4.5 Divisibility

A.4.5.1 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 governing costs.

Elements of Divisibility Provisions	
Element 1.	Quota Shares: nearly unrestricted divisibility - “many decimal points."
Element 2.	Quota Pounds: divisible to the single pound

<u>TIQC Recommendations:</u> 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 in entry and exit. 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.

<u>Public Comments</u>:

Blocked quota shares	ED-Survey

A.4.4.2 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.

A.4.6 Liens

A.4.6.1 Discussion and Options

The NRC (1999, page 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 purchasers 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 (Use as Collateral) - Pledging IFQs as collateral is a matter of private contract, independent of the government program.

<u>Public Comments</u>: None

<u>Options from Public Comment Period</u>: Comments received during public scoping will be placed here.

4.6.2 Preliminary Analysis

The ability for new entrants to acquire financing for 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 lien 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.

A.4.7 Accumulation Limits

A.4.7.1 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 sectors such as crew and processors. 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 has not been sufficient to prevent problems resulting from excessive concentration of IFQ (NRC, 1999, page 209). The NRC also notes that concentration limits may not be very effective if there are ways 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 specification of its measurement, and prevent the accumulation of "excessive shares" of IFQ (NRC, 1999, pg. 210).

Options for IFQ concentration caps.

	Non-Whiting Groundfish				Whiting Fishery		
	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%

<u>TIQC Recommendations:</u> Caps should be considered to limit the amount of IFQ held.
Caps for catcher vessels may need to be different than caps for catcher-processors. No consensus has been identified with respect to specific percentages for the caps.

The caps may be for individual species and/or total IFQ holdings. The total holdings cap should be lower than the individual species cap so that a person cannot hold the maximum amount of every species. This provides another constraint on accumulation.

If an entity would be eligible to receive more than the cap as part of the initial allocation that entity should be allowed to receive and use the amount in excess.

If a person has partial control of an IFQ account (for example, through a partnership) all IFQ under that account would count toward that person's cap.

The TIQC discussed without resolution whether caps should be based on poundage or value. Under the British Columbia system value equivalents are established, using Pacific Ocean Perch as a base unit.

<u>Independent Experts Panel Comment:</u> If IFQs are area specific, the Council may wish to specify area specific accumulation caps.

<u>Public Comments:</u>

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

4.7.2 Preliminary Analysis

To address the concern that an excessive share of an individual segment of the fishery not be held by a single entity, caps would be applied to individual species and for all groundfish overall. By ensuring more vessels participate in the fishery, caps help reduce the chance that some ports my be eliminated from participation due to consolidation of harvest.

A limit on control (IFQ owned or leased) would be more restrictive than a limit on ownership. Because of the many ways available to circumvent control limits, limits on concentration of harvest aboard a single vessel may also encourage the spreading of benefits from harvest.

One issue imbedded in the options pertaining to ownership and control is the degree of control required before the IFQ counts against the ownership or control cap. For the sablefish tier program any interest in the ownership or control of a permit counts as complete ownership or control of the 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. For the Alaska IFQ system 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, 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 that of the permit stacking program are put in place for the 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,
- quota pounds fished by crew members off the leased vessel

Options for alternative ways to define control have not been developed.

A.4.8 Vertical Integration Limit

A.4.8.1 Discussion and Options

Vertical integration occurs when a single entity operates at several levels in the harvest and distribution chain, e.g. owns both a catcher vessel and a processing facility.

TIQC Recommendations: No limits on vertical integration other than what is provided through the accumulation caps.

Public Comments: None

4.8.2 Preliminary Analysis

Some degree of vertical integration already exists in the industry through processor control of permits and vessels. The creation of IFQ would involve a redefinition of the privileges conveyed by a limited entry permit. If processors were to be prohibited from owning IFQ vertical integration would be reduced from present levels.

Vertical integration will be limited to some degree by the caps discussed in Section 4.7. Depending on the number and landings history of permits held by processors, the amount (if any) of IFQ allocated among processors, the ownership and control caps may be exceeded by processors under a grandfather clause (as is the case for any permit holder receiving an initial allocation).

A.5.0 Rollover (Carryover) to a Following Year

A.5.1 Discussion and Options

Allowing a fisher to land catch in excess of his or her IFQ allotment but counting it against the following year's allotment is one means of penalizing fishers for exceeding their IFQ without creating large incentives for discarding the excess harvest (NRC, 1999, pg. 217). Similarly, allowing a fisher to carry over some portion of his or her unused IFQ allotment from one year to the next creates a situation in which there is less incentive for fishers to catch up to their full limit and hence risk exceeding the limit. While midseason transfers can facilitate coverage of any over catch, as the season progresses there would be less and less IFQ available for transfer.

Summary of Options from Public Information Document:

Option 1	No rollover.
Option 2	10% rollover (no rollover allowance for overfished species).
Option 3	20% rollover (5% rollover allowance for overfished species).
Option 4	30% rollover (full rollover allowance for overfished species).

Question: If quota pounds have been leased out to a vessel how would rollover provisions for overages be applied to quota shares?
TIQC Recommendations: The TIQC identified options 1 through 4. No consensus has been identified.

Public Comments: None

A.5.2 Preliminary Analysis

In deciding whether or how much rollover to allow, consider that if too much rollover is allowed and there are substantial overages for overfished species, fishing in the subsequent year could be seriously constrained. Also, if a fleet overage resulted in the potential for harvest in excess of ABC, other sectors might have to be constrained. While these are possibilities, the Canadian system has a roll-over provision and has not exceeded the quota for a stock in any one year. Consideration might be given to not providing a roll-over for overfished species because the objective for those species is often to minimize harvest, not take full advantage of harvest available.

For some fishers, a rollover could just become another target up to which they will fish. However, if the fishery is fully monitored at-sea, given that IFQ counts against catch, penalties would be incurred for fish caught in excess of the roll-over provisions. For those wishing to avoid such penalties, the roll-over 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.6.0 Use-or-Lose Provisions

A.6.1 Discussion and Options

Use-or-lose provisions would require that if IFQ is not used over a certain period of time it would expire or be revoked and reallocated. The objective of the use-or-lose provision would be to ensure for processors and communities the benefit of biologically sustainable harvest opportunities by preventing the reservation of quota by persons that may not use it for a variety of reasons. Concerns motivating consideration of this provision also include the possibility that someone might acquire large amounts of IFQ for a key species and then demand a high value for its release to someone who would use it.

Option 1	Include use-or-lose provisions (consider how to treat leases, medical exceptions, and partial use).
Option 2	Do not include use-or-lose provisions.

Several questions have been raised for consideration with respect to use-or-lose provisions:

- *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?*
- *How would it be determined which quota shares had been used and which not used?*
- *If someone failed to utilize the required proportion, what portion of the quota shares in the account would be forfeited?*
- *If there were a requirement that quota shares be used in three out of five years or 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?

- *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?*
- *How would use-or-lose provisions be applied if part but not all quota shares were transferred from one account to another?*
- *Would the quota shares be reissued or would the value of all remaining quota shares simply be allowed to increase?*

TIQC Recommendations: No consensus has been identified. The use-or-lose provision would apply to the person owning the IFQ. A requirement that IFQ be used in three out of five years was considered.

Public Comments: None

A.6.2 Preliminary Analysis

If implementation issues reflected in the above list of questions can be worked out it appears that a use-or-lose provision could achieve the objective of ensuring that quota is utilized. The main issue will be establishing a standard for determining whether IFQ has been used. The problem is aptly 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 “unused” money be tracked if it is transferred from one account to another?

Depending on how it might be implemented, the use-or-lose provision could interact with the roll-over provisions which allow some portion of the IFQ to be left unused each year. Rollover provisions may be a necessary part of an effective use-or-lose provision because, in a multispecies fishery catching near 100% of all quota pounds without exceeding some IFQ holdings would likely be impossible.

If IFQ is issued for all species (including some that are currently not fully harvested) the provision could result in wastage as fishermen might catch and discard fish only to ensure that they do not lose IFQ that might someday become more valuable (either for harvest and retention or to cover bycatch).

A.7.0 Entry Level Opportunities

A.7.1 Discussion and Options

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 (1999, 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.

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.

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) are to be included 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.

Option 1	Provide a low interest loan program (qualification factors to be determined).
Option 2	Provide an opportunity for new entrants to qualify for shares revoked for program violations (qualification factors to be determined).

What qualification criteria should be used to identify the relevant classes of beneficiaries:

- *entry-level fishermen,*
- *small vessel owners, and*
- *crew members who do not hold or qualify for individual fishing quotas?*

<u>TIQC Recommendations:</u>

- An option for a loan program should be included as part of the analysis. (The question of qualification for low interest loans was left open.)
- If penalties result in revocation of quota shares (including use-or-lose provisions), some of the revoked shares might be used for new entry. (The question as to how individuals might qualify for reissuance of revoked shares was left open.)

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 financing by ensuring more security in the collateral and therefore lower interest rates.
- Limiting ownership to individuals.

A zero revenue auction[6/] should not be considered as there would be sufficient trading to ensure the availability of quota on the market for purchase by a new entrant.

Public Comments:

Provide low interest loans for community nonprofits 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)

A.7.2 Initial Analysis

The M-S Act requires that some options be considered for accommodating entry-level fishermen, small vessel owners, and crew members not owning quota shares.

For the loan program option, 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, will 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 an option that would lower the cost of entry.

For the second option, an IFQ source would need to be identified in order to issue 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 developed or implemented. Such forfeitures might be used for new entrants. Another option would be to issue a certain amount of new or reclaimed quota share each year to new entrants. The two mechanisms would be mathematically equivalent with similar declines in the pounds represented by the quota share held by each existing participant.

Whether qualifying for a loan program or the reissuance of shares, some sort of qualifying requirements would need to be developed in order to identify and prioritize the various classes of beneficiaries.

6/ An auction under which revenue would go to those who provided the quota shares use in the auction (there would likely be a provision requiring that all quota holders surrender for auction a certain percentage of their quota shares each year).

A.8.0 Tracking IFQ, Monitoring Landings, and Enforcement

A.8.1 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, 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.

Elements of Tracking Monitoring and Enforcement System	
1.	Onboard compliance monitors (20%-100%)
2.	Dockside compliance monitors (20%-100%)
3.	Hailing requirements
4.	Small vessel exemptions for onboard compliance observers
5.	Video monitoring system
6.	Full retention requirement
7.	Bycatch reporting system
8.	Electronic landings tracking system
9.	Limited delivery ports
10.	Limited delivery sites
11.	Electronic IFQ tracking systems
12.	Vessel monitoring system (VMS)

These elements have been tentatively arrayed into enforcement programs in Table 1.

<u>TIQC Recommendations:</u>

A compliance monitoring program my be needed to monitor harvest (catch and/or landings). Of the above list, the TIQC identified the following elements for a compliance monitoring program

1. Onboard Compliance Observer (Compliance Monitors) (20% - 100%).
2. Dockside (Delivery Location) Compliance Monitor (20% - 100%).

1 & 2 (combined) Onboard and Delivery Location Compliance Monitors

3. 100% Hailing Requirement and Lesser % of Landings Monitored.
4. Exemption for Smaller Vessels (from need to carrying monitors.)
12. Video Monitoring System (Including all Components Necessary to Make Effective).

The skills of compliance monitors may or may not be different from those generally required for Federal fishery observers.

TIQ Enforcement Group Recommendations:

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 does 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 A-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 withunobserved 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. Reliance on the paper fishticket system might work but flexibility of the IFQ system and associated benefits would have to be substantially constrained. 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 would be inconsistencies between the fishticket system and what is reported as landed against IFQs. Under the current cumulative limit system, citations are issued on the basis of the dock receipt.

Shorebased Monitoring: Either 100% of the landings would have to be observed, or the opportunity to observe would have 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. 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 catch instead of landings, 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.

Public Comments:

Require VMS and 100% observer coverage - shoreside and at-sea	ED
Analyze limits on number of ports to which deliveries are allowed	WCSPA

A.8.2 Initial Analysis

Details of the enforcement program will need to be developed for the EIS in order to complete the impact assessment. However, it is uncertain 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 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 affect of distorting the size of vessels in the fleet. Consider the possibility of an observer pool and cost sharing.

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

A.9.0 Cost Recovery/Sharing and Rent Extraction

A.9.1 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 (NRC, 1999, 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)[7/] 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). The tax would serve a dual purpose of reducing the socially objectionable windfall and collecting rents.[8/] 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).

Summary from Public Information Document:

Elements of Cost Recovery/Sharing Rent Extraction Provisions	
1.	Landings Fee (max of three percent under current Magnuson-Stevens Act).

7/ 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).

8/ 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.

2.	Privatization of Elements of the Management System: Monitoring IFQ Landings (e.g. industry pays for their own compliance monitors) Fishtickets Stock Assessments

TIQC Recommendations: Options 1 and 2. No consensus has been identified. The TIQC also discussed the potential of using an auction to provide for an initial influx of revenue to support program startup costs.

Public Comments:

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)

A.9.2 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. The NRC (1999, pg. 214) recommends an increase in the cap to above three percent.

Legal council opinion is needed on the degree to which privatization of particular functions might be used to transfer a larger portion of program expense to industry. The TIQ Enforcement Group has indicated that the privatization of catch and landings monitoring responsibility industry would require increased enforcement activity to verify that the monitoring program is functioning properly.

A.10.0 Penalties

A.10.1 Discussion and Options

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, whereas penalizing by deducting any overage from a subsequent year's IFQ would substantially reduce that incentive (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	
1.	Strong sanctions for violators.
2.	Illegal overages should be forfeited on landings, debited against the IFQ holders account. Additional enforcement action should be taken, as appropriate. Fishing suspended until IFQ has been acquired to cover the overage.

TIQC Recommendations: The TIQC was generally supportive of strong sanctions for violators.

TIQ Enforcement Group Recommendations: 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).

Public Comments: None.

A.10.2 Initial Analysis

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 it wants to be involved 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]

A.11.0 Procedures for Program Performance Monitoring, Review, and Revision (Magnuson-Stevens Act (d)(5)(A))

A.11.1 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 (NRC, 1999, 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 (NRC, 1999, 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 (NRC, 1999, pg. 218). Additionally, annual reports should be provided describing trends in the fishery and effects of the IFQ program (NRC, 1999, 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 is contained in recent groundfish programmatic EISs, the EISs for annual and biennial 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 (NRC, 1999, pg. 201).

While sunset provisions are not recommended, 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.

Criteria on which to base program performance need to be developed. Such criteria should probably be derived from program goals and objectives.

Summary from Public Information Document:

Elements of Provisions Related to Performance Monitoring, Review and Revision	
1.	The program should include a review period, built in performance monitoring, and opportunity for adjustments to the program.
2.	No automatic sunset provisions.

TIQC Recommendations: 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 not be considered. Sunset provisions make the fishery less stable and make investment planning more difficult.

Public Comments:

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

A.11.2 Initial Analysis

No analysis provided at this time.

A.12.0 Data Collection

A.12.1 Discussion and Options

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 A.11.0 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. The 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 (NRC, 1999, 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 is included as part of the data collection provisions of the Alaska crab rationalization program. The Alaska program provisions are specific as to the data elements and include draft survey instruments.

TIQC Recommendations: None identified.

TIQC Considered But Rejected Options: None identified.

Public Comments: None.

A.12.2 Initial Analysis

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".

A.13.0 Initial 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 an unearned asset and income upon sale or lease of that asset.[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

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9/ This unearned income is regarded by many as an unfair windfall (recovery of windfall and extraction of rents is addressed in Section A.9).

disruption costs associated with implementation of the program. However, these disruption costs would be a short-term phenomena which would not substantially affect the long-term performance of the program. In addition to disruption costs, there may be longer-term impacts on shifts 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).

A.13.1 Eligible Groups

A.13.1.1 Discussion and Options

The NRC report notes that vessel owners are usually the recipients of initial allocation and makes the following recommendations with respect to allocation to other fishery participants (NRC, 1999, pgs. 202-207).

Groups (Other than Vessel Owners)	Summary of NRC Recommendation
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.

The following are options developed for the groups to whom allocations might be made.

Option 1	Allocate IFQ to Current Permit Owners.
Option 2	Allocate IFQ to Vessel Owners.
Option 3	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). *Combinations need to be specified to fully develop options.*

Option 4	Allocate to High Bidder in Auction (eligibility rules for participation to be developed).

Allocating to vessel owners is the equivalent to allocating to permit holders (the NWR Limited Entry permit holder identifies the vessel owner as the permit holder).

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. For example, IFQ might be allocated under a formula that gives equal weight to landings history of permit holders and vessel owners.

TIQC Recommendations: The TIQC developed Options 1-4. No consensus has been identified. The TIQC recommended against allocating to

1. those who owned the permit at time of landings
2. to 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 because no rationale could be identified for allocating to someone who no longer ones the fishing asset used to take the fish.

Public Comments:

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)

A.13.1.2 Initial Analysis

If IFQ is to be allocated to more than one group, some basis will need to be established to determine the amount of IFQ to be allocated among all of the eligible initial recipients. 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 qualifying 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.

Compensation for potential adverse impact is one possible basis for determining the appropriate groups to whom an initial allocation of IFQ might be made.

Imposition of an IFQ program will change the nature of the rights associated with the permits and hence the value. If IFQs are created the values of the permits are likely to decline substantially, with the vast majority of the value becoming associated with the IFQ. 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.

Allocating IFQ to vessel owners or processors would provide a valuable asset to the owner of a major capital assets in the fishery, the use of which could be affected by the IFQ program. There are a number of key questions to be answered with respect to qualification and evaluation of landings histories for either of these groups.

In order to allocate to vessel owners, the first question to address is whether the allocation based on landings history goes to the current owner of the vessel or the owner of the vessel at the time landings were made. Past owners may have since departed from the fishery either leaving their vessel in the fishery or taking their vessel to another fishery. Current owners may have recently acquired a new vessel with little or no history or have recently entered the fishery themselves with a vessel with little history. 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 tier program, no consideration was given to vessel history.

In order to allocate to proceessors/buyers, questions must be addressed that are similar to those for vessel owners but more extensive. The equivalent of the vessel is the processing/buying facility. However, there is not a unique and stable identification system for processing/buying facilities and the systems vary between states. Processor identifiers may or may not change with changes in the ownership of a facility or company and in some circumstances identifiers may change even if there is no change in ownership. There may also be multiple buyer codes used at a particular site. As an example of how the system works for an individual state, in Washington dealers and buyers are licensed. Buyers are individuals that work for dealers and each have their own unique identifiers. Dealer numbers may change when a dealer is purchased by another company or if the corporate status with the Washington Department of Revenue changes. When the dealer numbers change the buyer numbers that work with that dealer would also change. However, the difficulties in establishing unique identifiers make the analysis more difficult but do not prevent consideration of allocations to processors/buyers, once certain questions are addressed. For buyers/processors, the first issue is the nature of the entity for which IFQ would be issued: a company or a site. The second is, if there is a change in ownership, does landings history go to the new owners of a particular company or site or stay with the owners at the time a landing or delivery was received?

Rationalization of the fishery is also likely to affect the nature of employment opportunities for crew. The exact result for 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. IFQ also provide an opportunity for crew members to incrementally gain ownership of capital in the fishery through acquisition of IFQ. Methods for qualifying crew members for IFQ are discussed in the November 2004 Analytical Team Report.

A.13.2 Qualifying Criteria: Recent Participation

A.13.2.1 Discussion and Options

Recent participation requirements can be used to place more weight on recent participation and ensure that current participants benefit from allocations rather 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 degree of emphasis on the current participation requirement may be adjusted by limiting the portion of the allocation for which a recent participation requirement applies. Recent participation may be required to receive any allocation, or it may just be 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.

Option 1.	No recent participation requirement
Option 2.	Recent participation (1998-2003) required to be eligible for an initial allocation (number of trips and/or number of yrs required, to be specified).
Option 3.	Same as Option 2 but the years would be 2000-2003.

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.

TIQC Recommendations: The TIQC developed Options 1, 2 and 3. No consensus has been identified. The 2000-2003 recent participation period covers the years for which a small footrope was required.

Public Comments:

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

A.13.2.2 Initial Analysis

From the following table, it can be seen that a recent participation requirement of one 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 A.13.5) and whether there are other bases on which IFQ is allocated, such as some portion of the IFQ equally allocated (A.13.4).

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 qualifying period when large foot rope restrictions were in place. The 1998-2003 recent participation period (Option 3) includes time 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 would be to entirely eliminate from the allocation formula 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.

A.13.3 Elements of the Allocation "Formula"

A.13.3.1 Discussion and Options

In determining the amount of initial allocation, the NRC report (1999, 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 13.1, 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 13.1).

Vessel/Permit Related Allocation

Options for Vessels/Permits	
Option 1.	Auction

Option 2.	Some mix of criteria that might include: a. Landings history, wt (for certain species, consider allocating a portion based on an estimate of bycatch as determined by landings of target species). b. Equal sharing i. Equally allocate QS (represented by landings history) of those vessels/permits bought back among those vessels/permits with landings history for the species. ii. Equally allocate incidental catch species. iii. Some other equal sharing basis.
Option 3.	Landings history (wt) only (for certain species, consider allocating a portion based on an estimate of bycatch as determined by landings of target species).

TIQC Recommendations: The TIQC developed Options 1, 2 and 3. No consensus has been identified. The TIQC rejected vessel length as a basis for IFQ allocation.

Options from Public Comment Period:

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 (1st Buyer) Allocation

Options for Buyers/Processors	
Option 1.	1st receiver purchase history of groundfish trawl landings (lbs)
Option 2.	Auction

TIQC Recommendations: The TIQC developed Options 1 and 2. No consensus has been identified.

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 November 2004 Analytical Team Report.

A.13.3.2 Initial Analysis

Initial allocations determine a distribution of wealth, i.e. the windfall from the initial allocation of IFQ. The fairness and equity of that initial allocation is largely a judgement to be made by the Council, NMFS and, if challenged, the courts. Initial allocation will also affect transition costs, as participants, will trade IFQ and adjust their business operations to take advantage of perceived opportunities. Section 303(b)(6) also provides guidance on factors that must be taken into account in designing a limited entry program (either in the initial allocation or in other aspects of the program design). These factors include

(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 if necessary changes were made to Section 304(d) under the Magnuson-Stevens Act which states that

"The level of fees charged under this subsection shall not exceed the administrative costs incurred in issuing the permits. . ." [EXCEPT 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 program. (B) Such fee shall not exceed 3 percent of the ex-vessel value of fish harvested under any such program . . . ."

Equal Allocation

The asset value most directly affected by an IFQ program would likely be that of the permit. If an intent of the initial allocation is to compensate those who might be most adversely affected by the IFQ program, then an equal allocation may be preferred, since the relative values of permits do not vary as much as the catch history associated with a permit. There may be other rationales for allocating equally or for not allocating equally that have yet to be presented.

Landings History

Emphasizing landings history in the allocation formula is one means of reducing transition costs and disruption 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 13.5. The November 2004 Analytical Team Report covers data quality issues.

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:

- For substantial portions of the proposed allocation periods, these species were not sorted, therefore there will need to be heavy reliance on species catch composition information.

While this data is not generally considered valid at the individual landing or vessel level it may be the best reasonable proxy available.

- For other portions of some of the proposed allocation periods, most 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.
- Allocation based on catch history of incidental species rewards the fishers who were less successful in avoiding the incidental species. In some cases, these are the species which are now over fished.

For these reasons it has been suggested that consideration be given to allocating some incidental species based on a rough estimate of their co-occurrence with target species.

To Whom Does Landings History Accrue?

For IFQ issued to permits, 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 credited for all the landings history of the vessel or whether vessel owners get credit for landings made only 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 those for vessel owners but more extensive. The equivalent of the vessel is the processing/buying facility, however these facilities are often owned by companies which are themselves bought and sold. The basic question is should landings history go with the ownership at the time the landing was received, or go with the facility even if it is sold to a different group. If landings history goes with ownership, how should landings history be treated for a business (e.g. corporation) that is acquired by another business entity (another corporation).

A.13.4 Landings history: Species/Species Groups to Be Used for Allocation

A.13.4.1 Discussion and Options

For some species, species composition information would need to be applied to develop allocations based on the landings history. This requires application of fleet average species composition distributions to categories of species taken by individual vessels (e.g. applying fleet average species composition to landings recorded as “Slope Rockfish”).[10/] 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).

Summary of Options from Public Information Document:

Option 1.	Allocate species IFQ based on relative total groundfish catch except whiting, but use whiting to allocate whiting IFQ.
Option 2.	Allocate species IFQ based on relative catch of each species.

TIQC Recommendations: The TIQC developed Options 1 and 2. No consensus has been identified.

Public Comments: None

A.13.4.2 Initial Analysis

The following reflects the primary tradeoffs between the two options shown above:

Option 1	Option 2
a more simple allocation formula	relies on species comp data, that is generally not viewed as valid at the vessel level.
an IFQ allocation result that does not match up will with the species mix of the recipients landings	some method 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 November 2004 Analytical Team Report.

A.13.5 Landings history: Allocation Periods

A.13.5.1 Discussion and Options

If allocation is to be based on landings history a period would need to be used to define what landings count toward landings history. The following periods and rules could be applied to any group for which a portion of the IFQ allocation is to be based on landings history. Different periods and rules might be applied to different groups.

	Number of Years in Allocation Period	Number of Worst Years to Drop from Landings history	
Allocation Period Option		Option A	Option B
Option 1. 1994-2003	10	None	2

10/ Such species composition information is often specific for a given area and time period.

Option 2. 1994-1999	6	None	1
Option 3. 2000-2003	4	None	None
Option 4. 1998-2003	6	None	1

Consider suboptions

i. Base allocation on a calculation using total pounds summed across all years (a pound in 1994 will qualify an individual for the same amount of quota share as a pound landed in 2003).

ii. Base allocation on a calculation using the percent of total catch of each species in each year (0.005% of the landings in 1994 will qualify an individual for the same amount of quota share as 0.005% of the landings in 2003).

TIQC Recommendations: The TIQC developed Options 1 through 4 and specified the suboptions. No consensus has been identified.

Public Comments: None

A.13.5.2 Initial Analysis

Weighting the Catch

If all years are weighted evenly, years when there was more fishing opportunity would have a greater influence on the amount of IFQ allocated than years with less fishing opportunity. Since there has been less fishing opportunity in recent history years, 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 the volume of groundfish catch in 1994-2003.

Groundfish landings in thousands of tons by all limited entry trawlers (buyback and nonbuyback) (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 would vary from the averages that might be calculated from this table. The 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 some of the years selected to delineate 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 with 1984-1988 landings history. The use of vessel landings history prior to 1994 may be viewed as inconsistent with the issuance of permits with equivalent rights for vessels under construction or conversion through 1994 and those with 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 either small or large footropes could be widely used. The period after 2000 reflects how vessels operated given the opportunities present under the most recent management regime.

1998. This year is used to establish a six year period (1998-2003) that includes an amount of time 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 them for a permit. Using 1998-2003 counts landings history that includes 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 for consideration of hardship provisions in developing equitable allocations. The effect is to even out the distribution of IFQ among recipients.

As an indicator of the effect of dropping the worst years out of the allocation formula, the following tables shows the number of vessels for which **the share** of average revenues increases when the two worst years are dropped from a 10 year period (1994-2003). Note that average revenue increases for both groups when the two worst years are dropped.

	Vessels	Percent	Avg 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).

Years	1	2	3	4	5	6	7	8	9	10
Vessels	74	23	22	18	12	16	19	19	26	149

Similar information will be produced for permits and buyers/processors.

A.13.6 Landings history: Combined Permits and Other Exceptional Situations

A.13.6.1 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, permits remain distinct from one another.

Landings history for Combined Permits	
Option 1.	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.
Option 2.	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).

Other categories of catch to be considered for inclusion or exclusion as part of the landings history for purpose of allocation are:

- Illegal catch - do not count toward landings history
- Catch in excess of trip limits, as authorized under an EFP - whether to count needs to be decided
- Compensation fish (fish taken as payment by vessels assisting in research) - whether to count needs to be decided

TIQC Recommendations: The TIQC developed Options 1 and 2. No consensus has been identified. The TIQC recommended illegal catch not be counted toward qualifying for a permit.

Options from Public Comment Period: Comments received during public scoping will be placed here.

A.13.6.2 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 that they would have otherwise had, and participants in the EFP programs may have been at 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.

A.13.7 Initial Issuance Appeals Process

A.13.7.1 Discussion and Options

An appeals process may 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. For the license limitation program there were thresholds that had to be reached and, depending on whether that threshold was reached, a permit 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 tiered sablefish endorsement program there was also a threshold landing 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 the challenge of a fish ticket would 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 for the individual to dispute. The exception to this might be a recent participation requirement, which may be 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 initiate appeals.

TIQC Recommendations: None identified.

TIQ Enforcement Group Recommendations: Require that any proposed revisions to fishtickets undergo review by state enforcement personnel prior to finalization of the revisions.

Public Comments: None

A.13.7.2 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 A.13.6)

A.14.0 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.

Options from Public Comment Period: Comments received during public scoping will be placed here.

Dewees, CM 1996. Industry and Government Negotiation: Communication and Change in New Zealands ITQ System. pp. 333-341 in RM Meyers et al Proceedings of the World Fisheries Congress, Theme 2.

Casey, KE, et al 1995. Marine Resource Economics 110: 211-230.

Table A-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 (OY held in reserve)
Bycatch Reporting System Comparable to Landing Tracking System	None	System Needed (electronic)	System Needed (electronic)	System Needed (electronic)	None
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.

Appendix B - 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 FMPs 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 FMPs.

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 C - 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 D - AD HOC 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 E - 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 F - 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.

Galen R. Tromble,
Acting Director,
Office of Sustainable Fisheries,
National Marine Fisheries Service.

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 A

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!

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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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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

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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. And so, the primary message we would 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, 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.

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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.

Additional Alternatives to Be Considered

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.

IFQ Design Elements

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)).

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[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
BRUCE M. LEAMAN

P.O. BOX 95009
SEATTLE, WA 98145-2009

TELEPHONE
(206) 634-1838

FAX
(206) 632-2983

June 30, 2004

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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

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Chuck Wise
President
David Bitts
Vice-President
Larry Miyamura
Secretary
Marilyse Battistella
Treasurer
In Memoriam:
Nathaniel S. Bingham
Harold C. Christensen

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

W.F. "Zeke" Grader, Jr.
Executive Director
Glen H. Spain
Northwest Regional Director
Mitch Farro
Fishery Enhancement Director
Vivian Bolin
Watershed Conservation Director
Duncan MacLean
Salmon Advisor

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PFMC

Please Respond to:
✓ California Office
P.O. Box 29370
San Francisco, CA 94129-0370
Tel: (415) 561-5080
Fax: (415) 561-5464

http://www.pcffa.org

☐ Northwest Office
P.O. Box 11170
Eugene, OR 97440-3370
Tel: (541) 689-2000
Fax: (541) 689-2500

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

W.F. "Zeke" Grader, Jr.
Executive Director

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6/13/04 For TIQ 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.

1

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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

PO Box 59 • Astoria, Oregon 97103
Tel: (503) 325-8188 • (800) 343-5487 • Fax (503) 325-9681 • www.pmcc.org

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

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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
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

CHAIRMAN
Donald K. Hansen

EXECUTIVE DIRECTOR
Donald O. McIsaac

Telephone: 503-820-2280
Toll Free: 866-806-7204
Fax: 503-820-2299
www.pcouncil.org

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
Senior Policy Director
Pacific Marine Conservation Council
399 31st Street
PO Box 59
Astoria, Oregon 97103
phone (503) 325-8188
fax (503) 325-9681
cell (503) 440-3211
www.pmcc.org

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
15 elm street
florham park nj 07932

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WEST COAST SEAFOOD PROCESSORS ASSOCIATION

West Coast Seafood Processors Association
1618 SW 1st Ave., Suite 318, Portland, OR 97201
503-227-5076 503-227-0237 (fax)
email: seafood@attglobal.net

Serving the shore based seafood processing industry in California, Oregon and Washington

July 26, 2004

RECEIVED
JUL 26 2004
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

TIQ ENFORCEMENT GROUP REPORT ON TRAWL INDIVIDUAL QUOTAS

The TIQ Enforcement Group met September 28, 2004 to review scoping results and develop cost estimates.

Cost estimates were developed in two steps. First a determination was made of the additional expenditures necessary to arrive at an adequate level of enforcement under status quo. The development of this estimate was based in part on NMFS Office of Law Enforcement "gap analyses" that had been conducted previously in the Northwest and Southwest region offices. Incremental increases in enforcement tasks over the years have resulted in a deterioration in the overall level of enforcement in the groundfish fishery, a "gap." In general, the results from these analyses indicated the need for a doubling of the current level of enforcement effort.

The second step was to develop an estimate of the additional enforcement effort that might be required if an IFQ program is put in place. A generic program was assumed with transferable quotas and the following elements for a tracking and monitoring program:

- 100% at-sea monitoring
- Full retention required
- Advance notice of landings or restricted times of landing.
- 100% monitoring of offloading activities
- An electronic landings tracking system
- An electronic IFQ reporting system
- VMS

With these tracking and monitoring elements in place very little additional enforcement effort would be required with the implementation of an IFQ program.

Groundfish Trawl Individual Quota
Analytical Team
October 2004 Report

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:

Executive Summary

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 REG1.

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.

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 HL1.1). OYs for the foreseeable future are likely to remain fairly stable for most species, but constrained by overfished species (Table HL1.2)

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.

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 REG1 indicates the existing management measures likely to change and those likely to remain in place with adoption of an IFQ program.

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 BC1.2). 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 BC1.3 and BC1.4. 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 HL1.1). 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 BC1.8). 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.

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 AE1.1 and Table AE1.1). 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 15

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 SQ1 shows exvessel revenue from landings by limited entry trawl and other vessels in West Coast port areas in 2003. Table SQ2 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 SQ3 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 30

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.

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.

Groundfish Trawl Individual Quota
Analytical Team
October 2004 Report

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 REG1.

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 REG1.

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 HL1.1).[1/] For some

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1/ 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 overfished 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 HL1.2).[1/] 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.

<u>Discussion</u>

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

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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 beyond 2020 but did not include desired intervening years. The source of information for the estimates is annotated in the spreadsheet.

The second column of Table REG1 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.[2/] The term applies to both incidental and target catch. Quigley (2004) summarized several regulatory and economic reasons for discarding fish (Table BC1.1). 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 BC1.2). 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 BC1.3 and BC1.4).[3/] Estimated discards remain high especially for highly regulated species, although there was an overall reduction in discard in

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2/ 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 discarded. Incidental catch are species taken in pursuit of target species.

3/ 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 BC1.3 and BC1.4. 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 commercial fisheries between 2002 and 2003 (Table HL1.1). 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 BC1.5 and BC1.6).
>
> 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 BC1.5 and BC1.6).

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 BC1.7). 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 BC1.8). 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

<u>Introduction</u>

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.

<u>Key Economic Factors (Determinants) of Movement or Change in Fishing Activity</u>

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.

Key Social Factors (Determinants) of Movement or Change in Fishing Activity

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 A1.1a, A1.2a, and A1.3a). 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 A1.1b and A1.3b).

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.

<u>Canadian Government's Area Management Program</u>

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 AE1.1 and Table AE1.1). 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.

Discussion

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 SQ1 shows exvessel revenue from landings by limited entry trawl and other vessels in West Coast port areas in 2003. Table SQ2 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 SQ3 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.

<u>Summary</u>

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[4/] (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 [5/];

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[4] 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).

[5] 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.
- 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).

- 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 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[6/]. 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:

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[6] 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.

- Increasing fishing costs; and
- Ecological uncertainty[7].

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).

<u>Price Dispersion</u>

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;

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[7] 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.

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 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*[8/].
- 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)[9/].

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[8] 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.*

[9] 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

Gauvin et al (1994) suggest that, "there may also be some incentives for under reporting share sales prices to avoid capital gains taxes."

Value Differences between Quota Sale and Lease Prices

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.

Market Activity

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).

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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).

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."

Vessels

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[10/]. A report done by the GAO (2002) reacts to this

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[10] 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%."

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[11/].

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;

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[11] 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.

- 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 DQ1a through DQ1d 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 DQ2 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) 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 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.

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).[12/]

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 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 IA1 shows groundfish landings in 2003 by vessels with limited entry trawl permits using all types of gear. Table IA2 repeats this breakout for landings in 1998.

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12/ 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.

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TABLE REG1. 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 HL1.2. Projected OY for West Coast groundfish. 2004-2006 from Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery. Projections 2005-2006 ABC document (default), or stock assessment and rebuilding plan projections (in boxes).

Stock	2004	2005	2006	2010	2015	2020
LINGCOD - coastwide	735	2,414	2,414	2,414	2,414	2,414
Columbia and U.S./Vanc. areas						
Eureka, Monterey, and Conception areas						
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

Table 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 BC1.2. Reasons given for discard during three years of the Oregon Enhanced Data Collection Project (EDCP). Percentages based on pounds discarded and recorded reasons for discard of species (market, quality, or regulation). Species pounds discarded for unspecified or unknown reason were not included in total pounds used to calculate percentages. Approximately 46% of the discarded speciesby weight had reasons associated with the discard. Enviroment 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.

		1997-99					
Environment	**Species**	**Number of EDCP Records**	**Weight of Discard in lbs**	**Market**	**Quality**	**Regulation**	**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 categ*	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 Discar	7,455	2,665,545				
	Total All Discard	16,375	5,002,622				

Table 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	PRELIMINARY		TARGETS						
Species	Estimated Total Catch	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 BC1.4 Draft estimated 2003 total catch mortality of selected groundfish species from West Coast commercial, tribal and recreational fisheries (mt). a/

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)
	LANDINGS AND MORTALITY			TARGETS					
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	0.2	0.2		
Cowcod, Conception	0.0		0.0	5	2				
Yelloweye	8.1	1.5	6.6	52	22	0.3	0.3		1.3
Darkblotched	139.9	51.8	88.1	205	172	47.3	47.3	4.3	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 Washington EFP included full retention of shelf rockfish, no at-sea discard of these species was estimated for tows occuring within the RCA off Washington, or on tows that exceeded the 2-month allowance of arrowtooth flounder outside the EFP. 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 limited geographic coverage of available data, fixed-gear discard amounts for species 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.

e/ Includes "unspecified thornyheads" allocated based on ratios estimated from California landings and At Sea north/south ABCs.

Table 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	PRELIMINARY Estimated Commercial Fishery Discard Mortality b/	Actual Landings c/	Total Catch ABC	Total Catch OY	% shoreside landed catch	Estimated shoreside landed catch	Shoreside discard	Shoreside discard mortality	%shoreside discard mortality	% At-sea Catch	Estimated at-sea retained catch	At-sea whiting fishery discards	% at-sea discard mortality
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	129,999.4	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		
Unspecified 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 ismortality 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 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	PRELIMINARY Estimated Commercial Fishery Discard Mortality b/	Actual Landings c/	Total Catch ABC	Total Catch OY	% shoreside landed catch	Estimated shoreside landed catch	Shoreside discard	Shoreside discard mortality	%shoreside discard mortality	% At-sea Catch	Estimated at-sea retained catch	At-sea whiting fishery discards	% at-sea discard mortality
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	141,491.1	188,000	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 e/	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 e/	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 Rockfish (north)	174.0	0.0	174.0	615		49.9%	0					0.0		
Black Rockfish (south)	976.1	0.0	976.1	500		49.9%	0					0.0		
Black Rockfish Total	1,150.1	0.0	1,150.1	1,115		49.9%	1			0.0%		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 ismortality 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 BC1.7 Draft estimated 2002 and 2003 percent discard mortality of selected groundfish species from West Coast commercial, tribal, and recreational fisheries compared to estimates from expanded U.S. limited entry shoreside and at-sea trawl sectors, and B.C. bottom trawl trips based on 100% observer coverage (Branch et al., 2004). B.C. total percent discard include species not listed.

	2002-03 W.C. [a]		*W.C. Shoreside*		*W.C. At-sea*				*Branch et.al (2004)*	
							W.C	W.C.	B.C.	B.C.
Species	2002	2003	2002	2003	2002	2003	01-02	02-03	01-02	02-03
Lingcod	16%	6%	61%	53%	33%	53%	74%	77%	8%	11%
Pacific Cod	5%	6%	6%	7%		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 Thornyheads	34%	32%	37%	36%	0%	0%	34%	31%	5%	4%
Longspine Thds. North	18%	18%	18%	18%			19%	20%	10%	10%
Longspine Thds. South										
Unspecified 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%								
Black Rockfish Total		0%		0%			44%	0%	1%	1%

[a] Preliminary estimated discard mortality rate in the West Coast groundfish commercial fishery with respect to estimated total catch of all fisheries, and based on West Coast Observer Program data.

Table 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 manageing 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 penalities for overcatches	Provides incentive to incorporate selective fishing strategies that minimize bycatch of overfished or prohibited species, promotes individual accountability.	If penalities 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 AE1.1. 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
Polluck	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 SQ1. Onshore Ex-Vessel Value by Port Group in 2003.

Port Group	GF LE (EEZ) Trawl Ex-Vessel Value			Total Onshore Ex-Vessel	Percent GF LE Trawl Ex-Vessel
	Non-Whiting	Whiting	Total	Value	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%

Notes:

Table 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 PORTS													
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.
4. Large buyers are those with purchases over $500,000.
C = Data withheld for confidentiality reasons.

Table SQ3. Onshore Ex-processor Value and Regional Income Impacts 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 PORTS										
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), which is based on 2003 PacFIN landings and 1998 IMPLAN coefficients and multipliers.

Table DQ1a. PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
WOC	1 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	2 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	3 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	4 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	5 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	6 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	7 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	8 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	9 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	11 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	12 SHORTBELLY ROCKFISH	6,195	94,685	88,490	+	12,600	70,370	57,770	+	61,440	79,146	17,706	+
WOC	13 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	14 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	15 SPLITNOSE ROCKFISH	4,029	1,019,969	1,015,940	+	18	955,820	955,802	+	370	1,064,174	1,063,804	+
WOC	16 BANK ROCKFISH	56,439	749,602	693,163	+	106,377	899,800	793,423	+	66,639	1,221,580	1,154,941	+
WOC	17 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	18 BLACK ROCKFISH	456,967	683,231	226,264	+	465,134	590,960	125,826	+	582,558	569,149	13,409	<
WOC	19 BLACKGILL ROCKFISH	579,910	862,273	282,363	+	410,645	774,388	363,743	+	479,863	825,502	345,639	+
WOC	20 COWCOD ROCKFISH	33,718	75,597	41,879	+	52,129	144,034	91,905	+	34,054	88,452	54,398	+
WOC	21 DARKBLOTCHED ROCKFISH		1,882,413	1,882,413	+		1,668,955	1,668,955	+	178	1,769,899	1,769,721	+
WOC	22 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	23 SHARPCHIN ROCKFISH		1,074,289	1,074,289	+		836,965	836,965	+		748,550	748,550	+
WOC	24 YELLOWEYE ROCKFISH	56,765	551,500	494,735	+	67,001	629,393	562,392	+	99,667	457,641	357,974	+
WOC	25 YELLOWMOUTH ROCKFISH		565,402	565,402	+		261,345	261,345	+		416,617	416,617	+
WOC	26 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	27 ENGLISH SOLE	3,094,450	3,093,994	456	<	3,068,628	3,068,554	74	<	3,196,424	3,196,351	73	<
WOC	28 PETRALE SOLE	3,242,583	3,242,272	311	<	3,865,899	3,865,822	77	<	4,149,998	4,149,895	103	<
WOC	29 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	30 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	<
	Percent Movement			46%				19%				17%	

Table DQ1a. PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003

		1997				1998				1999			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
WOC	1 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	2 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	3 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	4 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	5 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	6 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	7 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	8 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	9 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	11 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	12 SHORTBELLY ROCKFISH	44,888	164,870	119,982	+	15,088	52,054	36,966	+	17,634	17,813	179	+
WOC	13 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	14 BOCACCIO	599,993	1,563,145	963,152	+	297,317	954,855	657,538	+	150,905	382,829	231,924	+
WOC	15 SPLITNOSE ROCKFISH	936	1,242,041	1,241,105	+	89,585	3,332,739	3,243,154	+	74,081	532,393	458,312	+
WOC	16 BANK ROCKFISH	81,466	930,022	848,556	+	451,652	1,226,260	774,608	+	27,166	84,719	57,553	+
WOC	17 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	18 BLACK ROCKFISH	667,829	675,717	7,888	+	624,227	644,164	19,937	+	411,418	392,661	18,757	<
WOC	19 BLACKGILL ROCKFISH	414,261	825,508	411,247	+	348,464	525,112	176,648	+	77,976	161,273	83,297	+
WOC	20 COWCOD ROCKFISH	21,635	120,117	98,482	+	25,771	43,030	17,259	+	6,810	24,806	17,996	+
WOC	21 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	22 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	23 SHARPCHIN ROCKFISH		864,696	864,696	+		268,236	268,236	+		144,838	144,838	+
WOC	24 YELLOWEYE ROCKFISH	92,221	437,598	345,377	+	38,216	177,339	139,123	+	20,670	250,222	229,552	+
WOC	25 YELLOWMOUTH ROCKFISH		249,557	249,557	+		97,748	97,748	+		90,606	90,606	+
WOC	26 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	27 ENGLISH SOLE	3,729,087	3,729,005	82	<	3,260,367	3,260,020	347	<	2,584,809	2,584,743	66	<
WOC	28 PETRALE SOLE	4,387,578	4,387,541	37	<	3,363,974	3,363,905	69	<	3,428,529	3,428,465	64	<
WOC	29 ARROWTOOTH FLOUNDER	8,026,214	8,026,137	77	<	10,749,413	10,749,370	43	<	14,227,305	14,227,270	35	<
WOC	30 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	143,058,858	142,642,590	24,655,530	<	113,526,904	113,183,675	24,806,721	<	106,724,724	106,258,752	9,665,574	<
	Percent Movement			17%				22%				9%	

Table DQ1a. PacFIN landings of groundfish groups on the West Coast recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direction	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direction	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direction	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
WOC	1 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	+	1,282,904	1,280,655	2,249	<
WOC	2 CANARY ROCKFISH	218,288	223,503	5,215	+	197,629	196,475	1,154	<	153,888	155,348	1,460	+	169,198	169,206	8	+
WOC	3 WIDOW ROCKFISH	8,506,565	8,525,619	19,054	+	5,258,424	5,295,547	37,123	+	896,964	899,799	2,835	+	417,950	417,950	-	0
WOC	4 LINGCOD	475,382	475,759	377	+	397,646	397,305	341	<	567,774	567,703	71	<	504,200	504,271	71	+
WOC	5 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	+	12,156,185	12,191,686	35,501	+
WOC	6 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	<	3,559,033	3,430,688	128,345	<
WOC	7 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	+	1,590,470	1,745,525	155,055	+
WOC	8 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	+	16,420,246	16,420,242	4	<
WOC	9 PACIFIC COD	883,149	883,178	29	+	1,011,686	1,011,608	78	<	2,149,757	2,149,659	98	<	3,091,235	3,091,332	97	+
WOC	11 PACIFIC OCEAN PERCH	1,141,874	1,158,661	16,787	+	709,604	708,326	1,278	<	446,132	449,532	3,400	+	546,234	553,751	7,517	+
WOC	12 SHORTBELLY ROCKFISH	42,795	42,795	-	0	11,679	11,679	-	0	138	269	131	+	1,221	1,234	13	+
WOC	13 CHILIPEPPER	986,692	1,012,979	26,287	+	764,281	954,261	189,980	+	346,795	367,102	20,307	+	38,799	40,002	1,203	+
WOC	14 BOCACCIO	54,486	67,160	12,674	+	48,471	83,394	34,923	+	46,257	78,475	32,218	+	1,368	35,951	34,583	+
WOC	15 SPLITNOSE ROCKFISH	49,962	232,378	182,416	+	30,475	171,127	140,652	+	40,304	149,345	109,041	+	49,778	349,592	299,814	+
WOC	16 BANK ROCKFISH	180,422	187,017	6,595	+	124,051	203,059	79,008	+	439,106	646,556	207,450	+	159,733	226,682	66,949	+
WOC	17 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	<	949,890	878,986	70,904	<
WOC	18 BLACK ROCKFISH	350,682	337,240	13,442	<	555,764	542,192	13,572	<	484,113	487,064	2,951	+	387,705	384,079	3,626	<
WOC	19 BLACKGILL ROCKFISH	99,118	191,522	92,404	+	181,784	294,028	112,244	+	207,685	330,793	123,108	+	395,465	435,749	40,284	+
WOC	20 COWCOD ROCKFISH	1,626	2,909	1,283	+	56	1,904	1,848	+	113	311	198	+	11	101	90	+
WOC	21 DARKBLOTCHED ROCKFISH	25,148	497,257	472,109	+	206,606	357,228	150,622	+	174,543	236,009	61,466	+	164,615	177,041	12,426	+
WOC	22 REDSTRIPE ROCKFISH	52,992	46,511	6,481	<	30,985	32,098	1,113	+	30,655	23,713	6,942	<	39,377	15,260	24,117	<
WOC	23 SHARPCHIN ROCKFISH		21,634	21,634	+		6,886	6,886	+		20,228	20,228	+		8,869	8,869	+
WOC	24 YELLOWEYE ROCKFISH	7,298	18,388	11,090	+	8,423	27,253	18,830	+	14,956	15,979	1,023	+	10,565	11,499	934	+
WOC	25 YELLOWMOUTH ROCKFISH		22,652	22,652	+		8,345	8,345	+		4,575	4,575	+		9,069	9,069	+
WOC	26 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	<	2,038,197	1,625,426	412,771	<
WOC	27 ENGLISH SOLE	2,564,471	2,564,564	93	+	3,098,779	3,099,377	598	+	3,289,232	3,288,679	553	<	2,535,543	2,535,567	24	+
WOC	28 PETRALE SOLE	4,230,995	4,231,402	407	+	4,073,668	4,102,374	28,706	+	4,025,967	4,025,527	440	<	4,473,764	4,473,785	21	+
WOC	29 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	<	6,387,947	6,387,947	-	0
WOC	30 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	+	8,781,291	8,781,308	17	+
	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	<	66,152,924	66,183,453	1,314,561	+
	Percent Movement			3%				3%				2%				2%	

Table DQ1b. PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	1994 Unadjusted	1994 Adjusted	1994 Movement	1994 Direction	1995 Unadjusted	1995 Adjusted	1995 Movement	1995 Direction	1996 Unadjusted	1996 Adjusted	1996 Movement	1996 Direction
C	1 YELLOWTAIL ROCKFISH	545,863	708,588	162,725	+	533,709	670,088	136,379	+	465,550	595,758	130,208	+
C	2 CANARY ROCKFISH	207,276	463,788	256,512	+	341,978	429,008	87,030	+	404,443	595,134	190,691	+
C	3 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	4 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	5 SABLEFISH	4,818,728	4,818,844	116	+	6,215,008	6,215,012	4	+	7,045,716	7,045,716	-	0
C	6 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	7 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	8 DOVER SOLE	9,893,540	9,893,540	-	0	13,445,269	13,445,269	-	0	14,119,647	14,119,647	-	0
C	9 PACIFIC COD	28	28	-	0	4	4	-	0	10	10	-	0
C	11 PACIFIC OCEAN PERCH	323	14,407	14,084	+	20	19,400	19,380	+	45	40,560	40,515	+
C	12 SHORTBELLY ROCKFISH	6,195	10,161	3,966	+	12,600	24,938	12,338	+	61,440	70,779	9,339	+
C	13 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	14 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	15 SPLITNOSE ROCKFISH	4,029	702,350	698,321	+	18	763,530	763,512	+	370	912,101	911,731	+
C	16 BANK ROCKFISH	56,439	718,211	661,772	+	106,377	893,495	787,118	+	66,639	1,218,098	1,151,459	+
C	17 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	18 BLACK ROCKFISH	248,729	294,009	45,280	+	244,943	363,533	118,590	+	272,937	255,752	17,185	<
C	19 BLACKGILL ROCKFISH	579,910	852,637	272,727	+	410,645	732,824	322,179	+	479,863	808,680	328,817	+
C	20 COWCOD ROCKFISH	33,718	74,904	41,186	+	52,129	141,376	89,247	+	34,054	86,177	52,123	+
C	21 DARKBLOTCHED ROCKFISH		635,818	635,818	+		783,051	783,051	+	178	899,526	899,348	+
C	22 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	23 SHARPCHIN ROCKFISH		323,501	323,501	+		190,924	190,924	+		199,545	199,545	+
C	24 YELLOWEYE ROCKFISH	56,765	118,518	61,753	+	67,001	105,848	38,847	+	99,667	144,495	44,828	+
C	25 YELLOWMOUTH ROCKFISH		10,489	10,489	+						11,967	11,967	+
C	26 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	27 ENGLISH SOLE	1,020,041	1,020,041	-	0	1,103,120	1,103,120	-	0	1,281,487	1,281,487	-	0
C	28 PETRALE SOLE	1,211,554	1,211,555	1	+	1,306,892	1,306,892	-	0	1,803,987	1,803,987	-	0
C	29 ARROWTOOTH FLOUNDER	161,685	161,685	-	0	260,059	260,059	-	0	111,287	111,287	-	0
C	30 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	<
	Percent Movement			57%				25%				23%	

Table DQ1b. PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	1997 Unadjusted	1997 Adjusted	1997 Movement	1997 Direction	1998 Unadjusted	1998 Adjusted	1998 Movement	1998 Direction	1999 Unadjusted	1999 Adjusted	1999 Movement	1999 Direction
C	1 YELLOWTAIL ROCKFISH	549,985	906,149	356,164	+	755,340	960,331	204,991	+	206,451	210,726	4,275	+
C	2 CANARY ROCKFISH	477,193	500,152	22,959	+	399,366	428,714	29,348	+	233,097	259,855	26,758	+
C	3 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	4 LINGCOD	1,124,556	1,124,556	-	0	331,902	331,955	53	+	313,608	313,608	-	0
C	5 SABLEFISH	6,542,876	6,543,092	216	+	3,193,056	3,193,052	4	<	4,351,930	4,352,337	407	+
C	6 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	7 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	8 DOVER SOLE	11,703,251	11,703,251	-	0	7,874,916	7,874,916	-	0	8,417,520	8,417,520	-	0
C	9 PACIFIC COD	38	38	-	0	47	47	-	0	49	49	-	0
C	11 PACIFIC OCEAN PERCH		33,639	33,639	+		41,842	41,842	+	3,426	43,147	39,721	+
C	12 SHORTBELLY ROCKFISH	44,888	134,015	89,127	+	15,088	39,690	24,602	+	17,634	17,658	24	+
C	13 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	14 BOCACCIO	599,993	695,041	95,048	+	297,317	338,034	40,717	+	150,905	159,636	8,731	+
C	15 SPLITNOSE ROCKFISH	936	1,034,516	1,033,580	+	89,585	3,203,714	3,114,129	+	74,081	450,277	376,196	+
C	16 BANK ROCKFISH	81,466	921,045	839,579	+	451,652	1,223,111	771,459	+	27,166	71,138	43,972	+
C	17 OTHER SEBASTES COMPLEX	574,684	1,427,808	853,124	+	535,239	1,450,037	914,798	+	441,236	953,415	512,179	+
C	18 BLACK ROCKFISH	269,199	277,352	8,153	+	188,741	192,076	3,335	+	130,272	117,815	12,457	<
C	19 BLACKGILL ROCKFISH	414,261	597,005	182,744	+	348,464	501,328	152,864	+	77,976	119,929	41,953	+
C	20 COWCOD ROCKFISH	21,635	112,571	90,936	+	25,771	35,777	10,006	+	6,810	24,229	17,419	+
C	21 DARKBLOTCHED ROCKFISH	25,513	941,468	915,955	+	8,203	1,058,227	1,050,024	+	1,259	245,785	244,526	+
C	22 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	23 SHARPCHIN ROCKFISH		248,555	248,555	+		90,776	90,776	+		27,391	27,391	+
C	24 YELLOWEYE ROCKFISH	92,221	135,707	43,486	+	38,216	47,255	9,039	+	20,670	49,609	28,939	+
C	25 YELLOWMOUTH ROCKFISH		1,400	1,400	+		320	320	+				
C	26 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	27 ENGLISH SOLE	1,433,932	1,433,932	-	0	941,188	941,188	-	0	849,839	849,839	-	0
C	28 PETRALE SOLE	1,832,861	1,832,861	-	0	1,042,054	1,042,054	-	0	1,249,621	1,249,621	-	0
C	29 ARROWTOOTH FLOUNDER	104,739	104,739	-	0	82,096	82,096	-	0	94,301	94,301	-	0
C	30 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	<
	Percent Movement			25%				39%				11%	

Table DQ1b. PacFIN landings of groundfish groups in California recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direction	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direction	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direction	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
C	1 YELLOWTAIL ROCKFISH	108,049	106,222	1,827	<	91,631	97,082	5,451	+	30,765	40,630	9,865	+	5,045	5,045	-	0
C	2 CANARY ROCKFISH	34,963	38,206	3,243	+	32,035	30,504	1,531	<	24,051	25,396	1,345	+	1,150	1,150	-	0
C	3 WIDOW ROCKFISH	1,583,438	1,588,899	5,461	+	731,294	735,299	4,005	+	108,028	107,804	224	<	10,186	10,186	-	0
C	4 LINGCOD	119,938	119,938	-	0	138,244	137,882	362	<	179,295	179,295	-	0	115,749	115,748	1	<
C	5 SABLEFISH	4,139,830	4,139,828	2	<	3,419,904	3,434,594	14,690	+	2,894,682	2,894,682	-	0	3,613,876	3,613,995	119	+
C	6 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	<	1,863,127	1,761,674	101,453	<
C	7 SHORTSPINE THORNYHEAD	636,635	910,163	273,528	+	451,692	537,681	85,989	+	857,478	1,026,401	168,923	+	839,955	968,797	128,842	+
C	8 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	+	7,188,066	7,188,066	-	0
C	9 PACIFIC COD	22	22	-	0	798	798	-	0	6	6	-	0	1,316	1,316	-	0
C	11 PACIFIC OCEAN PERCH	7,143	13,584	6,441	+	2,195	1,160	1,035	<	108	1,672	1,564	+		278	278	+
C	12 SHORTBELLY ROCKFISH	8,710	8,710	-	0	11,470	11,470	-	0	25	156	131	+	1,123	1,130	7	+
C	13 CHILIPEPPER	986,692	1,011,962	25,270	+	764,281	727,935	36,346	<	346,795	366,845	20,050	+	38,799	38,754	45	<
C	14 BOCACCIO	54,486	60,670	6,184	+	48,471	49,453	982	+	46,257	47,742	1,485	+	1,368	1,368	-	0
C	15 SPLITNOSE ROCKFISH	49,962	180,314	130,352	+	30,475	161,578	131,103	+	40,304	132,498	92,194	+	49,778	333,335	283,557	+
C	16 BANK ROCKFISH	180,422	182,165	1,743	+	124,051	202,734	78,683	+	439,106	646,542	207,436	+	159,733	226,589	66,856	+
C	17 OTHER SEBASTES COMPLEX	835,336	588,782	246,554	<	843,595	540,126	303,469	<	774,234	472,903	301,331	<	314,948	339,204	24,256	+
C	18 BLACK ROCKFISH	110,830	103,284	7,546	<	229,671	219,826	9,845	<	203,988	208,193	4,205	+	128,414	128,494	80	+
C	19 BLACKGILL ROCKFISH	99,118	182,418	83,300	+	181,784	286,922	105,138	+	207,685	328,004	120,319	+	395,465	420,486	25,021	+
C	20 COWCOD ROCKFISH	1,626	2,882	1,256	+	56	1,694	1,638	+	113	194	81	+	11	101	90	+
C	21 DARKBLOTCHED ROCKFISH	25,148	233,870	208,722	+	38,522	190,301	151,779	+	42,613	105,616	63,003	+	13,151	25,374	12,223	+
C	22 REDSTRIPE ROCKFISH	52,992	38,408	14,584	<	30,985	17,053	13,932	<	30,655	10,229	20,426	<	39,377	12,021	27,356	<
C	23 SHARPCHIN ROCKFISH		3,977	3,977	+		1,706	1,706	+		2,465	2,465	+				
C	24 YELLOWEYE ROCKFISH	7,298	8,599	1,301	+	8,423	9,454	1,031	+	146	527	381	+	22	29	7	+
C	25 YELLOWMOUTH ROCKFISH																
C	26 OTHER ROCKFISH	1,283,505	1,053,340	230,165	<	1,040,632	924,609	116,023	<	926,392	702,297	224,095	<	995,206	580,743	414,463	<
C	27 ENGLISH SOLE	668,165	668,165	-	0	929,144	929,779	635	+	822,078	822,078	-	0	289,836	289,836	-	0
C	28 PETRALE SOLE	1,400,703	1,400,703	-	0	1,238,371	1,267,667	29,296	+	1,057,633	1,057,633	-	0	838,339	838,339	-	0
C	29 ARROWTOOTH FLOUNDER	57,646	57,646	-	0	20,586	21,003	417	+	64,085	64,085	-	0	95,711	95,711	-	0
C	30 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	+	2,528,988	2,529,003	15	+
	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	<	19,528,739	19,526,772	1,084,669	<
	Percent Movement			6%				6%				7%				6%	

Table DQ1c. PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	1994 Unadjusted	1994 Adjusted	1994 Movement	1994 Direction	1995 Unadjusted	1995 Adjusted	1995 Movement	1995 Direction	1996 Unadjusted	1996 Adjusted	1996 Movement	1996 Direction
O	1 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	2 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	3 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	4 LINGCOD	1,898,239	1,897,556	683	<	1,433,279	1,433,176	103	<	1,581,978	1,581,959	19	<
O	5 SABLEFISH	9,037,724	9,037,690	34	<	6,980,398	6,980,376	22	<	7,065,073	7,064,938	135	<
O	6 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	7 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	8 DOVER SOLE	8,533,771	8,533,509	262	<	7,793,874	7,793,526	348	<	10,334,613	10,334,592	21	<
O	9 PACIFIC COD	376,053	375,803	250	<	177,067	176,989	78	<	185,068	185,058	10	<
O	11 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	12 SHORTBELLY ROCKFISH		84,524	84,524	+		45,402	45,402	+		8,317	8,317	+
O	13 CHILIPEPPER		41,120	41,120	+		20,254	20,254	+		20,315	20,315	+
O	14 BOCACCIO		278,745	278,745	+		222,796	222,796	+		174,489	174,489	+
O	15 SPLITNOSE ROCKFISH		284,793	284,793	+		146,617	146,617	+		99,655	99,655	+
O	16 BANK ROCKFISH		31,391	31,391	+		6,305	6,305	+		3,482	3,482	+
O	17 OTHER SEBASTES COMPLEX		1,136,754	1,136,754	+		1,001,675	1,001,675	+		1,353,892	1,353,892	+
O	18 BLACK ROCKFISH	208,238	384,579	176,341	+	220,191	213,200	6,991	<	309,621	313,397	3,776	+
O	19 BLACKGILL ROCKFISH		9,636	9,636	+		13,233	13,233	+		5,166	5,166	+
O	20 COWCOD ROCKFISH		693	693	+		2,658	2,658	+		2,275	2,275	+
O	21 DARKBLOTCHED ROCKFISH		1,207,929	1,207,929	+		741,925	741,925	+		665,092	665,092	+
O	22 REDSTRIPE ROCKFISH		847,538	847,538	+		468,992	468,992	+		400,391	400,391	+
O	23 SHARPCHIN ROCKFISH		628,000	628,000	+		287,415	287,415	+		263,262	263,262	+
O	24 YELLOWEYE ROCKFISH		223,801	223,801	+		327,517	327,517	+		213,858	213,858	+
O	25 YELLOWMOUTH ROCKFISH		515,358	515,358	+		194,701	194,701	+		201,717	201,717	+
O	26 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	27 ENGLISH SOLE	789,608	789,157	451	<	689,004	688,936	68	<	860,721	860,654	67	<
O	28 PETRALE SOLE	1,357,412	1,357,092	320	<	1,756,061	1,755,990	71	<	1,588,255	1,588,153	102	<
O	29 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	30 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	<
	Percent Movement			49%				14%				13%	

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Table DQ1c. PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	1997 Unadjusted	1997 Adjusted	1997 Movement	1997 Direction	1998 Unadjusted	1998 Adjusted	1998 Movement	1998 Direction	1999 Unadjusted	1999 Adjusted	1999 Movement	1999 Direction
O	1 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	2 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	3 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	4 LINGCOD	1,695,848	1,692,524	3,324	<	355,727	355,648	79	<	383,210	383,206	4	<
O	5 SABLEFISH	6,542,950	6,541,210	1,740	<	3,888,687	3,888,647	40	<	6,590,299	6,590,258	41	<
O	6 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	7 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	8 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	9 PACIFIC COD	115,644	114,740	904	<	173,076	172,265	811	<	82,995	82,969	26	<
O	11 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	12 SHORTBELLY ROCKFISH		30,855	30,855	+		12,364	12,364	+		155	155	+
O	13 CHILIPEPPER		19,510	19,510	+		50,425	50,425	+		4,417	4,417	+
O	14 BOCACCIO		176,210	176,210	+		127,529	127,529	+		63,275	63,275	+
O	15 SPLITNOSE ROCKFISH		175,573	175,573	+		104,943	104,943	+		76,543	76,543	+
O	16 BANK ROCKFISH		8,977	8,977	+		3,149	3,149	+		13,581	13,581	+
O	17 OTHER SEBASTES COMPLEX		643,494	643,494	+		954,899	954,899	+		508,089	508,089	+
O	18 BLACK ROCKFISH	398,630	396,255	2,375	<	435,486	411,777	23,709	<	281,146	274,846	6,300	<
O	19 BLACKGILL ROCKFISH		7,273	7,273	+		3,499	3,499	+		9,689	9,689	+
O	20 COWCOD ROCKFISH		7,546	7,546	+		7,253	7,253	+		577	577	+
O	21 DARKBLOTCHED ROCKFISH		654,641	654,641	+		752,399	752,399	+		522,233	522,233	+
O	22 REDSTRIPE ROCKFISH		204,347	204,347	+		181,889	181,889	+		49,289	49,289	+
O	23 SHARPCHIN ROCKFISH		376,863	376,863	+		137,187	137,187	+		54,777	54,777	+
O	24 YELLOWEYE ROCKFISH		271,400	271,400	+		85,766	85,766	+		120,262	120,262	+
O	25 YELLOWMOUTH ROCKFISH		122,445	122,445	+		63,083	63,083	+		48,093	48,093	+
O	26 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	27 ENGLISH SOLE	1,214,554	1,214,474	80	<	1,047,200	1,046,852	348	<	768,843	768,772	71	<
O	28 PETRALE SOLE	1,776,714	1,776,678	36	<	1,503,352	1,503,286	66	<	1,486,914	1,486,859	55	<
O	29 ARROWTOOTH FLOUNDER	2,561,594	2,561,515	79	<	3,506,589	3,506,552	37	<	5,021,558	5,021,525	33	<
O	30 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	<
	Percent Movement			11%				12%				7%	

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Table DQ1c. PacFIN landings of groundfish groups in Oregon recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direction	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direction	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direction	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
O	1 YELLOWTAIL ROCKFISH	4,427,720	4,414,727	12,993	<	2,432,934	2,171,981	260,953	<	774,250	770,135	4,115	<	123,547	121,283	2,264	<
O	2 CANARY ROCKFISH	71,346	71,682	336	+	42,045	42,301	256	+	38,240	37,942	298	<	8,111	8,111	-	0
O	3 WIDOW ROCKFISH	6,004,282	6,017,825	13,543	+	3,742,651	3,775,510	32,859	+	557,190	560,167	2,977	+	126,710	126,710	-	0
O	4 LINGCOD	141,877	141,882	5	+	150,066	150,079	13	+	181,572	181,492	80	<	152,751	152,752	1	+
O	5 SABLEFISH	6,256,288	6,255,483	805	<	5,697,280	5,697,156	124	<	3,184,819	3,184,770	49	<	4,786,031	4,786,037	6	+
O	6 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	<	1,625,772	1,603,659	22,113	<
O	7 SHORTSPINE THORNYHEAD	628,308	693,336	65,028	+	495,351	507,268	11,917	+	577,238	587,822	10,584	+	648,870	670,330	21,460	+
O	8 DOVER SOLE	10,393,272	10,392,656	616	<	8,241,861	8,241,852	9	<	6,001,276	6,001,275	1	<	7,983,418	7,983,418	-	0
O	9 PACIFIC COD	24,164	24,149	15	<	68,541	68,460	81	<	59,352	59,239	113	<	634,735	634,735	-	0
O	11 PACIFIC OCEAN PERCH	220,184	224,342	4,158	+	426,836	425,294	1,542	<	235,660	236,205	545	+	214,408	219,842	5,434	+
O	12 SHORTBELLY ROCKFISH	34,085	34,085	-	0	209	209	-	0	113	113	-	0	98	104	6	+
O	13 CHILIPEPPER		422	422	+		226,326	226,326	+		91	91	+		390	390	+
O	14 BOCACCIO		472	472	+		3,441	3,441	+		289	289	+		4,146	4,146	+
O	15 SPLITNOSE ROCKFISH		45,408	45,408	+		7,591	7,591	+		8,083	8,083	+		10,617	10,617	+
O	16 BANK ROCKFISH		4,852	4,852	+		325	325	+		14	14	+		93	93	+
O	17 OTHER SEBASTES COMPLEX	921,024	597,104	323,920	<	420,941	370,611	50,330	<	234,228	207,852	26,376	<	273,824	230,920	42,904	<
O	18 BLACK ROCKFISH	239,852	233,956	5,896	<	326,093	322,366	3,727	<	280,125	278,260	1,865	<	259,291	255,585	3,706	<
O	19 BLACKGILL ROCKFISH		3,728	3,728	+		5,541	5,541	+		1,639	1,639	+		7,462	7,462	+
O	20 COWCOD ROCKFISH		27	27	+		210	210	+		117	117	+				
O	21 DARKBLOTCHED ROCKFISH		244,013	244,013	+	148,875	147,391	1,484	<	116,158	114,254	1,904	<	145,686	145,741	55	+
O	22 REDSTRIPE ROCKFISH		4,968	4,968	+		5,594	5,594	+		1,615	1,615	+		636	636	+
O	23 SHARPCHIN ROCKFISH		10,644	10,644	+		4,608	4,608	+		4,823	4,823	+		6,248	6,248	+
O	24 YELLOWEYE ROCKFISH		9,416	9,416	+		14,772	14,772	+	3,512	3,591	79	+	3,173	4,100	927	+
O	25 YELLOWMOUTH ROCKFISH		19,187	19,187	+		8,330	8,330	+		4,552	4,552	+		9,048	9,048	+
O	26 OTHER ROCKFISH	322,399	325,558	3,159	+	382,344	384,686	2,342	+	420,632	423,712	3,080	+	438,817	440,509	1,692	+
O	27 ENGLISH SOLE	542,991	542,985	6	<	895,972	895,935	37	<	960,016	959,463	553	<	773,668	773,668	-	0
O	28 PETRALE SOLE	1,896,175	1,896,172	3	<	2,033,638	2,032,769	869	<	1,967,931	1,967,491	440	<	2,424,986	2,424,986	-	0
O	29 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	<	1,768,611	1,768,611	-	0
O	30 OTHER GROUNDFISH	2,944,324	2,944,270	54	<	2,391,003	2,390,408	595	<	2,567,622	2,567,483	139	<	3,350,330	3,350,329	1	<
	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	<	25,742,837	25,740,070	139,209	<
	Percent Movement			2%				2%				0%				1%	

Table DQ1d. PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003

		1994				1995				1996			
AGID	groundfish groups	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
W	1 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	2 CANARY ROCKFISH		1,977,646	1,977,646	+	293,395	444,366	150,971	+	380,638	546,663	166,025	+
W	3 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	4 LINGCOD	3,256,159	3,256,188	29	+	1,233,875	1,233,889	14	+	1,446,336	1,446,108	228	<
W	5 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	6 LONGSPINE THORNYHEAD					932,949	849,641	83,308	<	737,599	681,757	55,842	<
W	7 SHORTSPINE THORNYHEAD	1,251,004	2,415,294	1,164,290	+	343,841	432,092	88,251	+	398,359	453,528	55,169	+
W	8 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	9 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	11 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	12 SHORTBELLY ROCKFISH						30	30	+		50	50	+
W	13 CHILIPEPPER												
W	14 BOCACCIO		598,686	598,686	+		925,525	925,525	+		357,947	357,947	+
W	15 SPLITNOSE ROCKFISH		32,826	32,826	+		45,673	45,673	+		52,418	52,418	+
W	17 OTHER SEBASTES COMPLEX		341,161	341,161	+		2,419,423	2,419,423	+		1,888,834	1,888,834	+
W	18 BLACK ROCKFISH		4,643	4,643	+		14,227	14,227	+				
W	19 BLACKGILL ROCKFISH						28,331	28,331	+		11,656	11,656	+
W	21 DARKBLOTCHED ROCKFISH		38,666	38,666	+		143,979	143,979	+		205,281	205,281	+
W	22 REDSTRIPE ROCKFISH		147,548	147,548	+		1,224,231	1,224,231	+		1,041,594	1,041,594	+
W	23 SHARPCHIN ROCKFISH		122,788	122,788	+		358,626	358,626	+		285,743	285,743	+
W	24 YELLOWEYE ROCKFISH		209,181	209,181	+		196,028	196,028	+		99,288	99,288	+
W	25 YELLOWMOUTH ROCKFISH		39,555	39,555	+		66,644	66,644	+		202,933	202,933	+
W	26 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	27 ENGLISH SOLE	1,284,801	1,284,796	5	<	1,276,504	1,276,498	6	<	1,054,216	1,054,210	6	<
W	28 PETRALE SOLE	673,617	673,625	8	+	802,946	802,940	6	<	757,756	757,755	1	<
W	29 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	30 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	<
	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	<
	Percent Movement			37%				27%				22%	

Table DQ1d. PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	1997 Unadjusted	1997 Adjusted	1997 Movement	1997 Direction	1998 Unadjusted	1998 Adjusted	1998 Movement	1998 Direction	1999 Unadjusted	1999 Adjusted	1999 Movement	1999 Direction
W	1 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	2 CANARY ROCKFISH	629,969	719,623	89,654	+	733,662	754,818	21,156	+	508,488	539,359	30,871	+
W	3 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	4 LINGCOD	1,028,443	1,028,449	6	+	509,195	509,206	11	+	339,459	321,659	17,800	<
W	5 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	6 LONGSPINE THORNYHEAD	640,111	592,105	48,006	<	182,123	166,785	15,338	<	70,024	67,575	2,449	<
W	7 SHORTSPINE THORNYHEAD	356,507	383,415	26,908	+	221,407	233,130	11,723	+	157,781	167,765	9,984	+
W	8 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	9 PACIFIC COD	1,623,546	1,623,258	288	<	1,439,469	1,437,319	2,150	<	706,738	704,007	2,731	<
W	11 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	12 SHORTBELLY ROCKFISH												
W	13 CHILIPEPPER		56	56	+		130	130	+		2,204	2,204	+
W	14 BOCACCIO		691,894	691,894	+		489,292	489,292	+		159,918	159,918	+
W	15 SPLITNOSE ROCKFISH		31,952	31,952	+		24,082	24,082	+		5,573	5,573	+
W	17 OTHER SEBASTES COMPLEX		1,001,514	1,001,514	+		1,371,763	1,371,763	+		979,344	979,344	+
W	18 BLACK ROCKFISH		2,110	2,110	+		40,311	40,311	+				
W	19 BLACKGILL ROCKFISH		221,230	221,230	+		20,285	20,285	+		31,655	31,655	+
W	21 DARKBLOTCHED ROCKFISH		299,293	299,293	+		216,727	216,727	+		80,531	80,531	+
W	22 REDSTRIPE ROCKFISH		34,042	34,042	+		95,147	95,147	+		24,683	24,683	+
W	23 SHARPCHIN ROCKFISH		239,278	239,278	+		40,273	40,273	+		62,670	62,670	+
W	24 YELLOWEYE ROCKFISH		30,491	30,491	+		44,318	44,318	+		80,351	80,351	+
W	25 YELLOWMOUTH ROCKFISH		125,712	125,712	+		34,345	34,345	+		42,513	42,513	+
W	26 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	27 ENGLISH SOLE	1,080,601	1,080,599	2	<	1,271,979	1,271,980	1	+	966,127	966,132	5	+
W	28 PETRALE SOLE	778,003	778,002	1	<	818,568	818,565	3	<	691,994	691,985	9	<
W	29 ARROWTOOTH FLOUNDER	5,359,881	5,359,883	2	+	7,160,728	7,160,722	6	<	9,111,446	9,111,444	2	<
W	30 OTHER GROUNDFISH	5,815,215	5,815,219	4	+	3,927,411	3,927,409	2	<	2,763,781	2,760,620	3,161	<
	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	<
	Percent Movement			16%				16%				11%	

Table DQ1d. PacFIN landings of groundfish groups in Washington recorded before and after application of average species composition distributions: 1994-2003

AGID	groundfish groups	2000 Unadjusted	2000 Adjusted	2000 Movement	2000 Direction	2001 Unadjusted	2001 Adjusted	2001 Movement	2001 Direction	2002 Unadjusted	2002 Adjusted	2002 Movement	2002 Direction	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
W	1 YELLOWTAIL ROCKFISH	2,447,698	2,447,814	116	+	2,073,687	2,074,786	1,099	+	1,635,023	1,635,023	-	0	1,154,312	1,154,327	15	+
W	2 CANARY ROCKFISH	111,979	113,615	1,636	+	123,549	123,670	121	+	91,597	92,010	413	+	159,937	159,945	8	+
W	3 WIDOW ROCKFISH	918,845	918,895	50	+	784,479	784,738	259	+	231,746	231,828	82	+	281,054	281,054	-	0
W	4 LINGCOD	213,567	213,939	372	+	109,336	109,344	8	+	206,907	206,916	9	+	235,700	235,771	71	+
W	5 SABLEFISH	3,776,243	3,803,805	27,562	+	3,612,774	3,613,040	266	+	2,567,157	2,579,005	11,848	+	3,756,278	3,791,654	35,376	+
W	6 LONGSPINE THORNYHEAD	41,496	34,219	7,277	<	37,451	33,121	4,330	<	17,472	18,381	909	+	70,134	65,355	4,779	<
W	7 SHORTSPINE THORNYHEAD	127,971	135,768	7,797	+	100,175	104,821	4,646	+	76,670	76,529	141	<	101,645	106,398	4,753	+
W	8 DOVER SOLE	2,028,856	2,031,907	3,051	+	1,715,662	1,716,114	452	+	1,157,682	1,157,687	5	+	1,248,762	1,248,758	4	<
W	9 PACIFIC COD	858,963	859,007	44	+	942,347	942,350	3	+	2,090,399	2,090,414	15	+	2,455,184	2,455,281	97	+
W	11 PACIFIC OCEAN PERCH	914,547	920,735	6,188	+	280,573	281,872	1,299	+	210,364	211,655	1,291	+	331,826	333,631	1,805	+
W	12 SHORTBELLY ROCKFISH																
W	13 CHILIPEPPER		595	595	+						166	166	+		858	858	+
W	14 BOCACCIO		6,018	6,018	+		30,500	30,500	+		30,444	30,444	+		30,437	30,437	+
W	15 SPLITNOSE ROCKFISH		6,656	6,656	+		1,958	1,958	+		8,764	8,764	+		5,640	5,640	+
W	17 OTHER SEBASTES COMPLEX	351,626	290,459	61,167	<	357,028	307,199	49,829	<	351,700	281,437	70,263	<	361,118	308,862	52,256	<
W	18 BLACK ROCKFISH										611	611	+				
W	19 BLACKGILL ROCKFISH		5,376	5,376	+		1,565	1,565	+		1,150	1,150	+		7,801	7,801	+
W	21 DARKBLOTCHED ROCKFISH		19,374	19,374	+	19,209	19,536	327	+	15,772	16,139	367	+	5,778	5,926	148	+
W	22 REDSTRIPE ROCKFISH		3,135	3,135	+		9,451	9,451	+		11,869	11,869	+		2,603	2,603	+
W	23 SHARPCHIN ROCKFISH		7,013	7,013	+		572	572	+		12,940	12,940	+		2,621	2,621	+
W	24 YELLOWEYE ROCKFISH		373	373	+		3,027	3,027	+	11,298	11,861	563	+	7,370	7,370	-	0
W	25 YELLOWMOUTH ROCKFISH		3,465	3,465	+		15	15	+		23	23	+		21	21	+
W	26 OTHER ROCKFISH	968,325	969,037	712	+	587,734	587,734	-	0	8,207,377	8,207,377	-	0	604,174	604,174	-	0
W	27 ENGLISH SOLE	1,353,315	1,353,414	99	+	1,273,663	1,273,663	-	0	1,507,138	1,507,138	-	0	1,472,039	1,472,063	24	+
W	28 PETRALE SOLE	934,117	934,527	410	+	801,659	801,938	279	+	1,000,403	1,000,403	-	0	1,210,439	1,210,460	21	+
W	29 ARROWTOOTH FLOUNDER	6,880,678	6,882,078	1,400	+	4,700,081	4,700,081	-	0	4,321,215	4,321,215	-	0	4,523,625	4,523,625	-	0
W	30 OTHER GROUNDFISH	3,310,641	3,310,913	272	+	2,757,391	2,757,394	3	+	3,586,290	3,586,286	4	<	2,901,973	2,901,976	3	+
	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	+	20,881,348	20,916,611	149,341	+
	Percent Movement			1%				1%				1%				1%	

Table DQ2. West Coast PacFIN landings recorded in "nominal" and "uspecified" groundfish categories before and after application of average species composition distributions: 1994-2003

			1994				1995				1996			
group	Common Name	SPID	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
1	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	<
2	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	<
3	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	<
6	NOM. LONGSPINE THORNYHEAD	LSP1					12,554,999	1,310,568	11,244,431	<	10,992,753	1,468,621	9,524,132	<
7	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	<
11	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	<
11	NOMINAL POP	POP2	1,213,593	259,744	953,849	<	1,015,667	237,931	777,736	<	1,060,192	292,206	767,986	<
11	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	<
12	NOM. SHORTBELLY ROCKFISH	SBL1	6,195	6,195	-	0	12,600	12,600	-	0	61,440	61,440	-	0
13	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	<
14	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	<
15	NOM. SPLITNOSE ROCKFISH	SNS1	4,029	4,029	-	0	18	18	-	0	370	370	-	0
16	NOM. BANK ROCKFISH	BNK1	56,439	3,076	53,363	<	106,377	83,551	22,826	<	66,639	18,262	48,377	<
17	NOM. AURORA ROCKFISH	ARR1												
17	NOM. BLACK-AND-YELLOW ROCKFISH	BYL1	5	5	-	0					7	7	-	0
17	NOM. BLUE ROCKFISH	BLU1	73,618	28,739	44,879	<	40,385	23,278	17,107	<	25,346	9,150	16,196	<
17	NOM. BRONZESPOTTED ROCKFISH	BRZ1	54	54	-	0	627	627	-	0				
17	NOM. BROWN ROCKFISH	BRW1	7,737	7,737	-	0	3,931	3,681	250	<	2,729	2,729	-	0
17	NOM. CALIF. SCORPIONFISH	SCR1		113,215	113,215	+		90,918	90,918	+		76,677	76,677	+
17	NOM. CHAMELEON ROCKFISH	CML1												
17	NOM. CHINA ROCKFISH	CHN1	67,916	31,827	36,089	<	58,193	35,994	22,199	<	38,428	16,810	21,618	<
17	NOM. COPPER ROCKFISH	COP1	77,001	31,690	45,311	<	97,882	52,855	45,027	<	142,814	56,139	86,675	<
17	NOM. FLAG ROCKFISH	FLG1	180	180	-	0	1,005	1,005	-	0	18	18	-	0
17	NOM. GOPHER ROCKFISH	GPH1	31,158	31,191	33	+	17,448	17,448	-	0	12,110	12,110	-	0
17	NOM. GRASS ROCKFISH	GRS1	72,944	68,171	4,773	<	109,136	107,221	1,915	<	93,690	92,832	858	<
17	NOM. GREENBLOTCHED ROCKFISH	GBL1												
17	NOM. GREENSPOTTED ROCKFISH	GSP1	33,381	17,765	15,616	<	15,358	4,581	10,777	<	41,796	10,423	31,373	<
17	NOM. GREENSTRIPED ROCKFISH	GSR1	3,140	3,140	-	0	4,235	4,235	-	0	1,529	1,384	145	<
17	NOM. KELP ROCKFISH	KLP1	6,706	6,427	279	<	5,343	5,078	265	<	4,342	4,235	107	<
17	NOM. MEXICAN ROCKFISH	MXR1												
17	NOM. OLIVE ROCKFISH	OLV1	136	136	-	0	564	564	-	0	728	728	-	0
17	NOM. PINK ROCKFISH	PNK1												
17	NOM. PINKROSE ROCKFISH	PRR1	214	214	-	0								
17	NOM. QUILLBACK ROCKFISH	QLB1	2,809	2,809	-	0	11,448	4,809	6,639	<	17,937	14,046	3,891	<
17	NOM. REDBANDED ROCKFISH	RDB1	6,138	6,138	-	0	2,175	2,175	-	0	1,104	1,104	-	0
17	NOM. ROSETHORN ROCKFISH	RST1	10,157	10,157	-	0	10,250	2,121	8,129	<	15,855	15,855	-	0
17	NOM. ROSY ROCKFISH	ROS1	1,002	1,002	-	0	202	202	-	0	39	39	-	0
17	NOM. SPECKLED ROCKFISH	SPK1	13	13	-	0	10	10	-	0	4,707	4,707	-	0
17	NOM. SQUARESPOT	SQR1	1,413	1,413	-	0	94	94	-	0				
17	NOM. STARRY ROCKFISH	STR1	18,711	18,711	-	0	4,355	4,355	-	0	455	455	-	0
17	NOM. SWORDSPINE ROCKFISH	SWS1									1,423	1,423	-	0

Table DQ2. West Coast PacFIN landings recorded in "nominal" and "uspecified" groundfish categories before and after application of average species composition distributions: 1994-2003

group	Common Name	SPID	1994 Unadjusted	1994 Adjusted	1994 Movement	1994 Direction	1995 Unadjusted	1995 Adjusted	1995 Movement	1995 Direction	1996 Unadjusted	1996 Adjusted	1996 Movement	1996 Direction
17	NOM. TIGER ROCKFISH	TGR1												
17	NOM. TREEFISH	TRE1	117	113	4	<	203	203	-	0	1,540	1,505	35	<
17	NOM. VERMILLION ROCKFISH	VRM1	48,497	7,304	41,193	<	46,662	42,284	4,378	<	30,826	30,826	-	0
17	NOR. UNSP. NEAR-SHORE ROCKFISH	NUSR												
17	NOR. UNSP. SHELF ROCKFISH	NUSF												
17	NOR. UNSP. SLOPE ROCKFISH	NUSP												
17	UNSP. NEAR-SHORE ROCKFISH	USHR												
17	UNSP. SHELF ROCKFISH	USLF												
17	UNSP. SLOPE ROCKFISH	USLP												
18	NOM. BLACK ROCKFISH	BLK1	456,967	225,163	231,804	<	465,134	129,504	335,630	<	582,558	215,573	366,985	<
19	NOM. BLACKGILL ROCKFISH	BGL1	579,910	176,601	403,309	<	410,645	122,744	287,901	<	479,863	134,836	345,027	<
20	NOM. COWCOD ROCKFISH	CWC1	33,718	33,269	449	<	52,129	46,657	5,472	<	34,054	23,703	10,351	<
21	NOM. DARKBLOTCHED ROCKFISH	DBR1									178	178	-	0
22	NOM. STRIPETAIL ROCKFISH	STL1												
22	UNSP. DPWTR REDS RCKFSH	RCK3	2,368	2,368	-	0	36,572	36,572	-	0	6,138	6,138	-	0
22	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	<
22	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	<
24	NOM. YELLOWEYE ROCKFISH	YEY1	56,765	18,541	38,224	<	67,001	5,070	61,931	<	99,667	21,862	77,805	<
26	BLACK+BLUE ROCKFISH	RCK9	10,309	1,635	8,674	<	384	384	-	0	2,226	2,226	-	0
26	BOCACCIO+CHILIPEPPER RCKFSH	RCK1												
26	CANARY+VERMILION RCKFSH	RCK8	147	2	145	<	227	227	-	0	33	33	-	0
26	NOM. CABEZON	CBZ1	83,346	80,620	2,726	<	194,687	183,824	10,863	<	246,181	238,085	8,096	<
26	NOM. KELP GREENLING	KGL1	2,949	2,949	-	0	2,674	2,674	-	0	7,293	7,293	-	0
26	OTHER GROUNDFISH	OGRN					164	164	-	0	1,757	1,757	-	0
26	OTHER ROCKFISH	ORCK	2,516,791	537,240	1,979,551	<		35,072	35,072	+		30,610	30,610	+
26	THORNYHEADS (MIXED)	THDS	16,223,816	847,215	15,376,601	<	527,420	225,373	302,047	<	345,721	242,109	103,612	<
26	UNSP. BOLINA RCKFSH	RCK2	73,667	48,666	25,001	<	56,353	35,497	20,856	<	97,519	65,272	32,247	<
26	UNSP. GOPHER RCKFSH	RCK7	147,625	80,159	67,466	<	168,649	108,385	60,264	<	221,777	191,676	30,101	<
26	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	<
26	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	<
26	UNSP. ROSEFISH RCKFSH	RCK6	549,425	6,160	543,265	<	649,779	1,489	648,290	<	594,180	32,589	561,591	<
30	NOM. LONGFIN SANDDAB	LDB1												
30	NOM. PACIFIC SANDDAB	PDB1	91,278	91,278	-	0	9,908	9,908	-	0	958	958	-	0
30	NOM. SPECKLED SANDDAB	SDB1												
30	OTHER FLATFISH	OFLT	572	572	-	0	1,012	1,012	-	0	1,680	1,680	-	0
30	UNSP. FLATFISH	UFLT	62,481	62,535	54	+	108,108	108,109	1	+	87,089	87,089	-	0
30	UNSP. SANDDABS	UDAB	1,428,483	1,428,483	-	0	1,492,832	1,492,832	-	0	1,741,884	1,741,884	-	0
30	UNSP. SKATE	USKT	478,499	478,546	47	+	1,069,398	1,069,380	18	<	3,431,713	3,431,724	11	+
30	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%	

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Table DQ2. PacFIN landings amounts recorded in "nominal" and "uspecified" groundfish species categories before and after application of average species composition distributions: 1994-2003

group	Common Name	SPID	1997				1998				1999			
			Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
1	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	<
2	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	<
3	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	<
6	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	<
7	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	<
11	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	<
11	NOMINAL POP	POP2	881,818	307,358	574,460	<	887,429	373,553	513,876	<	686,039	204,334	481,705	<
11	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	<
12	NOM. SHORTBELLY ROCKFISH	SBL1	44,888	3,996	40,892	<	15,088	15,088	-	0	17,634	17,634	-	0
13	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	<
14	NOM. BOCACCIO	BCC1	599,993	47,709	552,284	<	297,317	32,024	265,293	<	150,905	27,539	123,366	<
15	NOM. SPLITNOSE ROCKFISH	SNS1	936	936	-	0	89,585	55,647	33,938	<	74,081	15,394	58,687	<
16	NOM. BANK ROCKFISH	BNK1	81,466	8,648	72,818	<	451,652	66,746	384,906	<	27,166	7,682	19,484	<
17	NOM. AURORA ROCKFISH	ARR1	97	97	-	0	4	4	-	0				
17	NOM. BLACK-AND-YELLOW ROCKFISH	BYL1	908	59	849	<	2,069	1,261	808	<	23,668	2,148	21,520	<
17	NOM. BLUE ROCKFISH	BLU1	86,166	26,716	59,450	<	92,190	11,730	80,460	<	30,447	20,402	10,045	<
17	NOM. BRONZESPOTTED ROCKFISH	BRZ1	16	16	-	0	136	136	-	0				
17	NOM. BROWN ROCKFISH	BRW1	29,391	29,391	-	0	13,297	13,297	-	0	24,547	19,150	5,397	<
17	NOM. CALIF. SCORPIONFISH	SCR1		96,056	96,056	+	113,066	113,066	-	0	86,853	62,862	23,991	<
17	NOM. CHAMELEON ROCKFISH	CML1					18	18	-	0				
17	NOM. CHINA ROCKFISH	CHN1	47,728	11,028	36,700	<	21,949	13,767	8,182	<	14,419	3,255	11,164	<
17	NOM. COPPER ROCKFISH	COP1	101,488	26,134	75,354	<	66,820	36,464	30,356	<	35,580	10,915	24,665	<
17	NOM. FLAG ROCKFISH	FLG1	130	130	-	0	170	170	-	0	1	1	-	0
17	NOM. GOPHER ROCKFISH	GPH1	19,450	11,478	7,972	<	23,551	18,321	5,230	<	93,749	11,663	82,086	<
17	NOM. GRASS ROCKFISH	GRS1	68,242	58,517	9,725	<	92,428	25,689	66,739	<	59,427	12,248	47,179	<
17	NOM. GREENBLOTCHED ROCKFISH	GBL1					19	19	-	0				
17	NOM. GREENSPOTTED ROCKFISH	GSP1	44,779	6,677	38,102	<	27,162	14,089	13,073	<	13,526	9,358	4,168	<
17	NOM. GREENSTRIPED ROCKFISH	GSR1	1,909	1,776	133	<	7,317	7,144	173	<	1,782	1,782	-	0
17	NOM. KELP ROCKFISH	KLP1	2,017	1,726	291	<	1,658	1,304	354	<	2,989	397	2,592	<
17	NOM. MEXICAN ROCKFISH	MXR1												
17	NOM. OLIVE ROCKFISH	OLV1	648	532	116	<	1,262	1,262	-	0	1,219	1,219	-	0
17	NOM. PINK ROCKFISH	PNK1	2	2	-	0								
17	NOM. PINKROSE ROCKFISH	PRR1	296	296	-	0	3,757	3,757	-	0				
17	NOM. QUILLBACK ROCKFISH	QLB1	20,745	15,353	5,392	<	26,173	22,215	3,958	<	18,042	10,644	7,398	<
17	NOM. REDBANDED ROCKFISH	RDB1	1,480	1,480	-	0	447	342	105	<	252	141	111	<
17	NOM. ROSETHORN ROCKFISH	RST1	18,794	18,794	-	0	5,312	5,312	-	0	1,107	1,107	-	0
17	NOM. ROSY ROCKFISH	ROS1					8,560	8,560	-	0	592	592	-	0
17	NOM. SPECKLED ROCKFISH	SPK1	455	455	-	0	1,447	392	1,055	<	4,975	4,975	-	0
17	NOM. SQUARESPOT	SQR1									23	23	-	0
17	NOM. STARRY ROCKFISH	STR1	148	148	-	0	3,482	3,482	-	0	2,275	2,275	-	0
17	NOM. SWORDSPINE ROCKFISH	SWS1	2	2	-	0					295	295	-	0

Table DQ2. PacFIN landings amounts recorded in "nominal" and "uspecified" groundfish species categories before and after application of average species composition distributions: 1994-2003

group	Common Name	SPID	1997				1998				1999			
			Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction	Unadjusted	Adjusted	Movement	Direction
17	NOM. TIGER ROCKFISH	TGR1												
17	NOM. TREEFISH	TRE1	1,746	1,723	23	<	233	125	108	<	1,993	241	1,752	<
17	NOM. VERMILLION ROCKFISH	VRM1	31,991	12,314	19,677	<	22,712	7,420	15,292	<	23,346	13,424	9,922	<
17	NOR. UNSP. NEAR-SHORE ROCKFISH	NUSR												
17	NOR. UNSP. SHELF ROCKFISH	NUSF												
17	NOR. UNSP. SLOPE ROCKFISH	NUSP												
17	UNSP. NEAR-SHORE ROCKFISH	USHR									129	129	-	0
17	UNSP. SHELF ROCKFISH	USLF												
17	UNSP. SLOPE ROCKFISH	USLP												
18	NOM. BLACK ROCKFISH	BLK1	667,829	219,775	448,054	<	624,227	143,449	480,778	<	411,418	139,014	272,404	<
19	NOM. BLACKGILL ROCKFISH	BGL1	414,261	126,975	287,286	<	348,464	210,427	138,037	<	77,976	27,368	50,608	<
20	NOM. COWCOD ROCKFISH	CWC1	21,635	15,825	5,810	<	25,771	8,982	16,789	<	6,810	6,810	-	0
21	NOM. DARKBLOTCHED ROCKFISH	DBR1	25,513	506	25,007	<	8,203	250	7,953	<	1,259	1,259	-	0
22	NOM. STRIPETAIL ROCKFISH	STL1												
22	UNSP. DPWTR REDS RCKFSH	RCK3	4,332	392	3,940	<	379	379	-	0				
22	UNSP. REDS RCKFSH	RCK4	850,863	348,624	502,239	<	710,243	264,518	445,725	<	243,203	32,962	210,241	<
22	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	<
24	NOM. YELLOWEYE ROCKFISH	YEY1	92,221	18,126	74,095	<	38,216	12,692	25,524	<	20,670	6,366	14,304	<
26	BLACK+BLUE ROCKFISH	RCK9	8,197	6,171	2,026	<	2,696	2,696	-	0	487	487	-	0
26	BOCACCIO+CHILIPEPPER RCKFSH	RCK1	542	542	-	0								
26	CANARY+VERMILION RCKFSH	RCK8	58	58	-	0					164	164	-	0
26	NOM. CABEZON	CBZ1	265,594	206,891	58,703	<	374,291	87,057	287,234	<	277,668	36,849	240,819	<
26	NOM. KELP GREENLING	KGL1	46,532	46,532	-	0	36,460	36,460	-	0	86,863	86,863	-	0
26	OTHER GROUNDFISH	OGRN	37	37	-	0	405	405	-	0	1,147	1,147	-	0
26	OTHER ROCKFISH	ORCK		12,502	12,502	+		7,339	7,339	+		6,062	6,062	+
26	THORNYHEADS (MIXED)	THDS	271,471	247,699	23,772	<	107,730	107,730	-	0	129,376	91,335	38,041	<
26	UNSP. BOLINA RCKFSH	RCK2	126,196	86,055	40,141	<	125,959	21,412	104,547	<	112,923	8,743	104,180	<
26	UNSP. GOPHER RCKFSH	RCK7	142,167	103,792	38,375	<	135,606	12,224	123,382	<	28,513	7,060	21,453	<
26	UNSP. GRENADIERS	GRDR	2,076,739	2,076,696	43	<	1,723,682	1,723,678	4	<	964,134	964,130	4	<
26	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	<
26	UNSP. ROSEFISH RCKFSH	RCK6	773,483	34,486	738,997	<	2,761,055	5,343	2,755,712	<	409,944	49,787	360,157	<
30	NOM. LONGFIN SANDDAB	LDB1									3	3	-	0
30	NOM. PACIFIC SANDDAB	PDB1	1,041	1,041	-	0	2,758	2,758	-	0	24,399	24,399	-	0
30	NOM. SPECKLED SANDDAB	SDB1	30	30	-	0	231	231	-	0				
30	OTHER FLATFISH	OFLT	229	229	-	0	1,946	1,946	-	0	707	707	-	0
30	UNSP. FLATFISH	UFLT	67,927	67,927	-	0	123,213	123,213	-	0	87,157	83,999	3,158	<
30	UNSP. SANDDABS	UDAB	2,049,581	2,049,581	-	0	1,417,345	1,417,345	-	0	2,021,742	2,021,742	-	0
30	UNSP. SKATE	USKT	5,742,625	5,742,008	617	<	2,834,379	2,834,307	72	<	3,694,488	3,694,473	15	<
30	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%	

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Table DQ2. PacFIN landings amounts recorded in "nominal" and "uspecified" groundfish species categories before and after application of average species composition distributions: 1994-2003

group	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	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
1	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	<	1,282,904	91,862	1,191,042	<
2	NOM. CANARY ROCKFISH	CNR1	218,288	70,517	147,771	<	197,629	36,992	160,637	<	153,888	18,705	135,183	<	169,198	6,849	162,349	<
3	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	<	417,950	129,313	288,637	<
6	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	<	3,559,033	245,180	3,313,853	<
7	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	<	1,590,470	241,444	1,349,026	<
11	GEN. SHELF/SLOPE RF	POP1	16	16	-	0												
11	NOMINAL POP	POP2	220,168	109,725	110,443	<	426,836	285,664	141,172	<	235,660	30,264	205,396	<	214,408	20,967	193,441	<
11	UNSP. POP GROUP	UPOP	914,547	1,219	913,328	<	280,573	79	280,494	<	210,364	51	210,313	<	331,826	22	331,804	<
12	NOM. SHORTBELLY ROCKFISH	SBL1	42,795	42,795	-	0	11,679	843	10,836	<	138	138	-	0	1,221	1,220	1	<
13	NOM. CHILIPEPPER	CLP1	986,692	65,482	921,210	<	764,281	19,229	745,052	<	346,795	4,224	342,571	<	38,799	2,732	36,067	<
14	NOM. BOCACCIO	BCC1	54,486	18,312	36,174	<	48,471	8,736	39,735	<	46,257	5,929	40,328	<	1,368	1,362	6	<
15	NOM. SPLITNOSE ROCKFISH	SNS1	49,962	11,869	38,093	<	30,475	17,324	13,151	<	40,304	5,701	34,603	<	49,778	43,887	5,891	<
16	NOM. BANK ROCKFISH	BNK1	180,422	15,950	164,472	<	124,051	10,675	113,376	<	439,106	2,184	436,922	<	159,733	7,774	151,959	<
17	NOM. AURORA ROCKFISH	ARR1	1,527	495	1,032	<	339	339	-	0	825	825	-	0	3,399	884	2,515	<
17	NOM. BLACK-AND-YELLOW ROCKFISH	BYL1	32,214	2,645	29,569	<	19,807	3,796	16,011	<	18,992	8,513	10,479	<	16,706	6,993	9,713	<
17	NOM. BLUE ROCKFISH	BLU1	26,529	19,135	7,394	<	35,278	7,957	27,321	<	45,049	11,199	33,850	<	26,767	6,700	20,067	<
17	NOM. BRONZESPOTTED ROCKFISH	BRZ1	61	61	-	0	55	55	-	0	109		109	<				
17	NOM. BROWN ROCKFISH	BRW1	29,228	4,251	24,977	<	59,314	7,197	52,117	<	47,432	6,567	40,865	<	44,255	7,060	37,195	<
17	NOM. CALIF. SCORPIONFISH	SCR1	41,359	41,359	-	0	44,202	44,204	2	+	29,811	29,811	-	0	11,608	11,608	-	0
17	NOM. CHAMELEON ROCKFISH	CML1					29	33	4	+								
17	NOM. CHINA ROCKFISH	CHN1	12,374	3,666	8,708	<	10,537	5,168	5,369	<	11,362	3,059	8,303	<	3,480	2,377	1,103	<
17	NOM. COPPER ROCKFISH	COP1	21,855	14,012	7,843	<	32,953	11,690	21,263	<	28,267	9,227	19,040	<	6,622	5,135	1,487	<
17	NOM. FLAG ROCKFISH	FLG1	281	281	-	0	83	83	-	0	181	111	70	<	54	54	-	0
17	NOM. GOPHER ROCKFISH	GPH1	78,204	10,385	67,819	<	97,420	9,092	88,328	<	74,761	17,702	57,059	<	29,657	4,795	24,862	<
17	NOM. GRASS ROCKFISH	GRS1	63,071	7,319	55,752	<	51,431	8,105	43,326	<	37,523	7,658	29,865	<	29,880	4,654	25,226	<
17	NOM. GREENBLOTCHED ROCKFISH	GBL1	477	477	-	0	1,113	1,113	-	0	147	147	-	0	27	3	24	<
17	NOM. GREENSPOTTED ROCKFISH	GSP1	6,495	5,814	681	<	1,446	1,092	354	<	1,556	1,319	237	<	703	64	639	<
17	NOM. GREENSTRIPED ROCKFISH	GSR1	986	986	-	0	635	581	54	<	274	185	89	<	827	821	6	<
17	NOM. KELP ROCKFISH	KLP1	2,243	1,350	893	<	2,172	1,802	370	<	2,532	1,215	1,317	<	2,507	1,739	768	<
17	NOM. MEXICAN ROCKFISH	MXR1									141	141	-	0	4	4	-	0
17	NOM. OLIVE ROCKFISH	OLV1	2,188	2,188	-	0	2,367	2,267	100	<	1,884	1,830	54	<	1,591	1,591	-	0
17	NOM. PINK ROCKFISH	PNK1									48	48	-	0	6	6	-	0
17	NOM. PINKROSE ROCKFISH	PRR1					5	5	-	0								
17	NOM. QUILLBACK ROCKFISH	QLB1	13,859	8,252	5,607	<	26,165	8,211	17,954	<	9,952	2,431	7,521	<	4,324	4,324	-	0
17	NOM. REDBANDED ROCKFISH	RDB1	10,174	10,174	-	0	742	742	-	0	1,585	1,367	218	<	403	403	-	0
17	NOM. ROSETHORN ROCKFISH	RST1	285	285	-	0	513	513	-	0	200	200	-	0	81	81	-	0
17	NOM. ROSY ROCKFISH	ROS1	297	297	-	0	2,568	2,568	-	0	6,493	6,493	-	0	536	536	-	0
17	NOM. SPECKLED ROCKFISH	SPK1	223	223	-	0	46	46	-	0	41	41	-	0	64	64	-	0
17	NOM. SQUARESPOT	SQR1													424	424	-	0
17	NOM. STARRY ROCKFISH	STR1	335	335	-	0	237	237	-	0	198	198	-	0	49	49	-	0
17	NOM. SWORDSPINE ROCKFISH	SWS1	1,778	1,778	-	0	46	46	-	0					10	10	-	0

Table DQ2. PacFIN landings amounts recorded in "nominal" and "uspecified" groundfish species categories before and after application of average species composition distributions: 1994-2003

group	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	2003 Unadjusted	2003 Adjusted	2003 Movement	2003 Direction
17	NOM. TIGER ROCKFISH	TGR1										506	506	+	123	123	-	0
17	NOM. TREEFISH	TRE1	3,763	2,128	1,635	<	3,491	675	2,816	<	2,771	790	1,981	<	1,776	485	1,291	<
17	NOM. VERMILLION ROCKFISH	VRM1	22,945	9,409	13,536	<	26,067	17,550	8,517	<	18,668	12,760	5,908	<	18,323	12,097	6,226	<
17	NOR. UNSP. NEAR-SHORE ROCKFISH	NUSR	58,406	13,638	44,768	<	59,779	5,505	54,274	<	55,531	4,430	51,101	<	42,444	15,916	26,528	<
17	NOR. UNSP. SHELF ROCKFISH	NUSF	206,554	79,482	127,072	<	241,244	109,644	131,600	<	145,803	34,609	111,194	<	168,090	28,051	140,039	<
17	NOR. UNSP. SLOPE ROCKFISH	NUSP	999,066	395,379	603,687	<	468,333	226,605	241,728	<	377,697	146,755	230,942	<	409,877	118,034	291,843	<
17	UNSP. NEAR-SHORE ROCKFISH	USHR	6,558	4,461	2,097	<	6,255	4,539	1,716	<	2,547	1,449	1,098	<	458	378	80	<
17	UNSP. SHELF ROCKFISH	USLF	42,883	11,537	31,346	<	26,972	8,193	18,779	<	26,502	6,032	20,470	<	1,629	1,574	55	<
17	UNSP. SLOPE ROCKFISH	USLP	421,768	45,103	376,665	<	399,920	11,665	388,255	<	411,280	5,637	405,643	<	123,186	10,908	112,278	<
18	NOM. BLACK ROCKFISH	BLK1	350,682	143,457	207,225	<	555,764	96,497	459,267	<	484,113	102,471	381,642	<	387,705	79,763	307,942	<
19	NOM. BLACKGILL ROCKFISH	BGL1	99,118	43,809	55,309	<	181,784	85,135	96,649	<	207,685	51,309	156,376	<	395,465	84,110	311,355	<
20	NOM. COWCOD ROCKFISH	CWC1	1,626	1,344	282	<	56	56	-	0	113	59	54	<	11		11	<
21	NOM. DARKBLOTCHED ROCKFISH	DBR1	25,148	7,018	18,130	<	206,606	59,859	146,747	<	174,543	24,291	150,252	<	164,615	31,900	132,715	<
22	NOM. STRIPETAIL ROCKFISH	STL1	14	14	-	0												
22	UNSP. DPWTR REDS RCKFSH	RCK3	271	271	-	0					21	21	-	0	59	59	-	0
22	UNSP. REDS RCKFSH	RCK4	40,349	25,431	14,918	<	23,220	9,272	13,948	<	17,999	7,248	10,751	<	34,981	7,625	27,356	<
22	UNSP. SMALL REDS RCKFSH	RCK5	12,358	12,358	-	0	7,765	7,769	4	+	12,635	2,960	9,675	<	4,337	4,337	-	0
24	NOM. YELLOWEYE ROCKFISH	YEY1	7,298	3,596	3,702	<	8,423	3,646	4,777	<	14,956	15,014	58	+	10,565	11,191	626	+
26	BLACK+BLUE ROCKFISH	RCK9	48	48	-	0	1,021	1,021	-	0					93	93	-	0
26	BOCACCIO+CHILIPEPPER RCKFSH	RCK1					26	26	-	0								
26	CANARY+VERMILION RCKFSH	RCK8	23	23	-	0	5	5	-	0								
26	NOM. CABEZON	CBZ1	256,587	59,492	197,095	<	159,930	38,357	121,573	<	111,175	111,175	-	0	87,617	87,617	-	0
26	NOM. KELP GREENLING	KGL1	94,093	45,380	48,713	<	87,667	67,887	19,780	<	135,827	135,827	-	0	55,472	55,471	1	<
26	OTHER GROUNDFISH	OGRN	309	309	-	0												
26	OTHER ROCKFISH	ORCK		3,226	3,226	+		33,877	33,877	+		3,078	3,078	+		1,692	1,692	+
26	THORNYHEADS (MIXED)	THDS	165,734	149,486	16,248	<	105,100	105,100	-	0	148,982	130,647	18,335	<	130,237	103,026	27,211	<
26	UNSP. BOLINA RCKFSH	RCK2	67,498	22,664	44,834	<	36,089	36,089	-	0	17,866	12,773	5,093	<	4,903	4,903	-	0
26	UNSP. GOPHER RCKFSH	RCK7	12,065	2,551	9,514	<	4,559	4,065	494	<	2,812	2,812	-	0	3,644	3,644	-	0
26	UNSP. GRENADIERS	GRDR	693,853	693,859	6	+	676,750	677,196	446	+	608,107	608,109	2	+	697,581	697,581	-	0
26	UNSP. ROCKFISH	URCK	1,009,375	987,575	21,800	<	45,220	41,789	3,431	<	61,647	25,411	36,236	<	82,220	65,413	16,807	<
26	UNSP. ROSEFISH RCKFSH	RCK6	192,311	54,497	137,814	<	206,317	62,109	144,208	<	165,620	1,189	164,431	<	373,299	2,855	370,444	<
30	NOM. LONGFIN SANDDAB	LDB1					107	107	-	0								
30	NOM. PACIFIC SANDDAB	PDB1	10,447	10,447	-	0	16,999	16,999	-	0	64	64	-	0	187	187	-	0
30	NOM. SPECKLED SANDDAB	SDB1									64	64	-	0				
30	OTHER FLATFISH	OFLT	796	796	-	0	275	275	-	0	2,710	2,710	-	0	90	90	-	0
30	UNSP. FLATFISH	UFLT	85,276	85,275	1	<	104,070	104,196	126	+	54,981	54,979	2	<	73,646	73,645	1	<
30	UNSP. SANDDABS	UDAB	1,638,269	1,638,269	-	0	1,740,231	1,739,785	446	<	1,328,580	1,328,580	-	0	1,376,493	1,376,493	-	0
30	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	<	2,972,196	2,972,201	5	+
30	UNSP. TURBOTS	UTRB	4,369	4,369	-	0	12,944	12,944	-	0	6,633	6,633	-	0	5,705	5,705	-	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	<	15,627,699	6,710,158	8,922,187	<
	Percent Movement				62%				58%				66%				57%	

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Table 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
1 YELLOWTAIL ROCKFISH	301,676			156	156	301,832
2 CANARY ROCKFISH	17,434					17,434
3 WIDOW ROCKFISH	35,683	667		930	1,597	37,280
4 LINGCOD	136,533	1,420		859	2,279	138,812
5 SABLEFISH	5,032,320	309,637		2,185	311,822	5,344,142
6 LONGSPINE THORNYHEAD	3,470,123			474	474	3,470,597
7 SHORTSPINE THORNYHEAD	1,310,362	379		355	734	1,311,096
8 DOVER SOLE	16,116,356	338		300	638	16,116,994
9 PACIFIC COD	2,276,766					2,276,766
11 PACIFIC OCEAN PERCH	279,251	4			4	279,255
12 SHORTBELLY ROCKFISH	592					592
13 CHILIPEPPER	37,567			283	283	37,850
14 BOCACCIO	279					279
15 SPLITNOSE ROCKFISH	46,109			2,517	2,517	48,626
16 BANK ROCKFISH	124,690					124,690
17 OTHER SEBASTES COMPLEX	380,822	3,190	4	1,892	5,086	385,908
18 BLACK ROCKFISH	2,110	75			75	2,185
19 BLACKGILL ROCKFISH	98,399					98,399
20 COWCOD ROCKFISH	11					11
21 DARKBLOTCHED ROCKFISH	162,684					162,684
22 REDSTRIPE ROCKFISH	31,452					31,452
24 YELLOWEYE ROCKFISH	807					807
26 OTHER ROCKFISH	1,251,184	4	69	1,215	1,288	1,252,472
27 ENGLISH SOLE	1,775,789	14		4,375	4,389	1,780,178
28 PETRALE SOLE	4,207,827			17,840	17,840	4,225,667
29 ARROWTOOTH FLOUNDER	5,054,522	42			42	5,054,564
30 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
0 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 IA2. PacFIN Groundfish landings in 1998 by vessels with Limited Entry (LE) trawl permits using all types of gear (lbs).

Groundfish species groups	With LE Trawl Gear	Landings with Non-Trawl Gear: With LE Fixed Gear	With OA Fixed Gear	With Other OA Gears	Landings Totals: NonTrawl Gear (LE+OA)	All Gears
1 YELLOWTAIL ROCKFISH	4,743,871	8,988	10	59,965	68,963	4,812,834
2 CANARY ROCKFISH	1,951,763	3,015	11	8,151	11,177	1,962,940
3 WIDOW ROCKFISH	8,185,816	15		11,540	11,555	8,197,371
4 LINGCOD	476,158	160		7,316	7,476	483,634
5 SABLEFISH	4,724,579	199,548	87	10,185	209,820	4,934,399
6 LONGSPINE THORNYHEAD	5,106,757			6,134	6,134	5,112,891
7 SHORTSPINE THORNYHEAD	2,345,916	30		3,065	3,095	2,349,011
8 DOVER SOLE	17,545,514	439		37,906	38,345	17,583,859
9 PACIFIC COD	897,249			375	375	897,624
11 PACIFIC OCEAN PERCH	2,697,539	76		9,354	9,430	2,706,969
12 SHORTBELLY ROCKFISH	15,088					15,088
13 CHILIPEPPER	1,403,327			4,627	4,627	1,407,954
14 BOCACCIO	134,469			787	787	135,256
15 SPLITNOSE ROCKFISH	78,425					78,425
16 BANK ROCKFISH	335,974					335,974
17 OTHER SEBASTES COMPLEX	8,130	43	48	44	135	8,265
18 BLACK ROCKFISH	136,982	15		7	22	137,004
19 BLACKGILL ROCKFISH	114,508					114,508
20 COWCOD ROCKFISH	2,620	50		286	336	2,956
21 DARKBLOTCHED ROCKFISH	8,002					8,002
22 REDSTRIPE ROCKFISH	1,470,913			10,630	10,630	1,481,543
24 YELLOWEYE ROCKFISH	4,181					4,181
26 OTHER ROCKFISH	8,904,448	2,128	376	67,114	69,618	8,974,066
27 ENGLISH SOLE	2,498,455			3,766	3,766	2,502,221
28 PETRALE SOLE	3,183,859	5		10,254	10,259	3,194,118
29 ARROWTOOTH FLOUNDER	6,976,826	7	23	2,710	2,740	6,979,566
30 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
0 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 AE1.1 British Columbia groundfish trawl species management areas.

Appendix 3: Groundfish Trawl Species Management Areas

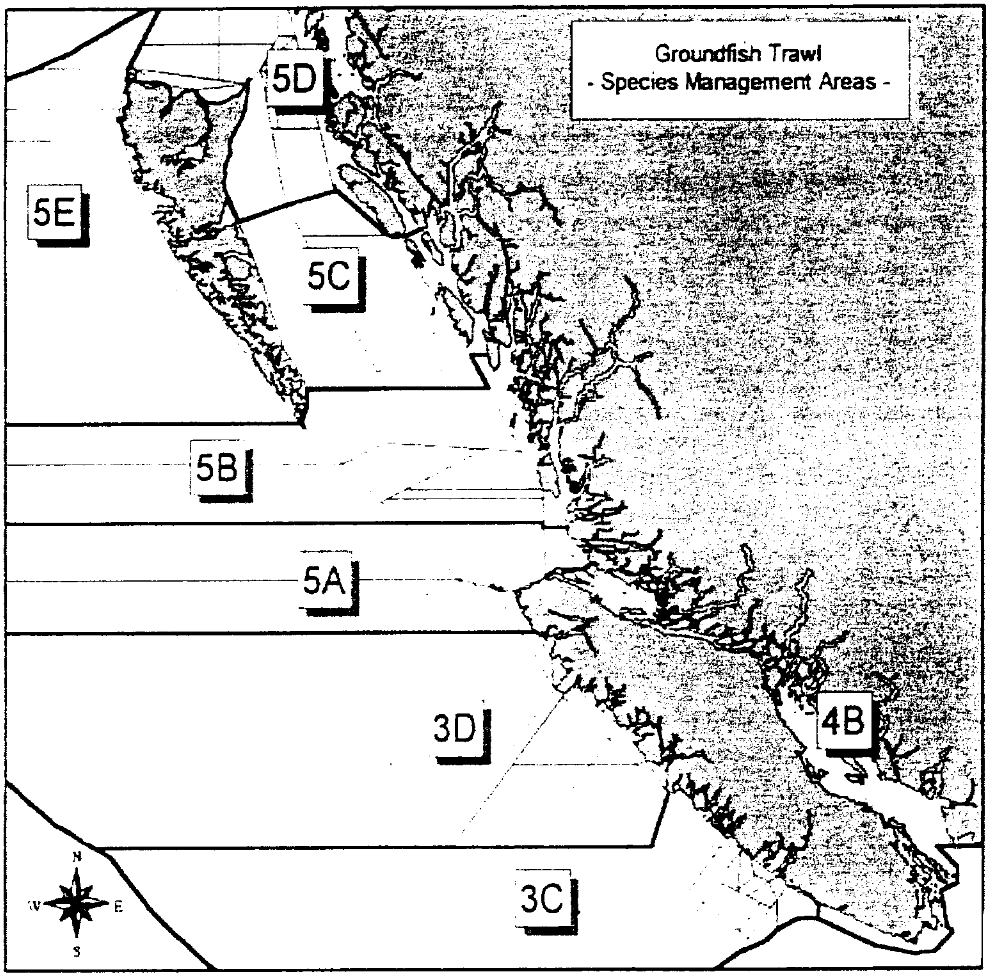
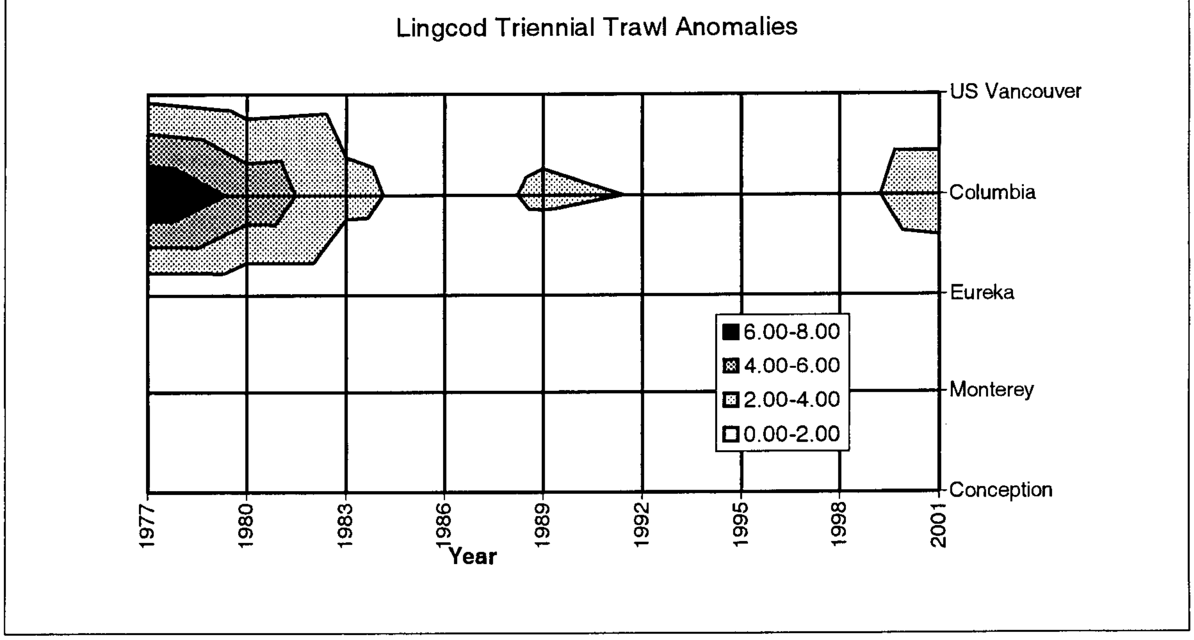
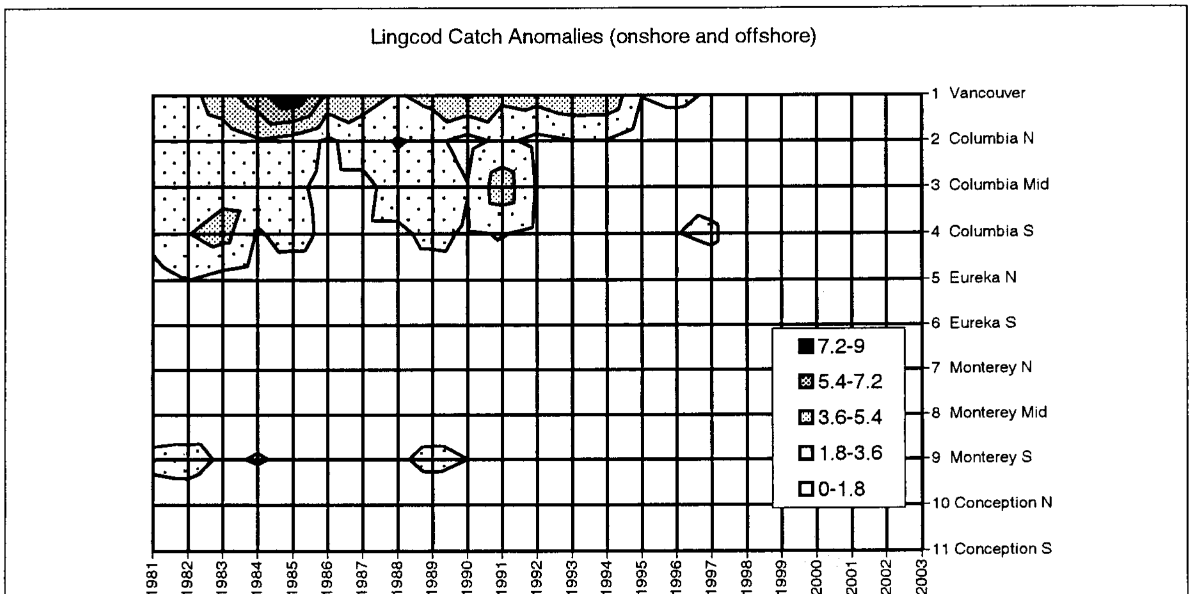


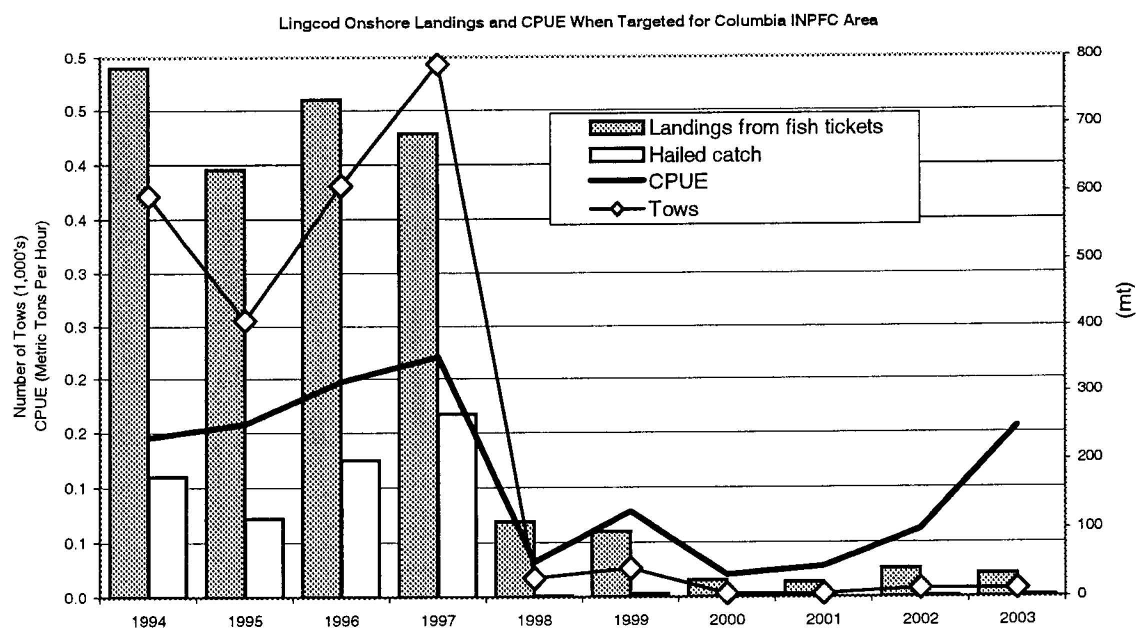
Figure A1.1a. Lingcod triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





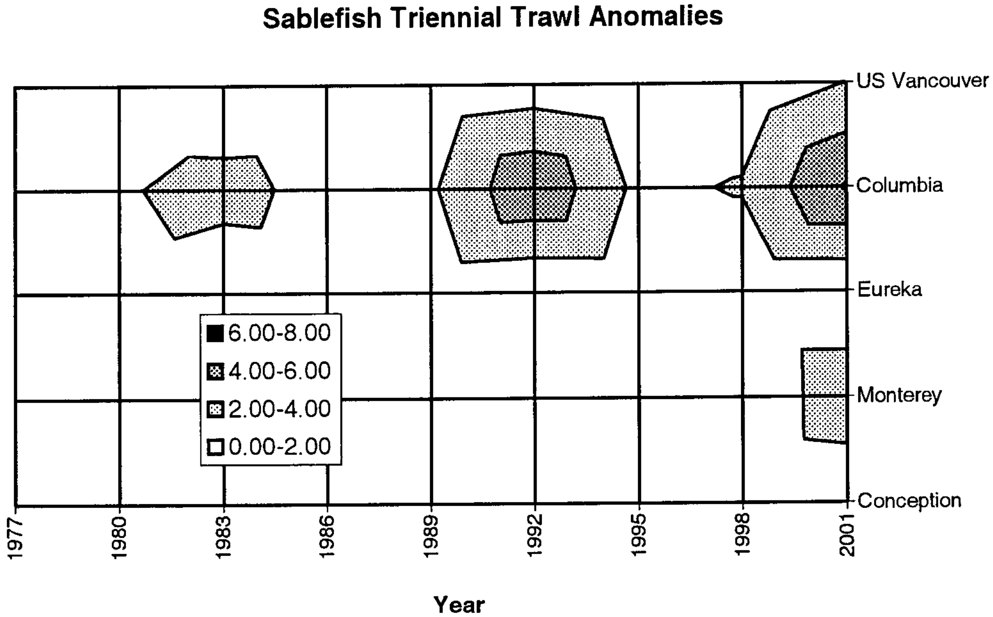
Notes: 1. Years prior to 1991 include only onshore landings.
2. Average of all areas and years includes zeros when no landings were made.

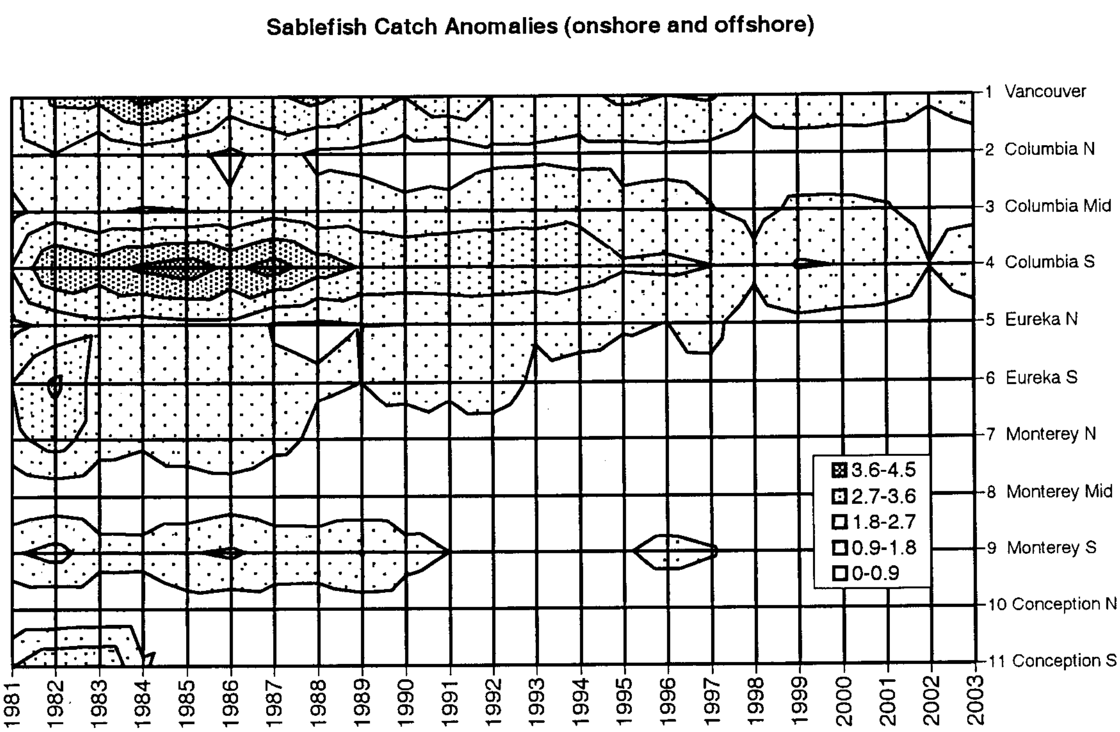
Figure A1.1b Lingcod onshore landed catch and CPUE for INPFC Columbia area (1994-2003).



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.

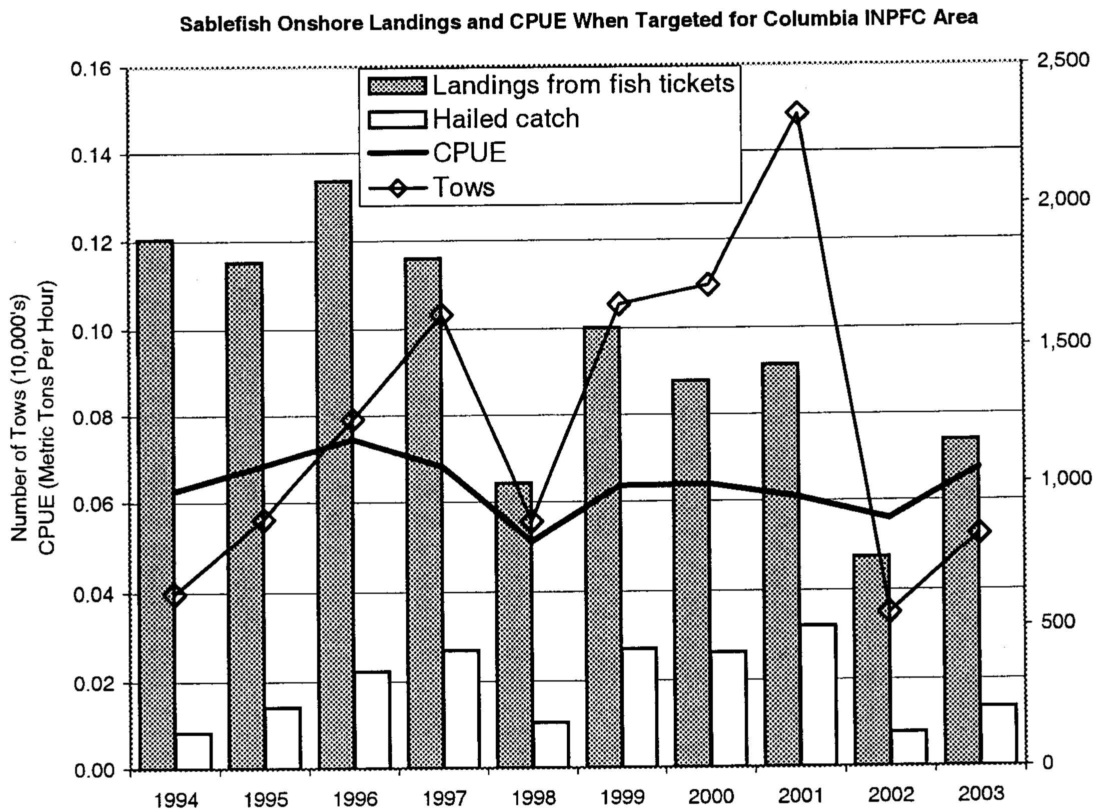
Figure A1.2a. Sablefish triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





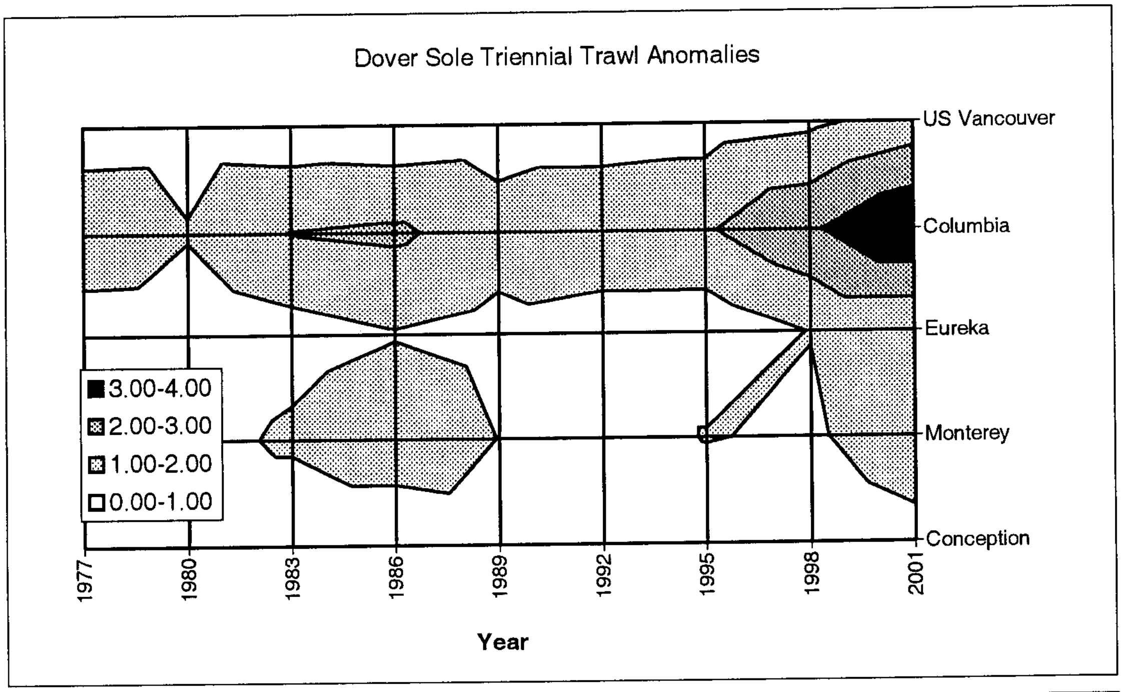
Notes: 1. Years prior to 1991 include only onshore landings.
2. Average of all areas and years includes zeros when no landings were made.

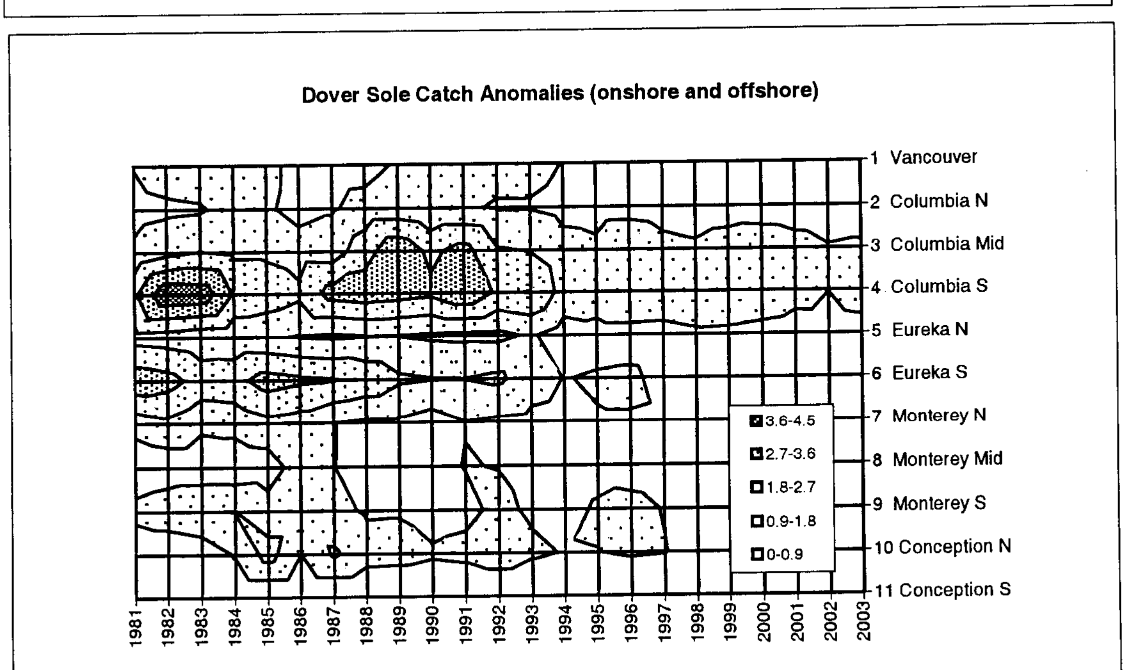
Figure A1.2b Sablefish onshore landed catch and CPUE for INPFC Columbia area (1994-2003).



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.

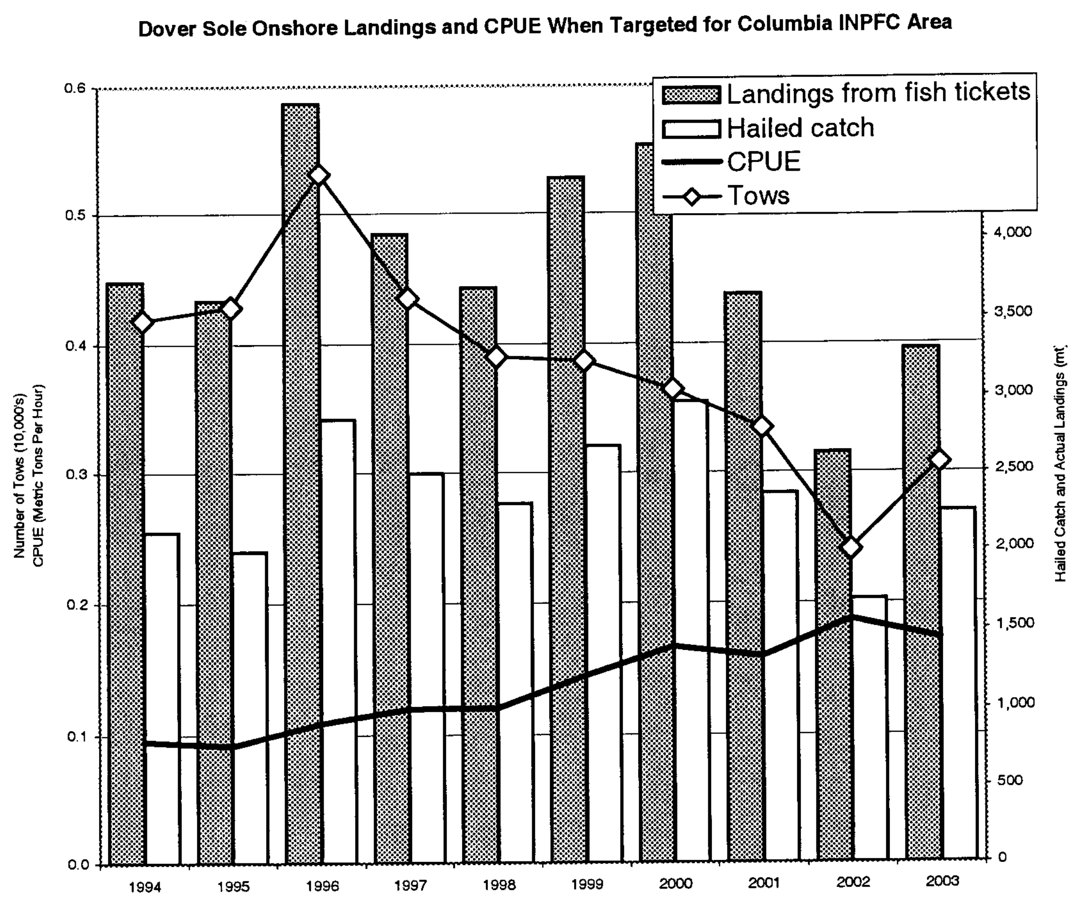
Figure A1.3a. Dover sole triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





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 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.

Open Access

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.

Limited Entry

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.

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, 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.

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 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.

Limited Entry

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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TIQ INDEPENDENT EXPERTS PANEL REPORT TO THE COUNCIL ON TRAWL INDIVIDUAL QUOTAS

The Independent Experts Panel (IEP) met to review the results of the Council scoping process on a dedicated access privilege system (individual quotas) for the groundfish trawl fishery. The objective identified for the panel's meeting was:

to determine whether there are major policy options and potential impacts that the Council should be considering in addressing the problem statement and stated goals and objectives, that have not surfaced during preliminary scoping by various Council committees or during the public scoping process.

The panel found the list of options that have come forward during public scoping to be complete with the following notes:

- If IFQs are area specific, the Council may wish to specify area specific accumulation caps.
- Substantial concerns identified by local communities may best be addressed by some combination of options such as a Canadian-like Groundfish Development Quota system,[1/] issuing or allowing community organizations to acquire quota shares, and other such measures. In considering the importance of including options that address community concerns the Council should note that planning horizons and scope of effects of concern to communities are to some degree different from and broader than those of the fishing and buyer/processor sectors.

The panel also reviewed the goals and objectives for the IFQ program and identified the following concern:

Clearly stated, concise measurable objectives are needed to

- improve the analysts ability to provide relevant information focused on the issues of greatest concern to the Council,
- make the most efficient use of analyst time, and
- enhance post-implementation evaluation of program performance and the collection of data needed to support that evaluation.

To that end, the panel suggests that the Council consider the following recrafted goals and objectives. Note that in this recrafted version of the draft list, a distinction has been made between objectives that relate to the purpose for considering the program and objectives that relate to impacts

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1/ Under the Canadian system, 10% of the IFQ is held back and issued to vessel/processor joint venture cooperatives on the basis of proposals judged, in part, on the basis of benefits provided to local fishing communities. This 10% allows the leveraging of much larger shares to the benefit of local communities. For example, a cooperative might dedicate all of its IFQ to landings in a particular community in order to gain access to some portion of the additional 10% available through the CDQ program.

the Council wants to be aware of and avoid in developing the program. This later type of objective the panel suggests be recategorized as a "constraint or guiding principle."

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 including:

   Provide for a viable and efficient groundfish fishery
   Increase net benefits that arise from the fishery
   Provide for a fair and equitable distribution of fishery benefits
   Provide for a safe fishery

   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 Provide for a viable, profitable and efficient groundfish fishery (previously Goal 2, with addition of the word of "profitable")

2 Minimize negative ecological impact ~~while taking the available harvest.~~(previously Obj 2) *(The panel's perspective is that the clause "while taking the available harvest" can be assumed.)*

3. Reduce discard mortality ~~bycatch and discard.~~ (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. ~~Encourage sustainable fishing practices.~~ (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 ~~bycatch~~ discards). (previously Obj 6)
6. ~~Provide~~ Increase ~~certainty/~~stability for business ~~economic~~ planning (previously Obj 9)
7. ~~Provide~~ Increase operational flexibility. (previously Obj 10)
8. Minimize adverse effects from IFQs on fishing communities to the extent practical. (previously Obj 11)

9. ~~Promote economic and employment benefits through the seafood catching, processing, and distribution elements of the industry.~~ (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)

During its meeting the panel also identified some communication protocols for interacting with and advising the analytical team working on this project.

AD HOC GROUNDFISH TRAWL INDIVIDUAL QUOTA COMMITTEE REPORT NOVEMBER 2004

The Ad Hoc Groundfish Trawl Individual Quota Committee (TIQC) met October 25-26, 2004 to develop recommendations for the Council on preliminary alternatives for analysis. The TIQC reviewed some analysis and results from public scoping that pertained to its discussions. TIQC deliberations were complex and time consuming. During the meeting it became apparent that thorough consideration of each topic will require substantial meeting time and require analytical documents carefully focused to address the issues before the TIQC. In order to provide the TIQC with adequate meeting time to consider the alternatives and to provide analysts with the opportunity to develop needed documentation in advance of the meeting, the TIQC would like to proceed in a more step-wise fashion. Specifically, the TIQC would like to convene two to three additional meetings, each meeting focused on particular parts of the IFQ alternative, with adequate time between meetings for the development of needed supporting documentation. The first of these meetings would be scheduled for the middle of the week of January 26, 2005. The TIQC would provide progress reports to the Council in the spring.

One of the first orders of business at the TIQC's meeting was discussion of the Council Chair's request that the TIQC reconsider their decision rules and revisit its previous votes on processor issues in light of the recently changed membership on the TIQC. A report to the Council on this issue was requested for this meeting. Hence forward, the TIQC will strive to achieve consensus but when consensus, cannot be achieved, the TIQC will report majority and minority views. The TIQC will revisit previous votes as the related topics come up during its meetings.

The TIQC began working through the Decision Step Summary (Agenda Item E.6.a, Attachment 3). It completed work on the first three items and left off part way through item 4.a. "Design Tools, IFQs." Item 4.a. is covered in Appendix A. The TIQC completed its discussions through Section A.4 of the appendix. There were extensive discussions on Sections A.5 and A.6, discussions which will need to be completed at a subsequent meeting. Decisions of the TIQC are presented here in the order they are taken up in the Decision Step Summary. At the end of this report is a request for a legal opinion on an issue that does not fall entirely under another category in the Decision Step Summary.

TIQC actions fall into two categories: (1) recommendations for narrowing and refining options and (2) information requests. With respect to the first task, the TIQC would be interested in any additional guidance the Council may want to provide pertaining to the direction of TIQC deliberations. With respect to information requests, the TIQC would ask that these requests be tasked out, as appropriate.

1. Goals and Objectives and Scope of Action

Goals and Objectives - The TIQC reviewed the Independent Experts Panel (IEP) recommendation that the goals and objectives be modified and has the following comments on those recommendations:

> Restore the deleted clause in Objective 2 "while taking the available harvest." While most may assume the resource is to be harvested, the TIQC believes it is important to explicitly state and recognize the balance between conservation and use implied by the wording in the original statement of this objective.
>
> Restore Objective 9 (previously Objective 12) with the indicated changes. Again, the TIQC believes it is important to explicitly state this objective. It is not comfortable with the IEP approach of assuming it would be understood Objective 9 is covered under more general goals and objectives.

Recommendation: Revise IEP report Objective 2 and restore a revised Objective 9 to read as follows.

Objective 2: Minimize negative ecological impacts while taking the available harvest.

Objective 9: Promote measurable economic and employment benefits through the seafood ~~harvesting~~ catching processing, ~~and~~ distribution elements, and support sectors of the industry.

Scope of Action - The TIQC discussed the potential inclusion of other sectors in the IFQ program and, specifically, the possibility of allowing other sectors to enhance their fishing opportunity by acquiring trawl IFQ. TIQC members felt that a system which would allow other sectors to acquire trawl quota should also allow trawl fishers to acquire quota from other sectors. In the long-run, such cross sector transfers are desirable and care should be taken to design a system that can be integrated with IFQ programs developed for other sectors. In the meantime, absent an opportunity for the trawl sector to acquire additional fishing opportunity from other sectors, allowing other sectors to purchase trawl IFQ would be unfair and premature.

Recommendation: Make no changes to the scope of action.

2. Definition of Status Quo and Baseline

The TIQC reviewed presentations on this issue and provided comments to authors on changes that will clarify the information provided. Related to the description of status quo is an assessment of discards and the reasons for these discards. An assessment of discards will help evaluate the benefits IFQs might generate if the program is designed to reduce discards. Progress by the Ad Hoc TIQ Analytical Team (TIQ A Team) on this issue is contingent, in part, on the provision of data from the West Coast Groundfish Observer Program. Data is needed on reasons for discards (as recorded by at-sea observers), and updated information is needed on the quantity of discards.

The TIQC was also informed of the need for increased enforcement effort under status quo management, and observer coverage might also increase under status quo. If there is to be cost sharing for the IFQ program, the trawl industry should not bear the burden of bringing these presently underfunded programs up to the level at which they should be under status quo.

Recommendation:

1. The TIQC requests the Council ask the West Coast Groundfish Observer Program to make needed discard information available to the TIQ Analytical Team, including updated bycatch rates and attendant data on the reported reasons for the discards. The form in which the data is provided should be that which allows for its timely use.

2. The TIQC asks that costs associated with status quo be clearly identified and not attributed to the IFQ program, particularly with respect to determination of industry cost sharing.

3. Alternative Tools

Recommendation: Under alternative tools, permit stacking and extended cumulative limit periods should be listed as separate choices rather than combined. This will provide the Council with more flexibility and clearer analysis of the suite of measures that might potentially be used to manage the fishery.

4. Tool Design - IFQs

Section A.1.0 - Portion of the Limited Entry (LE) Trawl Fleet Allocation for Which IFQs are Required

The TIQC recommends the adoption of Option 2c as the preferred option. Option 2 limits the scope of the IFQ program to LE trawl vessels using groundfish trawl gear. Another means needs to be identified for managing open access gear used by these vessels 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.

Recommendation:

1. Option 2c is the TIQC's preferred option.

2. Request a projection of the amount of fish that would be needed by LE trawl vessels using open access gear.

Section A.2.0 Area Restrictions on IFQ

Area restrictions on the IFQ would reduce flexibility, and the information necessary to properly manage small areas may not be available.

Recommendation: Area restrictions on IFQ should be the minimum necessary to address biological concerns. Research should be undertaken on the problem of localized depletion and the need for area management.

Section A.3.0 IFQ and LE Permit Holding Requirements

The TIQC recommends Option 3, that a vessel:

- must be an LE trawl vessel to fish IFQ
- may not depart on a fishing trip if it has a deficit for any species (has caught fish in excess of the IFQ quota pounds held), and
- must acquire IFQ to cover its catch within 30 days of landing.

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.

Recommendation: The TIQC recommends Option 3.

Section A.4.1 Transfer of IFQ to a Different Sector

This section should address transfer of IFQ among different segments of the trawl sector. Three options have been identified for segmentation of the trawl sector, the first of which is "no segmentation."

	Division of Trawl Sectors		
Option 1:	One Trawl Sector		
Option 2:	Shoreside	Mothership	Catcher-Processor

Option 3:	Shoreside Whiting	Shoreside Nonwhiting	Mothership	Catcher-Processor

The options for Individual Bycatch Quota should be changed to eliminate the issue of the possible transfer of individual bycatch quota (IBQ) to a nontrawl sector.

Recommendations:

- Continue development of this option based on the above possible segmentation of the trawl sector.
- Request development of a criteria for distinguishing shoreside whiting from shoreside nonwhiting landings.
- IBQ Option 2 is the TIQC's preferred option, except remove language that would allow transfer of IBQ to a nontrawl sector.

Section 4.2 Eligible Owners/Holders (Who May Own/Hold)

Allowing anyone to acquire IFQ would be a step toward addressing many concerns about community and other stakeholder ability to secure their interest and involvement in the fishery. For that reason, the TIQC recommends that any entity eligible to own a U.S. documented fishing vessel be allowed to own IFQ. The TIQC is concerned about the potential for someone to purchase and not use the IFQ, depriving the industry and communities of benefits from the fishery. The TIQC hopes to be able to address this concern through use-it-or-lose-it provisions.

Recommendation: Option 1 is the TIQC's preferred option. Modify the language such that it reads as follows with respect to who may acquire IFQ: "Any entity eligible to own a U.S. documented fishing vessel." Eliminate Option 2, with the caveat that ways be developed to ensure IFQ is used.

Section 4.3 Duration of Transfer - Leasing and Sale Production

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.

Recommendation: Option 2 is the TIQC's preferred option. Eliminate the suboption that would temporarily restrict transfers, and keep Option 1 for comparison.

Section 4.4 Time of Transfer

For administrative reasons, it may be necessary to prohibit quota share transfers during certain times of the year. The Council should keep both options (Option 1: allow year round transfers, and Option 2: allow transfers only at the end of the year).

Transfers 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.

Recommendation: Make no changes to the "Time of Year" options. Modify the "Transfer Embargo" provision such that it applies only to quota shares held by the vessel.

Section 4.5 Divisibility

The provisions allow for unlimited divisibility, and no options have been specified.

Recommendation: Make no changes.

Section 4.6 Liens

There are no options under the lien provision. 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.

Recommendation: 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.

Minority: Exclude recommendation on ownership.

Section 4.7 Accumulation Limits

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.

Recommendations:

- Include a no cap option for analysis.
- Add a 50% cap option to provide a more complete range of options.
- Clarify that different options may be selected for different columns of the caps option table (below).
- If the whiting sectors are segmented (Section A.4.1) there may need to be different caps for each sector.
- 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.

Options for IFQ concentration caps.

	Non-Whiting Groundfish			Whiting Fishery **(Separate Matrix for Each Sector Specified in the Options Selected in Section 4.1)**		
	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

Minority: Provide different caps for different types of entities (e.g., processors, communities, etc.)

Section 4.8 Vertical Integrations

There are no options to limit vertical integration, and the TIQC is not recommending the creation of such limits.

Section A.12.0 Data Collection

This section was not specifically discussed during the meeting. However, TIQC members expressed concern about the limited availability of information for projecting effects of an IFQ program, particularly with respect to the trawl sector. Processors committed to providing analysts with cost information, and analysts were asked to provide processors with a lot of the needed information. In early 2005, there will be a trawl cost survey that will collect information useful in the analysis of an IFQ program and other alternatives.

Section A.13.0 - Initial IFQ Allocation

Data Quality - This section was not specifically discussed during the meeting, however, related data quality issues were addressed. To apply an allocation formula based on catch history for a particular species, a method would need to be developed for attributing landings for which the species is coded as unspecified or as a species group. While on average it appears in some years that roughly 5% to 10% of the landings might fall into these categories, for some vessels the proportion is substantially larger. For the purpose of the allocation formula, a standardized method needs to be developed for allocating these landings to a particular species.

Recommendation: Request the development of a method for attributing all landings to a particular groundfish species for the purpose of the allocation of IFQ.

Acceptable Biological Catch/Optimum Yield Overages and Request for Legal Opinion

To the degree there is an expectation that the trawl IFQ fishery could be shut down early due to an overage in another sector, the IFQ fishery could be transformed into a race to catch allowable harvest before the fishery is closed.

Recommendations: If a sector exceeds its cap such that the OY will be exceeded, other sectors should not be shut down–so long as the OY is achieved on average over the long term. Any overage or underage that is rolled over from one year to the next should accrue to the sector generating the rollover.

The Council should request a formal legal opinion on the following:

1. If the OY or rebuilding target for overfished species is exceeded either through another sector going over its quota or from a single vessel harvesting in excess of its IFQ, would the IFQ fishery need to be shut down?

   Closely related to this is the rollover provision (Section A.5.0). The rollover provision would allow a vessel to carryover from one year to the next some amount of an overage or underage of harvest, with respect to the IFQ held by the vessel.

2. If the rollover provision could result in the trawl fleet taking harvest in excess of its allocation in a particular year (to be made up in the following year) and, consequently, total catch in excess of the OY, would this provision be approvable?

3. If overages can be rolled over to a following year, could underages be rolled over–such that there would be a larger total allowable catch the following year?

Agenda Item E.6.b
Supplemental Ad Hoc TIQ Analytical Team PowerPoint Presentation
November 2004

Summary of Key Topics from the TIQ Analytical Team Report

Report to the Pacific Fisheries Management Council
November 2004

Presented by:
Kate Quigley, Economist
Sustainable Fisheries Division, NMFS

Outline of Presentation

- Issues the AT thought would be relevant regardless of alternatives chosen
- Questions we thought would be useful to answer
- Progress made on addressing these issues
  - Several issues have not yet been adequately addressed
  - Several issues are not referred to in this report

Status Quo Management Regulations

What is the status quo against which IFQs or other management alternatives will be measured?

- Status quo:
  - Increased bycatch monitoring; and
  - Increased enforcement.

Management Measures Remaining in Place with IFQs

Which current management measures would remain in place, and which would be replaced under an IFQ program?

- Management measures we expect to remain:
  - RCAs
  - Restrictions on trawl gear
- Management measures we expect to be replaced:
  - Cumulative trip limits

Harvest Levels Under Status Quo Policies

What harvest levels might be expected under status quo harvest policies?

- Harvest will likely continue to be constrained by overfished species.
- Subject to constraints, opportunities may exist for reduced discard and fuller utilization of catch OYs.

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 and current volume of discards?*
  - Market constraints (68%), regulations (24%), quality reasons (8%) (Enhanced Data Collection Program)
  - WCGOP
- *What effect may IFQ programs have on discards, and what design elements might tend to increase and decrease discards?*
  - Linking quota to total catch
  - 100% observer coverage
  - Quota transferability
  - Strong disincentives for failing to cover catch with quota

Need for Area Management of IFQs

- *Is a redistribution or concentration of catch more likely to occur under an IFQ program than under status quo?*
  - Divisibility and transferability of quota shares increase the likelihood of geographic shifts. The degree and direction of shifts are not predictable.
- *What kind of geographic shifts have been observed historically?*
  - Historical catch indicates strong variability over time.
  - From observation of data, it not apparent that fishing effort necessarily follows survey biomass or CPUE.
- *What biological concerns might be associated with an increase in the concentration of harvest in some areas?*
  - Existence of potentially adverse concentrations of effort unknown
  - 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.

Economic Impacts under IFQs

- *What is the likely effect of IFQs on asset values?*
  - It is likely that IFQs will influence the value of existing assets like permits, vessels, plants and processing capital, and community infrastructure.

- *What is the potential for efficiency gains under IFQs?*
  - Depends on…
    - Fleet restructuring;
    - Increased efficiency of individual vessels;
    - Shift of harvesting to more efficient vessels; and/or
    - Increased product value.
  - Some studies indicate 40% reduction in harvesting costs (mostly through decrease in vessel numbers)
  - Some studies estimate efficiency gains under IFQs of over $10 million.

- *How will IFQs affect enforcement and other program costs?*
  - Assuming that adequate tracking and monitoring elements are put in place prior to an IFQ, very little additional enforcement effort would be required to implement an IFQ.
  - Other major program costs are being evaluated.

IFQ Allocation Issues

- *Data Quality Issues*
  - *Sample coverage and species assignments are not uniform along the West Coast;*
  - *Not all the nominal fish ticket categories are reassigned to specific categories; and*
  - *Since average catch distributions are applied, any particular individual's fishing practices are not accurately represented*

  …catch histories for some vessels appear with more than half their total annual catch still residing in generic species categories.

- *Limited Entry Vessels Using Open Access Gear*

Summary of Key Topics from the TIQ Analytical Team Report

The Ad Hoc Groundfish Trawl Individual Quota (TIQ) Analytical Team presented preliminary results of ongoing analyses at the Ad Hoc TIQ Committee (TIQC) meeting in Portland, Oregon, October 25-26, 2004. The following summary excerpts the key information from those presentations.

Status Quo Management Regulations

What is the status quo against which individual fishing quotas (IFQs) or other management alternatives will be measured?

Status quo management for the trawl fishery is generally characterized by cumulative landing limits, closure of areas and depths (e.g., Rockfish Conservation Areas [RCAs]), and season management for Pacific whiting. The need for increased bycatch monitoring has been generally recognized and is part of the preferred alternative that was adopted under the programmatic bycatch environmental impact statement (EIS). Increased funding commitment is also needed to adequately enforce status quo regulations. While resulting in higher program costs than is currently the case, such changes are needed to achieve adequate control under the status quo management system and should, therefore, not be counted as new costs under an IFQ program.

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 RCAs, are likely to remain in place with or without IFQs. Likewise, restrictions on trawl gear such as maximum footrope diameter and minimum net mesh size would likely remain in place. Such restrictions will continue to be necessary under any management system in order to reduce the mortality of overfished species. The main features of the current management system that would likely disapppear under an IFQ program are (cumulative) trip limits. This along with IFQs would give vessels more control over the timing of fishing trips and deliveries, thereby increasing efficiency and net value.

Harvest Levels Under Status Quo Polices

What harvest levels might be expected under status quo harvest policies?

The present fishery is characterized by significant underharvest of available catch optimum yield (OY) for many species - only approximately half of the available OY is being taken (Table 1). The harvest of target species OYs for the foreseeable future will continue to be constrained by overfished species.

Subject to the constraints imposed by species under rebuilding plans, opportunities may exist for reduced discard and fuller utilization of catch OYs. A carefully designed IFQ program (and possibly other program alternatives) may provide incentives to modify gear and strategies to retain more catch and access more of the available OY.

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 and current volume of discards?

The Enhanced Data Collection Program collected data between 1995 through 1999 on the reasons for discards. The primary reasons listed for discard were market constraints (68%), followed by regulations (24%), and quality reasons (8%). The West Coast Groundfish Observer Program (WCGOP) collects similar data. Opportunity to examine this data would help attain a greater understanding of the impact of the current fishery management system.

Present information on discard is limited. Estimates of total catch including discard mortality for 2002 and 2003 are provided in Tables 2 and 3. 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 1). Updated total catch mortality estimates by fishery sector, including adjustments for depth and management period, are currently on hold pending the receipt of discard data from the WCGOP.

What effect may IFQ programs have on discards, and what design elements might tend to increase or decrease discards?

A combination of present management measures and new IFQ tools could be used to reduce bycatch under an IFQ program. While multispecies fisheries managed under IFQs have had mixed success, British Columbia experienced a reduction in discard, albeit with an underachievement of the total allowable catch (TAC) for many species. Success in reducing discards in the British Columbia program was attributed to linking quota to total catch (including bycatch) instead of only landings, requiring 100% observer coverage, quota transferability, and creating strong disincentives for failing to cover catch with quota. Table 4 identifies several IFQ program features that may be useful in reducing at-sea discards under an IFQ program.

Need for Area Management of IFQs

Is a redistribution or concentration of catch more likely to occur under an IFQ program than under status quo?

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.

What kind of geographic shifts have been observed historically?

Under past and present fisheries management, except for the recent application of depth or area specific regulations, distribution of fishing effort has not generally been constrained. Generally, maps of survey biomass for lingcod, sablefish, and Dover sole show changes in concentration over time, but relatively less association with latitude (Figures 1, 2 and 3). Maps of historical catch demonstrate strong variability over time with some changes over latitude, but these trends do not always correspond with those indicated by the biomass surveys. It is not apparent that fishing effort necessarily follows high survey biomass or catch per unit effort (CPUE) under the current management system. Restrivtive cumulative limits may be acting to even out the geographic distribution of harvest. Relief from these limits may result in a redistribution of catch.

What biological concerns might be associated with an increase in the concentration of harvest in some areas?

The Canadian government adopted an area allocation scheme for conservation reasons. 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 for a mixed stock fishery in the absence of clear-cut stock information. Area allocation was designed to prevent overfishing and possible localized and/or serial depletion of resources.

While the existence of potentially adverse concentrations of effort in the current West Coast fishery is unknown, 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 localized depletion (lingcod) or are judged to have a high potential for localized 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 found to be a preferred alternative, then these groups should also be instrumental in defining management areas.

Economic Impacts under IFQs

What is the effect of IFQs on asset values?

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 likely reduce 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.

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.

What is the potential for efficiency gains under IFQs?

Efficiency changes expected under an IFQ management system typically occur through four mechanisms: fleet restructuring, increased efficiency of individual vessels, shifting of harvesting to relatively more efficient vessels, and/or increased product value.

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. Most studies have also focused primarily on vessels, so the potential effects on processors' efficiency are less studied. Results vary considerably, but many studies show substantial efficiency gains resulting from reductions in vessel harvesting cost. Forty percent reductions in harvesting costs were noted in some studies, achieved chiefly through the retirement of less efficient vessels. A number of studies estimated annual efficiency gains under IFQs 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. An effort was also initiated at the October 2004 TIQC meeting to collect costs and earnings data from West Coast groundfish processors. Results from these surveys will provide improved data for estimating the potential effects on costs, earnings, and efficiency of harvesting and processing sectors likely to result under an IFQ program.

How will IFQs affect enforcement and other program costs?

Increased bycatch monitoring and effort is needed to adequately enforce bycatch limits and other status quo regulations. Assuming adequate tracking and monitoring elements are put in place (including 100% at-sea coverage and a dockside monitoring program), very little additional enforcement effort would be required to implement an IFQ program. Full time equivalent estimates have been developed by the Ad Hoc TIQ Enforcement Group and are forthcoming.

Other major program costs associated with initial development and setup of an IFQ program include expenditures for issuing initial quota, tracking and matching quota with catch (software and database programming), and managing an appeals process.

Depending on final program design, other administrative costs may include: administering a database to analyze alternative allocations, setting up a quota market, upgrading methods and devices for recording landings, administering community development programs, conducting community education and outreach, and establishing a program for accommodating new entrants.

IFQ Allocation Issues

Initial allocation of IFQ will be one of the most contentious issues. There are many decision points along the way. The following discussion summarizes a few main issues.

Data Quality Issues

If allocation of individual species quotas will be based on historical landings, it is important to understand the limitations of using available Pacific Coast Fisheries Information Network (PacFIN) data for that purpose. Initially, landings of many rockfish and other groundfish species are recorded in PacFIN as "nominal" or "unspecified" categories. This was especially true for rockfish species landed prior to 1999. These landings are later assigned to other PacFIN categories by applying sample-based distributions of average species composition to the generic category totals. However, sample coverage and species assignments are not uniform along the West Coast, not all the generic categories are reassigned to specific categories, and since average catch distributions are applied, any particular individual's fishing practices are not accurately represented. As a result of these factors, catch histories for some vessels appear with more than half their total annual catch still residing in generic species categories (Figure 4).

Limited Entry Vessels Using Open Access Gear

The Council will need to determine whether or not groundfish taken by limited entry (LE) trawlers while engaged in other fisheries will be subject individual quotas. 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 a total of 280,000 pounds of groundfish against their open access limits. In 2003, 16 LE trawl vessels landed 154,000 pounds of groundfish using open access gears.

TABLE 1. (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%
	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 2. (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 3. (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 Washington EFP included full retention of shelf rockfish, no at-sea discard of these species was estimated for tows occuring within the RCA off Washington, or on tows that exceeded the 2-month allowance of arrowtooth flounder outside the EFP. 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 limited geographic coverage of available data, fixed-gear discard amounts for species 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).

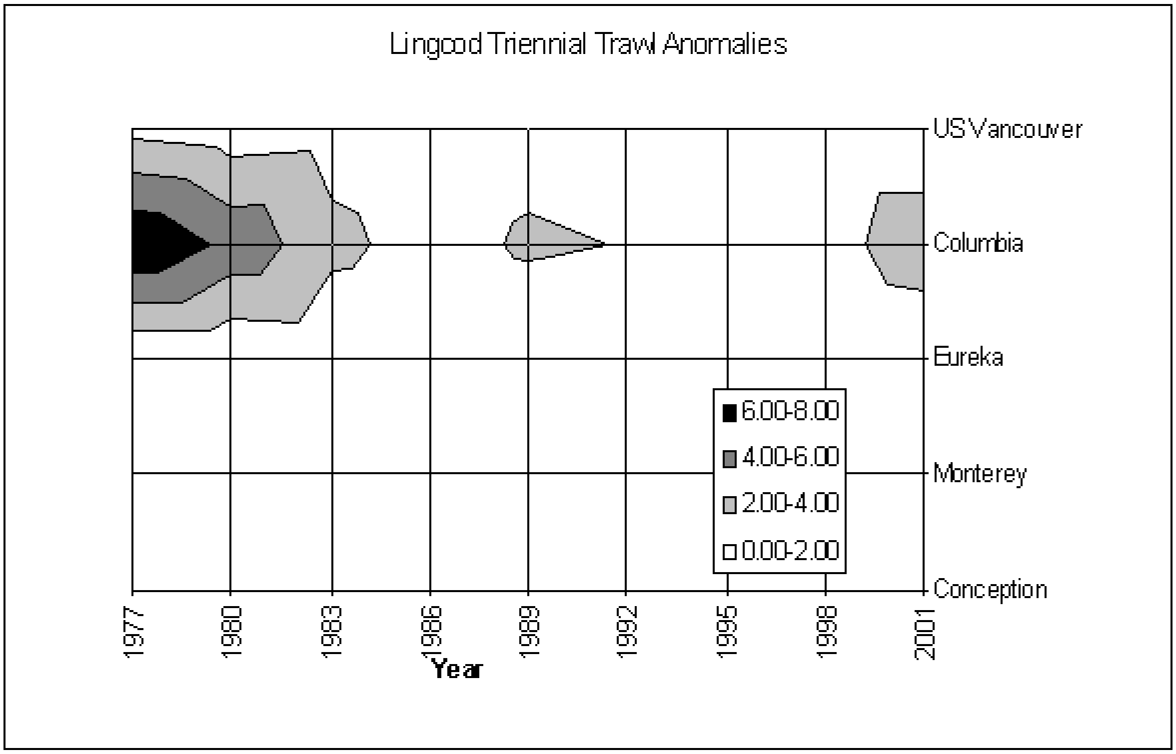
d/ Discards of whiting are estimated from observer data and counted towards the OY inseason.

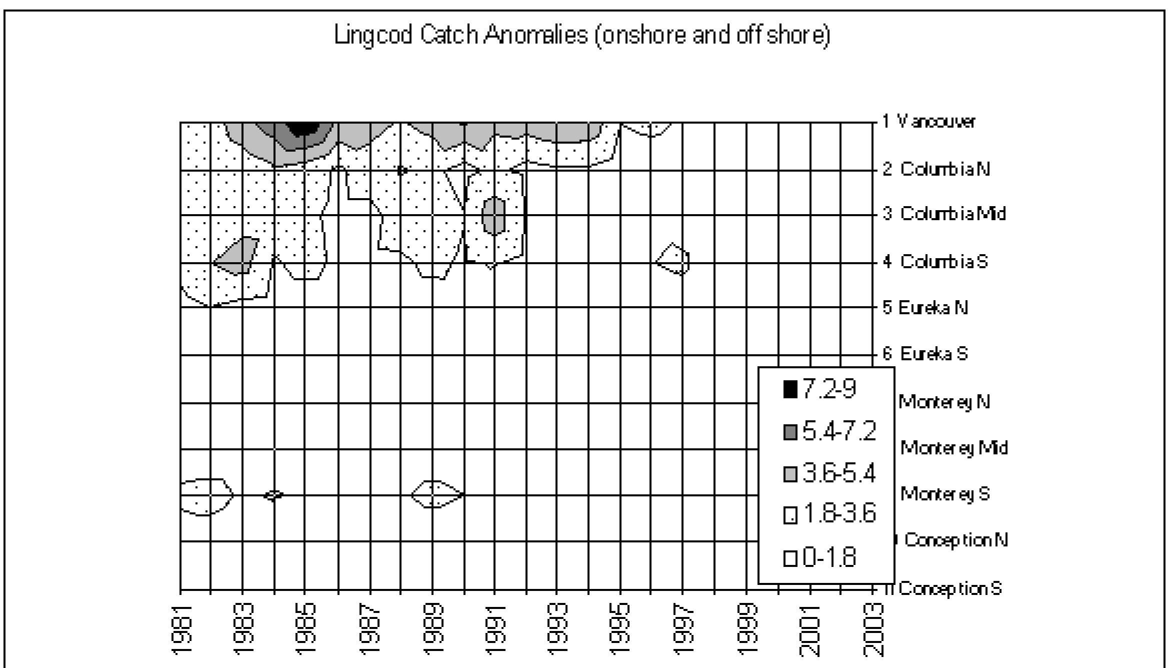
e/ Includes "unspecified thornyheads" allocated based on ratios estimated from California landings and At Sea north/south ABCs.

TABLE 4. (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 manageing 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 penalities for overcatches	Provides incentive to incorporate selective fishing strategies that minimize bycatch of overfished or prohibited species, promotes individual accountability.	If penalities 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.	

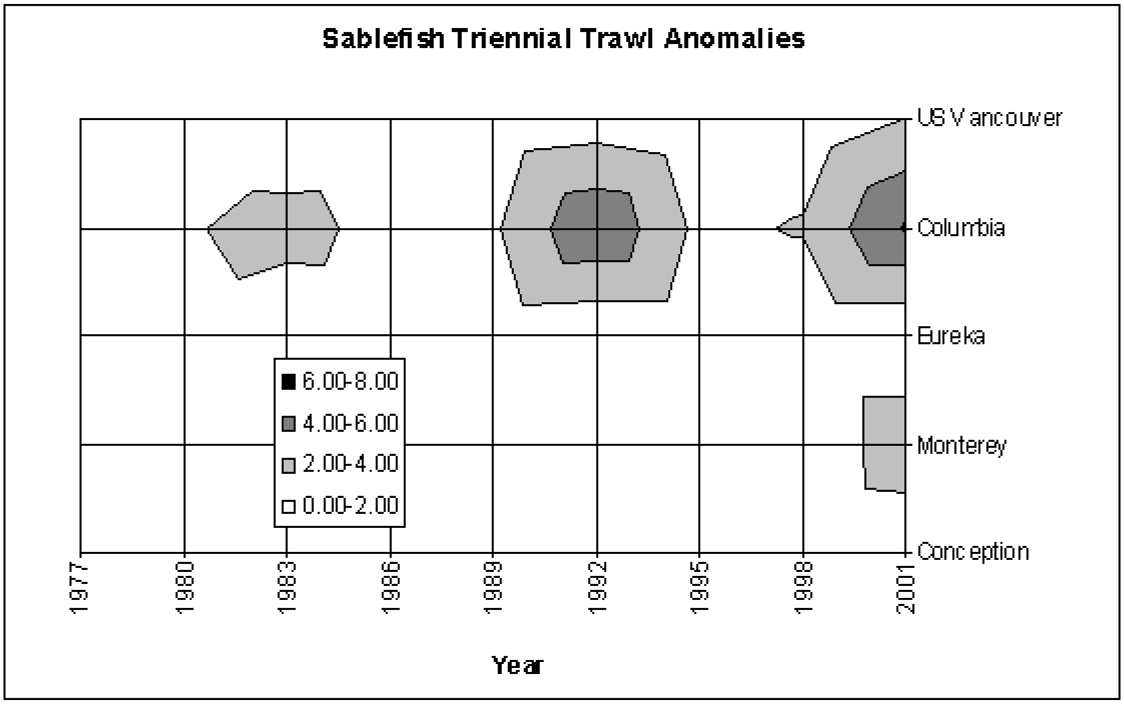
FIGURE 1. (A1.1a) Lingcod triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).

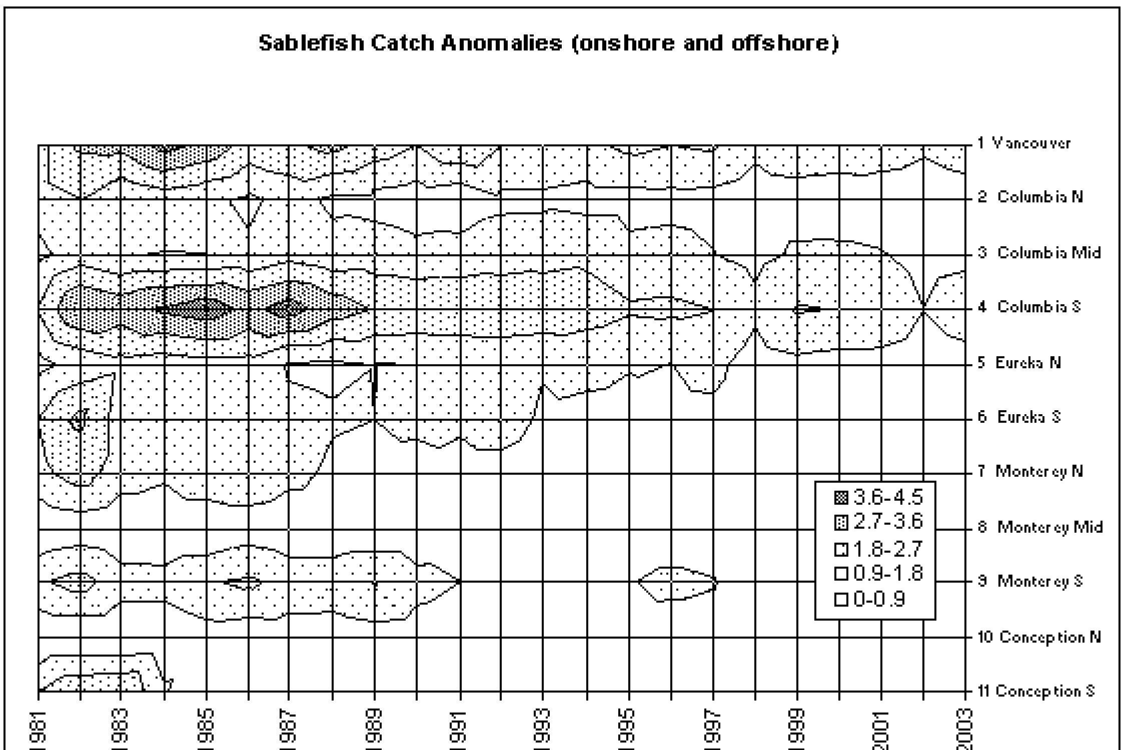




Notes: 1. Years prior to 1991 include only onshore landings.
2. Average of all areas and years includes zeros when no landings were made.

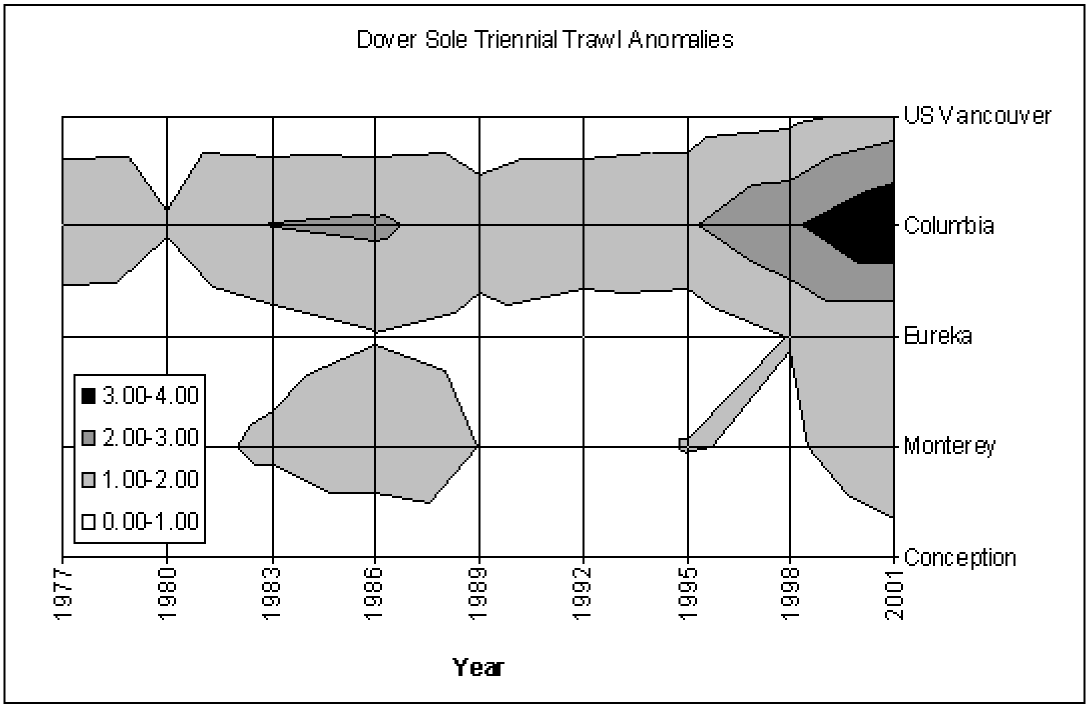
FIGURE 2 (A1.2a) Sablefish triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).





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 3 (A1.3a) Dover sole triennial trawl anomalies by INPFC area (1977-2001) and commercial catch anomalies by INPFC area (1981-2003).



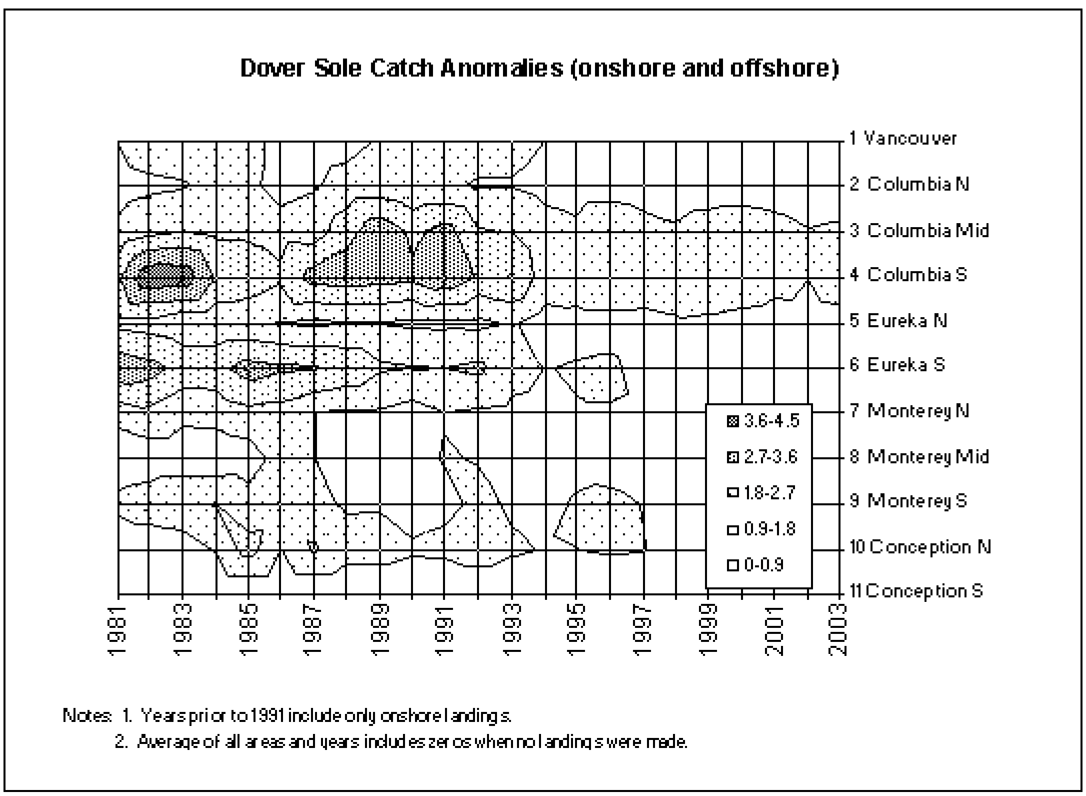
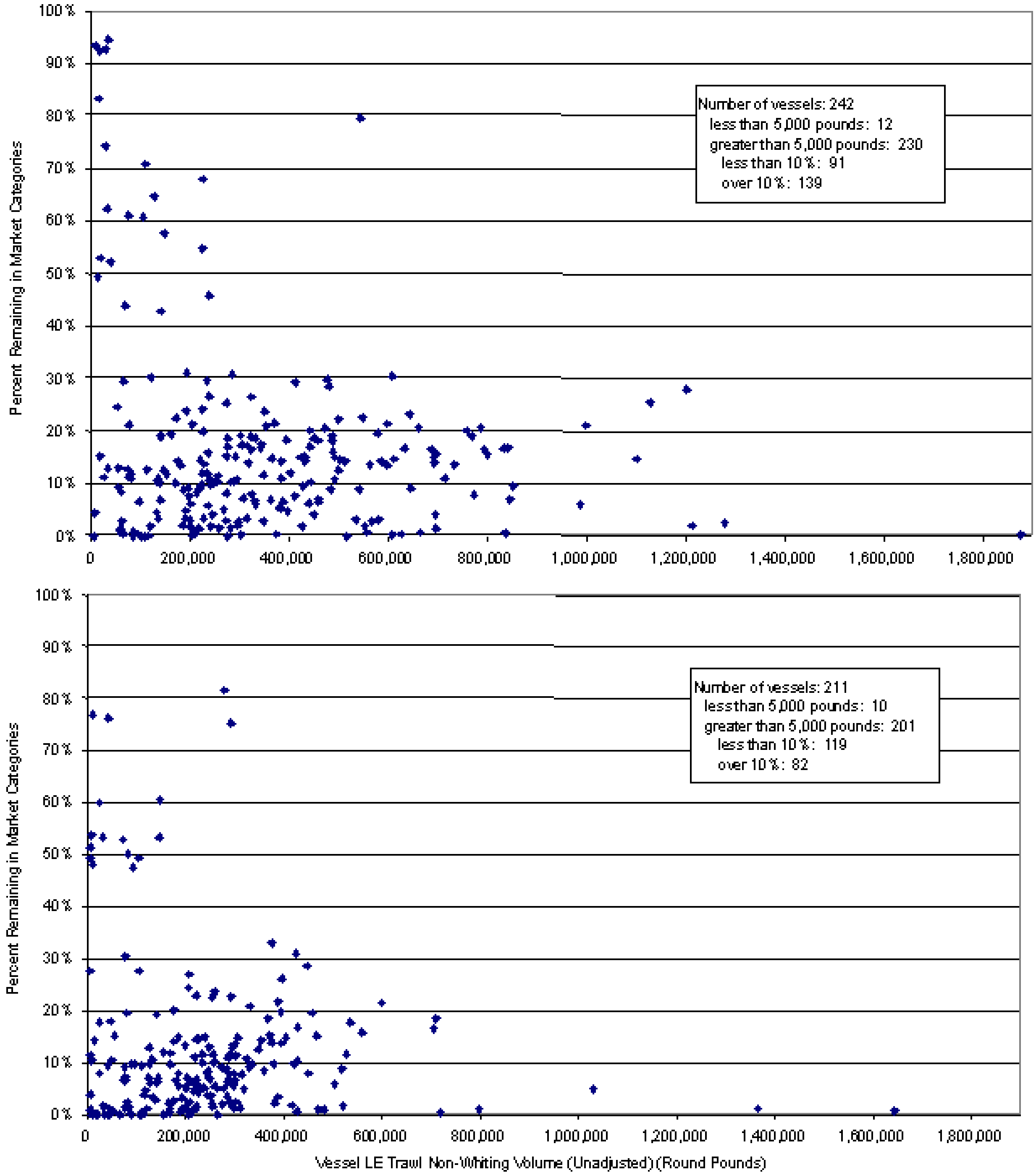


FIGURE 4. Remaining market category species after composition adjustment for LE Trawl Non-Whiting Groundfish vessels in 1998 (top) and 2003 (bottom)



Notes: 1. Market category adjusted species codes are for common name species descriptions starting with NOM, NOR, UNSP, OTHER, or containing MIXED.
2. Filtered for vessels landing at least 5,000 pounds of non-whiting groundfish LE trawl.

GROUNDFISH ADVISORY SUBPANEL STATEMENT ON TRAWL INDIVIDUAL QUOTAS

The Groundfish Advisory Panel (GAP) reviewed the progress made by the Ad Hoc Groundfish Trawl Individual Quota (TIQ) Committee and the material presented by the Council staff at the joint Council briefing on Monday.

Because the TIQ Committee did not have sufficient time at their last meeting to provide a list of proposed alternatives, the GAP believes it is inappropriate, at this point, to review and comment on an incomplete package. The GAP defers comments until a future meeting when a complete report from the TIQ Committee is available. After consulting with TIQ Committee members who attended the GAP meeting, the GAP believes a more complete report will be available in the spring.

On a separate issue, the GAP was asked to comment on a proposal that a separate Council subcommittee be appointed to interact with the TIQ Committee and review its work. The GAP believes this proposal is premature, especially since the TIQ Committee has not finished its work. We should not be considering adding additional layers of Council review to a difficult process unless there is some clear indication the process has failed.

PFMC
11/03/04

Agenda Item E.6.c
Supplemental SSC Report
November 2004

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TRAWL INDIVIDUAL QUOTAS - PART I

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). 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

Agenda Item E.6.d
Public Comment
November 2004

October 5, 2004

Dr. David Hanson
Chair, Trawl IQ Committee
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220

Dear Dr. Hanson:

We were provided with a copy of a August 19 letter from the trawl representatives on the Trawl IQ Committee that was entered as public comment during the September Council meeting. Although the letter was not addressed to us, we understand that you have requested a response from the processor representatives on the committee.

We have all worked diligently through the Council system to support better science and management for the pacific groundfish fishery. We participate at the Council, serve on Council committees, and consistently push for more funding for fisheries science and research.
We supported the trawl buyback program in spite of reservations (which unfortunately came true in some cases) that a skewed geographic distribution of permit reductions would cause problems. We have supported the Council's efforts to construct a groundfish rationalization program, seeking to ensure only that it benefits all participants in the fishery.

Regarding the specific proposals made by the trawl representatives, we suggest the following:

- We agree with changing the decision rules of the TIQ Committee so that all decisions are made by consensus. However, if consensus is not reached, we suggest that the issue be taken off the table and not forwarded by the Committee.

- We agree that the analytical committee be requested to outline data needs. However, this should include the means of collecting the needed data, not just analyzing the incomplete data that exists, especially in regard to processing. We note that the analytical committee seems to be rushing forward with analysis without taking the time to assess data gaps and determining how to fill them.

- We have no objection to informal meetings and have already discussed this possibility with trawl and environmental representatives. We note that the offices of Senator Smith and Senator Murray have already convened one such meeting and appreciate their interest in our fishery.

- We further suggest that the Council consider separating discussions on whiting and non-whiting trawl IQ's. It may be possible to reach an earlier consensus on a rationalization plan for the whiting fishery, which could even serve as a template for the non-whiting trawl fishery.

We note that Dr. Hogarth recently made this suggestion at the Pacific States Marine Fisheries Commission meeting in Seattle.

We also suggest that the Council and NMFS decide on funding priorities for their many activities, including groundfish rationalization, support of fishery management plans, and fisheries research. We are concerned that earlier this year the Northwest Fisheries Science Center suffered a shortfall in survey money due to funds being used to support development of a rationalization plan and that the shortfall was alleviated by taking money away from cooperative research. It does us no good to allocate access privileges among fishery participants if we have no idea how much fish is available to allocate. We also note that the Council has insufficient funds to manage the highly migratory species fishery.
The Council needs to determine how to fulfill its responsibilities under the law.

Like the trawl representatives, we are fully committed - and have demonstrated that commitment - to working cooperatively to conserve and manage our west coast fisheries.

Sincerely,

M Jay Bornstein

Jay Bornstein

Frank Dulcich

Dale D. Myer

Dale Myer

Joseph T. Plesha

Joe Plesha

August 19, 2004

Dr David Hanson
Chair of the Trawl IQ Committee
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220

Dear Dr. Hanson:

The Council took an important step forward when they began the process of examining how an individual quota system could promote both the biological and economic health of our West coast trawl groundfish fishery. Studies of IFQ programs from around the world have shown that a properly designed system can enhance safety, increase the value of fishery products, reduce discards and bycatch, increase the availability of fresh seafood, improve fishing industry profits, and provide for effective harvest capacity management and sustainable fisheries. IFQs contribute to safe, stable jobs that pay living wages. They are a crucial part of a rational fishery.

We have a chance to realize these benefits in our trawl groundfish fishery, but only if all stakeholders work together in developing and discussing alternatives in a rational, analysis-driven process. As harvesting sector representatives of the Trawl Individual Quota Committee, we are committed to working with our colleagues representing the processing sector, conservation groups, and coastal communities to properly and effectively evaluate alternatives and provide advice to the Council on designing an IFQ program that balances the needs of harvesters, processors, coastal communities, and the resource. To this end, we propose that:

- The decision rules of the Trawl IQ Committee be changed so that all Committee recommendations are developed through consensus rather than by voting. If, after full deliberation, consensus is not reached, the Committee will provide the Council with position statements that identify each group's key concerns and rationale for their position, and discuss why consensus could not be achieved.

- The Council's IQ analytical committee be requested to outline what information is needed, and whether this information is available, so the impacts of a full range of harvester/processor initial harvesting quota allocation options can be assessed.

- We meet informally with processors, conservation and coastal community interests prior to the next Trawl IQ Committee to discuss what each sector believes to be essential sector-specific objectives achieved from an IQ program, as well as to discuss information that could be made available to the analytical committee to assist in their impact analysis. We hope that such a dialogue could help us focus our discussions on the relative benefits of alternatives when we next meet as a Committee. Understanding and clearly defining these objectives – including those that may be conflicting – will aid in understanding the trade-offs between alternatives currently under discussion as well as designing new alternatives that may better address specific concerns.

We are committed to doing our part in developing an IFQ program that best meets the unique needs of West coast harvesters, processors, coastal communities, government managers, and, most importantly, the resource. We support funding this initiative, because adequately funded analysis is a critical component of our ability to fully discuss trade-offs between alternatives and provide reasoned advice to the Council. We believe it is imperative for all the stakeholders in the west coast trawl groundfish fishery -- the harvesters, processors, the coastal communities, environmental groups, and fishery managers -- to work cooperatively towards improved fisheries management. A safer, more profitable, and better managed fishery is possible, if only we can all work together.

Sincerely,

Steve Bodner
Chris Garbrick
Alan Hightower
David Jincks
Marion Larkin
Pete Leipzig
Brad Pettinger
Rich Young

cc: Don Hansen, Chair, PFMC
Don McIssac, Executive Director, PFMC
Other members of the Trawl IQ Committee
Steve Freese, NMFS, NW Region
Dr. Bill Hogarth, Assistant Administrator for Fisheries, NMFS, NOAA
West Coast Congressional delegation

Pacific Marine Conservation Council

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October 13, 2004

Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Trawl Individual Fishing Quota (IFQ) alternatives and the Council decision whether to continue investing in their development

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 has previously provided comments to the Council on this issue, recording both procedural complaints and substantive concerns. We have also contributed to the public scoping process which NOAA Fisheries has conducted under the National Environmental Policy Act in preparation for possible development of an environmental impact statement. Our scoping testimony and comments are fairly well chronicled in the scoping summary prepared by Council staff, that was presented at the September Council meeting. This summary document is useful not only to review the pitfalls of possible trawl IFQ systems that have been identified by PMCC, but also to keep in mind the fears and concerns raised by others.

This is clearly an extremely controversial issue. It is also exceptionally complicated. The IFQ-style options we seen presented to this point fail to fully address the goals and objectives set forth in the Council's strategic plan, or even the internal objectives of this process. I realize that some additional analysis will be completed between the date of this letter and the Council meeting – including the Council requests to take a look at permit stacking and longer cumulative limit periods – so I don't want to arbitrarily suggest that fresh ideas might not come forward. But, realistically it's time to take a hard look at where this is going.

PMCC strongly recommends that further development of a trawl-only IFQ system be tabled. We make this recommendation not only because we see the inherent flaws in a trawl IFQ system that

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would promote inequity within the commercial groundfish fishery, threaten the health of recreational fisheries, consternate the implementation of essential conservation measures, and hurt the economies of some of our coastal communities. We also believe that the process of developing a trawl-only IFQ system is diverting resources and staff time that could be better spent.

Taking creative and decisive action to significantly reduce bycatch in the groundfish fishery is a far better focus at this time. The Council is about to embark on development of a bycatch program fishery management plan amendment. This amendment and its implementing regulations could help ensure that we effectively rebuild depleted fish populations along this coast while providing increased economic opportunities. In a time of scarce and uncertain resources it makes much more sense to go after the core of what restrains our commercial and recreational fisheries, rather than to pour money on a complicated and dangerous economic experiment for one gear group.

However, should some new ideas for alternatives be offered at the Council meeting we want to remind the Council to carefully consider whether these alternatives are consistent with the following provisions of national fisheries law:

> *From Magnuson-Stevens Act (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, and*
> *(F) any other relevant considerations.*

I'd also like to offer here an excerpt from the February 2004 GAO study, *INDIVIDUAL FISHING QUOTAS: Methods for Community Protection and New Entry Require Periodic Evaluation*:

> *"Several methods are available for protecting the economic viability of fishing communities and facilitating new entry into IFQ fisheries. The easiest and most direct way to help protect communities under an IFQ program is to allow the communities themselves to hold quota. Fishery managers can also help communities by adopting rules aimed at protecting certain groups of fishery participants. Methods for facilitating new entry principally fall into three categories: (1) adopting transfer rules on selling or leasing quota that help make quota more available and affordable to new entrants; (2) setting aside quota for new entrants; and (3) providing economic assistance, such as loans and subsidies, to new entrants.*
>
> *"In considering methods to protect communities and facilitate new entry into IFQ fisheries, fishery managers face issues of efficiency and fairness, as well as design and implementation. Community protection and new entry methods are designed to achieve social objectives, but realizing these objectives may undermine economic efficiency and raise questions of equity. For example, allowing communities to hold quota may result in a loss of economic efficiency because communities may not have the knowledge and skills to manage the*

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quota effectively. Similarly, rules to protect communities or facilitate new entry may appear to favor one group of fishermen over another. Furthermore, community protection and new entry methods raise a number of design and implementation challenges. For example, according to fishery experts, defining a community can be challenging because communities can be defined in geographic and nongeographic ways. Similarly, loans or grants may help provide new entrants with the capital needed to purchase quota, but they may also contribute to further quota price increases. Given the various issues that fishery managers face in developing community protection and new entry methods, it is unlikely that any single method can protect every type of fishing community or facilitate new entry into every IFQ fishery. Deciding which method(s) to use is made more challenging because fishery managers have not conducted comprehensive evaluations of how IFQ programs protect communities or facilitate new entry.

"In comparing the key features of IFQ programs and U.S. fishery cooperatives, we found that each approach has advantages and disadvantages in terms of regulatory and management framework, number of participants, quota allocation and transfer, and monitoring and enforcement. Specifically, in terms of regulatory and management framework, IFQ programs have greater stability than cooperatives because they are established by federal regulations, while cooperatives are voluntary contractual arrangements. In terms of quota allocation and transfer, IFQ programs are open in that they allow the transfer of quota to new entrants, whereas cooperatives are exclusive by contractual arrangement among members. In terms of monitoring and enforcement, IFQ programs are viewed as being more difficult to administer, because NMFS must monitor individual participants, while cooperatives are viewed to be simpler for NMFS to administer, because NMFS monitors only one entity—the cooperative. For some fisheries, a combined approach may be beneficial. For example, a cooperative of IFQ quota holders can combine an IFQ program's stability with a cooperative's collaboration to help manage the fishery."

Finally, PMCC believes that it makes sense for the Council, in considering IFQ programs or any other type of dedicated access privileges (DAP), to evaluate alternatives for consistency with the recommended DAP standards crafted by the US Commission on Ocean Policy, as included in the Commission's final report to the President:

"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.

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• *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.*
• *be adopted only after adequate public discussion and close consultation with all affected stakeholders, to ensure community acceptance of a dedicated access plan prior to final Regional Fishery Management Council approval."*

We believe that the US Commission on Ocean Policy recommendations should be incorporated into a clearly defined set of national standards for IFQ programs. These standards, once adopted by Congress, would help frame future debates in the Region, should the Council decide to once again examine the possibility of IFQ management in one of more fisheries.

Thank you for considering our comments.

Respectfully,

Peter Huhtala
Senior Policy Director

PO Box 59 • Astoria, Oregon 97103
Tel: (503) 325-8188 • (800) 343-5487 • Fax (503) 325-9681 • www.pmcc.org

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)

COLUMBIA RIVER CRAB FISHERMAN'S ASSOC.

IFQ - PFQ JUST SAY NO

The fish in the sea are a vital part of our countries fishing heritage that is protected by the "Public Trust Doctrine" which is integral to our common law that protects public trust assets for "ALL".

Marine fish are the property of the American people, are held in trust for them by federal and state governments, and must be managed to preserve the full range of those benefits for present and future generations. Privatizing the fish in the sea is an inappropriate application and unconscionable mismanagement of that TRUST.

Promote EQUAL ACCESS – EQUAL OPPORTUNITY for all fishermen and all processors

Equal opportunity for time on the sea
Equal gear restrictions
Equal opportunity to access public resource
Equal and healthy price competition among processors
Equal antitrust applications for all

An IFQ is a regulatory taking of equal access to a public resource that currently exists & disenfranchises smaller entities, the young, and the elderly within the fishing communities and rewards over-capitalization, the problem child of the fisheries.

JUST SAY NO to privatizing a public resource to a few concentrated hands

JUST SAY NO to rewarding over-capitalization

JUST SAY NO to sharecropping a public resource

JUST SAY NO to rewarding over-fishing

JUST SAY NO to those with the least conservation ethic

JUST SAY NO to those that have had the most by-catch and regulatory discards

JUST SAY NO to rewarding illegal activity that contributes to quota share

JUST SAY NO to making different classes of fishermen

JUST SAY NO to IFQ an unneeded and discriminatory management tool. There were and still are valid reasons for the congressional moratorium on IFQ – **show me an IFQ supporter & I'll show you someone with something to gain at public expense.**

Is each and every charter boat going to get an individual IFQ. What about an IFQ for each individual that wants to go sport fishing? Or an IFQ to each community to divvy up on an equal basis. Why are Alaskan communities now having to go out and buy IFQ quota back from private individuals, this is a ridiculous way to run public trust, public buying public assets back. How about your grandson, why should he have to buy into a public resource because you gave it away? IFQ's are just plain WRONG and have no place in fishing. Only those that have ONE, will tell you they are good. You can accomplish the same resource and safety benefits as IFQ's by just dividing the annual OY into the number of boats that fish each year and assign years quota's to each boat, EQUALLY, without giving it away in the form of a dedicated IFQ.

As for processor IFQ's – PFQ's slavery was taken out by President Lincoln and the Union Army, I see no reason to re-initiate that archaic institution that only promotes dissension in the industry between the haves and the have nots and makes fishermen into sharecroppers.

JUST SAY NO!!

What else is there to say, I don't believe in them, they take from the POOR and Give to the RICH and permanently remove all hope for the small beginning fisherman and they stifle fishing communities to just a few boats. They won't let fishermen just be happy with a reasonable standard of living, they make them compete for the last fish in open season just before assignments of IFQ's.

This summer I would like to say home with my sick wife but will have to go Tuna fishing because in a few short years IFQ's will be threatening & if I don't have a BIG catch history I'll get SCREWED, so I have to go now or starve in the future, REDICULOUS way to have to be forced from my family at a time so crucial to my wife's mental well being, a TERRIBLE position to be placed in just to survive myself in the future.

Don't give me this HARDSHIP case either, I've been there and gotten taken before. In 1980 I had just bought a brand new 75 foot state of the everything fishing vessel, there was not a fishery on the West Coast it was not designed to participate in, and be a highliner - Trawl, Shrimp, Crab, Tuna, Salmon. The vessel had 4 engines, futuristic electronics, three fish holds, tanked, freezing capacity, Stern ramps, net reels, excess fuel capacity, spacious luxury living quarters, raised foredeck, you name it had it. Disaster, Brand new, never fished a day, $500,000 mortgage and whoops the architect made a mistake, it tipped over. Insurance payment $17,000.00 per year, & they refused to pay. Four years in the court system, no justice. Broke, no possible way to get another vessel of any kind. Along comes limited entry, I tried for a hardship case, but since I did not deliver any fish I was short shifted – no permit – no more trawling, done, not because I had not put up my life's investment and tried. I was forced into being a sharecropper for 12 years, fishing someone else's boat before I could get started on my own again. No Cadillac the second time around, An ol' vessel, with no frills, just a good ol' sea boat, capable of a reasonable standard of living, but not IFQ material, at least not one to offer a living. So you see it's not all Roses in the fishing business & I don't believe I should be short shifted again by privatizing the resources I depend on for my families living. PLEASE JUST SAY NO! That is why I work so hard politically, not for myself, but for the young, the old, the not so lucky members of our industry. I've been there and lost, and know what it's like to have the rug jerked out from under you. Fishing communities are made up of all types of people and that diversity needs to be maintained. the POOR need a chance and the RICH already have it made. They do not need any more advantage.

IFQ's are like cancer, once initiated will spill over into other fisheries as the "ONLY" tool to solve the race to fish. It is criminal to allocate processor IFQ – PFQ on our opinion & that will end up a huge issue before this is over, just like in Alaska crab. Stop it NOW. We can do better than giving our public resources to private business. My grandson wants a job he should not have to buy a public resource from someone that has over-exploited it in the past & then had it given to him, RIDICULOUS way to run a ship by over-rewarding over-capitalization.

IFQ – JUST SAY NO

Dale Beasley, CRCFA

Some Late Scoping Comments from Dave Fraser
On:
Inclusion of Processors in the PFMC Groundfish Rationalization

IFQs allocate access to a share of a public resource, which becomes private property only after it is captured. IPQs grant a right or privilege to process a fixed portion of the harvest. Thus IPQs direct the disposition of private property, rather than a public resource.

IFQs insure that public resources are harvested in a safe and efficient manner. IPQs eliminate or restrain competition among processors and create a regulated marketplace which requires creating a substitute mechanism for price formation.

Throughout the NPRMC's crab rationalization process process, the crab processing sector was adamant that rationalization was not going forward without processor quota. In the end all the arguments for IPQ come down to this: "Our way, or no way."

Major players in the processing sector has made it clear to everyone seeking to rationalize fisheries, that regardless of the economic cost to other non-diversified processors, fishing communities, vessel owners, or, indeed, the cost in human life for those who work in the nation's most dangerous occupation, they will block any action that doesn't give them control of the harvester's market choices.

High powered lobbying efforts should not be allowed to preclude building a low cost and effective rationalization program within the current framework of the Magnuson/Stevens Fisheries Management and Conservation Act.

There are many alternative approaches that have been utilized to deal with the concerns of processors in a variety of rationalized fisheries. Even without IPQs, the crab rationalization plan gives processors substantial protection by program elements. These include:

- Separate Catcher Vessel and Catcher Processor classes of quota, so fishermen can't process their own catch.
- Regional restrictions on deliveries.
- Processors are allowed to acquire and own harvest quota.
- Limits on consolidation of harvest quota, preserving a diverse supply for processors.

Legitimate processor concerns can be addressed without creating IPQs and segmenting markets.

1.0 The Missing Analysis

The National Standards disallow measures that have economic allocation as their sole purpose. While IFQs to harvesters do result in economic allocation, they have strong conservation and safety purposes. However, the argument for inclusion of processors in quota allocation is almost entirely economic.

Before including any specific element such as direct allocation of IFQ to processors, a closed class for processors, or IPQs in the groundfish rationalization program, there needs to be economic analysis of the fixed capital investment by groundfish processors.

One of the stated purposes of IPQs (or the allocation of IFQ to processors) is to address the transitional costs associated with non-malleable capital in the processing sector. An appropriate analysis dealing with inclusion of processors in a groundfish rationalization program requires quantitative analysis of the groundfish specific fixed capital (malleable or otherwise) in the processing sector, and a comparison with fixed capital in the harvest sector.

Unfortunately an obstacle to the necessary analysis is that Section 303(b)(7) of the M-S Act exempts processors from the requirement to submit economic data. As a result they are free to claim harm, but the analysts don't have the ability to verify their claims. None the less, the analysis should include an evaluation of the level and duration of the IPQ or other compensation necessary to compensate the transitional costs of the processing sector.

Processors hid behind the lack of data in the development of the NPFMC crab program. Given that the primary argument for inclusion of processors in quota allocation is economic, they should be required to provide verifiable, meaningful data to the analysts to support their claim to IPQ or IFQ allocation in the PFMC groundfish program.

2.0 Are Processor Quotas Necessary or Prudent?

2.1 National Academy of Science Recommendations

In the 1996 Magnuson-Stevens Reauthorization Congress directed the National Academy of Science to provide advice and recommendations on IFQ programs and specifically directed the evaluation of processor allocations. Section 303(d)(5) of the M-S Act directs Councils to consider the recommendations for the NAS report (Sharing the Fish).

2.1.1 "Sharing the Fish" on Processor Quota

Page 205 of "Sharing the Fish" contains a two part recommendation relative to processors and quota. The first part speaks to allocating a portion of the IFQs to processors; the second speaks to creating a "two pie" or IPQ system:

> "On a national basis, the committee found no compelling reason to recommend the inclusion or exclusion of processors from eligibility to receive initial (fishing) quota shares"
> ***"Nor did the committee find a compelling reason to establish a separate, complementary processor quota system (the "two-pie" system)."***

Page 153-155 of "Sharing the Fish" provides a more extensive and very useful discussion of the issues surrounding processor quota allocations. The NAS concluded:

> "The committee was not convinced, however, that the solution to the perceived problems lies in the allocation of either harvesting or processing quota to processors."

2.1.2 Distribution of Benefits of Quota Shares - Initial Allocation

"Sharing the Fish" - the report to Congress by the National Academy of Science recommended a broad distribution of the benefits of Quota share programs. The benefits are inherently broadly distributed in the initial allocation under a harvester IFQ due to the large number of vessels and fishers. However, the benefits of the Processor Quota are highly concentrated due to the concentration of the groundfish processing sector that has all ready occurred through consolidation under the status quo.

Processor Quotas are inconsistent with the recommendations of the National Academy of Sciences found in "Sharing the Fish."

2.2 Economists' Views on Processor Quotas

The entire theoretical underpinning of Processor Quotas rests on the work of one economist – Scott Matulich. It is his belief that in a free market, fishers with IFQs will "expropriate the quasi-rents rightfully belonging to processors" because harvesters would no longer fear that company owned boats would pre-empt their catch if they were to go on strike.

Matulich has been able to parlay this diagnosis into a prescription for a particular cure of his own design called the “2-pie” or IPQ system.

To judge whether the side effects of Matulich’s cure are likely to be worse than the disease, it is necessary to turn to other economists. As noted in the preceding section the National Academy of Science considered and rejected Matulich’s prescription. They were not alone.

2.2.1 The GAO on Matulich

In December of 2002 the GAO provided this committee with a report on IFQs which contained a very critical review of a paper by Matulich purporting to provide an empirical basis for his theory in the context of the existing Halibut and Sablefish IFQ program. They questioned the methodology and the potential for bias in the survey design for gathering data.

2.2.2 Economists on Processor Quota - Milon and Hamilton

In a paper prepared under contract for the North Pacific Council by Florida economists J. Walter Milon and Stephan F. Hamilton (A Comparative Analysis of Alternative Rationalization Models for the Bering Sea/Aleutian Islands Crab Fisheries - March 2002) the authors describe the impacts of a "segmented monopsony."

In discussing the IIPQ model Milon and Hamilton noted:

> "The (IPQ) quota allocation defines a property right of each processor to serve a perfectly segmented market, and, with a fixed quantity of harvest, each processor maximizes his profits by paying the lowest ex-vessel price that supports harvester delivery of this quantity. ***The outcome is regional monopsony ex-vessel pricing***...Accordingly, the delineation of processor quota rights subsumes all economic rent from the ITQ program in the harvest sector...With a two pie permit distribution that allocates the full processing quota, the value of harvester permits are driven to zero...With completely defined property rights in the processing sector, the allocation of property rights in a harvest sector ITQ program becomes redundant."

Milon and Hamilton went on to observe that in a system where some percent of the harvest share remains "free market" (such as the 10% “B” shares in the NPFMC crab program) the outcome is a blend that:

> "...results in a continuum of market segmentation levels. Consequently, all possible two-pie permit distributions have identical implications for economic efficiency, but differ in the degree to which the policy rent is shared between market participants. ***Processors are likely to fare better, and harvesters fare worse, as the ratio of A to B permits increases in the proposed fishery management system."***

Cartels are precluded by existing anti-trust laws. It is ironic that the same outcome (monopsony pricing) would be legally achievable under Processor Quotas. The only functional difference is that when a legal Processor Quota system segments the market, it will be more effective than if a group of processors had conspired to set prices. In the latter instance there is always hope that a new processor could enter destabilize the cartel by offering competitive prices.

2.2.3 Economists on Processor Quota – Halvorsen

Economist Dr. Halverson, who was contracted by the NPFMC for an earlier analysis of the distribution of bargaining power under different 'game' rules for American Fisheries Act coops, was also critical of the Matulich 2 Pie theory. Dr. Halvorsen presented a paper to a hearing of the U.S. House Resources Committee explaining the theoretical deficiencies of the Matulich theory.

2.2.4 Economists on Processor Quota - Christy and Anderson

Two other very prominent fisheries economists served on the NMFS Advisory Panel to the NAS when "Sharing the Fish" was prepared, Lee Anderson (chairman of the NMFS East Coast AP) and Francis Christy. Christy, who worked in fisheries for many years for the UN-FAO, is considered to be the economist who came up with the idea for IFQs. Lee Anderson, who wrote a seminal text book on IFQs and economic theory, was a member of the Mid-Atlantic Fisheries Management Council when the 1st IFQ program was adopted. Both economists have been very critical of the Matulich theory and of the idea of IPQs. While Anderson recognizes the potential for negative impacts on processors from IFQs to the extent that their capital is non-malleable, he doesn't advocate IPQs as the appropriate fix for that potential problem.

2.3 Department of Justice

The DOJ Anti-trust division prepared a memo dated August 27th 2003, which recommended NOAA oppose IPQs.

3.0 Do We Believe in the Value of a Competitive Marketplace?

3.1 Price Formation Under Status Quo versus Under Processor Quota

The heart of the controversy over Processor Quota goes to its impact on price formation.

IPQs would effectively segment and allocate the market into which groundfish harvests will be delivered. That action would radically shift negotiating leverage between harvesters and processors relative to status quo. Without a specific legislative exemption, that action would constitute a “per se” violation of antitrust law equivalent to price fixing. It is a “hard-core cartel agreement” that is prosecuted criminally by the Department of Justice.

Processor Quotas create a very different environment. The harvest must be delivered only to a processor holding unused IPQ. This results in a game of "musical chairs" where the "last man standing" has no choice about where to sell - and as a consequence there is an urgency to "sit down" early at a sub-optimal price to avoid being the "last man standing."

If a harvester wishes to move to a different processor because they are unhappy with the way they are being treated, there is only one way to do it. They must displace someone who is working for a different processor. The only way to do that is to offer to fish at a lower price than the person you are displacing. This fundamental alteration of the dynamics into a game of musical chairs destroys the ability of fishers to benefit from collective bargaining as provided under the 1934 Fishermen’s Marketing Act.

3.2 The Nature of the Right or Privilege represented by the Processing Quota

There is a fundamental difference in purpose between IFQs and IPQs. The purpose of IPQ is to direct the transfer of private property. The purpose of IFQs is to allocate access to a share of free swimming critters, which up to the point of capture, are a public trust resource.

IFQs are generally understood to be a privilege to harvest a fixed portion of the common property public trust resource. The result of being allowed to harvest that resource is that it is converted to private property at the point of harvest.

A IPQ is a right or privilege to process a fixed portion of the harvest. Congress has been clear that they regard Harvest Quota shares as a privilege, but there is a spectrum between 'privilege' and 'right' that has yet to be debated with regard to IPQs. The wrinkle here is that crab, once harvested, have been converted to private property. Thus, it appears that the IPQ directs the disposition of private property, rather than the disposition of a public resource.

The introduction of IPQs for the purpose of eliminating or restraining competition among processors creates a regulated marketplace and the need to provide a substitute mechanism for price formation.

4.0 Community Protections and IPQ

The element of community protections in the NPFMC crab program are largely a response to the impacts of market segmentation resulting from IPQs. The testimony of Mayor Freed of Kodiak to the Senate commerce committee hear in May 2003 indicated that their community believed the best protection would be to not adopt an IPQ element. Many other Alaskan communities adopted resolutions opposing IPQs.

IPQs facilitate consolidation and without meaningful processor consolidation limits this ultimately means plant closings in coastal communities.

5.0 Alternatives to Processor Quotas to Protect Processors

There are many alternative approaches that have been utilized elsewhere to deal with the concerns of processors in a variety of rationalized fisheries. These include elements in a number of existing programs, as well as proposed alternatives that didn't receive adequate consideration by the Council.

In the crab rationalization plan, processors were given substantial protection by various program elements including the following:

- Processors are allowed to own and acquire IFQs.
- Catcher Vessel IFQ holders must deliver their crab to processors rather than processing themselves as Catcher Processors.
- Regional restriction on deliveries, which favor existing processors.
- Limitations on consolidation of IFQ ownership at 1% each for harvesters, which preserve a diverse supply for processors.
- Processors are allowed up to 5% each of the harvest IFQ, in contrast to 1% limit for harvesters.

Without analysis of the adequacy of these provisions, nor discussion or debate, the NPFMC added the provision of Processor Quota. If analysis shows there is further necessity to protect processors, there are less-damaging alternatives in existing programs such as the AFA.

5.1 Other Alternatives

- Processors could be allocated a portion of the harvest ITQ commensurate with their relative proportion of fishery specific non-malleable capital.

- A quasi closed class of processors, guaranteeing a percentage of the harvest to be delivered to the class of eligible processors based on their aggregate processing history.
- An AFA style coops with disincentives for leaving a coop, such as a one year forfeiture of 10% of the harvester's IFQ to the coop being left.

5.2 Existing Programs

5.2.1 AFA Pollock in the Shoreside Sector

- AFA shoreside processors were collectively guaranteed a share of the pie.
- AFA shoreside processors were provided a closed class.
- AFA shoreside processors were provided with a degree of stability in the design of the coop rule.

AFA catcher vessels are only guaranteed their history as a member of a coop with a processor partner. 90% of the catch history of the coop had to be delivered to the processor partner in a given year. Though vessels are able to move between processors annually, disincentives were built in that discouraged movement between coops, where the alternative to being in a coop was an open access derby for one year.

The critical difference between the AFA processor protections and IPQs is that while the AFA coops provide a large measure of stability through the requirement for annual coop contracts with an eligible processor, no processor is guaranteed a fixed share of the harvest for more than one year, and ultimately it is competition that governs whether a vessel will remain with a processor or move its quota to another processor.

5.2.2 Halibut & Sablefish IFQs

Halibut and sablefish shoreside processors were protected from competing with freezer boats.

5.2.3 British Columbia's IVQ Groundfish

In the BC Canada groundfish IFQ, the allocation of 10% of a vessel's catch history is conditional on community and processor concerns. This 10% of the IFQ provides leverage to processors, working in cooperation with community interests, that can be used to attract deliveries made under the harvester portion of the IFQ.

5.2.4 Eastern Canada Opilio Crab

In the "harvester only" IFQ program for snow crab, binding arbitration was instituted to set a base price. It is worth noting that crab processing there is still profitable enough that it has attracted a number of new entrants.

There are many options for addressing processor concerns without adopting IPQs and a segmented market.

U.S. DEPARTMENT OF JUSTICE
Antitrust Division

R. HEWITT PATE
Assistant Attorney General

Main Justice Building
950 Pennsylvania Avenue, N.W.
Washington, D.C. 20530-0001
(202) 514-2401 / (202) 616-2645 (fax)
E-mail: antitrust@usdoj.gov

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 cooperative'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

Subject: FW: Letter to PFMC
From: "Ofelia Svart" <ofelia@ecotrust.org>
Date: Wed, 13 Oct 2004 16:24:05 -0700
To: <pfmc.comments@noaa.gov>

October 13, 2004

Mr. Donald McIssac
Executive Director
Pacific Fishery Management Council
7700 Ambassador Place, Ste. 200
Portland, OR 97220-1384

Dear Mr. McIssac:
Ecotrust and Ecotrust Canada are pleased to submit for inclusion in the briefing book for the upcoming Council meeting a draft report on the effects of IFQ programs on coastal communities in British Columbia. The final report and our complete database will be available to the Council in November.

The results are rather striking. While clearly the intent was to improve the economic viability of fishing operations, the result in fact has been to dramatically increase the rate of overcapitalization, further isolate rural and First Nations communities, as well as raise huge economic barriers for the next generation of fishermen hoping to enter the fleets.

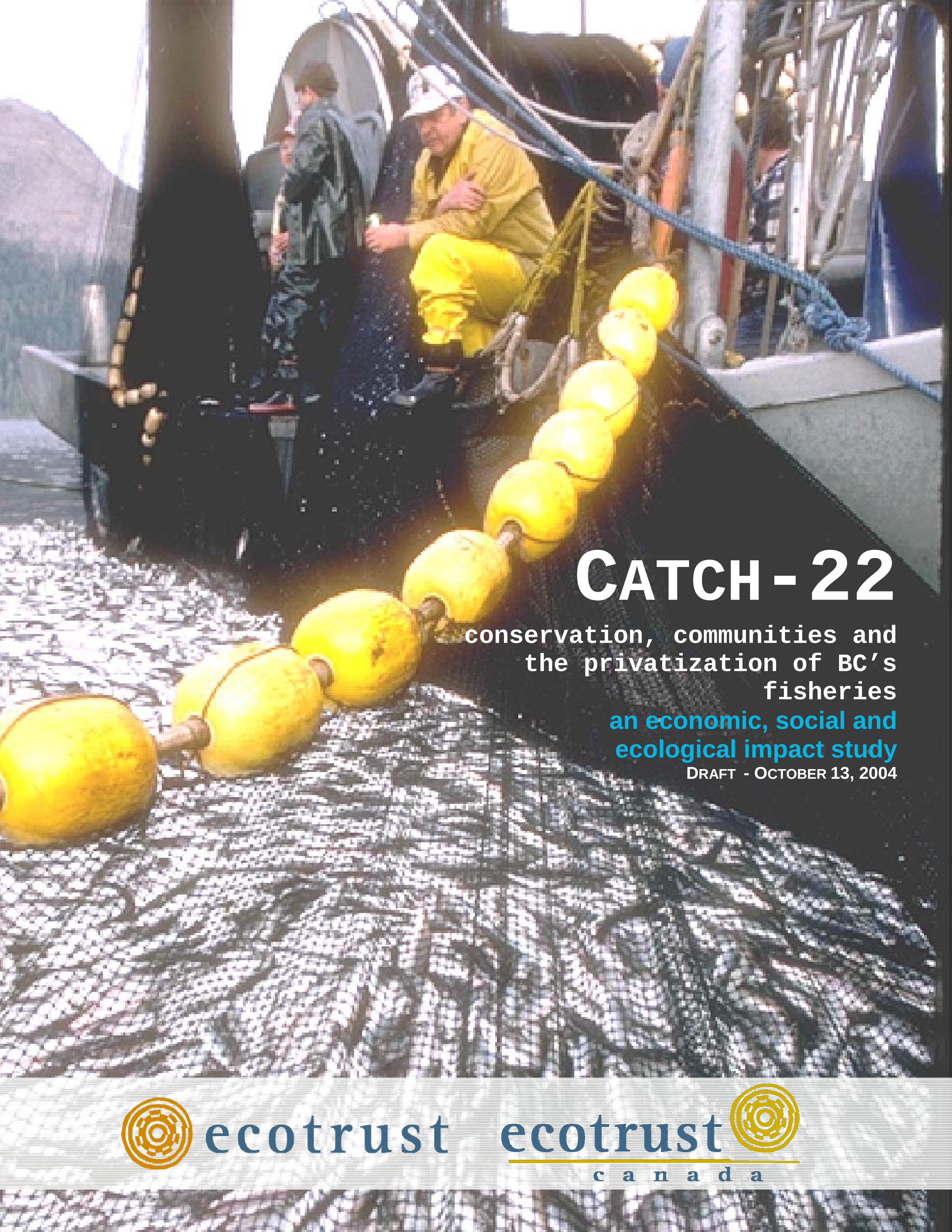
The report utilizes maps to illustrate the geographic patterns of license and quota holdings by community for the entire BC coast.
In light of these findings, we would like to request that the Council consider restarting its approach to IFQ program development. We suggest a focus not on just one gear sector of the groundfish fleet, but a comprehensive review of all sectors where IFQs may be relevant and conducting a thorough impact analysis on coastal communities. This will allow a far more rational approach to understanding how IQ programs can be structured to allow creative and adaptive responses by communities wishing to remain engaged in fisheries along the west coast.

The report is intended to stimulate further thinking and dialogue about IQ programs and we hope it will be received in this manner.

Respectfully,

Edward H. Backus

Vice President, Fisheries
Co-Director, State of the Salmon
Ecotrust
721 NW 9th Avenue, Ste. 200
Portland, OR 97420
www.ecotrust.org
www.stateofthesalmon.org



CATCH-22

conservation, communities and the privatization of BC's fisheries

an economic, social and ecological impact study

DRAFT - OCTOBER 13, 2004

ecotrust

ecotrust canada

executive summary

Catch-22: Conservation, Communities and the Privatization of BC Fisheries investigates the economic, social and ecological impacts of federal fisheries licensing policy, especially those promoting privatization whereby an individual or company owns a preset portion of the total allowable catch called an individual fishing quota (IFQ). Quotas are bought, sold or traded like shares on a stock exchange. Critics consider IFQs a form of resource privatization.

The Department of Fisheries and Oceans (DFO) has implemented IFQs in the geoduck, halibut, sablefish, groundfish trawl and three shellfish fisheries. It is currently developing a controversial plan—opposed by many working fishermen and First Nations—to privatize B.C.'s salmon fishery.

Many of the major reforms of B.C. fisheries in the 1990s, including the introduction of IFQ programs, represented a catch-22 for fishing-dependent communities. DFO's solutions created as many economic, social and ecological problems as they solved.

ECONOMIC IMPACT

In the 1990s, Ottawa committed to reducing overcapitalization in the B.C. fishing industry to increase its economic viability. A decade later the market value of fishing vessels, equipment and licences actually grew. Overcapitalization is worse than ever. What went wrong?

Through license buybacks and other policies, Ottawa cut the fishing fleet in half and thereby reduced investment in vessels and equipment to about $286 million, a 64 percent reduction from 1988 to 2003. However, this decrease was more than offset by the doubling in value of commercial fishing licenses and quota to $1.8 billion over those same years.

DFO policies, such as the Mifflin Plan for salmon and individual fishing quotas (IFQs) for groundfish, created wildly inflationary markets for licences and quota. Between 1994 and 2002, the price of gillnet salmon licences more than doubled and troll licences rose more than one-third. Other fisheries experienced skyrocketing trends, too. The advertised price of halibut quota increased from $9 per pound in 1991 to $36 per pound in 2004. In fact, the groundfish IFQ fisheries including halibut, sablefish and groundfish trawl are some of the most capital-intensive fisheries in B.C.

For those who have them, fishing quotas and licences are highly profitable, revenue-generating assets. As a result, they are becoming increasingly concentrated in fewer and fewer hands. Their extremely high market value is well outside the reach of many rural working families, First Nations and younger fishermen. A fisherman now needs to be a millionaire to enter into most fisheries.

SOCIAL IMPACTS

With salmon catches declining and the prices of licences and quota soaring because of DFO policies, many fishermen have been forced to sell out either under the auspices of "voluntary" licence retirement programs or by selling their licences to wealthier fishermen

Not surprisingly, many of those fishermen who sold out were in rural and aboriginal communities. Between 1994 and 2002, rural communities, with a population of less than 10,000, lost 554 licences as a result of fleet downsizing and the sale of licences to urban areas. That's almost half (45 percent) of all shellfish, groundfish and pelagic fishing licences owned by rural people. The decline in urban coastal regions was only 30 percent.

Because of lower incomes, limited economic opportunities and lower property values, rural fishermen have less access to capital than their urban counterparts. First Nations people face even more obstacles, since their incomes are 35 percent lower than the B.C. average and unemployment is double. Additionally, many native people living on Indian reserves do not have fee-simple ownership of their homes and therefore cannot use home equity to borrow money to buy fishing licences or quotas.

As a result, both rural and aboriginal individual ownership of commercial fishing licences and quota has declined precipitously. Native individuals privately own 1,106 fishing licences, or only 18 percent of all commercial licences (excluding clam licences which cannot be bought or sold and so don't have a market value). For IFQ fisheries, private native ownership is only five percent.

One of the effects of the shift in licence ownership is that many rural communities and First Nations see few benefits accruing from adjacent fisheries resources. The West Coast of Vancouver Island is a case in point. Local residents own only two percent of all groundfish trawl, halibut and sablefish licences. Participation in IFQ fisheries is only marginally better in the North Island and North Coast, at three and nine percent, respectively.

In effect, fisheries policy, whether intentional or not, is skewed in favour of urban-based corporations and individuals with greater access to capital and economic opportunities. Those communities most dependent on fishing for their economic lifeblood are being squeezed out of B.C. fisheries.

ECOLOGICAL IMPACTS

The conservation record of privatizing fisheries through individual fishing quotas (IFQs) is dubious at best. By giving fishermen a set individual quota, IFQs end the frenzied "race for fish." However, IFQs can induce bad behaviour by fishermen, including quota busting, poaching, throwing back small fish (high-grading) and misreporting catches. These problems can be solved in part by onboard and dockside observers but add considerable costs to fishing.

Setting a total allowable catch (TAC)—which is scientifically defensible and sustainable—is one of the most important fisheries conservation measures. Privatizing fisheries through IFQs raises two fundamental problems about how sustainable catch levels are set.

First, IFQs create windfall profits for those who initially receive them, but create huge debt for new entrants who must buy the expensive quotas in order to fish. This overcapitalization puts pressure on the resource since fishermen lobby for higher catches to finance their bigger debt-loads. Previously, the problem was "too many fishermen chasing too few fish." Today, it's "too much money chasing too few fish." Under such a scenario, short-term profits win out over conservation as fishermen succumb to immediate financial pressures.

Second, as part of their attempts to privatize fishery resources, DFO has established co-management agreements with exclusive groups of licence and quota holders, which has increased the influence of industry stakeholders. Conservation groups, communities, First Nations, and labour interests are marginalized, since fisheries management becomes increasingly focused on maximizing the narrow economic returns of licence and quota holders. Economic interests must be balanced by community and conservation values.

The privatization of B.C. fisheries has netted a catch-22: DFO's solution has become the problem, worsening overcapitalization, undermining the sustainability of fishing-dependent communities and compromising conservation for economic efficiency. It is time for a serious re-examination of current policy and a move towards new solutions that work towards the long-term health and viability of fishing-dependent communities and fish stocks.

RECOMMENDATIONS

1) Public Registry
DFO should establish a public registry requiring individuals and companies to register all their leases, trades and sales of fishing licences and quota, and to fully disclose financial interes ts in these assets. The registry would allow the government, industry and public to monitor ownership and capital trends in the industry and to help protect against corporate concentration and overcapitalization.

2) National Standards
DFO should establish national standards for IFQ programs that would reduce overcapitalization in licences and quota, protect working crews from bearing the costs of quota leases, and limit excessive consolidation and corporate concentration in the fishing industry.

3) Community Quota Entities
DFO should permit the establishment of and provide funding for Community Quota Entities, which would be non-profit societies established to hold fisheries licences and quota in trust for aboriginal and fishing-dependent coastal communities. The CQEs would lease fishing privileges to local fishermen and facilitate new entrants into the industry.

4) Public Data
DFO should establish a comprehensive data-access policy that provides full and transparent access to biological and catch data and thereby rebuild trust in DFO Science and ensure rigorous review of fisheries decision-making by independent scientists and the public. Furthermore, all fisheries data funded and collected by private companies as part of IFQ fisheries must be placed in the public domain.

5) Fisheries Co-management
DFO must ensure that diverse interests are represented in fisheries co-management agreements and harvesting committees including licence and quota holders, labour, processors, coastal communities, First Nations, environmentalists and other citizen groups. Economic interests must be balanced by social and ecological values.

research team

This report is published by Ecotrust Canada and Ecotrust (USA), based in Vancouver, B.C, and Portland, Oregon, respectively. The work of both non-profit organizations is predicated on the notion that economic and ecological systems are mutually interdependent. To this relationship, Ecotrust Canada and Ecotrust have sought to add a third "e"—social equity—to ensure that economic development awards benefits to all the citizens of the Pacific Northwest. Economy, ecology, equity: the triple bottom line. That's the vision and methodology we have applied in *Catch-22: Conservation, Communities and the Privatization of B.C. Fisheries.*

A team of researchers in Canada and the United States researched and wrote the report. They include Dr. **Astrid Scholz**, a resource economist for Ecotrust; **Eric Enno Tamm**, a researcher and writer for Ecotrust Canada; Dr. **Andrew Day**, a fisheries management consultant; **Danielle Edwards**, a fisheries database specialist and marine biologist; and **Charles Steinback**, a GIS (Geographic Information Systems) analyst for Ecotrust.

acknowledgements

The report was commissioned in partnership with the West Coast of Vancouver Island Aquatic Management Board and 'Namgis First Nation on Vancouver Island, and represents independent advice and analysis provided to these partners. Ecotrust Canada and Ecotrust would like to thank the steering committee which guided the production of the report, including members of the research team, Dr. **Marty Weinstein**, aquatic resources coordinator to the 'Namgis First Nation; **Mona McDougall**, assistant aquatic resources coordinator to the 'Namgis First Nation; **Edward Backus**, Vice President of Fisheries for Ecotrust; **Brenda Kuecks**, Director of Community Programs for Ecotrust Canada; and **Ian Scott**, GIS manager for Ecotrust Canada.

Ecotrust Canada and Ecotrust would also like to thank several individuals who reviewed early drafts of the document: Dr. **Don Hall**, Fisheries Manager for the Nuu-chah-nulth Tribal Council; and Dr. **Chris Newton**, formerly the chief fisheries economist for the Food and Agriculture Organization in Rome. Special thanks also to **Jeff Ardron**, marine analyst with Living Ocean Society, for providing fisheries data to the research team.

Ecotrust Canada and Ecotrust would also like to thank the Oak Foundation for their financial contributions to research and publish this report.

note on statistics

Unless otherwise noted, data for this report were obtained from the DFO Pacific Fishery Licence Unit, DFO Catch Statistics Unit, on-line landings statistics, and various publications and reports. Due to considerable challenges in obtaining complete time series of information for all fisheries, we focus our analysis between 1994 and 2002—the two most complete years of data available to us, which also fall before and after several major regulatory and policy changes in B.C. fisheries. The comparative analysis for 1994 and 2002 excludes the party-based non-vessel licences (such as herring gillnet, intertidal clam, goose barnacle, herring bait and smelt fisheries), because the 1994 licence lists were not available from DFO. Financial figures have been converted to constant 2003 dollars, unless otherwise noted.

contents

CHAPTER 1
introduction

Over the past decade, Canada's Pacific fishery has undergone fundamental changes. A combination of factors—habitat degradation, overcapacity and overcapitalization, fish stock depletions, declines in ocean productivity and depressed global fish prices—threatened the fishing industry's viability. In response, the Department of Fisheries and Oceans (DFO) introduced a sweeping set of policies to restructure and rationalize the industry. The objectives were two-fold: (1) to improve economic viability and (2) to impose stricter conservation measures including reduced bycatch, improved monitoring and the targeted protection of weak fish stocks.

In part, these changes came as a result of severe federal government restraint. [1] In the 1995 federal budget then-Finance Minister Paul Martin committed to privatizing many of the responsibilities and services of DFO by entering "into partnerships with the fishing industry and others in the management of capacity, licensing and compliance."[2] The objectives of cutting DFO's budget, increasing revenues through new user fees and downloading responsibility to industry were well served by privatization.

This report focuses on the impact of these policy reforms on communities and conservation. We begin by reviewing the history of federal fisheries licensing policy and the growing shift to privatized models of fisheries ownership and management. The study looks at how these policy reforms have changed the economics of fishing. Have fisheries reforms reduced or increased over-capitalization in the fishing industry? We then explore the social impacts in terms of distribution of wealth, especially to rural and aboriginal communities. How has DFO policy reform affected fishermen in rural communities and aboriginal participation in fisheries? Our research employs a novel approach by using GIS (Geographic Information Systems) to investigate the spatial patterns of licence ownership, effectively mapping the socio-economics of B.C. fisheries. The final section of the report deals with conservation. What are the long-term ecological implications of this policy reform on fish stocks? Does privatizing the ownership of fisheries resources promote conservation?

Our analysis is based on DFO's licensing and catch landings databases from 1994 to 2002, a survey of the market value of fishing licences and a review of relevant academic research and published reports. Using this data and information, we address the economic, social and ecological impacts of fisheries licensing policy in BC.

We do so in the spirit of provoking a broad-based public discussion about the future of our ocean resources and to provide communities and First Nations with both data and analysis that will contribute to a better understanding of fisheries policy. Our report is also a challenge to decision-makers to conduct thorough and comprehensive impact analysis of policy options in fisheries prior to implementation. We caution that our report is only a beginning and invite discussion, debate and further research and analysis on these issues critical to the survival of our ocean resources and coastal communities.

Our analysis shows that many of the major reforms of B.C. fisheries in the 1990s represented a catch-22 for communities: The solutions became, in effect, part of the problem. Far from reducing over-capitalization in fisheries, DFO policies exacerbated the problem and instead of increasing the economic viability of coastal communities, the rationalization, restructuring and ultimately privatization of B.C. fisheries marginalized aboriginal fishermen and rural regions. Poor regions have become even poorer. Despite the commitment stated in *Canada's Oceans Strategy* that coastal communities "be actively involved in the development, promotion, and implementation of sustainable oceans activities,"[3] this report has revealed that quite the opposite is true. As far as commercial fisheries are concerned, coastal communities are less involved than a decade ago.

Human communities are part of the rich diversity of B.C.'s marine ecosystem. Recognizing the importance of the connection of coastal people to the sea, the U.N. Convention of the Law of the Sea calls upon states to consider the "economic needs of coastal fishing communities" [4] and the FAO's Code of Conduct for Responsible Fisheries recognizes "the important contributions of artisanal and small-scale fisheries to employment, income and food security" in fishing-dependent communities, which should receive "preferential access" to fisheries.[5]

A thriving coastal economy and bustling rural communities, social justice and the righting of historic wrongs for First Nations, abundant fish stocks and pristine marine ecosystems—these are the tangible benchmarks by which we must measure our success to manage our ocean resources. The ocean is part of humanity's common wealth. We have provided in this report some practical and innovative recommendations to enhance conservation and to re-engage coastal communities in the ownership and management of our common-property ocean resources.

CHAPTER 2
fisheries: public trust or private property?

Fish, by nature, are a common property. They are largely undomesticated animals and swim indifferently across the world's borders. Their home—the ocean—is a common pool, defying bureaucratic boxes, legal jurisdictions, economic theories, and physical barriers. This has created a challenge for fisheries managers throughout history.

Under British common law, the Crown has provided the public with a right to tidal fisheries dating back to the Magna Carta in 1215 AD. In Canada, the federal government, on behalf of the Crown, has legal authority to manage fisheries in the public interest.

Canadian federal authority, however, is balanced with First Nations' rights and title. Through various decisions, including *R. v. Delgamuukw* and *R. v. Sparrow*, among others, courts have defined aboriginal title as a *sui generis* collective property right, meaning British common law and Canadian constitutional law need to be reconciled with the prior occupation of First Nations. Aboriginal title involves several issues—how the land and ocean resources are managed and used, the right to exclusive use or occupation, and the question of "fair" economic benefit from resource use. In addition to rights to fish for food, social and ceremonial purposes, First Nations have established rights to fish for economic purposes (*R. v. Gladstone*). The extent of First Nations' rights and title are the subject of on-going litigation and negotiation.

Subject to certain conditions, including conservation measures and the aforementioned First Nations rights, the Minister of Fisheries and Oceans grants a fishing licence to a person (an individual or a company) to harvest a certain species of fish. Legally, a licence is not a permanent authorization or right to fish nor a permanent grant of fish. It is a privilege granted on an annual basis. The courts have confirmed that under the Fisheries Act, "the Minister has absolute discretion in determining the issuance of licences."[6]

For much of the twentieth century, the Minister granted fishing licences to any citizen who wanted to fish. The only exceptions were, at times, racial restrictions placed on Aboriginal people and immigrants of Asian descent. Otherwise, any Canadian was free to participate, commercially or recreationally, in fishing. By the 1960s, however, this open-access system became untenable. There were simply "too many fishermen chasing too few fish" in largely unregulated, highly competitive derby fisheries. There was a perceived need for stricter government control.

LIMITED ENTRY

In 1969, Ottawa imposed limited entry in the commercial salmon industry in B.C., restricting access to vessels that historically participated in the salmon fishery. Under the "Davis Plan," named after Fisheries Minister Jack Davis at the time, any fishing vessel that caught 10,000 pounds or more of salmon in either 1967 or 1968 was granted a licence. A total of 5,870 salmon or "A" licences were issued. In 1974, herring licences were similarly limited. Limited entry ended the open access nature of commercial fishing in B.C.

In 1977, Canada extended its jurisdiction 200 nautical miles offshore and asserted control over fisheries in its territorial waters, the so-called Exclusive Economic Zone (EEZ). With expansion of domestic fishing capacity, Ottawa imposed limited entry in several other fisheries by the early 1980s: halibut, groundfish trawl, geoduck, abalone, spawn-on-kelp and sablefish. A decade later, there was limited entry in almost every commercial fishery in B.C.

In 1969 the estimated value of the salmon fleet was $483 million (in 2003 dollars), reflecting the value of vessels and equipment.[7] With the introduction of the Davis Plan, however, the value soared. Although a licence was still—by legal definition—only an annual permit to fish, the government allowed fishermen to buy, sell and transfer them. A fishing licence became a valuable privilege, especially as prices for salmon and herring rose in the 1970s. By 1988, the estimated market value of the fishing fleet was $1.68 billion. More than half of that, or $902 million, reflected the value of the fleet's licences. Taking inflation into account, the capital value of the fleet increased more than threefold in 20 years.[8] With virtually no limits on licence transferability and growing investment in new vessels and technology, capitalization in the industry actually grew.

INDIVIDUAL FISHING QUOTAS

Responding to overcapitalization and excess capacity issues in the fishing fleet, in 1982 Dr. Peter Pearse, then chairman of the Royal Commission on Pacific Fisheries Policy, recommended that Ottawa go further in formalizing private property rights through a new licensing regime. The proposed remedy had the same objective as in the 1960s: to reduce the fleet by excluding some fishermen while granting more secure fishing rights to others. Dr. Pearse recommended that DFO not only give fewer licences, but also give selected licence holders a pre-defined portion of the available fish. Individual fishing quotas, or IFQs, would grant an exclusive right to an individual or company to fish a certain percentage of the total allowable catch (TAC) of a fish species in a specific geographic area. Quotas would end the competitive nature of fisheries.

Pearse's proposal went further still. He proposed that licence holders should be able to buy, sell, lease and trade quota without restriction, making quotas fully transferable. This is known as an ITQ (individual transferable quota) system. As fishermen buy and sell licences, according to economic theory, larger, more efficient operators would buy out smaller ones, overcapitalization would decrease, and the fleet would become smaller and more manageable. (Pearse recently repeated this proposal in his coauthored federal-provincial report on the salmon fishery, *Treatise and Transition: Towards a Sustainable Fishery on Canada's Pacific Coast.*[9] In this latest version, he emphasized the concept that licences should be long-term tenures rather than annual privileges.)

The idea that fish should be privately owned and bought and sold like shares in the stock market was a radical departure from the notion of fish as common property. Nevertheless, the idea of privatizing fisheries through tradable quotas gained prominence. Some fishermen and fishing companies who stood to gain a "windfall profit" from the initial grant of quotas promoted privatization. Senior DFO officials, who saw an opportunity to offload management costs and responsibilities onto industry and meet their budget reduction targets, also supported privatization. Others, such as the Fraser Institute, trumpeted quotas for ideological reasons, believing that a free-market approach to managing natural resources would optimize economic benefits and ensure conservation.[10]

TABLE 1: Commercial Fishing Licences and Major Policy Reforms

	Licence	Year of limited entry	Major licensing reforms	Number of licences
Quota Fisheries				
Abalone	Closed	1977	Quota system in 1979; Closed for conservation reasons in 1990	26
Geoduck	G	1979	Quota system in 1989	55
Sablefish	K	1981	Quota system in 1990	48
Halibut	L	1979	Quota system in 1991	436
Red Sea Urchin	ZC	1991	Quota system in 1994	110
Green Sea Urchin	ZA	1991	Quota system in 1995	49
Sea Cucumber	ZD	1991	Quota system in 1995	85
Groundfish Trawl	T	1979	Quota system in 1997	142
Herring	HS / HG	1974	In 1979, an owner-operator provision was dropped and in 1991 the licence became transferable. Today, fishermen form licence pools that are assigned quotas.	252 / 1,257
Competitive Fisheries				
Salmon	A	1969	Mifflin Plan in 1996	2,220
Prawn	W	1990	Trap limits in 1995	251
Crab	R	1991	Licence retirement program in 1997	222
Clam	Z2	1998	1989 introduced area licensing	1,146
Rockfish Hook and Line	ZN	1991-1992	Catches were cut by 50% in 2002 and 89 Rockfish Conservation Areas were established in 2004.	262
Shrimp	S	1969	Fishery began in 1960s as part of A license. Mifflin Plan allowed separation of A from S licence.	247

In 1989, DFO published a strategic outlook, *Vision 2000: A Vision of Pacific Fisheries at the Beginning of the 21st Century*, which announced a “move towards property rights concept for all fisheries.”[11] Soon after, DFO implemented individual transferable quotas in the geoduck, sablefish, and halibut fisheries.

SALMON DILEMMA

Salmon, however, were problematic and not so easily moved into a quota system. In 1994, there were 4,415 salmon licences, divided among seiners, gillnetters and trollers, which caught five species of salmon from more than 4,000 distinct stocks spawning in some 1,500 streams and rivers. Salmon stock levels fluctuate wildly, forcing DFO managers to upgrade or downgrade the salmon runs and allowable catches during the fishing season. It would be logistically difficult, perhaps even impossible, to assign individual quotas to each fisherman for each species for each river, and adjust these in-season. Salmon stocks were nevertheless declining and excessive fishing capacity threatened the resource. A different solution was sought in 1996 with the introduction of the Pacific Salmon Revitalization Strategy, known as the Mifflin Plan, name after Fisheries Minister Fred Mifflin at the time.

The Mifflin Plan involved three elements: an $80-million licence retirement or “buyback” program, single gear licensing which restricted fishermen to one kind of gear only, and area licensing which further restricted fishermen to one of two seine areas, or one of three gillnet or troll areas. If fishermen wanted to fish in another area or with different gear, they would have to buy out a fellow fisherman and ”stack” the licence on their vessel. The stacking provision would further rationalize the fleet. Following Pearse’s argument, fishermen with more efficient boats—and more money—would buy out smaller, marginal operators.

GROUNDFISH TRAWL IFQS

The following year DFO reformed the groundfish trawl fishery, implementing individual transferable quotas. At approximately 140,000 tonnes in annual landings, groundfish trawling is the largest fishery by volume in B.C. It equals about 60 percent of the total landed weight of all fisheries in B.C. There are 55 area-specific species quotas in the fishery and through a system of buying, selling, trading and leasing the fleet was rationalized to some 60 to 80 working vessels from 142. A Groundfish Development Authority (GDA), representing community and labour interests, was also established to provide advice to the Minister regarding 20 percent of the quota allocations.

The privatization of the trawl fishery saw the establishment of a commercial quota registry. According to its website, A to Z Quota Registry is "sort of like a small stock exchange. Vessel and licence holders register their quotas, vessels, licences, and equipment with our company, and we try and match buyers with sellers, or those interested in trading quota. When a match is found we collect either a service charge or commission from the participants."[12] Thus, B.C.'s first private fish stock exchange with buyers, sellers and brokers was created.

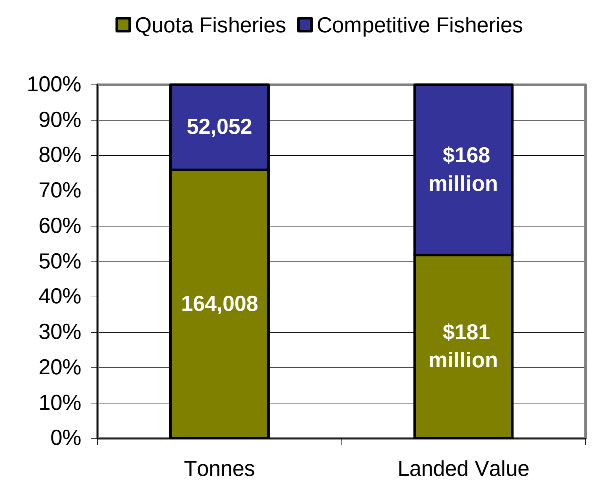
RESOURCE PRIVATIZATION

What has been the cumulative effect of all these licensing policy reforms? More than 30 years after the introduction of the Davis Plan, the B.C. fishery is being consolidated and increasingly privatized. By 2003, 76 percent of all commercial fisheries, by weight, were managed as quota fisheries (including roe herring which involves licence pools and quotas); the percentage is 52 percent by landed value.

Participation in commercial fisheries—with the exception of special non-transferable native and clam licences—is dependent on how much money one has. Access to capital has become the ultimate requisite for a successful fisherman. According to the A to Z Quota Registry, participation in commercial fishing "is just a matter of money." [13]

B.C.'s fisheries are being managed to maximize the returns of licence and quota holders—if not the *de jure* then the *de facto* owners of the fish in the ocean—while marginalizing or simply ignoring the interests of crews, shore workers, marine suppliers and the broader socio-economic benefits for rural fishing communities and First Nations. Ocean resources are shifting from being a public trust managed for the benefit of all Canadians to private property managed in the narrow interest of exclusive groups of licence and quota holders. This privatization of a public resource has fundamentally changed the economics of fishing and significantly skewed who participates in and benefits from Canada's Pacific fisheries.

FIGURE 1: Privatization of B.C. Fisheries
Landings of Quota* & Competitive Fisheries, 2003



* Quota fisheries include roe herring gillnet and seine fisheries

CHAPTER 3

economic impacts: fishing for millionaires

Capital investment in the B.C. fishing fleet has soared since 1969.[14] Investment has taken two forms. The first category is investment in vessels and equipment. As earnings grew in the 1970s, fishermen reinvested in their operations to increase their fishing efficiency. Vessels became bigger, more powerful and faster to increase their catching capacity in the race for the fish. Many boats were retrofitted with bigger holds, better motors, keener electronics and refrigeration to freeze fish at sea. The fishing fleet had far more catching capacity than could be supported by sustainable harvest levels.

Increased earnings and more catching capacity, combined with limited entry, created a lucrative market for fishermen to buy and sell their licences. Investment in licences, in fact, became larger than investment in vessels and equipment. From 1969 to 1988, the market value of the fleet jumped by 360 percent. More than half this reflected the enormous value of licences, largely salmon and herring—the coast's two most lucrative fisheries.[15] Unfortunately, this capitalization in vessels and licences created more problems than it solved.

A 1986 report by the Auditor-General of Canada identified several negative consequences of

TABLE 2: Estimation of Licence and Quota Market Values by B.C. Fishery

	No. of Licences	Value / Licence ($)	Total Licence Value ($)	Quota Value ($)	Fishery Value Licence + Quota ($)
SALMON					
Seine (AS)	266	$361,880	$96,260,000	-	$96,260,000
Gillnet (AG)	1075	82,767	88,975,000	-	88,975,000
Troll (AT)	520	99,115	51,540,000	-	51,540,000
Salmon Total			236,775,000	-	236,775,000
HERRING					
Seine (HS)	251	709,462	178,075,000	-	178,075,000
Gillnet (HG)	1250	140,564	175,705,000	-	175,705,000
Spawn on kelp (J)	37	925,000	34,225,000	-	34,225,000
Herring total			388,005,000	-	388,005,000
GROUNDFISH					
Trawl (T)	142	81,900	11,629,800	267,622,500	279,252,300
Halibut (L)	410	46,860	19,212,600	317,250,000	336,462,600
Sablefish (k)	47	190,000	8,930,000	139,568,817	148,498,817
Rockfish (ZN)	248	101,782	25,242,000	-	25,242,000
Schedule II (C)	527	20,400	10,750800		10,750,800
Groundfish total			75,765,200	724,441,317	789,455,717
SHELLFISH					
Crab (R)	213	352,000	74,976,000	-	74,976,000
Prawn (W)	247	438,000	108,186,000	-	108,186,000
Shrimp (S)	235	49,200	11,562,000	-	11,562,000
Geoduck (G)	55	3,000,000	165,000,000	-	165,000,000
Red Urchin	104	235,000	24,440,000	-	24,440,000
Green Urchin	49	40,000	1,960,000	-	1,960,000
Sea Cucumber	85	100,000	8,500,000	-	8,500,000
Euphausiid (ZF)	18	75,000	1,350,000		1,350,000
TOTAL FISHERIES			**$1,096,519,200**	**$724,441,317**	**1,820,960,517**

SOURCE: Nelson Bros Fisheries Ltd, Licence Values in the Pacific Fishing Fleet, report prepared for DFO, March 31, 2003. Values are approximately December 31, 2002 and exclude AI, F and N licence categories.

DFO's licensing policy.[16] According to the Auditor-General, although the number of fishing boats declined from 6,600 to 4,400 over a 15-year period, "the catching capability of the total fleet has increased dramatically through upgrading vessels under existing licences or by technological improvements."[17]
Furthermore, the Auditor General concluded that, "the high level of investment in fleet capacity in relation to the value of the fisheries resource makes it difficult for fishermen to earn an adequate return on their investment income and creates financial difficulties when there are poor fishing seasons, price declines, or interest rate increases."[18] As a result, "the risk of over-fishing has increased substantially in the past decade." The risk was reality. The Auditor General noted declining fish stocks and consistent over-fishing.

By 1995, in fact, salmon stocks and prices had declined to the point where the fishing fleet in B.C. began to lose money in terms of pre-tax income. The Mifflin Plan was designed to increase the fleet's economic viability. Between 1996 and 2000, the combined effect of the licence retirement program and licence stacking cut the fleet by 54 percent, reducing capital investment in vessels and equipment proportionately.

However, a report commissioned by the BC Job Protection Commission found that the Mifflin Plan's buyback and new licensing provisions doubled the market value of licences, even in the face of declining catches.[19]

RISING MARKET VALUES

A survey of average sale prices (in 2003 dollars) advertised in various maritime publications (including *The West Coast Fishermen* and *Fishermen Life*) provides a relative comparison of the growing capitalization in salmon licences. Between 1994 (before the Mifflin Plan) and 2002, the average advertised sale value of a gillnet licence more than doubled, while the landed value per licence dropped by 60 percent. The sale value of troll licences went up by 35 percent while the average catch per licence dropped 48 percent. Although the Mifflin Plan was supposed to reduce overcapitalization in the fleet by reducing the number of boats, it had the opposite effect since licence values soared. It became more expensive than ever to become a salmon fisherman. A gillnet licence was worth six times the value of its annual landed catch and a troll licence three times.

Other fisheries, especially those with IFQ programs, experienced inflationary trends too. The advertised price of halibut quota, for example, increased from $9 per pound in 1991 (the first year of the quota system) to $27 per pound in 2002, a threef d increase when adjusted for inflation. By 2004, the price of one pound of halibut quota reached as high as $36.

FIGURE 3A: Salmon Troll Licences

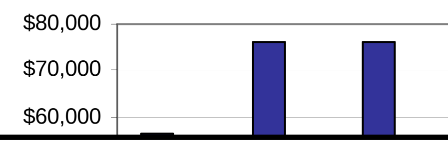
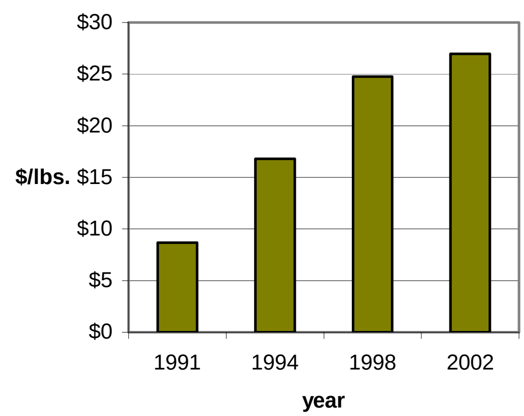


FIGURE 2: Quota Market Value B.C. Halibut Fishery 1991 - 2002



Three factors, in part, increased the market value of halibut quota: harvesting costs decreased since fewer boats and crews fished the stock and the landed value rose more from $21 million in 1990 to $39 million in 1999, an 84 percent increase, due to higher catches and prices.[20] Still,

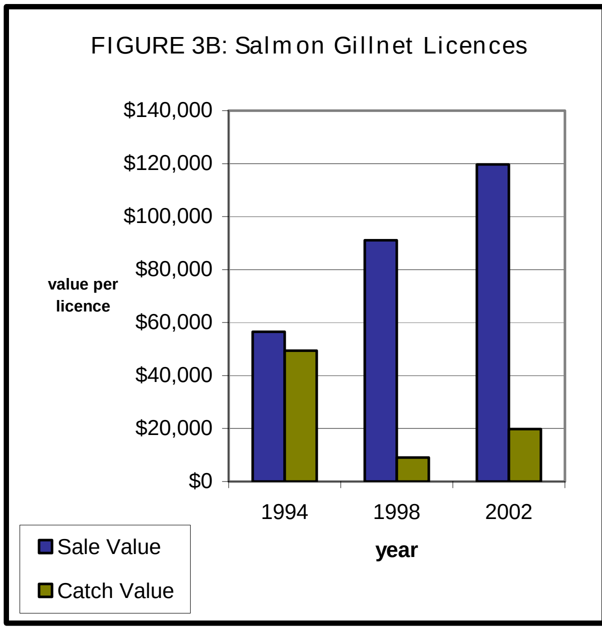


FIGURE 2A and 2B: The difference between the purchase

FIGURE 3A and 3B: The difference between the purchase price (sale value) of a licence and the average landed catch value per licence for gillnet and troll salmon fisheries for the years 1994, 1998 and 2002. In 1994, salmon troll and gillnet licences were the same licence, but were split into separate licence types in 1996. The 1998 and 2002 years are averaged for all licence areas. The purchase price values were gathered from advertised licence prices. The catch value was taken from DFO catch statistics.

larger landings, better prices and lower costs do not account for most of the 300 percent increase in the market value of quota. A similar trend occurred with sablefish quota, which was advertised in the *West Coast Fishermen* in 1990 (the first year of the quota system) for $7.86 per pound, but is valued now between $40 and $50 per pound.

Licence values rose across the board for all fisheries, but disproportionately higher in groundfish quota fisheries. DFO set out to reduce overcapitalization in the fishing industry, but its policies had the opposite effect. What went wrong?

"WINDFALL PROFITS"

Several factors influenced the market value of commercial fishing privileges. First the granting or gifting of licences and quota created "windfall profits" for those who received them. The initial allocation of licences and quota cost nothing to the initial recipients and represented "a giveaway of public resources."[21] New entrants to fisheries must buy these licences to gain access to the resource. The market value paid to the initial recipient represents a windfall.[22] So for instance, those 55 individuals initially granted geoduck quota-licences (one licence equals a 1/55th quota share of the TAC) in 1989 now have an asset worth $3 million. The average sablefis h licence and quota holder owns an asset worth $3.2 million. And the average halibut licence and quota holder has an $820,000 asset. Many of those who were given licences and quota have reinvested their earnings in the fishery by buying more licences and quota. The tax system encourages this by making licence and quota purchases tax deductible. The initial windfall profit and subsequent buying and selling of licences and quota capitalized the fishery unlike never before.

LICENCE STACKING

Fisheries policy reform in the later 1990s created markets for the buying and selling of licences and quota. The Mifflin Plan, for instance, allowed those remaining in the industry to buy more licences to remain viable. A small-boat fisherman could stack multiple licences on a single vessel under the scheme. Many fishermen did just that. In 1994, 81 percent of salmon fishermen only owned one licence; in 2002, that number declined to 52 percent.

Fisheries policies that permit "stacking" increase the market value of licences. According to one study, "Each dollar of fisheries revenue for which licences can be stacked has much greater profit potential than a dollar of revenue for unstackable licences. The reason is that the revenue from the additional licence(s) does not have to go to serving fixed costs, such as vessel insurance and repairs. This greater profit potential, in turn, is translated into a higher licence value."[23] The study found that the market value of "stackable" licences (such as salmon) is three to six times the annual landed value per licence, while the market value of non-stackable licences are on par with annual catches. This is consistent with our findings. (See Figure 2A and 2B.)

QUOTA LEASING

Quotas can also be stacked in that fishermen can accumulate quota on a single vessel and increased their efficiency through economies of scale. IFQs also have another attribute which has made them more valuable. IFQs encourage leasing whereby a quota holder rents quota to a working fishermen for a fee. Leasing fees, especially in the B.C. halibut fishery, have been as high as 70 to 80 percent of the revenue from the landed catch, which is similar to anecdotal evidence in Atlantic Canada.[24]

It's a lucrative arrangement for quota holders, since their economic returns are often secured through pre-season agreements irrespective of the fluctuating market price for the fish. Furthermore, quota holders bear no risk to property or personal injury from fishing, a dangerous occupation even during fair weather. Leasing—often done privately and informally—further increased the market value of IFQs, making them a valuable, revenue-generating asset.

INCREASING DEMAND, SHRINKING SUPPLY

Another factor contributing to the rising market value for fishing licences is growing demand, especially in the face of declining stocks (decreasing supply) in many fisheries. Allocation disputes among recreational, commercial and aboriginal fishermen have become more acrimonious as a result.

Over the past three decades, many of those fishermen initially excluded in limited-entry licensing were First Nation fishermen.[25] To address this loss of access, the government has chosen to purchase some licences back from commercial fishermen and reissue them to First Nations through the Northern Native Fishing Corporation or band-held, non-transferable communal licences.[26]

There is now growing demand for more licences. In 2004, a First Nation Panel on Fisheries recommended, "Canada take immediate steps to allocate to First Nations a minimum 50 per cent share of all fisheries, with the understanding that this may eventually reach 100 per cent in some fisheries."[27] Similar demands for an increased share of fisheries resources are also being made in modern treaty negotiations and litigation by coastal and in-river tribes.

Realizing the growing demand for fisheries quota and licences, many fishermen have supported IFQs to secure their ownership over fisheries and thus ensure they are adequately compensated if licences and quota are bought and transferred to First Nations through treaties. This has added the dynamic of speculative investment, a problem that even DFO has recognized. In 1994, an internal DFO memo from Assistant Deputy Minister Pat Chamut stated "the creation of IQs [individual quotas] creates disproportionate wealth for those who receive them… It has become evident that the adoption of IQs and the associated windfall profits that they will generate for fishermen will significantly increase the costs of future land claim settlements."[28]

Realizing this problem, the First Nations Panel on Fisheries has recently renewed calls that "a moratorium be placed on the further introduction of individual property rights regimes such as Individual Fishing Quotas (IFQs) unless First Nation interests including allocations in those fisheries are first addressed."[29]

Windfall profits,, licensing policy that encourages licence stacking and quota leasing and growing demands by First Nations and stakeholders for commercial allocations have all contributed to the rising price of fishing licences and quota.

GROWING OVERCAPITALIZATION

How can overcapitalization in fisheries be measured? One means to compare the relative capitalization of one fishery to another is to calculate the ratio of the market value of licences and quota (capitalization) to the annual landed value in the fishery (revenue). Capital-to-revenue ratios have been calculated for B.C. fisheries in Table 3. A higher ratio indicates a relatively higher level of capitalization in the fishery.

In B.C., the gillnet and seine roe herring fisheries suffer from the most severe overcapitalization, with a capital-to-revenue ratio of 10. The fishery involves several licence holders “pooling” their licences together (a minimum of four for gillnet and eight for seine) and then receiving a collective quota to be fished by a vessel.[30] In this way, the fishery combines elements of licence stacking (through the pooling of several licences on one vessel) and quotas. Since an owner-operator provision was dropped in 1979 and licences made transferable in 1991, leasing of herring licences is also permitted. These licensing provisions, combined with decreased catches and low herring prices, has created a highly overcapitalized fishery.

In contrast, the spawn-on-kelp roe herring fishery is one of the least capital-intensive fisheries in the province. The market value of the 37 J licences for the fishery is about $34 million and the average annual landed value is $9.5 million, giving a capital-to-revenue ratio of 3.6. All commercial licences in the spawn-on-kelp fishery are non-transferable and 78 percent are held by First Nations.[31] Because these licences cannot be technically transferred (private, unofficial leasing does occur), their market value has remained low.

The groundfish trawl, halibut and sablefish IFQ fisheries suffer from overcapitalization with ratios of 9.2, 8.3 and 6.9 respectively. In the case of sablefish, the ratio is increasing since the landed value of sablefish has steadily declined by 50 percent since 1999. (Landed values in the ratios are based on a five-year annual average to take into account cyclical fluctuations.) Using only the 2003 landed value, the ratio would be 8.3 for sablefish.

The fisheries with the lowest capitalization ratios tend to be non-IFQ or have a low landed value.

FISHING FOR MILLIONAIRES

In the 1990s, Ottawa committed to reducing overcapitalization in the B.C. fishing industry to increase its economic viability. A decade later the value of fishing vessels, equipment and licences actually increased. Overcapitalization is worse than ever. What went wrong?

Ottawa cut the fishing fleet in half, through licence buybacks and other policies, reducing investment in vessels and equipment to about $286 million, a 64 percent reduction from 1988 to 2003. However, these same policies had the opposite effect on capitalization in fishing privileges. The value of all B.C. commercial fishing licences and quotas doubled in those years to $1.8 billion. This increased the total market value of the fishing fleet (including licences, equipment and vessels) by 25 percent.

TABLE 3: Relative Capitalization in B.C. Fisheries

	Capitalization (market value) of licences and quota	annual landed value (5-year average)	Capital-Revenue ratios
Roe Herring (HS, HG)	$ 353,780,000	$ 35,313,400	10.02
Groundfish Trawl (T)*	$ 279,252,300	$ 30,184,148	9.25
Halibut (L) **	$ 336,462,600	$ 40,807,400	8.25
Sablefish (K)***	$ 148,498,817	$ 21,469,990	6.92
Sea Cucumber (ZD)	$ 8,500,000	$ 1,580,200	5.38
Salmon (AS, AG, AT)	$ 236,775,000	$ 44,390,400	5.33
Geoduck (G)	$ 165,000,000	$ 35,805,800	4.61
Prawn (W)	$ 108,186,000	$ 26,309,800	4.11
Red Urchin (ZC)	$ 24,440,000	$ 7,617,600	3.21
Green Urchin (ZA)	$ 1,960,000	$ 644,400	3.04
Spawn on Kelp (J)****	$ 34,225,000	$ 9,552,400	3.58
Crab (R)	$ 74,976,000	$ 29,403,000	2.55
Shrimp (S)	$ 11,562,000	$ 5,033,000	2.30

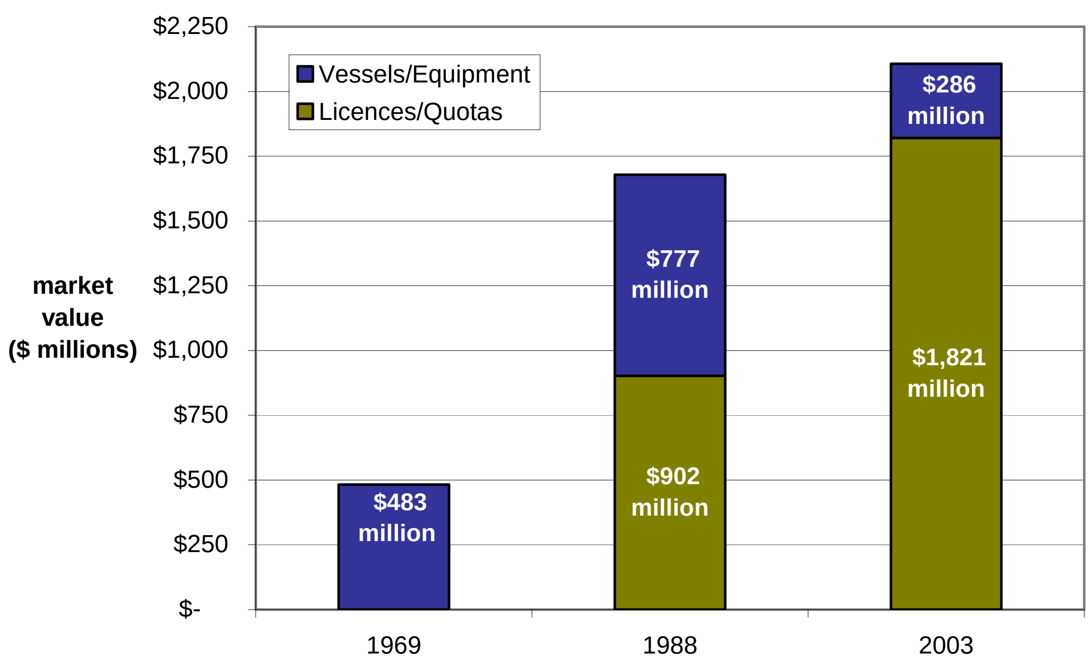
SOURCE: Most landed values for species are from DFO’s Commercial Catch Statistics homepage (http://www.pac.dfo-mpo.gc.ca/pages/data_e.htm) with some exceptions footnoted below; and capitalization levels are from Nelson Bros Fisheries Ltd, Licence Values in the Pacific Fishing Fleet, report prepared for DFO, March 31, 2003.
* Groundfish Trawl T licence landed values (excluding hake) have been calculated from landed weights and prices per pound obtained from DFO and Living Oceans Society. Hake landed values have been obtained from DFO’s statistics homepage. According to these calculations, the average landed value is about $30 million, significantly lower than the $65 million stated on DFO’s Groundfish Trawl homepage. The report authors have submitted this data to DFO’s Groundfish Unit for clarification and thus the landed value may change pending DFO’s response.
** Halibut L licence landed values do not include non-halibut species such as various rockfish which are caught and sold by L licence holders. Rockfish species make up more than 10 percent of the landed weight of the L licence catch.
*** Sablefish landed value is a four-year average, 2000/2001-20003/2004. Landed weights and prices per pound are from DFO.
**** Spawn-on-kelp J licence landed values came from the B.C. Spawn-on-Kelp Association and are about 20 percent lower than the export values recorded on DFO’s Commercial Catch Statistics homepage.

Expensive fishing licences and quotas are now becoming increasingly concentrated in fewer and fewer hands. The number of fishermen owning only one licence in B.C. declined from 43 percent in 1994 to 35 percent in 2002.[32]

The extremely high market value of licence and quota is well outside the reach of many rural working families, First Nations and younger fishermen. Increasingly, B.C.'s fishery is being divided between quota and licence holders and tenant fishermen, that is working fishermen who must lease licences and quota in order to go fishing. Most people simply don't have the capital necessary to buy quotas or licences.

This inequity will become especially acute as today's fishermen retire and either lease their quotas and licences or sell them to the highest bidder. At one time, a young fisherman could earn the money needed to invest in the fishery by working as a deckhand on a fish boat and being mentored into the industry at the same time. Today, that is not a possibility. A fisherman now needs to be a millionaire to enter into most fisheries.

FIGURE 4: Capitalization in the B.C. Fishing Fleet 1969 - 2003
(market values in 2003 dollars)



SOURCE: Statistics have been converted into constant 2003 dollars from the following sources: Department of Fisheries and Oceans. *Financial Performance of the British Columbia Salmon Fleet 1986-1990.* Vancouver: DFO Program Planning and Economics Branch, July 1992; and Nelson Bros Fisheries Ltd, Licence Values in the Pacific Fishing Fleet, report prepared for DFO, March 31, 2003. Values are approximately December 31, 2002 and exclude AI, F and N licence categories.

CHAPTER 4
social impacts: net loss to fishing communities

Fisheries are extremely important and valuable to communities whose economies are partially fishing-dependent and whose identity and, in the case of coastal First Nations, culture are tied directly to fishing.

Not surprisingly, the decline of coastal resource industries, especially forestry and fishing, has adversely affected coastal communities more than other regions of the province. Statistics from the 2001 Census show that the rural communities—those outside the Capital Region, Greater Vancouver and Nanaimo—have experienced the largest population decline in modern history, a drop of 2.6 percent in only five years.[33] Some communities lost more than a quarter of their populations in this same period. An index of human economic hardship in 2003 also showed that the North Coast and West Coast of Vancouver Island are the poorest regions in B.C.[34]

SOCIOECONOMIC NEEDS

The major restructuring and rationalization of the fishing industry exacerbated the economic conditions in many communities. The objectives of fisheries policy focused on the economic viability of industry stakeholders (primarily licence and quota holders and processing companies), with little regard for, and only limited analysis of, regional or community impacts.

This was especially true of programs to privatize fisheries through IFQs. In assessing the first five years of the halibut IFQ program, DFO focused on the impacts on biological management, economic efficiency, crew employment and enforcement and administration. There was no mention of community or regional impacts.[35] IFQ programs, in fact, aren't designed to increase the viability of rural or aboriginal economies—and can even be detrimental to traditional fishing communities.[36]

The growing capitalization in fisheries in the 1990s has excluded many individuals from the fishing industry. Since investment and economic opportunities are limited and have declined significantly in resource-dependent communities over the last decade, urban-based fishermen and corporations have successfully outbid rural and aboriginal fishermen to buy commercial fishing licences and quota. The result has been a disproportionate loss of licences and quota in rural communities, and a disconnection between communities and their adjacent aquatic resources on the B.C. coast.

MARGINALIZING RURAL COMMUNITIES

In Canada, household incomes are lower in rural communities, defined as areas with a population under 10,000. In fact, rural families have had the lowest average incomes compared to families living in communities with a population of 100,000 or more for three decades.[37] Furthermore, residential home values in Greater Vancouver are twice as high as on Vancouver Island and three times as high as Northern B.C.[38] Home equity is an important source of capital for fishermen, because commercial lenders do not accept a fishing licence as collateral since it is not legally a form of property. Fishermen therefore often use the equity in their homes to borrow money to buy fishing licences. Because of lower incomes, limited economic opportunities and lower property values, rural families have less access to capital than their urban counterparts.

As fishing licence values increased, and catches declined, many rural and aboriginal fishermen have been forced out of the fishery under the auspices of "voluntary" buyback programs. Others have simply sold out to other fishermen who stacked multiple licences and quota on a single vessel. With few exceptions the loss of licences has been more pronounced in rural areas than in urban areas. Between 1994 and 2002, 554 licences have been lost from rural communities as a result of fleet downsizing and the movement of licences to urban areas. That's almost half (45 percent) of all shellfish, groundfish and pelagic fishing licences owned by rural people. The decline in urban coastal regions was only 30 percent.

The downsizing of the salmon fishery through a government buyback of licences represented the largest loss of licences in rural and urban regions. However, the number of non-salmon licences declined by 28 percent in rural communities compared to only five percent in urban regions. Even fisheries that have traditionally been based in small communities declined. According to DFO, "more than 84 percent of prawn licence holders live in smaller coastal communities outside of major metropolitan areas. Their incomes make an important contribution to local economies."[39] Between 1994 and 2002, however, the number of prawn licences in communities with a population of less than 10,000 people declined by 58 percent. With only two exceptions,[40] the rationalization and restructuring of fisheries has been significantly more detrimental to rural regions compared to urban regions.

BARRIERS TO ABORIGINAL PEOPLES

First Nations people face more obstacles in buying fishing licences and quota than non-native fishermen. According to the 1996 Census, incomes for aboriginal people are 35 percent lower than the B.C. average and unemployment is double.[41] Many native people living on Indian reserves do not have fee-simple ownership of their homes either; thus, they cannot tap their home equity to borrow money to buy fishing licences or quota.

As a result, native ownership of full-fee commercial licences has declined precipitously. There are only 199 full-fee commercial licences owned by native individuals in B.C. (excluding clams, which has been traditionally a low-value, labour-intensive fishery and is currently non-transferable). That is only three percent of all commercial licences. However, through non-transferable native licences (including "A-I" which are reduced fee licences held by status

TABLE 4: Net Loss of Licences from Rural Fishing Communities, 1994-2002

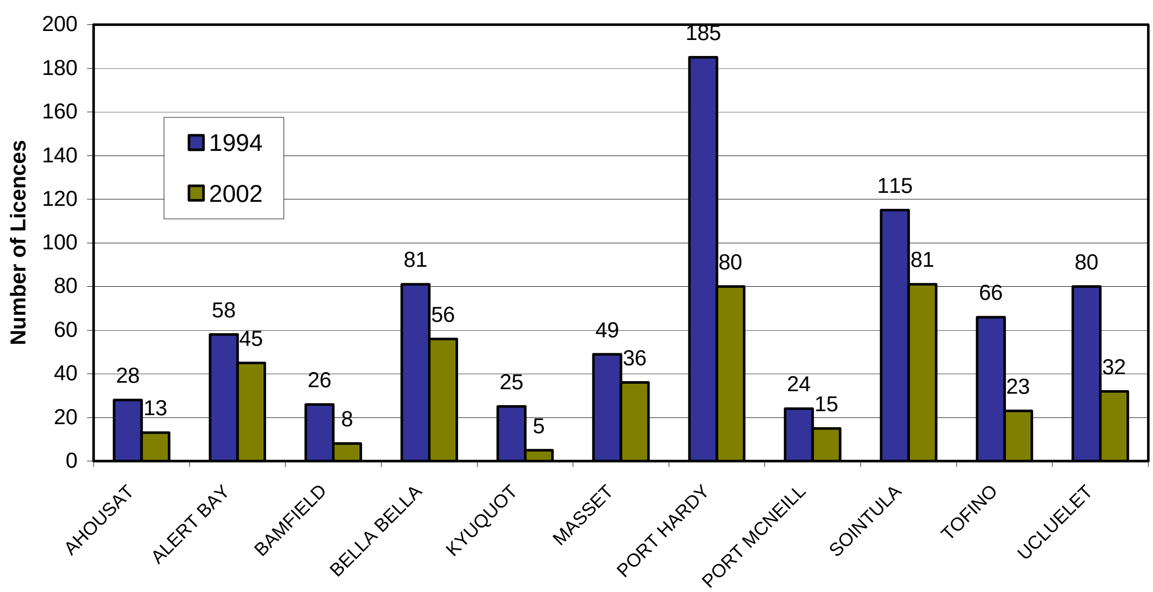
Fishery	License	Rural Licences 1994	Rural Licences 2002	Rural % change	Urban % Change
Salmon Gillnet & Troll	A	707	329	**-53%**	**-47%**
Salmon Seine	AS	95	30	**-68%**	**-44%**
Schedule II Species by Hook and Line	C	112	94	**-16%**	**-1%**
Geoduck	G	4	3	**-25%**	**6%**
Halibut	L	59	50	**-15%**	**4%**
Crab	R	50	29	**-42%**	**13%**
Shrimp	S	17	30	**76%**	**-8%**
Sablefish	K	2	2	**0%**	**0%**
Groundfish Trawl	T	3	6	**100%**	**-2%**
Prawn	W	53	22	**-58%**	**12%**
Green Sea Urchin	ZA	6	1	**-83%**	**-43%**
Red Sea Urchin	ZC	19	13	**-32%**	**-41%**
Sea Cucumber	ZD	16	10	**-38%**	**-28%**
Rockfish Hook and Line	ZN	56	42	**-25%**	**-10%**
Total	-	1199	659	**-45%**	**- 30%**

TABLE 5: First Nation Ownership of B.C. Fishing Licences, 2003

	Licence	Communal Licences	Reduced Fee Licences	NNC / Other Licences	Full-Fee Licences	Native Held	Total Licences	% Native Held
Salmon (Seine)	AS	12	18		50	80	276	29%
Salmon (Gillnet)	AG	76	164	254	42	536	1406	38%
Salmon (Troll)	AT	19	24	0	7	50	539	9%
Herring (Gillnet)	HG	27	325		2	354	1256	28%
Herring (Seine)	HS	1	51		11	63	252	25%
Spawn on Kelp	J	11		15	11	36	46	78%
Halibut	L	26			27	53	435	12%
Sablefish	K	1			1	2	48	4%
Groundfish Trawl	T				5	5	142	4%
Rockfish	ZN	14			5	19	262	7%
Sardine	JS	25			4	29	50	58%
Eulachon	ZU				2	2	16	13%
Schedule II	C	8			12	20	541	4%
Crab	R	9			2	11	222	5%
Prawn	W	5			4	9	252	4%
Geoduck	G				1	1	55	2%
Red Sea Urchin	ZC	6		7	1	14	110	13%
Sea Cucumber	ZD			5	5	10	85	12%
Shrimp	S	11			4	15	246	6%
Krill	-	1			1	2	19	11%
Total		279	907	281	199	1666	6258	27%

SOURCE: James, Michelle. *Native Participation in British Columbia Commercial Fisheries—2003.* Victoria: Ministry of Agriculture, Fisheries and Food, November 2003.

FIGURE 5: Loss of Fishing Licences in B.C. Coastal Communities 1994-2002



NOTE: Licence numbers do no include Z2 clam licences or HG herring gillnet licence.

Indians, "N" licences held by the Northern Native Fishing Corporation and "F" licences held communally by bands) the number climbs to almost 27 percent. These special provisions have stemmed the flood of licences out of aboriginal communities. This is particularly true in the salmon fishery.

The Northern Native Fishing Corporation (NNFC) holds 254 gillnet licences, about half of all native licences in that gear type in the North Coast. As a result, First Nations hold 38 percent of all commercial licences in the gillnet fishery coastwide. This contrasts sharply with troll licences. The NNFC holds no troll licences and there are relatively few communal licences, leading to very low native participation in the fishery, about nine percent. A spatial analysis of salmon licence ownership depicted on coastal maps (See Appendix A) illustrates the role the NNFC has played in protecting rural and aboriginal ownership of salmon licences. Some 49 percent of North Coast gillnet salmon licences are held in North Coast communities. The number for northern troll licences is 27 percent and for northern seine licences only 11 percent.

The high level of capitalization in IFQ fisheries and the poorer economic status of First Nations mean relatively few IFQ licences (halibut, sablefish, groundfish trawl, sea cucumbers and urchins) are owned by aboriginal people. Less than five percent of commercial IFQ licences are held by First Nations. When communal and reduced fee IFQ licences are included, participation in IFQ fisheries doubles to 10 percent.

Given the economic challenges facing aboriginal communities, including lower incomes, limited employment opportunities on reserve and lack of home equity, the participation of native people in the West Coast fishery would have declined even more without the NNFC and protective measures such as communal ownership. These non-transferable native licences represent a form of community-based ownership and are an exception to DFO's commercial licensing policy.

UNDERMINING THE ADJACENCY PRINCIPLE

One of the effects of the shift in licence ownership is that many rural communities and First Nations see few benefits accruing from adjacent fisheries resources. The West Coast of Vancouver Island, stretching from Barkley Sound to Kyuquot Sound, is a case in point. Spatial analysis of the residency of licence owners shows that very few fishermen in this region own fishing licences. Yet the sparsely populated region is tremendously rich in aquatic resources including groundfish, shellfish, salmon and other species. By and large, ownership of licences and quota to fish on the West Coast resides with individuals who live outside the region. Local residents and First Nations own only 11 (2 percent) of all groundfish quota licences, including groundfish trawl, halibut and sablefish. IFQs are capital-intensive fisheries and thus less likely owned by residents of rural communities. On the West Coast of Vancouver Island, only two percent of B.C. quota licences are owned locally compared to six percent of non-quota fisheries. This is also true on the North Island and North Coast, where only three and nine percent of quota licenses are held, respectively.

The opposite is true in urban areas. Almost 44 percent of all quota licences are held in the metropolitan regions of Victoria and Vancouver. The portion of non-quota licences held in these metropolitan regions is 29 percent. In other words, individual fishing quotas tend to be more concentrated in metropolitan areas than non-quota fisheries.

TABLE 6: Ownership of Major Fishing Licences on the West Coast of Vancouver Island (WCVI) 2002

Fishery	License
Salmon Gillnet	AG
Salmon Troll	AT
Salmon Seine	AS
Groundfish Trawl	T
Halibut	L
Sablefish	K
Geoduck	G
Crab	R
Shrimp	S
Prawn	W
Rockfish Hook and Line	ZN
Total	

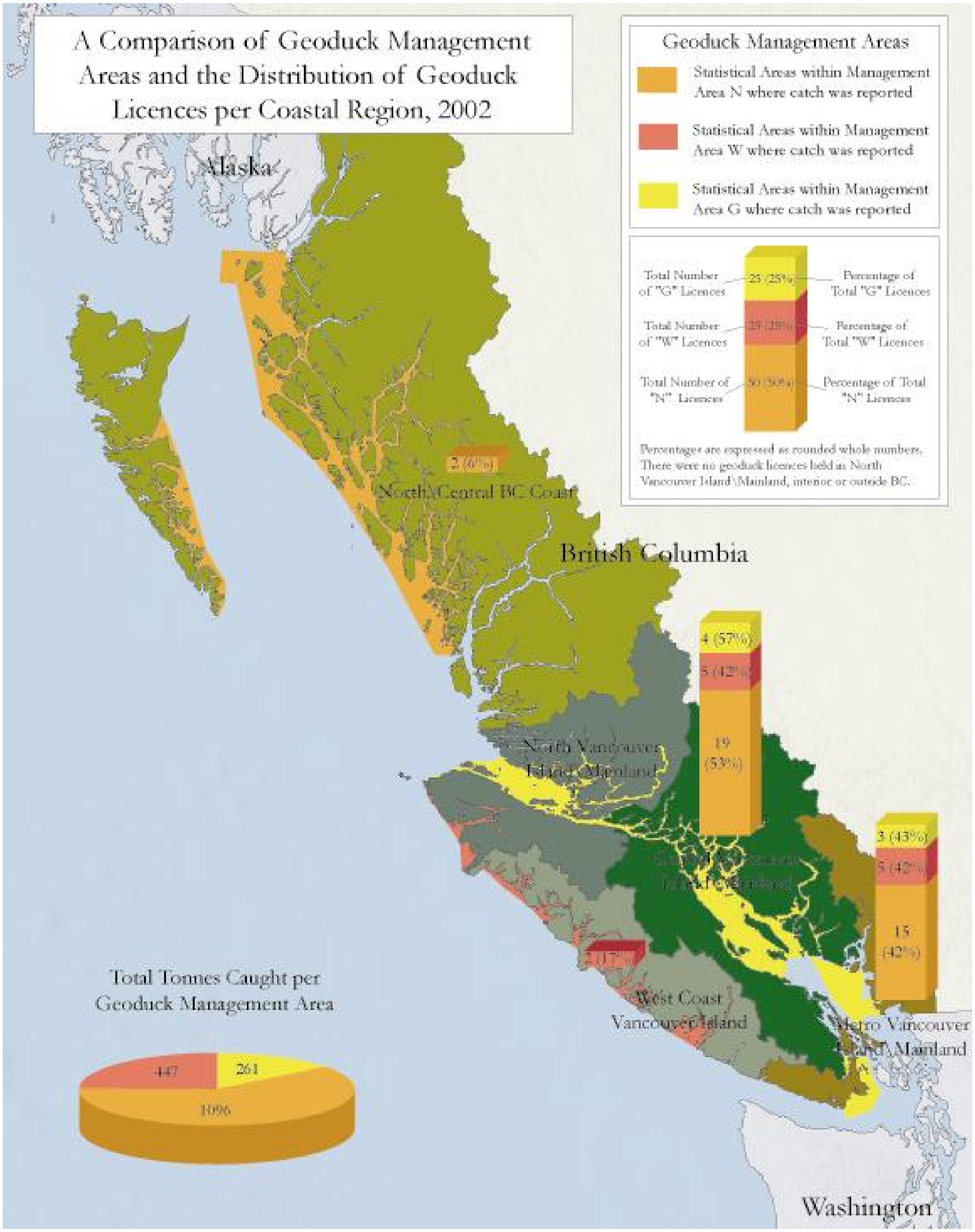
community-based clam fishery

The wild clam ("Z2" licence) fishery is a good example of a rural, community-based fishery. In 1998, licence limitation was introduced into the South Coast commercial clam fishery, reducing the number of clam harvesters to approximately 1,165. Clam licences are non-transferable, meaning harvesters cannot sell these licenses freely. In addition, DFO established a community management board on the West Coast of Vancouver Island (Area F) to allow for greater involvement of the local communities in the management of the fishery. Native people hold almost 57 percent of all "Z2" intertidal clam licences and rural ownership—at approximately 30 percent—is one of the highest participation rates of rural people in commercial fisheries in B.C. On the West Coast of Vancouver Island, more than 85 percent of the 337 clam licences (237 aboriginal communal and 100 regular clam licenses) are held locally, illustrating the local retention of non-transferable fishing rights and their associated economic opportunities.

By way of example, a spatial analysis of the landed value and ownership of geoduck quota shows how an IFQ fishery is concentrated in urban areas and how disconnected rural communities have become to their adjacent aquatic resources. On the West Coast of Vancouver Island, one individual living in Tofino owns the only two licences to harvest geoducks in this region. The situation is worse in the North Coast. Although $23 million in geoducks were harvested in the North Coast region in 2002, local residents only owned two of 36 quota licences. In a region that is suffering population loss and economic depression, almost $22 million in geoduck fisheries revenue went to individuals or companies outside the North Coast.

CORPORATE OWNERSHIP

Many licences in urban areas are owned by companies or individuals who effectively act as "absentee landlords" in that they lease their quotas or licences to tenant fishermen. Leasing is usually done through private, contractual agreements and so there is little or no data available on how widespread the practice is. There is, however, some data on corporate ownership of fishing licences.


A Comparison of Geoduck Management Areas and the Distribution of Geoduck Licences per Coastal Region, 2002
Geoduck Management Areas
Statistical Areas within Management Area N where catch was reported
Statistical Areas within Management Area W where catch was reported
Statistical Areas within Management Area G where catch was reported
Total Number of "G" Licences
Percentage of Total "G" Licences
Total Number of "W" Licences
Percentage of Total "W" Licences
Total Number of "N" Licences
Percentage of Total "N" Licences
Percentages are expressed as rounded whole numbers. There were no geoduck licences held in North Vancouver Island\Mainland, interior or outside BC.
Alaska
2 (6%)
North Central BC Coast
British Columbia
4 (57%)
5 (42%)
19
(53%)
North Vancouver Island\Mainland
3 (43%)
5 (42%)
15
(42%)
Total Tonnes Caught per Geoduck Management Area
447
261
1096
West Coast Vancouver Island
Metro Vancouver Island\Mainland
Washington

In B.C., the largest corporate entity in fisheries is the Canadian Fishing Company (Canfisco), which owned 244 fishing licences of various fisheries in 2002. The total market value of Canfisco's licences and quota is approximately $123 million. Jim Pattison Group, which also owns Overwaitea Food Group with 100 stores and Buy-Low Foods with 26 stores in Western Canada, owns Canfisco.

Canfisco is a large owner of the B.C. seine fleet. It directly owns one-third of all herring seine licences and 20 percent of all salmon seine licences. It is the largest canner of salmon in Canada and the largest roe herring exporter. Canfisco is dominant in these fisheries and is vertically integrated from the sea to the shopping cart.

TABLE 7: Canfisco Ownership of B.C. Fishing Licences in B.C., 2002

Licence	Number	Estimated Market Value
Salmon Gillnet (AG)	3	$ 248,301
Salmon Seine (AS)	90	$ 32,569,200
Herring Gillnet (HG)	81	$ 11,385,684
Herring Seine (HS)	51	$ 36,182,562
Sablefish (K) *	1	$ 190,000
Halibut (L) *	9	$ 28,435,944
Groundfish Trawl (T) *	7	$ 13,765,958
Other	2	-
Total	244	$ 122,777,649

* average price for groundfish licences includes average quota price.
SOURCE: Licence numbers from DFO licensing database (2002) and prices are from Nelson Bros Fisheries Ltd. Licence Values in the Pacific Fishing Fleet, report prepared for DFO, March 31, 2003.

SOCIAL INEQUITY

Growing corporate concentration, absentee landlords and dwindling licence ownership in fishing-dependent regions is indicative of a fundamental shift occurring in Pacific fisheries. The very measures that were meant to improve the economics of fishing have, in fact, undermined the viability of many rural and aboriginal fishing communities. The rationalization and restructuring of the West Coast fishing industry has impacted them disproportionately. In effect, fisheries policy, whether intentional or not, is skewed in favour of urban-based corporations and individuals with greater access to capital and economic opportunities. Fishermen in those rural communities most dependent on fishing are being bid out of the fishery.

Leasing, consolidation and the loss of licences in rural communities will likely become worse as the current generation of fishermen retire. These fishermen will either sell their fishing privileges to the highest bidder or simply lease their licences and quota and thereby earn revenues throughout their retirement. This will make it increasingly difficult for new entrants to fisheries. The U.S. General Accounting Office (GAO) has singled out this inequity as a problem, reporting to Congress that IFQ programs have "raised concerns about the fairness of initial quota allocations, the increased costs for fishermen to gain entry, and the loss of employment and revenues in communities that have historically depended on fishing." [42] The GAO outlined a series of measures that could protect community interests and facilitate new entrants in IFQ fisheries. Without similar measures in B.C. fisheries, social inequality will grow as fewer individuals gain greater access to and benefits from the resource.

Chapter 5
ecological impacts: selling out conservation

Assessing the impacts of federal fisheries licensing policy on conservation is a difficult and complex task. Many factors, including habitat degradation, ocean survival rates and climate change, affect fish stocks. Nevertheless, fisheries licensing policy does play an important role in providing incentives and disincentives to fishermen to conserve fish stocks.

Fisheries licensing policy can take the form of *input* or *output* controls. Input controls limit the number of vessels, type and amount of gear, fishing methods, length of vessels and fishing season and permitted fishing areas. Output controls limit the amount of catch that can be taken out of the sea, which are usually set as annual TACs. An IFQ system can be both an input and output control. Quotas limit the amount of fish an individual fisherman can catch (an output control), but by making quotas transferable and stackable, the number of vessels fishing is often reduced (an input control) through fleet rationalization.

The conservation record of IFQ programs is mixed. By ending the race for the fish and rationalizing fishing fleets, they've helped fisheries managers control over-harvesting, ensuring that landings don't exceed TACs. Since the introduction of IFQs in the B.C. halibut fishery in 1991, the catch has been slightly lower than the TAC each year.[43] The Alaskan IFQ programs in halibut and sablefish were also successful at eliminating the frenzied derby fishery, improving crew safety and reducing waste resulting from ghost fishing by gear lost at sea.[44]

Still, IFQs can induce bad behaviour by fishermen, including quota busting, discarding, poaching, high grading of catch and data fouling.[45] These problems can be solved in part by onboard and dockside observers, but add considerable costs to fishing operations.

A 1997 global study by the Organization for Economic Cooperation and Development found that 24 of 37 IFQ fisheries surveyed were experiencing varying degrees of stock decline.[46] One investigation of New Zealand fisheries under IFQ management found that in 1998 of the 187 stocks managed under IFQ programs, only 25 had stock assessments and of those 13 were below the biomass that would support maximum sustainable yield.[47]

The impact of IFQs on fisheries conservation in B.C. is equally inconclusive. The first IFQ program introduced in B.C. was in the abalone fishery in 1979, which closed in 1990 and remains closed today for conservation concerns. Catches in the geoduck, urchin and sea cucumber IFQ fisheries have remained stable, and increased in some cases. Catches of halibut have remained stable, though some First Nations claim that local depletions are considerable.[48] Catches in the sablefish IFQ program have been declining since the early 1990s. Since the introduction of IFQs in 1997, the groundfish trawl industry has had steady catches, although the hake fishery collapsed in 2000 and then bounced back a few years later.

The conservation record of privatization is dubious, according to a major fisheries study by the U.S. National Research Council, in part because "IFQs are not a conservation tool, they're mainly an economic tool to control overcapitalization and 'the race for fish'. The TAC and other management measures are the main conservation tools in IFQ systems."[49]

As outlined in this report, IFQs have reduced overcapitalization in fishing capacity in B.C. by reducing the number of working vessels, but licences and quota market values have soared. Overall, capitalization in the fishing fleet has actually increased.

The growing capitalization in fisheries licences and quota has serious long-term implications for conservation. Although the soaring price of quota and licences represents a "windfall profit" to those initially granted them, it represents a capital cost that will have to be born by new entrants into fisheries, once current fishermen retire. This enormous financial cost will put pressure on future fishermen to catch more fish and to apply political pressure on DFO to maintain high catch levels.

Past over-fishing has often been attributed to undue influence of industry stakeholders, as the Auditor General pointed out in its 1986 report on fisheries. This is certainly true of the Atlantic cod fishery. Privatization through IFQs and the establishment of co-management agreements with exclusive groups of licence and quota holders is likely to increase the influence of industry stakeholders, while marginalizing conservation, community and citizen groups in fisheries management. DFO's concept of co-management focuses on narrow, economic interests in fisheries, negating social and conservation values represented by non-industry groups.

According to one assessment of the quota management system in New Zealand, "ITQs in combination with 'cost recovery' has distorted perceptions of the legitimacy of quota owners compared to recreational fishers, the environment, the other non-extractive values and uses of the environment."[50] Moreover, privatization has allowed quota owners to invest their returns from resource rents into influencing fisheries officials and politicians in New Zealand. This has given them "a disproportionate voice" and allowed quota owners to engineer "the evolution of institutions to further enhance their power and control and to marginalise other interests." In British Columbia, a similar system dominated by licence and quota holders is being established to manage fisheries.

Full-cost recovery for data collection by private companies also raises questions about the ownership of fisheries data and the transparency of fisheries management and science. Already, the Marine Conservation Caucus, a DFO advisory process for environmental groups, has run into serious problems accessing data on the groundfish industry and has withdrawn from DFO's groundfish consultation process as a result. The lack of access to data has hampered the efforts of independent scientists to scrutinize DFO Science and decision-making. There's also concern that privileged access to data by certain industry consultants has strengthened at least the perception of biased science.

While it is important to incorporate the traditional knowledge of fishermen into stock assessment, there are serious concerns about having industry pay for and carry out data collection and stock assessment and act as co-managers of the resource. Short-term profits could win out over long-term sustainability in the fishery.

The shifting nature of the ownership of fisheries may also have serious implications for conservation. This is especially true of the salmon fishery, since the anadromous species is highly dependent on terrestrial habitat for its survival. According to one group of fisheries experts, the move to an IFQ fishery in salmon "takes the economic benefit of fisheries out of coastal communities, removing the incentive for local residents to protect critical salmon habitat."[51]

DFO is currently promoting the integration of all groundfish fisheries, including trawl (T), halibut (L), sablefish (K), rockfish (ZN) and Schedule II (C) licences, into a single IFQ system whereby quotas can be transferred between gear types: trap, hook and line and trawl. This could further rationalize the fishing fleet as large, efficient trawlers buy out smaller hook-and-line operators. This would have adverse impacts for conservation considering the impact trawlers have on seafloor habitat. Bottom trawls constitute one of the most invasive methods of fishing and the rate of habitat alternation of the seafloor has been calculated at more than 150 times the rate of global deforestation through clear-cutting.[52] Coastal communities would also suffer from decreased employment, since so few trawlers are based in rural and aboriginal communities.

IFQs are about economic efficiency: bigger boats and fewer licence and quota holders earning higher profits and wielding greater influence over fisheries. With privatization, the resource is eventually sold to the highest bidder. The soaring capitalization in licences and quota, and resulting debt load, threatens the resource by putting pressure on new entrants to catch more fish. At the same time, the disenfranchisement of rural and aboriginal communities adjacent to fisheries resources undermines the stewardship role these communities could play in promoting fisheries conservation and especially protecting fisheries habitat in the case of salmon.

Chapter 6
conclusion and recommendations

Integrating ecological, economic and social values in fisheries management is paramount to conservation. Both human communities and marine ecosystems must be healthy for sustainability to occur.

This report focuses on a fundamental paradox of Canadian fisheries policy. While the objective of several decades of reform and rationalization in the West Coast fishery has been to increase economic viability, it has had the opposite effect for communities. The privatization of B.C. fisheries has netted a catch-22. DFO's solutions have become problematic, worsening overcapitalization in the fishing industry even in the face of declining stocks, undermining the sustainability of fishing-dependent communities and threatening conservation.

Canada's public fisheries resources are being bought, sold and traded in a highly unregulated, speculative market through private brokers and quota registries acting as veritable fish stock exchanges. There's a complete lack of transparency and accountability in the ownership system. Trading and leasing is often done privately, without DFO's knowledge. Prices and lease costs are unmonitored. While publicly traded corporations are subjected to certain regulations and disclosure rules, Canada's public fisheries resources, by comparison, are not. Furthermore, there are no national standards for IFQ programs, protecting crew and community benefits and limiting consolidation of the industry, such as those being currently developed and debated by the U.S. Congress.

Without access to significant amounts of capital, rural and aboriginal fishermen are being slowly bought out. Federal fishing licensing policy is effectively severing the economic link between coastal communities and their adjacent aquatic resources. After thousands of years of unfettered dominion, First Nations especially have become tenants in their own territories. Marine resources are shifting from being common property, rural and community-based to an ownership structure that is urban, corporate and privatized.

Today, fisheries are becoming increasingly concentrated among fewer individuals and corporations who claim *de facto* proprietorship over the fish in the sea. DFO policies are effectively privatizing ocean resources, once considered a common property to be shared by all Canadians.

Still, governments can protect the next generation of fishermen by implementing measures to facilitate new entrants into fisheries and safeguard the interests of First Nations and coastal communities through a number of innovative policies. These measures include:[53]

- Buying back quota which are allocated to younger, professional fishermen
- Issuing quota for a fixed period of time
- Setting aside TAC increases for new entrants
- Providing financial assistance for new entrants to buy quota and licences

- Prohibiting quota and licence sales, making them non-transferable.
- Placing geographic restrictions on quota and licence transfers
- Setting limits on the amount of quota or licences an individual or entity can hold
- Requiring quota and licence holders to be onboard their vessels when fish are caught
- Restricting the ports to which quota can be landed
- Creating separate quota markets for large and small vessels
- Giving communities the right of first refusal to buy licences and quota

Most countries with IFQ programs have recognized the detrimental effect of fisheries privatization on social equity and have introduced many of these provisions. These countries include Iceland, Norway, Scotland, New Zealand and the United States. In Canada, DFO has granted special licences and quotas to protect First Nations interests and in 1997 established the Groundfish Development Authority (GDA), a non-profit society consisting of labour and community interests which advises the Minister of Fisheries on the allocation of 20 percent of the TAC. (The allocation advice involves processors and quota holders jointly applying for quota from the GDA and is based on a complex and weighted formula that limits the actual influence of community and labour interests over the allocations.)

In assessing the suite of options available to fisheries managers, the U.S. General Accounting Office concluded that the "easiest and most direct way to help protect communities under an IFQ program is to allow the communities themselves to hold quota."[54] In June 2001, the U.S. North Pacific Fishery Management Council recognized the fact that a number of small coastal communities "are struggling to remain economically viable" and that "[a]llowing qualifying communities to purchase halibut and sablefish quota share for use by community residents will help minimize adverse economic impacts on these small, remote, coastal communities in Southeast and Southcentral Alaska, and help provide for the sustained participation of these communities in the halibut and sablefish IFQ fisheries."[55]

In April 2004, U.S. federal fisheries regulations were amended to allow 42 rural communities with a population of less than 1,500 people and with historic participation in the halibut and sablefish fisheries to establish non-profit Community Quota Entities (CQEs) to hold and lease fisheries quota for local residents. The Alaskan state government provided CQEs with up to US$2 million in loans to purchase quotas. This program comes on the heels of Alaska's successful Community Development Quota program, which granted a portion of Alaska's pollock fishery to rural communities. Since 1992, the CDQ program has generated U.S. $110 million in wages, education and training benefits for over 25,000 residents of Bering Sea communities, US$500 million in revenues and US$260 million in asset value for six CDQ groups. The CDQ program has funded docks, harbours, seafood processing facilities, the acquisition of equity ownership in the pollock, Pacific cod and crab fisheries, and local economic development projects.[56] The program has received widespread, bipartisan support in Alaska.

Without similar measures to protect rural fishing communities and First Nations in B.C., ownership of fisheries licences and quota by local residents will continue to dwindle, adding to the downward economic spiral of coastal communities. Furthermore, the skyrocketing overcapitalization in fishing licences and quota will put pressure on fish stocks as the fishing industry gains more influence over fisheries through co-management agreements with exclude or minimize the interests of First Nations, communities, recreational fishermen, environmental groups and the public at large. Fisheries co-management must be inclusive of all these diverse interests, accountable to the public and transparent in its decision-making. A mix of values and experience must share the responsibility of fisheries co-management. To limit fisheries co-management to the narrow economic interests of exclusive groups of licence and quota holders is to effectively privatize the public resource.

RECOMMENDATIONS

1) Public Registry: DFO should establish a public registry that would ensure full disclosure of ownership and market values of licences and quota. Fishermen would be required to register all their leases, trades and sales of licences and quota, and fully disclose financial interests in the assets. The registry would allow the government, industry and public to monitor ownership and capital trends in the industry and to help protect against corporate concentration and overcapitalization.

2) National Standards: DFO should establish national standards for IFQ programs that would reduce overcapitalization in licences and quota, protect working crews from bearing the costs of quota leases, and limit excessive consolidation and corporate concentration in the industry.

3) Community Quota Entities: DFO in partnership with provincial, municipal and First Nation governments should permit the establishment of and provide funding for Community Quota Entities, which would be non-profit societies established to hold fisheries licences and quota in trust for aboriginal and fishing-dependent coastal communities. The CQEs would lease fishing privileges to local fishermen and facilitate new entrants, i.e. the next generation, into the industry. The CQE program would be modelled on a similar program established in Alaska, including government-funded loans of up to $2 million for each CQE.

4) Public Data: DFO should establish a comprehensive data-access policy that provides full and transparent access to biological and catch data. Public access to fisheries data would re-build trust in DFO Science, promote public accountability and ensure rigorous review of fisheries management by independent scientists and concerned citizens. Furthermore, all fisheries data funded and collected by private companies as part of IFQ fisheries must be placed in the public domain.

5) Fisheries Co-management: DFO must ensure that diverse interests are represented in fisheries co-management agreements and harvesting committees including licence and quota holders, labour, processors, coastal communities, First Nations, environmentalists and other citizen groups. Furthermore, DFO should protect against the undue influence of licence and quota holders in the management of fisheries resources.

Appendix A

SPATIAL ANALYSIS OF THE OWNERSHIP OF B.C. SALMON LICENCES

endnotes

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[56] See http://www.dced.state.ak.us/bsc/CDQ/cdq.htm

PO Box 1954
Newport, Oregon 97365
(541) 574-6212
October 22, 2004

ATTN: Jim Seger
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220
FAX (503) 820-2280

RE: PUBLIC COMMENTS ITEM E.6: DEDICATED ACCESS PRIVILEGES FOR THE WEST COAST LIMITED ENTRY TRAWL GROUNDFISH FISHERY (TIQ)

Dear Director Dr. Issac and Council members;

Please permit me to register my concerns regarding the proposal for individual fishing quotas for the groundfish trawl fleet. Trawl IFQ's would divide up the exclusive right to harvest most of the West Coast groundfish among one sector of the fishery and is not consistent with the council's goal of "fair and equitable distribution of fishery benefits." These resources are part of the public commons and for the council to consider exclusive rights to harvest for only one sector of the population at large and a single fishery type specifically is a privatization of public resources for the limited benefit (and financial windfall) of one small group that was given majority representation on the committee that developed the proposal. This committee did not include any representation of the larger public to whom these resources also belong, nor did it include recreational fisherpersons nor those using other commercial gear types. That members of the committee developed findings that they would themselves benefit from financially is both a conflict of interest and a resource grab that will do nothing to further the council's goal of protecting and conserving groundfish resources.

As a member of the public, I also have a proportional interest and right to these resources and very much object to the council dividing up the groundfish harvest in a manner that not only serves the personal financial interests of a narrow group but perpetuates and legitimizes a fishery type that is the most destructive and least selective method of fishing currently practiced. Exclusive rights to harvest only benefit an exclusive group. Exclusive rights to harvest that this exclusive group would like to have extended into perpetuity no less. They would like to own all the fish in the sea. This isn't even an auction to the highest bidder or to the group whose fishing method is most likely to conserve publicly owned groundfish resources. This is nothing less than the public gifting of millions of dollars of resources in the least fair and equitable distribution method possible to the fishery sector that is doing the least to "protect and conserve" it. Suggested provisions to word quotas as non-personal property, limiting the shares owned by one person/business, limiting or prohibiting resale of quota rights or making them of limited duration with regular reviews are not enough and completely ignore the central issue: granting exclusive rights to harvest is privatization of ocean resources however worded. These resources are a heritage and common property of all citizens and of all future citizens; if they can be said to be owned by anyone at all. They are not the council's property to give or lease exclusive rights to, the council is simply a steward of these resources. Precisely how would IFQ's benefit the public? It doesn't, it only benefits a select group of businesses. How would if protect and conserve groundfish resources? It doesn't, because the council is considering turning it over to the bottom trawling sector that creates the most waste of fish resources via a method that is the most destructive to fish habitat. Bottom trawlers are the last group that should be considered to start up a program of IFQ's. The council has only heard recommendations from a narrow group acting in self-interest. I urge you not to grant any exclusive rights to harvest to any method that is destructive to groundfish resources. Thank you for your time in consideration of my comments.

Melinda McComb *M McComb*

WHY FISHERMEN AND PROCESSORS SHOULD BE PROVIDED FOR EQUALLY IN A WEST COAST GROUNDFISH ITQ PLAN

Prepared by the Coastal Jobs Coalition
October 22, 2004

OUR POSITION:
A harvest sharing approach that allows fishermen to be economically efficient and primary processors to obtain the fish they need will provide sustainable economic benefits to both sectors as well as the communities in which they operate.

Lessons from trawl buyback

In December of 2003 the federal government successfully completed a buyback of fishing permits for 92 groundfish trawl vessels in Washington, Oregon and California. The buyback resulted in a consolidation of an over-capitalized fleet. With over a third of the vessels now retired, the remaining boats will have greater fishing—and therefore economic—opportunity.

While by all accounts a long-term success, the buyback had severe side-effects for primary processors of trawl-caught groundfish up and down the coast.

From a vessel standpoint, the buy-back was a safe bet: either you get bought out and make a little money that way, or you stay in and hope for more fish to catch, and make a little more money. But for shore-based seafood processors and small coastal communities, the buyback was a risky gamble with winners and losers. The roll of the dice ended up hitting three longtime fishing communities very hard.

Once the buyback list was published it was quickly clear that a handful of primary processing plants had the rug pulled out from under them. In Eureka, California, Pacific Choice Seafood lost two-thirds of its groundfish fleet. Crescent City, California, saw 15 of 16 trawl vessels home-ported there bought back. And in Bellingham, Washington, Bornstein Seafoods lost five out of five vessels in the buyback, their entire fleet.

"The buyback left us on the verge of getting out of groundfish," says Jay Bornstein.

COASTAL JOBS COALITION
WORKING FOR SUSTAINABLE FISHERIES AND COMMUNITIES

PO Box 1715
Portland, OR 97207
503-970-4978
www.coastaljobs.org

"It cost us a lot of money to try and stay in. We were forced to buy vessels in an effort to maintain our access to the resource. I'm a processor. I don't want to be in the fishing [harvesting] business. I only jumped in to stay alive, and maintain our access to the resource to keep our plants running. We have a hard time investing, managing and keeping our own business going, let alone the other side of the business [harvesting]," says Bornstein.

Though the buyback carefully accounted for variability in vessel catch histories and values, little advance planning was done to predict the likely impact retirement of 1/3 of the trawl fleet would have on the primary processors who rely on the landings those vessels provide.

> The goal of the Coastal Jobs Coalition is to learn from this mistake, and prevent a similar disruption from happening again as the industry moves towards individual quotas. The way to ensure a win-win on IQs is by allocating harvest quota equally between fishermen and primary processors.

The Pacific Fishery Management Council is considering the development of a trawl individual transferable quota (referred to as an ITQ, or dedicated access privilege—DAP) program for the Pacific groundfish fishery. The shore-based primary seafood processors engaged in the fishery and the industries that support them are urging the Council, Congress, and other decision makers to carefully consider primary processors' role and investment in the fishery so a plan can be crafted that provides benefits for both harvesters and primary processors as equal stakeholders and partners in a viable long-term rationalized fishery.

Three reasons for a balanced ITQ approach

There are three primary factors supporting a balanced ITQ approach that recognizes harvesters and primary processors equally:

1. Primary processors' capital investments in plants, equipment and human resources are symmetric with investments made in vessels. And because West Coast seafood processors are <u>overcapitalized</u> symmetrically with vessels, processing plant owners face the same devaluation of their investment as vessel owners when an open access fishery is rationalized.

There may be particular fisheries in some regions of the United States where the amount of non-malleable capital invested in seafood processing is small or non-existent. But along the West Coast, seafood processing is very capital and human-resource intensive.

"Both sectors have made investments, we've both committed time, energy and dollars, were equally extended. I have 40 years in this business, both processing and fishing. I don't understand the basis for one-sided allocation; this is simply not a one-sided industry," says Barry Cohen, owner of Olde Port Fisheries in Avila Beach, California.

Furthermore, rationalization will affect fishery participants' ability to access capital. Because value in the fishery will migrate from the vessels and plants towards the quota, quota becomes the preferred collateral for securing financing.

Only an initial allocation of quota will protect processor investment in the industry, and ensure adequate opportunity to employ that investment in the fishery going forward.

2. Only allocation of ITQ will guarantee access to resources traditionally enjoyed by either vessels or plants. Historically, a large number of vessels participated in the Pacific groundfish fishery, and each vessel had an opportunity to catch significant amounts of fish. This allowed primary seafood processors significant opportunities to buy fish given there were many suppliers available.

Today that is not the case. Fewer fish have shrunk the number of boats and plants. With fewer boats participating in the fishery, there are simply fewer suppliers for plants to buy fish from. With rationalization, the number of vessels will shrink considerably further, and each vessel will have control over a significantly greater amount of fish.

Where a plant currently might require 10 boats to guarantee adequate throughput, in the future that same plant may require only three vessels for the same throughput. The consolidation makes each of those vessels that much more important, because a loss of even one vessel cannot be so easily absorbed. In this example, one boat lured away by a competitor or deciding to vertically integrate and get into processing on its own means a 33% reduction in throughput for the plant—a significant hit.

Primary processor Jay Bornstein describes his concerns about access to resource, "I'm going through that right now in my efforts to build a new plant in Astoria. It's kind of like being born again. In 1977 we took out a 25 year extension on our lease. But before we did we had to determine whether the fishery resource would be there for us another 25 years."

"Each time you renew a major financial commitment like that you have to evaluate the future. But this time it's not the health of the resource I'm worried about. I have confidence it will be there 25 to 30 years in the future. What we're scrutinizing more this time as we build a new plant in Astoria is our access to that resource, and the political decisions that may limit our access to that resource."

"Our long-term viability will be based on political decisions that determine our ability to access resource. I'm obligating the next generation of my company to this. This is why an initial allocation of quota to primary processors is so important, because it guarantees you the privilege to access that resource. If you don't get the privilege initially, you have to spend extra money to buy that privilege, because those privileges can move and coalesce anywhere, in any community—and that may not be my community. Without being included in an initial allocation, all bets are off; we have no guarantee we'll be able to access the resource going forward and our ability to survive is harder to bank on."

Without an initial allocation, plants will have to buy harvesting quota to guarantee future access to the groundfish resource. According to Jay Bornstein, "The medium and small guys like me are the ones radically at risk, because we don't have the resources to buy quota if the fishery goes one-sided IQ. I'd have to sell my company to buy the quota, but with no plant left what would I do with it?"

And while some fishermen legitimately fear that allocation of quota to processors will spur those processors to vertically integrate, the reverse is true. "The thing the boats need to understand is that if I'm allocated quota, they will still fish it. Some quota just guarantees me the right to access fish, but I have no intention of getting additional boats for harvesting," adds Barry Cohen.

<u>The only way to guarantee stability for primary processing plants is by initially allocating them harvesting quota.</u>

3. Allocation of ITQ to one sector alone—either harvesters or processors—will empower them with the ability to extract rents from the fishery to the detriment of the other sector.

The free market sets the price of fish. In today's global seafood marketplace, West Coast wild Dover sole competes for shelf space with farm-raised tilapia. Pacific snapper competes against imported orange roughy. And soon, wild-caught black cod will compete with farm-raised black cod. The price the West Coast wild-caught groundfish industry can command for their fish is not theirs to determine, it is the market that decides.

Yet, under a rationalized fishery that allocates quota entirely to harvesters, the small number of remaining vessels with newly concentrated quota will hold tremendous leverage over the seafood buyer to extract rents from the fishery.

Caught between these rent-extracting ex-vessel prices and an inflexible market price for the finished product, primary processors will see their margins shrink below that necessary to maintain plant and equipment, maintain market presence, maintain a steady labor force and maintain a profit at the same time.

Without alternatives to access the same groundfish resource, buyers will have little choice but to yield to the demands of their suppliers and accept thinner margins. Or they will become their own suppliers, buying vessels and harvest quota to supply their plants. While our current fishery has little vertical integration, a rationalized fishery with a one-sided allocation of quota will actually foster vertical integration.

<u>Only an initial allocation of quota to processors will ensure balance, preventing one sector from extracting rents from the other, and reducing the incentive to vertically integrate.</u>

A winning solution is needed

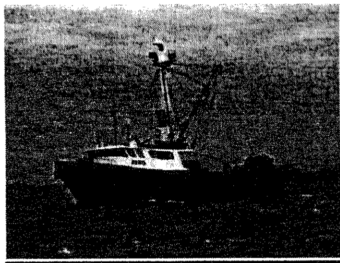
The initial allocation of quota is the most contentious issue currently facing the Pacific groundfish industry as it moves towards rationalization. Yet, it is an issue that can be solved, by crafting a quota system that adequately recognizes and provides equally for both major industry sectors—harvesters and primary processors. A system that offers vessels a profitable long-term future in the fishery, while ensuring primary processors' access to resource will provide sustainable economic benefits to coastal communities.

Everybody wins.

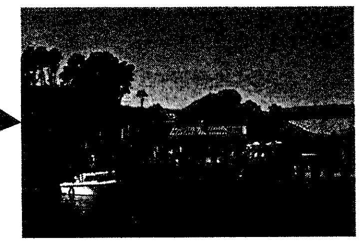
A Balanced ITQ Approach

Harvesters & processors share the fish

100,000 lbs.
harvest quota
allocated equally



F/V Helen M.
50,000 lbs.
quota owned



Hall Bros. Seafoods
50,000 lbs.
quota owned

Harvesters and processors form partnerships
Hall Bros. gives their quota to *Helen M.* in exchange for right to buy all 100,000 lbs.

Helen M. harvests all 100,000 lbs.

Helen M. sells all 100,000 lbs. to Hall Bros. for processing

- ☑ Harvester wins
- ☑ Processing plant wins
- ☑ Community wins

Jobs are protected
Local economies benefit
Fishery resource better managed

EQUAL PARTICIPATION
EQUAL ALLOCATION

Coastal Jobs Coalition
PO Box 1715
Portland, OR 97207
503-970-4978
www.coastaljobs.org

GROUNDFISH ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT

At the September 2004 meeting, the Council considered a preliminary range of alternatives developed by the Ad Hoc Essential Fish Habitat (EFH) Environmental Impact Statement (EIS) Oversight Committee for evaluation in the Groundfish EFH EIS. The Council adopted a somewhat altered range of alternatives and forwarded them for analysis in a draft EIS (DEIS) (The analysis of the range of alternatives is contained in Agenda item E.7.b, a preliminary DEIS.)

The Council task at this meeting is to select preferred alternatives from the range of alternatives adopted at the September meeting. The alternatives are grouped in four categories: alternatives to (1) designate EFH, (2) designate habitat areas of particular concern (HAPCs), (3) mitigate fishing impacts to EFH, and (4) implement habitat-related research and monitoring initiatives. In order to select a single comprehensive preferred alternative, the Council should, at a minimum, choose one alternative from each of the four categories just described. However, the alternatives in categories 2, 3, and 4 are not mutually exclusive. Therefore, the Council could choose any number of alternatives from within each of these categories as preferred, without necessarily causing conflicts or inconsistencies. The Council also needs to consider the relationship between each set of alternatives. The choice of an EFH designation alternative may determine which alternatives can be chosen from the set of HAPC alternatives and the set of impact mitigation alternatives. HAPCs must occur within designated EFH, and mitigation measures are primarily directed at areas designated EFH.

It should be kept in mind that the preparation of this EFH EIS stems from a 2000 court order in *AOC v. Daley*, which required several councils, including the Pacific Council, to prepare EISs to evaluate the effects of fishing and identify measures to mitigate those impacts, to the extent practicable, for their fishery management plans (FMPs). (Only the Council's Pacific Groundfish FMP was affected by this order.) A subsequent joint stipulation and order, as amended, sets out various requirements that NMFS must satisfy in preparing the EIS and a time line for its completion. The order requires NMFS to identify one or more preferred alternatives in both the draft and final EIS. Furthermore, according to this stipulation, NMFS will propose to the Council that an alternative specified by the plaintiffs be adopted and fully analyzed in the DEIS. Plaintiffs will provide to NMFS their alternatives as a "specific fishery management action" before the Council meeting at which the alternatives are adopted for analysis in the DEIS.[1] It also stipulates that NMFS must publish the DEIS by February 11, 2005. A required public comment period shall end on May 11, 2005. The Final EIS (FEIS) must be published by December 9, 2005, and the record of decision (ROD) published on February 28, 2006. NMFS must approve any FMP amendment or implementing regulations by May 6, 2006. (These dates are reflected in time lines presented at previous Council meetings.) Finally, the order states that the Ad Hoc Groundfish Habitat Technical Review Committee (Habitat TRC) will provide a technical review of the range of alternatives adopted by

1/ At the September 2004 meeting, the Council adopted Impacts Minimization Alternative 13, identified as the plaintiffs' alternative, as part of the preliminary range of alternatives to be analyzed in the EIS.

the Council for analysis in the DEIS. The Habitat TRC is scheduled to meet in early December 2004 for this purpose. This could result in some modification of the alternatives. For example, the extent of EFH designated under an alternative, based on criteria described therein, could change, because of data updates or model changes recommended by the Habitat TRC. Substantial changes to the alternatives or their predicted impacts are not anticipated, however.

In selecting preferred alternatives, the Council should be aware of some of the limitations of the analysis in the preliminary DEIS. Although identified in Chapter 2, the DEIS contains no description or analysis of Impacts Minimization Alternative 13, the plaintiffs' (Oceana) alternative. A letter from Oceana (included under Agenda Item E.7.d, Public Comment), briefly describes their comprehensive alternative and explains why a more detailed description and impact analysis was not available for inclusion in the briefing materials. They indicate that additional information and analysis is to be provided to the Council at the November meeting. The Nature Conservancy and Environmental Defense have provided information (see Agenda Item E.7.d, Public Comment) they believe the Council will find useful in evaluating Impacts Minimization Alternative 11, which establishes a no-trawl zone on the central California coast and associated privately funded buyout of fishing permits. They note that they have not yet got access to all of the information they would need to provide a full analysis or to work with NMFS staff in fully developing and analyzing this alternative. Analysis is also still pending for some of the other alternatives in the preliminary DEIS. For example, most of the HAPC Alternatives show analysis pending in Chapter 4 of the document. However, the California Artificial Reef Enhancement Program (CARE) has provided a report (see E.7.d) in support of HAPC Alternative 8, designating areas around oil production platforms.

To conclude, in making a decision on preferred alternatives while balancing sound decision-making on this issue with the terms set out in the joint stipulation and order, the Council could formulate an approach by considering the following options:

- Select preferred alternatives in all four categories of alternatives. The Council would have to consider the relevance of any omissions or shortcomings in the preliminary DEIS analysis if this course were followed.
- Select preliminary preferred alternatives in all four categories of alternatives, based on the rationale used by the North Pacific Council in their EFH DEIS, published in January 2004 (see Agenda Item E.7, Attachment 1), which allows for later reconsideration.
- Select preferred alternatives from some of the categories while deferring a decision on preferred alternatives for the remaining categories. The Council could then take up this decision in the March-June time frame. This may not fully satisfy the requirement in the joint stipulation and order to identify a preferred alternative or alternatives in the DEIS, so the Council would have to weigh this against their ability to make an informed choice of alternatives at this meeting.
- Defer the choice of preferred alternatives until the March-June time frame. Although this course of action would provide the greatest opportunity for informed decision-making, based on a fully developed and distributed DEIS, it clearly would not satisfy the requirement in the joint stipulation and order for the DEIS to identify a preferred alternative or alternatives. Therefore, in order to comply with the joint stipulation NMFS would have to choose a preferred alternative or alternatives for inclusion in the DEIS.

If the Council were to consider deferring some or all decisions until the March-June time frame, the timing of Council action during this period should be considered. A decision at the March meeting, which would fall during the public comment period for the DEIS, would allow the public to be informed of their decision. A decision at the June meeting, after the public comment period has closed, would allow the public to fully comment on which alternatives should be identified as preferred. The North Pacific EFH EIS model has the advantage of informing the public of the likely course of action, through the identification of preliminary preferred alternatives, while allowing the Council to fully consider public comment on those preliminary decisions. Using this approach, the Council would have the opportunity to revisit their decision at the June 2005 Council meeting, after the public comment period closed. It is important to note that any selection or confirmation of a preferred alternative during the March-June time frame could only concern the alternatives analyzed in the DEIS. New alternatives, not previously analyzed in the DEIS, could not be introduced during this period without a strong expectation of recirculating the DEIS (40 CFR 1502.9). This could be difficult, given the requirement to publish an FEIS by December 9, 2005.

Council Action:

Adopt preferred alternatives for draft EIS analysis and, if appropriate, further refine the range of alternatives included in the DEIS.

Reference Materials:

1. Agenda Item E.7.a, Attachment 1: Description of Decision Process for the North Pacific Council EFH EIS.
2 Agenda Item E.7.b, NMFS Report - EFH EIS: Pacific Groundfish Essential Fish Habitat Preliminary Draft EIS.
3. Agenda Item E.7.d, Public Comment (California Artificial Reef Enhancement Program, Oceana, The Nature Conservancy).

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. NMFS Report — Steve Copps
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt Preferred Alternatives for Draft EIS Analysis and, if Appropriate, Further Refine the Range of Alternatives Included in the DEIS

PFMC
10/19/04

Description of Decision Process For the North Pacific Council Essential Fish Habitat Environmental Impact Statement

The following passage describes the selection of preliminary preferred alternatives by the North Pacific Council for inclusion in their Essential Fish Habitat (EFH) Draft Environmental Impact Statement (DEIS).

> At its October 2003 meeting, the [North Pacific] Council selected preliminary preferred alternatives for each of the three actions in the EIS. The preliminary preferred alternatives are those alternatives currently favored by the [North Pacific] Council based on the information available. Such selection allows members of the public to tailor their comments on the draft EIS accordingly. Based on public comments and any new information that becomes available, in the final EIS, the [North Pacific] Council and NMFS may reaffirm these alternatives as the preferred alternatives, or may select different preferred alternatives. (Page 2-58)

Source

NMFS. 2004. *Draft Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska (Amendment 78 to the Fishery Management Plan for the Groundfish Fishery of the Bering Sea/Aleutian Islands Area, Amendment 73 to the Fishery Management Plan for Groundfish of the Gulf of Alaska, Amendment 16 to the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs, Amendment 8 to the Fishery Management Plan for the Scallop Fishery off Alaska, Amendment 7 to the Fishery Management Plan for the Salmon Fisheries in the Exclusive Economic Zone off the Coast of Alaska).* Juneau: NMFS Alaska Region. January 2004. (Available at http://www.fakr.noaa.gov/habitat/seis/efheis.htm)

A note on this approach

It is important to note that any selection or confirmation of a preferred alternative after the public comment period could only concern the alternatives analyzed in the DEIS that was distributed. New alternatives, not previously analyzed in the DEIS, could not be introduced during this period without a strong expectation of recirculating the DEIS (40 CFR 1502.9).

PFMC
10/19/04

Agenda Item E.7.b
NMFS Report–EFH EIS
November 2004

PACIFIC GROUNDFISH FISHERY MANAGEMENT PLAN

ESSENTIAL FISH HABITAT

PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT

National Marine Fisheries Service–Northwest Region
7600 Sand Point Way N.E.
Seattle, Washington 98115

October 2004

Preliminary Draft Environmental Impact Statement

Title of Proposed Action:	Amend the Pacific Coast Groundfish FMP to (1) describe and identify essential fish habitat (EFH) for the fishery, (2) minimize to the extent practicable the adverse effects of fishing on EFH, and (3) identify other actions to encourage the conservation and enhancement of EFH.
Responsible Official:	D. Robert Lohn Regional Administrator National Marine Fisheries Service 7600 Sand Point Way N.E. Seattle, Washington 98115
Contacts:	Mr. Stephen Copps Senior Policy Analyst National Marine Fisheries Service 7600 Sand Point Way N.E. Seattle, Washington 98115 Dr. Kit Dahl NEPA Coordinator Pacific Fishery Management Council 7700 NE Ambassador Place, Suite 200 Portland, OR 977220
Legal Mandate:	Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1851 et. seq., as implemented by 50 CFR Subpart J
Location of Proposed Action:	Pacific Coast Exclusive Economic Zone

Note to Readers: This document is being provided to the Pacific Fishery Management Council for consideration at their November, 2004 meeting. It is not a complete Draft EIS, nor has it undergone agency review. The Draft EIS is scheduled for publication in February, 2005 and is likely to be considerably different than what is presented here.

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Chapter 1 Purpose and Need

1.1 Introduction

The Pacific Fishery Management Council and the National Marine Fisheries Service are developing a comprehensive strategy to conserve and enhance essential fish habitat for Pacific Coast groundfish. Elements under consideration range from basic identification of important habitats, to specific actions for minimizing adverse effects on habitat from fishing, to general strategies for encouraging and enhancing important habitat parcels, to improving the scientific base upon which conservation decisions depend.

The project area under consideration is the entire Pacific Coast Exclusive Economic Zone and includes all federal and state marine and estuary waters from the U.S.-Canadian border in the North to the U.S. Mexican border in the South. The project area is home to a diverse range of marine life and the habitats on which they depend. Alone, Pacific Coast groundfish account for more than 80 species including rockfish, flatfish, roundfish, sharks and skates, and other species. Habitat types occupied by groundfish extend from the estuaries where salt and fresh water mix, to shallow tide pools, out to depths of at least 3000 meters.

Coastal communities have a rich tradition in commerce within the project area including commercial fisheries that in 2003 alone generated over $352 million in ex-vessel revenue and recreational fisheries that accounted for over 852,000 angler trips. The coastal economies that are supported by such commerce extend the length of the coast and are linked to the health and management of marine resources.

The Pacific Fishery Management Council in cooperation with the National Marine Fisheries Service, coastal states, and tribes, share stewardship responsibilities for many of the resources within the project area including the protection and enhancement of habitat for groundfish.

1.2 Purpose and Need for the Proposed Action

1.2.1 The Proposed Action

The proposed action is to amend the Pacific Coast Groundfish 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) minimize to the extent practicable the adverse effects of fishing on EFH, and (3) identify other actions to encourage the conservation and enhancement of EFH. The project area for this action is the Pacific Coast Exclusive Economic Zone shoreward to the inland extent of estuaries.   (Figure 1-1).

1.2.2 Purpose of the Proposed Action

The purpose of 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; second, to ensure that this EFH is capable of sustaining groundfish stocks at levels which support vibrant fisheries; and third, that it is a healthy component of fully functioning ecosystems.

Figure 1-1: U.S. Exclusive Economic Zone seaward of the Pacific Coastal States, project area for the EIS.

1.2.3 Need

The proposed action is needed because the Council and NMFS have not had the tools needed to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decision-making. The West Coast groundfish fishery suffers from numerous problems; although identifying and conserving EFH cannot address all these problems, the proposed action will allow managers to consider solutions in a more comprehensive way. Among the problems facing the fishery are overcapacity, or too many boats chasing too few fish; declining stock sizes, leading the Secretary of Commerce to declare nine groundfish stocks overfished;[1] and changing ocean conditions, which may have contributed to the failure of some groundfish stocks to replace themselves (recruitment failure). An

[1] One of these stocks, Pacific whiting, has subsequently been declared rebuilt.

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.

In Section 2(9) of the Magnuson-Stevens Act, Congress found that "one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats" and "habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." Furthermore, one of long-term goals for the groundfish fishery, adopted by the Pacific Fishery Management Council in its strategic plan, is "to protect, maintain, and/or recover those habitats necessary for healthy fish populations and the productivity of those habitats" (PSMFC 2000).

These statements underscore the need to understand and conserve EFH as part of a holistic approach to fishery management. Each of the key problems mentioned earlier is related to the need to sustain fully functional EFH. Overcapacity, for example, if it results in higher levels of fishing effort than would otherwise be necessary, may contribute to adverse fishing impacts to EFH. On the biological side of the system, degraded EFH may be factor in declines in stock abundance. However, these questions cannot be definitively answered without better scientific information about the location of EFH and the role it plays in stock productivity.

1.3 Objectives Satisfied By This EIS

Acting on the advice of the National Academy of Sciences (NRC 2002), NMFS and the Council have engaged in a public process to develop a comprehensive risk assessment to determine if EFH-related problems exist, and if so, which of these problems could be appropriately considered through the Council and NEPA processes. The risk assessment focuses on the identification of EFH, threats to its health and function, and the delineation of gaps in the available data, which if filled would improve the risk assessment and support its ongoing use. Once the risk assessment was completed, the following problem statement was developed, in order to highlight those issues that this EIS is intended to resolve:

> *Based on the results of the risk assessment, the Council, NMFS, and partner organizations have developed the following objectives for this EIS:*

- *consider alternatives for the designation of EFH;*
- *consider alternatives for the designation of HAPCs;*
- *consider alternatives for minimization of adverse effects of fishing on EFH; and,*
- *address gaps in available data.*

1.4 Background

This section is designed to give the reader the necessary background material for understanding the mandates and context issues for the EIS and associated decisions.

1.3.1 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et. seq.), was established to, among other things:

- maintain healthy stocks important to commercial, recreational, and subsistence fisheries;
- eliminate overfishing and rebuild overfished stocks important to commercial, recreational, and subsistence fisheries;
- increase long-term economic and social benefits to the nation from living marine resources;
- promote the protection of essential fish habitat; and,
- establish Regional Fishery Management Councils.

Section 303(a)(7), directs that the Councils and NMFS describe and identify EFH in each fishery management plan, minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Section 305 (b)(2) directs each Federal Agency to consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under the Magnuson–Stevens Act.

The Regional Fishery Management Councils were established in section 302 (a)(2)(F) of the Magnuson-Stevens Act to "to exercise sound judgment in the stewardship of fishery resources through the preparation, monitoring, and revision of fishery management plans (A) which will enable the States, the fishing industry, consumer and environmental organizations, and other interested persons to participate in, and advise on, the establishment and administration of [fishery management] plans, and (B) which take into account the social and economic needs of the States." There are eight individual Councils that have stewardship responsibilities for their respective areas (North Pacific, Pacific, Western Pacific, Gulf of Mexico, Caribbean, South Atlantic, Mid-Atlantic, and New England). The Councils have been designed to provide a public forum that is integrated with NEPA and other relevant decisionmaking processes to implement the conservation provisions of the Magnuson-Stevens Act. Decisions by the Regional Fishery Management Councils are submitted for approval by NMFS and the Secretary of Commerce.

The Pacific Fishery Management Council (Council) is the regional Council with stewardship responsibilities for the project area and groundfish fishery and will be discussed in the sections to follow.

1.4.1 The Pacific Coast Groundfish Fishery Management Plan

The Pacific Coast Groundfish Fishery Management Plan (groundfish FMP) was developed by the Council and approved by the Secretary of Commerce to guide management and stewardship of groundfish resources. The plan includes a broad range of management tools and measures that are implemented through regulation. The plan was amended in 1998 to describe EFH for groundfish. A summary of the plan is included in Appendix x.x.x.x.

The Council first considered groundfish EFH through Amendment 11 to the FMP. The amendment is profiled as part of the status quo in the alternatives that are described in chapter 2. The amendment was the subject of litigation which is described below.

1.4.2 Overlapping Fisheries and Other Important Considerations

There is a wide array of human activities and environmental influences on habitat that merit consideration in this EIS and will be explored in the later sections. This sub-section briefly introduces the regulatory system and jurisdictional issues for those activities. Specific fisheries and other environmental influences will be described in detail in Chapter 3.

1.4.2.1 State/Federal Jurisdiction under the Magnuson-Stevens Act

Under the Magnuson-Stevens Act, NMFS manages the groundfish fishery in the Exclusive Economic Zone, which starts at the seaward boundary of the state waters (3 nm from shore) and extends 200 miles offshore. The states retain jurisdiction to manage fisheries in state waters (within 3 nm of shore). A state can also regulate vessels registered under the laws of that state in federal waters if the state's laws and regulations are consistent with the FMP and applicable federal law.

In practice, the states and federal government manage the groundfish fishery consistently and cooperatively. For the groundfish fishery, the states, the responsible federal agencies, and the Pacific Fishery Management Council coordinate closely. Each state has a representative of its fishery agency as a voting member on the Council. NMFS has a voting member on the Council, and the U.S. Coast Guard, U.S. Fish and Wildlife Service, and the Pacific States Marine Fisheries Commission have non-voting members on the Council. The states and NMFS also have representatives on the Council management and scientific committees that help develop the management measures.

Management measures—including catch limits, bag limits, and size limits—apply to vessels operating in the EEZ (50 CFR 660.301). However, these limits, which apply to vessels that fish in the EEZ, also include fish caught between 0 and 3 miles from shore (50 CFR 660.323(a)). If, for instance, a vessel fishes in both state and federal waters, any fish caught count toward the limits in the federal groundfish regulations, no matter whether the fish were caught in state or federal waters. In addition, because the regulations have been developed cooperatively through the Council process, the States of

Washington, Oregon, and California adopt regulations under their own authority that are the same as the federal regulations. For area closures, the federal regulations implement closed areas in federal waters, and state regulations implement closed areas in state waters.

1.4.2.2 Treaty Indian Fishing Rights

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations in common with all citizens of the United States. See *U.S. v. Washington*, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974).

NMFS recognizes four tribes as having usual and accustomed grounds and stations in the marine areas managed by the Pacific Coast groundfish FMP: the Makah, Hoh, and Quileute tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinault, *et al.* (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374 (Quinault). The tribes' u&a grounds do not vary by species of fish. *U.S. v. Washington*, 157 F. 3d 630, 645 (9th Cir. 1998).

NMFS recognizes the areas set forth in the regulations cited below as marine usual and accustomed grounds and stations of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in *U.S. v. Washington*, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984); see also *Makah Indian Tribe v. Verity*, 910 F.2d 555, 556 (9th Cir. 1990); *Midwater Trawlers Co-op. v. Department of Commerce*, 282 F.3d 710, 718 (9th Cir. 2002). The usual and accustomed grounds and stations of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 67 Fed. Reg. 30616, 30624 (May 7, 2002) (usual and accustomed grounds and stations for salmon); 50 CFR 660.324(c) (usual and accustomed grounds and stations for groundfish); 50 CFR 300.64(I) (u&a grounds for halibut). The usual and accustomed grounds and stations recognized by NMFS may be revised as ordered by a federal court.

The treaty fishing right is generally described as the opportunity to take a fair share of the fish, which is interpreted as up to 50 percent of the harvestable surplus of fish that pass through the tribes' usual and accustomed grounds and stations. *Washington v. Washington State Commercial Passenger Fishing Vessel Association*, 443 U.S. 658, 685-687 (1979) (salmon); *U.S. v. Washington*, 459 F. Supp. 1020, 1065 (1978) (herring); *Makah v. Brown*, No. C85-160R, and *U.S. v. Washington*, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993) (halibut); *U.S. v. Washington*, 873 F. Supp. 1422, 1445 and n. 30 (W.D. Wash. 1994), aff'd in part and rev'd in part, 157 F. 3d 630, 651-652 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376 (1999) (shellfish); *U.S. v. Washington*, Subproceeding 96-2 (Order Granting Makah's Motion for Summary Judgment, etc. at 4, November 5,

1996) (Pacific whiting). The court applied the conservation necessity principle to federal determinations of harvestable surplus in *Makah v. Brown*, No. C85-160R/ *U.S. v. Washington*, Civil No. 9213 - Phase I, Subproceeding No. 92-1, Order on Five Motions Relating to Treaty Halibut Fishing, at 6-7, (W.D. Wash. Dec. 29, 1993); *Midwater Trawlers Co-op. v. Department of Commerce*, 282 F.3d 710, 718-719 (9th Cir. 2002).

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now recognized as applying to all species of fish and shellfish within the tribes' u&a grounds.[2] *U.S. v. Washington*, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376; *Midwater Trawlers Co-op. v. Department of Commerce*, 282 F.3d 710, 717 (9th Cir. 2002).

In 1994, the U.S. government formally recognized that the four Washington Coastal Tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish, and concluded that, in general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' usual and accustomed grounds and stations. In 1996, NMFS promulgated a "framework rule" on treaty Indian fishing rights to groundfish. This rule is codified at 50 CFR 660.324. The rule establishes procedures for implementing treaty rights, and provides that rights will be implemented either through an allocation of fish that will be managed by the tribes, or through federal regulations that apply specifically to tribal fisheries. Under 50 CFR 660.332(a), tribal allocations are subtracted from the species OY before limited entry and open access allocations are derived.

The tribal allocation of Pacific whiting has been based on a methodology originally proposed by the Makah Tribe in 1998. The methodology is an abundance-based sliding scale that determines the tribal allocation based on the level of the overall U.S. OY, up to a maximum 17.5 percent tribal harvest ceiling at OY levels below 145,000 mt.

The sliding scale methodology used to determine the treaty Indian share of Pacific whiting is the subject of ongoing litigation. In *U.S. v. Washington*, Subproceeding 96-2, the Court held that the methodology is consistent with the Magnuson-Stevens Act, and is the best available scientific method to determine the appropriate allocation of whiting to the tribes. *U.S. v. Washington*, 143 F.Supp.2d 1218 (W.D. Wash. 2001). This ruling was reaffirmed in July 2002. *Midwater Trawlers Cooperative v. Daley*, C96-1808R (W.D. Wash.) (Order Granting Defendants' Motion to Supplement Record, July 17, 2002). Additional briefing will occur in this case. However, at this time NMFS remains under a court order in Subproceeding 96-2 to continue use of the methodology unless the Secretary finds just cause for its alteration or abandonment, the parties agree to a permissible alternative, or further order issues from the court. Therefore, NMFS is obliged to continue to use the methodology unless one of the events identified by the court occurs. Since NMFS finds no reason to change the methodology, it has been used to determine the 2003 tribal whiting allocation.

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[2]"The term "fish" as used in the Stevens Treaties encompassed all species of fish, without exclusion and without requiring specific proof (citations omitted)".

For some species on which the tribes have a modest harvest, no specific allocation has been determined. Rather than try to reserve specific allocations for the tribes, NMFS establishes trip limits recommended by the tribes and the Council to accommodate modest tribal fisheries.

1.4.2.3 Coastal Zone Management

Management and protection of the coastal zone, including habitat, is carried out through a federal-state partnership under the Coastal Zone Management Act that among other things is designed to ensure "the protection of natural resources, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat, within the coastal zone (Coastal Zone Management Act of 1972, part 1452, section 303). Day-to-day management decisions occur at the state level with federal support where necessary.

1.4.2.4 EFH Consultation

Federal and state agencies are required to consult with NMFS if they determine that their actions may adversely affect EFH. The procedures for EFH consultation are outlined at 50 CFR 600.920.

1.4.2.5 Endangered Species Act – Habitat Conservation Planning and Consultation

Section 2(b) of the 1973 Endangered Species Act (ESA) states that "The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, ..." NOAA Fisheries shares ESA authority with the Department of U.S. Fish and Wildlife Service (FWS), which has responsibility over terrestrial animals, birds, and freshwater fishes. The Services follow joint regulations, at 50 CFR Part 402.

Section 7(a)(2) of the Act requires every Federal agency, in consultation with and with the assistance of NOAA Fisheries, to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The ESA requires consultation if a Federal action may affect an ESA-listed species. For such actions, Federal agencies are required to initiate section 7 consultation with NOAA Fisheries (or FWS) by developing an initiation package, or biological assessment (BA) for major construction activities requiring an EIS. The initiation package or BA will include a determination of whether the proposed action is likely to adversely affect the listed species or designated critical habitat. If the action is "likely to adversely affect," NOAA Fisheries will prepare a

Biological Opinion (Opinion) with either a jeopardy or no jeopardy conclusion and for critical habitat; and either adverse modification or no adverse modification. Depending on the outcome, NOAA Fisheries may issue conservation recommendations, terms and conditions; or (in the case of a jeopardy/adverse modification Opinion) reasonable and prudent alternatives to reduce adverse effects. If an action is not likely to adversely affect ESA listed species or designated critical habitat, NOAA Fisheries will issue a concurrence letter.

In many cases, the geographic extent of a listed species overlaps with that of a species managed under the Magnuson Act. Therefore, the EFH regulations allow for EFH consultations to be incorporated into ESA consultation when possible. The ESA is relevant to the Pacific Coast Groundfish EIS, Record of Decision, and any Fishery Management Plan amendments because Federal agency decisions made through these documents represent a Federal action under the ESA and require a determination regarding whether the action may affect any ESA listed species or designated critical habitat. This determination will consider ESA listed species and critical habitat within the area that may be affected by the proposed action.

1.4.3 National EFH Guidance

NMFS has issued guidance in the form of final regulations for implementation of the EFH provisions of the Magnuson-Stevens Act (50 CFR part 600; subparts J and K). The regulations provide guidelines to fishery management councils for developing the EFH sections of fishery management plans, and establish procedures to be used by NMFS and other agencies to consult and coordinate regarding Federal and state agency actions that may adversely affect EFH.

1.4.3.1 AOC v. Daley

In 1999, a coalition of environmental groups challenged the Secretary of Commerce approval of the EFH FMP amendments prepared by the Gulf of Mexico, Caribbean, New England, North Pacific, and Pacific Fishery Management Councils (*American Oceans Campaign et. al. v. Daley et. al*., Civil Action No. 99-982 (GK)(D.D.C. September 14, 2000)). The court found that the agency's decisions on the EFH amendments were in accordance with the Magnuson-Stevens Act, but held that the Environmental Assessments (EAs) on the amendments were in violation of NEPA and ordered NMFS to complete new, more thorough NEPA analyses for each EFH amendment in question.

NMFS entered into a Joint Stipulation with the plaintiff organizations that called for each affected Council to complete EISs to consider actions to minimize adverse effects of fishing to the extent practicable on EFH (*AOC v. Evans*, Civil No. 99-982 (GK)(D.D.C. December 5, 2001)). However, because the court did not limit its criticism of the EAs to efforts to minimize fishing effects on EFH, NMFS decided that the scope of the EISs should be to address all required EFH components as described in the sub-section 1.2 above.

1.4.3.2 Other Guidance

On January 22, 2001, NMFS administrator Bill Hogarth issued a memorandum to NMFS Regional Administrators providing guidance for developing EISs for the EFH amendments per the *AOC v. Daley* court order(s). The memorandum provides guidance on the actions that must be addressed in the regional EISs and considerations for the structure of the documents and public process.

1.4.4 Public Process for this EIS

The development of this EIS has been integrated with the public process mandates of the Magnuson-Stevens Act and the committee structure of the Council. NMFS habitat scientists convened an agency workshop in March, 2002 at which they agreed on a rough decisionmaking framework that was presented to the Council as a “road map” for the EIS. At their November, 2002 meeting the Council formulated the ad hoc Pacific Coast Groundfish Habitat Technical Review Committee (TRC) to guide implemention the decisionmaking framework. The Council’s Scientific and Statistical Committee (SSC) has provided formal scientific review of the risk assessment. The Council’s ad hoc EIS Oversight Committee has been tasked by the Council to take the lead in developing the proposed action and alternatives. Final adoption of the alternatives is the responsibility the Council and NMFS.

1.4.4.1 Decisionmaking Framework

The decisionmaking framework for the EIS is designed for policy to flow from assessment (Figure 1-2). The framework is designed so that the best available science is interpreted for policy makers before they develop alternatives for the EIS. The benefit of the information flow is that all the science is consolidated and interpreted in a single assessment so that as policy discussions unfold, they are front-loaded with the best available science. This careful division of scientific assessment from policy is commonplace in fisheries management, particularly in the traditional stock assessment/quota management process where complete assessments are traditionally delivered to the Council prior to the development of alternative harvest levels. Another benefit of the decisionmaking framework is that the public has had the opportunity to see and comment on a complete map of the process as it has unfolded.

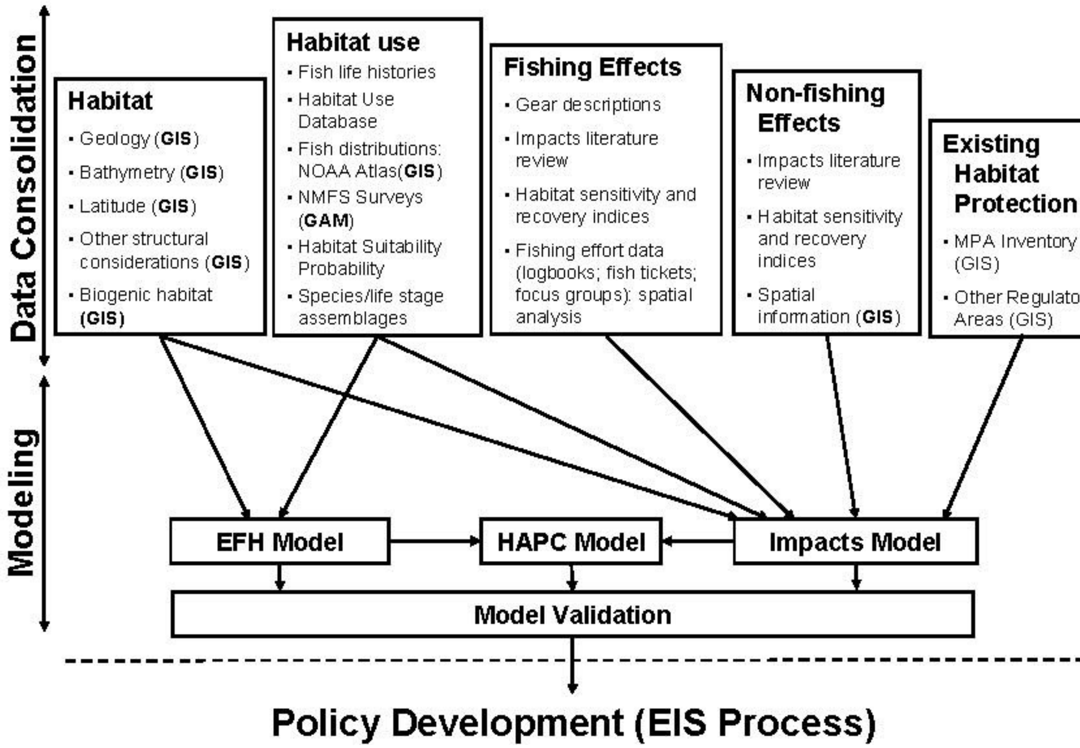

Figure 1-2: Decisionmaking Framework Diagram.

1.4.4.2 Phased Approach to the DEIS

The complexity of the risk assessment at a coast-wide scale has necessitated scientific innovation and institutional check-points on the efficacy of the approach as it has evolved. The risk assessment authors recognized that new data were available since the Council's initial EFH effort in 1998 that provided an opportunity to integrate a much broader range of information than was used before. For instance, the designation of groundfish EFH in 1998 was based primarily on catch records and a literature review of species' habitat associations. The method developed through the risk assessment process includes those elements as well as detailed analysis and interpretation of physical and biological substrate types that play key ecological roles in the functionality of habitat for groundfish. The risk assessment was developed in distinct phases with public workshops and opportunity for comment throughout. The phases are summarized as follows:

<u>Phase I - Initial Scoping (April, 2001 through October, 2001)</u>
This phase began upon publication of a Notice of Intent to prepare an EIS that was published on April 10, 2001 (66 FR 18586) and went through the October, 2001 Council meeting. The result of this phase was the decision to prepare two EISs instead of the single EIS contemplated in the NOI. The decision was described and published in a Notice of Availability for the scoping report (67 FR 5962; February 8, 2002). One EIS

was to focus on programmatic elements of the FMP and the second, this EIS, to focus on EFH. Public scoping meetings during this phase were held as follows:

- Newport, OR, Hatfield Marine Science Center; May 22, 2001.
- Astoria, OR, Oregon State University, Seafood Laboratory; May 23, 2001.
- Eureka, CA, Humboldt Bay Harbor, Woodley Marina; May 29, 2001.
- Los Alamitos, CA, California Department of Fish and Game; May 30, 2001.
- Seattle, WA, NOAA Sand Point Facilities; June 5, 2001.
- Burlingame, CA, Park Plaza International Hotel; June 12, 2001.

<u>Phase II – Kick-off (October, 2001 through April, 2002)</u>
This phase began after conclusion of initial scoping and resulted in Council adoption of the draft decisionmaking framework shown in Figure 1-2 at their April meeting. Two meetings were held during this phase as follows:

- Seattle, WA, NOAA Sand Point Facilities, March 24-25, 2002. Agency meeting of NMFS EFH experts that resulted in a draft of the decisionmaking framework and identification of key data sources.
- Portland, OR, DoubleTree Hotel - Columbia River, April 8-12, 2002. Council adopted decisionmaking framework.

<u>Phase III - Data Consolidation and Infrastructure Development (April, 2002 through November, 2002)</u>
This phase began after the April, 2002 Council meeting and established the technical infrastructure, databases, personal, and committee structure necessary to implement the decisionmaking framework. PSMFC used this time to develop appropriate contracts and consolidate necessary data and a preliminary risk assessment approach. It should be noted that data consolidation has in reality continued throughout implementation of the decisionmaking framework. One public meeting was held during this phase:

- Foster City, CA, Crowne Plaza Hotel, October 28 – November 1, 2002. Council formed TRC to provide guidance to risk assessment authors.

Phase IV – Proof of Concept (November, 2002 through April, 2003)
This phase began upon formation of the TRC and resulted in guidance and endorsement of the preliminary assessment approach. Two public meetings were held during this phase:

- Seattle, WA, NOAA Sand Point Facilities, February 19 – 20, 2002. The TRC reviewed the preliminary approach to the risk assessment and provided guidance and endorsement.
- Vancouver, WA, Red Lion Hotel; April 6 -11, 2003. The Council was presented with the results of the TRC meeting.

<u>Phase V - Assessment Modeling and Review Phase (April, 2003 through June, 2004)</u>
The technical work of developing the risk assessment and having it reviewed was done during this phase which culminated in delivery of final products to the Council at its April and June meetings. The TRC provided in-stream guidance while the risk assessment was being developed. The SSC provided scientific review of the final products. Six public meetings were held during this phase:

- Teleconference on August 4, 2002. Public listening posts in Seattle, WA; Gladstone, OR; Newport, OR; and, Santa Cruz, CA. The TRC reviewed progress and provided guidance to the risk assessment authors.
- Santa Cruz, NMFS, Southwest Fisheries Science Center Laboratory, November, 20-21. TRC reviewed progress and provided guidance to the risk assessment authors.
- Seattle, WA, NOAA Sand Point Facilities, February 23 24, 2004. SSC Groundfish Subcommittee reviewed and endorsed EFH component of the risk assessment.
- Sacramento, CA, Red Lion Hotel, April 4-9, 2004. Council adopted EFH component of the risk assessment as basis for alternative development in the EIS. Additionally, the Council tasked the Groundfish EIS Oversight Committee with holding public meeting(s) to develop alternatives for the EIS.
- Seattle, WA, NOAA Sand Point Facilities, May 24 - 25, 2004. SSC Groundfish Subcommittee reviewed and provided a qualified endorsement of the impacts component of the risk assessment.
- Foster City, CA, June 13 - 18, 2004. Council adopted impacts component of the risk assessment, with caveats described by the SSC, as the basis for alternative development in the EIS.

<u>Phase VI – Validation and Policy Development (June, 2004 through May, 2006)</u>
This phase is marked by separation from the risk assessment phases described above and is focused on development and analysis of alternatives through the EIS and if necessary promulgation of FMP amendment(s) and regulations. Meetings for this phase include:

- Portland OR, Pacific Fishery Management Council, August 16-18, 2004. EIS Oversight Committee developed preliminary alternatives for Council review.
- Place, September, 2004. Council adopts preliminary alternatives for analysis in the EIS.
- Place, Time. TRC reviews results of EFH component of risk assessment for validation develops preliminary research plan.
- Place, November, 2004. Council adopts preliminary preferred alternative for the EIS.

1.4.5 Roles of Key Organizations and Committees

This section provides an overview of the roles played by key organizations and committees who have participated in the development of the draft EIS.

<u>Pacific States Marine Fisheries Commission</u>
The Pacific States Marine Fisheries Commission (PSMFC), through a grant from NOAA, is responsible for production of the risk assessment and EIS. In cooperation with NMFS and the Council, they assembled a team of contractors and partners to implement the decisionmaking framework and phased approach described in the preceding sections.

<u>MRAG Americas</u>

MRAG Americas, under contract to PSMFC, is responsible for analytical components of the risk assessment and EIS specific to EFH and with a primary emphasis on statistical modeling and assessment.

TerraLogic GIS

TerraLogic GIS, under contract to PSMFC, is responsible for analytical components of the risk assessment and EIS specific to EFH with a primary emphasis on GIS data consolidation and analysis.

University of New Hampshire

The University of New Hampshire is a partner of MRAG Americas and has provided senior level consultation and analysis of habitat impacts and recovery.

Ecotrust

Ecotrust, under contract to PSMFC, initially had lead in developing a spatial profile of fishing activity off the west coast.

Oregon Sea Grant

Oregon Sea Grant participated in a project with PSMFC, Pacific Cable Commission, and NMFS to profile a subset of spatial patterns of fishing activity off the west coast based on the experience of fishermen.

Oregon Fishermen's Cable Committee

The Oregon Fishermen's Cable Committee participated in a project with PSMFC, Pacific Cable Commission, and NMFS to profile a subset of spatial patterns of fishing activity off the west coast based on the experience of fishermen.

University of Oregon

The University of Oregon, under contract to PSMFC, provided benthic substrate data for the areas off Oregon and Washington.

Moss Landing Marine Laboratory

The Moss Landing Marine Laboratory, under contract to PSMFC, provided benthic substrate data for the areas off California.

NOAA

- NMFS, Northwest Region is the government organization responsible for NEPA compliance for this action and regulation of the groundfish fishery and has provided project management for the risk assessment and EIS.

- NMFS, Southwest Region is a partner in developing the EIS and has EFH consultation responsibilities on non-fishing activities.

- NMFS' Northwest and Southwest Fisheries Science Centers have provided consultation and analytical services in the development of the risk assessment and EIS.

- The NOS Biogeography Program has provided consultation in the development of the risk assessment.

- The NOAA MPA Center has provided spatial data on status quo habitat protection measures.

Council

The Council is the Regional Fishery Management Council that has stewardship responsibilities for the project area and provided guidance and key decisions throughout the project.

- The full Council is structured to incorporate state, tribal, and federal agencies in addition to representatives from commercial and recreational fishing groups. The Council follows a highly public process that fosters input prior to guidance and final decisions.
- The TRC is a Council committee that was created to guide implementation of the data consolidation and assessment phases of the decisionmaking framework. The committee will also provide for validation of model results and technical review of the range of alternatives in the EIS. The membership of the TRC was chosen to reflect the broad range of expertise necessary to follow the decisionmaking framework and includes geologists, fish ecologists, environmentalists, fishermen, and experts in statistical modeling.
- The SSC is a Council committee that serves as the body responsible for determining the scientific adequacy of any analysis on which Council decisions are based. The SSC held public meetings to review the risk assessment and provided comments and caveats for its application to the Council. The membership of the SSC is chosen to reflect an independent, well-qualified academic committee.
- The EIS Oversight Committee is a Council Committee that was created to respond to the risk assessment and develop alternatives for the EIS. Membership of the committee is structured to incorporate senior representatives of the three coastal states, industry representatives, and environmental representatives including a representative of the plaintiff's in *AOC v. Daley*.
- The GMT, GAP, and HC are Council committees that were created to participate in the development and review of fishery management actions. The committees, in public meetings, have reviewed and commented on the risk assessment and EIS as it has developed. Membership on the committees is diverse and ranges from federal representatives, recreational and commercial fishing representatives, and academics.

Chapter 2 Alternatives

2.1 Introduction

The alternatives in this section are designed to track with the objectives for this EIS described in sub-section 1.2. The objectives are:

- consider alternatives for designation of EFH;
- consider alternatives for designation of HAPC;
- consider alternatives for minimization of adverse effects of fishing on EFH; and,
- address gaps in available data.

The objectives are related but necessarily dependent and will therefore be explored through separate sets of alternatives. Any dependencies among the alternatives will be explored as a function of this EIS in the *Environmental Consequences* section. Structuring the alternatives separately for each objective is beneficial to maintain ease of analysis and provide the public with an easily understood connection between the alternatives and the need for the EIS. The final action(s) that result from this EIS may contain elements from each set of alternatives.

Separate alternatives will be described in this chapter for:

1) EFH designation;
2) HAPC designation;
3) Adaptive management (address data gaps); and,
4) Minimization of adverse impacts.

Alternatives or options within each category are not necessarily exclusive. For instance, the final action(s) that result from this EIS may include designation of more than one HAPC or more than one action to minimize adverse impacts or address data gaps.

Note To Reviewers: New geological information has become available since the substrate data was consolidated and utilized to develop the alternatives described in this section. The new information has not undergone technical review or been used to update the alternatives as of this date. Pending scientific review, the information may be utilized prior to publication of the Draft EIS. For this reason, a map is included in the briefing package that shows areas where new information may be added. Additionally, Table 2-1 at the end of this chapter summarizes those alternatives that are most likely to change as a result of including the new information.

2.2 Alternatives for EFH Designation

The following subsections (i.e. 2.2.1, Background and Identification of Alternatives for Designating EFH through 2.2.3, EFH Designation Alternative Two – HSP Approach) describe the basis for forming the EFH designation alternatives.

2.2.1 Background and Identification of Alternatives for Designating EFH

Requirements for EFH designation are found in the Magnuson-Stevens Act and implementing regulations (50 CFR part 600; subpart J). The regulations in summary, require the agency to undergo a scientific process to determine the location of habitat that is essential for managed species throughout their life history. There are few implications of EFH designation other than the administrative requirements of consultation and to provide geographic focus for development of research and conservation strategies.

2.2.1.1 EFH Designation Alternative 1 (Satus Quo)

The FMP was amended in 1998 to designate EFH and no action would be required to maintain that designation. Alternative One for EFH designation is to maintain the 1998 designation. It groups the various EFH descriptions into seven composites as follows:

1. Estuarine – Those waters, substrates, and associated biological communities within bays and estuaries of the EEZ, from the mean higher high water level (MHHW, which is the high tide line) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in 33 CFR 80.1 (Coast Guard Lines of demarcation).
2. Rocky Shelf – Those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the high tide line MHHW to the shelf break (~200 meters or 109 fathoms).
3. Nonrocky Shelf - Those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the high tide line MHHW to the shelf break (~200 meters or 109 fathoms).
4. Canyon – Those waters, substrates, and associated biological communities living within submarine canyons, including the walls, beds, seafloor, and any outcrops or landslide morphology, such as slump scarps and debris fields.
5. Continental Slope/Basin - Those waters, substrates, and associated biological communities living on or within 20 meters (11 fathoms) overlying the substrates of the continental slope and basin below the shelf break (~200 meters or 109 fathoms) and extending to the westward boundary of the EEZ.
6. Neritic Zone - Those waters, substrates, and associated biological communities living in the water column more than 10 meters (5.5 fathoms) above the continental shelf.

7. Oceanic Zone - Those waters, substrates, and associated biological communities living in the water column more than 20 meters (11 fathoms) above the continental slope and abyssal plain, extending to the westward boundary of the EEZ.

2.2.1.2 EFH Designation Alternative 2

Designate 100% of the area where habitat suitability probability (HSP) is greater than zero for all species and any additional area in depths greater than or equal to 3,500 m (1,914 fm). HSP refers to the probability that an area is suitable habitat for groundfish. The methods for calculating HSP are described in the comprehensive risk assessment. (Area covered: 187,741 sq. miles.)

2.2.1.3 EFH Designation Alternative 3

Designate 100% of the area where HSP is greater than zero for all species. (Area covered: 87,160 sq. miles.)

2.2.1.4 EFH Designation Alternative 4

Designate 100% of the area where HSP is greater than zero for assessed species only. (Area covered: 80,933 sq. miles.)

2.2.1.5 EFH Designation Alternative 5

Designate 100% of the HSP area of overfished species (bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch, yelloweye rockfish, and widow rockfish), upper 90% of the HSP area of precautionary zone species (Dover sole, sablefish, and shortspine thornyhead), and upper 70% of the HSP area for all other groundfish, and all seamounts. (Area covered: 80,507 sq. miles.)

2.2.1.6 EFH Designation Alternative 6

Designate 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. (Area covered: 79,481 sq miles.)

2.2.1.7 EFH Designation Alternative 7

Designate upper 70% of the area where HSP is greater than zero. (Area covered: 78,569 sq. miles.)

2.2.1.8 EFH Designation Alternative 8

Designate upper 30% of the area where HSP is greater than zero for all species. (Area covered: 66,589 sq. miles.)

2.3 Alternatives for HAPC Designation

The following subsections (i.e. 2.3.1, Background and Identification of Alternatives for Designating HAPC through 2.3.10, HAPC Designation Alternative 9 – Seamounts) describe the basis for forming the HAPC designation alternatives.

2.3.1 Background and Identification of Alternatives for Designating HAPC

Designation of HAPC is not a mandatory provision of the Magnuson-Stevens Act; however, Councils are encouraged through the EFH regulations to identify HAPC based on one or more of the following considerations:

1) the importance of the ecological function provided by the habitat;
2) the extent to which the habitat is sensitive to human-induced environmental degradation;
3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and,
4) the rarity of the habitat type (50 CFR 600.815 (a)(8)).

2.3.1.1 HAPC Designation Alternative 1 (Status Quo)

This alternative would maintain the status quo for which there are no HAPC designated within the Pacific Coast EEZ.

2.3.1.2 HAPC Alternative 2

<u>Designate estuaries as HAPC</u>

This alternative would designate, through an FMP amendment, estuary areas off the West Coast as HAPC.

2.3.1.3 HAPC Alternative 3

Designate canopy kelp as HAPC

This alternative would designate, through an FMP amendment, areas off the West Coast where canopy kelp (Macrocystis spp. and Nereocystis sp.) has been documented and mapped.

2.3.1.4 HAPC Alternative 4

Designate sea grass beds as HAPC

This alternative would designate, through an FMP amendment, areas off the West Coast where eelgrass (Zostera spp. and Ruppia sp.) and surfgrass (Phyllospadix spp.) have been documented and mapped.

2.3.1.5 HAPC Alternative 5

Designate core habitat for juvenile and adult overfished and precautionary zone groundfish species as HAPC.

This alternative would designate core areas, defined as the upper 10% HSP, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species.

2.3.1.6 HAPC Alternative 6

Designate nearshore rocky reef areas HAPC

This alternative would designate all rocky reef areas within 3 nm of shore and in depths less than or equal to 35 fm that are in waters outside of 3 nm.

2.3.1.7 HAPC Alternative 7

Designate certain areas of interest as HAPC based on their sensitivity, complexity, and ecological importance

These areas are: the northern portion of the Olympic National Marine Sanctuary, Astoria canyon, Daisy Bank, Heceta Bank, Rogue Canyon, Eel River Canyon, Mendocino Canyon, Gorda Escarpment, Cordell Bank, Monterey Canyon, Monterey Bay, Morro Ridge, Thompson Seamount, President Jackson Seamount, Taney Seamount, Guide Seamount, Pioneer Seamount, Gumdrop Seamount, Davidson Seamount, San Juan Seamount, and the Cowcod Conservation Area(s). Each area of interest is presented as a separate suboption. The Council could choose any combination of these areas as a preferred alternative.

2.3.1.8 HAPC Alternative 8

<u>Designate areas around oil production platforms as HAPC.</u>

This alternative would designate, through an FMP amendment, the areas around existing oil rigs as HAPC.

2.3.1.9 HAPC Alternative 9

<u>Amend the FMP to Include a Streamlined Process for Consideration of HAPC Designation Proposals as New Information Becomes Available</u>

Scientific information that may be relevant to the designation of HAPC is frequently becoming available although unlike stock assessments, the timing of the availability of new information is not predictable. To accommodate the unpredictable timing of such information, the Council chose to consider an alternative that would allow for streamlined consideration of HAPC proposals outside the mandatory 5-year review cycle for the mandatory EFH components of the FMP. For purposes of this document, staff preparing the EIS has outlined a preliminary concept for implementation of this alternative below. Specific amendatory language for the FMP would be developed after public comment is received on the DEIS.

<u>Preliminary Concept for HAPC Designation Alternative 9</u>

1) The streamlined HAPC designation process would be initiated through a formal proposal of a site-specific HAPC made by letter to the Chairman and Executive Director of the Council.
2) Mandatory components of a proposal would be designated through the FMP amendment and may include: (a) geographic coordinates for the delineation of the HAPC proposal; (b) intent of the HAPC proposal in terms of the environmental affects on the habitat therein; (c) regulatory implications of the proposal (i.e. desired changes to regulations governing the groundfish fishery); (d) a preliminary assessment of potential negative social or economic effects; and, (e) a biological justification for the proposed designation.
3) Council/NMFS staff would conduct an initial review of the proposal for compliance with the mandatory components outlined in step 2 above. If the proposal were to be judged non-compliant, a letter that details the proposals failure would be sent to the sponsor of the proposal. If the proposal were determined to be compliant, it would be forwarded to the Council for full consideration as described in the following points.

4) Full Council consideration of HAPC proposals would occur over a 3-meeting process as follows:
    i. (meeting one) The Council would consider the proposal for priorities in the context of other Council business and establish a timeline for consideration. At the appropriate time, the proposal would be sent to the HC and the SSC for merit review.
    ii. (meeting two) The HC and SSC would conduct the merit review and report to the full Council. Based on the merit review, Council staff would be tasked to prepare appropriate legal documentation for potential implementation and the proposal would be forwarded to other advisory bodies for additional review.
    iii. (meeting three) The Council would receive advisory body reports, review legal documentation, and adopt/not adopt an FMP amendment for Secretarial review.

2.4 Alternatives to Minimize Adverse Impacts

The National Academy of Sciences characterizes three variables that directly influence fishing impacts to habitat: gear type, habitat type, and intensity of fishing effort. It follows that gear modification, area closures, and fishing effort reduction are the three management tools that can be utilized to directly reduce adverse impacts to habitat from fishing (NRC 2002). Separate alternatives and options to minimize adverse impacts from fishing are developed in this section that utilize gear modification and area closures. Effort reduction alternatives are being considered by the Council in the Programmatic Bycatch EIS and through an EIS to develop an Individual Quota program for the trawl fisheries. The potential influence these programs may have on the consequences of each alternative however will be fully addressed in the Environmental Consequences section of this document.

2.4.1 Impacts Minimization Alternative 1 (Status Quo)

2.4.2 Impacts Minimization Alternative 2

<u>Depth-based gear restrictions for large footrope trawl gear and fixed gear.</u>

The following subsections (i.e. 2.4.2.1, Background and Identification of Trawl Footrope Restrictions through 2.4.2.3, Trawl Footrope Restriction - Option 2) describe the basis for forming the Trawl Footrope Restriction alternative and options therein.

2.4.2.1 Background and Identification of Trawl Footrope Restrictions

This alternative contains options for prohibiting limited entry and open access trawlers from using large footrope gear that contacts the ocean bottom. The alternative would be instituted through an FMP amendment and implementing regulations. It is based on a recent study by University of Oregon researchers that indicates the potential for trawl gear to be used in areas of rocky habitat is limited by the size of the foot rope (Bellman, 2004).

Types of trawl gear allowable under the groundfish FMP are large footrope, small footrope, and mid-water or pelagic as defined at 50 CFR 660.302 and 660.322(b). Specific restrictions on the use of each are currently defined as a function of annual management and inseason adjustment. Since 2000, the Council and NMFS have implemented (bi)annual prohibitions on the use of large footrope trawls in certain areas with the expressed intent to reduce the mortality of certain rockfish species. Bellman's work suggests the restriction has resulted in removal of trawl effort on rocky habitat in the areas where it has been implemented. Large footrope is defined at 50 CFR 660.x. Rocky habitats that would potentially become inaccessible to trawlers under this alternative are shown in

> Option 1: 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 2: 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 3: Prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 60 fm coastwide.

2.4.3 Impacts Minimization Alternative 3

<u>Control-rule based area closures using habitat sensitivity index values</u>

Area closures are defined for each gear type by the following control rule:

> Option 1: Those areas where the sensitivity index value is greater than or equal to 2, the recovery index value is greater than 1, and cumulative trawl hours are less than 100 hours for the years 2000 through 2002.
>
> Option 2: Those areas where both the sensitivity and recovery index values are greater than or equal to 0.5 and cumulative trawl hours are less than 100 hours for the years 2000 through 2002.
>
> Option 3: The same as Option 1 except no adjustment is made for trawl effort.

Option 4: The same as Option 2 except no adjustment is made for trawl effort.

2.4.4 Impacts Minimization Alternative 4

Restrict the potential for commercial fisheries to expand into areas that are currently unimpacted or have not been fished between 2000 and 2002

Option 1: Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002.

Option 2: Apply the expansion limit to all bottom-tending gear types. Due to the absence of geo-referenced fishing effort data for fixed-gear fisheries, 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.

2.4.5 Impacts Minimization Alternative 5

Prohibit development of the krill fishery

This option is designed to protect the prey field, as a component of pelagic habitat, for species that rely on krill either as a primary prey or through secondary or later food web dependencies. It is a proactive option because there is not currently a krill fishery that operates within the project area.

2.4.6 Impacts Minimization Alternative 6

Close 25% of representative habitat to all fishing

Option 1: Identify 25% of the area of each habitat type identified in the comprehensive risk assessment GIS. (The level in the hierarchical classification system to be used for identification of habitat type, which 25% of each habitat type area to designate, and how to create reasonably contiguous areas remains to be determined.)

Option 2: Identify 25% of the area known to have high densities of benthic structure-forming invertebrates.

2.4.7 Impacts Minimization Alternative 7

Prohibit bottom trawling in “hotspot” areas.

Hotspot areas are determined by identifying the upper 20% HSP area for all species and finding those areas for which this condition is satisfied for 50 or more species (e.g. where habitat is suitable for 50 species or more).

2.4.8 Impacts Minimization Alternative 8

Limit fishing impacts in areas of interest

> Option 1: Prohibit bottom trawling in any or all of the areas of interest identified under HAPC alternative 7 above.
>
> Option 2: Prohibit all bottom-contacting activities in any or all of the areas of interest identified under HAPC alternative 7 above.

2.4.9 Impacts Minimization Alternative 9

Zoning and Triggered Closures

This alternative would limit the use of bottom-tending fishing gear to specified zones where the NMFS determines that such activities can be conducted without altering or destroying a significant amount of habitat.

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 would immediately be closed to certain bottom-tending fishing gear types, depending on the options described below. The remaining area of EFH would remain open to these activities, subject to all other regulations, for the next five years.

Within this five-year period, NMFS will conduct the research necessary to delineate zones within EFH where various types of bottom-tending fishing gear could be used without altering or destroying significant amounts of habitat. Any unavoidable adverse impacts must be expected to be minimal and temporary, based on the best scientific information available. All areas not specifically zoned to permit such activity would be closed to those methods of fishing.

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.

Option 1: This alternative would only apply to bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear.

Option 2: This alternative would apply to all gear with bottom contact, including bottom longlines, traps and pots.

2.4.10 Impacts Minimization Alternative 10

Establish impact-reducing fishing gear requirements

Options below are not mutually exclusive, nor are they entirely inclusive.

Option 1: For bottom trawl gear, prohibit roller gear larger than 15 inches.

Option 2: Require the use of weak links on tickler chains designed to break if the chain snags on hard habitat.

Option 3: Prohibit the use of flat trawl doors (i.e., require cambered doors).

Option 4: Analyze five-year phase in requirement for aluminum trawl doors.

Option 5: Limit longline groundline to 3 nm.

Option 6: Assess potential to employ "habitat-friendly" anchoring systems for fixed gear.

Option 7: Prohibit dredge gear.

Option 8: Prohibit beam-trawl gear.

Option 9: Prohibit set-gillnets in waters deeper than either (a) 30 fm, (b) 60 fm, or (c) 80 fm.

Option 10: Prohibit stick gear, and for hook-and-line gear prohibit weights with hooks on the ocean bottom.

Option 11: Prohibit dingle bar gear (troll groundfish gear).

2.4.11 Impacts Minimization Alternative 11

Nature Conservancy Proposal

Designate a no-trawl zone on the central California coast (Santa Cruz to Point Conception) in cooperation with The Nature Conservancy and tied to a privately funded buyout of eligible fishing permits in the designated no-trawl zone. (Read The Nature Conservancy's project proposal.)

2.4.12 Alternative 12

<u>Allow fish to be harvested by any legal gear without regard to gear endorsements.</u>

2.4.13 Alternative 13

<u>Alternative developed by plaintiffs (Oceana)</u>

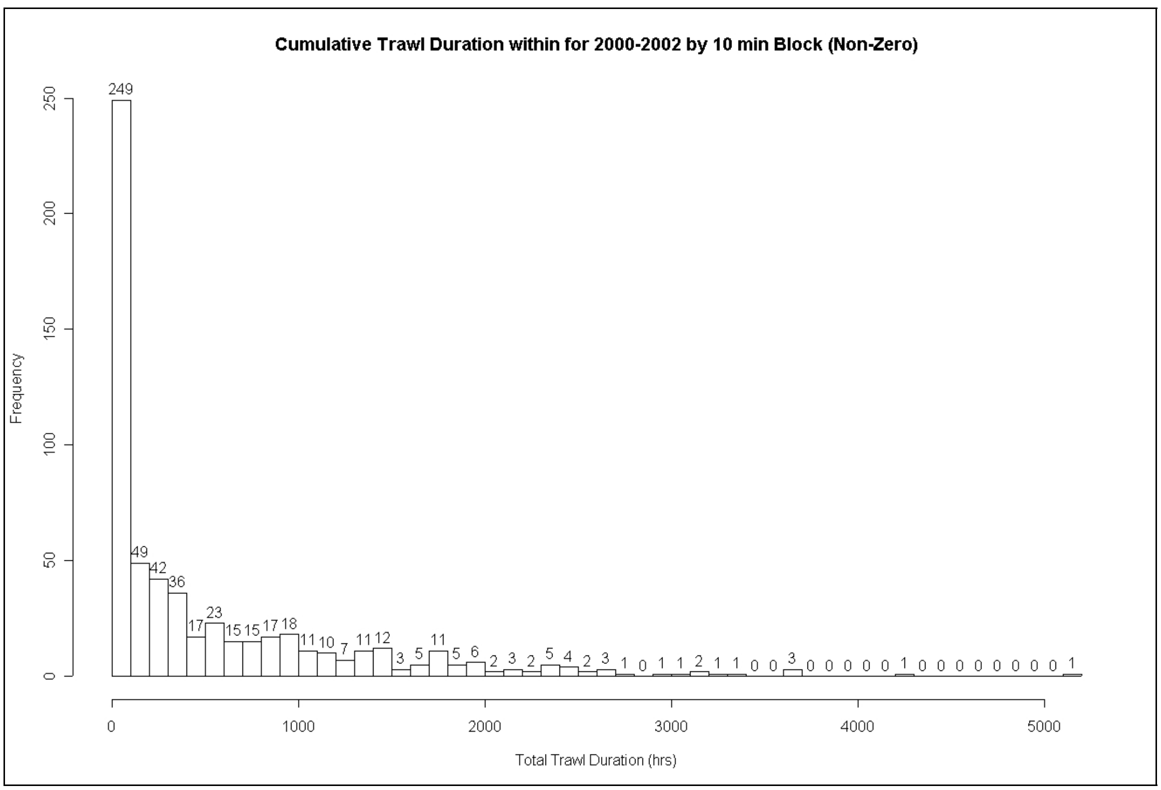

Figure 2-1: Frequency distribution of total trawl duration within 10 minute blocks where effort is greater than zero.

2.5 Alternatives for Research and Monitoring

The following subsections (i.e. 2.5.1 through 2.5.1.4) describe the basis for forming the Adaptive Management alternative and options therein.

2.5.1 Background and Identification of Alternatives for Research and Monitoring

This alternative contains options for improving the scientific basis for EFH conservation and empower the Council, NMFS, and state management agencies to adapt EFH conservations as new science becomes available. The Council is required by regulation to review the EFH provisions of the FMP at least every five years (50 CFR 600.815(a)(10)). This requirement was established by NMFS in the EFH final rule to accommodate progress in our scientific understanding of marine habitat. The five-year review cycle is a mandatory check-point for the Council to consider new science and adapt the FMP appropriately. The risk assessment described in appendix x.x highlights numerous data gaps that prevent definitive identification of adverse impacts. It is impossible to predict future changes in management the Council, NMFS, or its partner organizations may adopt. However, the options describe below are designed to fill the data gaps described in the risk assessment to better inform the Council during the review cycle.

2.5.1.1 Research and Monitoring Alternative 1 (Status Quo)

<u>Continue current research and monitoring programs.</u>

2.5.1.2 Research and Monitoring Alternative 2

<u>Amend the FMP and implementing regulations to require all commercial and charter fishing vessels to participate in the logbook program.</u>

Option 1: Collect haul-by-haul data on all fishing operations of all fishing vessels;

Option 2: Collect haul-by-haul data on all fishing operations of a representative, random sample of all
fishing vessels

2.5.1.3 Research and Monitoring Alternative 3

<u>Amend the FMP and implementing regulations to require all commercial and charter fishing vessels to participate in the Vessel Monitoring System program.</u>

Options: consider thresholds related to vessel length overall.

2.5.1.4 Research and Monitoring Alternative 4

<u>Establish a system of research closures to provide areas for experiments to observe habitat condition in open and closed areas and to monitor in situ changes in various habitat types caused by known amounts of fishing effort by fishing gears currently used.</u>

This alternative would be developed in conjunction with other alternatives that establish open and closed areas.

Table 2-1: Summary of alternatives that are subject to change if new substrate information is incorporated (pending scientific review).

Alternative	Description	Potentially Expanded by Inclusion of New Rocky Areas
EFH Designation Alternatives		
EFH Alt 1 - Status Quo	Status Quo	No
EFH Alt 2		No
EFH Alt 3		No
EFH Alt 4		No
EFH Alt 5		No
EFH Alt 6		No
EFH Alt 7		No
EFH Alt 8		No
HAPC Designation Alternatives		
HAPC 1	Status Quo	No
HAPC 2	Estuaries	No
HAPC 3	Canopy kelp	No
HAPC 4	Seagrass	No
HAPC 5	Overfished/Precautionary Core	Yes
HAPC 6	Nearshore Rocky	No
HAPC 7	Areas of Interest	No
HAPC 8	Oil Rigs	No
Minimize Impacts Alternatives		
Minimize Impacts Alt 1, Status Quo		No
Minimize Impacts Alt 2, Option 1, trawl	Depth Restriction - 200 fm	No
Minimize Impacts Alt 2, Option 1, fixed	Depth Restriction - 100/150 fm	No
Minimize Impacts Alt 2, Option 2, trawl	Depth Restriction - EEZ	No
Minimize Impacts Alt 2, Option 2, fixed	Depth Restriction - 100/150 fm	No
Minimize Impacts Alt 2, Option 3, trawl	Depth Restriction - EEZ	No
Minimize Impacts Alt 2, Option 3, fixed	Depth Restriction - 60 fm	No
Minimize Impacts Alt 3, Option 1	s > 2, r > 1, twlhrs < 100	Yes
Minimize Impacts Alt 3, Option 2	s > 0.5, r > 0.5, twlhrs < 100	Yes
Minimize Impacts Alt 3, Option 3	s > 2, r > 1	Yes
Minimize Impacts Alt 3, Option 5	s >0.5, r > 0.5	Yes
Minimize Impacts Alt 4, Option 1	untrawled 2000-2002	No
Minimize Impacts Alt 4, Option 2	deeper than 2000 m	No
Minimize Impacts Alt 5	prohibit krill fishery	
Minimize Impacts Alt 6, Option 1	25% representative habitat	
Minimize Impacts Alt 6, Option 2	25% representative habitat	
Minimize Impacts Alt 7	hotspot - 20% hsp, >50 spp	No
Minimize Impacts Alt 8, Option 1 or 2	Areas of Interest	No
Minimize Impacts Alt 9, Option 1 or 2	Zoning - deeper than 2000 m	No
Minimize Impacts Alt 10	fishing gear	

Alternative	Description	Potentially Expanded by Inclusion of New Rocky Areas
Minimize Impacts Alt 11	TNC - central Cal	No
Minimize Impacts Alt 12	fishing gear	

Chapter 3 Affected Environment

3.1 Introduction

This section describes current conditions of resources that may potentially be affected by implementation of the alternatives.

3.2 Habitats of importance to Groundfish

3.2.1 Introduction

From a broad perspective, fish habitat is the geographic area where the species occurs at any time during its life. Habitat characteristics comprise a variety of attributes and scales, including physical (geological), biological, and chemical parameters, location, and time. It is the interactions between environmental variables that make up habitat that determine a species' biological niche. These variables include both physical variables such as depth, substrate, temperature range, salinity, dissolved oxygen, and biological variables such as the presence of competitors, predators or facilitators.

Species distributions are affected by characteristics of habitats that include obvious structure or substrate (e.g., reefs, marshes, or kelp beds) and other structures that are less distinct (e.g., turbidity zones, thermoclines, or fronts separating water masses). Fish habitat utilized by a species can change with life history stage, abundance of the species, competition from other species, environmental variability in time and space, and human induced changes. Occupation and use of habitats by fish may change on a wide range of temporal scales: seasonally, inter-annually, inter-decadal (e.g. regime changes), or longer. Habitat not currently used but potentially used in the future should be considered when establishing long-term goals for EFH and species productivity.

Fish species rely on habitat characteristics to support primary ecological functions comprising spawning, breeding, feeding and growth to maturity. Important secondary functions that may form part of one or more of these primary functions include migration and shelter. Most habitats provide only a subset of these functions. The type of habitat available, its attributes, and its functions are important to species productivity and the maintenance of healthy ecosystems.

Not unexpectedly, almost all species in the groundfish FMP associate with the benthos at some stage in their lifecycles. The Life History Appendix gives information on habitat usage by each of the species in the Groundfish FMP, as well as information on fisheries that harvest the species, geographic range, migrations and movements, reproduction, growth and development, and trophic interactions. The Habitat Use Database also contains information on the utilization of west coast habitats by the various life stages of managed species. Based on the data in the HUD, Table 3-2, shows the number of species/life stages of west coast groundfish that are known to

occupy each of the specific habitat categories. The number of species/life stages in each habitat is broken down by the four ecological functions listed in the M-S Act (spawning, breeding, feeding and growth to maturity). The numbers in each category can be large because each species has four life stages and may occupy more than one habitat type, and perform more than one ecological function in that habitat. Additionally, not all ecological functions are shown separately. The “All” column means that all four of the functions are performed by the species/life stages listed as having an association with that habitat. Hence the numbers in the columns for spawning and breeding seem low, but this is because in most cases where fish are performing either of these functions, they are also performing all of the others.
The strength of the species-habitat association is also included in the HUD, measured on a simple three point scale (strong – medium – weak). Table 3-3, Table 3-4, Table 3-5, and Table 3-6 show the data in broken down by these three levels of association, plus unknown.

It should also be noted that the data in these tables should not be regarded as being complete. The state of knowledge regarding the habitat associations of many species is poor. These values should therefore be treated with caution, and at best provide an indication of the relative importance of different habitat types in terms of the numbers of groundfish species and life stages they support. The paucity of knowledge is evidenced by the large number of cases for which the nature of the association between a species/life stage and its habitat is unknown – i.e. there is a record of occurrence, but no information on what ecological function, or activity was occurring.

In addition to assessing species habitat associations, this section will delineate habitat types by their sensitivity to fishing gears and associated recovery times from impact. Sensitivity values are described in Table 3-1. A full description of the derivation of values for sensitiviy and recovery is provided in Appendix 10 to the Comprehensive Risk Assessment. It is important that readers familiarize themselves with the uncertainty surrounding these values as it is characterized in the appendix.

Table 3-1 Sensitivity values for West Coast Habitat Types (see Appendix 10 to the Comprehensive Risk Assessment)

Sensitivity Level	Sensitivity Description
0	No detectable adverse impacts on seabed; i.e. no significant differences between impact and control areas in any metrics.
1	Minor impacts such as shallow furrows on bottom; small differences between impact and control sites, <25% in most measured metrics.
2	Substantial changes such as deep furrows on bottom; differences between impact and control sites 25 to 50% in most metrics measured.
3	Major changes in bottom structure such as re-arranged boulders; large losses of many organisms with differences between impact and control sites >50% in most measured metrics.

3.2.2 Mapping of habitat types

In the first instance, benthic habitat has been characterized for the purposes of the EIS on the basis of the physical substrate. Other important aspects of habitat, such as biogenic structures are also considered to the extent possible (see below). Marine geology experts have developed GIS data delineating bottom-types and physiographic features associated with groundfish habitats. Benthic habitat data for Washington and Oregon were developed by the Active Tectonics and Seafloor Mapping Lab, College of Oceanic and Atmospheric Sciences at Oregon State University (Appendix 2 to the Comprehensive Risk Assessment). Data for California were developed by the Center for Habitat Studies at Moss Landing Marine Laboratories (Appendix 3 to the Comprehensive Risk Assessment). TerraLogic GIS was responsible for merging and cleaning these two data sources to create a seamless west coast coverage. All lithologic and physiographic features were classified according to a deep-water benthic habitat classification system developed by Greene *et al*. (1999). Detailed documentation about the classification system and mapping methods are included in Appendix 3 to the Comprehensive Risk Assessment.

In general, the benthic habitat is classified according to its physical features in several levels of a hierarchical system. The levels, in order, are: megahabitat, seafloor induration, meso/macrohabitat, and modifier(s). For the west coast, the following types have been delineated:

<u>Level 1: Megahabitat:</u>

Continental Rise/Apron;
Basin Floor;
Continental Slope;
Ridge, Bank or Seamount;
Continental Shelf.

<u>Level 2: Seafloor Induration</u>:

Hard substrate;
Soft substrate.

<u>Level 3: Meso/macrohabitat</u>:

Canyon wall;
Canyon floor;
Exposure, bedrock;
Gully;
Gully floor;
Ice-formed feature;
Landslide.

<u>Level 4: Modifier</u>:

Bimodal pavement;
Outwash;
Unconsolidated sediment.

Each unique combination of these four characteristics defines a unique benthic habitat type. For the west coast EFH project, 35 unique benthic habitat types have been delineated. These are plotted for illustrative purposes in Figure 1.

Information on the distribution of biogenic structures and other organisms, which may form an essential, and potentially sensitive, component of habitat is less readily available, but is included to the extent possible at this stage. Biological organisms may play a critical role in determining groundfish habitat use and preference. Structure forming invertebrates, for example, such as sponges, anemones and cold water corals, can be an important and component of fish habitat. An example within the US EEZ is the Oculina Bank on the Atlantic coast of Florida. On the West Coast, however, assessment of the significance of associations between structure forming invertebrates and groundfish species is limited by available literature.

GIS data have been compiled for several essential biological habitat components, specifically canopy kelp, seagrass, and benthic invertebrates. Limited information is available to spatially delineate these biological habitats coastwide. However, because these habitats are so important, the project team felt that incomplete coverage was preferable to leaving these data out of the GIS.

Estuaries are known to be important areas for some groundfish species, such as kelp greenling, starry flounder and cabezon. However, estuarine seafloor types were generally not mapped by the marine geologists during the initial data consolidation phase of the project. They are included as a separate mapped category of their own for inclusion in modeling efforts.

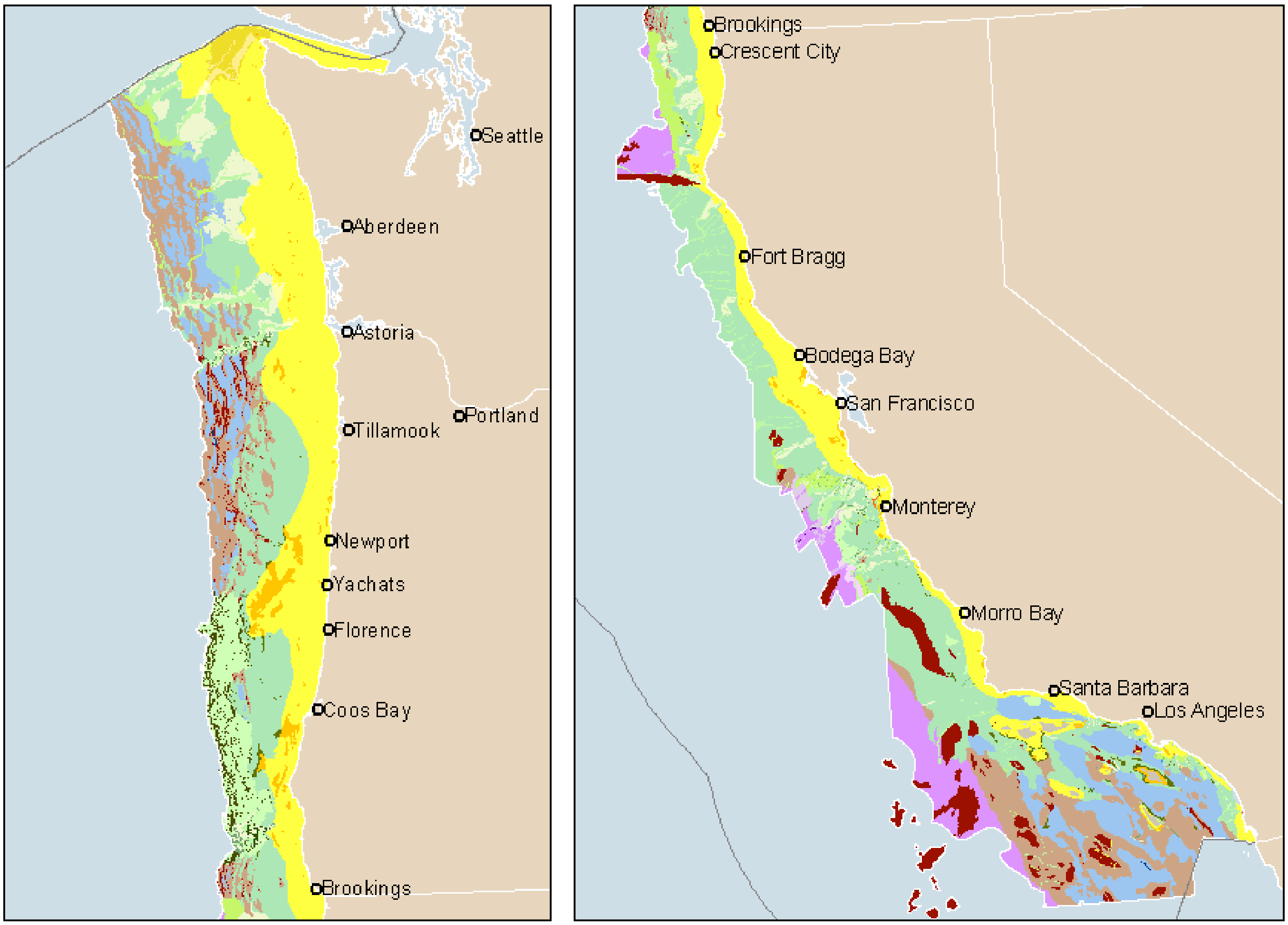

Figure 3-1. Thirty five (35) unique benthic types off the coasts of Washington, Oregon and California. Graphics created by TerraLogic GIS Inc. from data provided by MLML (CA) and OSU (OR, WA).

3.2.3 Nearshore, estuarine and intertidal habitats

3.2.3.1 Estuaries

Estuaries are the bays and inlets influenced by both the ocean and a river and serve as the transitional zone between fresh and salt water (Botkin *et al.* 1995). Estuaries support a community of plants and animals that are adapted to the zone where fresh and salt waters mix (Zedler *et al.* 1992). Estuaries are naturally dynamic and complex, and human actions that degrade or eliminate estuarine conditions have the effect of stabilizing and simplifying this complexity (Williams *et al.* 1996), reducing their ability to function in a manner beneficial to anadromous and marine fish. Habitat degradation and loss adversely affect inshore and riverine ecosystems critical to living marine resources (Chambers 1992). In addition, the cumulative effects of small changes in many estuaries may have a large systematic impact on estuarine and coastal oceanic carrying capacity (Monaco *et al.* 1990).

Estuarine habitats fulfill fish and wildlife needs for reproduction, feeding, refuge, and other physiological necessities (Good 1987; Phillips 1984; Simenstad *et al.* 1991). Coastal fish populations depend upon both the quantity and quality of the available habitat (Peters and Cross. 1992). Almost all marine and intertidal waters, wetlands, swamps and marshes are critical to fish (Fedler and Crookshank 1992). For example, seagrass beds protect young fish from predators, provide habitat for fish and wildlife, improve water quality, and control sediments (Hoss and Thayer 1993; Lockwood 1990; Phillips 1984; Thayer *et al.* 1984) . In addition, seagrass beds are critical to nearshore food web dynamics (Wyllie-Echeverria and Phillips 1994).

Studies have shown seagrass beds to be among the areas of highest primary productivity in the world (Herke and Rogers 1993; Hoss and Thayer 1993). This primary production, combined with other nutrients, provide high rates of secondary production in the form of fish (Emmett *et al.* 1991; Good 1987; Herke and Rogers 1993; Sogard and Able 1991).

Other estuarine habitats such as mud flats, high salt marsh, and saltmarsh creeks also provide productive shallow water habitat for epibenthic fishes and decapods (Sogard and Able 1991). Simenstad, *et al.* (1990) found that coarse sediment tidal flats were productive benthic infauna areas.

Woody debris plays a significant role in salt marsh ecology (Maser and Sedell 1994). Reductions in woody debris input to the estuaries may affect the ecological balance of the estuary. Large woody debris also play a significant role in benthic ocean ecology, where deep-sea wood borers convert the wood to fecal matter, providing terrestrial based carbon to the ocean food chain (Maser and Sedell 1994). Dams and commercial in-river harvest of large woody debris have dwindled the supply of wood, jeopardizing the ecological link between the forest and the sea (Maser and Sedell 1994).

Estuarine zone fisheries are of great economic importance across the nation (Herke and Rogers 1993). Three-fourths of the fish species caught in the United States are supported by estuarine habitats (Hinman 1992). Clams, crabs, oysters, mussels, scallops, and estuarine and nearshore small commercial fishes contributed an average dockside revenue of $389 million nationally from 1990 to 1992 (NMFS 1993). Using NMFS data, Chambers (1992) determined that 75% of all commercial fish and shellfish landings are of estuarine-dependent species. At least 31 groundfish species inhabit estuaries and nearshore kelp forests for part, or all, of their life cycle.

Fox (1992) states: “The ability of habitats to support high productivity levels of marine resources is diminishing, while pressures for their conversion to other uses are continuing.” Point and nonpoint discharges, waste dumps, eutrophication, acid rain, and other human impacts reduce this ability (Fox 1992). Population growth and demands for international business trade along the Pacific Rim exert pressure to expand coastal towns and port facilities, resulting in net estuary losses (Fawcett and Marcus1991; Kagan 1991). Carefoot (1977), discussing Pacific seashores, states “Estuaries are complex systems which can succumb to humankind’s massive and pervasive assaults.” Estuarine, rocky shelf and nonrocky shelf habitats are probably the most susceptible to deleterious impacts from nonfishing activities.

3.2.3.2 Nearshore Biogenic habitats (kelp, seagrass, sponges)

In some cases, the biological component of the habitat is the most important feature that makes the habitat suitable for a particular species/life stage. Certain habitat components known to be important to groundfish (e.g. rockfish) include canopy kelp, seagrass, and benthic invertebrates. Kelp beds (such as *Macrocystis* spp. and *Nereocystis* sp.) have been shown to be important to many groundfish species, including several rockfish species. Seagrasses including eelgrass (Zostera spp., Ruppia sp.) and surfgrass (*Phyllospadix* spp.) are known to be important for many species. 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. Structure forming invertebrates such as sponges and anemones can also be an important and component of fish habitat.

Managed species known to use vegetated bottom habitats in the coastal zone during some portion of their life cycles include black rockfish, black-and-yellow rockfish, brown rockfish, cabezon, copper rockfish, english sole, gopher rockfish, grass rockfish, kelp greenling, leopard shark, lingcod, olive rockfish, quillback rockfish, silvergray rockfish,vermilion rockfish. In addition, juvenile quillback rockfish are know to use sponge habitat for feeding.

The analyses of the sensitivity of habitats to fishing gear impacts and habitat recovery times (see Appendix 10 of the Comprehensive Risk Assessment for details of the analyses and descriptions of sensitivity index values) examined gear impacts on two biogenic habitats in the coastal zone, estuarine macrophyte and estuarine shellfish habitats. The sensitivity of estuarine macrophyte habitat to the effects of dredges was highest among gears with sensitivity scores ranging from 2.8 to 3.0. Sensitivity values are explained in Table 3-1. Based on a scale of 0-3, with 3 being the highest sensitivity, and mean recovery time ranging from 2.6 to 5.5 years. Sensitivity scores for interactions between estuarine macrophyte habitat and bottom trawls ranged from 1.0 to 2.0 with recovery times ranging from 1.5 to 4.5 years. Estuarine macrophyte sensitivities to nets ranged from 0.5 to 1.0 and recovery times ranged from 0.5 to 2.0 years. Sensitivities to pots and traps ranged from 0.0 to 0.5 with recovery ranging from 0.0 to 0.5 years. Sensitivities to hook and line (including bottom longlines) ranged from 0.0 to 0.5 with recovery ranging 0.0 to 0.5 years. Values for dredges and bottom trawls come from the literature, while values for the remaining gears are derived values.

The sensitivity of estuarine shellfish habitat to the effects of dredges ranged from 2.0 to 3.0 with mean recovery times ranging from 2.5 to 5.5 years. Sensitivity values for bottom trawl activities on shellfish habitat ranged from 1.0 to 2.0 with recovery times between 1.5 and 4.5 years. Sensitivities to nets ranged from 0.5 to 1.0 with recovery times from 0.5 to 2.0 years. Sensitivities to pots and traps ranged from 0.0 to 0.5 with recoveries between 0.0 and 0.5 years. Shellfish habitat sensitivities to hook and line gears ranged between 0.0 and 0.5 with recovery times from 0.0 to 0.5 years. Dredge values come from the literature, but all other values are derived.

Non-fishing activities which may negatively impact biogenic habitats in the coastal zone include dredging projects; disposal of dredge and fill material; vessel operations; activities related to navigation; exotic species introductions; installation and removal of pilings; overwater structures; flood control, shoreline protection; water control structures; log transfer and storage; installation of utility lines; cables, and pipelines; commercial use of habitat; point source discharge; disposal of fish processing waste; and water intakes and discharges. See Appendix 14 to the Comprehensive Risk Assessment for detailed discussions regarding different non-fishing effects on fish habitats.

3.2.3.3 Tide pools

Tide pools are depressions along rocky coasts which are covered by the ocean during high tides and left filled with seawater when the tide recedes. They are often inhabited by a variety of attached algae, invertebrates, and small fishes.

Tide pool habitats are known to be utilized by juvenile and adult cabezon, and juvenile canary rockfish, grass rockfish, and black rockfish.

In general, tide pools are not impacted by any fishing activities except direct hand harvest during low tides.

Non-fishing activities which may negatively impact intertidal pool habitats in the coastal zone are the same as those listed above for biogenic habitats (Section 3.2.2.1).

3.2.3.4 Nearshore Unconsolidated bottom (silt, mud, sand, gravel or mixed)

Unconsolidated bottom habitats are composed of smaller particles (i.e. gravel, sand, mud, silt, and various mixtures of these particles) and contain little to no vegetative growth due to the lack of stable surfaces for attachment. Benthic fauna often consist of infaunal organisms. Compared with unconsolidated bottom in deeper waters, the shallower habitats are subject to greater amounts of natural and anthropogenic disturbance.

Coastal unconsolidated bottom habitats are utilized by a number of managed fish species which include big skate, butter sole, cabezon, calico rockfish, California scorpionfish, California skate, Dover sole, english sole, flathead sole, gopher rockfish, leopard shark, lingcod, Pacific cod, Pacific sanddab, petrale sole, quillback rockfish, rex sole, rock sole, sand sole, soupfin shark, spiny dogfish, spotted ratfish and starry flounder.

The analyses of the habitat sensitivity to fishing gear impacts and habitat recovery times examined gear impacts on estuarine soft bottom habitat. The range of sensitivity scores for dredge impacts on estuarine soft bottom was 1.0 to 1.6 with recovery times between 0.2 and 0.6 years. For bottom trawl impacts, sensitivity scores ranged from 0.5 to 1.0 with recovery times from 0.1 to 0.3 years. Sensitivities to nets ranged from 0.0 to 0.5 with recovery ranging from 0.0 to 0.5 years. Soft bottom sensitivities to pots and traps ranged from 0.0 to 0.5 with recovery times between 0.0 and 0.5 years. Sensitivities to hook and line gears (includes bottom longlines) ranged from 0.0 to 0.5 and recovery times ranged from 0.0 to 0.5 years. Values for dredges and bottom trawls come from the literature, while values for the remaining gears are derived values.

Non-fishing activities which may negatively impact unconsolidated bottom habitats in the coastal zone are the same as those listed above for biogenic habitats (Section 3.2.2.1).

3.2.3.5 Nearshore Hard bottom

Hard bottom habitats in the coastal zone may be composed of bedrock, boulders, cobble, or gravel/cobble. Hard substrates are one of the least abundant benthic habitats, yet they are among the among the most important habitats for fishes. Typical shallow water hard bottom fishes include rockfish (e.g. *Sebastes* spp.), lingcod, and sculpins (MMS 2002).

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.

The analyses of the habitat sensitivity to fishing gear impacts and habitat recovery times examined gear impacts on estuarine hard bottom habitats. The sensitivity of hard bottom habitats to dredge gear ranged from 1.5 to 2.5 with recovery times between 1.5 and 2.5 years. The sensitivity of estuarine hard bottom to bottom trawls ranged from 1.0 to 2.0 with recovery times from 1.0 to 2.0 years. Sensitivities to nets ranged from 0.5 to 1.0 with recovery times ranging from 0.5 to 1.0 years. Sensitivities to pots and traps ranged from 0.0 to 0.5 and recovery times ranged from 0.0 to 0.5 years. Sensitivities to hook and line gears ranged from 0.0 to 0.5 and recovery times ranged from 0.0 to 0.5 years. Values for all gears are derived values.

Non-fishing activities which may negatively impact unconsolidated bottom habitats in the coastal zone are the same as those listed above for biogenic habitats (Section 3.2.2.1).

3.2.3.6 Nearshore Artificial structures

Artificial structures in the coastal zone consist of artificial reefs and piers as defined in the Habitat Use Database. Artificial reefs consist of items such as sunken vessels and other man-made objects which mimic reefs and hard substrates.

Managed species known to use coastal artificial structures include black rockfish, bocaccio, brown rockfish, copper rockfish vermilion rockfish, and leopard shark.

Non-fishing activities which may negatively impact artificial structure habitats in the coastal zone are the same as those listed above for coastal biogenic habitats (Section 3.2.2.1).

3.2.3.7 Nearshore Water column

There are a number of species and life stages in the Groundfish FMP that occur in the water column, but do not have any association with benthic substrate. In the Habitat Use Database, species inhabiting the coastal epipelagic zone in open water or in association with macrophyte canopies or drift algae fall under this category.

Managed species known to use water column (epipelagic) habitat in the coastal zone include black rockfish, brown rockfish, cabezon, copper rockfish, Dover sole, english sole, flathead sole, gopher rockfish, grass rockfish, kelp greenling, lingcod, olive rockfish, Pacific cod, Pacific hake, Pacific sanddab, petrale sole, quillback rockfish, redstripe rockfish, rock sole, sand sole, silvergray rockfish, soupfin shark, spiny dogfish, and starry flounder. These are primarily the egg, larval , and juvenile stages of these species.

There is no separate analysis of the habitat sensitivity or habitat recovery times in relation to fishing gear effects on the water column. It is generally accepted that the physical impacts of fishing gears on water column habitat are minimal and temporary. Non-fishing activities which may negatively impact water column habitats in the coastal zone are generally the same as those listed above for biogenic habitats (Section 3.2.2.1).

3.2.4 Offshore habitats (shelf and slope)

3.2.4.1 Offshore Biogenic habitats (corals, sponges etc.)

Offshore biogenic habitats may include cold water corals, algal beds, macrophytes, rooted vascular plants, basketstars, brittlestars, demosponges, gooseneck barnacles, sea anemones, sea lilies, sea urchins. sea whips, tube worms, vase sponges, and other sponges. A sizeable number of managed species use these offshore habitats during all or part of their life cycle.

Of the habitats associated with the rocky shelf habitat composite, kelp forests are of primary importance. Lush kelp forest communities (e.g., giant kelp, bull kelp, elk kelp, and feather boa kelp) are found relatively close to shore along the open coast. These subtidal communities provide vertically-structured habitat through the water column on the rocky shelf, made up of a canopy of tangled stipes from the water line to a depth of up to 10 meters, a mid-kelp, water-column region and the bottom, holdfast region. The stands provide nurseries, feeding grounds and/or shelter to a variety of groundfish species and their prey (Ebeling *et al.* 1980; Feder *et al.* 1974). Giant kelp communities are highly productive; relative to other habitats including wetlands, shallow and deep sand bottoms and rock bottom artificial reefs, kelp habitats are substantially more productive in the fish communities they support (Bond *et al.*, 1998). Their net primary production is an important component to the energy flow within food webs. Foster and Schiel (Foster and Schiel 1985) reported that the net primary productivity of kelp beds may be the highest of any marine community. The net primary production of seaweeds in a kelp forest is available to consumers in three forms: living tissue on attached plants; drift in the form of whole plants or detached pieces; and, dissolved organic matter exuded by attached and drifting plants (Foster and Schiel 1985).

Many managed species are known to use biogenic habitats in the offshore zone. Species utilizing vegetated bottom as biogenic habitat include black rockfish, black-and-yellow rockfish, blue rockfish, bocaccio, brown rockfish, cabezon, California scorpionfish, canary rockfish, chilipepper, China rockfish, copper rockfish, dusky rockfish, gopher rockfish, grass rockfish, kelp greenling, kelp rockfish, leopard shark, lingcod, olive rockfish, Pacific sanddab, shortbelly rockfish, speckled rockfish, splitnose rockfish, stripetail rockfish, vermilion rockfish, widow rockfish, and yellowtail rockfish.

Managed fish species 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.

The analyses of habitat sensitivity to fishing gears and habitat recovery times were applied to a number of biogenic habitat types in the offshore zone. See Appendix 10 to the Comprehensive Risk Assessment for a discussion of the derivation of these values.

The sensitivity of shelf macrophyte habitats to fishing gears and habitat recovery time ranges were as follows: dredges (1.4-3.0, 2.0-6.0 years); bottom trawls (1.0-3.0, 1.5-4.5 years); nets (0.5-2.5, 0.5-2.5 years); pots and traps (0.3-1.3, 0.3-1.3 years); hook and line (0.3-1.3, 0.3-1.3 years).

Shelf shellfish habitat sensitivity index and recovery time ranges were as follows: dredges (1.4-3.0, 2.0-6.0 years); bottom trawls (1.4-2.2, 1.0-3.0 years); nets (0.9-1.8, 0.5-1.5 years); pots and traps (0.4-1.2, 0.0-0.2 years); hook and line (0.2-1.0, 0.2-1.0 years).

Sensitivity index values and recovery times for shelf sponge habitat ranged from: dredge (2.0-3.0, 2.0-3.0 years); bottom trawl (2.0-2.4, 1.0-1.6 years); nets (0.9-1.8, 0.5-1.5 years); pots and traps (0.4-1.2, 0.4-1.2 years); hook and line (0.2-1.0, 0.2-1.0 years).

Sensitivity index values and recovery times for slope sponge habitat ranged from: dredge (2.5-3.0, 3.5-10.5 years); bottom trawls (2.5-3.0, 3.5-10.5 years); nets (1.0-2.0, 2.0-8.0 years); pots and traps (0.5-1.0, 0.0-3.0 years); hook and line (0.5-1.0, 0.0-3.0 years).

Shelf coral habitat sensitivity and recovery times ranged from: dredge (2.0-3.0, 2.0-3.0 years); bottom trawls (2.0-3.0, 1.0-1.6 years); nets (0.5-2.5, 0.5-1.5 years); pots and traps (0.3-1.3, 0.4-1.2 years); hook and line (0.3-1.3, 0.2-1.0 years).

Slope coral habitat sensitivity and recovery times ranged from: dredge (2.5-3.0, 3.5-10.5 years); bottom trawls (2.5-3.0, 3.5-10.5 years); nets (1.0-2.0, 2.0-8.0 years); pots and traps (0.5-1.0, 0.0-3.0 years); hook and line (0.5-1.0, 0.0-3.0 years).

Sensitivity index values and recovery times for ridge biogenic habitat ranged from: dredge (2.0-3.0, 2.0-3.0 years); bottom trawls (2.0-3.0, 2.0-3.0 years); nets (0.5-2.5, 0.5-2.5 years); pots and traps (0.3-1.3, 0.3-1.3 years); hook and line (0.3-1.3, 0.3-1.3 years).

Sensitivity index values and recovery times for basin biogenic habitat ranged from: dredge (2.0-3.0, 3.5-10.5 years); bottom trawls (2.0-3.0, 3.5-10.5 years); nets (0.5-2.5, 2.0-8.0 years); pots and traps (0.3-1.3, 0.0-3.0 years); hook and line (0.3-1.3, 0.0-3.0 years).

Sensitivity index values and recovery times for continental rise biogenic habitat ranged from: dredge (2.0-3.0, 3.5-10.5 years); bottom trawls (2.0-3.0, 3.5-10.5 years); nets (0.5-2.5, 2.0-8.0 years); pots and traps (0.3-1.3, 0.0-3.0 years); hook and line (0.3-1.3, 0.0-3.0 years).

Non-fishing activities which may negatively impact biogenic habitats in the offshore zone include vessel operations, installation of utility lines; cables, and pipelines; commercial use of habitat; disposal of fish processing waste (vessel operations); oil and gas exploration/development/production; and marine mining. See Appendix 14 to the Comprehensive Risk Assessment for detailed discussions regarding different non-fishing effects on fish habitats.

3.2.4.2 Offshore Unconsolidated bottom (silt, mud, sand, gravel or mixed)

Offshore unconsolidated bottom habitats are composed of smaller particles (i.e. gravel, sand, mud, silt, and various mixtures of these particles) and contain little to no vegetative growth due to the lack of stable surfaces for attachment. Benthic fauna often consist of infaunal organisms. Because unconsolidated bottom habitats in offshore waters are subject to lower levels of natural and anthropogenic disturbance than their inshore counterparts, they generally take longer to recover when they are disturbed.

Fish species commonly occurring over soft bottom benthos include skates and rays, smelts, surfperches, and flatfishes; however, other species may predominate in certain areas (e.g., white croaker, hagfish, ratfish (MMS 2002). In the Southern California Bight, about 40 % of the fish species and 50% of the families occur in soft-bottom areas of the open coast (Cross and Allen 1993).

A large number of managed groundfish species utilize offshore unconsolidated bottom habitat during at least part of their life cycle including arrowtooth flounder, aurora rockfish, bank rockfish, big skate, blackgill rockfish, bocaccio, butter sole, calico rockfish, California scorpionfish, California skate, chilipepper, cowcod, curlfin sole, darkblotched rockfish, Dover sole, english sole, flathead sole, gopher rockfish, greenspotted rockfish, greenstriped rockfish, honeycomb rockfish, leopard shark, lingcod, longnose skate, longspine thornyhead, Pacific cod, Pacific ocean perch, Pacific rattail (grenadier), Pacific sanddab, petrale sole, pink rockfish, quillback rockfish, redbanded rockfish, rex sole, rock sole, rosethorn rockfish, rougheye rockfish, sablefish, sand sole, sharpchin rockfish, shortbelly rockfish, shortraker rockfish, shortspine thornyhead, soupfin shark, speckled rockfish, spiny dogfish, splitnose rockfish, spotted ratfish, starry flounder, stripetail rockfish, vermilion rockfish, widow rockfish, yelloweye rockfish, and yellowtail rockfish.

Habitat sensitivity to fishing gears and habitat recovery times were examined for various types of unconsolidated bottom habitats in the offshore zone. See Appendix 10 to the Comprehensive Risk Assessment for a discussion of the derivation of these values.
Sensitivity index values and recovery times for shelf soft habitat ranged from: dredge (0.9-1.1, 0.3-0.7 years); bottom trawls (0.5-1.0, 0.2-0.6 years); nets (0.5-1.0, 0.1-0.5 years); pots and traps (0.0-0.5, 0.0-0.5 years); hook and line (0.0-0.2, 0.0-0.2 years).

The range of sensitivity index values and recovery times for shelf soft (canyon floor); shelf soft (canyon wall); shelf soft (gully); shelf soft (gully floor); and shelf soft (ice-formed feature) habitats were all identical and ranged from: dredge (0.9-1.1, 0.3-0.7 years); bottom trawls (0.5-

1.0, 0.2-0.6 years); nets (0.2-0.8, 0.1-0.5 years); pots and traps (0.0-0.5, 0.0-0.5 years); hook and line (0.0-0.2, 0.0-0.2 years).

Sensitivity index values and recovery times for ridge soft habitat ranged from: dredge (0.9-1.1, 0.9-1.1 years); bottom trawls (0.5-1.0, 0.5-1.0 years); nets (0.8-1.6, 0.8-1.6 years); pots and traps (0.0-0.6, 0.0-0.6 years); hook and line (0.0-0.6, 0.0-0.6 years).

Sensitivity index values and recovery times for slope soft habitat ranged from: dredge (1.0-2.0, 1.0-2.0 years); bottom trawls (0.5-1.5, 1.0-2.0 years); nets (0.5-1.0, 0.5-1.0 years); pots and traps (0.2-0.6, 0.2-0.6 years); hook and line (0.2-0.6, 0.2-0.6 years).

The range of sensitivity index values and recovery times for slope soft (canyon floor); slope soft (canyon wall); slope soft (gully); slope soft (gully floor); slope soft (landslide); basin soft; basin soft (canyon floor); basin soft (canyon wall); basin soft (gully); and basin soft (gully floor) habitats were all identical and ranged from: dredge (1.0-2.0, 1.0-2.0 years); bottom trawls (0.5-1.5, 1.0-2.0 years); nets (0.3-1.0, 0.5-1.0 years); pots and traps (0.2-0.6, 0.2-0.6 years); hook and line (0.1-0.3, 0.2-0.6 years).

The range of sensitivity index values and recovery times for continental rise soft; continental rise soft (canyon floor); continental rise soft (canyon wall); continental rise soft (gully); and continental rise soft (landslide) habitats were all identical and ranged from: dredge (1.0-2.0, 1.0-2.0 years); bottom trawls (0.5-1.5, 0.5-1.5 years); nets (0.3-1.0, 0.3-1.0 years); pots and traps (0.2-0.6, 0.2-0.6 years); hook and line (0.1-0.3, 0.1-0.3 years).

Non-fishing activities which may negatively impact unconsolidated bottom habitats in the offshore zone are the same as those listed above for offshore biogenic habitats (Section 3.2.3.1).

3.2.4.3 Offshore Hard bottom

Hard bottom habitats in the offshore zone may be composed of bedrock, boulders, cobble, or gravel/cobble. 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 gropundfish 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 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.

Analyses of habitat sensitivity and recovery times were conducted for various hard bottom habitat types in the offshore zone. See Appendix 10 to the Comprehensive Risk Assessment for a discussion of the derivation of these values.

The range of sensitivity index values and recovery times for shelf hard (canyon wall) and shelf hard (ice-formed feature) habitats were identical and ranged from: dredge (1.3-2.1, 1.0-3.0 years); bottom trawls (2.0-3.0, 1.0-2.0 years); nets (0.8-1.6, 0.5-1.5 years); pots and traps (0.0-0.6, 0.0-0.5 years); hook and line (0.0-0.6, 0.0-0.5 years).

Sensitivity index values and recovery times for shelf hard (exposure) habitat ranged from: dredge (1.3-2.1, 1.0-3.0 years); bottom trawls (2.0-3.0, 1.0-2.0 years); nets (0.8-1.6, 0.5-1.5 years); pots and traps (0.0-0.6, 0.0-0.1 years); hook and line (0.0-0.6, 0.0-0.5 years).

The range of sensitivity index values and recovery times for slope hard (canyon wall), slope hard (canyon floor), slope hard (exposure), slope hard (gully), slope hard (landslide), continental rise hard (canyon wall), and continental rise hard (exposure) habitats were all identical and ranged from: dredge (2.5-3.0, 2.5-3.0 years); bottom trawls (2.5-3.0, 2.5-3.0 years); nets (1.0-2.0, 1.0-2.0 years); pots and traps (0.5-1.0, 0.5-1.0 years); hook and line (0.5-1.0, 0.5-1.0 years).

Sensitivity index values and recovery times for basin hard (exposure) habitat ranged from: dredge (1.0-2.0, 2.5-3.0 years); bottom trawls (0.5-1.5, 2.5-3.0 years); nets (0.3-1.0, 1.0-2.0 years); pots and traps (0.2-0.6, 0.5-1.0 years); hook and line (0.1-0.3, 0.5-1.0 years).

Non-fishing activities which may negatively impact unconsolidated bottom habitats in the offshore zone are the same as those listed above for offshore biogenic habitats (Section 3.2.3.1).

3.2.4.4 Offshore Artificial structures

Artificial structures in the offshore zone consist of artificial reefs and oil and gas platforms as defined in the Habitat Use Database. 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.

Non-fishing activities which may negatively impact artificial structure habitats in the offshore zone are the same as those listed above for offshore biogenic habitats (Section 3.2.3.1).

3.2.4.5 Offshore Water column

There are a number of species and life stages in the Groundfish FMP that occur in the water column, but do not have any association with benthic substrate. In the Habitat Use Database, species inhabiting the offshore epipelagic zone in open water or in association with fronts, current systems, macrophyte canopies, or drift algae fall under this category. Another set of species/life stages of managed groundfishes utilizes the mesopelagic zone.

Managed species known to use epipelagic offshore water column habitat include arrowtooth flounder, aurora rockfish, bank rockfish, black rockfish, back-and-yellow rockfish, blackgill rockfish, blue rockfish, bocaccio, brown rockfish, butter sole, cabezon, calico rockfish, California scorpionfish, canary rockfish, chilipepper, China rockfish, copper rockfish, cowcod, curlfin sole, darkblotched rockfish, Dover sole, dusky rockfish, english sole, flag rockfish, flathead sole, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, harlequin rockfish, kelp greenling, kelp rockfish, leopard shark, lingcod, longspine thornyhead, Mexican rockfish, olive rockfish, Pacific cod, Pacific hake, Pacific ocean perch, Pacific rattail (grenadier), Pacific sanddab, petrale sole, quillback rockfish, redstripe rockfish, rex sole, rock sole, rosethorn rockfish, rosy rockfish, rougheye rockfish, sablefish, sand sole, sharpchin rockfish, shortbelly rockfish, shortraker rockfish, shortspine thornyhead, silvergray rockfish, soupfin shark, speckled rockfish, spiny dogfish, splitnose rockfish, squarespot rockfish, starry flounder, starry rockfish, stripetail rockfish, tiger rockfish, treefish, vermilion rockfish, widow rockfish, yelloweye rockfish, yellowmouth rockfish, and yellowtail rockfish. Many of these are the egg, larval and juvenile stages of these species.

Managed species known to use mesopelagic offshore water column habitat include arrowtooth flounder, aurora rockfish, bank rockfish, blackgill rockfish, blue rockfish, canary rockfish, chilipepper, cowcod, darkblotched rockfish, greenstriped rockfish, longspine thornyhead, Pacific cod, Pacific hake, Pacific ocean perch, Pacific rattail (grenadier), redstripe rockfish, rougheye rockfish, sablefish, sharpchin rockfish, shortbelly rockfish, shortspine thornyhead, silvergray rockfish, speckled rockfish, spiny dogfish, splitnose rockfish, stripetail rockfish, tiger rockfish, widow rockfish, and yellowtail rockfish.

There are no analyses of the habitat sensitivity or habitat recovery times in relation to fishing gear effects since it is generally accepted that the impacts of fishing gears on water column habitat are minimal and temporary. Non-fishing activities which may negatively impact water column habitats in the offshore zone are generally the same as those listed above for offshore biogenic habitats (Section 3.2.3.1).

3.2.5 Ecosystem engineer species

Some of the habitat-associated organisms discussed in this document may be considered ecosystem engineers. These are species which create more complex habitats 1) via their own morphological structures or 2) through behavioral actions which alter existing habitats (Coleman and Williams 2002). In the first group are species such as corals, kelps, and seagrasses whose own structure creates complex habitat for fishes and invertebrates (e.g. mineralized reefs, or vegetative canopies). A number of Federally managed and non-Federally managed fish and invertebrate species conduct activities which physically modify the habitats they occupy. These actions primarily involve excavations of substrate (such as those conducted by tilefish in the Gulf of Mexico to create burrows), but also include the less noticable modifications of bottom habitats by invertebrate infauna (e.g. marine worms, crabs).

The importance of these ecosystem engineers, in terms of the maintenance of community structure, function and diversity has begun to be recognized, as well as the potential consequences to an ecosystem if engineer species are removed by fishing activities (Coleman and Williams 2002). As an example, in the Gulf of Mexico, the most obvious examples of ecosystem engineers exploited by fishing activities would be tilefishes and epinepheline groupers (e.g. yellowedge grouper) which inhabit and modify shelf edge and slope biotopes. Their excavation activities produce complex habitats which are utilized by other fish species and invertebrates. Burrowing activities also affect biogeochemical cycling and the decomposition of organic matter in the substrate (Coleman and Williams 2002). In addition, because some "ecosystem engineer" fishes take a relatively long time to reach maturity, they do not recover quickly once they have been overexploited (Coleman and Williams 2002). As they are top-level predators their removal may cause additional problems such as trophic cascades and fishing down the food web (Sala *et al.* 1998, Pauly *et al.* 1998, Steneck 1998). Because of the importance of ecosystem engineers, they may be good candidates to be indicator species of ecosystem health in the future.

3.3 Groundfish Fishery Resources

3.3.1 Management Framework in Relation to Stock Status

The Council process for setting groundfish harvest levels and other specifications depends on periodic assessments of the status of groundfish stocks, rebuilding analyses of those stocks that are overfished and managed under rebuilding constraints, and a report from an established assessment review body or a STAR Panel. As appropriate, the SSC recommends the best available science for groundfish management decision making in the Council process. The SSC reviews new assessments, rebuilding analyses, and STAR Panel reports and recommends the data and analyses that should be used to set groundfish harvest levels and other specifications for the following biennial management period.

NMFS is currently planning the next round of stock assessments for completion and review in 2005 for use in developing management measures and harvest specifications for the 2007-2008 biennial management cycle. Rebuilding plans and stock assessments for overfished species are subject to review every two years. The list of species planned for updated assessments contains over 20 species. NMFS will also hold a series of workshops in 2004 focusing on data needs and available data sources for the ambitious list of stock assessments being considered for 2005. Additionally, the SSC is currently working on standards for the required review of rebuilding analyses. These reviews are required every two years for species under rebuilding plans.

3.3.2 Non-overfished groundfish species

The following Groundfish FMP species are not presently considered overfished by the Council, although most of these species have not been fully assessed because they are not target species and/or caught in large amounts.

Leopard Shark (*Triakis semifasciata*)
Soupfin Shark (*Galeorhinus zyopterus*)
Spiny Dogfish (*Squalus acanthias*)
Big Skate (*Raja binoculata*)
California Skate (*Raja inornata*)
Longnose Skate (*Raja rhina*)
Ratfish (*Hydrolagus colliei*)
Finescale Codling (*Antimora microlepis*)
Pacific Rattail (*Coryphaenoides acrolepis*)
Cabezon (*Scorpaenichthys marmoratus*)
Kelp Greenling (*Hexagrammos decagrammus*)
Pacific Cod (*Gadus macrocephalus*)
Pacific Whiting (Pacific Hake) (*Merluccius productus*)
Aurora Rockfish (*Sebastes aurora*)
Bank Rockfish (*Sebastes rufus*)
Black Rockfish (*Sebastes melanops*)
Black-and-Yellow Rockfish (*Sebastes chrysomelas*)
Blackgill Rockfish (*Sebastes melanostomus*)
Blue Rockfish (*Sebastes mystinus*)
Bronzespotted Rockfish (*Sebastes gilli*)
Brown Rockfish (*Sebastes auriculatus*)
Calico Rockfish (*Sebastes dalli*)
California Scorpionfish (*Scorpaena guttata*)
Chilipepper (*Sebastes goodei*)
China Rockfish (*Sebastes nebulosus*)
Copper Rockfish (*Sebastes caurinus*)
Dusky Rockfish (*Sebastes ciliatus*)
Flag Rockfish (*Sebastes rubrivinctus*)
Gopher Rockfish (*Sebastes carnatus*)
Grass Rockfish (*Sebastes rastrelliger*)
Greenblotched Rockfish (*Sebastes rosenblatti*)
Greenspotted Rockfish (*Sebastes chlorostictus*)
Greenstriped Rockfish (*Sebastes elongatus*)

Harlequin Rockfish (*Sebastes variegatus*)
Honeycomb Rockfish (*Sebastes umbrosus*)
Kelp Rockfish (*Sebastes atrovirens*)
Longspine Thornyhead (*Sebastolobus altivelis*)
Mexican Rockfish (*Sebastes macdonaldi*)
Olive Rockfish (*Sebastes serranoides*)
Pink Rockfish (*Sebastes eos*)
Quillback Rockfish (*Sebastes maliger*)
Redbanded Rockfish (*Sebastes babcocki*)
Redstripe Rockfish (*Sebastes proriger*)
Rosethorn Rockfish (*Sebastes helvomaculatus*)
Rosy Rockfish (*Sebastes rosaceus*)
Rougheye Rockfish (*Sebastes aleutianus*)
Sharpchin Rockfish (*Sebastes zacentrus*)
Shortbelly Rockfish (*Sebastes jordani*)
Shortraker Rockfish (*Sebastes borealis*)
Silvergray Rockfish (*Sebastes brevispinis*)
Speckled Rockfish (*Sebastes ovalis*)
Splitnose Rockfish (*Sebastes diploproa*)
Squarespot Rockfish (*Sebastes hopkinsi*)
Starry Rockfish (*Sebastes constellatus*)
Stripetail Rockfish (*Sebastes saxicola*)
Tiger Rockfish (*Sebastes nigrocinctus*)
Treefish (*Sebastes serriceps*)
Vermilion Rockfish (*Sebastes miniatus*)
Yellowmouth Rockfish (*Sebastes reedi*)
Yellowtail Rockfish (*Sebastes flavidus*)
Arrowtooth Flounder (*Atheresthes stomias*)
Butter Sole (*Pleuronectes isolepis*)
Curlfin Sole (*Pleuronichthys decurrens*)
English Sole (*Pleuronectes vetulus*)
Flathead Sole (*Hippoglossoides elassodon*)
Pacific Sanddab (*Citharichthys sordidus*)
Petrale Sole (*Eopsetta jordani*)
Rex Sole (*Errex zachirus*)
Rock Sole (*Lepidopsetta bilineata*)
Sand Sole (*Psettichthys melanostictus*)
Starry Flounder (*Platichthys stellatus*)

For each of these species, detailed information can be found in the Life History Appendix to the FMP regarding habitat utilization patterns, fisheries which harvest the species, geographic range, migrations and movements, reproduction, growth and development, and trophic interactions. The Habitat Use Database also contains information on the utilization of west coast habitats and other life history characteristics of the various life stages of the managed groundfish species listed above.

3.3.3 Overfished groundfish species

Eight species of West Coast groundfish have been declared overfished by the National Marine Fisheries Service (NMFS). They include:

Cowcod (*Sebastes levis*)
Canary Rockfish (*Sebastes pinniger*)
Darkblotched Rockfish (*Sebastes crameri*)
Pacific Ocean Perch (*Sebastes alutus*)
Lingcod (*Ophiodon elongatus*)
Bocaccio (*Sebastes paucispinis*)
Widow Rockfish (*Sebastes entomelas*)
Yelloweye Rockfish (*Sebastes ruberrimus*)

Rockfish are long-lived, late maturing, and slow-growing species. These traits make them particularly vulnerable to overfishing.

Pacific whiting was declared overfished in 2002. However, following Council review and approval of the latest Pacific whiting stock assessment in March 2004, NMFS announced that whiting is estimated to be above the target rebuilding biomass and will no longer be considered overfished.

“Overfishing” and “overfished” are defined in the Pacific Coast Groundfish FMP for each species or species complex. According to the FMP’s definition, a stock (or fish population) is overfished when its spawning stock abundance declines to 25% of its estimated “virgin biomass” (the spawning population size if the stock had never been fished; biomass is the weight of a population of fish). Once a stock is declared overfished, measures must be taken to rebuild stock abundance to a level that supports maximum sustained yield (MSY). For most west coast groundfish stocks, that level is defined as 40% of the stock’s virgin, unfished abundance. “Overfishing” is defined as a harvest rate that is predicted to cause a stock to decline to an overfished level. The Magnuson-Stevens Fishery Management and Conservation Act and FMP require management measures that end overfishing.

The Magnuson-Stevens Act also requires that the Council rebuild an overfished stock within ten years, if the stock’s biology allows it to be rebuilt within this relatively short timeframe. Rebuilding the currently overfished rockfish species will probably take significantly longer. If a stock cannot be rebuilt within ten years, then the maximum allowable time to rebuild the stock is the time to rebuild the stock in the absence of fishing, plus one mean generation time. (Mean generation time is the time it takes for a sexually mature female to replace herself in the population).

Historically, these species were taken by trawl, hook and line, and sport gear. Trawl catches of rockfish have been reduced by the small footrope restrictions put in place on the shelf since 2000, which keep trawlers out of most rockfish habitat. Overfished shelf rockfish species are still incidentally caught with commercial and sport line gear, but are now much less common in bottom trawl catches. Depth-based restrictions have been adopted to reduce harvest of overfished groundfish, to end overfishing, and to rebuild these stocks.

Some assessed species, including some of the most important target species such as sablefish (*Anoplopoma fimbria*), Dover sole (*Microstomus pacificus*), and shortspine thornyhead (*Sebastolobus alascanus*) are below the target biomass, BMSY, although not overfished. These species are classified as precautionary zone species and OYs for these stocks are set according to a precautionary formula that progressively reduces the OY below the ABC as the estimated stock size is lower. This precautionary reduction allows sufficient surplus production to allow the stock to increase to the target biomass over time.

For each of the above overfished or precautionary zone fish species, detailed information can be found in the Life History Appendix to the FMP regarding habitat utilization patterns, fisheries which harvest the species, geographic range, migrations and movements, reproduction, growth and development, and trophic interactions. The Habitat Use Database also contains information on the utilization of west coast habitats and other life history characteristics of the various life stages of these species.

3.3.4 Non-groundfish stocks

The following non-groundfish species may be caught incidentally in fisheries targeting groundfish. Thus, changes in fishing regulations in groundfish fisheries could increase or decrease fishing mortality on incidentally caught species. Alternatively, those fisheries targeting nongroundfish species may be affected by management measures intended to reduce or eliminate incidental catches of overfished groundfish species in these fisheries.

3.3.4.1 California Halibut

California halibut (*Paralichthys californicus*) are a left-eyed flatfish of the family Bothidae. They range from Northern Washington at approximately the Quileuete River to southern Baja, California (Eschmeyer *et al.* 1983), but are most common south of Oregon. They are predominantly associated with sand substrates from nearshore areas just beyond the surf line to about 183 m.

California halibut feed on fishes and squids and can take their prey well off the bottom. They are an important sport and commercial species, especially in California where they are targeted using hook-and-line and trawl gear.

3.3.4.2 California Sheepshead

California sheephead (*Semicossyphus pulcher*) are a large member of the wrasse family Labridae. They range from Monterey Bay south to Guadalupe Island in central Baja, California and in the Gulf of California, but are uncommon north of Point Conception. They are associated with rocky bottom habitats, particularly in kelp beds to 55 m, but more commonly at depths of 3 m to 30 m.

They can live to 50 years of age and a maximum length of 91 cm (16 kg). Like some other wrasse species, California sheephead change sex starting first as a female, but changing to a male at about 30 cm in length.

3.3.4.3 Coastal Pelagic Species (CPS)

CPS are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. These species include: northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific (chub) mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), and market squid (*Decapoda spp*.). Until 1999, northern anchovy was managed under the Council's Northern Anchovy FMP. Amendment 8 to the Northern Anchovy FMP brought the remaining CPS species under federal management and renamed the FMP the Coastal Pelagic Species FMP. This FMP was implemented in December 1999.

Sardines inhabit coastal subtropical and temperate waters, and at times, have been the most abundant fish species in the California current. During times of high abundance, Pacific sardine range from the tip of Baja, California to southeastern Alaska. When abundance is low, Pacific sardine do not occur in large quantities north of Point Conception, California. Pacific mackerel in the northeastern Pacific range from Banderas Bay, Mexico to southeastern Alaska. They are common from Monterey Bay, California to Cabo San Lucas, Baja, California, and most abundant south of Point Conception, California. The central subpopulation of northern anchovy ranges from San Francisco, California to Punta Baja, Mexico. Jack mackerel are a pelagic schooling fish that range widely throughout the northeastern Pacific; however, much of their range lies outside the U.S. EEZ. Adult and juvenile market squid are distributed throughout the Alaska and California current systems, but are most abundant between Punta Eugenio, Baja, California and Monterey Bay, Central California.

Recent (December 1999 and July 1999, respectively) stock assessments indicate Pacific sardine and Pacific mackerel are increasing in relative abundance. Pacific sardine biomass in U.S. waters was estimated to be 1,581,346 mt in 1999; Pacific mackerel biomass (in U.S. waters) was estimated to be 239,286 mt. Pacific sardine landings for the directed fisheries off California and Baja, California reached the highest level in recent history during 1999, with a combined total of 115,051 mt harvested. In 1998 70,799 mt of Pacific mackerel were landed, representing near-record levels for the combined directed fisheries off California and Baja, California. Population dynamics for market squid are poorly understood, and annual fluctuations in commercial catch vary from <10,000 mt to 90,000 mt. Amendment 10 to the CPS FMP describes and analyzes several approaches for estimating an MSY-proxy for market squid. Amendment 10 was adopted by the Council in June 2002 and is currently under review by NMFS. Market squid are thought to have an annual mortality rate approaching 100%, which means the adult population is almost entirely new recruits and successful spawning is crucial to future years' abundance.

3.3.4.4 Dungeness crab

The Dungeness crab (*Cancer magister*) is distributed from the Aleutian Islands, Alaska, to Monterey Bay, California. They live in bays, inlets, around estuaries, and on the continental shelf. Dungeness crab are found to a depth of about 180 m. Although it is found at times on mud and gravel, this crab is most abundant on sand bottoms; frequently it occurs among eelgrass. The Dungeness crab, which are typically harvested using traps (crab pots), ring nets, by hand (scuba divers), or dip nets are incidentally taken or harmed unintentionally by groundfish gears. Dungeness crab are managed by the states of Oregon and California, and by the State of Washington in cooperation with Washington Coast treaty tribes.

3.3.4.5 Highly Migratory Species

Highly migratory species (HMS) include tunas, billfish, dorado, and sharks—species that range great distances during their lifetime, extending beyond national boundaries into international waters and among the EEZs of many nations in the Pacific. The Council is adopting a Highly Migratory Species FMP to federally regulate the take of HMS within and outside the EEZ. The HMS FMP describes species proposed for active management in detail. These are five tuna species, five shark species, striped marlin, swordfish, and dorado or dolphinfish. A much longer list of species, constituting all those that have been caught in HMS fisheries and not already under state or federal management, will be monitored, but are not part of the management unit.

3.3.4.6 Ocean whitefish

Ocean whitefish (*Caulolatilus princeps*) occur as far north as Vancouver Island in British Columbia, but are rare north of Central California. A solitary species, it inhabits rocky bottoms and is also found on soft sand and mud bottoms. Whitefish dig into the substrate for food.

3.3.4.7 Pacific pink shrimp

Pacific pink shrimp (*Pandalus jordani*) are found from Unalaska in the Aleutian Islands to San Diego, California, at depths of 25 fm to 200 fm (46 m to 366 m). Off the U.S. West Coast these shrimp are harvested with trawl gear from Northern Washington to Central California between 60 fm and 100 fm (110 m to 180 m). The majority of the catch is taken off the coast of Oregon. Concentrations of pink shrimp are associated with well-defined areas of green mud and muddy-sand bottoms. Shrimp trawl nets are usually constructed with net mesh sizes smaller than the net mesh sizes for legal groundfish trawl gear. Thus, shrimp trawlers commonly take groundfish in association with shrimp (rather than the reverse). Pacific shrimp fisheries are managed by the states of Washington, Oregon, and California.

3.3.4.8 Pacific halibut

Pacific halibut (*Hippoglossus stenolepis*) belong to a family of flounders called Pleuronectidae. Pacific halibut can be found along the continental shelf in the North Pacific and Bering Sea. They have flat, diamond-shaped bodies and are able to migrate long distances. Most adult fish tend to remain on the same grounds year after year, making only a seasonal migration from the more shallow feeding grounds in summer to deeper spawning grounds in winter. Halibut are usually found in deep water (40 m to 200 m).

Pacific halibut are managed by the bilateral (U.S./Canada) International Pacific Halibut Commission (IPHC). The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the West Coast. Implementation of IPHC catch levels and regulations is the responsibility of the Council, the states of Washington, Oregon, and California, and the Pacific halibut treaty tribes.

3.3.4.9 Ridgeback prawn

Ridgeback prawns (*Sicyonia ingentis*) are found south of Monterey, California to Baja, California in depths of 145 metric feet to 525 metric feet (Sunada *et al.* 2001). They are more abundant south of Point Conception and are the most common invertebrate appearing in trawls. Their preferred habitat is sand, shell and green mud substrate, and they are relatively sessile. Although information about their feeding habits is limited, these prawns probably are detritus feeders. In turn, they are prey for sea robins, rockfish, and lingcod. Unlike other shrimp species, which carry their eggs during maturation, ridgeback prawns release their eggs into the water column. They spawn seasonally from June to October. Surveys recorded increasing abundance of ridgeback prawns from 1982, when surveys began, to 1985. The population then declined. More recent CPUE data suggest increased abundance in the 1990s. These changes may be due to climate phenomena, particularly El Niño events.

3.3.4.10 Sea cucumber

Two sea cucumber species are targeted commercially: the California sea cucumber *(Parastichopus californicus*) and the warty sea cucumber (*P. parvimensis*) (Rogers-Bennett and Ono 2001). These species are tube-shaped Echinoderms, a phylum that also includes sea stars and sea urchins. The California sea cucumber occurs as far north as Alaska, while the warty sea cucumber is uncommon north of Point Conception and does not occur north of Monterey. Both species are found in the intertidal zone to as deep as 300 feet. These bottom-dwelling organisms feed on detritus and small organisms found in the sand and mud. Because sea cucumbers consume bottom sediment and remove food from it, they can alter the substrate in areas where they are concentrated. They can also increase turbidity as they excrete ingested sand or mud particles. They are preyed upon by sea stars, crabs, various fishes, and sea otters. They spawn by releasing gametes into the water column, and spawning occurs simultaneously for different segments of a population. During development, they go through several planktonic larval stages, settling to the bottom two months to three months after fertilization of the egg. Little is known about the population status of these two species; and assessment is difficult, because of their patchy distribution. However, density surveys suggest abundance has declined since the late 1980s. This is not unexpected since a commercial fishery for these species began in the late 1970s and expanded substantially after 1990.

3.3.4.11 Spot prawn

Spot prawn (*Pandalus platyceros*) are the largest of the pandalid shrimp and range from Baja, California north to the Aleutian Islands and west to the Korean Strait (Larson 2001). They inhabit rocky or hard bottoms including coral reefs, glass sponge reefs, and the edges of marine canyons. They have a patchy distribution, which may result from active habitat selection and larval transport. Spot prawn are hermaphroditic, first maturing as males at about three years of age. They enter a transition phase after mating at about four years of age when they metamorphose into females.

Spot prawns are taken by both traps and trawls on the West Coast with the fishery taking predominantly older females. These fisheries are open access and managed by the West Coast states.

3.3.4.12 White seabass

White seabass (*Atractoscion nobilis*), a large member of the croaker family, range from southeast Alaska to Baja but are rare north of California (Eschmeyer *et al.* 1983). White seabass are primarily targeted with driftnet gear since the setnet fishery for white seabass was prohibited in 1994. White seabass may also be caught with commercial hook-and-line gear in the early spring, when large seabass are available. Regulations covering white seabass have been in effect since 1931 and have included a minimum size limit, closed seasons, bag limits, and fishing gear restrictions. Such regulations are in effect today, with slight variations. An FMP for white seabass is presently being adopted and the need for additional regulations will be considered (Vojkovich and Crooke 2001).

3.3.4.13 Miscellaneous species

Little information is available on nongroundfish species that are incidentally captured in the groundfish fishery. Other than those species mentioned above, documentation from the whiting fishery indicates that species such as American shad (*Alosa sapidissima*) and walleye pollock (*Theragra chalcogramma*) are taken incidentally. According to preliminary data, about 112 mt of shad and 280 mt of pollock were taken as incidental catch in the at-sea sector of the Pacific whiting fishery in 2001, through October. American shad was also taken in the shore-based whiting fishery. Introduced in 1885, they have flourished throughout the lower Columbia River, producing a record run of 4.0 million fish in 1990 (ODFW and WDFW 2002). Walleye pollock are found in the waters of the Northeastern Pacific Ocean from the Sea of Japan, north to the Sea of Okhotsk, east in the Bering Sea and Gulf of Alaska, and south in the Northwestern Pacific Ocean along the Canadian and U.S. West Coast to Carmel, California. In 2002 trawlers began targeting this species off Washington after the primary whiting fishery closed, based on reports of larger concentrations of the fish in these waters. Since this species is not managed under any of the Council's FMPs, there are no harvest levels, management measures, or observer requirements specified for this fishery. In 2003, WDFW sponsored an EFP to explore selective harvesting of pollock while minimizing impacts to incidental species. WDFW has submitted an application for this EFP to continue in 2004.

3.3.5 Prey Species

Major prey items of managed groundfish species include copepod eggs, copepod nauplii, amphipods, diatoms, dinoflagellates, tintinnids, cladocerans, fish and invertebrate eggs and larvae, mysids, ophiuroids, tunicates, worms (e.g. annelids and polychaetes), shrimp, decapod crustaceans, bivalve mollusks, squids and octopi, euphausiids, pelagic fishes (e.g. anchovies, smelt, lanternfishes, and herring), sculpins, juvenile flatfishes, juvenile rockfishes, and other small fishes. These prey occupy the same habitats as the groundfish species/life stage that prey upon them. There is usually a dietary progression in groundfish coinciding with ontogeny, which generally begins with the consumption of zooplankton during early life stages and culminates with the consumption of crustaceans, bivalves, cephalopods and/or fishes in the adult life stage. The various species/life stages of groundfish take prey by a wide range of strategies including planktivory, sit and wait predation, and active predation on sedentary or mobile prey items. Some groundfish species feed throughout the diel cycle, some feed diurnally, while others are nocturnal hunters. Groundfish diets may shift in response to seasonal variations in prey abundance.

Pink shrimp are associated with green mud and muddy-sand bottoms and are important prey for many species. Arrowtooth flounder, petrale sole, sablefish, and Pacific whiting are some of the groundfish that prey heavily on pink shrimp. Small coastal pelagic fishes provide an important prey source for Pacific whiting and other marine species. Dungeness crab, through all its life history stages, is an important prey species for many groundfish. Krill (i.e. euphausiids) are a critical prey item for many managed groundfish species (either as primary prey or through secondary or later food web dependencies). No krill fishery currently exists for on the west coast, but concerns have been raised regarding the potential development of such a fishery and the possible detrimental effects it might have on the groundfish prey field. Removal of large amounts of krill or other zooplankton could result in reduced productivity and mortality of higher trophic animals.

Cannibalism on various life stages is known to occur in some groundfish such as the macrourids, cabezon, kelp greenling, gopher rockfish, Pacific whiting, rock and petrale sole.

See the Life History Appendix to the FMP and the Habitat Use Database for detailed information on the trophic interactions of each species in the groundfish FMU.

3.3.6 Predator Species

Groundfish species may be preyed upon by a number of different organisms depending on the life stage in question. The eggs of groundfish species may be consumed by various planktivores and benthic predators (e.g. gastropods, crabs, fishes, echinoderms). Larvae and juveniles are taken by sea birds, porpoises, larger life stages of groundfish, chaetognaths, and invertebrates (e.g. siphonophores, jellyfishes). Adults of managed groundfish species are preyed upon by man, sharks, marine mammals (e.g. sea lions, seals, whales, dolphins, porpoises, otters), halibut, albacore, salmon, and other larger predatory groundfishes such as cabezon, lingcod, and sablefish. These groundfish predators either occupy the same habitats as their groundfish prey or encounter those habitats in the course of hunting over larger areas of ocean territory.

There is some concern that the biological environment has been directly affected by fishing and other marine harvesting activities which removes top-level predators. For example, several recent studies have suggested that removal of whales and other marine mammals has created cascading effects throughout marine food webs. From an ecosystem perspective, human fishing activities might be viewed as large-scale predation that consumes species at a variety of trophic levels and may also affect other tropic levels
directly or indirectly. Effects of fishing on species abundance, species diversity, community structure and physical environment have been described in numerous studies.
For example, top predators may be removed, resulting in increases of species lower in the food web. Fishing practices can also affect habitats, community structure and biodiversity. The cumulative effects of 100 years of West Coast groundfish fishing (and fishing for other species) have helped shape present day ecosystem structure. Forage species (including groundfish and nongroundfish) captured in the course of groundfish fishing may be removed from the environment. Top level predator species may also be removed, resulting in increases of their prey species. Or, their competitors may increase, making it difficult to regain their previous position in the hierarchy. In either case, fishing increases the mortality rate of “unfished” populations. These and other changes could alter trophic dynamics, abundance and biodiversity of the ecosystem. It is difficult, however, to separate many of these fisheries-related changes from environmental ones.

See the Life History Appendix to the FMP and the Habitat Use Database for detailed information on the known predators of each species in the groundfish FMU.

Table 3-2 The number of managed species/life stages known to use U.S. west coast habitats for the ecological functions delineated in the M-S Act.

Zone	Habitat	All Activities	Specified Activity					Grand Total
			Breeding	Feeding	Growth to Maturity	Spawning	Unknown	
Nearshore,Estuarine, & Intertidal	Artificial Structure	2		1				3
	Biogenic	13		22	1	1	8	45
	Epipelagic Zone	1		30	1	1	30	63
	Hard Bottom	20	5	31	5	1	11	73
	Mixed Bottom	5		3	6			14
	Tide Pool			7			2	9
	Unconsolidated	28	2	55	13	3	9	110
	Unknown			8			69	77
Nearshore,Estuarine, & Intertidal Total		69	7	157	26	6	129	394
Offshore	Artificial Structure	17		38	3		1	59
	Biogenic	19		48	14		8	89
	Epipelagic Zone	18	1	198	5		80	302
	Hard Bottom	159		14	42	4	25	244
	Mesopelagic Zone	6		22			11	39
	Mixed Bottom	89		12	34		2	137
	Unconsolidated	120		29	74	5	28	256
	Unknown	5		20	1		208	234
Offshore Total		433	1	381	173	9	363	1360
Grand Total		502	8	538	199	15	492	1754

Table 3-3 The number of managed species/life stages known to have STRONG Association with U.S. west coast habitats for the ecological functions delineated in the M-S Act.

HabitatAssociation	Strong

			Activity					
Zone	Habitat	All Activities	Breeding	Feeding	Growth to Maturity	Spawning	Unknown	Grand Total
Nearshore,Estuarine, & Intertidal	Epipelagic Zone			15		1	18	34
	Hard Bottom	18	4	9	3	1	11	46
	Mixed Bottom	2		1	1			4
	Tide Pool			1			1	2
	Unconsolidated	14		20	3	3	2	42
	Unknown			4			3	7
	Vegetated Bottom	12		3	1	1	4	21
Nearshore,Estuarine, & Intertidal Total		46	4	53	8	6	39	156
Offshore	Artificial Structure	2		2				4
	Epipelagic Zone	16	1	138	5		57	217
	Hard Bottom	112		3	35	4	19	173
	Mesopelagic Zone	4		8			10	22
	Mixed Bottom	49		6	21			76
	Unconsolidated	58		12	50	2	23	145
	Unknown	3		5	1		4	13
	Vegetated Bottom	10		6	10		2	28
Offshore Total		254	1	180	122	6	115	678
Grand Total		300	5	233	130	12	154	834

Table 3-4 The number of managed species/life stages known to have MEDIUM Association with U.S. west coast habitats for the ecological functions delineated in the M-S Act.

HabitatAssociation	Medium

			Activity					
Zone	Habitat	All Activities	Breeding	Feeding	Growth to Maturity	Spawning	Unknown	Grand Total
Nearshore,Estuarine, & Intertidal	Artificial Structure	2		1				3
	Biogenic			1				1
	Epipelagic Zone	1		13	1		11	26
	Hard Bottom	2		11	2			15
	Mixed Bottom	3		2	5			10
	Tide Pool			6			1	7
	Unconsolidated	14	2	25	9		5	55
	Unknown						1	1
	Vegetated Bottom	1		17			4	22
Nearshore,Estuarine, & Intertidal Total		23	2	76	17		22	140
Offshore	Artificial Structure	15		36	3		1	55
	Biogenic	2		28	3		3	36
	Epipelagic Zone	2		53			11	66
	Hard Bottom	34		11	7		6	58
	Mesopelagic Zone	2		13				15
	Mixed Bottom	36		5	11		2	54
	Unconsolidated	45		15	17	2	4	83
	Unknown	1		5			6	12
	Vegetated Bottom	4		10	1		3	18
Offshore Total		141		176	42	2	36	397
Grand Total		164	2	252	59	2	58	537

Table 3-5 The number of managed species/life stages known to have WEAK Association with U.S. west coast habitats for the ecological functions delineated in the M-S Act.

HabitatAssociation	Weak

Count of Lifestage			Activity					
Zone	Habitat	All Activities	Breeding	Feeding	Growth to Maturity	Spawning	Unknown	Grand Total
Nearshore,Estuarine, & Intertidal	Epipelagic Zone			2				2
	Hard Bottom		1	11				12
	Unconsolidated			10	1		2	13
	Unknown						1	1
	Vegetated Bottom			1				1
Nearshore,Estuarine, & Intertidal Total			1	24	1		3	29
Offshore	Biogenic			4				4
	Epipelagic Zone			4			10	14
	Hard Bottom	13						13
	Mesopelagic Zone			1			1	2
	Mixed Bottom	4		1	2			7
	Unconsolidated	17		2	7	1	1	28
	Unknown	1						1
	Vegetated Bottom	3						3
Offshore Total		38		12	9	1	12	72
Grand Total		38	1	36	10	1	15	101

Table 3-6 The number of managed species/life stages known to have an Association of UNKNOWN STRENGTH with U.S. west coast habitats for the ecological functions delineated in the M-S Act.

HabitatAssociation	Unknown

		Activity		
Zone	Habitat	Feeding	Unknown	Grand Total
Nearshore,Estuarine, & Intertidal	Epipelagic Zone		1	1
	Unknown	4	64	68
Nearshore,Estuarine, & Intertidal Total		4	65	69
Offshore	Epipelagic Zone	3	2	5
	Unknown	10	198	208
Offshore Total		13	200	213
Grand Total		17	265	282

3.4 Pacific Coast Fisheries

For this affected environment, the fisheries that occur within the action area of the Pacific Coast EEZ best represent the categories of fishing and fishing-related activities that are both a risk factor to EFH and the subject of costs or benefits as a result of regulation and the environmental consequences of EFH conservation. The term “fishery” is defined in the Maguson-Stevens 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 fishing for such stocks (16 U.S.C. 1802 et. seq.). This section describes each fishery within categories for commercial, tribal, and, recreational. Where it applies and data is available, community-specific information on the geographic distribution of landings and revenue is detailed for the Pacific Coast fisheries.

Under the Pacific Groundfish Fishery Management Plan (FMP), commercial, tribal, and recreational fishermen harvest over 83 species of groundfish off the coasts of Washington, Oregon, and California. Among this Plan’s objectives are two objectives that affect not only the management of groundfish but the management of other Pacific Coast fisheries: maintaining year-round fishing groundfish and reducing bycatch of the eight overfished groundfish species within the groundfish fishery and in other fisheries. These other fisheries include salmon, highly migratory species, coastal pelagic species, shrimp, and crab amongst others. Pacific coast fishermen often participate in several of these fisheries throughout the year. All of these fisheries contribute to a wide range of commercial, recreational, and tribal activities that have economic, social, and cultural significance to those engaged in harvesting fish resources. Dependent on these fisheries are the fish buyers and processors, suppliers of commercial and recreational fishing equipment and services, and ultimately the fishing-dependent communities where vessels dock and fishing families live.

Active participation in Pacific Coast shorebased commercial fisheries has been declining according to the Pacific States Marine Fisheries Commission’s Pacific Fishery Information Network (PacFIN). For the years, 2000, 2001, 2002, and 2003, there were 4,495, 4,430, 4,109, and 4,013 active vessels respectively. Of these vessels in 2003, 704 vessels made landings of Pacific coast groundfish, 339 made landings of coastal pelagic, 2,028 made landings of crab, 1,050 made landings of highly migratory species, 2,900 made landings of salmon, and 359 made landings of shrimp. In 2003, coastal pelagic species accounted for 33% of all landings by weight, crab 10%, groundfish 23%, shellfish 17%, shrimp 4%, highly migratory species, 5%, salmon 6%, and other species accounted for 3% (not including at sea activity).

The FMP classifies commercial activities as either “limited entry,” “open access.” or tribal. Since 1994 the FMP has limited the number of commercial fishing vessels that are allowed to target groundfish including Pacific whiting. Other fisheries, which either target groundfish or catch them incidentally, but do not hold groundfish limited entry permits, are considered “open access” fisheries although these vessels may possess limited entry licenses for other, state-managed nongroundfish fisheries such as pink shrimp or Dungeness crab. The Council allocates harvest limits (expressed as optimum yields, or OYs) between different regulatory and fishery sectors, including limited entry and open access fisheries with the majority of groundfish allocated to the limited entry sector. Indian tribes in Washington, primarily the Makah, Quileute, and Quinault harvest Pacific groundfish. There are formal tribal allocations that are set species like sablefish and Pacific whiting, while other species' allocations are determined through the Council process in coordination with the tribes, states, and NMFS.

In addition to commercial and tribal fisheries, there are recreational fisheries for groundfish. Marine recreational fisheries consist of charter vessels, private vessels, and shore anglers. Charter vessels are larger vessels for hire, which typically can fish farther offshore than most vessels in the private recreational fleet. Shorebased anglers often fish in intertidal areas, within the surf, or off jetties for example. Fishing opportunity both in nearshore areas and farther out on the continental shelf are important for West Coast recreational fishermen. (According to Pacific States Marine Fisheries Recreational Fishery Information Network, there are virtually no records of recreationally caught continental slope species meaning that recreational groundfish fishing occurs along the continental shelf or nearshore). Recreational fishers targeting nongroundfish species such as tuna and billfish may travel longer distances including areas outside the U.S. EEZ.

This section describes landings, effort, and exvessel revenue generated by groundfish fisheries, or fisheries that may be affected by actions pertaining to groundfish fish habitat designation. Non-groundfish fisheries may be affected by direct actions themselves, or by indirect impacts resulting in – for example – commercial fishers changing the timing of effort, species target, fishing location, or switching to another fishery altogether.

3.4.1 Commercial Fisheries

Commercial fisheries make up the largest portion of Pacific coast landed catch by weight. Since 2000, the four largest species groups by weight have been coastal pelagic species, followed by groundfish, crab, and highly migratory species. The four largest gear groups by weight have been net, trawl, pot, and troll gear. Conversely, by value the four largest species groups from 2000 – 2003 were crab, followed by groundfish, coastal pelagic species, and highly migratory species respectively.

Table 3-7. Shoreside Landings and Exvessel Revenue by Species Category and Year

		Year			
Species Group	Data type	2000	2001	2002	2003
Coastal Pelagic	Landed weight (lbs)	498,232,740	431,544,771	403,146,744	266,368,388
	Exvessel Revenue	42,069,760	32,494,118	32,732,787	33,824,432
Crab	Landed weight (lbs)	30,562,479	26,645,343	37,156,344	75,126,504
	Exvessel Revenue	64,575,735	54,017,788	62,570,332	118,393,209
Groundfish	Landed weight (lbs)	268,754,713	226,402,046	164,010,829	180,765,829
	Exvessel Revenue	62,689,248	52,034,893	43,438,224	48,945,438
Highly Migratory	Landed weight (lbs)	23,217,661	27,365,996	23,269,259	38,071,415
	Exvessel Revenue	22,790,849	24,253,397	17,256,645	28,126,563
Other	Landed weight (lbs)	21,579,099	19,705,423	20,890,419	16,868,699
	Exvessel Revenue	27,123,067	23,982,459	23,098,380	20,616,940
Salmon	Landed weight (lbs)	7,122,757	6,458,681	9,790,983	11,493,417
	Exvessel Revenue	13,962,096	10,605,885	14,345,088	20,959,564
Shellfish	Landed weight (lbs)	18,101,109	18,552,442	27,117,595	26,746,585
	Exvessel Revenue	45,577,879	44,101,002	61,294,480	69,678,867
Shrimp	Landed weight (lbs)	35,906,296	40,960,953	57,818,606	32,160,356
	Exvessel Revenue	20,543,414	16,753,777	21,407,954	11,479,887
Total Landed weight (lbs)		903,476,854	797,635,655	743,200,779	647,601,193
Total Exvessel Revenue		299,332,048	258,243,320	276,143,890	352,024,899

Source: PacFIN ftl table. August 2004

Note: Data shown is for PFMC management areas and does not include inside waters such as Puget Sound and Columbia River for example.

Table 3-8. Shoreside Landings and Revenue by Gear Type and Year

		Year			
Gear	Data type	2000	2001	2002	2003
Dredge	Landed weight (lbs)			C	
	Exvessel Revenue			C	
Hook and Line	Landed weight (lbs)	11,802,585	11,020,956	12,614,636	10,825,355
	Exvessel Revenue	20,935,838	19,225,187	17,679,231	19,776,877
Misc	Landed weight (lbs)	35,380,715	33,635,105	42,904,188	38,561,396
	Exvessel Revenue	62,944,925	58,034,808	74,019,410	79,445,478
Net	Landed weight (lbs)	502,470,237	435,111,623	406,345,771	268,877,740
	Exvessel Revenue	48,226,898	36,665,962	36,382,949	36,919,258
Pot	Landed weight (lbs)	33,746,129	29,263,663	39,942,815	78,765,977
	Exvessel Revenue	75,724,736	64,286,487	71,891,553	129,824,380
Troll	Landed weight (lbs)	25,541,566	28,789,324	27,054,341	45,832,676
	Exvessel Revenue	29,247,312	29,245,055	25,667,562	43,931,473
Trawl	Landed weight (lbs)	259,658,663	220,003,436	157,474,652	173,261,044
	Exvessel Revenue	43,868,230	36,547,531	31,428,967	33,034,613
Shrimp Trawl	Landed weight (lbs)	34,876,959	39,811,548	56,862,974	31,477,005
	Exvessel Revenue	18,384,109	14,238,290	19,072,882	9,092,821
Total Landed weight (lbs)		903,476,854	797,635,655	743,199,377*	647,601,193
Total Exvessel Revenue		299,332,048	258,243,320	276,142,553*	352,024,899

Source: PacFIN ftl table. August 2004
Note: Data shown is for PFMC management areas only and does not include areas such as Puget Sound and Columbia River for example.
C means data was restricted due to confidentiality
* totals do not include confidential data

3.4.1.1 Limited Entry Groundfish Trawl Sector

West Coast limited entry trawl vessels use midwater trawl gear, and small and large footrope bottom trawl gear (defined at 50 CFR 660.302 and 660.322(b)). Midwater trawl gear is not designed to touch ocean bottom and is therefore used to target groundfish species that ascend above the ocean floor such as Pacific whiting and yellowtail rockfish. Small and large footrope trawl gear is designed to remain in contact with the ocean floor and is used to target species that reside along the ocean bottom such as flatfish on the continental shelf and slope, or DTS species (Dover sole, thornyhead and sablefish complex) in deep water. Small footrope trawl gear is used to access areas that generally have a mild substrate - few rocks or outcroppings - and is generally used more widely on the continental shelf than the continental slope (due in large part to regulatory requirements). Large footrope trawl gear is designed to access areas that may have a more severe substrate, and tend to be used more along the continental slope and in deeper water.

Most vessels in the limited entry trawl sector are shore-based vessels that are less than 100 feet in length, with most vessels ranging in size from 40 to 90 feet in length (Table 3-9). These vessels primarily deliver their catch to processors and buyers located along the coasts of Washington, Oregon, and California, and tend to have their homeports located in towns within the same general area as their deliveries are made. Larger vessels in the shore-based limited entry trawl sector focus more heavily on the DTS complex in deep water, while smaller trawl vessels focus more heavily on the shelf. Large trawl vessels also tend to participate in the trawl fishery for more months of the year than small trawl vessels.

Table 3-9. Count of Limited Entry Trawl Vessels Making Landings by State, Year, and Vessel Length

		Vessel Length (feet)						
State	YEAR	0 – 40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	> 90
CA	2000	1	13	24	20	18	6	2
	2001	4	10	16	15	12	7	1
	2002	2	5	5	8	12	3	0
	2003	3	8	8	4	5	1	0
OR	2000	1	3	21	35	30	15	7
	2001	2	7	19	34	31	13	3
	2002	2	5	17	32	29	14	3
	2003	2	5	17	33	28	15	3
WA	2000	0	3	5	5	10	4	3
	2001	0	5	5	4	12	3	1
	2002	0	2	6	3	8	4	1
	2003	0	1	2	4	9	3	1

Source: PacFIN ftl and cg tables. July 2004

In addition to the shore-based limited entry trawl fishery, an at-sea limited entry trawl fishery exists off the coast of Washington, Oregon, and California. The at-sea fishery is a high volume fishery that targets Pacific whiting with the use of midwater trawls. Pacific whiting is a high volume fishery that commands a relatively low price per pound in the market place. The limited entry at sea sector is made up of a catcher processor fleet and a mothership fleet. A catcher processor is a ship that participates in both catching and processing, while a mothership is a ship that only engages in the processing of a particular catch, and has deliveries of catch made to it by catcher vessels. Many of the catcher vessels that deliver to the west coast mothership sector can also be described as shore-based trawl vessels when the Pacific whiting season is closed, though historically some catcher vessels have only participated in the Pacific whiting fishery along the west coast, and participate in North Pacific fisheries when the Pacific whiting season is closed.

According to PacFIN data, the at sea sector annually catches over 100 million pounds of Pacific whiting (hake), as well as several hundred thousand pounds of other types of Pacific coast groundfish (Table 3-10). Unfortunately, readily available data does not exist estimating the value of at-sea activities.

Table 3-10. At - Sea Sector Catch by Year, Species Aggregation, and Sector (Units are in pounds)

Species Aggregation	At - Sea Sector	2000	2001	2002	2003
Non-Whiting Groundfish	Catcher/Processor	1,227,955	869,326	532,717	230,094
	Non - Tribal Mothership	1,188,862	427,932	69,445	13,610
Pacific Whiting	Catcher/Processor	149,505,480	129,251,616	80,119,007	90,862,066
	Non - Tribal Mothership	103,265,104	78,976,106	58,628,095	57,367,288

Source: PacFIN NPAC4900 table. February 2004

3.4.1.1.1 Distribution of Effort by Limited Entry Groundfish Trawl Vessels

Limited entry trawl vessels focus much of their efforts on DTS species along the slope, and flatfish species along the shelf. Historically, much effort was focused on rockfish species, but recent regulatory requirements – such as rockfish conservation areas and various cumulative limits - have curtailed rockfish opportunities to protect overfished stocks, and in 2004 a specific small footrope trawl designed to avoid rockfish (the selective flatfish trawl) will work to further avoid the catch of rockfish along the shelf while increasing opportunities for flatfish north of 40 degrees 10 minutes latitude. Opportunities to harvest DTS and flatfish species – largely in the form of differential cumulative limits and rockfish conservation area boundaries – dictate the location of much of the trawl effort, though not all effort is dictated by regulation. Vessels differ in size and technical capacity. For example, small vessels may find it more difficult to fish during the winter months because of weather and other vessels may not have the capacity to fish in deep water where DTS species primarily reside. In other cases, some vessel captains may be more knowledgeable and more successful in certain areas. This knowledge would also influence the location and timing of effort by certain vessels. Furthermore, some species are known to migrate and aggregate during certain months of the year. For example, Petrale and Dover sole are known to aggregate for spawning during the winter months, and several types of flatfish are known to migrate onto the shelf during the summer months. Fishers may target the location of their efforts according to species aggregations and the tendencies of certain fish species to migrate. In summary, differences in knowledge, capital constraint, fish migration, and the regulatory environment can – in large part – describe the location and time of effort by commercial fishing vessels.

Table 3-11 shows the depth-based annual distribution of effort made by non-shrimp trawl vessels as recorded in trawl logbook data within PacFIN. This data includes bottom trawl and midwater trawl gear.

Table 3-11. Depth Based Distribution of Effort by Trawl Vessels by Year, State, and Depth (sum of vessels making tows by depth)

		Year		
State	Depth (fathoms)	2001	2002	2003
California	0 - 50	1,522	1,599	1,172
	51 - 100	1,422	1,068	407
	101 - 150	675	440	22
	151 - 200	557	465	201
	200 - 250	531	533	566
	> 250	2,022	2,809	2,291
Oregon	0 - 50	552	777	644
	51 - 100	2,169	1,858	1,484
	101 - 150	988	473	276
	151 - 200	897	399	411
	200 - 250	735	311	814
	> 250	2,193	1,617	2,219
Washington	0 - 50	141	252	244
	51 - 100	1,208	1,419	793
	101 - 150	281	193	76
	151 - 200	119	75	118
	200 - 250	63	43	85
	> 250	158	72	170

Source: PacFIN logbook data. July 2004

Table 3-12. Monthly Distribution of Effort by Trawl Vessels by Year, Vessel Length, and Month (sum of vessels making tows by depth)

Length Category	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
< 46	2001	63	81	102	113	144	228	189	179	181	145	125	51
	2002	112	91	117	133	159	154	125	147	68	103	62	35
	2003	88	42	60	85	82	113	93	137	103	95	50	5
< 46 Total		263	214	279	331	385	495	407	463	352	343	237	91
46 - 65	2001	561	698	813	1071	1101	1305	1057	1080	1142	674	404	219
	2002	489	785	866	958	979	951	840	809	389	808	557	231
	2003	461	578	454	809	658	717	794	700	569	459	286	90
46 - 65 Total		1511	2061	2133	2838	2738	2973	2691	2589	2100	1941	1247	540
> 65	2001	429	529	468	540	463	774	745	658	649	119	129	109
	2002	305	573	480	471	401	675	658	457	108	549	371	163
	2003	364	427	305	554	446	809	721	334	434	356	247	121
> 65 Total		1098	1529	1253	1565	1310	2258	2124	1449	1191	1024	747	393

Source: PacFIN logbook data. July 2004

3.4.1.1.2 Landings and Revenues from Groundfish Trawl Vessels

Trawlers catch a wide range of species. By weight, the following species account for the bulk of landings (other than Pacific whiting): Dover sole, arrowtooth flounder, petrale sole, sablefish, thornyheads, and yellowtail rockfish. Although some rockfish species were an important component of landings in the past, management measures intended to reduce the directed and incidental catch of overfished rockfish and other depleted species have significantly reduced the rockfish catches in recent years.

Table 3-13. Trawl Shoreside Landings and Exvessel Revenue by State and Year

State	Species Aggregation	Data Type	2000	2001	2002	2003
CA	Non-Whiting Groundfish	Landed Weight (lbs)	21,332,461	17,533,624	17,684,047	16,119,987
		Landed Revenue	11,742,269	9,579,192	10,064,667	8,593,528
	Pacific Whiting	Landed Weight (lbs)	10,991,151	5,083,027	6,113,247	3,736,459
		Landed Revenue	765,155	171,099	273,550	165,508
OR	Non-Whiting Groundfish	Landed Weight (lbs)	35,196,227	26,791,342	18,539,890	22,958,844
		Landed Revenue	17,989,249	14,686,968	10,150,420	12,766,460
	Pacific Whiting	Landed Weight (lbs)	151,460,973	117,673,122	71,219,860	80,647,902
		Landed Revenue	6,081,274	4,131,962	3,219,324	3,642,455
WA	Non-Whiting Groundfish	Landed Weight (lbs)	12,408,949	11,071,405	19,458,230	11,283,851
		Landed Revenue	4,635,366	4,449,096	4,688,602	4,634,791
	Pacific Whiting	Landed Weight (lbs)	26,799,684	39,087,616	23,434,208	37,506,184
		Landed Revenue	1,121,763	1,438,685	1,061,440	1,709,533

Source: PacFIN ftl data. July 2004
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

By weight, the vast majority of trawl vessel groundfish is caught with midwater trawl gear. This is due to the fact that Pacific whiting is targeted with midwater trawl gear. In contrast, the majority of trawl exvessel revenues are attributed to the bottom trawl sector (Table 3-14).

Table 3-14. Shoreside Trawl Groundfish Landings and Exvessel Revenue by Year, State, and Trawl Type

			YEAR			
Trawl Type	State	Data Type	2000	2001	2002	2003
Bottom Trawl	CA	Landed Weight	19,450,020	16,461,234	17,468,986	16,097,882
		Exvessel Revenue	10,837,133	9,067,273	9,956,840	8,586,131
	OR	Landed Weight	25,029,598	22,072,494	17,508,908	22,867,904
		Exvessel Revenue	13,518,662	12,544,088	9,660,636	12,678,106
	WA	Landed Weight	9,919,916	8,353,238	9,947,471	10,157,735
		Exvessel Revenue	3,554,208	3,413,438	3,633,637	4,186,790
Midwater Trawl	CA	Landed Weight	12,873,592	6,155,417	6,328,308	3,758,564
		Exvessel Revenue	1,670,291	683,018	381,377	172,905
	OR	Landed Weight	161,627,602	122,391,970	72,250,842	80,738,842
		Exvessel Revenue	10,551,861	6,274,841	3,709,107	3,730,809
	WA	Landed Weight	29,288,717	41,805,783	32,944,967	38,632,300
		Exvessel Revenue	2,202,921	2,474,343	2,116,405	2,157,534
Total Landed Weight			258,189,445	217,240,136	156,449,482	172,253,227
Total Exvessel Revenue			42,335,075	34,457,002	29,458,003	31,512,275

Source: PacFIN FTL table. July 2004
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Trawlers take the vast majority of the groundfish harvest measured by weight but somewhat less if measured by value. In 2003, groundfish trawlers landed over 95 percent of total groundfish harvest by weight but only 64 percent by value (Table 3-15). The difference in trawl weight and revenue proportions is mostly due to the catch of Pacific whiting. Since whiting are caught almost exclusively by limited entry trawl vessels, they skew the overall value per unit weight calculations for this sector.

Table 3-15. Shoreside Groundfish Landings and Revenue by Trawl and Non-Trawl Vessels

Gear Group	Data type	2000	2001	2002	2003
Non-Trawl	Landed Weight (lbs)	10,565,268	9,161,910	7,561,347	8,512,602
	Landed Revenue (US $)	20,354,173	17,577,891	13,980,221	17,433,163
Trawl	Landed Weight (lbs)	258,189,445	217,240,136	156,449,482	172,253,227
	Landed Revenue (US $)	42,335,075	34,457,002	29,458,003	31,512,275
Trawl Portion	Landed Weight (lbs)	96%	96%	95%	95%
	Landed Revenue (US $)	68%	66%	68%	64%

Source: PacFIN ftl data. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Trawl vessels make most of their landings in Oregon, and three of the largest four ports for landed weight from trawl vessels over the 2000 – 2003 period are located in Oregon. These same ports are the three largest ports for exvessel revenue, though the ranking differs somewhat (Table 3-16). Aside from Newport, Astoria, and Coos Bay, the other largest ports for trawl vessel landings are Westport and Ilwaco, WA, Eureka and Crescent City, CA, Brookings, OR, and Bellingham Bay and Neah Bay, WA.

Table 3-16. Largest Ports for LE Trawl Vessel Groundfish Landings and Exvessel Revenue (2000 – 2003)

Rank	Rank by Weight	Rank by Exvessel Revenue
1	NEWPORT	ASTORIA
2	ASTORIA	NEWPORT
3	WESTPORT	CHARLESTON (COOS BAY)
4	CHARLESTON (COOS BAY)	WESTPORT
5	ILWACO	BROOKINGS
6	EUREKA	BELLINGHAM BAY
7	CRESCENT CITY	NEAH BAY
8	BROOKINGS	PRINCETON / HALF MOON BAY
9	BELLINGHAM BAY	EUREKA
10	NEAH BAY	BLAINE
11	FIELDS LANDING	CRESCENT CITY
12	PRINCETON / HALF MOON BAY	ILWACO
13	BLAINE	SAN FRANCISCO
14	SAN FRANCISCO	FIELDS LANDING
15	PORT ANGELES	GARIBALDI (TILLAMOOK)

Source: PacFIN FTL table. July 2004

3.4.1.2 Limited Entry Groundfish Fixed Gear Sector

West coast limited entry fixed gear vessels typically use longline and fish pots (traps) for catching groundfish. Groundfish longline activities involve anchoring a stationary line to the ocean floor that has multiple baited hooks attached. The lines are attached with a buoy or pole at either end that floats at the surface, and then left within the water for up to several hours at a time. When ready, the vessel returns to the line and hauls the line to the surface to retrieve the gear and fish. Fish pots or traps that are used to harvest groundfish are traps that are generally square and have mesh or twine encompassing the exterior. These traps are set with bait that is fixed to the interior of the pot and the pot is dropped to the bottom of the ocean. A vertical line is attached to a surface pole or buoy so that the pot can be retrieved after the vessel detaches from the fishing gear. The fish can enter the trap through a door in the trap, but cannot exit the trap unless they are small enough to escape through the mesh, or back out the door. These pots are retrieved by the vessel several hours after being set. Both longlines and fish pots can be set across diverse ocean bottom types, though longlines can get hooked on rocky areas or reefs, causing some gear loss.

Most limited entry fixed gear vessels are shorebased vessels that range in size from 30 feet to 65 feet in length, with some vessels exceeding 100 feet, and some as small as 23 feet (Table 3-17). Limited entry fixed gear vessels may also participate in open access fisheries or in the limited entry trawl fishery. Like the limited entry trawl fleet, limited entry fixed gear vessels deliver their catch to ports along the Washington, Oregon, and California coast.

Table 3-17. Count of Limited Entry Vessels Making Landings with Hook and Line or Pot Gear by State, Year, and Vessel Length

		Vessel Length (feet)						
State	Year	< 40	40 - 49	50 - 59	60 - 69	70 – 79	80 - 89	> 89
CA	2000	23	25	14	2			
	2001	13	28	9	2			
	2002	14	23	10		2		
	2003	14	18	8				
OR	2000	24	46	18	14		1	
	2001	17	31	16	13	1	1	1
	2002	15	19	14	11		1	
	2003	15	21	10	9	1	2	1
WA	2000	11	21	16	5	2	1	
	2001	6	18	13	3	2	1	
	2002	7	14	10	6	2	1	
	2003	7	16	13	5	2	1	

Source: PacFIN FTL table. July 2004

3.4.1.2.1 Distribution of Effort by Limited Entry Fixed Gear Vessels

The principal target of limited entry fixed gear vessels is sablefish; a species that tends to reside in relatively deep water. The limited entry fixed gear sector is subject to rockfish conservation areas like the limited entry trawl sector, however the boundaries differ somewhat. Fixed gear vessels are more prone to catching some overfished rockfish species than trawl vessels - like yelloweye rockfish for example - and are therefore restricted from fishing on the continental shelf in a manner that differs from trawl vessels. Unfortunately, logbook data showing location and depth of effort for limited entry fixed gear vessels is not readily available, however some qualitative information is available describing the location of limited entry fixed gear effort. In large part, the locational abundance of sablefish and the boundaries of the rockfish conservation area have recently dictated the location of effort by limited entry fixed gear vessels. The current rockfish conservation area boundaries (in July 2004) for limited entry fixed gear has a seaward boundary of approximately 100 fathoms. North of 40 minutes, 10 degrees latitude, the population abundance of sablefish declines notably seaward of 150 fathoms, and is notably higher at 100 fathoms (NWFSC, 2003, PFMC, 2004), meaning that a large amount of limited entry fixed gear effort north of 40 minutes, 10 degrees latitude is exerted along a depth contour between 100 and 150 fathoms.

Limited entry fixed gear vessels exert most of their effort during the late spring, summer, and early fall. The monthly distribution of effort has become more spread out over the year, and the number of vessels participating has declined as the tier system and permit stacking provisions were put in place in 1998 and 2001 respectively (Table 3-18).

Table 3-18. Count of Limited Entry Vessels Making Landings with Fixed Gear by Month, Year, and Vessel Length

		Month											
Year	Vessel Length (feet)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	< 41	145	136	211	373	479	620	632	764	803	499	363	424
	41 - 65	85	78	114	221	248	185	336	725	476	271	181	123
	> 65			3				18	75	23		18	7
2001	< 41	453	452	380	552	487	491	524	556	630	320	204	79
	41 - 65	58	143	208	217	265	314	367	418	459	397	65	40
	> 65	1		8	7		12	26	52	53	26	4	
2002	< 41	303	350	415	359	368	331	242	330	367	321	226	167
	41 - 65	76	123	145	136	190	293	250	326	281	238	95	31
	> 65				14	36	24	14	17	40	25	4	4
2003	< 41	220	236	237	200	302	292	297	368	343	243	179	107
	41 - 65	55	77	69	72	146	254	329	312	314	222	72	21
	> 65			4	12	28	28	34	37	33	8	4	

Source: PacFIN VSMRFD files. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

3.4.1.2.2 Landings and Revenue from Limited Entry Fixed Gear Vessels

Vessels deploying longlines and traps (pots) comprise the bulk of the limited entry fixed gear sector. These gear types also may be used by vessels in the open access sector, but preferential harvest limits favor license holders. High-value sablefish have been the principal target for these vessels; this species accounts for a large share of landings, especially when measured by exvessel value. Not unexpectedly, this sector has been plagued by overcapacity, although a series of management initiatives have largely addressed the problem. In the early to mid 1990s the fishery was a “derby” managed by very short seasons of two weeks or less. Two groundfish FMP amendments, Amendment 9, requiring a permit endorsement to participate in the primary sablefish fishery, and Amendment 14, introducing permit stacking, have helped to alleviate the symptoms of over capacity in the fixed gear sablefish fishery, effectively eliminating the short, derby season. (Permit stacking allows up to three sablefish-endorsed permits to be used per vessel. Through a tier system, landing limits vary with the number and type of permits held.) According to PacFIN data, the majority of limited entry fixed gear landings occur in Oregon and Washington. Oregon and Washington also have a higher price per pound for sablefish, while California has a higher price per pound for other types of groundfish. This is most likely representative of the higher amount of high valued live fish landings that occur in California, as opposed to Oregon and Washington.

Table 3-19. Landings and Exvessel Revenue made by Limited Entry Vessels with Fixed Gear by State and Year (Hkl and Pot Gear)

			Year			
State	Species Aggregation	Data Type	2000	2001	2002	2003
CA	Non-Sablefish Groundfish	Landed Weight	558,671	544,400	527,015	609,251
		Exvessel Revenue	1,089,097	973,961	938,230	1,264,475
	Sablefish	Landed Weight	1,209,816	961,551	776,349	859,625
		Exvessel Revenue	1,867,147	1,448,199	1,146,177	1,508,804
OR	Non-Sablefish Groundfish	Landed Weight	163,965	227,351	112,882	83,201
		Exvessel Revenue	242,990	366,559	200,186	117,054
	Sablefish	Landed Weight	2,170,149	1,549,376	958,843	1,329,379
		Exvessel Revenue	4,874,550	3,426,052	2,278,876	3,339,126
WA	Non-Sablefish Groundfish	Landed Weight	845,502	573,704	991,433	503,736
		Exvessel Revenue	240,463	161,697	221,228	119,652
	Sablefish	Landed Weight	843,220	761,788	627,641	1,061,477
		Exvessel Revenue	2,476,966	2,138,753	1,873,744	3,194,644

Source: PacFIN FTL table. July 2004
Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Table 3-20 shows the top fifteen ports for limited entry fixed gear landings and exvessel revenue (there are 62 ports listed as receiving landings from LE fixed gear vessels from 2000 – 2003). The largest ports for limited entry fixed gear landings and exvessel revenue are located within Washington, Oregon, and northern California. The top ports for landings differ slightly from the top ports for exvessel revenue. The top five ports for landings make up approximately 54 percent of total landings, while the top five ports for revenue make up approximately 49 percent of total exvessel revenues for limited entry fixed gear vessels.

Table 3-20. Largest Ports for Limited Entry Fixed Gear Landings and Exvessel Revenue (2000 - 2003)

Rank	Top Ports for Exvessel Revenue	Top Ports for Landings
1	NEWPORT	BELLINGHAM BAY
2	BELLINGHAM BAY	NEWPORT
3	ASTORIA	MOSS LANDING
4	CHARLESTON (COOS BAY)	ASTORIA
5	MOSS LANDING	PORT ORFORD
6	WESTPORT	CHARLESTON (COOS BAY)
7	PORT ORFORD	WESTPORT
8	PORT ANGELES	PORT ANGELES
9	EUREKA	EUREKA
10	CRESCENT CITY	CRESCENT CITY
11	OCEANSIDE	SAN FRANCISCO
12	FORT BRAGG	FORT BRAGG
13	SAN FRANCISCO	OCEANSIDE
14	FLORENCE	FLORENCE
15	SEATTLE	NEWPORT BEACH

Source: PacFIN FTL table. July 2004

3.4.1.3 The Groundfish Open Access Sector

The open access sector comprises vessels that do not hold a federal groundfish limited entry permit and that target or incidentally catch groundfish using a variety of gears. The "open access" appellation can be confusing because vessels in this sector may hold limited entry permits for other, nongroundfish fisheries issued by the federal or state governments. However, groundfish catches by these vessels are regulated under the groundfish FMP. For example, open access vessels must comply with cumulative trip limits established for this sector and are subject to the other operational restrictions imposed in the regulations, including general exclusion from the Rockfish Conservation Areas.

Most open access groundfish is caught by fixed gear, though there are also substantial landings made by non-shrimp trawl gear, and net types other than trawl such as set net (Table 3-21). Sablefish and rockfish are generally the largest source of open access landings by weight and revenue, though there are also substantial landings of groundfish other than sablefish, rockfish, or flatfish and skates (Table 3-23).

Table 3-21. Open Access Groundfish Landings and Exvessel Revenue by State, Year, and Gear Group

			Year			
State	Gear Group	Data Type	2000	2001	2002	2003
CA	Dredge	Landed Weight (lbs)	C	C	C	C
		Exvessel Revenue	C	C	C	C
	Hook and Line	Landed Weight (lbs)	1,218,626	1,053,789	865,280	818,292
		Exvessel Revenue	2,871,120	2,521,246	1,864,774	1,644,510
	Misc.	Landed Weight (lbs)	2,140	148	229	63
		Exvessel Revenue	3,151	448	1,154	65
	Net	Landed Weight (lbs)	100,870	128,117	98,048	106,461
		Exvessel Revenue	85,625	106,763	88,543	97,987
	Pot	Landed Weight (lbs)	361,750	305,553	263,532	387,890
		Exvessel Revenue	852,555	704,248	557,881	677,169
	Shrimp Trawl	Landed Weight (lbs)	18,084	8,932	8,508	4,532
		Exvessel Revenue	18,753	10,806	11,885	7,045
	Non-Shrimp Trawl	Landed Weight (lbs)	54,701	15,949	19,232	4,563
		Exvessel Revenue	45,766	12,511	20,727	5,253
OR	Hook and Line	Landed Weight (lbs)	421,803	563,759	615,247	642,047
		Exvessel Revenue	749,701	995,381	1,280,502	1,160,157
	Net	Landed Weight (lbs)	C	C	C	C
		Exvessel Revenue	C	C	C	C
	Pot	Landed Weight (lbs)	10,449	28,488	24,453	41,978
		Exvessel Revenue	19,093	54,702	57,569	89,877
	Shrimp Trawl	Landed Weight (lbs)	21,978	19,527	9,376	8,904
		Exvessel Revenue	19,824	15,193	7,291	7,785
	Non-Shrimp Trawl	Landed Weight (lbs)		173,020		
		Exvessel Revenue		85,548		
WA	Hook and Line	Landed Weight (lbs)	182,386	206,037	184,726	376,393
		Exvessel Revenue	258,062	278,436	303,130	538,521
	Net	Landed Weight (lbs)	C	C	C	C
		Exvessel Revenue	C	C	C	C
	Pot	Landed Weight (lbs)	864	477		11,132
		Exvessel Revenue	1,817	1,284		28,035
	Shrimp Trawl	Landed Weight (lbs)	23,355	17,145	20,332	25,063
		Exvessel Revenue	11,537	9,774	12,577	12,905
	Non-Shrimp Trawl	Landed Weight (lbs)	73,597	236,614	604,280	823,468
		Exvessel Revenue	32,382	112,078	288,282	410,344
Total Landed Weight (lbs)			2,490,891	2,757,572	2,714,645	3,251,081
Total Exvessel Revenue			4,969,431	4,908,420	4,495,652	4,679,666

Source: PacFIN VSMRFD files. July 2004

Note: C represents data restricted due to confidentiality

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Fishery managers divide this sector into directed and incidental categories. The directed fishery comprises vessels targeting groundfish while the incidental fishery category applies to vessels targeting other fish but landing some groundfish in the process. In practice it can be difficult to segregate vessels into these two categories because, ultimately, the choice depends on the intention of the fisher (which the manager does not know). Over the course of a year—or even during a single trip—a fisher may engage in several different strategies, switching between the directed and incidental categories. Such changes in strategy are likely the result of a variety of factors, but especially the potential economic return from landing a particular mix of species. Because of these complexities, managers typically distinguish directed from incidental vessels by applying a value threshold to the landings composition for a particular vessel (or trip, depending on the kind of analysis): open access vessels with more than half of their total landings value coming from groundfish are included in the directed fishery while the remainder are assumed to be landing groundfish incidentally while targeting other species. Based on this criterion, the number of unique vessels targeting groundfish in the open access fishery between 1995 and 1998 coastwide was 2,723, while 2,024 unique vessels landed groundfish as incidental catch (1,231 of these vessels participated in both) (SSC Economic Subcommittee 2000).

Fisheries are generally distributed along the coast in patterns governed by factors such as location of target species, presence of ports with supporting marine supplies and services, and restrictions or regulations imposed by state and federal governments. The majority of landings by the directed groundfish fishery, by weight, occur off California, while Oregon shows the next highest landings. In the incidental groundfish fisheries, Washington also has the lowest groundfish landings by the incidental fishery (Hastie 2001). Participation in the open access fishery is much greater in California than in Oregon and Washington combined. In 1998, 779 California boats, 232 Oregon boats, and 50 Washington boats participated in the directed open access groundfish fishery; and 520 California boats, 305 Oregon boats, and 40 Washington boats participated in the incidental open access fishery (SSC Economic Subcommittee 2000).

Hook-and-line gear, the most common open access gear type, is generally used to target sablefish, rockfish, and lingcod; pot gear generally is used when targeting sablefish and some thornyheads and rockfish. Though largely restricted from use under current regulations, in the past in Southern and Central California setnet gear was used to target rockfish, including chilipepper, widow rockfish, bocaccio, yellowtail rockfish, and olive rockfish, and to a lesser extent vermillion rockfish.

Although most groundfish landed by open access fishers are typically landed and sold dead, higher prices for live fish have stimulated landings in this category. Live fish harvests are a recent but growing component of the directed fishery: In 2001, 20 percent of fish landed (by weight, coastwide) by directed open access fishers was alive, compared to only 6 percent in 1996.[3] In the live-fish fishery, the fish are caught using pots, stick gear, and rod-and-reel, and kept aboard the vessel in a seawater tank, to be delivered to foodfish markets—such as the large Asian communities in California—that pay a premium for live fish. Currently, Oregon and California are drafting nearshore fishery management plans that would move some species of groundfish landed in the live fish fishery from federal to state management.

Many fishers catch groundfish incidentally when targeting other species because of the kind of gear they use and the co-occurrence of target and groundfish species in a given area. Managers classify vessels in the open access incidental fishery if groundfish comprise 50 percent or less of their landings, measured by dollar value. Fisheries targeting pink shrimp, spot prawn, ridgeback prawn, California and Pacific halibut, Dungeness crab, salmon, sea cucumber, coastal pelagic species, California sheephead, highly migratory species, and the mix of species caught in the gillnet complex comprise this incidental segment of the open access sector.

3.4.1.3.1 Distribution of Effort by Groundfish Open Access Vessels

Limited information exists on the distribution of effort by open access vessels. The open access sector is made up of many different gear types, along with directed and incidental catch which makes it difficult to discern the location of effort, though based on the diversity of this sector, it is reasonable to assume that effort is widespread across the Pacific coast. Interestingly, the open access sector has a large live-fish fishery component, and it is assumed that a large portion of the live fish fishery is made up of effort located near shore due to the large degree of near shore species which make up live fish landings. The live fish fishery is a quickly growing component of the open access sector and it is reasonable to state that effort will continue to grow in the near shore areas as the live fish fishery component expands.

As shown in Table 3-22, open access landings and revenue tend to be more highly concentrated during the spring, summer, and fall months, though in 2003 higher landings occurred almost exclusively during the fall months. Unfortunately it is not possible to distinguish vessel intent, so it is therefore not possible to distinguish incidental from targeted open access. Assuming that landed catch is representative of directed open access, and that landed catch is a function of effort, then more open access related fishing activity occurs during the spring, summer, and fall months than winter months.

3/ Managers are faced with a similar problem as discussed above in determining landings from this fishery. Landings data do distinguish live fish sales, but the price information suggests that this classification is inaccurate. Therefore, in practice, only those sales of species other than sablefish that garner a landed price above $2.50 per pound are classified in the live fish sector

Table 3-22. Open Access Groundfish Landings and Exvessel Revenue by Year and Month

		Year			
Month	Data Type	2000	2001	2002	2003
Jan	Landed Weight (lbs)	93,701	112,254	181,903	110,711
	Exvessel Revenue	145,656	223,168	306,917	205,300
Feb	Landed Weight (lbs)	41,385	165,665	182,796	163,689
	Exvessel Revenue	65,017	302,154	414,606	340,653
Mar	Landed Weight (lbs)	73,791	143,817	252,550	160,549
	Exvessel Revenue	146,782	233,427	336,792	185,578
Apr	Landed Weight (lbs)	159,222	167,204	179,382	245,277
	Exvessel Revenue	288,795	289,676	302,902	254,953
May	Landed Weight (lbs)	183,220	258,256	262,229	292,340
	Exvessel Revenue	375,394	548,591	533,438	579,894
Jun	Landed Weight (lbs)	254,531	261,425	312,602	270,832
	Exvessel Revenue	536,131	500,489	548,528	532,533
Jul	Landed Weight (lbs)	317,609	515,377	273,616	291,337
	Exvessel Revenue	577,348	757,606	476,710	573,222
Aug	Landed Weight (lbs)	293,626	360,067	303,725	344,512
	Exvessel Revenue	683,134	638,477	504,046	549,447
Sep	Landed Weight (lbs)	256,663	306,550	305,507	536,720
	Exvessel Revenue	548,398	538,645	357,348	627,820
Oct	Landed Weight (lbs)	250,241	191,702	184,380	392,800
	Exvessel Revenue	477,569	418,312	315,544	401,556
Nov	Landed Weight (lbs)	271,041	193,812	196,511	359,501
	Exvessel Revenue	522,012	302,037	292,301	344,660
Dec	Landed Weight (lbs)	295,861	81,443	79,445	82,812
	Exvessel Revenue	603,194	155,837	106,519	84,050

Source: PacFIN VSMRFD files. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

3.4.1.3.2 Landings and Revenue from Groundfish Open Access Vessels

Landings and revenue made by the open access sector are mainly composed of rockfish, thornyheads, and sablefish (Table 3-23), and as shown previously, the largest gear type for open access landings is hook and line. Open access landings in the state of California have a large live fish component, which is made evident by the relatively high per unit value of rockfish in that state compared to the unit value of rockfish in Oregon and Washington. Many of the largest ports for open access landings and revenue are located in California (Table 3-24).

Table 3-23. Open Access Groundfish Landings and Exvessel Revenue by Year, State, and Species

			Year			
State	Species Aggregation	Data Type	2000	2001	2002	2003
CA	Flatfish and Skates	Landed Weight (lbs)	93,158	48,856	42,579	15,140
		Exvessel Revenue	87,688	63,929	61,621	20,649
	Rockfish(1)	Landed Weight (lbs)	705,190	652,021	486,113	461,812
		Exvessel Revenue	1,789,851	1,750,273	1,259,855	1,027,475
	Other Groundfish	Landed Weight (lbs)	300,719	253,393	185,577	169,155
		Exvessel Revenue	1,070,487	775,543	533,652	506,268
	Sablefish	Landed Weight (lbs)	657,104	558,217	541,963	675,694
		Exvessel Revenue	928,945	766,276	691,173	877,637
OR	Flatfish and Skates	Landed Weight (lbs)	310	22,435	1,034	1,750
		Exvessel Revenue	69	12,341	159	391
	Rockfish(1)	Landed Weight (lbs)	241,363	455,647	309,452	260,633
		Exvessel Revenue	292,445	428,552	478,855	329,766
	Other Groundfish	Landed Weight (lbs)	123,930	176,758	242,546	150,631
		Exvessel Revenue	329,379	462,625	678,185	399,524
	Sablefish	Landed Weight (lbs)	88,627	129,954	96,044	280,209
		Exvessel Revenue	166,725	247,306	188,163	528,151
WA	Flatfish and Skates	Landed Weight (lbs)	2,899	6,052	3,045	23,268
		Exvessel Revenue	814	1,453	1,067	4,533
	Rockfish(1)	Landed Weight (lbs)	172,836	338,792	670,658	662,355
		Exvessel Revenue	80,701	164,664	323,228	319,673
	Other Groundfish	Landed Weight (lbs)	31,187	26,426	36,572	369,093
		Exvessel Revenue	15,785	15,262	20,284	172,052
	Sablefish	Landed Weight (lbs)	73,567	89,021	99,063	181,340
		Exvessel Revenue	206,543	220,195	259,410	493,547
Total Landed Weight (lbs)			2,490,890	2,757,572	2,714,646	3,251,080
Total Exvessel Revenue			4,969,432	4,908,419	4,495,652	4,679,666

1) The "Rockfish" aggregation includes thornyheads and scorpionfish

Source: PacFIN VSMRFD files. July 2004

Note: Data shown is for PFMC management areas and does not include areas such as Puget Sound and Columbia River for example.

Table 3-24. Top Ports for Open Access Groundfish Landings and Revenue (2000 - 2003)

Rank	Top 15 Ports for Landed Revenue	Top 15 Ports for Landed Weight
1	MORRO BAY	MOSS LANDING
2	PORT ORFORD	NEAH BAY
3	MOSS LANDING	FORT BRAGG
4	FORT BRAGG	PORT ORFORD
5	GOLD BEACH	PORT ANGELES
6	AVILA	MORRO BAY
7	SANTA BARBARA	GOLD BEACH
8	PORT ANGELES	WESTPORT
9	CRESCENT CITY	EUREKA
10	NEAH BAY	CRESCENT CITY
11	SAN FRANCISCO	ASTORIA
12	MONTEREY	SAN FRANCISCO
13	ASTORIA	AVILA
14	EUREKA	CHARLESTON (COOS BAY)
15	WESTPORT	BROOKINGS

Source: PacFIN VSMRFD files. July 2004

3.4.1.4 Non – Groundfish Fisheries

Nongroundfish species and fisheries targeting them often need to be considered in groundfish management for several reasons. Other species may be caught incidentally in fisheries targeting groundfish, thus management measures that change total fishing effort in groundfish fisheries could increase or decrease fishing mortality of incidentally-caught non-groundfish species; management measures affecting groundfish fisheries may create a secondary effect by inducing additional effort in non-groundfish fisheries on the part of groundfish fishermen that may be displaced by groundfish regulations; fisheries targeting nongroundfish species may be affected by management measures intended to reduce or eliminate incidental catches of overfished groundfish species in these fisheries; and the spatial distribution of effort within these fisheries may overlap with habitat areas that are of interest to this EIS. This section describes these fisheries.

3.4.1.4.1 Dungeness Crab Fishery

Dungeness crab are managed by the states of Oregon and California, and by the State of Washington in cooperation with Washington Coast treaty tribes, and with inter-state coordination through the Pacific States Marine Fisheries Commission. The Dungeness crab fishery is divided between treaty sectors, covering catches by Indian Tribes, and a non-treaty sector. This fishery is managed on the basis of simple “3-S” principles: sex, season, and size. Only male crabs may be retained in the commercial fishery (thus protecting the reproductive potential of the populations), the fishery has open and closed seasons, and a minimum size limit is imposed on commercial landings of male crabs. In

Washington, the Dungeness crab fishery is managed under a limited entry system with two tiers of pot limits and a December 1 through September 15 season. In Oregon, 306 vessels made landings in 1999 during a season that generally starts on December 1. In California, distinct fisheries occur in Northern and Central California, with the northern fishery covering a larger area. California implemented a limited entry program in 1995, and as of March 2000 about 600 California residents and 70 non-residents had limited entry permits. Nonetheless, effort has increased with the entry of larger multipurpose vessels from other fisheries. Landings have not declined, but this effort increase has resulted in a “race for fish” with more than 80 percent of total landings made during the month of December.

Dungeness crab are targeted by both personal use fishers and commercial fishers. At the commercial level, the Dungeness crab fishery generates a sizeable amount of exvessel revenue, and in recent years (2002 and 2003) the amount of exvessel revenue generated by the fishery has been increasing due in part to increases in stock biomass. The majority of Dungeness crab fishing effort and catch occurs during the months of December and January. Many types of vessels participate in this fishery including vessels that may otherwise be limited entry groundfish trawlers, limited entry groundfish fixed gear vessels, or other types of vessels that may be considered albacore trollers for example.

The Dungeness crab fishery tends to occur in areas nearer to shore than the limited entry trawl and fixed gear fisheries. In fact, there is a conscious effort on the part of the PFMC’s Groundfish Management Team to allow groundfish trawl vessels access to waters deeper than 60 fathoms during winter months in order to avoid gear interactions with the Dungeness crab fishery.

All three states are comparable in terms of landed weight and revenue in coastal management areas, though Washington has a large Puget Sound component. Washington has been the largest state in recent years for coastal Dungeness crab, followed closely by Oregon, then California, respectively.

Table 3-25. Landings and Exvessel Revenue of Dungeness Crab by Area, State, and Year (2000 - 2003)

			YEAR			
Area	State	Data type	2000	2001	2002	2003
Coastal Management Areas	CA	Landed weight (lbs)	6,482,913	3,546,106	7,297,676	22,196,754
		Exvessel revenue	13,751,700	9,009,756	13,458,089	35,270,665
	OR	Landed weight (lbs)	11,180,845	9,689,804	12,442,612	23,480,735
		Exvessel revenue	23,710,261	19,291,484	20,759,342	36,399,904
	WA	Landed weight (lbs)	11,700,416	12,049,827	16,101,625	28,191,992
		Exvessel revenue	25,609,842	24,003,463	26,707,196	45,129,820
Other Management Areas	CA	Landed weight (lbs)				C
		Exvessel revenue				C
	WA	Landed weight (lbs)	6,732,220	7,522,403	6,944,948	6,941,032
		Exvessel revenue	14,084,886	14,752,254	13,548,402	13,259,518
Total Landed weight (lbs)			36,096,394	32,808,140	42,786,861	80,810,513*
Total Exvessel revenue			77,156,690	67,056,957	130,059,907	130,071,468*

Source: PacFIN ftl table. August 2004
Note: C represents data restricted due to confidentiality
“Other management areas” includes inside waters such as Puget Sound and Columbia River
* totals do not include confidential data

Table 3-26. Top 15 Ports for Dungeness Crab Landings and Revenue (2000 - 2003)

Rank	Top Ports for Dungeness Crab by Weight	Top Ports for Dungeness Crab by Value
1	WESTPORT	WESTPORT
2	ASTORIA	ASTORIA
3	CRESCENT CITY	CRESCENT CITY
4	NEWPORT	NEWPORT
5	BELLINGHAM BAY	BELLINGHAM BAY
6	CHARLESTON (COOS BAY)	CHARLESTON (COOS BAY)
7	EUREKA	EUREKA
8	BROOKINGS	BLAINE
9	BLAINE	BROOKINGS
10	ILWACO	SAN FRANCISCO
11	SAN FRANCISCO	LACONNER
12	CHINOOK	ILWACO
13	LACONNER	CHINOOK
14	TAHOLAH	TAHOLAH
15	ANACORTES	PRINCETON / HALF MOON BAY

Source: PacFIN FTL table. July 2004

3.4.1.4.2 Highly Migratory Species Fisheries

Highly migratory species (HMS) include tunas, billfish, dorado, and sharks—species that range great distances during their lifetime, extending beyond national boundaries into international waters and among the EEZs of many nations in the Pacific. In 2003, the Council adopted a Highly Migratory Species FMP to federally regulate the take of HMS within and outside the U.S. West Coast EEZ. NMFS approved the FMP, allowing implementation, on January 30, 2004. The FMP (PFMC 2003c) describes management unit species in detail; these are five tuna species, five shark species, striped marlin, swordfish, and dorado (dolphinfish). A much longer list of species, constituting all those that have been caught in HMS fisheries and not already under state or federal management, will be monitored, but are not part of the management unit.

Management of HMS is complex due to the multiple management jurisdictions, users, and gear types targeting these species. Adding to this complexity are oceanic regimes that play a major role in determining species availability and which species will be harvested off the U.S. West Coast in a given year. There are five distinctive gear types used to harvest HMS commercially, with hook-and-line gear being the oldest and most common. Other gear types used to target HMS are driftnet, pelagic longline, purse seine, and harpoon. While hook-and-line can be used to take any HMS species, traditionally it has been used to harvest tunas. The principal target species in these fisheries include albacore and other tunas, swordfish and other billfish, several shark species, and dorado. Albacore is the most important species, in terms of landings and is commonly caught with troll gear. The majority of albacore are taken by troll and jig-and-bait gear (92% in 1999), with a small portion of fish landed by gillnet, drift longline, and other gear. These gears vary in the incidence of groundfish interception depending on the area fished, time of year, as well as gear type. Overall, nearly half of the total coastwide landings of albacore, by weight, were landed in California. Other HMS gear includes pelagic longline, used to target swordfish, shark and tunas; drift gillnet gear for swordfish, tunas, and sharks off California and Oregon; purse seine gear for tuna off California and Oregon; and harpoon for swordfish off California and Oregon. Some vessels, especially longliners and purse seiners, fish outside of the U.S. EEZ, but may deliver to West Coast ports. Drift gillnet is most likely to intercept groundfish, including whiting, spiny dogfish, and yellowtail rockfish.

Table 3-27. Landings and Revenue of HMS by Species and Year

		Year			
Species Type	Data Type	2000	2001	2002	2003
Albacore	Landed Weight (lbs)	19,848,814	24,495,425	22,063,692	36,485,624
	Exvessel Revenue	17,103,010	20,577,991	14,272,304	24,305,367
Shark	Landed Weight (lbs)	547,195	567,274	517,745	491,807
	Exvessel Revenue	720,450	670,249	629,727	588,697
Other Tuna	Landed Weight (lbs)	1,559,831	1,644,104	78,491	113,077
	Exvessel Revenue	900,461	833,464	90,157	100,998
Dorado and Marlin	Landed Weight (lbs)	8,946	18,394	C	C
	Exvessel Revenue	12,633	13,501	C	C
Swordfish	Landed Weight (lbs)	1,252,875	640,799	609,248	980,229
	Exvessel Revenue	4,054,296	2,158,192	2,264,288	3,131,158
Total Landed Weight (lbs)		23,217,661	27,365,996	23,269,176*	38,070,737*
Total Exvessel Revenue		22,790,849	24,253,397	17,256,476*	28,126,220*

Source: PacFIN FTL table. July 2004

Note: C represents data restricted due to confidentiality

* totals do not include confidential data

Table 3-28. HMS Landings and Exvessel Revenue by State, Year, and Major Gear Group

			YEAR			
State	Gear Group	Data Type	2000	2001	2002	2003
CA	Hook and Line	Landed Weight (lbs)	2,323,968	2,402,114	4,534,829	2,697,411
		Exvessel Revenue	2,741,226	2,334,606	2,945,594	2,741,955
	Net	Landed Weight (lbs)	2,902,991	2,802,769	1,090,415	930,255
		Exvessel Revenue	3,975,012	2,850,343	2,225,363	1,741,480
	Troll	Landed Weight (lbs)	1,964,550	3,907,886	1,364,167	1,360,872
		Exvessel Revenue	1,872,012	3,063,523	1,024,421	988,564
OR		Landed Weight (lbs)	C	76,513	323,497	C
	Hook and Line	Exvessel Revenue	C	41,340	198,261	C
	Net	Landed Weight (lbs)	C		C	86,604
		Exvessel Revenue	C		C	13,720
	Troll	Landed Weight (lbs)	8,755,933	8,948,222	4,036,735	9,039,680
		Exvessel Revenue	7,488,326	7,545,405	2,752,640	6,115,181
WA		Landed Weight (lbs)	C	C	C	
	Hook and Line	Exvessel Revenue	C	C	C	
	Net	Landed Weight (lbs)	C			
		Exvessel Revenue	C			
	Troll	Landed Weight (lbs)	7,020,617	9,145,451	11,776,387	23,792,124
		Exvessel Revenue	5,836,813	7,947,279	7,418,555	15,706,940

Source: PacFIN FTL table. July 2004.
Note: C represents data restricted due to confidentiality

Table 3-29. Top Ports for HMS Landings and Exvessel Revenue (2000 - 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	ILWACO	ILWACO
2	NEWPORT	NEWPORT
3	WESTPORT	WESTPORT
4	ASTORIA	ASTORIA
5	CHARLESTON (COOS BAY)	SAN DIEGO
6	TERMINAL ISLAND	MORRO BAY
7	EUREKA	SAN PEDRO
8	MORRO BAY	CHARLESTON (COOS BAY)
9	MOSS LANDING	TERMINAL ISLAND
10	BELLINGHAM BAY	EUREKA
11	SAN PEDRO	MOSS LANDING
12	SAN DIEGO	BELLINGHAM BAY
13	OCEANSIDE	SAN FRANCISCO
14	FIELDS LANDING	OCEANSIDE
15	CRESCENT CITY	CRESCENT CITY

Source: PacFIN FTL table. July 2004

3.4.1.4.3 Pacific Pink Shrimp Fishery

Pacific pink shrimp (Pandalus jordani) are found from Unalaska in the Aleutian Islands to San Diego, California, at depths of 25 fm to 200 fm (46 m to 366 m). Off the U.S. West Coast these shrimp are harvested with trawl gear from Northern Washington to Central California between 60 fm and 100 fm (110 m to 180 m). The majority of the catch is taken off the coast of Oregon. Concentrations of pink shrimp are associated with well-defined areas of green mud and muddy-sand bottoms. Shrimp trawl nets are usually constructed with net mesh sizes smaller than the net mesh sizes for legal groundfish trawl gear. Thus, it is shrimp trawlers that commonly take groundfish in association with shrimp, rather than the reverse.

Pacific shrimp fisheries are managed by the states of Washington, Oregon, and California. The pink shrimp fishery is managed by the states of Washington, Oregon, and California. The Council has no direct management authority. In 1981, the three coastal states established uniform coastwide regulations for the pink shrimp fishery. The season runs from April 1 through October 31. Pink shrimp may be taken for commercial purposes only by trawl nets or pots. Most of the pink shrimp catch is taken with trawl gear with minimum mesh size of one inch to three-eights inches between knots. In some years the pink shrimp trawl fishery has accounted for a significant share of canary rockfish incidental catch. The Council has discussed methods to control shrimp fishing activities, such as requiring all vessels to use bycatch reduction devices (finfish excluders). In 2002, finfish excluders in the pink shrimp fisheries were mandatory in California, Oregon, and Washington. Many vessels that participate in the shrimp trawl fishery also have groundfish limited entry permits. When participating in the pink shrimp fishery, they must abide by the same rules as vessels that do not have limited entry permits. However, all groundfish landed by vessels with limited entry permits are included in the limited entry total.

Table 3-30. Pink Shrimp Landings and Exvessel Revenue by Year and State (LBS and USD)

		YEAR			
State	Data Type	2000	2001	2002	2003
CA	Landed Weight (lbs)	2,459,095	3,612,205	4,116,213	2,147,685
	Exvessel Revenue	1,049,119	992,644	1,275,023	657,159
OR	Landed Weight (lbs)	25,462,479	28,482,140	41,583,534	20,545,976
	Exvessel Revenue	10,192,294	7,560,473	11,352,588	5,051,246
WA	Landed Weight (lbs)	4,360,914	6,590,344	10,105,043	7,893,802
	Exvessel Revenue	1,700,410	1,713,687	2,745,707	1,959,662
Total Landed Weight (lbs)		32,282,488	38,684,689	55,804,790	30,587,463
Total Exvessel Revenue		12,941,823	10,266,804	15,373,317	7,668,068

Source: PacFIN FTL table. July 2004

Table 3-31. Top 15 Ports for Pink Shrimp Landings and Exvessel Revenue (2000 – 2003)

Rank	Top Ports by Weight	Top Ports by Exvessel Revenue
1	ASTORIA	ASTORIA
2	NEWPORT	NEWPORT
3	CHARLESTON (COOS BAY)	CHARLESTON (COOS BAY)
4	WESTPORT	WESTPORT
5	GARIBALDI (TILLAMOOK)	GARIBALDI (TILLAMOOK)
6	EUREKA	EUREKA
7	CRESCENT CITY	CRESCENT CITY
8	BROOKINGS	BROOKINGS
9	ILWACO	ILWACO
10	SOUTH BEND	SOUTH BEND
11	TOKELAND	MORRO BAY
12	MORRO BAY	TOKELAND
13	AVILA	AVILA
14	FIELDS LANDING	FIELDS LANDING
15	MONTEREY	MONTEREY

Source: PacFIN FTL table. July 2004

3.4.1.4.4 Ridgeback Prawn Fisheries

Ridgeback prawns (Sicyonia ingentis) are found south of Monterey, California to Baja California, Mexico, in depths of 145 metric feet to 525 metric feet (Sunada et al. 2001). They are more abundant south of Point Conception and are the most common invertebrate appearing in trawls. Their preferred habitat is sand, shell and green mud substrate, and relatively sessile. Although information about their feeding habits is limited, these prawns probably are detritus feeders. In turn, they are prey for sea robins, rockfish, and lingcod. Unlike other shrimp species, which carry their eggs during maturation, ridgeback prawns release their eggs into the water column. They spawn seasonally from June to October. Surveys recorded increasing abundance of ridgeback prawns from 1982, when surveys began, to 1985; the population then declined; more recent CPUE data suggest increased abundance in the 1990s. These changes may be due to climate phenomena, particularly El Niño events.

The Ridgeback prawn fishery occurs exclusively in California, centered in the Santa Barbara Channel and off Santa Monica Bay. In 1999, 32 boats participated in the ridgeback prawn fishery. Traditionally, a number of boats fish year-round for both ridgeback and spot prawns, targeting ridgeback prawns during the closed season for spot prawns and vice versa. Most boats typically use single-rig trawl gear. The ridgeback prawn fishery is managed by the State of California and, similar to spot prawn and pink shrimp, is considered an “exempted” trawl gear in the federal open access groundfish fishery, entitling the fishery to groundfish trip limits.

Following a 1981 decline in landings, the California Fish and Game Commission adopted a June through September closure to protect spawning female and juvenile ridgeback prawns. An incidental take of 50 pounds of prawns or 15 percent by weight is allowed during the closed period. During the season, a maximum of 1,000 pounds of other finfish may be landed with ridgeback prawns, of which federal regulations require no more than 300 pounds per trip be groundfish. Any amount of sea cucumbers may be landed with ridgeback prawns as long as the vessel owner/operator possesses a sea cucumber permit. Other regulations include a prohibition on trawling within state waters, a minimum fishing depth of 25 fm, a minimum mesh size of 1.5 inches for single-walled codends or 3 inches for double-walled codends and a logbook requirement. Ridgeback prawn trawl logs have been required since 1986.

Table 3-32. Ridgeback Prawn Landings and Exvessel Revenue by Year (LBS and USD)

		YEAR			
Gear Group	Data Type	2000	2001	2002	2003
Trawl	Landed Weight (lbs)	141,160	16,920	19,735	12,454
	Exvessel Revenue	165,345	26,976	31,599	14,641
Shrimp Trawl	Landed Weight (lbs)	1,414,844	340,024	422,240	486,890
	Exvessel Revenue	1,633,636	508,853	606,064	669,274
Other Gears	Landed Weight (lbs)	10,172			237
	Exvessel Revenue	13,201			641
Total Landed Weight (lbs)		1,566,176	356,944	441,975	499,581
Total Exvessel Revenue		1,812,182	535,829	637,663	684,557

Source: PacFIN FTL table. July 2004

Table 3-33. Rank of All Ports with Ridgeback Prawn Landings and Exvessel Revenue (2000 – 2003)

Rank	Rank of Ports by Weight	Rank of Ports by Exvessel Revenue
1	SANTA BARBARA	SANTA BARBARA
2	VENTURA	VENTURA
3	OXNARD	OXNARD
4	TERMINAL ISLAND	TERMINAL ISLAND
5	LONG BEACH	LONG BEACH
6	PLAYA DEL REY	PLAYA DEL REY
7	PORT HUENEME	PORT HUENEME
8	SAN PEDRO	SAN PEDRO
9	MORRO BAY	MORRO BAY
10	AVILA	AVILA
11	SAN SIMEON	SAN SIMEON
12	POINT ARENA	POINT ARENA
13	PRINCETON / HALF MOON BAY	PRINCETON / HALF MOON BAY

Source: PacFIN ftl table. August 2004

3.4.1.4.5 Kelp Fishery

The giant kelp forest canopy serves as a nursery, feeding grounds, and/or shelter for a variety of groundfish species and their prey. In addition, when kelp plants are naturally broken free of their holdfasts, the kelp is carried by waves and currents along the bottom to deep-water habitats and in surface waters to beaches and rocky intertidal areas. Kelp detritus supports high secondary production and prey for many fishes.

The commercial harvest of giant kelp forests has been a thriving industry in California since 1910. Harvesting is undertaken by ships designed specifically for cutting the surface canopy no lower than 1.2 m below the surface in a strip eight meters wide, much like a lawn mower. Regulations are imposed by the State of California to ensure that harvesting activities have a minimal impact on kelp forests. Kelp canopies cut according to this regulation generally grow back within several weeks to a few months.

Kelp harvesting can have a variety of possible impacts on kelp forests and nearshore communities. For example, giant kelp is a source of food for other marine communities, and unregulated harvest of kelp can potentially remove a substantial portion of this source. The kelp canopy also serves as habitat for canopy-dwelling invertebrates and has may have an enhancing effect on fish recruitment and abundance; these functions can be severely impeded by unregulated harvesting operations. Removal of the canopy can displace fish such as young-of-the-year rockfishes. Extensive or permanent loss of kelp canopy could have adverse impacts on local fish recruitment and abundance.

The following references were used in compiling this description: California Department of Fish and Game (1995), Cross and Allen (1993), Feder, et al. (1974), Foster and Schiel (1985), and Vetter (1995).

Table 3-34. Harvest of Kelp off California by Year

Year	Harvested Weight (short tons)
1990	151,439.21
1991	127,504.68
1992	91,246.54
1993	92,940.41
1994	81,006.38
1995	77,753.00
1996	78,461.00
1997	73,165.00
1998	25,313.00
1999	42,211.00
2000	46,200.00
2001	40,298.00
2002	51,868.00

Source: California Department of Fish and Game. As cited at NMFS SWR website Aug 2004. http://swr.nmfs.noaa.gov/fmd/bill/kelp.htm.

3.4.1.4.6 Salmon

The ocean commercial salmon fishery, both non-treaty and treaty, is under federal management with a suite of seasons and total allowable harvest. The Council manages fisheries in the EEZ while the states manage fisheries in their waters (zero nm to three nm). All ocean commercial salmon fisheries off the West Coast states use troll gear. Chinook and coho are the principle target species with limited pink salmon landings in odd-years. However, commercial coho landings fell precipitously in the early 1990s and remain very low. Because many wild salmon stocks have been listed under the ESA, the management regime is largely structured around so-called “no jeopardy standards” developed through the ESA-mandated consultation process. Ocean fisheries are managed according to zones reflecting the distribution of salmon stocks and are structured to allow and encourage capture of hatchery-produced stocks while depressed natural stocks are avoided. The Columbia River, on the Oregon/Washington border, the Klamath River in Southern Oregon, and the Sacramento River in Central California support the largest runs of returning salmon.

The salmon troll fishery has an incidental catch of Pacific halibut and groundfish, including yellowtail rockfish. The historical data show that trips where no halibut are landed have a higher range of groundfish landings (11-149 mt) in comparison to trips where halibut was landed (1-19 mt). However, looking at groundfish catch frequency, either by vessel or trips, reveals that groundfish are caught more often by vessels or on trips catching halibut. Small amounts of rockfish and other groundfish are taken as incidental catch in salmon troll fisheries. Although the gillnet/tangle net fishery does not technically occur in Council-managed waters, it may have some impact on groundfish that migrate through that area during part of their life cycle. To account for yellowtail rockfish landed incidentally while not promoting targeting on the species, a federal regulation was adopted in 2001 that allowed salmon trollers to land up to one pound of yellowtail per two pounds of salmon, not to exceed 300 pounds per month (north of Cape Mendocino).

Table 3-35. Salmon Landings and Exvessel Revenue by Area, State, and Year (LBS and USD)

			YEAR			
Area	State	Data type	2000	2001	2002	2003
Coastal Management Areas	CA	Landed weight (lbs)	5,143,030	2,407,615	4,941,537	6,382,942
		Exvessel revenue	10,325,395	4,772,551	7,643,076	12,166,622
	OR	Landed weight (lbs)	1,563,697	2,960,716	3,501,154	3,667,155
		Exvessel revenue	3,069,828	4,736,557	5,388,352	7,198,494
	WA	Landed weight (lbs)	416,030	1,090,350	1,348,292	1,443,320
		Exvessel revenue	566,873	1,096,778	1,313,661	1,594,448
Other Management Areas	OR	Landed weight (lbs)	1,340,819	1,855,600	2,089,757	2,438,378
		Exvessel revenue	961,419	1,125,372	1,543,793	1,586,972
	WA	Landed weight (lbs)	12,750,614	28,791,819	32,904,386	31,122,453
		Exvessel revenue	9,772,895	11,298,116	12,013,803	11,100,583
Total Landed weight (lbs)			21,214,190	37,106,100	44,785,126	45,054,248
Total Exvessel revenue			24,696,410	23,029,373	27,902,685	33,647,119

Source: PacFIN ftl table. August 2004
Note: “Other management areas” includes inside waters such as Puget Sound and Columbia River

Table 3-36. Top 15 Ports for Salmon Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	BELLINGHAM BAY	NEWPORT
2	SEATTLE	FORT BRAGG
3	SHELTON	BELLINGHAM BAY
4	COLUMBIA RIVER PORTS - OREGON	CHARLESTON (COOS BAY)
5	TAHOLAH	BODEGA BAY
6	LACONNER	SAN FRANCISCO
7	NEWPORT	COLUMBIA RIVER PORTS - OREGON
8	EVERETT	SHELTON
9	FORT BRAGG	PRINCETON / HALF MOON BAY
10	TACOMA	SEATTLE
11	BLAINE	MOSS LANDING
12	COPALIS BEACH	TACOMA
13	PORT ANGELES	TAHOLAH
14	BODEGA BAY	PORT ANGELES
15	CHARLESTON (COOS BAY)	BLAINE

Source: PacFIN ftl tables. August 2004

3.4.1.4.7 Pacific Halibut

Pacific halibut (Hippoglossus stenolepis) belong to a family of flounders called Pleuronectidae. Pacific halibut can be found along the continental shelf in the North Pacific and Bering Sea. They have flat, diamond-shaped bodies and are able to migrate long distances. Most adult fish tend to remain on the same grounds year after year, making only a seasonal migrations from the more shallow feeding grounds in summer to deeper spawning grounds in winter. Halibut are usually found in deep water (40 m to 200 m).

Pacific halibut are managed by the bilateral (U.S./Canada) International Pacific Halibut Commission (IPHC) with implementing regulations set by Canada and the U.S. in their own waters. The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the West Coast. Implementation of IPHC catch levels and regulations is the responsibility of the Council, the states of Washington, Oregon, and California, and the Pacific halibut treaty tribes. A license from the IPHC is required to participate in the commercial Pacific halibut fishery. The commercial sector in Area 2A has both a treaty and non-treaty sector. The directed commercial fishery in Area 2A is confined to south of Point Chehalis, Washington, Oregon, and California. In the non-treaty commercial sector, 85% of the harvest is allocated to the directed halibut fishery and 15% to the salmon troll fishery to cover incidental catch. When the Area 2A total allowable catch (TAC) is above 900,000 pounds, halibut may be retained in the limited entry primary sablefish fishery north of Point Chehalis, Washington (46E 53' 18" N latitude). In 2003, the TAC was above this level, and the allocation was 70,000 pounds. Final landings for this fishery in 2003 were 65,325 pounds; 56% (47,946 pounds) of the allocation was harvested. Area 2A licenses, issued for the directed commercial fishery, have decreased from 428 in 1997 to 320 in 2001.

Table 3-37. Pacific Halibut Landings and Exvessel Revenue by Year and Gear (LBS and USD)

		YEAR			
Gear Group	Data Type	2000	2001	2002	2003
Hook and Line	Landed weight (lbs)	519,645	745,500	949,274	807,131
	Exvessel Revenue	1,358,462	1,578,914	1,941,603	2,226,318
Troll	Landed weight (lbs)	25,574	37,639	42,811	48,416
	Exvessel Revenue	62,210	78,409	81,505	107,640
Total Landed weight (lbs)		545,219	783,139	992,085	855,547
Total Exvessel Revenue		1,420,671	1,657,323	2,023,108	2,333,958

Source: PacFIN ftl table. August 2004

Table 3-38. Top 15 Ports for Pacific Halibut Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	NEAH BAY	NEAH BAY
2	NEWPORT	NEWPORT
3	PORT ANGELES	PORT ANGELES
4	TAHOLAH	BELLINGHAM BAY
5	BELLINGHAM BAY	TAHOLAH
6	LAPUSH	LAPUSH
7	ASTORIA	ASTORIA
8	WESTPORT	WESTPORT
9	CHARLESTON (COOS BAY)	CHARLESTON (COOS BAY)
10	EVERETT	BLAINE
11	BLAINE	EVERETT
12	FLORENCE	FLORENCE
13	PORT ORFORD	GARIBALDI (TILLAMOOK)
14	GARIBALDI (TILLAMOOK)	CHINOOK
15	CHINOOK	PORT ORFORD

Source: PacFIN ftl table. August 2004

3.4.1.4.8 California Halibut

California halibut (Paralichthys californicus) are a left-eyed flatfish of the family Bothidae. They range from Northern Washington at approximately the Quileute River to southern Baja California, Mexico, (Eschmeyer et al. 1983), but are most common south of Oregon. They are predominantly associated with sand substrates from nearshore areas just beyond the surf line to about 183 m. California halibut feed on fishes and squids and can take their prey well off the bottom.

The commercial California halibut fishery extends from Bodega Bay in northern California to San Diego in Southern California, and across the international border into Mexico. California halibut, a state-managed species, is targeted with hook-and-line, setnets and trawl gear, all of which intercept groundfish. Fishing with 4.5-inch minimum mesh size trawl nets is permitted in federal waters, but prohibited within state waters, except in the designated “California halibut trawl grounds,” where a 7.5-inch minimum mesh size must be used. These areas are also closed seasonally. Historically, commercial halibut fishers have preferred setnets, because of these restrictions. Setnets with 8.5-inch mesh and maximum length of 9,000 feet are the main gear type used in Southern California. Setnets are prohibited in certain designated areas, including a Marine Resources Protection Zone (MRPZ), covering state waters (to 3 nm) south of Point Conception and waters around the Channel Islands to 70 fm, but extending seaward no more than one mile. In comparison to trawl and setnet landings, commercial hook-and-line catches are historically insignificant. Over the last decade they have ranged from 11% to 23% of total California halibut landings. Most of those landings were made in the San Francisco Bay area by salmon fishers mooching or trolling slowly over the ocean bottom (Kramer et al. 2001).

Table 3-39.California Halibut Landings and Exvessel Revenue by Year and Gear (LBS and USD)

		YEAR			
Gear Group	Data type	2000	2001	2002	2003
Hook and Line	Landed weight (lbs)	118,519	124,241	166,307	208,887
	Exvessel revenue	366,478	398,222	523,217	654,537
Misc.	Landed weight (lbs)	C	C	C	C
	Exvessel revenue	C	C	C	C
Net	Landed weight (lbs)	380,105	319,235	255,720	181,439
	Exvessel revenue	1,122,396	981,323	820,973	601,822
Pot	Landed weight (lbs)	463	170	1,501	592
	Exvessel revenue	1,225	531	3,594	2,419
Troll	Landed weight (lbs)	9,163	10,382	8,259	13,735
	Exvessel revenue	21,241	24,687	18,784	29,589
Trawl	Landed weight (lbs)	277,878	377,094	451,186	342,609
	Exvessel revenue	728,537	1,076,334	1,276,334	912,487
Shrimp Trawl	Landed weight (lbs)	63,947	66,634	55,534	77,324
	Exvessel revenue	214,903	226,478	203,011	326,085
Total Landed weight (lbs)		C	C	C	C
Total Exvessel revenue		C	C	C	C

Source: PacFIN ftl table. August 2004

Table 3-40. Top 15 Ports for California Halibut Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	SAN FRANCISCO	SAN FRANCISCO
2	PRINCETON / HALF MOON BAY	VENTURA
3	VENTURA	PRINCETON / HALF MOON BAY
4	SANTA BARBARA	SANTA BARBARA
5	SAN PEDRO	TERMINAL ISLAND
6	TERMINAL ISLAND	SAN PEDRO
7	OXNARD	OXNARD
8	MOSS LANDING	PORT HUENEME
9	SANTA CRUZ	OCEANSIDE
10	AVILA	SANTA CRUZ
11	PORT HUENEME	AVILA
12	OCEANSIDE	MOSS LANDING
13	MONTEREY	SAN DIEGO
14	SAN DIEGO	MONTEREY
15	MORRO BAY	MORRO BAY

Source: PacFIN ftl table. August 2004

3.4.1.4.9 Puget Sound Geoduck

The wildstock geoduck fishery in Washington state is jointly managed by the Washington Department of Natural Resources, the Washington Department of Fish and Wildlife (WDFW), and the Puget Sound Treaty Indian Tribes (Tribes) that have a right to 50 % of the harvestable surplus of geoducks. The State and the Tribes are responsible for estimating geoduck population size, determining sustainable yield, and ensuring adverse effects to the environment are kept to a minimum. DNR has proprietary management interest in the State's half of the harvest and auctions the right to harvest wildstock geoducks to private companies and individuals. Management of the geoduck resource is dynamic due to changes in market demand, resource economics, and new information on geoduck biology and population dynamics. DNR and WDFW conduct civil and criminal enforcement of Washington state laws, regulations and contract conditions that apply to the State's wildstock geoduck fishery (Washington Department of Natural Resources. 2004)

3.4.1.4.10 California Sheephead

California sheephead (Semicossyphus pulcher) are a large member of the wrasse family Labridae. They range from Monterey Bay south to Guadalupe Island in central Baja California and the Gulf of California, in Mexico, but are uncommon north of Point Conception. They are associated with rocky bottom habitats, particularly in kelp beds to 55 m, but more commonly at depths of 3 m to 30 m.

They can live to 50 years of age and a maximum length of 91 cm (16 kg). Like some other wrasse species, California sheephead change sex starting first as a female, but changing to a male at about 30 cm in length.

Table 3-41. Landings and Exvessel Revenue of California Sheephead by State, Gear, and Year (LBS and USD)

			YEAR			
State	Gear	Data type	2000	2001	2002	2003
California	Hook and Line	Landed weight (lbs)	33,211	23,928	22,698	24,587
		Exvessel revenue	93,186	73,996	66,304	82,449
	Other Gears	Landed weight (lbs)	1,506	1,268	1,199	2,677
		Exvessel revenue	4,663	2,860	4,100	10,131
	Net	Landed weight (lbs)	3,067	3,097	1,432	474
		Exvessel revenue	5,897	3,401	1,388	1,317
	Pot	Landed weight (lbs)	136,161	121,941	95,719	79,618
		Exvessel revenue	490,773	437,409	339,741	292,673
Total Landed weight (lbs)			173,945	150,234	121,048	107,356
Total Exvessel revenue			594,519	517,666	411,532	386,570

Table 3-42. Top 15 Ports for Sheephead Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	OXNARD	OXNARD
2	SAN DIEGO	SAN DIEGO
3	SANTA BARBARA	TERMINAL ISLAND
4	TERMINAL ISLAND	SANTA BARBARA
5	NEWPORT BEACH	NEWPORT BEACH
6	VENTURA	MISSION BAY
7	MISSION BAY	VENTURA
8	OCEANSIDE	OCEANSIDE
9	DANA POINT	DANA POINT
10	SAN PEDRO	SAN PEDRO
11	POINT LOMA	POINT LOMA
12	LONG BEACH	LONG BEACH
13	MORRO BAY	PLAYA DEL REY
14	PLAYA DEL REY	REDONDO BEACH
15	REDONDO BEACH	MORRO BAY

3.4.1.4.11 Coastal Pelagic Species

CPS are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. These species include: northern anchovy (Engraulis mordax), Pacific sardine (Sardinops sagax), Pacific (chub) mackerel (Scomber japonicus), jack mackerel (Trachurus symmetricus), and market squid (Decapoda spp.). Until 1999, northern anchovy was managed under the Council's Northern Anchovy FMP. Amendment 8 to the Northern Anchovy FMP brought the remaining CPS species under federal management and renamed the FMP the Coastal Pelagic Species FMP. This FMP was implemented in December 1999.

Sardines inhabit coastal subtropical and temperate waters, and at times, have been the most abundant fish species in the California current. During times of high abundance, Pacific sardine range from the tip of Baja California, Mexico, to southeastern Alaska. When abundance is low, Pacific sardine do not occur in large quantities north of Point Conception, California. Pacific mackerel in the northeastern Pacific range from Banderas Bay, Mexico to southeastern Alaska. They are common from Monterey Bay, California to Cabo San Lucas, Baja California, and most abundant south of Point Conception, California. The central subpopulation of northern anchovy ranges from San Francisco, California to Punta Baja, Mexico. Jack mackerel are a pelagic schooling fish that range widely throughout the northeastern Pacific; however, much of their range lies outside the U.S. EEZ. Adult and juvenile market squid are distributed throughout the Alaska and California current systems, but are most abundant between Punta Eugenio, Baja California, Mexico, and Monterey Bay, Central California.

Recent (December 1999 and July 1999, respectively) stock assessments indicate Pacific sardine and Pacific mackerel are increasing in relative abundance. Pacific sardine biomass in U.S. waters was estimated to be 1,581,346 mt in 1999; Pacific mackerel biomass (in U.S. waters) was estimated to be 239,286 mt. Pacific sardine landings for the directed fisheries off California and Baja California, Mexico, reached the highest level in recent history during 1999, with a combined total of 115,051 mt harvested. In 1998 70,799 mt of Pacific mackerel were landed, representing near-record levels for the combined directed fisheries off California and Baja California. Population dynamics for market squid are poorly understood, and annual fluctuations in commercial catch vary from less than 10,000 mt to 90,000 mt. Amendment 10 to the CPS FMP describes and analyzes several approaches for estimating an MSY proxy for market squid. Amendment 10 was adopted by the Council in June 2002 and implemented by NMFS on January 27, 2003 (68 FR 3819). They are thought to have an annual mortality rate approaching 100%, which means the adult population is almost entirely new recruits and successful spawning is crucial to future years' abundance.

CPS are largely landed with round haul gear (purse seines and lampara nets); vessels using round haul gear are responsible for 99% of total CPS landings and revenues per year. These fisheries are concentrated in California, but CPS fishing also occurs in Washington and Oregon. In Washington, the sardine fishery is managed under the Emerging Commercial Fishery provisions as a trial commercial fishery. The target of the trial fishery is sardines; however, anchovy, mackerel, and squid are also landed. The fishery is limited to vessels using purse seine gear. It is also prohibited inside of three miles and logbooks are required. Eleven of the 45 permits holders participated in the fishery in 2000, landing 4,791 mt of sardines (Robinson 2000). Three vessels accounted for 88% of the landings. Of these, two fished out of Ilwaco and one out of Westport. In Oregon, the sardine fishery is managed under the Development Fishery Program under annually-issued permits, which have ranged from 15 in 1999 and 2000 to 20 in 2001. Landings, almost all by purse seine vessels, have rapidly increased in Oregon: from 776 mt in 1999 to 12,798 mt in 2001. The number of vessels increased from three to 18 during this period (McCrae 2001; McCrae 2002). The Southern California round haul fleet is the most important sector of the CPS fishery in terms of landings. This fleet is primarily based in Los Angeles Harbor, along with fewer vessels in the Monterey and Ventura areas. The fishery harvests Pacific bonito, market squid, and tunas as well as CPS. The fleet consists of about 40 active purse seiners averaging 20 m in length. Approximately one-third of this fleet are steel-hull boats built during the last 20 years, the remainder are wooden-hulled vessels built from 1930 to 1949, during the boom of the Pacific sardine fleet. Because stock sizes of these species can radically change in response to ocean conditions, the CPS FMP takes a flexible management approach. Pacific mackerel and Pacific sardine are actively managed through annual harvest guidelines based on periodic assessments. Northern anchovy, jack mackerel, and market squid are monitored through commercial catch data. If appropriate, one third of the harvest guideline is allocated to Washington, Oregon, and northern California (north of 35E40' N latitude) and two-thirds is allocated to Southern California (south of 35E40' N latitude). An open access CPS fishery is in place north of 39E N latitude and a limited entry fishery is in place south of 39E N latitude. The Council does not set harvest guidelines for anchovy, jack mackerel, or market squid (PFMC 1998).

Table 3-43. CPS Landings and Exvessel Revenue by Area, State, and Year (LBS and USD)

			YEAR			
Area	State	Data type	2000	2001	2002	2003
Coastal Management Areas	CA	Landed weight (lbs)	465,666,430	376,633,573	316,754,663	182,994,919
		Exvessel revenue	40,179,911	29,373,729	27,852,840	29,261,203
	OR	Landed weight (lbs)	21,629,154	29,337,380	50,396,664	56,500,887
		Exvessel revenue	1,173,218	1,726,387	2,835,693	3,016,660
	WA	Landed weight (lbs)	10,937,156	25,573,818	35,995,417	26,872,582
		Exvessel revenue	716,632	1,394,002	2,044,254	1,546,569
Other Management Areas	OR	Landed weight (lbs)	C	C	C	C
		Exvessel revenue	C	C	C	C
	WA	Landed weight (lbs)	530,364	813,484	1,196,872	1,070,620
		Exvessel revenue	208,419	297,702	529,434	510,373
Total Landed weight (lbs)			498,763,104	432,358,255	404,343,616	267,439,008
Total Exvessel revenue			42,278,180	32,791,820	33,262,222	34,334,805

Source: PacFIN ftl table. August 2004
Note: C represents data restricted due to confidentiality
Totals do not include confidential data
“Other management areas” includes inside waters such as Puget Sound and Columbia River

Table 3-44. CPS Landings and Exvessel Revenue by Year and Gear(LBS and USD)

		YEAR			
Gear Group	Data type	2000	2001	2002	2003
Hook and Line	Landed weight (lbs)	447,269	132,292	46,697	135,851
	Exvessel revenue	64,810	63,396	30,017	53,557
Misc	Landed weight (lbs)	238,310	53,720	90,661	141,291
	Exvessel revenue	82,093	390,882	621,647	463,864
Net	Landed weight (lbs)	496,714,839	430,478,604	404,186,770	266,878,952
	Exvessel revenue	42,035,766	32,142,853	32,605,922	33,761,365
Pot	Landed weight (lbs)	100,375	1,240	347	57,592
	Exvessel revenue	10,194	398	126	15,534
Troll	Landed weight (lbs)	645,533	307,434	558	43,777
	Exvessel revenue	57,140	11,811	666	15,701
Trawl	Landed weight (lbs)	626,541	1,384,594	21,999	181,009
	Exvessel revenue	28,150	182,129	2,734	24,105
Shrimp Trawl	Landed weight (lbs)	1,086	371	1,255	536
	Exvessel revenue	569	351	1,577	678
Total Landed weight (lbs)		498,773,953	432,358,255	404,348,287	267,439,008
Total Exvessel revenue		42,278,722	32,791,820	33,262,689	34,334,805

Source: PacFIN ftl table. August 2004

Table 3-45. Top 15 Ports for CPS Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	SAN PEDRO	SAN PEDRO
2	PORT HUENEME	PORT HUENEME
3	TERMINAL ISLAND	MOSS LANDING
4	MOSS LANDING	TERMINAL ISLAND
5	ASTORIA	VENTURA
6	VENTURA	ASTORIA
7	ILWACO	SAN FRANCISCO
8	MONTEREY	MONTEREY
9	SAN FRANCISCO	ILWACO
10	WESTPORT	SAUSALITO
11	SAUSALITO	PRINCETON / HALF MOON BAY
12	PRINCETON / HALF MOON BAY	WESTPORT
13	SANTA BARBARA	TACOMA
14	LONG BEACH	MARSHALL
15	MARSHALL	SANTA BARBARA

Source: PacFIN ftl table. August 2004

3.4.1.4.12 Sea Cucumber

Two sea cucumber species are targeted commercially: the California sea cucumber (Parastichopus californicus), also known as the giant red sea cucumber, and the warty sea cucumber (P. parvimensis) (Rogers-Bennett and Ono 2001). These species are tube-shaped Echinoderms, a phylum that also includes sea stars and sea urchins. The California sea cucumber occurs as far north as Alaska, while the warty sea cucumber is uncommon north of Point Conception and does not occur north of Monterey. Both species are found in the intertidal zone to as deep as 300 feet (the California sea cucumber). These bottom-dwelling organisms feed on detritus and small organisms found in the sand and mud. Because sea cucumbers consume bottom sediment and remove food from it, they can alter the substrate in areas where they are concentrated. They can also increase turbidity as they excrete ingested sand or mud particles. They are preyed upon by sea stars, crabs, various fishes, and sea otters. They spawn by releasing gametes into the water column, and spawning occurs simultaneously for different segments of a population. During development, they go through several planktonic larval stages, settling to the bottom two months to three months after fertilization of the egg. Little is known about the population status of these two species; and assessment is difficult, because of their patchy distribution. However, density surveys suggest abundance has declined since the late 1980s. This is not unexpected since a commercial fishery for these species began in the late 1970s and expanded substantially after 1990.

Along the West Coast, sea cucumbers are harvested by diving or trawling. They are managed by the states. The warty sea cucumber is fished almost exclusively by divers. The California sea cucumber is caught principally by trawling in Southern California, but is targeted by divers in Northern California. Only the trawl fishery for sea cucumbers lands an incidental catch of groundfish.

California implemented a permit program in 1992. In 1997 the state established separate, limited entry permits for the dive and trawl sectors. Permit rules encourage transfer to the dive sector, and this has lead to growth in this sector, which now accounts for 80% of landings. There are currently 113 sea cucumber dive permittees and 36 sea cucumber trawl permittees. Many commercial sea urchin and/or abalone divers also hold sea cucumber permits and began targeting sea cucumbers more heavily beginning in 1997. At up to $20 per pound wholesale for processed sea cucumbers, there is a strong incentive to participate in this fishery.

Sea cucumber fisheries have expanded worldwide and, on this coast, there is a dive fishery for warty sea cucumbers in Baja California, Mexico, and dive fisheries for California sea cucumbers in Washington, Oregon, Alaska, and British Columbia, Canada (Rogers-Bennett and Ono 2001). In Washington, the sea cucumber fishery only occurs inside Puget Sound and the Straight of Juan de Fuca. Most of the harvest is taken by diving, although the tribes can also trawl for sea cucumbers in these waters.

Table 3-46. Sea Cucumber Landings and Exvessel Revenue by Area, State, and Year (LBS and USD)

			YEAR			
Area	State	Data type	2000	2001	2002	2003
Coastal Management Areas	CA	Landed weight (lbs)	643,310	717,695	946,810	758,569
		Exvessel revenue	606,578	584,970	801,276	687,854
	OR	Landed weight (lbs)	C	C		C
		Exvessel revenue	C	C		C
Other Management Areas	WA	Landed weight (lbs)	605,755	661,657	549,127	438,707
		Exvessel revenue	836,720	903,570	598,820	560,533
Total Landed weight (lbs)			1,249,065	1,379,352	1,495,937	1,197,276
Total Exvessel revenue			1,443,297	1,488,540	1,400,096	1,248,387

Source: PacFIN ftl table. August 2004
Note: C represents data restricted due to confidentiality
“Other management areas” includes inside waters such as Puget Sound and Columbia River

Table 3-47. Sea Cucumber Landings and Exvessel Revenue by Year and Gear (LBS and USD)

		YEAR			
Gear aggregation	Data type	2000	2001	2002	2003
Misc. (including dive gear)	Landed weight (lbs)	574,689	465,804	660,598	466,855
	Exvessel revenue	558,029	419,318	610,742	475,262
Other Gears	Landed weight (lbs)	674,667	913,583	835,339	731,109
	Exvessel revenue	885,777	1,069,291	789,354	774,084
Total Landed weight (lbs)		1,249,065	1,379,352	1,495,937	1,197,276
Total Exvessel revenue		1,443,297	1,488,540	1,400,096	1,248,387

Source: PacFIN ftl table. August 2004
Note: C represents data restricted due to confidentiality
"Other management areas" includes inside waters such as Puget Sound and Columbia River
totals are equivalent to previous table to protect confidentiality

Table 3-48. Top 15 Ports for Sea Cucumber Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	OXNARD	OXNARD
2	SANTA BARBARA	BLAINE
3	BLAINE	ANACORTES
4	ANACORTES	SANTA BARBARA
5	TERMINAL ISLAND	TERMINAL ISLAND
6	POULSBO	BELLINGHAM BAY
7	BELLINGHAM BAY	POULSBO
8	SEATTLE	SEATTLE
9	TACOMA	TACOMA
10	VENTURA	LACONNER
11	LACONNER	VENTURA
12	PUGET ISLAND	PUGET ISLAND
13	FRIDAY HARBOR	FRIDAY HARBOR
14	SAN PEDRO	SAN PEDRO
15	MISSION BAY	PORT TOWNSEND

Source: PacFIN ftl table. August 2004

3.4.1.4.13 Spot Prawn

Spot prawn (Pandalus platyceros) are the largest of the pandalid shrimp and range from Baja California, Mexico, north to the Aleutian Islands and west to the Korean Strait (Larson 2001). They inhabit rocky or hard bottoms including coral reefs, glass sponge reefs, and the edges of marine canyons. They have a patchy distribution, which may result from active habitat selection and larval transport. Spot prawn are hermaphroditic, first maturing as males at about three years of age. They enter a transition phase after mating at about four years of age when they metamorphose into females.

Spot prawn are targeted with both trawl and pot gear. Although these fisheries are state-managed, for the purposes of managing incidentally-caught groundfish, the trawl fishery is categorized in the open access sector. California has the largest and oldest trawl fishery with about 54 vessels operating from Bodega Bay south to the U.S./Mexico border. (Most vessels operate out of Monterey, Morro Bay, Santa Barbara, and Ventura, although some Washington-based vessels participate in this fishery during the fall and winter.) Standard gear is a single-rig shrimp trawl with roller gear, varying in size from eight-inch disks to 28-inch tires. Washington state phased out its trawl fishery by converting its trawl permits to pot/trap permits in 2003. In California, area and season closures for the trawl fleet were instituted in 1984 to protect spot prawns during their peak egg-bearing months of November through January. In 1994, the trawl area and season closure was expanded to include the entire Southern California Bight. As of 2003, the trawl fishery was closed. These closures, along with the development of ridgeback prawn, sea cucumber, and other fisheries, and also greater demand for fresh fish, have kept spot prawn trawl landings low and facilitated growth of the trap fishery. The trap fishery began in 1985 with a live prawn segment developing subsequently. The fleet operates from Monterey Bay, where 6 boats are based, to Southern California, where a 30 to 40 boat fleet results in higher production. In both fishing areas traps are set at depths of 600 feet to 1,000 feet along submarine canyons or along shelf breaks. Between 1985 and 1991 trapping accounted for 75% of statewide landings; trawling accounted for the remaining 25% (Larson 2001). Landings continued to increase through 1998, when they reached a historic high of 780,000 pounds. Growth in participation and a subsequent drop in landings led to the development of a limited entry program, which is still in the process of being implemented. Other recent regulations include closures, trap limits, bycatch reduction measures for the trawl fishery, and an observer program.

Table 3-49. Spot Prawn Landings and Exvessel Revenue by Year and Gear in California (LBS and USD)

		Year			
Gear	Data type	2000	2001	2002	2003
Pot	Landed weight (lbs)	180,339	218,813	175,497	159,168
	Exvessel Revenue	1,646,474	1,993,004	1,607,681	1,505,684
Trawl (all trawl types)	Landed weight (lbs)	266,682	203,346	218,067	6,841
	Exvessel Revenue	2,188,968	1,709,452	1,759,197	61,364
Total Landed weight (lbs)		447,021	422,159	393,564	166,009
Total Exvessel Revenue		3,835,442	3,702,456	3,366,877	1,567,049

Source: PacFIN ftl table. August 2004

Note: Spot prawn landings do not show up specifically in landed catch data for WA and OR

Table 3-50. Top 15 Ports for Spot Prawn Landings and Exvessel Revenue in California (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	MORRO BAY	MORRO BAY
2	MONTEREY	MONTEREY
3	OXNARD	OXNARD
4	VENTURA	VENTURA
5	DANA POINT	DANA POINT
6	TERMINAL ISLAND	TERMINAL ISLAND
7	SANTA BARBARA	OCEANSIDE
8	OCEANSIDE	SANTA BARBARA
9	SAN DIEGO	MOSS LANDING
10	RICHMOND	SAN DIEGO
11	MOSS LANDING	RICHMOND
12	SAN FRANCISCO	SAN FRANCISCO
13	FORT BRAGG	FORT BRAGG
14	BODEGA BAY	BODEGA BAY
15	HUNTINGTON BEACH	MISSION BAY

Source: PacFIN ftl table. August 2004

3.4.1.4.14 Sea Urchin

Sea urchins are harvested along the California coast, the Oregon coast, and the Strait of Juan de Fuca region of Washington. Both red and green sea urchins are found along the west coast. The red sea urchin usually occupies shallow waters, from the mid to low intertidal zones to depths in excess of 164 feet, but have been found as deep as 410 feet (McCauley and Carey, 1967; as cited in University of California Extension, 1995). Individuals prefer rocky substrates, particularly ledges and crevices, and avoid sand and mud (Kato and Schroeter, 1985; as cited in University of California Extension, 1995).

Red sea urchins are comparatively long-lived, with some living for at least 30 years. In southern California, the giant kelp (Macrocystis pyrifera) is preferred for food (Leighton, 1965; as cited in University of California Extension, 1995). In northern California, sea urchin feed on bull and brown kelp (Parker and Kalvass, 1992; as cited in University of California Extension, 1995).

The sea urchin fishery first began in the 1970's in response to demand for sea urchin in the Japanese sushi market. Prior to the development of the fishery, sea urchins were regarded as a nuisance by kelp harvesters due to their impact on the kelp resource. Sea urchins are primarily harvested by persons using dive gear, and in California, landings are prevalent during the winter months in response to peak demand during the Japanese holiday season.

West coast sea urchins are commercially harvested by divers using "hooka" diving gear, consisting of a low-pressure air compressor that feeds air through a hose from the vessel to the divers (University of California Extension, 1995). Sea urchins are targeted at depths between 5 and 100 feet, with most dives in the 20 to 60 foot range. Sea urchins are harvested from the ocean bottom with a hand-held rake or hook and put into a hoop net bag or wire basket. The basket is winched onto the boat and emptied into a larger net bag (University of California Extension, 1995). In areas far from port, a larger "pick-up" vessel may take the catch from several harvesting vessels back to port (Parker and Kalvass, 1992; as cited in University of California Extension, 1995).

Table 3-51. Landings and Exvessel Revenue by Area, State, and Year (LBS and USD)

			YEAR			
Area	State	Data type	2000	2001	2002	2003
Coastal Management Areas	CA	Landed weight (lbs)	15,199,851	13,123,830	13,957,127	10,769,868
		Exvessel revenue	15,057,844	11,686,980	10,218,060	7,699,447
	OR	Landed weight (lbs)	983,556	1,258,957	812,395	143,727
		Exvessel revenue	682,484	802,224	347,879	60,282
Other Management Areas	CA	Landed weight (lbs)	C	C	C	C
		Exvessel revenue	C	C	C	C
	WA	Landed weight (lbs)	940,707	757,465	538,489	387,432
		Exvessel revenue	782,394	559,099	461,781	289,767
Total Landed weight (lbs)			17,124,114	15,140,252	15,309,330	11,301,027
Total Exvessel revenue			16,522,723	13,048,302	11,028,776	8,049,496

Source: PacFIN ftl table. August 2004
Note: “Other management areas” includes inside waters such as Puget Sound and Columbia River

Table 3-52. Sea Urchin Landings and Exvessel Revenue by Area, Gear and Year (LBS and USD)

			YEAR			
Area	Gear Aggregation	Data type	2000	2001	2002	2003
Coastal Management Areas	Other Gears	Landed weight (lbs)	940,707	757,465	538,489	387,432
		Exvessel revenue	782,394	559,099	461,781	289,767
	Misc. (including dive gear)	Landed weight (lbs)	0	0	C	0
		Exvessel revenue	0	0	C	0
Other Management Areas	Other Gears	Landed weight (lbs)	23,635	7,533	8,254	17,859
		Exvessel revenue	21,231	6,824	8,372	13,427
	Misc. (including dive gear)	Landed weight (lbs)	16,159,772	14,375,254	14,761,268	10,895,736
		Exvessel revenue	15,719,098	12,482,380	10,557,567	7,746,301
Total Landed weight (lbs)			17,124,114	15,140,252	C	11,301,027
Total Exvessel revenue			16,522,723	13,048,302	C	8,049,496

Source: PacFIN ftl table. August 2004
Note: “Other management areas” includes inside waters such as Puget Sound and Columbia River

Table 3-53. Top 15 Ports for Sea Urchin Landings and Exvessel Revenue (2000 – 2003)

Rank	Top 15 Ports by Weight	Top 15 Ports by Exvessel Revenue
1	SANTA BARBARA	SANTA BARBARA
2	TERMINAL ISLAND	TERMINAL ISLAND
3	OXNARD	OXNARD
4	FORT BRAGG	FORT BRAGG
5	POINT ARENA	SAN PEDRO
6	SAN PEDRO	POINT ARENA
7	ALBION	MISSION BAY
8	MISSION BAY	ALBION
9	BODEGA BAY	BODEGA BAY
10	PORT ORFORD	POINT LOMA
11	POINT LOMA	SEATTLE
12	SEATTLE	PORT ORFORD
13	DEPOE BAY	PORT TOWNSEND
14	PORT TOWNSEND	DEPOE BAY
15	CHARLESTON (COOS BAY)	DANA POINT

Source: PacFIN ftl table. August 2004

3.4.2 Tribal Fisheries

West Coast treaty tribes have formal allocations for sablefish, black rockfish, and Pacific whiting. Members of the four coastal treaty tribes participate in commercial, ceremonial, and subsistence fisheries off the Washington coast. Participants in the tribal commercial fisheries use similar gear to non-tribal fishers. Fish caught in the tribal commercial fishery are distributed through the same markets as non-tribal commercial catch.

There are several species taken in tribal fisheries for which the tribes have no formal allocations, and some species for which no specific allocation has been determined. Rather than try to reserve specific allocations of these species, the tribes annually recommend trip limits for some species to the Council, who try to accommodate these fisheries.

Thirteen western Washington tribes possess and exercise treaty fishing rights to halibut, including the four tribes that possess treaty fishing rights to groundfish. Tribal halibut allocations are divided into a tribal commercial component and the year-round ceremonial and subsistence component.

In addition, the Makah tribe annually harvests a whiting allocation using mid-water trawl gear. Since 1996, a portion of the U.S. whiting OY has been allocated to the Pacific Coast treaty tribes. The tribal allocation is subtracted from the whiting OY before allocation to the nontribal sectors. Since 1999, the tribal allocation has been based on a sliding scale related to the U.S. whiting OY. To date, only the Makah tribe has fished on the tribal whiting allocation. Makah vessels fit with mid-water trawl gear have also been targeting widow rockfish and yellowtail rockfish in recent years.

Table 3-54. Tribal Shoreside Landings and Exvessel Revenue by Species Group and Year

		Year				
Species Group	Data Type	2000	2001	2002	2003	2004
CPEL	Landed Weight (lbs)				C	
	Exvessel Revenue				C	
CRAB	Landed Weight (lbs)	922,909	665,443	1,804,399	1,420,102	100,164
	Exvessel Revenue	1,957,757	1,292,271	3,240,886	2,660,939	168,661
GRND	Landed Weight (lbs)	1,152,546	1,274,750	1,675,078	11,808,437	10,048,079
	Exvessel Revenue	2,625,809	2,589,479	2,034,776	3,639,098	2,616,741
HMSP	Landed Weight (lbs)		15,110	21,664	37,950	
	Exvessel Revenue		11,876	11,645	33,456	
OTHR	Landed Weight (lbs)	281,820	418,480	480,185	485,509	490,334
	Exvessel Revenue	747,950	840,983	949,711	1,271,393	1,385,798
SAMN	Landed Weight (lbs)	236,966	735,977	573,684	513,772	297,344
	Exvessel Revenue	282,162	631,997	444,341	512,614	671,301
SHLL	Landed Weight (lbs)	C			C	C
	Exvessel Revenue	C			C	C
Total Sum of weight		2,594,241	3,109,760	4,555,010	14,265,770	10,935,921
Total Sum of revenue		5,613,678	5,366,606	6,681,359	8,117,500	4,842,501

Source: PacFIN FTL table. July 2004
Note: Totals do not include confidential data

Table 3-55. Tribal Shoreside Landings by Gear Type and Year

		Year				
Gear Type	Data	2000	2001	2002	2003	2004
Hook and Line	Landed Weight (lbs)	1,317,524	1,406,585	1,125,842	1,362,733	1,338,721
	Exvessel Revenue	3,264,578	3,296,352	2,470,980	3,423,539	3,347,593
Misc.	Landed Weight (lbs)	C			C	C
	Exvessel Revenue	C			C	C
Net	Landed Weight (lbs)	55,731	119,043	11,810	5,412	100
	Exvessel Revenue	66,020	84,960	8,185	4,950	96
Pot	Landed Weight (lbs)	943,559	665,443	1,804,399	1,420,102	100,164
	Exvessel Revenue	2,022,219	1,292,271	3,240,886	2,660,939	168,661
Troll	Landed Weight (lbs)	198,984	656,317	600,689	567,302	329,905
	Exvessel Revenue	226,440	569,236	457,477	553,069	701,372
Trawl	Landed Weight (lbs)	78,443	262,372	1,012,270	10,910,311	9,167,031
	Exvessel Revenue	34,420	123,789	503,830	1,475,040	624,780
Total Sum of weight		2,594,241	3,109,760	4,555,010	14,265,770	10,935,921
Total Sum of revenue		5,613,678	5,366,606	6,681,359	8,117,500	4,842,501

Source: PacFIN FTL table. July 2004
Note: Totals do not include confidential data

Table 3-56. Tribal At-Sea Catch by Year (Units are in Pounds)

	YEAR			
Species Aggregation	2000	2001	2002	2003
Other Fish	483,822	1,529,540	2,987,067	3,145,036
Pacific Whiting	13,781,245	13,404,002	48,045,527	51,706,192
Total	14,265,068	14,933,542	51,032,594	54,851,228

Source: PacFIN NPAC4900 table. February 2004

Table 3-57 Distribution of Vessels Engaged in Tribal Groundfish Fisheries

Treaty Tribe	Number of Vessels in Groundfish Fishery			Port
	Longline (length in ft)	Trawl (length in ft)	Total	
Makah	35 (33'-62')	10 (49'-62')	41 a/	Neah Bay
Hoh	1	-	1	La Push
Quileute	7	-	7	La Push
Quinault	10	-	10	West Port
a/ Four Makah vessels participate in both longline and trawl fisheries.				

Source: NMFS. 2004. Groundfish Bycatch Final Programmatic Environmental Impact Statement

3.4.3 Recreational Fisheries

The distribution of resident and non-resident ocean anglers among the West Coast states in 2000, 2001 and 2002 is shown in Table 3-58. The table demonstrates the importance of recreational fishing, especially in Southern California. The estimated number of resident recreational marine anglers in Southern California was more than double the number in the next most numerous region, Washington state. While most of the recreational anglers were residents of those states where they fished, a significant share were also non-residents. Oregon had the largest share of non-resident ocean anglers in all three years.

Table 3-58. Estimated number of West Coast marine anglers: 2000 - 2002 (thousands)

Year/State	Total	State Residents	Non-Residents	% Non-Residents
2000				
Washington	497	450	47	9.50%
Oregon	365	285	80	21.90%
Northern California	-	388	-	
Southern California	-	1,097	-	
Total California	1,705	1,485	220	12.90%
2001				
Washington	915	861	54	5.90%
Oregon	601	505	97	16.10%
Northern California	-	961	-	
Southern California	-	1,838	-	
Total California	3,084	2,799	285	9.20%
2002				
Washington	1,493	1,399	94	6.30%
Oregon	1,056	845	211	20.00%
Northern California	-	2,022	-	
Southern California	-	3,709	-	
Total California	6,406	5,731	675	10.50%

source: Pacific Fishery Management Council. 2004. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery. Draft Environmental Impact Statement.

Fishing effort is related to weather, with relatively more effort occurring in the milder months of summer, and relatively less in winter (Table 3-59). As might be expected, this effect is more pronounced in higher latitudes, although the reasons include opportunity as well as climate. Salmon seasons are longer in California than in Oregon, which in turn are longer than in Washington. Until recently, groundfish seasons were also more restrictive in Washington, with the lingcod season being closed from November through March.

Table 3-59. Total estimated West Coast recreational marine angler boat trips in 2003 by mode and region (thousands of angler trips)

State/Region	Boat Mode	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Annual Total
WA	Charter	0.0	1.2	16.0	37.8	6.1	0.0	61.1
	Private	22.0	19.5	57.2	32.9	5.0	0.0	136.5
	Total	22.0	20.6	73.2	70.7	11.1	0.0	197.6
OR	Charter	0.8	4.4	27.0	34.2	7.7	0.7	74.8
	Private	31.4	31.2	123.6	108.4	19.4	1.3	315.3
	Total	32.2	35.7	150.6	142.5	27.1	2.0	390.1
	Charter	3.4	11.3	24.1	73.3	33.0	3.3	148.4
N. CA	Private	75.9	83.9	332.5	502.8	211.5	278.2	1,485.0
	Total	79.4	95.2	356.7	576.1	244.6	281.5	1,633.4
	Charter	32.7	42.0	113.0	256.2	87.3	42.4	573.6
S. CA	Private	136.9	192.8	348.2	400.8	331.3	222.5	1,632.5
	Total	169.5	234.8	461.1	657.0	418.6	264.9	2,206.1
Total All States	Charter	36.9	58.9	180.1	401.5	134.1	46.4	857.9
	Private	266.2	327.4	861.5	1,044.9	567.2	502.0	3,569.3
	Total	303.1	386.2	1,041.6	1,446.4	701.3	548.4	4,427.2

source: Pacific Fishery Management Council. 2004. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery. Draft Environmental Impact Statement.

Recreational fishing in the open ocean has generally been declining slightly since 1996 (see Table 3-60); however, charter effort has decreased while private effort increased during that period. Part of this increase is likely the result of longer salmon seasons associated with increased abundance. Some effort shift from salmon to groundfish for example likely occurred prior to 1996 when salmon seasons were shortened.

Table 3-60. Trends in effort for recreational ocean fisheries in thousands of angler trips

Area	1996	1997	1998	1999	2000	2001a/	2002a/	2003b/
Total Angler Trips								
Washington	51	50	44	49	40	61	56	61
Oregon	54	65	57	60	87	70	62	75
North and Central CA	90	139	158	162	206	221	142	148
Southern CA	982	812	674	609	876	577	438	574
Total	1,177	1,066	933	880	1,218	927	843	858

source: Pacific Fishery Management Council. 2004. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2005-2006 Pacific Coast Groundfish Fishery. Draft Environmental Impact Statement.
a) The 2001 and 2002 estimates are not directly comparable to previous years due to differences in estimation methodology
b) Preliminary

3.4.3.1 Recreational Charter Industry

Table 3-59 shows the distribution of trips by boat mode and region in 2003. More than half of the charter vessel trips operated from California ports, demonstrating the importance of recreational fishing industry in that state.

3.4.3.2 Private Vessels and the Recreational Fishing Experience Market

Demand for recreational trips and estimates of the economic impacts resulting from recreational fishing are related to numbers of anglers. Reliable data are not available on the number of West Coast anglers targeting specific species. However, data are available on the total number of saltwater anglers, and it is evident the presence of opportunities to catch species other than directly targeted ones increases the propensity of anglers to fish and the value of the overall recreational fishing experience. In the U.S., over 9 million anglers took part in 76 million marine recreational fishing trips in 2000. The West Coast accounted for about 22 percent of these participants and 12 percent of trips. Seventy percent of West Coast trips were made off California, 19 percent off Washington, and 11 percent from Oregon {Gentner, 2001 #661}.

3.5 Buyers and Processors

Excluding Pacific whiting that is delivered to at-sea processors, vessels participating in Pacific fisheries deliver to shore-based processors within Washington, Oregon, and California. Buyers are located along the entire coast, however processing capacity has been consolidating in recent years. Several companies have left the Pacific coast or have chosen to no longer stay in business entirely. Some former plants have been purchased by remaining companies (Research Group, 2003), but some plants have remained inactive. This has created cases where fish landed in certain ports may be trucked to another community for processing. Therefore, landings are not necessarily indicative of processing activity in those communities, however, by examining the species composition of landed catch by state, it is possible to draw inferences upon some processor characteristics.

According to PacFIN data, in 2002 Oregon had the largest amount of groundfish landings (56 percent), followed by Washington (28 percent), and California (16 percent). In contrast, when viewed in terms of exvessel value, Oregon has the largest amount of revenue (40 percent), followed by California (32 percent) and Washington (22 percent) respectively. The largest state for Pacific whiting landings is Oregon, which creates the large difference between the percentage of landed catch and exvessel revenue in Oregon since Pacific whiting has a relatively low price per pound. It may be reasonable to state that the relatively high amount of Pacific whiting being landed in Oregon creates a case where many processors need to operate in a manner that is capable of handling extremely large quantities, whereas processors concentrating on Pacific coast fisheries in California may not have the same needs. Processors in Washington have a distinct advantage in that some of them are able to diversify to include landings from Alaska fisheries for example.

Depending on the amount of catch Washington processors can draw from Alaska fisheries, some Washington processors that participate in west coast fisheries may need to operate in a manner that is capable of handling large quantities.

The seafood distribution chain begins with deliveries by the harvesters (exvessel landings) to the shoreside networks of buyers and processors, and includes the linkage between buyers and processors and seafood markets. In addition to shoreside activities, processing of certain species (e.g. Pacific whiting) also occurs offshore on factory ships. Several thousand entities have permits to buy fish on the West Coast. Of these 1,780 purchased fish caught in the ocean area and landed on Washington, Oregon, or California state fishtickets in the year 2000 (excluding tribal catch) and 732 purchased groundfish (PFMC, 2004).[4]

According to PacFIN data, the number of unique companies buying groundfish along the Pacific coast has been declining in recent years. This trend coincides with recent regulatory restrictions and diminished landings of higher valued species such as rockfish (Table 3-61). Buyers purchasing other species such as crab and salmon have been stable or increasing in recent years.

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4/ A "buyer” was defined here by a unique combination of Pacific Coast Fisheries Information Network (PacFIN) port code and state buyer code on the fishticket. For California, a single company may have several buying codes that vary only by the last two digits. In PacFIN, these last two digits are truncated, and so were treated as separate buying units only if they appear for different ports

Table 3-61. Count of Fish Buyers by Year, Species Type, and State (not unique records)

		Year			
State	Species Group	2000	2001	2002	2003
CA	CPEL	174	126	118	112
	CRAB	298	306	291	351
	GRND	412	385	324	310
	HMSP	233	241	222	199
	OTHR	558	515	510	505
	SAMN	277	225	269	273
	SHLL	6	10	2	2
	SRMP	154	126	129	107
OR	CPEL	14	15	16	16
	CRAB	67	77	81	83
	GRND	84	74	79	81
	HMSP	96	112	125	138
	OTHR	90	91	103	94
	SAMN	104	134	143	150
	SHLL	19	14	46	27
	SRMP	36	36	30	26
WA	CPEL	12	17	16	15
	CRAB	125	125	158	168
	GRND	43	42	40	45
	HMSP	37	39	55	53
	OTHR	109	102	98	106
	SAMN	189	218	219	213
	SHLL	167	178	177	171
	SRMP	75	72	72	80

Source: PacFIN ftl and ft tables. July 2004
Note: records are not unique buyers and should not be summed

3.6 Fishing Communities

Fishing communities, as defined in the Magnuson-Stevens Act, include not only the people who actually catch the fish, but also those who share a common dependency on directly related fisheries-dependent services and industries. In commercial fishing this may include boatyards, fish handlers, processors, and ice suppliers. Similarly, entities that depend on recreational fishing may include tackle shops, small marinas, lodging facilities catering to out-of-town anglers, and tourism bureaus advertising charter fishing opportunities. People employed in fishery management and enforcement make up another component of fishing communities.

Fishing communities on the West Coast depend on commercial and/or recreational fisheries for many species. Participants in these fisheries employ a variety of fishing gears and combinations of gears. Naturally, community patterns of fishery participation vary coastwide and seasonally, based on species availability, the regulatory environment, and oceanographic and weather conditions. Communities are characterized by the mix of fishery operations, fishing areas, habitat types, seasonal patterns, and target species. While each community is unique, there are many similarities. For example, all face danger, safety issues, dwindling resources, and a multitude of state and federal regulations.

Individuals make up unique communities with differing cultural heritages and economic characteristics. Examples include a Vietnamese fishing community of San Francisco Bay and an Italian fishing community in Southern California. Native American communities with an interest in the groundfish fisheries are also considered. In most areas, fishers with a variety of ethnic backgrounds come together to form the fishing communities within local areas, drawn together by their common interests in economic and physical survival in an uncertain and changing ocean and regulatory environment.

This section provides an overview of West Coast fishing communities organized around regions comprising port groups and ports consistent with the organization of fish landings data in the PacFIN database. Ports are coded in PacFIN using a two- or three-letter code, or PCID; landings data from several sites may be combined under one of these ports.1/ The ports have been further aggregated into 18 port groups. These port groups are designed to reduce issues surrounding the disclosure of confidential information (which could be a problem with very disaggregated data). Because ports and port groups are also units of analysis when evaluating socioeconomic and demographic characteristics, their boundaries are consistent with major civil boundaries, such as county and state lines.

The discussion here further aggregates these geographic entities into seven larger regions, each comprising one or more port groups: Puget Sound, the Washington coast, the northern Oregon coast, the southern Oregon coast, Northern California, Central California, and Southern California. Each subsection first describes the constituent port groups and ports and associated fleet characteristics. Socioeconomic and demographic characteristics are then summarized. The following tables provide the detailed source information for the description of fleet characteristics:

Supplementary Table 1: Landings at each port by species group in 1998.
Supplementary Table 2: Landings at each port by species group in 2002.
Supplementary Table 3: Exvessel revenue at each port by species group in 1998.
Supplementary Table 4: Exvessel revenue at each port by species group in 2002.
Supplementary Table 5: Number of vessels by primary port and species group in 2001.
Supplementary Table 6: Number of vessels by primary port and vessel length class in 2001.
Supplementary Table 7: Number of processors/buyers by primary port in 2001.
Supplementary Table 8: Number of processors/buyers by purchase value of raw product by port group.

[5]/ Additional codes account for fish landed in unspecified locations.

The socioeconomic and demographic descriptions are drawn from the following detailed tables:

Supplementary Table: Income and employment from commercial fishing activities in 2001.
Supplementary Table: Effort, personal income, and jobs related to recreational fishing on the West Coast in 2001.
Supplementary Table: Urban and rural population at state, regional, and port levels in 2000.
Supplementary Table: Racial composition at state, regional, and port levels in 2000.
Supplementary Table: Hispanic population at state, regional, and port levels in 2000.
Supplementary Table: Age distribution of the population at state, regional, and port levels in 2000.
Supplementary Table: Educational attainment of the population at state, regional, and port levels in 2000.
Supplementary Table: Unemployment and employment in natural-resource-related resource occupations at state, regional, and port levels in 2000.
Supplementary Table: Median income, average income and poverty rate at state, regional, and port levels in 2000
Supplementary Table: County-level economic profile.
Supplementary Table: County unemployment rates, 2002.

Demographic characteristics at the state, port group, county, and port levels are derived from U.S. census data. Port- and port group-level data are derived in two ways. First, census places are used. The U.S. Census Bureau defines these entities as census designated places (CDPs), consolidated cities, and incorporated places.1/ However, the following ports are not identified as census places: La Push, Grays Harbor, and Willapa Bay in Washington; Salmon River in Oregon; and Albion, Princeton, Avila Beach, Ventura, San Pedro, Wilmington, and Terminal Island in California. Furthermore, in rural areas population may be more dispersed so that the census places are less representative of population involved in the local economy. For these two reasons, ports have also been characterized by deriving data at the census block group level. Census block groups comprise several census blocks and contains between 600 and 3,000 people, with an optimum of 1,500.1/ Block groups never cross county or state lines. A geographic information system (GIS) was used to select block groups covering an area

[6]/ In some cases more than one census place corresponds to a port. These are: Port Angeles and Port Angeles East; Crescent City, Bertsch Oceanview, and Crescent City North; and Newport Beach and Newport Coast CDP. Demographics are reported separately for these places in the tables.

[7]/ Because block groups are delineated to limit the variation in population size between block groups, the geographic size of block groups can vary substantially. In urban areas, with high population density, block groups are smaller than in rural areas where population density is lower. This explains why block groups representing ports in rural areas cover large geographic areas in comparison to the census place.

coincident with the corresponding census place in urban areas and a somewhat larger area in rural areas.1/ For the ports without corresponding census places, Zip Code Tabulation Areas were used in all cases except Salmon River, Oregon, were a point designating the location of a boat landing was used. Demographic data are only reported for the "block group equivalent area" in these cases. The block groups comprising the block group equivalent areas were further filtered by choosing only those within 10 miles of the coast. Block group equivalent areas have a larger population for ports in rural areas. In urban areas there is typically little or no population difference between the block group area and the census place. In a few cases, such as San Diego, the population of the block group equivalent area may actually be smaller because part of the census place lies further than 10 miles from the coast.

3.6.1 Washington State

3.6.1.1 Puget Sound

3.6.1.1.1 Port Infrastructure and Fleet Characteristics

Puget Sound is dominated by the Seattle metropolitan area; the city is a regional population center and economically important regionally and nationally. Seattle has traditionally been an important entrepôt for Alaska, and many of the large catcher-processors participating in Alaskan fisheries are based there. Blaine and Bellingham, both north of Seattle, are important ports for groundfish vessels.

In 2002, 3,794 mt of groundfish were landed in the Puget Sound port group, a smaller amount than most other port groups in Washington and Oregon. Exvessel revenue from Puget Sound landings in 2002 was relatively high at $3.3 million, comparable to other port groups in Washington. This is partly explained by the large amounts of high-value sablefish landed in this region; flatfish are also a large component of landings than in other port groups.

About one-third of the port group's fishing vessels home port in Bellingham in 2001.1/ A vessel buyback program permanently retired 91 groundfish limited entry trawl vessels and associated permits. Thus the current number of limited entry trawl vessels is less than what is reported here. A recent report (NMFS 2004a) provides information on the home ports of retired vessels. Where appropriate, changes in vessel numbers are noted. Bellingham and Blaine—on Puget Sound near the Canadian border—hosted all nine of the region's groundfish limited entry trawl vessels and almost all the limited entry fixed gear vessels. However, the aforementioned report shows that four vessels were retired in

[8]/ The basic query rule for selecting block groups in rural areas was to choose block groups whose boundaries fell within a half-mile of the boundary of the census place.

[9]/ In some cases, a vessel's primary port for landings may not be its home port. To simplify the description, however, these primary ports are also referred to as the home port.

Bellingham and one in Blaine. Seattle is a distant second in terms of the number of vessels participating in West Coast fisheries, with 93, and only two limited entry fixed gear vessels port there. But many of the vessels listed as at-sea only—which participate in the Pacific whiting fishery—are likely part of the fleet based in Seattle and also fishing in Alaska. Otherwise, Puget Sound is less important as a center for West Coast groundfish vessels; with 36 vessels it ranks near the bottom among the port groups. In terms of the distribution of different sized vessels, Puget Sound is consistent with the West Coast as a whole, with about two-thirds of the vessels under 40 feet; one of the two vessels over 150 feet participating in West Coast fisheries is based in Seattle, however.

Table 3-62 Puget Sound Demographics at a Glance

	Value	Rank
Total population:	749,916	3
Urban population	97.2%	5
Non-white population:	25%	5
Hispanic population:	5.5%	11
Working age population (17-64):	69.4%	4
High school graduate and higher*:	88.1%	4
Natural resource-related employment**:	0.4%	15
Average household income:	$58,327	7
Poverty rate:	11.6%	12

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

As noted above, the Puget Sound is a major population center on the West Coast and is largely urban. Washington and Oregon, and the more rural coastal areas in particular, are less racially and ethnically diverse than coastal California, especially Southern California. The Puget Sound region has the fifth-largest percent non-white population of the port groups, or about a quarter of the population. All the other port groups with larger percent non-white populations are in Central and Southern California. Hawaiian and Pacific Islanders represent largest non-white racial group with 10% of the population for the port group and 13% of Seattle's population. (As might be expected, Seattle and Tacoma are the most ethnically diverse census places in this port group.) Puget Sound ranks eleventh among the port groups for the percentage of the population that is Hispanic, fourteenth if looking at census places, suggesting that the Hispanic population is more rural. Comparing communities within the Puget Sound port group, Skagit County, and the La Conner environs in particular, and also Shelton have a proportionately large Hispanic population, although the absolute numbers in these more rural communities are small.

Employment- and income-related statistics reflect the area's urbanism and economic activity. A large proportion of the population is of working age (defined as between 17 to 64 year olds) and incomes are relatively high, although these data, from the 2000 census and representing income in 1999, do not reflect the subsequent economic down-turn. As has been widely reported, Washington and Oregon unemployment rates were the highest in the nation in subsequent years; employment in Oregon especially has been slow to rebound. Median income values, which are reported in the census, cannot be aggregated and are thus not available for the port area, although data is available for states, counties and census places. (Median income is a better measure of economic well being of the population at large since it is not skewed by a relative few “outlier” high income earners.) Of census places, Seattle has the highest median income in this port group, $45,736, which is very close to the value for Washington state as a whole. The counties impinging on the port areas (which, as defined by census place or block group equivalent generally exclude inland areas of counties) generally show higher median and average incomes, probably reflecting greater wealth in surrounding suburbs.

According to economic modeling estimates of income and employment derived from fisheries (for November 2002 to October 2001), Puget Sound ranks at the bottom in terms of the share of personal income and employment derived from all commercial fishing activities. The relative unimportance of fisheries as a share of total income and employment in the region reflects its economic dynamism, with many industries—notably computer software and commercial aircraft manufacture—providing substantial income and employment. However, looking at fishery-related income alone, at 61%, more of it is derived from groundfish-fishery-related activities than in any of the other port areas. Thus, groundfish fisheries play an important role in what is a relatively small sector of the total regional economy.

3.6.1.2 Washington Coast (North Washington Coast and Central and South Washington Coast)

3.6.1.2.1 Port Infrastructure and Fleet Characteristics

Ports in the Straits of Juan de Fuca, along the north coast of the Olympic Peninsula, and Pacific coast of the peninsula are part of the North Washington Coast port group. The Central and South Washington Coast port group continues south to the Columbia River border with Oregon. The South and Central Washington Coast shows the largest groundfish landings of the three Washington port groups in 2002, with 13,247 mt. However, most of this is relatively low-value Pacific whiting delivered to shore-based processing plants. As a result, the North Washington Coast, with greater landings of higher value species such as sablefish shows more ex-vessel revenue in 2002—$3.4 million versus $2.6 million. It is important to note, however, that the treaty Indian tribes participating in West Coast groundfish fisheries are located in these two port groups and landings from their fisheries are not reflected. Because of the Pacific whiting landings, the Central and South Washington Coast ranks third among the port groups for total groundfish landings in 2002. In terms of landings value, however, these two port areas are similar to other port groups in southern Oregon and Washington—northern Oregon ports have notably higher exvessel revenue while Southern California ports have significantly less. The South Washington Coast is also a major center for several nongroundfish fisheries, and measured by its $34.4 million in exvessel revenue from all fisheries in 2002, is the largest port area on the West Coast. High-value Dungeness crab is the big contributor to this total.

The South Coast has almost twice as many vessels involved in the groundfish fishery as the North Coast port group─97 versus and 52. Port Angeles, Neah Bay, and La Push are the only ports in the North Coast region hosting groundfish vessels, with no limited entry trawl vessels listed for La Push. Neah Bay is home to the Makah Tribe, while La Push is near the Quileute Indian reservation and it is likely that some of the five vessels ported there are involved in the tribal fishery sector. However, Port Angeles is the delivery port for the bulk of limited entry fixed gear and open access groundfish vessels in the North Coast region. Westport and Ilwaco are the dominant ports for groundfish in the Central and South Coast port group. Ilwaco has relatively few groundfish limited entry vessels, but comparable numbers of groundfish open access vessels, so that its total of 42 groundfish vessels is only nine less than the 51 in Westport. Most of the larger vessels, in excess of 60 feet, are ported in Westport and Ilwaco. Some of these are likely participants in groundfish fisheries, particularly the industrial fishery for Pacific whiting.

3.6.1.2.2 Community Demographics

Table 3-63 Washington Coast Demographics at a Glance

	North Coast		Central/South Coast	
	Value	Rank	Value	Rank
Total population:	58,855	7	39,574	11
Urban population	63.1%	12	60.5%	13
Non-white population:	9.8%	13	9.6%	14
Hispanic population:	2.3%	18	5.0%	14
Working age population (17-64):	58.1%	16	58.5	15
High school graduate and higher*:	87.7%	5	78.8%	15
Natural resource-related employment**:	1.92%	13	3.72%	3
Average household income:	$45,252	11	$40,188	15
Poverty rate:	12.6%	7	15.0%	4

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

These two port groups are sparsely populated, more rural areas. Both are less ethnically diverse than most of the other port groups; lower ranked port groups for this statistic are on the Oregon coast. However, these regions have large Native American populations, at least proportionately, and rank third and seventh for this statistic. Both port groups also have a comparatively lower proportion of working age population. The North Coast port group includes some communities with a large number of retirees. Forty-six percent of the population in Sequim, for example, is 65 and older. The Central and South Coast port group is noticeably worse off in terms of other socioeconomic indicators of education and income. But Neah Bay, in the North Coast group, has the lowest median income, at $21,635 in 1999, of any of the ports that are also census places.

Earnings from and employment in fishing-related activities is important in the Washington Coast port groups. The South Coast ranked first for the proportion of total personal income that is derived from fishing activities at 4.8%, with the Central and North Coast regions ranking fifth and ninth in 2001. This is consistent with the employment-related census data discussed above. Groundfish-related revenues are a less important component of fisheries-related income and employment on the South Coast, however, in comparison to the Central and North Coast regions. Fifty-nine percent of fisheries income was derived from groundfish-related activities on the North Coast, for example, as compared to only 7.4% on the South Coast in 2001.

3.6.2 Oregon

3.6.2.1 North Oregon Coast (Astoria, Tillamook, and Newport)

3.6.2.1.1 Port Infrastructure and Fleet Characteristics

The north Oregon coast is the most important groundfish region on the West Coast in terms of total groundfish landings and revenue. These port groups accounted for $12.3 million in exvessel groundfish revenue in 2002, almost a quarter of the $51.5 million coastwide total, including at-sea deliveries. (Note that the bulk of the at-sea deliveries—which are Pacific whiting delivered to floating processors—are attributable to these port groups.) Astoria-Tillamook, grouped as one port area in the fishery-related tables (but split out in the demographic tables), and Newport are at or near the top of all the groundfish species categories, indicating that although the high-volume whiting fishery is centered in this region, other groundfish are equally important, surpassing whiting in terms of exvessel revenue. For example, these two port areas rank second and third behind the North Washington Coast for sablefish landings.

Astoria and Newport are home to a large fraction of the limited entry groundfish trawl fleet with 57 of the 243 total vessels in the fleet in 2002. The vessel buyback program retired 13 limited entry trawl vessels in Astoria and six trawlers in Newport in 2003 (NMFS 2004a). These port areas have a relatively large number of vessels in the 60 foot and above length classes, also reflecting the larger limited entry trawlers fishing out of these ports.

3.6.2.1.2 Community Demographics

Table 3-64 North Oregon Coast Demographics at a Glance

	Astoria		Tillamook		Newport	
	Value	Rank	Value	Rank	Value	Rank
Total population:	39,957	12	19,876	17	24,335	14
Urban population	71.51%	11	28.51%	18	61.21%	13
Non-white population:	7.4%	16	5.47%	18	10.4	11
Hispanic population:	5.1%	13	5.1%	12	4.8%	15
Working age population (17-64):	62.9%	11	59.8%	14	60.87	13
High school graduate and higher*:	85.0%	7	85.0%	8	85.3%	6
Natural resource-related employment**:	2.07%	11	7.31%	1	2.5%	9
Average household income:	$45,399	10	$42,730	13	$44,715	12
Poverty rate:	12.3%	10	11.4%	13	10.9%	14

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

These port groups are demographically quite similar. Tillamook is much more rural, ranking lowest for urban population of all the port groups. (Even looking at the value for census places, Tillamook ranks fourteenth in terms of urban population, with 70%.) It is also the least racially diverse port group and has the highest proportion of the population involved in natural resource-related occupations (farming, forestry, fishing, and hunting). Of these three areas, Newport has the highest percent nonwhite population, and Native Americans represent the largest share of this population with 3.2% of the total population. These port groups rank in the middle in terms of educational attainment. Although average income is comparatively modest, poverty rates also rank lower, which could suggest less wealth disparity in these areas. However, looking at rates for individual census places suggests pockets of poverty in some areas. The rate for Astoria is 15.2% while Siletz Bay in the Newport port group has a 15.7% poverty rate. Siletz Bay also has a large percentage of Native Americans: they make up 19.3% of the population. Median incomes range from a low of $31,074 for Seaside in the Astoria port group to a high of $40,250 in Nehalem Bay in the Tillamook port group, which has the lowest average income of the three.

Fishery-related income and employment are important in these port groups. Newport ranked second while Astoria-Tillamook ranked fourth in terms of contribution fisheries activities made to these economic indicators in 2001. About half of all fisheries income in these port groups was derived from groundfish-fishery-related activities in that year, reflecting the significance of these ports to the West Coast groundfish fishery, discussed above.

3.6.2.2 South Oregon Coast (Coos Bay and Brookings)

3.6.2.2.1 Port Infrastructure and Fleet Characteristics

The Pacific whiting fishery diminishes in importance, measured by landings and exvessel revenue in southern Oregon. Although still a component of the Coos Bay port group landings, no whiting landings are shown in the Brookings region. Groundfish landings in the Brooking port group for 2002, at 881 mt, were less than any other port group north of San Francisco. However, with $2.3 million in exvessel revenue from groundfish in 2002, the Brookings port group is not substantially smaller than most of the other port groups. The rockfish category contributes most to revenues in Brookings. Because many of these are sold as live fish, which command higher prices, Brookings ports earned more revenue from fewer landed fish in comparison to the neighboring Coos Bay port group. Live fish deliveries are an important component of California groundfish fisheries, and increasingly in southern Oregon as well. Also, as a proportion of revenue from all fisheries, groundfish are especially important in the Brooking region: the $2.3 million value amounts to just over half the $4.3 million in landings from all fisheries.

There are some notable differences in fleet characteristics between these two port groups. Coos Bay had 29 limited entry groundfish trawlers in 2001 versus only four in Brookings. The vessel buyback program retired eight limited entry trawl vessels in Coos Bay. Five retired vessels are reported for Brookings out of a total of nine (NMFS 2004a), more than the 2001 count. This discrepancy is likely due to differences in the way vessel home ports are determined. Port Orford in the Brookings port group had a fleet of limited entry fixed vessels numbering 14 in 2001. The table also shows a large number of vessels in the open access category of more than 5% of revenue from groundfish in the Brookings port group. Some of these vessels are likely participating in the live fish fishery and contributing to high-value rockfish landings.

3.6.2.2.2 Community Demographics

Table 3-65 South Oregon Coast Demographics at a Glance

	Coos Bay		Brookings	
	Value	Rank	Value	Rank
Total population:	59,901	8	20,137	16
Urban population	80.44%	9	49.2%	15
Non-white population:	7.8%	15	6.7%	17
Hispanic population:	3.1%	17	3.4%	16
Working age population (17-64):	57.6%	17	55.5%	18
High school graduate and higher*:	83.0%	11	81.3%	13
Natural resource-related employment**:	2.52%	8	3.0%	5
Average household income:	$39,553	18	$39,563	17
Poverty rate:	14.8%	5	13.3%	6

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

These two fairly rural port groups are generally similar to northern Oregon ports in terms of race and ethnicity, or the comparatively small percentage of the population that is non-white and Hispanic. Native Americans are the largest minority group at a little over two percent in both port groups. These two port groups rank at the bottom for the percent of the population between 17 and 64; Coos Bay ranks first for population 65 years old and up, Brookings third. This reflects the popularity of this part of the Oregon coast as a retirement destination. They also rank at the bottom in terms of average household income and have fairly high poverty rates. Median incomes in constituent census places, however, are higher than in some Northern California communities (see below), ranging from $31,656 in Brookings to $29,492 in Bandon. These values are about two-thirds the statewide value of $40,916. Fisheries made a modest contribution to income and employment in 2001, with Brookings ranking somewhat higher than Coos Bay for the percent share coming from fisheries.

3.6.3 California

3.6.3.1 Northern California (Crescent City, Eureka, and Fort Bragg)

3.6.3.1.1 Port Infrastructure and Fleet Characteristics

Groundfish are an important component of landings, measured by value, in Northern California even if the total amount of groundfish landed in these three port groups is less than for most port groups in Washington and Oregon. In 2002, groundfish landings accounted for 29% of total exvessel revenues in these three port groups compared to 34% in Oregon and 18% in Washington. During this year these port groups also accounted for a little over half of the value of all groundfish landed in California but only about a quarter of all fishery landings in California. Yet the amount of groundfish landed in these three port groups, 8,303 mt in 2002, is less than that landed in any one of three port groups in Washington and Oregon (South and Central Washington, Astoria-Tillamook, and Newport) and less than the sum of any three port groups in those two states. As in southern Oregon, rockfish and lingcod are an important component of landings, measured by exvessel revenue. In Fort Bragg rockfish were the largest component of groundfish landings. As mentioned above, this likely reflects the importance of high-value live fish deliveries. Eureka represents the southern terminus of the Pacific whiting fishery in terms of landings ports with 2,775 mt landed there in 2002, a small amount in comparison to landings in southern Washington and northern Oregon.

The total number of groundfish vessels in each of these three port groups is less than in Oregon port groups, although greater than port groups in Washington. However, the largest number of limited entry trawl vessels were retired by the vessel buyback program in this region. According to the report (NMFS 2004a), 14 vessels each were retired in Crescent City and Eureka. Another four vessels in Fort Bragg were retired. The open access sector also plays a larger role in these ports. In Eureka, for example, of the 98 vessels making groundfish landings in 2001, 68 were in the open access sector with groundfish accounting for more than 5% of their revenue for the year. Smaller vessels are more prevalent in the fishing fleets in these port groups; only 7% of the vessels are in the 60 feet and above size groups, half or less of the comparable percentage in Oregon port groups such as Astoria-Tillamook and Newport.

3.6.3.1.2 Community Demographics

Table 3-66 Northern California Coast Demographics at a Glance

	Crescent City		Eureka		Fort Bragg	
	Value	Rank	Value	Rank	Value	Rank
Total population:	24,472	13	52,460	9	21,237	15
Urban population	76.3%	10	82.5%	8	43.9%	17
Non-white population:	20.9	6	14.5	9	14.7	8
Hispanic population:	13.0%	7	6.2%	9	14.1%	6
Working age population (17-64):	64.8%	6	64.6%	7	73.9%	8
High school graduate and higher*:	71.4%	18	84.8	9	84.0	10
Natural resource-related employment**:	2.6%	12	2.0%	12	5.1%	2
Average household income:	$39,654	16	$41,482	14	$49,781	9
Poverty rate:	18.5%	1	17.3%	2	12.5%	8

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

Hispanics are the largest minority group in these three port groups, although their share of the population is less than in most of the other port groups in California. The next largest minority groups after Hispanics is Native Americans, which make up 5.4% of the population in the Crescent City area, 4.0% in Eureka, and 2.9% in Fort Bragg, ranking them first, third, and fifth among the port groups, respectively, for this statistic. Crescent City and Eureka rank low in terms of average household income and have the highest poverty rates among all the port groups. Median incomes in constituent census places are also comparatively low; in fact the median income for Crescent City—$20,133—is less than half the value for California as a whole. Fort Bragg is notable in terms of the comparatively high percentage of the population employed in natural resource related jobs. Estimated employment in fisheries in 2001 was relatively high in Crescent City but more modest in the other two port groups. Groundfish fisheries played a more prominent role in Eureka than the other two port groups in this region, likely because of the shore-based processing of Pacific whiting at this port.

3.6.3.2 Central California (Bodega Bay, San Francisco, Monterey, and Morro Bay)

3.6.3.2.1 Port Infrastructure and Fleet Characteristics

In Central California, and Southern California especially (see below), groundfish diminish as a significant component of commercial landings. In 2002 San Francisco ranked below Eureka and Fort Bragg port groups in terms of the amount of groundfish landings, but second only to Eureka in California measured by exvessel value. (Note that in the fishery-related tables, as opposed to the demographic tables, Bodega Bay ports are included in the San Francisco port group.) Rockfish were an important component of landings in all three port groups in 2002, but in Morro Bay especially they provided a large portion of exvessel revenue. As noted above, this reflects the importance of the live fish fishery. Flatfish are also an important contributor to landings in all three port groups, while sablefish are significant in the Monterey port group.

As in Northern California, open access vessels were an important part of the fleet in these port groups, based on landings at member ports. The limited entry trawl vessel buyback program retired 11 vessels in this region (NMFS 2004a), further reducing the importance of that sector. Taking the three port groups together, 86% of vessels making groundfish landings were in the open access sector, and the great majority of these likely targeted groundfish on some trips, given the number for which groundfish account for more than 5% of total landings value. In Morro Bay almost all of these vessels made landings of nearshore species, again suggesting the importance of the live fish fishery—which targets fish in relatively shallow water—in this port group. These port groups have more smaller vessels—97.5% are less than 60 feet in comparison to the coastwide value of 92%.

3.6.3.2.2 Community Demographics

Table 3-67 Central California Coast Demographics at a Glance

	Bodega Bay		San Francisco		Monterey		Morro Bay	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Total population:	15,592	18	1,484,046	1	112,344	6	40,812	10
Urban population	49.1%	16	99.7%	2	92.5%	6	87.7%	7
Non-white population:	11.0%	10	55.0%	1	20.1%	7	10.3%	12
Hispanic population:	9.2%	9	16.7%	4	16.0%	5	10.9%	8
Working age population (17-64):	73.9%	1	70.0%	3	72.2%	2	61.6%	12
High school graduate and higher*:	93.9%	1	80.1%	14	89.3%	3	91.2%	2
Natural resource-related employment**:	2.8%	6	0.1%	18	1.0%	14	2.4%	10
Average household income:	$108,183	1	$72,203	2	$67,623	3	$56,804	8
Poverty rate:	6.3%	18	12.3%	9	10.3%	15	9.9%	17

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

This region is more ethnically diverse, better educated and wealthier than port groups to the north. Like Seattle in Puget Sound, San Francisco and the Bay Area conurbation dominate this region in terms of population and economic activity. The sparsely populated Bodega Bay port group includes affluent Sausalito, just across the Golden Gate Bridge from San Francisco. Its median income of $87,469 places it above all other communities except for the Newport Coast CDP in Southern California. Yet all of these port groups compare positively in terms of the statistics measuring income and education, with Morro Bay somewhat of a laggard in comparison to the other three port groups. As might be expected, natural resource related employment is insignificant in the San Francisco port group and modest in the other three. These ports rank near the bottom of the West Coast port groups in estimates of 2001 income and employment from fisheries.

Groundfish-related activities were also a less important share of fisheries income and employment in the Central California port groups, outranking only Southern California.

3.6.3.3 Southern California (Santa Barbara, Los Angeles, and San Diego)

3.6.3.3.1 Port Infrastructure and Fleet Characteristics

Commercial groundfish fisheries are relatively unimportant in Southern California; these port groups show groundfish exvessel revenue in 2002 somewhat greater than a half a million dollars in each group. Half of that revenue, or better, came from rockfish. In contrast, Los Angeles ranked second (behind the South Washington Coast) for exvessel revenue from all fisheries on the West Coast, and Santa Barbara ranked fourth in 2002. The importance of recreational fisheries for groundfish in this region: an estimated $37.2 million in income was generated in 2001. (This statistic cannot be directly compared to exvessel revenue figures because income includes a wider range of economic activity than what is reflected in exvessel revenue. Nonetheless, it suggests that recreational groundfish fisheries play a greater role in the regional economy than commercial groundfish fisheries.)

This region is dominated by open access groundfish fisheries. No groundfish limited entry trawlers operate out of these ports and only a modest number of limited entry fixed gear vessels do. Of the 258 vessels making groundfish landings at these ports in 2001, 236 were in the open access sector.

3.6.3.3.2 Community Demographics

Table 3-68 Southern California Coast Demographics at a Glance

	Santa Barbara		Los Angeles		San Diego	
	Value	Rank	Value	Rank	Value	Rank
Total population:	400,353	5	703,511	4	1,336,350	2
Urban population	99.2%	3	100.0%	1	99.6%	3
Non-white population:	39.2%	3	46.9%	2	38.8%	4
Hispanic population:	45.8%	1	35.8%	2	26.0%	3
Working age population (17-64):	63.8%	10	63.8%	9	66.2%	5
High school graduate and higher*:	73.8%	17	75.1%	16	82.5%	12
Natural resource-related employment**:	3.4%	4	0.1%	17	0.2%	16
Average household income:	$63,423	5	$64,901	4	$61,947	6
Poverty rate:	9.9%	16	15.6%	3	11.9%	11

(Values for block group equivalent areas. Census data, 2000. *Some college, bachelor and graduate degrees. **Population employed in private sector natural resource-related occupation.)

Coastal Southern California is overwhelmingly urban and the most racially and ethnically diverse region on the West Coast. Los Angeles is the preeminent urban center on the West Coast. As might be expected, these port groups rank at the top for the percent of the population that is Hispanic. The population value for the Los Angeles port group is somewhat misleading because it includes a small subset of the cities and communities in the Los Angeles area. In comparison, the combined population of Los Angeles and Orange counties is 7.7 million. The Los Angeles ports in particular show significant disparities in economic well-being. The Newport Coast CDP, for example, has the highest median income of the West Coast port areas—$164,653—and an average income of $264,648. This is more than four times the average income for the port group as a whole. To a lesser degree, there are these types of disparities in the Santa Barbara port group. Santa Barbara itself is a quite affluent city while the coastal areas in Ventura county to the south, also part of the port group, have fewer wealthy residents. Comparison of the median and average income values for Santa Barbara and the other ports in the port group reflect the differences in income distribution. There is a much greater difference between median income and average income in Santa Barbara compared to the other ports. For example, median household income in Santa Barbara is less than in Oxnard while average household income is greater.

The estimates of income and employment derived from fisheries are comparatively small for these port groups; Santa Barbara ranks higher than the other two but still in the bottom half of all West Coast port groups. These port groups rank at the bottom of the port roups in terms of the share groundfish contributes to fishery-related income.

3.6.4 Coastwide Summary

3.6.4.1 Dependence on and Engagement in Fishing and Fishing-Related Activities

By examining the rankings we get an idea of how engaged each port area is in commercial fishing relative to other opportunities in the regional economy. Both the income and employment measures show that the south Washington coast is the area most heavily invested in commercial fishing relative to its economy. Newport and Astoria-Tillamook in Oregon, and Crescent City, California, are the next most engaged. Brookings and Central Washington coast alternate for fifth and sixth place, depending on whether the income or employment measure is used. By this measure the least engaged port areas are the large, relatively urbanized centers of Puget Sound, San Diego, San Francisco, and Los Angeles. While these areas certainly include local pockets that are heavily engaged in fishing activities, the size and diversity of the surrounding economies tend to mask the significance of locally important factors.

The second block shows how much of the total fishery-related income and employment in each region is generated by groundfish activity. This measure shows Puget Sound, North Washington Coast, Astoria-Tillamook, and Eureka all depend on groundfish for at least 50% of fishery-related income and employment. All but four of the port groups generate at least 14% of fishery-related income from groundfish.

The second page of splits the groundfish totals into limited entry trawl and other gear components. From this information we see that of the regions highly involved in groundfish, Astoria-Tillamook, Puget Sound, Newport, and Eureka-derive more than 40% of groundfish income from the limited entry trawl fishery. Only the North Washington coast derives more than one-third of groundfish income from nontrawl sources.

Estimated personal income generated in 2001 by the West Coast ocean recreational fishery were also generated using the Fisheries Economic Assessment Model (or FEAM, see Jensen 1996). The ocean recreational fishery accounted for $254 million in personal income and almost 10,000 jobs in 2001. Of this, groundfish trips accounted for $71 million and 2,800 jobs, respectively, or about 28% of the total. The proportion of income associated with groundfish trips ranged from 17% in Washington to 45% in Oregon. The ratio of charter angler trips to private vessel participation was much greater in Northern and Southern California than in Washington and Oregon, probably reflecting differences in species opportunities, season length and weather along the coast.

3.6.4.2 County Economic Indicators

Tables x and x display the most recent (2001) information on the components of total personal income in counties along the West Coast, Puget Sound, and Lower Columbia River by county. The counties are ranked on the basis of several different average or per capita income measures. In terms of total per capita personal income, the urban Northern California counties are on top, with Marin county ranked number one, followed by two other Bay Area counties: San Mateo and San Francisco. San Mateo and San Francisco also rank first and second in terms of average annual wage, a measure of the strength of these economies as centers of high wage employment, with King county Washington at number three. Marin, San Mateo, and San Francisco counties are ranked first, second, and third in terms of per capita non-labor income (dividends, interest and rent). The status of Marin county as a top bedroom community for San Francisco-bound commuters is betrayed by its ranking as number one in terms of residence adjustment, a net measure of income brought home by resident commuters minus the income carried out by non-residents. The number two and three spots in this category are held by Contra Costa, California, and Columbia County, Oregon, respectively. The four poorest counties in the region, measured by per capita income, are Del Norte County in California, and Klickitat, Pacific, and Grays Harbor counties in Washington.

Transfer payments include welfare and Social Security benefits received from federal, state, and local governments. As such, it can be both a measure of how dependent an area is on public assistance or an indicator of how attractive an area is as a retirement destination. By this measure, Pacific County, Washington, is number one, followed by Curry County, Oregon and Clallam County in Washington. Looking at dividends, interest, and rent (a measure of wealth) expands this picture. By this measure, Curry and Clallam counties rank relatively high (7th and 11th respectively), but Pacific County is well down the list at thirty-third, indicating that Pacific is probably the poorer of the three counties.

According to 2002 unemployment rates in coastal counties (the latest available county-level data) counties with relatively high unemployment rates are arrayed along the lower Washington coast, Columbia River, and southern Oregon coast. Monterey and Del Norte were the only counties in California with unemployment rates among the highest ten. Three of the four counties with highest unemployment rates in 2002 were located in southwestern Washington.

According to national average unemployment rate and the state averages for the three coastal states, unemployment rates for all three states were significantly above the national average in 2002. In Washington, 11 of the 15 counties displayed had higher unemployment rates than the state average. In Oregon, 7 of 11 counties displayed had higher than state-average unemployment. In California, 7 of 19 counties displayed had unemployment rates higher than the state average.

3.6.4.3 Social Structure: Networks, Values, Identity

The fishing community on the West Coast is composed of many separate communities based on fishery, gear type, targeted species, geography and, to some degree, cultural background and ethnicity. For example, Astoria, Oregon, has Finnish roots that are celebrated in community festivals, and Native American communities have ties to the fishery that date back thousands of years.

Commercial fishing enterprises in Washington, Oregon, and California are socially and culturally diverse. However, most tend to be family-run businesses. While most fishers are male, women are often involved in the shoreside aspects of the fishing business and provide an important support and communications network for the fishing community. Few fishing families own multiple boats, and few boats are owned by large corporations. In many communities, families can trace several generations of involvement in the fishing industry.

Recreational fishing is also an important part of many communities' identities. The recreational fishing industry includes charter boats, guides, marinas; and gear, bait, and other suppliers. Many of these businesses are also family-owned and operated. In addition to their direct impact on the local community, the recreational fishing industry supports a broad-based community of thousands of individual boat owners and shore fishers participating in ocean and inland recreational fisheries.

The commercial fishing industry generally places a high value on independence. Fishing necessarily occurs at sea, and frequently attracts people who enjoy solitude and self-direction. This sense of independence and self-reliance contrasts sharply with the increasingly stringent controls being placed on the industry.

Fishing is also known for its high level of danger; it is consistently rated among the most dangerous professions in the United States. Despite this danger, there are few safety nets for people in the industry. Crew members are not technically "employees" and are not eligible for unemployment insurance, workers' compensation, and other benefits normally associated with workers in other demanding and dangerous occupations. Vagaries of weather, market conditions and regulations demand high levels of flexibility. Many crew members are itinerant, moving from port to port and job to job (Gilden 1999).

The challenges of pursuing and maintaining fishing-based livelihoods have caused fishers to form organizations to represent common interests. Examples include the Coos Bay Trawlers Association, the Newport Fishermen's Wives Association, the Pacific City Dorymen's Association, the Fishermen's Marketing Association, the Pacific Marine Conservation Council, the West Coast Fishermen's Alliance, the Western Fishboat

Owner's Association, and the Women's Coalition for Pacific Fisheries (Gilden 1999). These organizations help the multiple facets of the fishing community represent their interests to policy makers and the general public.

3.6.4.4 Impact on the Built Environment in Fishing Communities

While few coastal communities depend exclusively on fishing; harvesting, processing and related support industries (fuel, docks, ice, gear repair, etc.) are part of a complex web of interaction with other economic activities such as sport fishing, whale watching, tourism, and other recreational activities. Commercial and recreational fishers coexist, and both contribute financially to the businesses and infrastructure that serve and support them. Communities such as Newport, Oregon, celebrate their fishing industry, having turned the port waterfront into a major tourist attraction. This is also true for many other historic ports in Washington, Oregon, and California. Maintenance of port facilities for the fishing fleet provides access for other user groups, such as recreational fishers and boaters, and draws tourists who are attracted to the sights and smells of a working fishing port.

The presence of a viable commercial fleet helps provide the funding and incentive to dredge harbor entrances and to maintain jetties and port facilities. These in turn assist the recreational industry and private users to operate safely and efficiently from coastal ports. Seafood processors and shoreside support businesses pay property taxes and license fees to the port cities and surrounding jurisdictions, thereby contributing to the maintenance of the local infrastructure for all area residents.

The following are examples of fishery-related effects on port infrastructure. In ports such as Brookings and Garibaldi in Oregon, reduction in fishing fleets has coincided with the silting of harbor entrances due to reduced dredging. This has restricted access for larger vessels, including trawlers, and made it more difficult for a fleet to become established in the future (Gilden 1999). In another example, the Port of Astoria recently added a new breakwater to provide additional moorage for larger vessels involved in the new sardine fishery (Oregon Coastal Zone Management Association 2002).

3.6.4.5 Identification of Minority and Low Income Communities and Addressing Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address "disproportionately high adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States." Fishery management actions promulgated by the Pacific Council and implemented by NMFS can have environmental and socioeconomic impacts over a very wide area; the affected area of many actions covers all West Coast waters and adjacent coastal communities involved in fishing. This makes it difficult to identify minority and low-income populations that may be disproportionately affected.

The same population units described above and used to characterize the demographics of ports and port groups were used to evaluate what ports might qualify as low income and minority. These are census places and block group equivalent areas. Five criteria were used from SF3 population tables: percent non-white population, percent Native American population, percent Hispanic population, average income, and poverty rate.1/ Statistics for the ports need to be compared to a reference community in order to determine if they are sufficiently different from a more general, but comparable, population to be considered a minority or low-income community. Three reference communities were identified: north, central, and south. (A single coastwide reference community was not used because of the substantial variation in population characteristics along the coast.) To begin developing the reference communities census block groups within 10 miles of the coast were selected and coded using GIS. (Some manual editing was necessary to include smaller census blocks, which, although more than 10 miles from the coast, were surrounded by large block groups that qualified. This is because the selection rule was based on the boundary of the block group, not its centroid. A small number of block groups qualifying, but not in coastal counties, were also manually excluded.) The three regions are based on port groups; "coastal" block groups were further coded according to these regions. The northern region includes port groups in Washington, Oregon, and the Crescent City, Eureka, and Fort Bragg port groups in California. The central region includes the Bodega Bay, San Francisco, Monterey, and Morro Bay port groups. The southern region includes the Santa Barbara, Los Angeles, and San Diego port groups.

Once reference communities were identified, a threshold value for each of the five statistics used in the evaluation was determined. The block groups in each reference community were ranked and the value constituting the minimum of the highest quintile (twentieth percentile) was identified for percent nonwhite, percent Native American, percent Hispanic, and percent households below the poverty line, and the value constituting the maximum of the bottom quintile for average household income.

Using the quintile value, the ports were evaluated to see if they met the threshold for each of these statistics. Table xx summarizes the results; for each port the appropriate cell is shaded if that statistic is above (or below for average household income) the quintile threshold for the block group equivalent (the column headed "B") or census place (the column headed "P"). Providing results for both block group equivalents and census places allows comparison to note how they differ.

[10]/ Percent nonwhite was calculated by subtracting the white population from the total population. Sources for the other statistics are given in the notes for Table xx to xxx.

Table 3-69. Location and Composition of Port Groups. (Page 141 of 2)

State	Port Group Area	County	PCID	Name
Washington	Puget Sound	Whatcom	BLN	Blaine
		Whatcom	BLL	Bellingham Bay
		San Juan	FRI	Friday Harbor
		Skagit	ANA	Anacortes
		Skagit	LAC	La Conner
		Snohomish	ONP	Other North Puget Sound Ports
		Snohomish	EVR	Everett
		King	SEA	Seattle
		Pierce	TAC	Tacoma
		Thurston	OLY	Olympia
		Mason	SHL	Shelton
		Unknown	OSP	Other South Puget Sound Ports
	North Washington Coast	Jefferson	TNS	Port Townsend
		Clallam	SEQ	Sequim
		Clallam	PAG	Port Angeles
		Clallam	NEA	Neah Bay
		Clallam	LAP	La Push
	South & Central WA Coast	Grays Harbor	CPL	Copalis Beach
		Grays Harbor	GRH	Grays Harbor
		Grays Harbor	WPT	Westport
		Pacific	WLB	Willapa Bay
		Pacific	LWC	Ilwaco/chinook
		Klickitat	OCR	Other Columbia River Ports
	Unidentified WA	Pacific	OWC	Other Washington Coastal Ports
		Unknown	OWA	Unknown WA Ports
Oregon	Astoria	Multnomah	CRV	Psuedo Port Code for Columbia R.
		Clatsop	AST	Astoria
		Clatsop	GSS	Gearhart - Seaside
		Clatsop	CNB	Cannon Beach
		Unknown	WAL	Landed in WA; Transp. to OR
	Tillamook	Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
	Newport	Lincoln	SRV	Salmon River
		Lincoln	SLZ	Siletz Bay
		Lincoln	DPO	Depoe Bay
		Lincoln	NEW	Newport
		Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
	Coos Bay	Lane	FLR	Florence
		Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Brookings	Curry	ORF	Port Orford
		Curry	GLD	Gold Beach
		Curry	BRK	Brookings
California	Crescent City	Del Norte	CRS	Crescent City
		Del Norte	ODN	Other Del Norte County Ports
	Eureka	Humboldt	ERK	Eureka (Includes Fields Landing)
		Humboldt	FLN	Fields Landing
		Humboldt	TRN	Trinidad
		Humboldt	OHB	Other Humboldt County Ports
	Fort Bragg	Mendocino	BRG	Fort Bragg
		Mendocino	ALB	Albion
		Mendocino	ARE	Arena
		Mendocino	OMD	Other Mendocino County Ports
	Bodega Bay	Sonoma	BDG	Bodega Bay

Table 3-69. Location and Composition of Port Groups. (Page 141 of 2)

State	Port Group Area	County	PCID	Name
		Marin	TML	Tomales Bay
		Marin	RYS	Point Reyes
		Marin	OSM	Other Son. and Mar. Co. Outer Coast Ports
		Marin	SLT	Sausalito
	San Francisco	Alameda	OAK	Oakland
		Alameda	ALM	Alameda
		Alameda	BKL	Berkely
		Contra Costa	RCH	Richmond
		San Francisco	SF	San Francisco
		San Mateo	PRN	Princeton
		San Francisco	SFA	San Francisco Ara
		San Francisco	OSF	Other S.F. Bay and S.M. Co. Ports
	Monterey	Santa Cruz	CRZ	Santa Cruz
		Monterey	MOS	Moss Landing
		Monterey	MNT	Monterey
		Monterey	OCM	Other S.C. and Mon. Co. Ports
	Morro Bay	San Luis Obispo	MRO	Morro Bay
		San Luis Obispo	AVL	Avila
		San Luis Obispo	OSL	Other S.L..O. Co. Ports
	Santa Barbara	Santa Barbara	SB	Santa Barbara
		Santa Barbara	SBA	Santa Barbara Area
		Ventura	HNM	Port Hueneme
		Ventura	OXN	Oxnard
		Ventura	VEN	Ventura
		Ventura	OBV	Other S.B. and Ven. Co. Ports
	Los Angeles	Los Angeles	TRM	Terminal Island
		Los Angeles	SPA	San Pedro Area
		Los Angeles	SP	San Pedro
		Los Angeles	WLM	Willmington
		Los Angeles	LGB	Longbeach
		Orange	NWB	Newport Beach
		Orange	DNA	Dana Point
		Orange	OLA	Other LA and Orange Co. Ports
	San Diego	San Diego	SD	San Diego
		San Diego	OCN	Oceanside
		San Diego	SDA	San Diego Area
		San Diego	OSD	Other S.D. Co. Ports
	Unidentified CA	Unknown	OCA	Unknown CA Ports

3.7 Non-Fishing Values

This section discusses the value of the marine environment to members of the general public that are not involved in consumptive use of coastal and marine resources. The sectors benefiting from a resource can generally be placed into one of three groups: consumptive users (e.g., recreational fishers that keep their catch, commercial harvesters, and processors), non-consumptive users (e.g., wildlife viewers), and non-consumptive non-users (e.g., members of the general public who derive value from knowing that a species or habitat is being maintained at a healthy level). The following table displays the general relationship between use/non-use and consumptive/non-consumptive types of activities.

Table 3-70 Relationship between Use/Non-use and Consumptive/Non-consumptive Activities

	Consumptive	Non-Consumptive
Use	Commercial and Recreational Fishing	Wildlife Viewing
Non-use	N/A	Existence Value, Bequest Value, Social and Cultural Value

In this section, use and non-use non-consumptive activities within the marine environment are discussed. As seen in the table, use non-consumptive activities include marine wildlife viewing (whale watching, recreational diving, marine eco-tours, etc). Wildlife viewing can be either market or non-market consumer goods. Non-use non-consumptive value can result from the value placed on future access to the resource for oneself, others or future generations, biodiversity, cultural heritage and social significance of the coastal and marine resource. This is often called passive use value.

3.7.1 Non-Consumptive Use Value

Marine wildlife viewing along the Pacific coast includes on-shore and at-sea activities like SCUBA and skin diving, whale watching, eco-tours, tide pool viewing, etc. Wildlife viewing likely contributes to the tourism economy of several local communities by providing revenue and employment through companies providing these services to the public. It is also likely that restaurants and hotels receive some indirect value from these activities. Complete information about the prevalence, distribution and economic contribution of entities providing whale watching and eco-tour services are not currently available on a coastwide basis. However, a survey was completed by PSMFC in 2001 of charter boats operating in the Pacific Region. Results showed that 31 of 82 charter boats surveyed made at least one nature watching trip in 2000. The average number of trips made by each charter vessel was 14. Two of 82 surveyed charter vessels indicated that they conducted at least one non-fishing SCUBA diving trip with an average of 11 in the year (PSMFC, 2001).

Some area-specific information is available about particularly popular whale watching destinations such as the San Juan Islands and Channel Islands. In all, there are approximately 40 U.S. companies providing whale watching services in the Pacific Northwest (Personal communication 2004, Richard Osborne). Entities chartering trips in the San Juan Islands rely largely on revenues from whale watching of three resident killer whale pods in the Haro Strait region (located between the San Juan Islands and Vancouver Island). Other wildlife, such as transient Orcas, Minke whales, Gray whales, Dall's and Harbor porpoises, seals, sea lions, bald eagles, many kinds of seabirds, and blacktail deer are also viewed. Several of the American entities (17 companies) belong to an organization called Whalewatch Operators Northwest (along with several Canadian operations) and adhere to voluntary whale watching guidelines, sanctioned by the organization, that aim to be safe, professional and respectful of wildlife. U.S. boats have increased from zero in 1976 to about 28 vessels in 2003 in Haro Strait. The number of both whale watch boat passengers and land-based whale watching visitors to Lime Kiln State Park in Friday Harbor on San Juan Island tallied at about 30,000 and 65,000 respectively in 2003 (The Whale Museum, 2003). These statistics indicate the growth of the whale watching industry over the past three decades.

One project being pursued by NMFS social scientists at the Northwest Fisheries Science Center concerns how killer whales, as an unregulated common pool resource, are used non-consumptively by whale watch operators in the Puget Sound (Personal communication, Heather Lazrus and Karma Norman, 2004).

The Channel Islands is also a popular wildlife viewing destination. The Channel Islands National Marine Sanctuary (CINMS) DEIS provides some information about non-consumptive recreational activities in that area from commercial entities. In 1999, an estimated 42,008 person-days[11] were tallied as non-consumptive recreation from "for hire" operations in the CINMS. They were not able to estimate amounts of non-consumptive recreation from private household boats. Whale watching was the most prevalent non-consumptive recreational activity with about 26,000 person-days (62% of those surveyed for non-consumptive activities). Non-consumptive diving was about 26% of all activity while sailing and kayaking/Island sightseeing accounted for the remaining 13% of non-consumptive recreational activity. In all, these non-consumptive recreational activities were estimated to have contributed about $82,837 in total profit in 1999 (CINMS DEIS, 2000).

Some information is available about the distribution of entities providing diving trip services. The Diving Equipment and Marketing Association (www.dema.org) tallies 159 specialty diving retail entities in CA, 25 in Oregon, and 49 in Washington. Popular areas for diving include the Channel Islands and Monterey Bay. However, the Northwest states are also valued highly by divers. Washington State was just voted as one of the best places to dive in North America (SCUBA diving magazine, January 2004). The Channel Islands and Washington State were voted the 2nd and 8th best places to dive in North America. Kelp forests are often the primary destination for viewing wildlife. Dive shop owners indicate that wolf eels, octopi, sharks, anemones and rockfish are highlights of diving excursions.

3.7.1.1 Value of Protected or Preserved Marine Resources

Offsite non-consumptive uses of resources that are protected or preserved by management are public in nature in that no one is excluded from deriving the identified benefits. Total value placed on offsite non-consumptive use of the stock or component of the ecosystem set aside will also depend on:

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[11] A "person-day" is one person undertaking an activity for any part of a day or a whole day (CHNMS EIS, 2003).

1. The size of the human population.
2. The level of income.
3. Education levels.
4. Environmental perceptions and preferences.

(After Spurgeon, 1992, as cited in Caribbean Fishery Management Council, 1998).

The above relationships imply that as human populations and the welfare of those populations increase, and as the fish stocks and their ecosystems remaining in good condition decreases, the non-consumptive values associated with maintaining ocean resources are likely to increase. Also implied is that once the basic integrity of ecosystem processes and marine fisheries components are preserved, the likely additional benefit from incremental increases will decrease.

3.7.1.2 Estimation of Value

Non-consumptive use of the marine environment includes use of both market and non-market consumer goods. In the market for recreational charter trips that involve non-consumptive use of the marine environment (i.e. whale watching trips, eco-tours, etc.) individuals pay fees to a company or individual providing the service. When individuals participate in marine wildlife viewing on their own (i.e. tidal pool viewing, beachcombing, etc.) they often pay for transportation, lodging and other services as part of a recreational excursion. However, this bundle of services is not marketed in a traditional market and is therefore referred to as a non-market consumer good.

For goods exchanged in markets where a consumer price can be determined (i.e. seafood), price and quantity information can be used to estimate the benefits consumers derive from consumption activities. In the market for recreational experiences (i.e. charter boats offering marine wildlife viewing excursions), price and quantity information from these trips might allow estimation of the benefits participants derive from this type recreational activity. However, charter trips may often be purchased as part of a bundle of goods and services that include other recreational activities. Therefore, the estimation of benefits from recreational charter activities is less straightforward than for traditionally marketed consumer goods.

For other consumer goods, especially bundles of goods and services such as a recreational fishing trip taken on a private vessel, the prices and quantities associated with each transaction are much more difficult to determine. For the private recreationalist, the amount spent on gear and other goods necessary to carry out a particular marine wildlife viewing trip is difficult to isolate. The term “private” is used here to designate an individual using the marine environment from a private vessel, the shore, bank or a public pier, as opposed to using a charter vessel.

Although these values are not possible to quantify at this time due to a lack of data, there are indications that the use and value of certain aspects of the marine environment are increasing. However, cumulative value is uncertain with respect to the Pacific marine environment specifically.

3.7.2 Non-Consumptive Non-Use Values

3.7.2.1 Passive Use Values

Passive use values are often related to biodiversity, cultural heritage, social significance of the fishery or ecosystem, existence value and bequest value.

3.7.2.2 Biological Diversity

The value of biological diversity may be part of the value placed on a site by non-consumptive users (onsite or offsite). Three levels of biological diversity have been identified, (1) genetic diversity within a species, (2) species diversity (richness, abundance, and taxonomic diversity) and (3) ecosystem diversity. Ecosystem diversity encompasses the variety of habitats, biotic communities and ecological processes (Caribbean Fishery Management Council 1998). Healthy ecosystems characterized by high biological diversity are generally able to provide a wider range of ecosystem services than are available from damaged or less diverse ecological communities. Examples of such ecosystem services include the nutrient recycling and filtering capabilities of wetlands and the CO_2 sequestration function provided by growing forests.

3.7.2.3 Social and Cultural Value

The existence of coastal fishing communities in themselves may have social and cultural value. For example, the Newport Beach dory fishing fleet, founded in 1891, is a historical landmark designated by the Newport Beach Historical Society. The city grants the dory fleet use of the public beach in return for the business and tourism this unique fishery generates.

3.7.2.4 Existence Value

Existence value is often used to describe the willingness to pay for a good even though one makes no direct use of it, may not benefit from it individually and may not plan any future use for self or others. Benefits may accrue to passive users of coastal and marine resources from the preservation of fish stocks at higher levels of abundance.

3.7.2.5 Bequest Value

If value is placed on conservation for future generations, this is called bequest value. Bequest value is defined by willingness to pay in order to insure the continued supply of ecosystem services, the availability of which would otherwise be uncertain.

3.7.2.6 Estimation of Value

It is not possible at this time to adequately quantify passive use value under each of these categories due to a lack of data about individuals' value of the U.S. west coast marine environment specifically.

3.7.3 Non-fishing Activities

This section discusses the value of the marine environment to entities involved in use of the coastal and marine environment resulting from non-fishing activities. Appendix ___ describes several industries that benefit from direct use of the coastal and marine environment that do not involve fishing.

3.7.3.1 Industries Involved in Non-Fishing Activities

Several of the industries described in Appendix ___ are likely economically important to particular coastal communities. Providing a description of each of the industries described in Appendix ___ in the Pacific region requires economic information about the portion of economic value and employment that each industry creates related specifically to use of the Pacific coastal and marine environment. This information is not readily available at this time. Current socioeconomic research by social scientists at the NWFSC and AKFSC will describe some of these industries and their economic, social and cultural importance to specific coastal communities. However, many non-fishing activities referred to in Appendix ___ may take place further inland and it is possible that the community profiles research will not contain information adequate for evaluation of impacts to the coastal and marine environment.

Marine wildlife viewing along the Pacific coast includes on-shore and at-sea activities like SCUBA and skin diving, whale watching, eco-tours, tide pool viewing, etc. Wildlife viewing likely contributes to the tourism economy of several local communities by providing revenue and employment through companies providing these services to the public. It is also likely that restaurants and hotels receive some indirect value from these activities. However, information about the prevalence, distribution and economic contribution of entities providing whale watching and eco-tour services are not currently readily available. Current projects focusing on community profiling may provide some information about the significance of these industries to specific local economies.

Some information is available about the distribution of entities providing diving trip services. The Diving Equipment and Marketing Association (www.dema.org) tallies 159 specialty diving retail entities in CA, 25 in Oregon and 49 in Washington. Popular areas for diving include the Channel Islands and Monterey Bay. However, the Northwest states are also valued highly by divers. The Pacific Northwest was just voted the best place to dive in the US (SCUBA diving magazine, June 2004). Kelp forests are often the primary destination for viewing wildlife. Dive shop owners indicate that wolf eels, octopi, sharks, anemones and rockfish are highlights of diving excursions.

3.7.3.1.1 Dredging

Dredging navigable waters is a continuous impact primarily to benthic habitats, but also to adjacent habitats in the construction and operation of marinas, harbors, and ports. Routine dredging—that is, the excavation of soft bottom substrates—is required to provide or create navigational access for ships and boats to docking facilities (ports and marinas). Dredging is used to create deepwater navigable channels or to maintain existing channels that periodically fill with sediments that flow into these channels from rivers or move by wind, wave, and tidal dynamics. In the process of dredging, excessive quantities and associated qualities of the sea floor are removed, disturbed, and re-suspended. Turbidity plumes may arise. Legal mandates covering dredging are the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251 et seq.) and the River and Harbor Act of 1899 (33 U.S.C. 401 et seq.).

Dredging may adversely affect infaunal and bottom-dwelling organisms at the site by removing immobile organisms such as polychaete worms and other prey types or forcing mobile animals such as fish to migrate. Benthic plants and animals present prior to a discharge are unlikely to re-colonize if the composition of the deeper layers of sediment are drastically different.

Dredging events using certain types of dredging equipment can result in greatly elevated levels of fine-grained mineral particles, usually smaller than silt, and organic particles in the water column. These turbidity plumes of suspended particulates may reduce light penetration and lower the rate of photosynthesis (e.g., in adjacent eelgrass beds) and the primary productivity of an aquatic area if suspended for extended periods of times. If suspended particulates persist, fish may suffer reduced feeding ability and sensitive habitats such as submerged aquatic vegetation beds, which provide source of food and shelter, may be damaged. The contents of the suspended material may react with the dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or through food chain processes.

Dredging as well as the equipment used in the process, such as pipelines may damage or destroy spawning, nursery, and other sensitive habitats, such as emergent marshes and subaquatic vegetation, including eelgrass beds and kelp beds. Dredging may also modify current patterns and water circulation in the habitat by changing the direction or velocity of water flow, water circulation, or otherwise changing the dimensions of the water body traditionally utilized by fish for food, shelter or reproductive purposes.

The following references were used in compiling this description: Collins (Collins 1995), Farnworth, *et al.* (1979), LaSalle, *et al.* (1991), and Port of Long Beach, et. al. (1990).

3.7.3.1.2 Dredge Material Disposal/Fills

The discharge of dredged materials subsequent to dredging operations or the use of fill material in the construction/development of harbors results in sediments (e.g., dirt, sand, mud) covering or smothering existing submerged substrates. Usually these covered sediments are of a soft-bottom nature as opposed to rock or hard-bottom substrates.

The disposal of dredged or fill material can result in varying degrees of change in the physical, chemical, and biological characteristics of the substrate. Discharges may adversely affect infaunal and bottom-dwelling organisms at the site by smothering immobile organisms (e.g., prey invertebrate species) or forcing mobile animals (e.g., benthic-oriented fish species) to migrate from the area. Infaunal invertebrate plants and animals present prior to a discharge are unlikely to re-colonize if the composition of the discharged material is drastically different. Erosion, slumping, or lateral displacement of surrounding bottom of such deposits can also adversely affect substrate outside the perimeter of the disposal site by changing or destroying benthic habitat. The bulk and composition of the discharged material and the location, method, and timing of discharges may all influence the degree of impact on the substrate.

The discharge of dredged or fill material can result in greatly elevated levels of fine-grained mineral particles, usually smaller than silt, and organic particles in the water column (i.e., turbidity plumes). These suspended particulates may reduce light penetration and lower the rate of photosynthesis and the primary productivity of an aquatic area if suspended for lengthy intervals. Aquatic vegetation such as eelgrass beds and kelp beds may also be affected. Groundfish and other fish species may suffer reduced feeding ability leading to limited growth and lowered resistance to disease if high levels of suspended particulates persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or through food chain processes.

The discharge of dredged or fill material can change the chemistry and the physical characteristics of the receiving water at the disposal site by introducing chemical constituents in suspended or dissolved form. Reduced clarity and excessive contaminants can reduce, change or eliminate the suitability of water bodies for populations of groundfish, other fish species and their prey. The introduction of nutrients or organic material to the water column as a result of the discharge can lead to a high biochemical oxygen demand (BOD), which in turn can lead to reduced dissolved oxygen, thereby potentially affecting the survival of many aquatic organisms. Increases in nutrients can favor one group of organisms such as polychaetes or algae to the detriment of other types.

The discharge of dredged or fill material can modify current patterns and water circulation by obstructing flow, changing the direction or velocity of water flow, changing the direction or velocity of water flow and circulation, or otherwise changing the dimensions of a water body. As a result, adverse changes can occur in the location, structure, and dynamics of aquatic communities; shoreline and substrate erosion and deposition rates; the deposition of suspended particulates; the rate and extent of mixing of dissolved and suspended components of the water body; and water stratification.

Disposal events may lead to the full or partial loss of habitat functions due to extent of the burial at the site. Loss of habitat function can be temporary or permanent.

The following references were used in compiling this description: Peddicord and Herbich (1979) and NOAA (1991).

3.7.3.1.3 Oil/Gas Exploration/Production

Offshore exploration and production of natural gas and oil reserves have been and will continue to be important aspects of the U. S. economy as demand for energy resources grows. Oil exploration/production occurs in varying water depths and usually over soft-bottom substrates, although hard-bottom habitats may be present in the general vicinity. Oil exploration/production areas are vulnerable to an assortment of physical, chemical, and biological disturbances resulting from activities used to locate oil and gas deposits such as high energy seismic surveys and physical disruption resulting from the use and/or installation of anchors, chains, drilling templates, dredging, pipes, platform legs and biofouling communities associated with the platform jacket. During actual operations, the predominant emissions from oil platforms are drilling muds and cuttings, produced water, and sanitary wastes.

The impacts of oil exploration-related seismic energy release may cause fish to disperse from the acoustic pulse with possible disruption to their feeding patterns. The uses of these high energy sound sources may also disrupt or damage marine life. While available data on fish species does limit concerns regarding potential effects on marine life to sensitive egg and larval stages within a few meters of the sound source, whether this data pertains to all groundfish species is questioned.

Adjacent hard-bottom habitats can be severely impacted by anchoring operations during exploratory operations resulting in the crushing, removal or burial of substrate used for feeding or shelter purposes. Disturbances to the associated epifaunal communities may also result.

The discharge of exploratory drill muds and cuttings can result in varying degrees of change on the sea floor and affect the feeding, nursery, and shelter habitat for various life stages of groundfish and shellfish species that are important to commercial and recreational fishers. Drilling muds and cuttings may adversely affect bottom-dwelling organisms (e.g, prey) at the site by burial of immobile forms or forcing mobile forms to migrate. Exploratory activities may also result in resuspension of fine-grained mineral particles, usually smaller than silt in the water column. These suspended particulates may reduce light penetration and lower the rate of photosynthesis and thus primary productivity especially if suspended for lengthy intervals. Groundfish and other fish species may suffer reduced feeding ability leading to limited growth if high levels of suspended particulates persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion.

Benthic forms, especially prey species, present prior to the oil/gas operations may be unlikely to re-colonize if the composition of the substrate is altered drastically. This may be especially true during actual oil/gas production operations when filter-feeding organisms such as mussel colonies may periodically become dislodged from the oil platform and form biological debris mounds on the bottom. This alteration to the sea floor may affect naturally occurring feeding opportunities and spawning habitat.

The discharge of oil drilling muds can change the chemistry and physical characteristics of the receiving water at the disposal site by introducing toxic chemical constituents. Changes in the clarity and the addition of contaminants can reduce or eliminate the suitability of water bodies for habituation of fish species and their prey.

The following references were used in compiling this description: Battelle Ocean Sciences (1988), Coats (1994) Hyland, *et al.* (1994), MEC Analytical Systems (1995).

3.7.3.1.4 Water Intake Structures

The withdrawal of ocean water by offshore water intakes structures is a common coastwide occurrence. Water may be withdrawn to provide sources of cooling water for coastal power generating stations or as a source of potential drinking water as in the case of desalinization plants. If not properly designed, these structures may create unnatural and vulnerable conditions to various fish life stages and their prey. In addition, freshwater withdrawals from riverine systems to support industrial and agricultural operations also occurs.

The withdrawal of seawater can create unnatural conditions to the EFH of many species. Various life stages can be affected by water intake operations, such as entrapment through water withdrawal, impingement on intake screens, and entrainment through the heat exchange systems or discharge plumes of both heated and cooled effluent.

High approach velocities along with unscreened intake structures can create an unnatural current, making it difficult for fish species and their prey to escape. These structures may withdraw most larval and post-larval marine fishery organisms, and some proportion of more advanced life stages. Periods of low light (e.g, turbid waters, nocturnal periods) may also entrap adult and subadult species, many of which are caught by commercial or recreational fishers or serve as the prey of these species. Freshwater withdrawal also reduces the volume and perhaps timing of freshwater reaching estuarine environments, thereby potentially altering circulation patterns, salinity, and the upstream migration of the saltwater wedge.

The following reference was used in compiling this description: Helvey (1985)

3.7.3.1.5 Aquaculture

The culture of estuarine, marine, and freshwater species in coastal areas can reduce or degrade habitats used by native stocks. The location and operation of these facilities will determine the level of impact on the marine environment.

Aquaculture operations may discharge organic waste and/or antibiotics from the farms into the marine environment. Wastes are composed primarily of feces and excess feed and the buildup of waste products into the receiving waters will depend on water depths and circulation patterns. The release of these wastes may introduce nutrients or organic materials into the surrounding water body and lead to a high BOD, which may reduce dissolved oxygen, thereby potentially affecting the survival of many aquatic organisms in the area. Nutrient overloads at the discharge site can also favor one group of organisms to the detriment of other, more desirable prey types such as polychaete worms.

In the case of cage mariculture operations, cultured organisms may escape into the environment. Such operations may also impact the sea floor below the cages or pens. The composition and diversity of the bottom-dwelling community (e.g., prey organisms) due to the build-up of organic materials on the sea floor may be impacted. Growth of submerged aquatic vegetation, which may provide shelter and nursery habitat for a number of fish species and their prey, may be inhibited by shading effects.

The following reference was used in compiling this description: Water Management Branch (1990)

3.7.3.1.6 Wastewater Discharge

The discharge of wastewater from commercial activities, including municipal wastewater treatment plants, power generating stations, industrial plants (e.g., pulp mills, desalination plants), and storm water from drains into open ocean waters, bay, or estuarine waters can introduce chemical constituents or salinities potentially detrimental to estuarine and marine habitats. These constituents include pathogens, nutrients, sediments, heavy metals, oxygen demanding substances, hydrocarbons, and toxics. Historically, wastewater discharges have been one of the largest sources of contaminants into coastal waters. However, whereas wastewater discharges have been regulated under increasingly more stringent requirements over the last 25 years, non-point source/stormwater runoff has not been regulated to the same degree and continues to be a significant remaining source of pollution to the coastal areas and ocean. Changes in community structure and function, and health and abundance may result due to these discharges. Many of these changes can be long lasting.

Wastewater effluent and non-point source/stormwater discharges may affect the growth and condition of groundfish, other species of fish, and prey species if high contaminant levels are discharged (e.g., chlorinated hydrocarbons, trace metals, polynuclear aromatic hydrocarbons, pesticides, and herbicides). If contaminants are present, their effects may be manifested by absorption across the gills or through bioaccumulation as a result of consuming contaminated prey. Outfall sediments may alter the composition and abundance of benthic community invertebrates living in or on the sediments. Due to bioturbation, diffusion, and other upward transport mechanisms that move buried contaminants to the surface layers and eventually to the water column, pelagic and nektonic biota may also be exposed.

The use of biocides (e.g., chlorine, heat treatments) to prevent biofouling or the discharge of brine as a byproduct of desalinization can reduce or eliminate the suitability of water bodies for fish species and their prey in the general vicinity of the discharge pipe. The impacts of chlorination and heat treatments, if any, are minimized due to their intermittent use and regulation pursuant to state and/or federal National Pollutant Discharge Elimination System (NPDES) permit requirements. These compounds may change the chemistry and the physical characteristics of the receiving water at the disposal site by introducing chemical constituents in suspended or dissolved form. In addition to chemical and thermal effects, discharge sites may also create adverse impacts to sensitive areas, such as emergent marshes, sea grasses, and kelp beds, if located improperly.

Extreme discharge velocities of the effluent may also cause scouring at the discharge point as well as entrain particulates and thereby create turbidity plumes. These turbidity plumes may reduce light penetration and lower the rate of photosynthesis (e.g., in adjacent eelgrass beds or kelp beds) and the primary productivity of an aquatic area if suspension persists. Groundfish and other fish may suffer reduced feeding ability, especially if suspended particulates persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in oxygen depletion.

Mass emissions of suspended solids, contaminants and nutrient overloading from these outfalls may also affect submerged aquatic vegetation sites, including eelgrass beds and kelp beds. These beds are frequently utilized by groundfish and other fish species for shelter and protection from predators and for food by consuming organisms associated with these beds.

The byproduct of desalinated seawater is brine, which has a salinity about double that of seawater. The waste brine may be discharged directly to the ocean or discharged through sewage outfalls (where it may be diluted). Because this technology is fairly new, little is known about the toxicity of waste brine, but its potential impacts to early life stages of fish and their prey should be considered .

Storm water runoff, which can include both urban and agricultural runoff, is also a large source of particular contaminants to the marine environment affecting both water column and benthic habitats. These contaminants may find their way into the food web through benthic infaunal communities and subsequently bioaccumulate in numerous fish species.

The following references were used in compiling this description: Bay and Greenstien (1994), USEPA (1995), Ferraro, *et al.* (1991), Leonard (1994), Stull and Haydock (1989), USEPA (1993), Raco-Rands (1996).

3.7.3.1.7 Discharge of Oil or Release of Hazardous Substances

Accidental spills of oil or the release of a hazardous substance into estuarine and marine habitats can create significant pollution events. These inadvertent releases occur during the production, transportation, refining and use of hazardous materials from both facilities and vessels.

Exposure to petroleum products and hazardous substances from spills or other unauthorized releases can have both acute and chronic effects on groundfish, other fish species, and prey organisms, and also potentially reduce the marketability of target species. Direct physical contact with discharged oil or released hazardous substances (e.g., toxics such as oil dispersants and mercury) or indirect exposure resulting from food chain processes can produce a number of biological responses in fish resources and their prey. Exposure can occur in a variety of habitats, including the water column, sea floor, bays, and estuaries. Depending on the biological pathway involved, these biological responses may include death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations of fish that are important to commercial and recreational fishers.

Other issues related to the category include efforts to cleanup spills or releases that in themselves can create serious harm to the habitat. For example, the use of potentially toxic dispersants to break up an oil spill may adversely effect the egg and larval stages of most groundfish species.

The following references were used in compiling this description: Armstrong, *et al.* (1995), Sowby (1998), SCCWRP (1992).

3.7.3.1.8 Fish Enhancement Structures

Construction of fish enhancement structures, commonly called artificial reefs, is a popular management tool employed by state and federal governments and private groups. These structures have been used for centuries to enhance fishery resources and fishing

opportunities and usually entail placing miscellaneous materials in ocean or estuarine environments void of physical or "hard-bottom" relief. While scientists still debate whether reefs attract and/or produce fish biomass, the proliferation of artificial reefs continues. This popularity results from increased demands on fish stocks by both commercial and recreational fishermen and losses of habitat productivity due to development and pollution. However, the introduction of artificial reef material into the marine or estuarine environment can also produce negative impacts.
The use of artificial reefs can adversely impact the aquatic environment in at least two ways. First, habitat upon which the reef material is placed is lost. Usually, reef materials are set upon flat, relatively barren sandy sea floor; such placement may bury or smother faunal and bottom-dwelling organisms at the site or even prevent mobile forms (e.g., benthic-oriented fish species) from using the area. This effect has been shown in Hawaii. The second potential adverse impact results from use of inappropriate materials, such as automobile tires or compressed incinerator ash, which may degrade the marine habitat degradation. For example, automobile tires may release toxic substances into the marine environment and may cause physical damage to existing habitat if they break free of their anchoring systems.

The following references were used in compiling this description: Buckley (1989), Livingston (1994), McGurrin, *et al.* (1989), Nelson, *et al.* (1994), Polovina (1989).

3.7.3.1.9 Coastal Development Impacts

Coastal development involves changes in land use by the construction of urban, suburban, commercial, and industrial centers and the corresponding infrastructure. Vegetated areas are removed by cut-and-fill activities for enhancing the development potential of the land. Portions of the natural landscape are converted to impervious surfaces resulting in increased runoff volumes. Runoff from these developments may include heavy metals, sediments, nutrients, and organics, including synthetic and petroleum hydrocarbons, yard trimmings, litter, debris, and pet droppings. As residential, commercial and industrial growth continues, the demand for water escalates. As groundwater resources become depleted or contaminated, greater demands are placed on surface water through dam and reservoir construction or other methods of freshwater diversion. The consumptive use and redistribution of significant volumes of surface freshwater causes reduced river flows that can affect salinity regimes as saline waters intrude further upstream.

Development activities within watersheds and in coastal marine areas often impact groundfish habitat and other fish species on both long-term and short-term scales. Toxic runoff from development sites reduces the quality and quantity of suitable fish habitat by the introduction of pesticides, fertilizers, petrochemicals, and construction chemicals (e.g., concrete products, seals and paints). Sediment runoff can also restrict tidal flows resulting in losses of important fauna and flora (e.g., submerged aquatic vegetation). Shoreline stabilization projects that affect reflective wave energy can impede or accelerate natural movements of sand, thereby harming intertidal and sub-tidal habitats.

Wetlands serve an important function for exporting nutrients and energy, as well as serving as fish nursery areas, and loss or reduction of this function results from both reduction of geographic size and by input material exceeding processing capacity. Reduced freshwater flow into estuaries and wetlands can reduce productivity and habitat quality for fish by impacting the extent and location of the mixing or entrapment zone.

The following references were used in compiling this description: Baird (1996), Drinkwater and Frank (1994), McLusky, *et al.* (1992), Paul, *et al.* (Paul *et al.* 1992), Rozengurt, *et al.* (Rozengurt *et al.* 1994), Turek, *et al.* (1987), USEPA (1993).

3.7.3.1.10 Introduction of Exotic Species

Over the past two decades, there has been an increase in introductions of exotic species into marine habitats. Introductions can be intentional (e.g., for the purpose of stock or pest control) or unintentional (e.g., fouling organisms).

Exotic species introductions create five types of negative impacts: (1) habitat alteration, (2) trophic alteration; (3) gene pool alteration, (4) spatial alteration, and (5) introduction of diseases. Habitat alteration includes the excessive colonization of exotic species (e.g., San Diego bivalve and *Spartina* grass), which preclude endemic organisms (e.g., eelgrass). The introduction of exotic species may alter community structure by predation on native species (e.g., Japanese oyster drill, Chinese mitten crab, *Tilapia*, Oriental goby, striped bass) or by population explosions of the introduced species (e.g., Asian clam, green crab). Spatial alteration occurs when territorial introduced species compete with and displace native species. Although hybridization is rare, gene pool deterioration may occur between native and introduced species. One of the most severe threats to a native fish community is the introduction of bacteria, viruses, and parasites that reduce the quality of the habitat.

The following reference was used in compiling this description: Kohler and Courtenay (1986).

3.7.3.1.11 Agricultural Practices

Agricultural operations can result in the introduction of fertilizers, herbicides, insecticides, and other chemicals into the aquatic environment from the uncontrolled nonpoint source runoff draining agricultural lands. Additionally, agricultural runoff transports animal wastes and sediments into riverine, estuarine, and marine environments. Excessive uncontrolled or improper irrigation practices often exacerbate contaminant flushing.

The introduction of fertilizers, herbicides, insecticides, animal wastes, and other chemicals into the aquatic environment, especially estuaries, can affect the growth of aquatic plants, which in turn affects groundfish and other fish, invertebrates and the general ecological balance of the water body. Pollutants associated with these products include oxygen demanding substances; nutrients such as nitrogen and phosphorous, organic solids, microorganisms like bacteria and viruses, and salts. These pollutants and wastes may make habitat unsuitable for shelter, feeding, spawning; and if conditions are extreme, they result in fish kills.

The following reference was used in compiling this description: USEPA (1993).

3.7.3.1.12 Large Woody Debris Removal

Natural events (e.g., storms) and timber practices create situations where fallen trees end up in river systems and eventually work their way into estuaries and coastal waters. This timber or woody debris play a significant role in salt marsh ecology.

for a variety of reasons—including dam operations, aesthetics and commercial use of the wood—woody debris are often removed before reaching estuarine and coastal waters. Reductions in woody debris inputs to estuarine and coastal ecosystems may affect the ecological balance. For example, large woody debris play a significant role in benthic ocean ecology, where deep-sea wood borers convert the wood to fecal matter, supplying carbon from terrestrial sources to the ocean food chain. The dwindling supply of wood may jeopardize the ecological link between the forest and the sea.

The following reference was used in compiling this description: Maser and Sedell (1994).

3.8 Protected Species

Protected species fall under three overlapping categories, reflecting four mandates: the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), the Migratory Bird Treaty Act (MBTA), and EO 13186. These mandates, and the species thus protected, are described below.

3.8.1 ESA-listed Species

The ESA protects species in danger of extinction throughout all or a significant part of their range and mandates the conservation of the ecosystems on which they depend. Species" is defined by the Act to mean a species, a subspecies, or—for vertebrates only—a distinct population. Under the ESA, a species is listed as endangered if it is in danger of extinction throughout a significant portion of its range and threatened if it is likely to become an endangered species within the foreseeable future throughout all, or a significant part, of its range.

3.8.1.1 Salmon

Salmon caught in West Coast fisheries have life cycle ranges that include coastal streams and river systems from Central California to Alaska and marine waters along the U.S. and Canada seaward into the north central Pacific Ocean, including Canadian territorial waters and the high seas. Some of the more critical portions of these ranges are the freshwater spawning grounds and migration routes.

Chinook, or king salmon (*Oncorhynchus tshawytscha*), and coho, or silver salmon (*O. kisutch*), are the main species caught in Council-managed ocean salmon fisheries. In odd-numbered years, catches of pink salmon (*O. gorbuscha*) can also be significant, primarily off Washington and Oregon. NMFS issues a Biological Opinion for fisheries with a potential interaction with protected salmon species listed under the ESA (Table 5-1), specifying the allowable take given ESA conservation constraints. Additional information on Council-managed salmon fisheries and affected stocks may be found in the most recent environmental assessment for the ocean salmon fishery, prepared each April by the Council (available upon request from Council offices).

Salmon are caught incidentally in both the at-sea and shore-based segments of the whiting fishery. This bycatch is closely monitored through an at-sea observer program and dockside sorting of shore deliveries. A salmon bycatch reduction plan has also been implemented in this fishery. Because several chinook salmon runs are listed under the ESA, bycatch of chinook salmon is a concern in the at-sea whiting fishery. In 2002, the catcher-processor fleet caught 970 chinook for a bycatch rate of 0.0235 chinook per metric ton of whiting, the non-tribal mothership fleet caught 709 chinook for a bycatch rate of 0.0269 , and the tribal whiting fishery caught 1,018 chinook for a bycatch rate of 0.467 (NMFS 2003a). Vessels supplying fish to shore-based processors caught 1,062 chinook for a bycatch rate of .023 (NMFS 2003d). Table 5-2 provides the equivalent data for the years 1999-2001. It can be seen that bycatch rates both fluctuate year-to-year and differ among sectors.

The estimated coastwide bycatch of chinook in the whiting fishery, including the shore-based component, has averaged 7,067 annually since 1991. Limits on chinook bycatch in the whiting fishery were established as result of the September 27, 1993, Biological Opinion (BO) issued pursuant to the ESA. This opinion established the bycatch rate of 0.05 chinook salmon/mt of whiting with an 11,000 fish threshold for the entire whiting fishery (at-sea and shore-base sectors combined). Re-initiation of the BO is required if both the bycatch rate and bycatch limit are exceeded (NMFS 2003c). Table 5-3 shows the incidental annual catch of chinook salmon for all sectors of the whiting fleet combined (at-sea and shore-based), from 1991 to 2001. Values in bold indicate years in which the threshold established in the biological opinion was exceeded.

3.8.1.2 Sea Turtles

Sea turtles are highly migratory, and four of the six species found in U.S. waters have been sighted off the West Coast. These are loggerhead *(Caretta caretta*), green (*Chelonia mydas),* leatherback (*Dermochelys coriacea*), and olive ridley (*Lepidochelys olivacea*) sea turtles. Little is known about the interactions between sea turtles and West Coast fisheries. Directed fishing for sea turtles in West Coast groundfish fisheries is prohibited because of their ESA listings; however, incidental take of sea turtles by longline or trawl gear may occur. (Green, leatherback, and olive ridely sea turtles are listed as endangered; loggerheads are listed as threatened.) The management and conservation of sea turtles is shared between NMFS and the U.S. Fish and Wildlife Service (FWS).

The following species descriptions are taken from Appendix A to the groundfish bycatch mitigation draft programmatic EIS (DPEIS) (NMFS 2004b).

<u>Loggerhead Sea Turtles</u>

Loggerhead sea turtles (*Caretta caretta)* are widespread, inhabiting shallower continental areas in the subtropical and temperate waters (Eckert 1993; MMS 1992). Their population is estimated at about 300,000 (NMFS and USFWS 1998c; Pitman 1990) and with peak abundance summer and fall off southern California (NMFS and USFWS 1998c). The loggerhead turtle is listed as a threatened species throughout its range under the ESA.

Juvenile and subadult loggerheads are omnivorous, foraging on pelagic crabs, molluscs, jellyfish, and vegetation captured at or near the surface. The maximum recorded diving depth for a loggerhead is 233 meters (Eckert 1993).

The primary fishery threats to the loggerheads in the Pacific are longline and gillnet fisheries (NMFS and USFWS 1998c).

<u>Green Sea Turtle</u>

Green sea turtles *(Chelonia mydas)* are a cosmopolitan, highly migratory species, nesting mainly in tropical and subtropical regions. Green turtles have been declining throughout the Pacific Ocean, probably due to overexploitation and habitat loss (Eckert 1993) and are listed as threatened, except for breeding populations found in Florida and the Pacific coast of Mexico, which are listed as endangered.

The maximum recorded dive depth for an adult green turtle was 110 meters, while subadults routinely dive 20 m for 9 to 23 minutes, with a maximum recorded dive of 66 minutes (Eckert 1993). It is presumed that drift lines or surface current convergences are preferential zones due to increased densities of likely food items.

The primary green turtle nesting grounds in the eastern Pacific are located in Michoacán, Mexico, and the Galapagos Islands, Ecuador. More than 165,000 turtles were harvested from 1965 to 1977 in the Mexican Pacific. The nesting population at the two main nesting beaches in Michoacán decreased from 5,585 females in 1982 to 940 in 1984 (NMFS and USFWS 1998b).

Leatherback Sea Turtle

Leatherback sea turtles *(Dermochelys coriacea)* are distributed in most open ocean waters and range into higher latitudes than other sea turtles, as far north as Alaska (NMFS and USFWS 1998a), possibly associated with El Ni o events. Leatherbacks are commonly sighted near Monterey Bay, mainly in August (Starbird *et al.* 1993). The leatherback turtle is listed as an endangered species under the ESA throughout its range.

Leatherbacks are the largest of the sea turtles, possibly to maintain warmer body temperature over longer time periods. Prey include jellyfish, siphonophores, and tunicates (Eckert 1993). Leatherbacks are reported diving to depths exceeding 1000 m (Lutz and Musick 1997).

Primary threats to leatherbacks in the Pacific are the killing of nesting females and eggs at the nesting beaches and the incidental take in coastal and high seas fisheries (NMFS and USFWS 1998a).

Olive Ridley Sea turtle

Olive Ridley sea turtles *(Lepidochelys olivacea)* are the most abundant sea turtle in the Pacific basin. However, although these turtles remain relatively widespread and abundant, most nest sites support only small or moderate-scale nesting, and most populations are known or thought to be depleted. The olive ridley populations on the Pacific coast of Mexico are listed as endangered; all other populations are listed as threatened.

This sea turtle species appears to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. Occasionally they are found entangled in scraps of net or other floating debris. Despite its abundance, there are surprisingly few data relating to the feeding habits of the olive ridley. However, those reports that do exist suggest that the diet in the western Atlantic and eastern Pacific includes crabs, shrimp, rock lobsters, jellyfish, and tunicates. In some parts of the world, it has been reported that the principal food is algae. Although they are generally thought to be surface feeders, olive ridleys have been caught in trawls at depths of 80 to 110 m (NMFS and USFWS 1998d).

3.8.1.3 Marine Mammals

The waters off Washington, Oregon, and California support a wide variety of marine mammals. Approximately 30 species, including seals and sea lions, sea otters, whales, dolphins, and porpoise, occur within the EEZ. Many marine mammal species seasonally migrate through West Coast waters, while others are year-round residents. Table 5-4 lists marine mammal species occurring off the West Coast.

In addition to the ESA, the federal MMPA guides marine mammal species protection and conservation policy. Under the MMPA, on the West Coast NMFS is responsible for the management of cetaceans and pinnipeds, while the FWS manages sea otters. Stock assessment reports review new information every year for strategic stocks and every three years for non-strategic stocks. (Strategic stocks are those whose human-caused mortality and injury exceeds the potential biological removal [PBR].) Marine mammals, whose abundance falls below the optimum sustainable population (OSP), are listed as “depleted” according to the MMPA.

Fisheries that interact with species listed as depleted, threatened, or endangered (Table 5-4) may be subject to management restrictions under the MMPA and ESA. NMFS publishes an annual list of fisheries in the *Federal Register* separating commercial fisheries into one of three categories based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. West Coast groundfish fisheries are in Category III, denoting a remote likelihood of, or no known, serious injuries or mortalities to marine mammals.

<u>California Sea Lion</u>

California sea lions *(Zalophus californianus)* range from British Columbia south to Tres Marias Islands off Mexico. Breeding grounds are mainly on offshore islands from the Channel Islands south into Mexico. Breeding takes place in June and early July within a few days after the females give birth. NMFS conducts annual pup censuses at established rookeries (Lowry 1999) and uses a correction factor to obtain a total estimated population of 214,000 sea lions (Carretta *et al.* 2001). The stock appears to be increasing at about 6.2% per year while fishery mortality also is increasing (Lowry *et al.* 1992). California sea lions are not endangered or threatened under the Endangered Species Act (ESA) nor depleted under the MMPA. This stock is also not listed as a strategic under the MMPA and total human-caused mortality (1,352 sea lions) is less than the 6,591 sea lions allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

During the summer breeding season, most adults are present near rookeries principally located on the southern California Channel Islands and A o Nuevo Island near Monterey Bay. Males migrate northward in the fall, going as far north as Alaska and returning to their rookeries in the spring. Adult females generally do not migrate far away from rookery areas. Juveniles remain near rookery areas or move into waters off central California. Diet studies indicate that California sea lions feed on squid, octopus, and a variety of fishes: anchovies, sardine, mackerel, herring, rockfish, hake, and salmon (Antonelis *et al.* 1984; Lowry *et al.* 1990; NMFS 1997).

Incidental mortalities of California sea lions have been documented in set and drift gillnet fisheries (Carretta *et al.* 2001; Hanan *et al.* 1993). Skippers' logs and at-sea observations have shown that California sea lions have been incidentally killed in Washington, Oregon, and California groundfish trawls and during Washington, Oregon, and California commercial passenger fishing vessel fishing activities (Carretta *et al.* 2001).

Harbor Seal

Harbor seals *(Phoca vitulina richardsi*) inhabit nearshore and estuarine areas ranging from Baja California, Mexico, to the Pribilof Islands, Alaska. MMPA stock assessment reports recognize six stocks along the U.S. west coast: California, Oregon/ Washington outer coastal waters, Washington inland waters, and three stocks in Alaska coastal and inland waters (Carretta *et al.* 2001). Using the latest complete aerial survey (Hanan 1996) and appropriate corrections for counting bias, Carretta, *et al.* (2001) estimates the California stock at 30,293 seals, the Oregon/ Washington Coast stock at 26,180 seals, and the Washington inland-water stock at 16,056 seals. These estimates combine for a West Coast total of 72,529 seals. The population appears to be growing and fishery mortality is declining. Harbor seals are not endangered or threatened under the ESA nor depleted under the MMPA. This stock is also not listed as a strategic under the MMPA and total human-caused mortality (666 seals) is less than the 1,678 harbor seals allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Harbor seals do not migrate extensively, but have been documented to move along the coast between feeding and breeding locations (Brown 1988; Herder 1986; Jeffries 1985). The harbor seal diet includes herring, flounder, sculpin, cephalopods, whelks, shrimp, and amphipods (Bigg 1981; NMFS 1997).

Combining mortality estimates from California set net, northern Washington marine set gillnet, and groundfish trawl results in an estimated mean mortality rate in observed groundfish fisheries of 667 harbor seals per year along Washington, Oregon, and California (Carretta *et al.* 2001).

Northern Elephant Seal

Northern elephant seals *(Mirounga angustirostris*) range from Mexico to the Gulf of Alaska. Breeding and whelping occurs in California and Baja California, during winter and early spring (Stewart and Huber 1993) on islands and recently at some mainland sites. Stewart *et al*. (1994) estimated the population at 127,000 elephant seals in the U.S. and Mexico during 1991. The population is growing and fishery mortality may be declining, and the number of pups born may be leveling off in California during the last five years (Carretta *et al.* 2001). Northern elephant seals are not endangered or threatened under the ESA nor depleted under the MMPA. This stock is also not listed as a strategic under the MMPA and total human-caused mortality (33 seals) is less than the 2,142 elephant seals allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Northern elephant seals are polygynous breeders with males forming harems and defending them against other mature males in spectacular battles on the beach. Female give birth in December and January, mate about three weeks later, after which the pups are weaned (Reeves *et al.* 2002). They were hunted for their oil to near extinction and the current population is composed of the descendants of a few hundred seals that survived off Mexico (Stewart *et al.* 1994). They feed mainly at night in very deep water, consuming whiting, hake, skates, rays, sharks, cephalopods, shrimp, euphasiids, and pelagic red crab (Antonelis *et al.* 1987). Males feed in waters off Alaska, and females off Oregon and California (Le Boeuf *et al.* 1993; Stewart and Huber 1993).

There are no recent estimated incidental kills of Northern elephant seals in groundfish fisheries along Washington, Oregon, and California; however, they have been caught in setnet fisheries (Carretta *et al.* 2001).

<u>Guadalupe Fur Seal</u>

The historical distribution and abundance of the Guadalupe fur seal *(Arctocephalus townsendi)* are uncertain because commercial sealers and other observers failed to distinguish between this species and northern fur seals. However, the species likely ranged from Islas Revillagigedo, Mexico (18 N) to Point Conception, California (34 N latitude) and possibly as far north as the Farallon Islands, California (37 N). At the present time, this species ranges from Cedros Island, Mexico, to the northern Channel Islands. Remains have been found in Indian trash middens throughout the southern California bight and individual seals frequent Channel Island sea lion colonies (Stewart *et al.* 1987). This species was once thought to be extinct; however, Gallo (1994) estimated a total of about 7,408 animals in 1993, and a growth rate of about 13.7% per year (Carretta *et al.* 2001). Guadalupe fur seals are protected under Mexican law (Guadalupe Island is a marine sanctuary), the U.S. MMPA (depleted and strategic), the U.S. ESA (threatened), the California Fish and Game Code (fully protected), and the California Fish and Game Commission (threatened).

In 1892, only seven of these seals could be found; they were presumed extinct until 1926, when a group of 60 animals was discovered on Isla de Guadalupe, Mexico (Hubbs and Wick 1951). Although the primary breeding colony is on Guadalupe Island, Mexico, a pup was born at San Miguel Island, California (Melin and DeLong 1999). Males defend territories during May through July and mate with the females approximately one week after the birth of single pups. Guadalupe fur seals are reported to feed on fish including hake, rockfish, and cephalopods (Fleischer 1987) and probably require about 10% of their own body weight in fish per day.

There have been no U.S. reports of mortalities or injuries for Guadalupe fur seals (Cameron and Forney 1999; Julian 1997; Julian and Beeson 1998), although there have been reports of stranded animals with net abrasions and imbedded fish hooks (Hanni *et al.* 1997).

Northern Fur Seal

Northern fur seals *(Callorhinus ursinus)* range in the eastern north Pacific Ocean, from southern California to the Bering Sea. Two separate stocks of northern fur seals are recognized within U.S. waters: an Eastern Pacific stock and a San Miguel Island stock. Nearly hunted to extinction for its fur, the San Miguel Island stock is estimated at 4,336 seals (Carretta *et al.* 2001) and the Eastern Pacific stock at 941,756 seals (Angliss and Lodge 2002). The San Miguel Island stock is not endangered or threatened under the ESA nor depleted under the MMPA. This stock is also not listed as a strategic under the MMPA and total human-caused mortality (zero seals) is less than the 100 fur seals allowed under the Potential Biological Removal formula (Carretta *et al.* 2001). "The Eastern Pacific stock is classified as strategic because it is designated as depleted under the MMPA" (Angliss and Lodge 2002).

Prior to harvesting, northen fur seal populations were mainly located on the Pribilof Islands of Alaska, and were estimated at two million animals. Northern fur seals were harvested commercially from the 1700s to 1984. San Miguel Island is the only place in California where northern fur seals breed and pup. Offshore, they dive to depths of 20 to 130 m, usually at night, to feed opportunistically on pollock, herring, lantern fish, cod, rockfish, squid, loons, and petrels (Fiscus 1978; Gentry 1981; Kajimura 1984; Kooyman *et al.* 1976).

Fur seals are a pelagic species spending many months at sea migrating throughout the eastern North Pacific Ocean including off Oregon and California (Roppel 1984). There were no reported mortalities of northern fur seals in any observed fishery along the west coast of the continental U.S. during the period 1994-1998 (Carretta *et al.* 2001), although there were incidental mortalities in trawl and gillnet fisheries off Alaska (Angliss and Lodge 2002).

Northern or Steller Sea Lion

The northern or Steller sea lion *(Eumetopias jubatus*) ranges along the North Pacific Ocean from Japan to California (Loughlin *et al.* 1984). Two stocks are designated in U.S. waters with the eastern stock extending from Cape Suckling, Alaska to southern California (Loughlin 1997) with a total of 6,555 animals off Washington, Oregon and California. The eastern stock of Steller sea lion has a threatened listing under the ESA, depleted under the MMPA, and therefore is classified as a strategic stock (Angliss and Lodge 2002).

They do not make large migrations, but disperse after the breeding season (late May-early July), feeding on rockfish, sculpin, capelin, flatfish, squid, octopus, shrimp, crabs, and northern fur seals (Fiscus and Baines 1966).

Eastern stock Steller sea lions were observed taken incidentally in West Coast groundfish trawls and marine set gillnet fisheries (Angliss and Lodge 2002). Total estimated mortalities of this stock (44) is less than the 1,396 Steller sea lions allowed under the Potential Biological Removal formula (Angliss and Lodge 2002).

Southern Sea Otter

Southern sea otters *(Enhydra lutris nereis*) range along the mainland coast from Half Moon Bay, San Mateo County south to Gaviota, Santa Barbara County; an experimental population currently exists at San Nicolas Island, Ventura County (VanBlaricom and Ames 2001). Prior to the harvest that drove the population to near extinction, sea otters ranged from Oregon to Punta Abreojos, Baja California, Mexico (Wilson *et al.* 1991). The 2002 spring survey of 2,139 California sea otters reflects an overall decrease of 1.0% from the 2001 spring survey of 2,161 individuals, according to scientists at the U.S. Geological Survey. Observers recorded 1,846 independents in 2002 (adults and subadults), down 0.9% from the 2001 count of 1,863 independents; 293 pups were counted in 2002, down by 1.7% from the 2001 count of 298 pups (USGS 2002). The U.S. Fish and Wildlife Service declared the southern sea otter a threatened species in 1977 under the ESA and therefore the stock is also designated as depleted under the MMPA (VanBlaricom and Ames 2001).

Harvest for their fur reduced the sea otter population to very few animals and presumed extinction until California Department of Fish and Game biologists and wardens discovered a remnant group near Point Sur. In 1914, the total California population was estimated to be about 50 animals (CDFG 1976). Sea otters eat large-bodied bottom dwelling invertebrates such as sea urchins, crabs, clams, mussels, abalone, other shellfish, as well as market squid. Otters can dive up to 320 feet to forage (VanBlaricom and Ames 2001).

During the 1970s and 1980s considerable numbers of sea otters were observed caught in gill and trammel entangling nets in central California. This was projected as a significant source of mortality for the stock until gillnets were prohibited within their feeding range. During 1982 to 1984 an average of 80 sea otters were estimated to drown in gill and trammel nets (Wendell *et al.* 1986). More recent mortality data (Pattison *et al.* 1997) suggest similar patterns during a period of increasing trap and pot fishing for groundfish and crabs (Estes *et al.* In Press). This elevated mortality appears to be the main reason for both sluggish population growth and periods of decline in the California sea otter population (Estes *et al.* In Press).

Sea Otter

Sea otters *(Enhydra lutris kenyoni,* Washington stock) range from Pillar Point south to Destruction Island. In an effort to return the extirpated sea otters to Washington state waters, otters were transplanted from Amchitka Island, Alaska in 1969 and 1970; 59 otters were introduced (Jameson *et al.* 1982). The experiment worked, sea otter numbers increased, and they are re-occupying former range (Richardson and Allen 2000). The highest count for the 2001 survey was 555 sea otters, an increase of 10% from 2000 (USGS 2002). The rate of increase for this population since 1989 is about 8.8%. The Washington sea otter has no formal Federal listing under ESA or MMPA but is designated as endangered by the State of Washington.

Sea otters eat bottom dwelling invertebrates such as sea urchins, crabs, sea cucumbers, clams, mussels, abalone, and other shellfish, as well as market squid. Otters can dive up to 320 feet to forage (VanBlaricom and Ames 2001).

Gillnet and trammel net entanglements were a significant source of mortality for southern sea otters (Wendell *et al.* 1986) and some sea otters were taken incidentally in setnets off Washington (Kajimura 1990). Evidence from California and Alaska suggests that incidental take of sea otter in crab pots and tribal set-net fisheries may also occur. Sea otters are also quite vulnerable to oil spills due to oiled fur interfering with thermoregulation, ingested oil disintegrating the intestinal track, and inhaled fumes eroding the lungs (Richardson and Allen 2000).

Harbor Porpoise

Harbor porpoises *(Phocoena phocoena*) are small and inconspicuous. They range in nearshore waters from Point Conception, California, into Alaska and do not make large scale migrations (Gaskin 1984). Harbor porpoise in California are split into two separate stocks based on fisheries interactions: the central California stock, Point Conception to the Russian River, and the northern California stock in the remainder of northen California (Barlow and Hanan 1995). Oregon and Washington harbor porpoise are combined into a coastal stock and an inland Washington stock is also designated for inland waterways. The most recent abundance estimates, based on aerial surveys are 7,579 in central California, 15,198 in northern California, 44, 644 in Oregon/Washington coastal, and 3,509 in inland Washington. There are no clear trends in abundance for these stocks (Carretta *et al.* 2001). Harbor porpoise are not listed as threatened or endangered under the ESA nor as depleted under the MMPA. “The average annual mortality for 1996-99 (80 harbor porpoise) is greater than the calculated PBR (56) for central California harbor porpoise; therefore, the central California harbor porpoise population is strategic under the MMPA” (Carretta *et al.* 2001).

Although usually found in nearshore waters, “distinct seasonal changes in abundance along the west coast have been noted, and attributed to possible shifts in distribution to deeper offshore waters during late winter”

(Barlow 1988; Carretta *et al.* 2001; Dohl *et al.* 1983). The harbor porpoise diet is mainly composed of cephalopods and fishes, and they prefer schooling non-spiny fishes, such as herrings, mackerels, and sardines (Reeves *et al.* 2002).

Harbor porpoise are very susceptible to incidental capture and mortalities in setnet fisheries (Julian and Beeson 1998). Off Oregon and Washington, fishery mortalities of harbor porpoise have been recorded in the northern Washington marine set and drift gillnet fisheries (Carretta *et al.* 2001).

Dall's Porpoise

Dall's porpoises *(Phocoenoides dalli*) are common in shelf, slope and offshore waters in the north eastern Pacific Ocean down to southern California (Morejohn 1979). As a deep-water oceanic porpoise, they are often sighted nearshore over deep-water canyons. These porpoise are abundant and widely distributed, with at least 50,000 off California, Oregon, and Washington; however, because of their habit of approaching vessels at sea, it may be difficult to obtain an unbiased estimate of abundance (Reeves *et al.* 2002). They are not endangered or threatened under the ESA nor depleted under the MMPA. This stock is also not listed as strategic under the MMPA and total human-caused mortality (12) is less than the 737 porpoise allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Dall's porpoise calf between spring and fall after a 10 to 11 month gestation period (Reeves *et al.* 2002). Carretta, *et al*. (2001) observe that "north-south movement between California, Oregon and Washington occurs as oceanographic conditions change, both on seasonal and inter-annual time scales." Dall's porpoise feed on squid, crustaceans, and many kinds of fish including jack mackerel (Leatherwood *et al.* 1982; Scheffer 1953).

There is a harpoon fishery for Dall's porpoise in Japan where large numbers are killed (Reeves *et al.* 2002). Observers document that Dall's porpoise have been caught in the California, Oregon, and Washington domestic groundfish trawl fisheries (Perez and Loughlin 1991) but the estimated annual take is less than two porpoise per year.

Pacific White-Sided Dolphin

Pacific white-sided dolphins *(Lagenorhynchus obliquidens*) are abundant, gregarious and found in the cold temperate waters of the North Pacific Ocean. Along the west coast of north America they are rarely observed south of Baja California, Mexico. Aerial surveys have exceeded 100,000 white-sided dolphins over the California continental shelf and slope waters (Reeves *et al.* 2002). These dolphins are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (seven) is less than the 157 dolphins allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Little is known of their reproductive biology, although a 29 year old pregnant female is reported, indicating a relatively long reproductive span (Reeves *et al.* 2002). White-sided dolphins inhabit California waters during winter months moving northward into Oregon and Washington during spring and summer (Green *et al.* 1992). Shifts in abundance likely represent changes in prey abundance or migration of prey species. They are opportunistic feeders and often work collectively to concentrate and feed small schooling fish, including anchovies, hakes, herrings, sardines, and octopus.

Observers have documented mortalities in the California, Oregon, and Washington groundfish trawl fisheries for whiting (Perez and Loughlin 1991). The total estimated kill of white-sided dolphins in these fisheries averages less than one dolphin per year (Carretta *et al.* 2001).

<u>Risso's Dolphin</u>

Risso's dolphins (*Grampus griseus*) have world-wide distribution in warm-temperate waters of the upper continental slope in waters depths averaging 1,000 feet. They commonly move into shallow areas in pursuit of squid (Reeves *et al.* 2002). Reeves *et al*. (2002) also report up to 30,000 Risso's dolphins off the U.S. west coast. They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (six) is less than the 105 dolphins allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

The reproductive biology of this species is not well known. Risso's dolphins feed at night on fish, octopus and squid, but they concentrate on squid. They are usually observed in groups of 10-40 animals and may form loose aggregations of 100 to 200 animals (Reeves *et al.* 2002). It has been speculated that changes in ecological conditions and an El Ni o event off southern California may have resulted in this species filling a niche previously occupied by pilot whales (Reeves *et al.* 2002).

There have been no recent Risso's dolphin moralities in west coast groundfish fisheries (Carretta *et al.* 2001), although Reeves *et al*. (2002) report that Risso's are a bycatch in some longline and trawl fisheries.

<u>Short-Beaked Common Dolphin</u>

Short-beaked common dolphins *(Delphinus delphis)* commonly inhabit tropical and warm temperate oceans. Their distribution along the U.S. west coast extends from southern California to Chile and westward to 135 W longitude (Reeves *et al.* 2002). "The 1991-96 weighted average abundance estimate for California, Oregon and Washington waters based on the three ship surveys is 373,573 short-beaked common dolphins" (Barlow 1997; Carretta *et al.* 2001). They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (79) is less than the 3,188 dolphins allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Reproductive activity is non-seasonal in tropical waters calving peaks in spring and summer in more temperate waters (Reeves *et al.* 2002). Short-beaked common dolphins feed nearshore on squid, octopus, and schooling fish like anchovies, hake, lantern fish, deep-sea smelt or herring. These dolphins are often seen in very large schools of hundreds or thousands and are active bow riders.

Common dolphin mortality has been estimated for set gillnets in California (Julian and Beeson 1998); however, the two species (short-beaked and long-beaked) were not reported separately. Reeves *et al*. (2002) relate that short-beaked common dolphins are also a bycatch in some trawl fisheries.

<u>Long-Beaked Common Dolphin</u>

Long-beaked common dolphins *(Delphinus capensis)* were recognized as a distinct species in 1994 (Heyning and Perrin 1994; Rosel *et al.* 1995). Their distribution overlaps with the short-beaked common dolphin, although they are more typically observed in nearshore waters. "The 1991-96 weighted average abundance estimate for California, Oregon and Washington waters based on the three ship surveys is 32,239 long-beaked common dolphins" (Barlow 1997; Carretta *et al.* 2001). They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (14) is less than the 250 dolphins allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Reproductive activity is similar to short-beaked: non-seasonal in tropical waters spring and summer peaks in more temperate waters (Reeves *et al.* 2002). Long-beaked common dolphins feed nearshore on squid, octopus, and schooling fish like anchovies or herring. They are also active bow riders and break the water surface frequently when swimming in groups averaging 200 animals.

Common dolphin mortality has been estimated for set gillnets in California (Julian and Beeson 1998); however, short-beaked and long-beaked dolphin mortalities were not reported separately. Reeves *et al*. (Reeves *et al.* 2002) relate that long-beaked common dolphins are also a bycatch in some trawl fisheries.

<u>Short-Finned Pilot Whale</u>

Short-finned pilot whales *(Globicephala macrorhynchus*) favor a tropical and warm temperate distribution and are considered abundant (Reeves *et al.* 2002). They were common to Southern California, especially the isthmus of Santa Catalina Island during the winter (Dohl *et al.* 1980). However, following the 1982-83 El Ni o they have been rarely observed (Barlow 1997). "The 1991-96 weighted average abundance estimate for California, Oregon and Washington waters based on three ship surveys is 970 short-finned pilot whales" (Barlow 1997; Carretta *et al.* 2001). They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (three) is less than the six short-finned pilot whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

They form social groups of 15- 50 individuals often traveling in long lines two to three animals wide. A typical sex ratio is one mature male to eight mature females; mating occurs in August through January with a 15 month gestation period (Reeves *et al.* 2002).

Short-finned pilot whales feed somewhat exclusively on market squid, *Loligo opalescens*, and were believed by fishermen to significantly compete with squid purse seine operations off Southern California. There were many records and observations of short-finned pilot whale shootings by fishermen (Heyning and Perrin 1994; Miller *et al.* 1983). Although the squid fishery has become the largest fishery in California since 1992 (Vojkovich 1998), coinciding with reduced short-finned pilot whales numbers, there have been no recent reports of mortalities in this fishery (Carretta *et al.* 2001).

<u>Gray Whale</u>

The gray whale *(Eschrichtius robustus*) is represented as the Eastern Pacific stock along the west coast of North America. Currently, the population is estimated at about 26,000 whales (Reeves *et al.* 2002) with rates of increase just above two percent (Angliss and Lodge 2002). They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the MMPA and total human-caused mortality (48) is less than the 432 gray whales allowed under the Potential Biological Removal formula (Angliss and Lodge 2002).

Gray whales breed as they migrate through warmer waters; gestation lasts 12 to 13 months with females calving every 2 to 3 years (Reeves *et al.* 2002). At 5,000 miles, their migration from summer feeding grounds in the waters of Alaska to calving areas in bays and estuaries of Baja California, Mexico, is one of the longest for any mammal. The Eastern North Pacific stock feeds by filtering from the bottom sediments small, bottom-dwelling amphipods, crustaceans, and polychaete worms off Alaska during summer months (Rice and Wolman 1971).

The Eastern Pacific gray whale stock was removed from the ESA List of Endangered and Threatened Wildlife in 1994. They have been an incidental catch in set net fisheries, but there have been no recent takes in groundfish fisheries (Angliss and Lodge 2002).

<u>Minke Whale</u>

Minke whales *(Balaenoptera acutorostrata*) are one of the most widely distributed of baleen whales, ranging from South America to Alaska. For management, NMFS recognizes a California, Oregon, and Washington stock within the EEZ. "The number of minke whales is estimated as 631 (CV = 0.45) based on ship surveys in 1991, 1993, and 1996 off California and in 1996 off Oregon and Washington" (Barlow 1997; Carretta *et al.* 2001). They are not endangered or threatened under the ESA nor depleted under the MMPA. The stock is not listed as strategic under the

MMPA and total human-caused mortality (zero) is less than the four minke whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Little is known of their reproductive biology; presumably they calve in winter in tropical waters after about a ten-month gestation (Reeves *et al.* 2002). They are the smallest of the rorqual whales and only the pygmy right whale is smaller. Some migrate as far north as the ice edge in summer. The diet of Minke whales consists of plankton, krill, and small fish, including schools of sardines, anchovies and herring.

They have occasionally been caught in coastal gillnets off California (Hanan *et al.* 1993), in salmon drift gillnet in Puget Sound, Washington, and in drift gillnets off California and Oregon (Carretta *et al.* 2001). There have been no recent takes in groundfish fisheries off California, Oregon, or Washington (Carretta *et al.* 2001).

<u>Sperm Whale</u>

Sperm whales occur throughout the oceans and seas of the world near canyons and the continental slope. They are observed along the coasts of Oregon, and Washington (Carretta *et al.* 2001; Dohl *et al.* 1983). "Recently, a combined visual and acoustic line-transect survey conducted in the eastern temperate North Pacific in spring 1997 resulted in estimates of 24,000 (CV=0.46) sperm whales based on visual sightings, and 39,200 (CV=0.60) based acoustic detections and visual group size estimates"
(Carretta *et al.* 2001). Sperm whales are ESA listed as endangered; therefore, this stock is automatically considered as depleted and strategic under the MMPA. Annual human-caused mortality (1.7 whales) is less than the 2.1 sperm whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Mating occurs in the spring, and the calving interval is a minimum of four to six years. Combined with a gestation period of 18 months, this results in extremely low population growth rates (Reeves *et al.* 2002). All age classes and both sexes move throughout tropical waters, while males range farther and farther from the equator. Sperm whales feed near the ocean bottom, diving as deep as one mile to eat large squid (including giant squid), octopuses, rays, sharks, and fish (Reeves *et al.* 2002).
There are no recent observations of sperm whale incidental catches in West Coast groundfish fisheries.

<u>Humpback Whale</u>

Humpback whales *(Megaptera novaeangliae)* have a worldwide distribution and along Washington, Oregon, and California. NMFS recognizes the eastern North Pacific stock which is observed frequently in coastal areas. "The North Pacific total now almost certainly exceeds 6,000 humpback whales"
(Calambokidis *et al.* 1997; Carretta *et al.* 2001). Humpback whales are ESA listed as endangered; therefore, this stock is automatically considered as depleted and strategic under the MMPA. Annual human-caused mortality (>0.2 whales) is less than the 1.9 whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

male humpback whale songs are one of the most famous breeding behaviors of all the marine mammals. They breed during winter with a two to three year gestation and calving in the tropics (Reeves *et al.* 2002). Their migrations can be as long as 5,000 miles (one way) from the higher latitude feeding grounds to the tropics for breeding and calving. They feed on krill and pelagic schooling fish.

There are no recent observations of humpback whale incidental catches in West Coast groundfish fisheries.

Blue Whale

The blue whale *(Balaenoptera musculus)* is the largest animal ever to exist on this planet. They inhabit most oceans and seas of the world. The eastern north Pacific stock summers off California to feed and migrates as far south as the Costa Rica Dome. “The best estimate of blue whale abundance is the average of the line transect and mark-recapture estimates, weighted by their variances, or 1,940” (Carretta *et al.* 2001) whales in this stock. Blue whales are ESA listed as endangered; therefore, this stock is automatically considered as depleted and strategic under the MMPA. Annual human-caused mortality (zero whales) is less than the 1.7 whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Blue whale mating is unknown but calving takes place in winter after an eleven-month gestation. Calving interval is about two to three years. They feed on krill and possibly pelagic crabs (Reeves *et al.* 2002).

There are no recent observations of blue whale incidental catches in West Coast groundfish fisheries.

Fin Whale

Fin whales *(Balaenoptera physalus)* occur in the major oceans of the world and tend to be more prominent in temperate and polar waters. The California, Oregon, and Washington Stock was estimated at 1,851 fin whales, based on ship surveys in summer/autumn of 1993 and 1996 (Barlow and Taylor 2001). Fin whales are ESA listed as endangered; therefore, this stock is automatically considered as depleted and strategic under the MMPA. Annual human-caused mortality (1.5 whales) is less than the 3.2 whales allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

Little is known of their reproductive behavior, breeding, or calving areas. The female calving cycle is two to three years with an eleven or twelve-month gestation period following winter breeding. They probably do not make large-scale migrations and feed on krill and small pelagic fish such as herring (Reeves *et al.* 2002).

There are no recent observations of fin whale incidental catches in West Coast groundfish fisheries.

Killer Whale

Killer whales *(Orcinus orca*) inhabit most oceans and seas without respect to water temperature or depth, but are more prevalent in the higher colder latitudes (Reeves *et al.* 2002). Off Washington, Oregon, and California three stocks are recognized, based on behavior, photographic identification, and genetics differences. Those stocks are: Eastern North Pacific Offshore Stock, Eastern North Pacific Transient Stock, and Eastern North Pacific Southern Transient Stock (Carretta *et al.* 2001). "Based on summer/fall shipboard line-transect surveys in 1991, 1993 and 1996 (Barlow 1997), the total number of killer whales within 300 nm of the coasts of California, Oregon and Washington was recently estimated to be 819 animals. There is currently no way to reliably distinguish the different stocks of killer whales from sightings at sea..." (Carretta *et al.* 2001). Killer whales are not listed as endangered or threatened under the ESA nor depleted under the MMPA. None of the three stocks is listed as strategic under the MMPA and total human-caused mortality is less than that allowed under the Potential Biological Removal formula (Carretta *et al.* 2001).

A coalition of environmental groups recently filed a petition to protect the southern population of resident killer whales under the ESA. (This population lives in both U.S. and Canadian waters.) In June 2002, NMFS ruled this population of killer whales does not merit protection under the ESA. NMFS said the stock met two criteria: that it was a separate group and that it was in danger of extinction. But the third criteria—that of being a "significant" group—was not met because the southern population is considered part of the general killer whale population in the North Pacific, which is considered healthy. NMFS favors depleted status, with some protections under the MMPA. In December 2002, environmental groups filed a lawsuit on agency's ruling.

Killer whales give birth in all months with the peak in calving during winter. Movement seems to track prey items; along the West Coast, movements from Southeast Alaska to central California are documented (Goley and Straley 1994). Resident killer whales feed on fish, including salmon, and other large bodied fish. Transient killer whales feed on other marine mammals including sea otters, seals, porpoise, and baleen whales (Baird 2000). Offshore killer whales probably feed on squid and fish.

The only incidental take recorded by groundfish fishery observers was in the Bering Sea/Aleutian Islands (BSAI) groundfish trawl fishery (Carretta *et al.* 2001). There are also reports of interactions between killer whales and longline vessels (Perez and Loughlin 1991). (Longline fishers in the Aleutian Islands reported several cases where orcas removed sablefish from longlines as the gear was retrieved.) There are no other reports of killer whale takes in West Coast groundfish fisheries (Carretta *et al.* 2001).

Sei Whale

Sei whales *(Balaenoptera borealis)* occur in subtropical and tropical waters and into the higher latitudes, occupying both oceanic and coastal waters. "Seis are known worldwide for their unpredictable occurrences, with a sudden influx into an area followed by disappearance and subsequent absence for years or even decades" (Reeves *et al.* 2002). They are rare off Washington, Oregon, and California and there are no estimates of abundance or population trends for this stock. Sei whales in the eastern North Pacific (east of 180 W longitude) are considered a separate stock and listed as endangered under the ESA. Consequently, the eastern North Pacific stock is automatically considered as a depleted and strategic stock under the MMPA (Carretta *et al.* 2001).

Sei whales usually travel alone or in small groups and little is known of their behavior. They breed and calve in winter after a 11 to 12 month gestation. They forage on small fish, squid, krill, and copepods.

There are no observations of sei whale incidental catches in west coast fisheries, therefore no estimated groundfish fishery related losses.

Common Bottlenose Dolphin

Common bottlenose dolphins *(Tursiops truncatus)* are distributed worldwide in tropical and warm-temperate waters. For the MMPA stock assessment reports, bottlenose dolphins within the Pacific U.S. EEZ are divided into three stocks: California coastal stock; California, Oregon, and Washington offshore stock; and Hawaiian stock.

California coastal bottlenose dolphins are found within about one kilometer of shore, primarily from Point Conception south into Mexican waters. El Ni o events appear to influence the distribution of animals along the California coast; since the 1982-83 El Ni o they have been consistently sighted in central California as far north as San Francisco. Studies have documented north-south movements of coastal bottlenose dolphins (Defran *et al.* 1999; Hansen 1990). Coastal bottlenose dolphins spend an unknown amount of time in Mexican waters, where they are subject to mortality in Mexican fisheries. The best estimate of the average number of coastal bottlenose dolphins in U.S. waters is 169, based on two surveys conducted in 1994 and 1999 that covered virtually the entire U.S. range of this species. The minimum population size estimate for U.S. waters is 154 coastal bottlenose dolphins. The PBR level for this stock is 1.5 coastal bottlenose dolphins per year. This is calculated by multiplying the minimum population size by one half the default maximum net growth rate for cetaceans (half of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality (Wade and Angliss 1997).

Due to its exclusive use of coastal habitats, this bottlenose dolphin population is susceptible to fishery-related mortality in coastal set net fisheries. However, from 1991 to 1994 observers saw no bottlenose dolphins taken in this fishery, and in 1994 the Sate of California banned coastal set gillnet fishing within 3 nm of the Southern California coast. In central California, set gillnets have been restricted to waters deeper than 30 fathoms (56 m) since 1991 in all areas except between Point Sal and Point Arguello. These closures greatly reduced the potential for mortality of coastal bottlenose dolphins in the California set gillnet fishery. Coastal gillnet fisheries are still conducted in Mexico and probably take animals from this population, but no details are available.

Coastal bottlenose dolphins are not listed as threatened or endangered under the ESA nor as depleted under the MMPA. Because no recent fishery takes have been documented, coastal bottlenose dolphins are not classified as a strategic stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero.

California/Oregon/Washington Offshore Stock: On surveys conducted off California, offshore bottlenose dolphins have been found at distances greater than a few kilometers from the mainland and throughout the Southern California Bight. They have also been documented in offshore waters as far north as about 41 N latitude, and they may range into Oregon and Washington waters during warm water periods. Sighting records off California and Baja California, Mexico (Lee 1993; Mangels and Gerrodette 1994) suggest that offshore bottlenose dolphins have a continuous distribution in these two regions. The most comprehensive multi-year average abundance for California, Oregon, and Washington waters, based on the 1991-96 ship surveys, is 956 offshore bottlenose dolphins (Barlow 1997). The minimum population size estimate of offshore bottlenose dolphins is 850. The PBR level for this stock is 8.5 offshore bottlenose dolphins per year.

In 1997, a Take Reduction Plan for the California drift gillnet (non-groundfish) fishery was implemented, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders. Overall cetacean entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 1999). Based on 1997-98 data, the estimate of offshore bottlenose dolphins taken annually in the U.S. fishery is zero. Drift gillnet fisheries for swordfish and sharks are also conducted along the entire Pacific coast of Baja California and may take animals from the same population.

Offshore bottlenose dolphins are not listed as threatened or endangered under the ESA nor as depleted under the MMPA. Because no recent fishery takes have been documented, offshore bottlenose dolphins are not classified as a strategic stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero.

Striped Dolphin

Striped dolphins *(Stenella coeruleoalba)* are distributed world-wide in tropical and warm-temperate pelagic waters. For the MMPA stock assessment reports, striped dolphins within the Pacific U.S. EEZ are divided into two discrete, noncontiguous areas: 1) waters off California, Oregon, and Washington and 2) waters around Hawaii.

California/Oregon/Washington Stock: On recent shipboard surveys extending about 300 nm offshore of California, striped dolphins were sighted within about 100 nm to 300 nm from the coast. No sightings have been reported for Oregon and Washington waters, but striped dolphins have stranded in both states (Oregon Department of Fish and Wildlife, unpublished data; Washington Department of Fish and Wildlife, unpublished data). Striped dolphins are also commonly found in the central North Pacific, but sampling between this region and California has been insufficient to determine whether the distribution is continuous. Based on sighting records off California and Mexico, striped dolphins appear to have a continuous distribution in offshore waters of these two regions (Mangels and Gerrodette 1994; Perrin *et al.* 1985).

The abundance estimate for California, Oregon and Washington waters is 20,235 striped dolphins (Barlow 1997). The minimum population size estimate is 17,995. The PBR level for this stock is 180 striped dolphins per year, calculated as the minimum population size (17,995) times one half the default maximum net growth rate for cetaceans (half of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality; Wade and Angliss 1997).

Drift gillnet fisheries for swordfish and sharks conducted along the Pacific coast of Baja California, Mexico, may take animals from this population.

Striped dolphins are not listed as threatened or endangered under the ESA nor as depleted under the MMPA. Including U.S. driftnet information only for years after implementation of the Take Reduction Plan (1997-98), the average annual human-caused mortality in the years 1994 to 1998 is zero. Because recent mortality is zero, striped dolphins are not classified as a strategic stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero.

3.8.1.4 Seabirds

The highly productive California Current System, an eastern boundary current that stretches from Baja California, Mexico, to southern British Columbia, supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler, *et al.* (1993) reviewed seabird distribution and abundance in relation to oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ, including albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns, and alcids (murres, murrelets, guillemots, auklets, and puffins). In addition to these “classic” seabirds, millions of other birds are seasonally abundant in this oceanic habitat including: waterfowl, waterbirds (loons and grebes), and shorebirds (phalaropes). Not surprisingly, there is considerable overlap of fishing areas and areas of high bird density in this highly productive upwelling system. The species composition and abundance of birds varies spatially and temporally. The highest seabird biomass is found over the continental shelf, and bird density is highest during the spring and fall when local breeding species and migrants predominate.

The FWS is the primary federal agency responsible for seabird conservation and management. Four species found off the Pacific Coast are listed under the ESA, as noted in Table 5-5. In 2002, the FWS classified several seabird species that occur off the Pacific Coast as “Species of Conservation Concern.” These species include the black-footed albatross (*Phoebastria nigripes*), ashy storm-petrel (*Oceanodroma homochroa*), gull-billed tern (*Sterna nilotica*), elegant tern (*Sterna elegans*), arctic tern (*Sterna paradisaea*), black skimmer (*Rynchops niger*), and Xantus’s murrelet (*Synthliboramphus hypoleucus*).

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful. In addition to the MBTA, an Executive Order, Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186), directs federal agencies to negotiate Memoranda of Understanding with the FWS that would obligate agencies to evaluate the impact on migratory birds as part of any NEPA process. The FWS and NMFS are working on a Memorandum of Understanding concerning seabirds.

Under the Magnuson-Stevens Act, NMFS must ensure fishery management actions comply with other laws designed to protect seabirds. NMFS is also required to consult with FWS if fishery management plan actions may affect seabird species listed as endangered or threatened. Taken together, these laws and directives underscore the need to consider impacts to seabirds in decision making and consider ways to reduce potential impacts of the proposed action. In February 2001, NMFS adopted a National Plan of Action (NPOA) to Reduce the Incidental Take of Seabirds in Longline Fisheries. This NPOA contains guidelines that are applicable to relevant groundfish fisheries and would require seabird incidental catch mitigation if a significant problem is found to exist. During the first two years of NPOA implementation, NMFS regions were tasked with assessing the incidental take of seabirds in longline fisheries. In the limited entry groundfish longline fleet off the coast of Washington, Oregon, and California during September 2001–October 2002, there were no incidental seabird takes documented by West Coast Groundfish Observers. (During the assessment period, approximately 30% of landings by the limited entry fixed gear fleet had observer coverage.)

Albatross

Albatross range extensively throughout waters off the Pacific Coast. In particular, three albatross species, the short-tailed albatross (*Phoebastria albatrus*), the black-footed albatross (*Phoebastria nigripes*), and the Laysan albatross (*Phoebastria immutabilis*) occur in the waters off Washington, Oregon, and California.

Once considered the most common albatross ranging over the continental shelf, the short-tailed albatross was hunted to near extinction in the early 1900s and is now thought to be one of the rarest birds in the world.

Short-tailed albatross range widely in the North Pacific: breeding occurs off Japan and sightings extend from the Aleutian Islands to southern California (West Coast Groundfish Observer Program, NMFS, unpublished data, 2002). There are two known short-tailed albatross breeding colonies, one on Torishima Island and one on Minami-kojima Island, in the waters off Japan. Historical records indicate that there were over 100,000 individuals at the Torishima Island colony at the turn of the century and during 1998 and 1999 just over 400 breeding adults were found at the colony. The population on Torishima Island is now growing at an annual rate of 7.8%. The current estimate of the short-tailed albatross world population is about 1700 individuals (Hasegawa 2002; START 2002).

The short-tailed albatross feeds at the water's surface on squid, crustaceans, and various fish species. They sometimes follow fishing vessels and feed on offal. Chicks are fed a mixture of stomach oil and partially digested food that is regurgitated; nestlings are often fed squid, flying fishes, and crustaceans. Threats to short-tailed albatross include volcanic eruptions on the primary nesting island, Torishima, incidental take in commercial fisheries, ingestion of plastic, and the potential threat of oil spills.

Much like the short-tailed albatross, the black-footed albatross ranges throughout the North Pacific. Breeding occurs in the Northwestern Hawaiian Islands and Torishima Island, and the species disperses from the Bering Sea south along the Pacific Coast to California.

The black-footed albatross is the most numerous albatross species along the Pacific Coast and is present throughout the year (Briggs *et al.* 1987). The global black-footed albatross population is estimated at about 56,500 breeding pairs and thought to be decreasing (Naughton 2003). This species is classified as vulnerable by the IUCN (International Union for the Conservation of Nature and Natural Resources) based on a 19% population decrease during 1995 to 2000 and a projected future decline of more than 20% over the next 60 years owing to interactions with longline fisheries for tuna, billfish, and groundfish in the North Pacific (2001).

Black-footed albatross fed on fish, sea urchins, amphipods, and squid; foraging is done at night and prey is caught at the ocean's surface. This species will also follow fishing vessels and feed on discard. Besides interactions with longline fisheries, other threats to black-footed albatross include nest loss due to waves, pollution, introduced predators, oiling, ingestion of plastic, and volcanic eruptions on Torishima (2001).

The most abundant North Pacific albatross species is the Laysan albatross. The vast majority of the Laysan albatross population breeds in the Northwestern Hawaiian Islands, fewer numbers breed on the Japanese Ogasawara Islands, and still fewer pairs breed on islands off Baja California, Mexico (Guadalupe Island, Alijos Rocks, and in the

Revillagigedo Islands). When at sea, the Laysan albatross ranges from the Bering Sea, to California, to Japan.

The FWS counts this species at Midway Atoll once every four years and counts or samples density at French Frigate Shoals and Laysan Island every year. These monitoring sites account for 93% of the world population of about 393,000 breeding pairs. At these three sites breeding populations have declined at an average rate of 3.2% per year since 1992. This represents a 32% decline in annual breeding attempts over a 10-year period (Naughton 2003).

Similar to the other North Pacific albatross species, Laysan albatross feed on schooling fish and squid at the ocean's surface. The primary threat to their population is interactions with fisheries.

<u>California brown pelican</u>

Brown pelicans *(Pelecanus occidentalis californicus)* range along the Pacific Coast from British Columbia south to central America. Historically, breeding colonies were found at Point Lobos, California, and from the Channel Islands south to Baja California, Mexico. They are found in coastal areas, on rocky shores and cliffs, in sloughs, and may also be found on breakwaters, jetties, pilings, and sandbars in harbors. While the California brown pelican still occurs throughout its original range, the breeding colonies in California, located in the Channel Islands National Park, West Anacapa Island, and the Santa Barbara Islands, are in decline (CDFG 2000).

In the 1970s, California brown pelicans were threatened with extinction by the widespread use of the pesticide DDT (dichlorodiphenyltrichloroethane). This chemical is transmitted via the food chain and becomes concentrated in top predators. DDT affects the pelican's ability to metabolize calcium, resulting in thin-shelled eggs that break during incubation. The use of DDT was banned in 1972 and the California brown pelican population subsequently began its recovery (CDFG 2000).

In the early 2000s, it was estimated that the brown pelican breeding population in California was about 9,000 adults (CDFG 2001). While the brown pelican population is thought stable, food availability is a cause for concern. Pacific mackerel, Pacific sardine, and the northern anchovy are important prey for brown pelicans, especially during the breeding season. However, commercial over-harvesting of these coastal pelagic species has reduced the quantity of prey that is available to pelicans (CDFG 2000).

The primary threats to California brown pelicans are human development in coastal regions, entanglement in abandon recreational fishing gear, and oil spills (CDFG 2000).

<u>Terns</u>

Nine species of terns occur along the West Coast, they are the arctic tern (*Sterna paradisaea*), common tern (*Sterna hirundo*), black tern (*Chlidonias niger*), California least tern (*Sterna antillarum browni*), Caspian tern (*Sterna caspia*), Forster's tern (*Sterna forsteri*), gull-billed tern (*Sterna nilotica*), royal tern (*Sterna maxima*), and elegant tern (*Sterna elegans*).

The populations of most tern species found along the Pacific Coast are stable; however, some tern species are listed under the ESA or are considered Species of Conservation Concern by the USFWS.

The range of the California least tern is limited to California and Baja California. During 1988 and 1989 in California, the population was estimated to be about 1,250 pairs. As with most species of terns, California least tern are found along seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers. Terns usually nest on open, flat beaches along lagoons or estuary margins. California least terns usually nest in the same area during successive years and tend to return to the natal site to nest.

Terns obtain their prey by diving from the air into shallow water and their diet is predominately small fishes (e.g., anchovy, surf-perch).

Primary threats to the California least tern population, and possible threats to other tern populations, include human development of nesting habitat and predation of adults, eggs, and young by other birds and introduced mammals.

Murrelets

Four species of murrelets occur along the Pacific coast, they are the marbled murrelet (*Brachyramphus marmoratus*), Craveri's murrelet (*Synthliboramphus craveri*), Xantus's murrelet (*Synthliboramphus hypoleucus*), and the ancient murrelet (*Synthliboramphus antiquus*).

The marbled murrelet has an extensive range along the Pacific Coast, extending from Alaska to California and breeding occurs throughout their range. These birds are found in coastal areas, mainly in salt water, often in bays and sounds. They are also found up to 5 km offshore and are occasionally sighted on lakes and rivers within 20 km of the coast. Most populations are dependent upon large coniferous trees in old-growth forests as suitable nesting habitat.

The marbled murrelet population has probably declined substantially throughout the region and it is estimated that 10,000 to 20,000 individuals remain (Carter *et al.* 1995).

The diet of marbled murrelets includes fishes (e.g., sandlance, capelin, herring), crustaceans, and mollusks. Birds may also feed exclusively on freshwater prey for several weeks. Marbled murrelets typically forage in waters up to 80 m in depth and two kilometers from shore. Birds dive to capture prey; dives may extend down 30 m below the water's surface.

The continued harvest of old-growth and mature coastal coniferous forest threatens critical nesting habitat throughout the marbled murrelet range. Additional threats to this population are interactions with gillnet fisheries and oil spills.

The ancient murrelet ranges along the Pacific Coast from Alaska to California. The estimated global population is on the order of half a million breeding pairs, with just over half found on the Queen Charlotte Islands of British Columbia. This species nests in rocky offshore islands in crevices, under rocks, at the base of trees, and in burrows. Declines in the ancient murrelet population are often attributed to the introduction of predators onto offshore islands used for breeding. Rats, raccoons, and foxes have reduced what was once the world's the largest colony (Langara Island, British Columbia) from about 200,000 pairs in 1969 to 15,000 pairs in 1994. Ancient murrelets are also threatened by food availability, which is subject to pesticide pollution, and changes in marine currents controlling local productivity.

Xantus's and Craveri's murrelets have relatively restricted ranges, when compared to other Pacific Coast murrelets, and are primarily found in California. Both species breed on islands; the Craveri's breeds in the Gulf of California and along the western coast of Baja California, Mexico, while the Xantus's breeds on islands off central California and western Baja California.

The population of the Craveri's murrelets is estimated to be between 6,000 and 10,000 individuals. Xantus's murrelets persist in very low numbers and the breeding population is estimated to be between 2,000 and 5,000 individuals. Both species are threatened by predators introduced onto breeding islands—specifically, rats and feral cats—and oil spills, especially from offshore platforms in Santa Barbara Channel and oil tanker traffic in Los Angeles harbor (Carter *et al.* 1995).

<u>Northern Fulmars</u>

Northern fulmars (*Fulmarus glacialis*) range along the Pacific Coast from Alaska to Oregon and they are primarily pelagic.

The estimated total population of northern fulmars in the North Pacific is between 3 and 3.5 million individuals (Hatch 1993). This species primarily breeds in Alaska at colonies on sea cliffs and, less frequently, on low, flat rocky islands. Northern fulmars show strong mate and nest site fidelity (Shallenberger 1984). Nests are often raided by weasels and gulls.

Northern fulmars are surface feeders, they swim or float upon the ocean's surface while feeding on organisms found just below the surface. The diet of this species includes fishes, mollusks, crustaceans, and cephalopods. Northern fulmars have also been observed following fishing vessels, presumably to feed on offal.

Primary threats to northern fulmars are oil pollution, plastic debris, entanglement in fishing gear, and introduced predators and human disturbance on breeding islands (Hatch 1993).

<u>Storm-Petrels</u>

Seven species of storm-petrels occur along the Pacific Coast, they include the black storm-petrel (*Oceanodroma melania*), fork-tailed storm-petrel (*Oceanodroma furcata*), ashy storm-petrel (*Oceanodroma homochroa*), least storm-petrel (*Oceanodroma microsoma*), Galapagos storm-petrel (*Oceanodroma tethys*), Wilson's storm-petrel (*Oceanites oceanicus*), and Leach's storm-petrel (*Oceanodroma leucorhoa*).

Populations of storm-petrel species found along the Pacific Coast, along with the amount of information known about different populations, varies considerably. In the North Pacific, Leach's storm-petrel is the most abundant species (a conservative total population estimate is between 10 and 15 million individuals) followed by the fork-tailed storm-petrel (total population estimate is between 5 and 10 million individuals). Conversely, the populations of ashy storm-petrels (total population estimated at fewer than 10,000 individuals), black storm-petrels (population estimate ranges between 10, 000 and 100,000 individuals), and least storm-petrels (population estimate ranges between 10,000 and 50,000 individuals) may be at risk (Boersma and Groom 1993).

Storm-petrels are pelagic, spending the majority of their lives at sea and returning to land only to breed. When at the breeding colonies, storm-petrels are nocturnal, an adaptation that reduces their susceptibility to diurnal predators (e.g., gulls) (Speich and Wahl 1989). Nests are often located in burrows, rocky crevices, or grassy slopes on small coastal islands. Some species of storm-petrels nest in the same burrow in successive years (Spendelow and Patton 1988).

Storm-petrels feed at the water's surface, rarely diving beneath the surface in pursuit of food. They catch prey by "dipping and pattering," that is they hover on outstreched wings, paddle the water with their webbed feet, and dip their bills into the water (Ainley 1984b). The diet of storm-petrels includes such things as plankton, small fishes, crustaceans, and small squid.

Primary threats to storm-petrels include introduced predators on breeding islands, pesticides and contaminants, pollution, and oil spills.

<u>Shearwaters</u>

Eight species of shearwaters range along the Pacific Coast, they include Townsend's shearwater (*Puffinus auricularis*), black-vented shearwater (*Puffinus opisthomelas*), wedge-tailed shearwaters (*Puffinus pacificus*), sooty shearwater (*Puffinus griseus*), short-tailed shearwater (*Puffinus tenuirostris*), pink-footed shearwater (*Puffinus creatopus*), flesh-footed shearwater (*Puffinus carneipes*), and Buller's shearwater (*Puffinus bulleri*).

The populations of most shearwater species found along the Pacific Coast are stable; however, some shearwater populations are considered at risk by the IUCN. Many species of shearwaters move between hemispheres to take advantage of the best feeding conditions (Shallenberger 1984).

The black-vented shearwater breeds on a handful of small islands off the coast of Baja California; the wedge-tailed and Townsend's shearwater breed on islands off the coasts of Mexico and Hawaii. The five remaining species of shearwater breed in the southern hemisphere on islands off the coast of Chile, Australia, and New Zealand. Much like storm-petrels, shearwaters nest in burrows and rocky crevices and their activities at breeding colonies are largely nocturnal.

When foraging, shearwaters may feed at the water's surface, plunge from just above the water's surface, or dive to depths of 50 m. Their diet includes small fishes (e.g., northern anchovies, Pacific sardines), squid, plankton, and crustaceans.

Shearwater populations are primarily threatened by predation by feral mammals (e.g., cats, pigs, mongoose, rats) and loss of habitat on breeding islands. Other threats associated with urbanization include collisions with power lines and attraction to lights.

Cormorants

Three species of cormorants occur along the Pacific Coast: Brandt's cormorant (*Phalacrocorax penicillatus*), double-crested cormorant (*Phalacrocorax auritus*), and pelagic cormorant (*Phalacrocorax pelagius*).

Brandt's cormorants are by far the most abundant cormorant species nesting along the coast of Oregon and California. In Washington, however, they have never been numerous or widespread (Spendelow and Patton 1988). Brant's cormorants are typically found in inshore, coastal areas, especially in areas having kelp beds, brackish bays, sheltered inlets, and quiet bays. Large numbers of birds breed in California and Oregon with fewer numbers breeding in Washington. Brandt's cormorant usually nests on offshore islands or, less frequently, on inaccessible mainland bluffs and wide cliff ledges near the water (Speich and Wahl 1989). Resident throughout the year near nesting areas, birds range more widely during non-breeding periods.

Double-crested cormorants are widespread and breeding populations along the Pacific Coast seem to be increasing in number (Carter *et al.* 1995; Spendelow and Patton 1988). They can be found along seacoasts, marine islands, coastal bays, swamps, lagoons, rivers, and lakes. Double-crested cormorants nest in variety of habitats. Along the coast, they nest on offshore rocks and islands, exposed dunes, abandoned wharf timbers, and power poles. Birds nesting inland often use trees or snags (Sowls *et al.* 1980; Speich and Wahl 1989). Birds are usually found within a few hours of their roosting or breeding sites (Ainley 1984a).

Breeding populations of pelagic cormorants are relatively evenly distributed from Washington to California (Spendelow and Patton 1988), and in recent years populations have been increasing in number. Pelagic cormorants occur in outer coastal habitats, bays, and inlets, especially in rock-bottom habitats and often in water less than 100 m and within 1 - 2 km of shore. These birds will often nest with other pelagic cormorants or near other species of seabirds. Nesting occurs on island cliff ledges, crevices, and in sea caves by building nests out of seaweed (Sowls *et al.* 1980).

Cormorants are classified as diving birds; their strong swimming ability enables them to pursue and capture their prey underwater. Their diet includes small fishes, squid, crabs, marine worms, and amphipods.

Cormorant populations are threatened by pesticides, human disturbance at nesting sites, oiling, and interactions with fisheries.

<u>Jaegers</u>

Three species of jaegers occur along the Pacific Coast: the pomarine jaeger (*Stercorarius pomarinus*), parasitic jaeger (*Stercorarius parasiticus*), and long-tailed jaeger (*Stercorarius longicaudus*).

All three species of jaegers are primarily pelagic, but may be found in bays and harbors. Jaegers breed in the arctic and sub-arctic. Non-breeding birds and breeders during the non-breeding season can be found off Washington, Oregon, and California.

The diet of jaegers includes small mammals, birds, bird eggs, fishes, invertebrates, and offal from fishing vessels. Jaegers are well known for their habit of pursing other seabirds on the wing (Maher 1984), forcing the other birds to disgorge their food, and then stealing the food before it hits the ground.

<u>Gulls</u>

Eleven species of gulls occur along the Pacific Coast, these include the glaucous gull (*Larus hyperboreus*), glaucous-winged gull (*Larus glaucescens*), western gull (*Larus accidentalis*), herring gull (*Larus argentatus*), California gull (*Larus californicus*), Thayer’s gull (*Larus thayeri*), ring-billed gull (*Larus delawarensis*), mew gull (*Larus canus*), Heermann’s gull (*Larus heermanni*), Bonaparte’s gull (*Larus philadelphia*), and Sabine’s gull (*Larus sabini*).

For most marine-nesting species in the North Pacific, only rough estimates of nesting populations exist and reproductive success has only been investigated for one to two years (Vermeer *et al.* 1993). However, it is thought that most gull populations along the Pacific Coast are stable and not considered to be at risk.

Most gulls along the Pacific Coast occur during the non-breeding season or are non-breeding individuals. Birds can be found at sea, along the coast, on rocky shores or cliffs, bays, estuaries, beaches, and garbage dumps. Only two species of gulls breed along the Pacific Coast. The glaucous-winged gull has breeding colonies in British Columbia and Washington and the western gull has breeding colonies in California (most are located on the Farallon Islands), Oregon, and Washington (Drury 1984). Breeding habitat for these gulls includes coastal cliffs, rocks, grassy slopes, or offshore rock or sandbar islands.

Pacific Coast gulls feed at the ocean's surface and their diet typically includes fishes, mollusks, crustaceans, carrion, and garbage.

Primary threats to gulls include human disturbance at nesting locations.

Black-Legged Kittiwakes

Black-legged kittiwakes *(Rissa tridactyla)* range along the Pacific Coast from Alaska to Mexico (Drury 1984). While they are primarily pelagic, black-legged kittiwakes can also be found along sea coasts, bays, and estuaries.

It is estimated that there are approximately 2.6 million black-legged kittiwakes at colonies in the North Pacific. This species breeds on mainland and island sites in the Arctic and along the Aleutian islands.

Black-legged kittiwakes feed at the ocean's surface and their diet typically includes small fishes, mollusks, crustaceans, and plankton (Hatch 1993).

Primary threats to black-legged kittiwakes are unknown.

Common Murres

Common murres *(Uria aalge)* range along the Pacific Coast from Alaska to central California. While they are primarily pelagic, common murres can also be found along rocky sea coasts.

Common murres are the dominant member of the breeding seabird community along the Pacific Coast, but numbers have declined substantially in central California and Washington. In the mid-1800s, over 14 million murre eggs were harvested from Southeast Farallon Island to feed residents of the San Francisco Bay area (Manuwal 1984). The Washington population has been almost extirpated over the last decade due to a combination of oceanographic conditions, gillnets, low-flying aircrafts, and oil spills, and has not recovered. In contrast, the population of common murres in Oregon and California has been stable or increasing despite human disturbance (Carter *et al.* 1995). In the late 1980s, the Pacific Coast population was estimated to be greater than 600,000 individuals. Nesting typically occurs in large, dense colonies on mainland and island cliff ledges or on rocky, low-lying islands. Common murres do not build nests but lay their eggs directly on the bare soil or rock (Spendelow and Patton 1988).

Common murres are diving birds, capturing their prey underwater, and can descend to depths of 180 m. Their diet includes fishes, squid, mysids, and shrimp.

Primary threats to common murres include predators on breeding islands, increasing sea surface temperature, oil spills, gill-net mortality, and military practice bombing activity.

Pigeon Guillemots

Pigeon guillemots *(Cepphus columba)* range along the Pacific Coast from Alaska to southern California. While these birds are primarily pelagic, they can be found along rocky coasts and in bays and inlets.

In the late 1980s, the pigeon guillemot breeding population along the Pacific Coast was estimated to be greater than 20,000 individuals. Breeding occurs along coasts, on islands, on cliffs, in rock crevices, in abandoned burrows, or they may dig their own burrows. Pigeon guillemots have a spectacular courtship behavior (Manuwal 1984) and may use the same nest in successive years (Spendelow and Patton 1988).

Pigeon guillemots forage underwater; their diet includes small fishes, and inshore benthic species, mollusks, such as crustaceans, and marine worms.

Primary threats to pigeon guillemots include introduced predators on breeding islands, inshore gillnet fisheries, and oil spills (Erwins *et al.* 1993).

Auklets

Three species of auklets occur along the Pacific Coast: the parakeet auklet (*Aethia psittacula*), the rhinoceros auklet (*Cerorhinca monocerata*), and the Cassin's auklet (*Ptychoramphus aleuticus*).

In the eastern North Pacific, the estimated population of Cassin's auklets is over three million and the estimated population of parakeet auklets is approximately 200,000 (Springer *et al.* 1993). The estimated breeding population of rhinoceros auklets along the Pacific Coast is just over 60,000 (Spendelow and Patton 1988).

Auklets are primarily pelagic; however, they are also found along rocky coasts. The parakeet auklet only breeds in Alaska, while the rhinorceros and Cassin's auklets breed on offshore islands between Alaska and Baja California. Nesting generally occurs in areas with low vegetation, in burrows, or under rocks. Some nesting sites are used in successive years. Auklets may be diurnal as well as nocturnal.

Auklets dive from the water's surface when foraging. Their diet generally includes small fishes, crustaceans, and squid.

Primary threats to auklets include introduced predators on nesting islands; long-term oceanographic changes in the California Current System, which caused a decline in zooplankton populations; and oil spills.

Puffins

Two species of puffins occur along the Pacific Coast: the horned puffin (*Fratercula corniculata*) and the tufted puffin (*Fratercula cirrhata*). These colorful puffins are primarily pelagic but they can also be found along the coast (Manuwal 1984).

In the North Pacific, the estimated breeding population of tufted puffins and horned puffins is 3.5 million and 1.5 million, respectively (Byrd *et al.* 1993). Puffins breed on offshore islands or along the coast; nesting occurs in ground burrows, under and among rocks, and occasionally under dense vegetation. Horned puffins only nest in Alaska, while tufted puffins nest all along the Pacific Coast from Alaska to California.

Puffins are diving birds and capture their prey underwater. Their diet includes fish, cephalopods, crustaceans, and polychatetes.

Primary threats to puffins include introduced predators on breeding islands, oil spills, and gillnet fisheries. The low numbers of tufted puffins in California may be due to oil pollution and/or declines in the sardine population.

South Polar Skuas

South polar skuas (*Stercorarius maccormicki*) range along the Pacific Coast from Alaska to Mexico. While these birds are primarily pelagic and solitary, they can sometimes be found in small, loose groupings in and around harbors.

South polar skuas breed in and around Antarctica. Non-breeders can be found spring through fall along the Pacific Coast.

The diet of south polar skuas is diverse (Maher 1984). At sea, they pursue foraging seabirds until the other birds relinquish their prey, as well as following fishing vessels to forage on offal. On the breeding grounds, their diet includes fish, seabirds, small mammals, krill, penguin eggs and young, and carrion.

Because south polar skuas breed in such remote locations, there are relatively few threats to the breeding population. Additionally, they are relatively immune to threats during the non-breeding season because they spend the majority of their time at sea.

Black Skimmers

Black skimmers (*Rynchops niger*) can be found in California. This species is primarily found nearshore in coastal waters including bays, estuaries, lagoons, and mudflats.

In the late 1970s to early 1980s, the estimated breeding population of black skimmers throughout the United States was about 65,000 individuals and increasing. In California, however, less than 100 breeding individuals were found (Spendelow and Patton 1988).

Nesting generally occurs near coasts on sandy beaches, shell banks, coastal and estuary islands, salt pond levees, and on dredged material sites. Black skimmers are often nesting in association with or near terns.

As their name suggests, black skimmers forage by flying low over the water and skimming food off the surface with their lower mandible. The diet primarily includes small fish and crustaceans.

Primary threats to black skimmers include predation and human disturbance on nesting islands.

Table 3-71 Protected salmon species on the West Coast with their protected species designations .

Species and Stock	Scientific Name
Salmon species listed as endangered under the ESA	
Chinook salmon- Sacramento River Winter; Upper Columbia Spring	*Oncorhynchus tshawytscha*
Sockeye salmon- Snake River	*Oncorhynchus nerka*
Steelhead- Southern California; Upper Columbia	*Oncorhynchus mykiss*
Salmon species listed as threatened under the ESA	
Coho salmon- Central California, Southern Oregon, and Northern California Coasts	*Oncorhynchus kisutch*
Chinook salmon- Snake River Fall, Spring, and Summer; Puget Sound; Lower Columbia; Upper Willamette; Central Valley Spring; California Coastal	*Oncorhynchus tshawytscha*
Chum salmon- Hood Canal Summer; Columbia River	*Oncorhynchus keta*
Sockeye salmon- Ozette Lake	*Oncorhynchus nerka*
Steelhead- South-Central California, Central California Coast, Snake River Basin, Lower Columbia, California Central Valley, Upper Willamette, Middle Columbia, Northern California	*Oncorhynchus mykiss*

Table 3-72 Total catch of salmon (number) and chinook salmon bycatch rates (number of salmon/mt of whiting) taken by the at-sea and shore-based processing fleets, 1999-2001 .

	Catcher-processors		Non-tribal		Tribal Mothership		Shore-based	
Species	Catch	Bycatch	Catch	Bycatch	Catch	Bycatch	Catch	Bycatch
2001								
Chinook	847	0.014	1,721	0.048	959	0.158	2,634	0.036
Other	146		624		16		371	
2000								
Chinook	1,839	0.027	4,420	0.094	1,947	0.312	3,321	0.039
Other	88	0.001	27	0.001	16	0.003	24	
1999								
Chinook	2,704	0.040	1,687	0.036	4,497	0.174	1696	0.020
Other	296		506		278		16	

Sources: NMFS. 2003. Implementation of an observer program for at-sea processing vessels in the Pacific Coast groundfish fishery. National Marine Fisheries Service, Northwest Region, Seattle, June 2003. NMFS. 2003. Implementing a monitoring program to provide a full retention opportunity in the shore-based whiting fishery; Preliminary draft environmental assessment. National Marine Fisheries Service, Northwest Region, Seattle, September 2003.

Table 3-73 Incidental catch of chinook salmon in the whiting fishery 1991-2001, all sectors .

Year	Whiting (mt)	Chinook Salmon (no.)[a/]	Bycatch Rate (no/mt whiting)[a/]
1991	222,114	6,194	0.0279
1992	201,168	4,753	0.0236
1993	135,516	5,387	0.0398
1994	248,768	4,605	0.0185
1995	175,255	**15,062**	**0.0859**
1996	212,739	2,327	0.0109
1997	232,958	5,896	0.0253
1998	232,587	5262	0.0226
1999	224,459	10,579	0.0471
2000	202,527	**11,516**	**0.0569**
2001	173,857	6,161	0.0354
2002	130,004	3,759	0.0289

a/ Values in bold indicate years in which the threshold established in the biological opinion was exceeded. Source: NMFS. 2003. Implementation of an observer program for at-sea processing vessels in the Pacific Coast groundfish fishery. National Marine Fisheries Service, Northwest Region, Seattle, June 2003.

Table 3-74 Marine mammals occurring off the West Coast .

Common Name	Scientific Name	ESA Status	MMPA Status
Pinnipeds			
California sea lion	*Zalophus californianus*		
Pacific harbor seal	*Phoca vitulina richardsi*		
Northern elephant seal	*Mirounga angustirostris*		

Common Name	Scientific Name	ESA Status	MMPA Status
Guadalupe fur seal	*Arctocephalus townsendi*	T	D
Northern fur seal	*Callorhinus ursinus*		
Northern or Steller sea lion	*Eumetopias jubatus*	T	D
<u>Sea otters</u>			
Southern	*Enhydra lutris nereis*	T	
Washington	*Enhydra lutris kenyoni*		
<u>Cetaceans</u>			
Minke whale	*Balaenoptera acutorostrata*		
Short-finned pilot whale	*Globicephala macrorhyncus*		
Gray Whale	*Eschrichtius robustus*		
Harbor porpoise	*Phocoena phocoena*		
Dall's porpoise	*Phocoenoides dalli*		
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*		
Short-beaked common dolphin	Delphinus delphis		
Long-beaked common dolphin	*Delphinus capensis*		
The following cetaceans are present within the area managed by this FMP but not likely to interact with groundfish fisheries or have not been documented having had interactions in observed groundfish fisheries:			
Bottlenose dolphin	*Tursiops truncatus*		
Striped Dolphin	*Stenella coeruleoalba*		
Sei whale	*Balaenoptera borealis*	E	
Blue whale	*Balaenoptera musculus*	E	D
Fin whale	*Balaenoptera physalus*	E	D
Sperm whale	*Physeter macrocephalus*	E	D
Humpback whale	*Megaptera novaeangliae*	E	D

Common Name	Scientific Name	ESA Status	MMPA Status
Bryde's whale	*Balaenoptera edeni*		
Sei whale	*Balaenoptera*	E	
Killer whale	*Orcinus orca*		D
Baird's beaked whale	*Berardius bairdii*		
Cuvier's beaked whale	*Ziphius cavirostris*		
Pygmy sperm whale	*Kogia breviceps*		
Risso's dolphin	*Grampus griseus*		
Striped dolphin	*Stenella coeruleoalba*		
Northern right-whale dolphin	*Lissodelphis borealis*		

(Source: Groundfish bycatch draft programmatic EIS, 2004.)

Table 3-75 Protected seabirds on the West Coast with their protected species designations .

Species	Scientific Name
Seabirds listed as endangered under the ESA	
Short-tail albatross	*Phoebastria (=Diomedea) albatrus*
California brown pelican	*Pelecanus occidentalis*
California least tern	*Sterna antillarum browni*
Seabirds listed as threatened under the ESA	
Marbled murrelet	*Brachyramphs marmoratus*

Chapter 4 Environmental Consequences

4.1 Introduction

This chapter contains comparative analyses of the consequences of each alternative in the context of each component of the affected environment presented in Chapter 3.

4.2 Consequences of the Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

4.2.1 Consequences of EFH Designation Alternatives on Groundfish Habitat, Groundfish Fishery Resources

4.2.1.1 Criteria for Evaluating the Consequences of EFH Designation on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

The designation of EFH does not in and of itself have direct effects on habitat, the status of groundfish, or the ecosystem; however, the geographic focus it provides can serve as a tool for managers to focus conservation efforts and stewardship over the habitat component of groundfish resources. Section 303(a)(7) of the Magnuson-Stevens Act requires that adverse effects from fishing on EFH must be minimized to the extent practicable and other actions encouraged that would conserve and enhance such habitat. Designation of EFH is a management tool that is the starting point for considering conservation and enhancement.

The effects of EFH designation are contingent on future application and consultation that is not knowable. However, for this analysis, the effects of EFH designation will be assessed in terms of utility and accuracy which are a function of: (a) geographic resolution at the single species/life history stage level; and, (b) scientific uncertainty. Even though the results of individual consultations are unknowable, it is assumed that their effectiveness is proportional to these two factors.

Geographic resolution at the species/life history stage level is a fundamental issue. At any one time, an individual stock status is given to fluctuation and differing levels of concern by managers. In theory, population level response to protection of habitats that foster specific functional stages of a species life history (e.g. spawning, breeding, feeding, or growth to maturity) will be different depending on which stage is targeted. Further, different stocks have different functional relationships to habitat. Some stocks may respond more strongly, for example, from protection of nursery habitat (growth to maturity) than from spawning habitat.

Scientific uncertainty is a dominant issue in the field of marine habitat and can have profound implications on conservation and enhancement strategies. Where uncertainty is high, managers must consider how to incorporate precautionary management principles into conservation plans. For example, high uncertainty can result in an unwillingness to develop conservation strategies that would have adverse social or economic consequences. Conversely, managers may choose to compensate for uncertainty through higher levels of habitat conservation at the expense of social or economic cost. It should be noted that although several of the alternatives represent improved levels of uncertainty over the current designation, overall levels are still high. Readers are encouraged to read the Comprehensive Risk Assessment for a full discussion of how this has been treated in delineating suitable habitats for groundfish.

Each alternative is scored as No Change (0), Environmentally Positive (E+), Environmentally Negative (E-), or Unknown (U) for the categories of geographic resolution and scientific uncertainty.

4.2.1.2 Consequences of EFH Designation Alternative One on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative one provides limited geographic resolution at the species/life history stage level and is not expected to be utilized by managers in a manner improved over current levels (E-). Scientific uncertainty is relatively low in that, since it encompasses the entire EEZ, it is certain that all species/life history habitat requirements are within the designated area. However, public confidence that results from such low levels of uncertainty is so low as to render it a negative (E-).

4.2.1.3 Consequences of EFH Designation Alternative Two on Groundfish Habitat and Groundfish Fishery Resources

Alternative 2 provides geographic resolution for all species/life history stage combinations where sufficient data exist to delineate suitable habitat (E+). It compensates for scientific uncertainty by designating EFH in areas where suitable habitat has not been calculated but where, based on reasonable scientific judgment, important habitats for groundfish likely occur (E++).

4.2.1.4 Consequences of EFH Designation Alternative Three on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative 3 provides geographic resolution for all species/life history stage combinations where sufficient data exist to delineate suitable habitat (E+). The method for delineating suitable habitat incorporates due consideration for incorporation of scientific uncertainty; however, no additional consideration is provided as in alternative 2 (E+).

4.2.1.5 Consequences of EFH Designation Alternative Four on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative 4 provides geographic resolution for those species/life history stage combinations that are the subject of stock assessments but not for others where sufficient data exist to do so (E-). Data exist for reasonable consideration of scientific uncertainty that is not considered in this alternative (E-).

4.2.1.6 Consequences of EFH Designation Alternative Five on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative 5 provides geographic resolution for all species/life history stage combinations with broader geographic areas defined as a function of the level of concern for a given stock (E++). Scientific uncertainty is incorporated at higher levels based on the level of concern for a given stock; however, no precautionary adjustment is made for uncertainty in a global sense as with alternative 2 and 6 (E+).

4.2.1.7 Consequences of EFH Designation Alternative Six on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative provides geographic resolution for all species/life history stage combinations with broader geographic areas defined as a function of the level of concern for a given stock. The adjustment for species of concern is slightly less (10%) than those made in alternative 5. There is no objective rationale for knowing how this compares with alternative 5 however so they are scored equally (E++). Scientific uncertainty is incorporated at higher levels based on the level of concern for a given stock with a precautionary adjustment to include sea mounts (E+).

4.2.1.8 Consequences of EFH Designation Alternative Seven on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative 7 provides geographic resolution for all species/life history stage combinations where sufficient data exist to delineate suitable habitat. The geographic resolution is higher than other HSP based alternative (E++). Scientific uncertainty is slightly higher due to utilization of 70% probability threshold and no adjustment for species where insufficient data exist for delineation of suitable habitat (E+).

4.2.1.9 Consequences of EFH Designation Alternative Eight on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Alternative 8 provides the highest level of geographic resolution of all the alternatives (E+++). Scientific uncertainty is consequently the highest as well due to a low (30%) probability that all suitable habitat has been delineated where sufficient data exist to do so and lack of an adjustment for species where there is insufficient data (E-).

4.2.1.10 Geographic Comparison of the EFH Designation Alternatives

Table 4-1 through Table 4-4 compares the EFH designation alternatives geographically.

Table 4-1: Total Area (hactares and Square Meters) for EFH Designation Alternatives

EFH Designation Alternative	% status quo area	Area (ha)	Total Area (sq m)
EFH Alt 1 - Status Quo	100.0%	82,281,490.5	822814905002.73
EFH Alt 2	59.1%	48,624,590.3	486245903329.10
EFH Alt 3	27.4%	22,574,464.6	225744645840.50
EFH Alt 4	25.5%	20,961,637.2	209616371791.60
EFH Alt 5	25.3%	20,851,269.3	208512692724.10
EFH Alt 6	25.0%	20,585,561.0	205855610484.10
EFH Alt 7	24.7%	20,349,290.2	203492901517.20
EFH Alt 8	21.0%	17,246,419.7	172464197188.10

Table 4-2: Comparison of EFH Designation Alternatives by Area (gray shaded cells are common areas in hectares).

EFH Designation Alternatives Alternative		EFH Alt 1	EFH Alt 2	EFH Alt 3	EFH Alt 4	EFH Alt 5	EFH Alt 6	EFH Alt 7	EFH Alt 8
	Total Area (ha)	82281490.5	48624590.3	22574464.6	20961637.2	20851269.3	20585561.0	20349290.2	17246419.7
EFH Alt 1 - Status Quo	82281490.5	82281490.5	48624590.3	22574464.6	20961637.2	20851269.3	20585561.0	20349290.2	17246419.7
EFH Alt 2	48624590.3	48624590.3	48624590.3	22574464.6	20961637.2	20756750.5	20491042.3	20349290.2	17246419.7
EFH Alt 3	22574464.6	22574464.6	22574464.6	22574464.6	20961637.2	20639178.1	20373469.8	20349290.2	17246419.7
EFH Alt 4	20961637.2	20961637.2	20961637.2	20961637.2	20961637.2	20498772.1	20253540.5	20304357.0	17243076.2
EFH Alt 5	20851269.3	20851269.3	20756750.5	20639178.1	20498772.1	20851269.3	20585561.0	20349290.2	17246419.7
EFH Alt 6	20585561.0	20585561.0	20491042.3	20373469.8	20253540.5	20585561.0	20585561.0	20196416.2	17246419.7
EFH Alt 7	20349290.2	20349290.2	20349290.2	20349290.2	20304357.0	20349290.2	20196416.2	20349290.2	17246419.7
EFH Alt 8	17246419.7	17246419.7	17246419.7	17246419.7	17243076.2	17246419.7	17246419.7	17246419.7	17246419.7

Table 4-3: Comparison of the EFH Designation Alternatives by Percent Area.

		EFH Alt 1	EFH Alt 2	EFH Alt 3	EFH Alt 4	EFH Alt 5	EFH Alt 6	EFH Alt 7	EFH Alt 8
	Total Area (ha)	82281490.5	48624590.3	22574464.6	20961637.2	20851269.3	20585561.0	20349290.2	17246419.7
EFH Alt 1 - Status Quo	82281490.5	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
EFH Alt 2	48624590.3	59.1%	100.0%	100.0%	100.0%	99.5%	99.5%	100.0%	100.0%
EFH Alt 3	22574464.6	27.4%	46.4%	100.0%	100.0%	99.0%	99.0%	100.0%	100.0%
EFH Alt 4	20961637.2	25.5%	43.1%	92.9%	100.0%	98.3%	98.4%	99.8%	100.0%
EFH Alt 5	20851269.3	25.3%	42.7%	91.4%	97.8%	100.0%	100.0%	100.0%	100.0%
EFH Alt 6	20585561.0	25.0%	42.1%	90.3%	96.6%	98.7%	100.0%	99.2%	100.0%
EFH Alt 7	20349290.2	24.7%	41.8%	90.1%	96.9%	97.6%	98.1%	100.0%	100.0%
EFH Alt 8	17246419.7	21.0%	35.5%	76.4%	82.3%	82.7%	83.8%	84.8%	100.0%

Table 4-4: Comparison of EFH Designation Alternatives by Subset.

Alternative	EFH Alternatives			
EFH Alt 2	is a subset of	1		
EFH Alt 3	is a subset of	1	2	
EFH Alt4	is a subset of	1	2	3

EFH Alt 5	is a subset of	1 2	3 - with the addition of some areas around seamounts	
EFH Alt 6	is a subset of	1 2	3 + seamounts	5
EFH Alt 7	is a subset of	1 2	3	
EFH Alt 8	is a subset of	1 2	3	4 5 6 7 8

4.2.1.11 Summary of the Consequences of EFH Designation Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Table 4-5 summarizes and compares the consequences of the EFH designation alternatives.

Table 4-5 Summary of the Environmental Consequences of the EFH Designation Alternatives

	Geographic Resolution	Scientific Uncertainty
EFH Alternative 1	E-	E-
EFH Alternative 2	E+	E++
EFH Alternative 3	E+	E+
EFH Alternative 4	E-	E-
EFH Alternative 5	E++	E+
EFH Alternative 6	E++	E+
EFH Alternative 7	E++	E+
EFH Alternative 8	E+++	E-

4.2.2 Consequences of HAPC Designation Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

4.2.2.1 Criteria for Evaluating the Consequences of HAPC Designation Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

The designation of HAPC does not in and of itself have direct effects on either groundfish habitat or groundfish fishery resources; however, the geographic focus it provides can serve as a tool for managers to focus conservation efforts and stewardship over the habitat component of groundfish resources. The option of designating HAPC as a subset of EFH is provided for by regulation at 50 CFR 600.815 as a means of providing additional geographic focus around which to develop habitat conservation strategies. HAPC are generally viewed by managers as a tool to help focus the expenditure of scarce human and budgetary resources during the process of consultation (the consultation process is described in Chapter 1). Consultation on projects proposed within HAPC are expected to receive additional resources than those that are not. As with designation of EFH, HAPC designation is a management tool that is the starting point for considering conservation and enhancement.

The effects of HAPC designation are contingent on future application that is not knowable; however, limited assessment of the consequences of alternatives is possible by considering the extent to which the designation is consistent with four factors as defined at 50 CFR 600.815(a)(8):

5) the importance of the ecological function provided by the habitat;
6) the extent to which the habitat is sensitive to human-induced environmental degradation;
7) whether, and to what extent, development activities are, or will be, stressing the habitat type; and,
8) the rarity of the habitat type (50 CFR 600.815 (a)(8)).

For each of these factors, each alternative is scored as No Change (0), Environmentally Positive (E+), Environmentally Negative (E-), or Unknown (U).

4.2.2.2 Consequences of HAPC Designation Alternative One (no action) on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

This alternative would maintain the status quo for which there are no HAPC designated within the Pacific Coast EEZ. The alternative is scored as no change for all factors (0).

4.2.2.3 Consequences of HAPC Alternative Two (Estuaries) on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function
Estuaries are ecologically important as habitat for groundfish and the ecosystem as a whole. Table 4-6 summarizes information from the Habitat Use Database (see Comprehensive Risk Assessment) to show the species/life history stage combinations that rely on estuaries for the ecological functions spawning, breeding, feeding, and growth to maturity. The large number of combinations (107) that utilize estuaries demonstrates the importance of estuaries in terms of ecological function (E+).

Sensitivity to Human Induced Degradation
The quality of estuaries in terms of providing for ecological function, when considered at the scale of the project area, can be very sensitive to certain types of degradation. A full treatment of this topic is provided in Appendix 14 to the Comprehensive Risk Assessment. Due to the sensitivity of estuaries to human induced degradation, this alternative is projected to have a highly positive effect on groundfish habitat, groundfish resources, and ecosystem considerations (E++).

Present and Future Stress
Estuaries within the project area are subject to differing but important stresses from developmental activities including dredging, disposal/landfills, vessel operation/transportation/navigation, introduction of exotic species, pile installation and removal, overwater structures, flood control and shoreline protection, water control

structures, log transfer facilities/in-water log storage, utility line/cables/pipeline installation, and commercial utilization of habitat. Each of these activities represent potential past and future stress to the functionality of estuaries for groundfish and within the ecosystem. A full discussion of these activities is contained in Appendix 14 to the Comprehensive Risk Assessment. Because of the importance of these stress factors, and the potential for application of the HAPC designation to positively influence such factors, this alternative is projected to have a highly positive effect on groundfish habitat, groundfish resources, and ecosystem considerations (E++).

Rarity of Habitat Type

Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. No change is expected from this alternative (0).

Table 4-6: Summary of the Ecological Function of Estuaries for Groundfish

Level1Habitat	Level2Habitat	Level3Habitat	Level4Habitat	SpeciesSci	Lifestage	Activity
Estuarine	Benthos	Mixed Bottom	Silt/Sand	Citharichthys sordidus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Citharichthys sordidus	Juveniles	Growth to Maturity
Estuarine	Benthos	Mixed Bottom	Sand/Gravel	Citharichthys sordidus	Adults	Growth to Maturity
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Citharichthys sordidus	Adults	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Citharichthys sordidus	Adults	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Sand	Citharichthys sordidus	Adults	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Eopsetta jordani	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Eopsetta jordani	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Eopsetta jordani	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Gadus macrocephalus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Gadus macrocephalus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Gravel	Gadus macrocephalus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Gadus macrocephalus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Galeorhinus galeus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Galeorhinus galeus	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Galeorhinus galeus	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Galeorhinus galeus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Glyptocephalus zachirus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Glyptocephalus zachirus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Glyptocephalus zachirus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Glyptocephalus zachirus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Glyptocephalus zachirus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Glyptocephalus zachirus	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Juveniles	Growth to Maturity
Estuarine	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Hippoglossoides elassodon	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Hippoglossoides elassodon	Juveniles	Feeding

Estuarine	Benthos	Unconsolidated	Mud	Hippoglossoides elassodon	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Hippoglossoides elassodon	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Hippoglossoides elassodon	Adults	All
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Hippoglossoides elassodon	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Feeding

Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Unconsolidated	Mud	Isopsetta isolepis	Adults	Unknown
Estuarine	Benthos	Unconsolidated	Silt	Isopsetta isolepis	Adults	Unknown
Estuarine	Benthos	Unconsolidated	Sand	Lepidopsetta bilineata	Eggs	Unknown
Estuarine	Benthos	Mixed Bottom	Sand/Gravel	Lepidopsetta bilineata	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Sand	Lepidopsetta bilineata	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Lepidopsetta bilineata	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Gravel	Lepidopsetta bilineata	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Gravel	Lepidopsetta bilineata	Adults	All
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Lepidopsetta bilineata	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Lepidopsetta bilineata	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Microstomus pacificus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Sand	Microstomus pacificus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Microstomus pacificus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Microstomus pacificus	Adults	All
Estuarine	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Eggs	Unknown
Estuarine	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Eggs	Unknown
Estuarine	Benthos	Unconsolidated	Sand	Ophiodon elongatus	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Parophrys vetulus	Juveniles	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Parophrys vetulus	Juveniles	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Adults	Feeding
Estuarine	Benthos	Unconsolidated	Sand	Parophrys vetulus	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Parophrys vetulus	Adults	All
Estuarine	Water Column	Epipelagic Zone	Seawater surface	Platichthys stellatus	Eggs	Unknown
Estuarine	Benthos	Unconsolidated	Mud	Platichthys stellatus	Juveniles	Feeding

Estuarine	Benthos	Unconsolidated	Sand	Platichthys stellatus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Platichthys stellatus	Juveniles	Feeding
Estuarine	Benthos	Unconsolidated	Mud	Platichthys stellatus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Platichthys stellatus	Adults	All
Estuarine	Benthos	Unconsolidated	Gravel	Platichthys stellatus	Adults	All
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Platichthys stellatus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Psettichthys melanostictus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Psettichthys melanostictus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Psettichthys melanostictus	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mixed mud/sand	Psettichthys melanostictus	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Psettichthys melanostictus	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Psettichthys melanostictus	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Raja inornata	Eggs	Unknown
Estuarine	Benthos	Unconsolidated	Mud	Raja inornata	Adults	All
Estuarine	Intertidal Benthos	Unconsolidated	Mud	Raja inornata	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Scorpaenichthys marmoratus	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Cobble	Scorpaenichthys marmoratus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Scorpaenichthys marmoratus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Scorpaenichthys marmoratus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Scorpaenichthys marmoratus	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes auriculatus	Juveniles	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes auriculatus	Adults	All
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes auriculatus	Adults	Growth to Maturity
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes auriculatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Adults	Feeding
Estuarine	Benthos	Artificial Structure	Artifical Reef	Sebastes auriculatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes brevispinis	Juveniles	Feeding
Estuarine	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes caurinus	Larvae	Feeding
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes caurinus	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes caurinus	Adults	All
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes caurinus	Adults	All

Estuarine	Benthos	Artificial Structure	Artifical Reef	Sebastes caurinus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes caurinus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes caurinus	Adults	All
Estuarine	Benthos	Biogenic	Sponges	Sebastes maliger	Juveniles	Feeding
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes maliger	Juveniles	Growth to Maturity
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes maliger	Adults	All
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes maliger	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes melanops	Juveniles	Feeding
Estuarine	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Artificial Structure	Artifical Reef	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Sebastes proriger	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Squalus acanthias	Juveniles	Feeding
Estuarine	Intertidal Benthos	Unconsolidated	Mud	Squalus acanthias	Juveniles	Growth to Maturity
Estuarine	Benthos	Unconsolidated	Mud	Squalus acanthias	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Squalus acanthias	Adults	Unknown
Estuarine	Benthos	Unconsolidated	Mud	Squalus acanthias	Adults	Spawning
Estuarine	Intertidal Benthos	Unconsolidated	Mud	Squalus acanthias	Adults	All
Estuarine	Intertidal Benthos	Unconsolidated	Mud	Triakis semifasciata	Adults	All
Estuarine	Benthos	Unconsolidated	Mud	Triakis semifasciata	Adults	All
Estuarine	Benthos	Mixed Bottom	Mud/Rock	Triakis semifasciata	Adults	All
Estuarine	Benthos	Hard Bottom	Cobble	Triakis semifasciata	Adults	All
Estuarine	Benthos	Mixed Bottom	Mud/Boulders	Triakis semifasciata	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Triakis semifasciata	Adults	All
Estuarine	Benthos	Unconsolidated	Sand	Triakis semifasciata	Adults	All
Estuarine	Benthos	Mixed Bottom	Sand/Rock	Triakis semifasciata	Adults	All

4.2.2.4 Consequences of HAPC Designation Alternative 3 (Canopy Kelp) on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function

Canopy kelp is ecologically important as habitat for groundfish and the ecosystem as a whole. Table 4-7 summarizes information from the Habitat Use Database (see Comprehensive Risk Assessment) to show the species/life history stage combinations that utilize kelp for the ecological functions spawning, breeding, feeding, and growth to maturity (E+).

Sensitivity to Human Induced Degradation

[Analysis pending]

Present and Future Stress

[Analysis pending]

Rarity of Habitat Type

The distribution of kelp beds is highly variable as a result of natural fluctuation making a definitive calculation of rarity uncertain. Based on GIS information compiled for this EIS that includes areas where kelp now occurs or has been known to occur, this alternative would include 0.03% of the project area or 263 million square meters. Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. The extent to which the alternative has consequences on the distribution of kelp however is unknown (U).

Table 4-7: Summary of the Ecological Function of Canopy Kelp for Groundfish

Level1Habitat	Level2Habitat	Level3Habitat	Level4Habitat	SpeciesSci	Lifestage	Activity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Citharichthys sordidus	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	All
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Hexagrammos decagrammus	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Ophiodon elongatus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Ophiodon elongatus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Scorpaena guttata	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Scorpaenichthys marmoratus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Scorpaenichthys marmoratus	Adults	All
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Scorpaenichthys marmoratus	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes atrovirens	Larvae	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes atrovirens	Juveniles	Growth to Maturity
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes atrovirens	Juveniles	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes atrovirens	Adults	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes atrovirens	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes auriculatus	Juveniles	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes auriculatus	Juveniles	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes brevispinis	Juveniles	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes carnatus	Larvae	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes carnatus	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes carnatus	Adults	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes carnatus	Adults	All
Estuarine	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes caurinus	Larvae	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes caurinus	Larvae	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes caurinus	Juveniles	Feeding

Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes caurinus	Juveniles	Growth to Maturity
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes caurinus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes caurinus	Adults	All
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes chrysomelas	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes chrysomelas	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes chrysomelas	Adults	All
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes chrysomelas	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes chrysomelas	Adults	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes ciliatus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes diploproa	Juveniles	Growth to Maturity
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes diploproa	Juveniles	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes entomelas	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes entomelas	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes flavidus	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes flavidus	Adults	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes goodei	Larvae	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes goodei	Juveniles	Growth to Maturity
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes goodei	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes jordani	Juveniles	Feeding
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes maliger	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes melanops	Juveniles	Feeding
Estuarine	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes melanops	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes melanops	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes melanops	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes melanops	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes miniatus	Larvae	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes miniatus	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes miniatus	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes mystinus	Juveniles	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes mystinus	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes mystinus	Adults	All

Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes nebulosus	Adults	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes ovalis	Juveniles	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes paucispinis	Juveniles	Feeding
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes paucispinis	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes pinniger	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes rastrelliger	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes rastrelliger	Adults	All
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes saxicola	Juveniles	Growth to Maturity
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes serranoides	Juveniles	Growth to Maturity
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes serranoides	Adults	Feeding
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Sebastes serranoides	Adults	All
Shelf	Water Column	Epipelagic Zone	Macrophyte Canopy	Sebastes serranoides	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Triakis semifasciata	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Algal Beds/Macro	Triakis semifasciata	Adults	Spawning
Shelf	Benthos	Vegetated Bottom	Algal Beds/Macro	Triakis semifasciata	Adults	All
Estuarine	Benthos	Vegetated Bottom	Algal Beds/Macro	Triakis semifasciata	Adults	All

4.2.2.5 Consequences of HAPC Designation Alternative 4 (Sea Grass Beds) on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function

Sea grass beds are ecologically important as habitat for groundfish and the ecosystem as a whole. Table 4-8 summarizes information from the Habitat Use Database (see Comprehensive Risk Assessment) to show the species/life history stage combinations that utilize sea grass beds for the ecological functions spawning, breeding, feeding, and growth to maturity (E+).

Sensitivity to Human Induced Degradation

[Analysis pending]

Present and Future Stress

[Analysis pending]

Rarity of Habitat Type

Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. No change is expected from this alternative (0).

Table 4-8: Summary of the Ecological Function of Sea Grass Beds for Groundfish

Level1Habitat	Level2Habitat	Level3Habitat	Level4Habitat	SpeciesSci	Lifestage	Activity
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Parophrys vetulus	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Scorpaenichthys marmoratus	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Scorpaenichthys marmoratus	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Juveniles	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes auriculatus	Adults	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes maliger	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes maliger	Adults	Feeding
Estuarine	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes melanops	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes melanops	Juveniles	Feeding
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes miniatus	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes paucispinis	Juveniles	Feeding
Shelf	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes paucispinis	Adults	All
Coastal Intertidal	Benthos	Vegetated Bottom	Rooted Vascular	Sebastes rastrelliger	Adults	Feeding

4.2.2.6 Consequences of HAPC Designation Alternative 5 (Core Habitat for Juvenile and Adult Overfished Species) on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function
This alternative, by definition, would designate ecologically important areas (E+).

Sensitivity to Human Induced Degradation
[Analysis pending]

Present and Future Stress
[Analysis pending]

Rarity of Habitat Type
Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. No change is expected from this alternative (0).

4.2.2.7 Consequences of HAPC Designation Alternative 6 on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function
Near shore and shallow rocky areas are ecologically important as habitat for groundfish and the ecosystem as a whole. Table 4-9 summarizes information from the Habitat Use Database (see Comprehensive Risk Assessment) to show the species/life history stage combinations that utilize near shore rocky areas for the ecological functions spawning, breeding, feeding, and growth to maturity (E+).

Sensitivity to Human Induced Degradation
[Analysis pending]

Present and Future Stress
[Analysis pending]

Rarity of Habitat Type
Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. No change is expected from this alternative (0).

Table 4-9: Summary of the Ecological Function of Near Shore Rocky and shallow Areas for Groundfish.

Level1Habitat	Level2Habitat	Level3Habitat	Level4Habitat	SpeciesSci	Lifestage	Activity
Estuarine	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hexagrammos decagrammus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Growth to Maturity
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Growth to Maturity
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Spawning
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	All
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	All
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Spawning
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding

Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Breeding
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Gravel/Cobble	Hydrolagus colliei	Adults	Feeding
Estuarine	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Spawning
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Hydrolagus colliei	Adults	Spawning
Shelf	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Eggs	Unknown
Coastal Intertidal	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Eggs	Unknown
Shelf	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Eggs	Unknown
Estuarine	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Eggs	Unknown
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Eggs	Unknown
Shelf	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Eggs	Unknown
Shelf	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Eggs	Unknown
Estuarine	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Eggs	Unknown
Shelf	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Ophiodon elongatus	Adults	All
Estuarine	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Ophiodon elongatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Scorpaena guttata	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Scorpaena guttata	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Scorpaena guttata	Adults	Feeding
Coastal Intertidal	Benthos	Hard Bottom	Cobble	Scorpaenichthys marmoratus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Scorpaenichthys marmoratus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Scorpaenichthys marmoratus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Scorpaenichthys marmoratus	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Scorpaenichthys marmoratus	Adults	All
Estuarine	Benthos	Hard Bottom	Cobble	Scorpaenichthys marmoratus	Adults	All

Shelf	Benthos	Hard Bottom	Bedrock	Sebastes aleutianus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes alutus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes alutus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Boulder	Sebastes alutus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes alutus	Adults	All
Shelf	Benthos	Hard Bottom	Gravel/Cobble	Sebastes alutus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Gravel/Cobble	Sebastes alutus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes atrovirens	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes atrovirens	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes auriculatus	Juveniles	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes auriculatus	Juveniles	All
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes auriculatus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes auriculatus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes auriculatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes auriculatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes borealis	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes carnatus	Juveniles	Growth to Maturity
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes carnatus	Juveniles	Feeding
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes carnatus	Adults	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes carnatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes caurinus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes caurinus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes caurinus	Adults	All
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes caurinus	Adults	All
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes caurinus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes caurinus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes chlorostictus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes chlorostictus	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes chrysomelas	Juveniles	Growth to Maturity
Coastal Intertidal	Benthos	Hard Bottom	Boulder	Sebastes chrysomelas	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes chrysomelas	Adults	All

Coastal Intertidal	Benthos	Hard Bottom	Boulder	Sebastes chrysomelas	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes chrysomelas	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes chrysomelas	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ciliatus	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Boulder	Sebastes ciliatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ciliatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes constellatus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes constellatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes constellatus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes dalli	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes dalli	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes dalli	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes elongatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes elongatus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes elongatus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes entomelas	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes entomelas	Juveniles	Growth to Maturity
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes entomelas	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes entomelas	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes flavidus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes flavidus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes flavidus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes flavidus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes flavidus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes gilli	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes goodei	Juveniles	Growth to Maturity
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes goodei	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Boulder	Sebastes goodei	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes goodei	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes hopkinsi	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Cobble	Sebastes hopkinsi	Adults	All

Shelf	Benthos	Hard Bottom	Bedrock	Sebastes hopkinsi	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes jordani	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes jordani	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes jordani	Adults	All
Shelf	Benthos	Hard Bottom	Clay	Sebastes levis	Juveniles	Feeding
Shelf	Submarine Canyon	Hard Bottom	Clay	Sebastes levis	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes levis	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes macdonaldi	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes melanops	Juveniles	Growth to Maturity
Estuarine	Benthos	Hard Bottom	Bedrock	Sebastes melanops	Juveniles	Feeding
Estuarine	Benthos	Hard Bottom	Boulder	Sebastes melanops	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes melanops	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes melanops	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes melanops	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes melanostomus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes melanostomus	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes miniatus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes miniatus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes mystinus	Juveniles	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes mystinus	Juveniles	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes mystinus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes nebulosus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes nebulosus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes nebulosus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes nigrocinctus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes nigrocinctus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes nigrocinctus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ovalis	Juveniles	Growth to Maturity
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes ovalis	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes ovalis	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes ovalis	Adults	All

Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ovalis	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes paucispinis	Juveniles	Feeding
Shelf	Submarine Canyon	Hard Bottom	Boulder	Sebastes paucispinis	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes paucispinis	Juveniles	Growth to Maturity
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes paucispinis	Adults	All
Shelf	Submarine Canyon	Hard Bottom	Boulder	Sebastes paucispinis	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes paucispinis	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes paucispinis	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes pinniger	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes pinniger	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes pinniger	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes pinniger	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes pinniger	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rastrelliger	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes rastrelliger	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rastrelliger	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rosaceus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rosaceus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes rosaceus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes rosaceus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rosenblatti	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Boulder	Sebastes rosenblatti	Juveniles	Growth to Maturity
Shelf	Submarine Canyon	Hard Bottom	Clay	Sebastes rosenblatti	Adults	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ruberrimus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes ruberrimus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes ruberrimus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes ruberrimus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes rufus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes rufus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes rufus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes saxicola	Juveniles	Growth to Maturity

Coastal Intertidal	Benthos	Hard Bottom	Bedrock	Sebastes serranoides	Juveniles	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes serranoides	Juveniles	Growth to Maturity
Shelf	Submarine Canyon	Hard Bottom	Bedrock	Sebastes serranoides	Adults	Feeding
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes serranoides	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes serriceps	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes serriceps	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes umbosus	Juveniles	Growth to Maturity
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes umbosus	Adults	All
Shelf	Benthos	Hard Bottom	Bedrock	Sebastes variegatus	Adults	All
Shelf	Benthos	Hard Bottom	Boulder	Sebastes zacentrus	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Sebastes zacentrus	Adults	All
Estuarine	Benthos	Hard Bottom	Cobble	Triakis semifasciata	Adults	All
Shelf	Benthos	Hard Bottom	Cobble	Triakis semifasciata	Adults	All
Coastal Intertidal	Benthos	Hard Bottom	Boulder	Triakis semifasciata	Adults	Spawning
Coastal Intertidal	Benthos	Hard Bottom	Boulder	Triakis semifasciata	Adults	Feeding

4.2.2.8 Consequences of HAPC Alternative 7 on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

Importance of Ecological Function
[Analysis pending]

Sensitivity to Human Induced Degradation
[Analysis pending]

Present and Future Stress
[Analysis pending]

Rarity of Habitat Type
Table 4-10 summarizes the area of the HAPC designation alternatives. There is no clear metric for determining if this alternative qualifies as rare. No change is expected from this alternative (0).

These areas are: the northern portion of the Olympic National Marine Sanctuary, Astoria canyon, Daisy Bank, Heceta Bank, Rogue Canyon, Eel River Canyon, Mendocino Canyon, Gorda Escarpment, Cordell Bank, Monterey Canyon, Monterey Bay, Morro Ridge, Thompson Seamount, President Jackson Seamount, Taney Seamount, Guide Seamount, Pioneer Seamount, Gumdrop Seamount, Davidson Seamount, San Juan Seamount, and the Cowcod Conservation Area(s). Each area of interest is presented as a separate suboption. The Council could choose any combination of these areas as a preferred alternative.

4.2.2.9 Consequences of HAPC Designation Alternative 8 on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

- see appendix

4.2.2.10 Consequences of HAPC Designation Alternative 9 on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

This alternative would be contingent on future action so the relevance of the evaluation criteria are not clear. However, for purposes of this analysis, it is reasonable to assume the Council would adopt HAPC alternative consistent with the criteria in the EFH regulations. The alternative therefore merits environmentally scores (E+).

4.2.2.11 Geographic Comparison of the HAPC Designation Alternatives

Table 4-10 compares the EFH designation alternatives geographically.

Table 4-10: Summary of HAPC Designation alternatives 1-7 by area.

Alternative	% of EEZ	Area (ha)	Total Area (sq m)
HAPC Alt 1 – Status Quo	0.00%	0.0	0.0
HAPC Alt 2 - Estuaries	0.68%	560,737.9	5607379136.6
HAPC Alt 3 – Kelp	0.03%	26,346.5	263465362.6
HAPC Alt 4 - Seagrass	0.09%	77,612.5	776125472.7
HAPC Alt 5 - Core Area	6.18%	5,088,478.9	50884788874.4
HAPC Alt 6 - Nearshore Rock	0.23%	188,053.5	1880535158.9
HAPC Alt 7 - Areas of Interest	3.67%	3,017,147.7	30171476913.8

4.2.2.12 Summary of the Consequences of HAPC Designation Alternatives on Groundfish Habitat and Groundfish Fishery Resources

Table 4-11: Summary of the Consequeces of HAPC Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations.

	Importance of the Ecological Function	Sensitivity to Human Induced Degradation	Present and Future Stress	Rarity of Habitat Type
Alternative 1	0	0	0	0
Alternative 2	E+	E++	E++	0
Alternative 3	E+			0
Alternative 4	E+			0
Alternative 5	E+			0
Alternative 6	E+			0
Alternative 7	E+			0
Alternative 8				
Alternative 9	E+			E+

4.2.3 Consequences of Impacts Minimization Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

4.2.3.1 Criteria for Evaluating the Consequences of Impacts Minimization Alternatives on Groundfish Habitat, Groundfish Fishery Resources, and Ecosystem Considerations

This briefing book document presents two summary tables, Table 12 and Table 13, that consider the impacts of the impacts minimization alternatives habitat, fishery resources, and ecosystem considerations. Considerably more information is available in the Comprehensive Risk Assessment that may be utilized for the Draft EIS but is not included here at this time.

Table 12: Number of Species/Life History Stage Combinations within Each Impacts Alternative.

Alternative	Description	Species/Lifestage Count *(Maximum is 160)*
Minimize Impacts Alt 1, Status Quo		160
Minimize Impacts Alt 2, Option 1, trawl	Depth Restriction - 200 fm	160
Minimize Impacts Alt 2, Option 1, fixed	Depth Restriction - 100/150 fm	160
Minimize Impacts Alt 2, Option 2, trawl	Depth Restriction - EEZ	160
Minimize Impacts Alt 2, Option 2, fixed	Depth Restriction - 100/150 fm	160
Minimize Impacts Alt 2, Option 3, trawl	Depth Restriction - EEZ	160
Minimize Impacts Alt 2, Option 3, fixed	Depth Restriction - 60 fm	155
Minimize Impacts Alt 3, Option 1	s >= 2, r >= 1, twlhrs < 100	157
Minimize Impacts Alt 3, Option 2	s >= 0.5, r >= 0.5, twlhrs < 100	160
Minimize Impacts Alt 3, Option 3	s >= 2, r >= 1	159
Minimize Impacts Alt 3, Option 4	s >= 0.5, r >= 0.5	160
Minimize Impacts Alt 4, Option 1	untrawled 2000-2002	160
Minimize Impacts Alt 4, Option 2	deeper than 2000 m	16
Minimize Impacts Alt 5	prohibit krill fishery	
Minimize Impacts Alt 6, Option 1	25% representative habitat	
Minimize Impacts Alt 6, Option 2	25% representative habitat	
Minimize Impacts Alt 7	hotspot - 20% hsp, >50 spp	158
Minimize Impacts Alt 8, Option 1 or 2	AOI	159
Minimize Impacts Alt 9, Option 1 or 2	Zoning - deeper than 2000 m	16
Minimize Impacts Alt 10	fishing gear	
Minimize Impacts Alt 11	TNC - central Cal	154
Minimize Impacts Alt 12	fishing gear	
Minimize Impacts Alt 13	Oceana	

Table 13: Percent of Each FMP Species Suitable Habitat by area within Each Impacts Alternative.

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Atheresthes stomias	Arrowtooth flounder	Adults		81.6	68.6	100.0	42.4	0.1	0.6	0.2	29.6	1.5					82.7	3.4			1.7		
Atheresthes stomias	Arrowtooth flounder	Eggs		48.5	41.6	100.0	27.9	3.8	24.0	6.6	60.9	14.1	6.4				44.8	6.8	6.4		5.6		
Atheresthes stomias	Arrowtooth flounder	Juveniles		92.0	75.2	100.0	42.0	0.0	1.0	0.0	22.4	1.2					93.0	4.4			3.5		
Atheresthes stomias	Arrowtooth flounder	Larvae		49.1	42.1	100.0	28.3	3.6	23.0	6.4	60.2	13.4	5.6				45.4	6.6	5.6		5.7		
Sebastes aurora	Aurora rockfish	Adults		36.7	16.5	100.0	0.0	6.8	40.6	9.0	88.4	30.9	0.0				26.2	15.5	0.0		17.3		
Sebastes aurora	Aurora rockfish	Juveniles		68.7	57.7	100.0	36.3	0.2	16.2	0.2	43.7	16.5					63.6	8.4			10.5		
Sebastes rufus	Bank rockfish	Adults		55.4	38.3	100.0	8.0	60.4	65.6	79.5	99.0	40.6					14.7	42.7			28.9		
Sebastes rufus	Bank rockfish	Juveniles		100.0	99.3	100.0	70.2	3.0	3.0	7.9	7.9	13.6					96.6	5.4			11.4		
Sebastes melanops	Black rockfish	Adults		100.0	99.7	100.0	77.3	30.7	30.7	100.0	100.0	7.2					99.5	25.8			10.7		
Sebastes melanops	Black rockfish	Juveniles		99.9	99.7	100.0	84.7	10.8	17.5	34.5	41.6	3.2					49.0	8.9			3.8		
Sebastes melanostomus	Blackgill rockfish	Adults		26.8	16.4	100.0		74.4	74.4	100.0	100.0	41.8	0.0				1.3	51.6	0.0		40.5		
Sebastes melanostomus	Blackgill rockfish	Juveniles		75.7	62.8	100.0	37.5	0.1	0.3	0.1	37.5	1.1					77.4	0.1			1.0		
Sebastes melanostomus	Blackgill rockfish	Larvae		80.0	68.6	100.0	46.3	1.2	1.7	5.8	36.5	1.6					78.8	3.3			2.4		
Sebastes chrysomelas	Black-and-yellow rockfish	Adults		100.0	100.0	100.0	100.0	52.5	52.5	99.9	100.0	33.7					93.0	8.1			24.7		
Sebastes chrysomelas	Black-and-yellow rockfish	Juveniles		100.0	100.0	100.0	100.0	52.5	52.5	99.9	100.0	33.7					93.0	8.1			24.7		
Sebastes mystinus	Blue rockfish	Adults		91.4	84.3	100.0	55.3	52.5	52.5	100.0	100.0	32.3					60.9	35.2			10.0		
Sebastes mystinus	Blue rockfish	Juveniles		100.0	99.9	100.0	80.2	37.3	37.3	100.0	100.0	14.3					97.8	23.8			9.1		
Sebastes mystinus	Blue rockfish	Larvae		100.0	97.3	100.0	69.2	3.0	4.9	6.4	10.6	10.3					88.4	6.6			6.2		
Sebastes paucispinis	Bocaccio	Adults		100.0	95.9	100.0	57.2	8.3	8.3	15.8	15.8	18.0					90.7	10.9			13.7		
Sebastes paucispinis	Bocaccio	Juveniles		100.0	99.5	100.0	70.6	2.4	2.4	6.2	6.2	10.4					97.1	5.5			7.7		
Sebastes paucispinis	Bocaccio	Larvae		100.0	97.3	100.0	68.0	3.2	5.3	6.6	11.1	10.8					88.1	6.8			6.7		
Sebastes auriculatus	Brown rockfish	Adults		100.0	100.0	100.0	84.2	15.7	22.3	38.1	45.1	8.4					51.0	8.6			3.4		
Sebastes gilli	Bronzespotted rockfish	Adults		95.3	84.9	100.0	43.3	54.4	54.4	100.0	100.0	40.2					52.2	44.3			5.2		
Sebastes gilli	Bronzespotted rockfish	Juveniles		90.3	69.3	100.0	23.8	81.0	81.0	100.0	100.0	68.3						52.4			4.1		
Raja binoculata	Big skate	Adults		67.3	56.9	100.0	36.5	0.2	16.4	0.3	44.6	17.1					61.5	8.1			11.4		
Raja binoculata	Big skate	Eggs		100.0	91.0	100.0	59.8	3.6	8.5	6.7	19.0	12.5					84.4	8.3			7.0		
Raja binoculata	Big skate	Juveniles		100.0	95.4	100.0	65.3	0.4	0.4	0.5	0.5	10.1					97.1	5.3			7.3		
Isopsetta isolepis	Butter sole	Adults		100.0	89.1	100.0	60.3	0.4	1.6	0.4	10.3	3.1					92.6	4.0			7.0		

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Scorpaenichthys marmoratus	Cabezon	Adults		100.0	99.9	100.0	85.5	14.4	21.1	37.1	44.3	7.4					50.3	8.6			3.4		
Sebastes dalli	Calico rockfish	Adults		100.0	98.8	100.0	62.9	52.3	52.3	99.8	99.8	35.1					70.0	36.9			6.6		
Raja inornata	California skate	Adults		75.4	64.6	100.0	43.7	0.3	14.3	0.4	38.1	15.5					64.3	6.9			10.8		
Raja inornata	California skate	Eggs		73.0	62.1	100.0	40.8	4.1	18.8	7.1	44.2	16.9					60.5	10.5			10.8		
Raja inornata	California skate	Juveniles		99.8	94.9	100.0	65.0	0.4	0.4	0.5	0.5	10.1					96.9	5.4			7.3		
Sebastes pinniger	Canary rockfish	Adults		100.0	99.6	100.0	68.7	35.1	35.1	100.0	100.0	14.6					98.7	27.3			5.9		
Sebastes pinniger	Canary rockfish	Juveniles		100.0	99.7	100.0	75.3	40.3	40.4	100.0	100.0	17.6					97.9	23.0			9.2		
Sebastes goodie	Chilipepper	Adults		89.4	74.8	100.0	41.9	6.5	22.1	10.1	39.7	23.6					72.1	13.1			15.8		
Sebastes goodie	Chilipepper	Juveniles		100.0	100.0	100.0	84.2	2.9	2.9	7.4	7.4	12.5					96.4	5.5			8.8		
Sebastes nebulosus	China rockfish	Adults		100.0	100.0	100.0	86.5	34.3	34.3	100.0	100.0	7.9					99.5	26.0			11.3		
Sebastes caurinus	Copper rockfish	Adults		100.0	99.9	100.0	84.1	15.7	22.2	38.2	45.3	8.4					51.1	8.6			3.4		
Sebastes levis	Cowcod	Adults		100.0	90.3	100.0	38.4	76.3	76.3	100.0	100.0	63.7					34.2	42.8			7.7		
Sebastes levis	Cowcod	Juveniles		100.0	100.0	100.0	100.0	4.2	4.2	7.8	7.8	27.6					90.3	6.8			21.1		
Pleuronichthys decurrens	Curlfin sole	Adults		100.0	99.7	100.0	72.5	0.4	4.5	0.6	6.2	13.9					92.3	6.2			9.1		
Sebastes crameri	Darkblotched rockfish	Adults		85.5	69.5	100.0	38.1	0.0	9.6	0.0	32.2	10.1					79.1	7.8			7.3		
Sebastes crameri	Darkblotched rockfish	Juveniles		100.0	97.9	100.0	66.9	0.4	0.4	0.5	0.5	8.0					97.8	4.2			7.7		
Sebastes crameri	Darkblotched rockfish	Larvae		57.8	49.5	100.0	32.7	2.9	17.7	6.0	54.3	11.2	0.0				49.7	8.1	0.0		12.6		
Squalus acanthias	Spiny dogfish	Adults		65.4	56.1	100.0	37.3	0.3	16.4	0.3	45.9	16.0					56.2	7.4			10.8		
Squalus acanthias	Spiny dogfish	Juveniles		68.8	59.0	100.0	39.3	0.3	14.6	0.3	43.1	15.1					59.2	7.4			10.3		
Microstomus pacificus	Dover sole	Adults		50.7	42.3	100.0	25.8	0.0	28.4	0.0	58.7	24.3					46.5	8.2			12.4		
Microstomus pacificus	Dover sole	Juveniles		68.9	57.9	100.0	36.1	0.2	17.6	0.2	43.7	14.8					60.3	7.6			9.2		
Sebastes ciliatus	Dusky rockfish	Adults		99.1	95.2	100.0	62.5	52.3	52.3	100.0	100.0	33.8					68.7	33.5			6.8		
Pleuronectes vetulus	English sole	Adults		94.4	80.9	100.0	53.8	0.4	8.4	0.5	22.0	12.4					81.2	7.1			7.9		
Antimora microlepis	Finescale codling	Adults		38.9	33.1	100.0	21.2	7.2	46.5	9.4	70.8	35.4	13.2				34.9	10.0	13.2		14.2		
Sebastes rubrivinctus	Flag rockfish	Adults		98.5	92.0	100.0	3.0	40.4	40.4	100.0	100.0	28.8					92.0	15.8			9.0		
Sebastes rubrivinctus	Flag rockfish	Juveniles		100.0	100.0	100.0	100.0	47.0	47.0	100.0	100.0	19.5					96.6	19.6			9.8		
Hippoglossoides elassodon	Flathead sole	Adults		99.1	83.0	100.0	41.7	0.0	1.4	0.0	13.7	4.1					98.1	6.1			2.2		
Sebastes carnatus	GOPHER ROCKFISH	Adults		100.0	100.0	100.0	100.0	5.1	6.0	9.2	10.4	25.1					87.2	4.7			13.9		
Sebastes carnatus	GOPHER ROCKFISH	Juveniles		100.0	100.0	100.0	100.0	5.1	6.0	9.2	10.4	25.1					87.2	4.7			13.9		
Sebastes carnatus	GOPHER ROCKFISH	Larvae		100.0	100.0	100.0	100.0	5.1	6.0	9.2	10.4	25.1					87.2	4.7			13.9		

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Sebastes rastrelliger	Grass rockfish	Adults		100.0	100.0	100.0	100.0	55.8	55.8	99.9	100.0	31.1					92.7	7.3			21.0		
Sebastes rastrelliger	Grass rockfish	Juveniles		100.0	100.0	100.0	100.0	59.3	59.4	99.9	100.0	35.2					94.6	8.4			25.6		
Sebastes rosenblatti	Greenblotched rockfish	Adults		100.0	88.2	100.0	33.5	91.2	91.2	100.0	100.0	76.8					26.7	48.0			8.4		
Sebastes rosenblatti	Greenblotched rockfish	Juveniles		100.0	99.9	100.0	69.7	34.7	34.7	100.0	100.0	14.4					98.8	27.7			5.7		
Sebastes chlorostictus	Greenspotted rockfish	Adults		100.0	96.2	100.0	57.8	2.8	2.8	8.5	8.5	13.7					96.8	6.8			11.0		
Sebastes chlorostictus	Greenspotted rockfish	Juveniles		100.0	100.0	100.0	100.0	3.5	3.5	6.6	6.6	16.2					94.0	3.4			10.4		
Sebastes elongatus	Greenstriped rockfish	Adults		99.9	88.3	100.0	44.3	4.3	4.5	8.9	15.7	8.2					96.3	9.3			6.3		
Sebastes elongatus	Greenstriped rockfish	Juveniles		100.0	95.1	100.0	65.1	0.4	0.4	0.5	0.5	10.1					97.1	5.4			7.3		
Sebastes variegatus	Harlequin rockfish	Adults		96.2	85.1	100.0	39.5	47.0	47.0	100.0	100.0	28.1					60.7	34.9			3.2		
Sebastes umbosus	Honeycomb rockfish	Adults		100.0	100.0	100.0	91.8	42.0	42.0	100.0	100.0	18.3					97.3	24.5			10.8		
Hexagrammos decagrammus	Kelp greenling	Adults		100.0	100.0	100.0	90.6	9.5	17.9	15.8	24.9	5.3					33.7	0.9			2.7		
Hexagrammos decagrammus	Kelp greenling	Eggs		100.0	100.0	100.0	98.5	3.8	5.8	6.7	9.0	12.7					83.9	4.5			7.7		
Hexagrammos decagrammus	Kelp greenling	Juveniles		100.0	100.0	100.0	88.5	13.7	20.3	34.0	41.1	5.8					47.9	7.9			2.9		
Hexagrammos decagrammus	Kelp greenling	Larvae		100.0	100.0	100.0	96.9	3.1	6.0	5.2	8.4	11.8					73.6	2.4			7.3		
Sebastes atrovirens	Kelp rockfish	Adults		100.0	100.0	100.0	100.0	59.4	59.5	99.9	100.0	27.6					94.4	6.5			19.7		
Ophiodon elongatus	Lingcod	Adults		99.9	99.6	100.0	83.7	15.8	22.4	38.5	45.5	8.5					51.1	8.6			3.5		
Ophiodon elongatus	Lingcod	Eggs		100.0	100.0	100.0	97.8	2.7	4.9	4.8	7.2	9.3					81.0	2.0			4.7		
Ophiodon elongatus	Lingcod	Juveniles		100.0	99.4	100.0	71.5	0.5	1.5	0.6	1.7	9.3					89.7	4.2			6.6		
Ophiodon elongatus	Lingcod	Larvae		100.0	96.6	100.0	69.2	2.2	3.1	5.5	6.5	9.3					90.3	5.6			6.6		
Raja rhina	Longnose skate	Adults		74.7	63.2	100.0	40.6	0.2	14.3	0.3	38.5	16.3					68.3	8.4			10.6		
Raja rhina	Longnose skate	Eggs		71.7	61.0	100.0	40.1	4.4	20.5	7.3	45.1	18.8	0.0				59.5	11.0	0.0		10.2		
Raja rhina	Longnose skate	Larvae		99.8	94.9	100.0	65.0	0.4	0.4	0.5	0.5	10.1					96.9	5.4			7.3		
Triakis semifasciata	Leopard shark	Adults		100.0	100.0	100.0	100.0	4.5	4.9	8.0	8.4	21.1					91.3	4.4			13.9		
Triakis semifasciata	Leopard shark	Juveniles		100.0	100.0	100.0	100.0	3.9	8.4	5.1	10.1	9.9					91.9	0.0			0.0		
Sebastolobus altivelis	Longspine thornyhead	Adults		11.9	2.3	100.0			47.7	0.0	100.0	33.1					10.3	7.9			16.2		
Sebastolobus altivelis	Longspine thornyhead	Juveniles		10.5	1.9	100.0			48.0	0.0	100.0	33.4					10.1	7.3			16.3		
Sebastes mackonaldi	Mexican rockfish	Adults		100.0	100.0	100.0	65.0	76.3	76.4	100.0	100.0	61.9					54.3	38.4			12.0		
Sebastes mackonaldi	Mexican rockfish	Juveniles		100.0	100.0	100.0	100.0	82.3	82.6	99.7	100.0	54.4					93.0	5.9			33.3		
Sebastes mackonaldi	Mexican rockfish	Larvae		100.0	100.0	100.0	100.0	6.4	8.0	9.7	11.7	28.2					86.7	9.0			18.6		
Sebastes serranoides	Olive rockfish	Adults		100.0	100.0	100.0	89.5	54.2	54.3	100.0	100.0	35.3					94.9	10.5			19.7		

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Gadus macrocephalus	Pacific cod	Adults		99.8	82.1	100.0	45.2	0.0	0.2	0.0	11.8	1.0					99.7	6.7					
Gadus macrocephalus	Pacific cod	Eggs		100.0	100.0	100.0	77.1	1.9	3.1	5.6	7.4	5.3					91.0	4.1			7.4		
Gadus macrocephalus	Pacific cod	Juveniles		99.9	95.4	100.0	67.0	1.6	2.5	5.0	6.0	4.9					92.4	5.1			7.1		
Gadus macrocephalus	Pacific cod	Larvae		100.0	100.0	100.0	96.7	2.8	5.8	4.9	8.1	8.5					76.5	1.7			7.8		
Eopsetta jordani	Petrale sole	Adults		87.2	72.7	100.0	44.3	0.0	10.6	0.0	29.1	13.6					79.9	8.5			8.9		
Eopsetta jordani	Petrale sole	Juveniles		100.0	94.0	100.0	65.5	0.4	2.6	0.6	7.1	9.5					89.3	5.1			6.2		
Sebastes eos	Pink rockfish	Adults		100.0	89.2	100.0	40.0	86.4	86.4	100.0	100.0	72.8					31.6	47.1			8.2		
Sebastes alutus	Pacific ocean perch	Adults		75.2	46.1	100.0	8.9	0.4	0.6	6.0	51.7	0.3					75.1	10.3					
Sebastes alutus	Pacific ocean perch	Juveniles		44.4	21.3	100.0	7.5	6.7	20.9	15.0	100.0	10.2					32.2	10.4			13.7		
Sebastes alutus	Pacific ocean perch	Larvae		95.5	79.7	100.0	49.6	2.0	9.1	5.2	26.2	6.3					82.4	6.8			5.6		
Citharichthys sordidus	Pacific sanddab	Adults		100.0	92.2	100.0	59.4	0.5	6.7	0.6	12.6	13.4					90.3	7.1			8.6		
Sebastes maliger	Quillback rockfish	Adults		100.0	99.9	100.0	85.0	11.1	17.6	34.8	41.8	3.5					49.3	8.7			3.6		
Hydrolagus colliei	Spotted ratfish	Adults		99.8	95.5	100.0	67.5	2.3	3.2	5.5	6.5	9.7					90.3	5.9			6.7		
Hydrolagus colliei	Spotted ratfish	Eggs		60.5	51.5	100.0	33.8	4.2	24.1	7.0	53.7	20.2	0.0				50.2	10.9	0.0		11.2		
Hydrolagus colliei	Spotted ratfish	Juveniles		99.8	95.5	100.0	67.5	2.3	3.2	5.5	6.5	9.7					90.3	5.9			6.7		
Coryphaenoides acrolepis	Pacific rattail (grenadie)r	Adults		1.2	0.1	100.0	0.0	0.0	77.0	0.0	100.0	57.9	7.8				0.6	10.0	7.8				
Coryphaenoides acrolepis	Pacific rattail (grenadie)r	Eggs		100.0	91.8	100.0	60.5	3.5	7.7	6.7	18.1	12.0					85.3	8.1			6.9		
Coryphaenoides acrolepis	Pacific rattail (grenadie)r	Larvae		100.0	91.8	100.0	60.5	3.5	7.7	6.7	18.1	12.0					85.3	8.1			6.9		
Sebastes babcocki	Redbanded rockfish	Adults		82.0	54.8	100.0	7.1		12.8		46.2	9.6					73.3	10.1			7.0		
Sebastes proriger	Redstripe rockfish	Adults		99.8	92.9	100.0	37.4	39.7	39.7	100.0	100.0	23.8					67.3	37.2			3.4		
Errex zachirus	Rex sole	Adults		69.4	57.9	100.0	35.3	0.0	15.2	0.0	43.5	15.9					63.7	8.4			10.4		
Lepidopsetta bilineata	Rock sole	Adults		88.8	79.0	100.0	53.3	0.4	3.1	0.5	22.8	8.6					79.8	5.1			5.9		
Sebastes helvomaculatus	Rosethorn rockfish	Adults		99.7	98.2	100.0	51.8	21.6	21.6	100.0	100.0	8.7					98.2	37.5			6.0		
Sebastes rosaceus	Rosy rockfish	Adults		100.0	100.0	100.0	93.0	53.5	53.5	100.0	100.0	33.8					95.6	10.9			19.6		
Sebastes rosaceus	Rosy rockfish	Juveniles		100.0	100.0	100.0	100.0	47.0	47.0	100.0	100.0	31.2					89.1	7.1			18.8		
Sebastes aleutianus	Rougheye rockfish	Adults		74.9	55.8	100.0	24.2	0.7	2.6	4.9	44.2	0.6					75.2	6.6			3.2		
Sebastes aleutianus	Rougheye rockfish	Juveniles		65.9	55.6	100.0	35.5	0.2	19.4	0.2	45.8	19.5					60.4	8.6			10.8		
Anoplopoma fimbria	Sablefish	Adults		13.1	4.5	100.0	0.4	0.0	55.6	0.0	99.4	38.6	0.1				8.2	8.5	0.1		16.1		
Anoplopoma fimbria	Sablefish	Eggs		39.4	33.6	100.0	22.1	4.5	43.5	6.6	69.7	33.4	0.2				32.7	11.8	0.2		11.3		
Anoplopoma fimbria	Sablefish	Juveniles		53.2	45.0	100.0	28.9	0.2	27.0	0.2	56.2	24.1					48.6	8.1			12.2		

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Anoplopoma fimbria	Sablefish	Larvae		46.6	39.1	100.0	24.8	4.4	34.6	6.9	64.7	28.7	0.0				40.8	12.0	0.0		11.8		
Psettichthys melanostictus	Sand sole	Adults		100.0	91.2	100.0	62.8	0.4	2.4	0.5	9.2	8.1					89.9	5.2			6.2		
Psettichthys melanostictus	Sand sole	Juveniles		100.0	100.0	100.0	74.7	0.5	1.5	0.6	1.7	7.8					89.4	4.0			6.3		
Scorpaena guttata	California scorpionfish	Adults		100.0	100.0	100.0	83.2	5.7	5.7	7.8	7.8	39.4					86.9	10.2			33.5		
Sebastes zacentrus	Sharpchin rockfish	Adults		92.9	72.0	100.0	27.5	1.2	7.1	4.8	33.8	5.1					87.7	8.1			5.6		
Sebastes zacentrus	Sharpchin rockfish	Juveniles		94.4	79.4	100.0	49.3	0.2	5.3	0.2	21.9	8.0					89.0	6.2			7.0		
Sebastes zacentrus	Sharpchin rockfish	Larvae		3.2	0.0	100.0	0.0	5.9	60.3	7.3	99.9	37.8	12.4				3.5	11.6	12.4		14.0		
Sebastes borealis	Shortraker rockfish	Adults		29.6	0.0	100.0		8.3	41.1	11.0	88.9	31.4					27.5	23.6			9.2		
Sebastes jordani	Shortbelly rockfish	Adults		91.5	76.9	100.0	41.2	1.5	14.7	4.5	30.5	16.5					81.9	10.8			10.3		
Sebastes brevispinis	Silvergray rockfish	Adults		100.0	91.3	100.0	45.1	8.8	8.8	100.0	100.0	0.0					84.6	45.5					
Sebastes ovalis	Speckled rockfish	Adults		100.0	91.8	100.0	58.1	73.7	73.7	100.0	100.0	58.1					50.1	36.4			10.9		
Sebastes ovalis	Speckled rockfish	Juveniles		100.0	100.0	100.0	100.0	52.0	52.0	100.0	100.0	30.3					94.8	10.1			17.9		
Galeorhinus zyopterus	Soupfin Shark	Adults		85.4	72.3	100.0	44.6	6.2	25.2	9.0	43.0	23.3					67.9	12.2			15.2		
Galeorhinus zyopterus	Soupfin Shark	Juveniles		81.4	69.3	100.0	45.5	4.1	16.5	7.0	37.8	16.0					67.5	10.6			9.6		
Sebastes diploproa	Splitnose rockfish	Adults		85.1	68.5	100.0	37.2	0.0	11.1	0.0	33.3	10.5					77.1	8.0			7.2		
Sebastes diploproa	Splitnose rockfish	Juveniles		67.3	56.5	100.0	36.0	0.2	17.5	0.3	45.4	17.5					60.7	8.0			10.6		
Sebastes diploproa	Splitnose rockfish	Larvae		38.0	32.3	100.0	21.2	4.7	45.5	6.7	70.9	34.9	1.6				31.5	11.7	1.6		11.4		
Sebastes hopkinsi	Squarespot rockfish	Adults		100.0	100.0	100.0	85.7	54.9	54.9	100.0	100.0	35.3					96.0	11.0			18.7		
Sebastes hopkinsi	Squarespot rockfish	Juveniles		100.0	100.0	100.0	100.0	52.6	52.6	99.9	100.0	34.4					92.0	8.1			23.2		
Sebastolobus alascanus	Shortspine thornyhead	Adults		47.4	37.7	100.0	19.4	0.1	27.8	0.1	63.1	20.9					43.8	7.9			12.7		
Sebastolobus alascanus	Shortspine thornyhead	Eggs		100.0	100.0	100.0	98.0	2.8	4.8	6.4	8.5	8.3					83.0	3.1			4.2		
Sebastolobus alascanus	Shortspine thornyhead	Juveniles		74.5	60.7	100.0	33.8	0.1	13.7	0.2	40.6	12.5					69.2	8.3			9.4		
Platichthys stellatus	Starry flounder	Adults		100.0	95.5	100.0	67.1	0.4	1.4	0.5	1.6	7.3					90.8	4.3			6.8		
Platichthys stellatus	Starry flounder	Eggs		100.0	100.0	100.0	97.7	3.0	5.3	5.4	8.0	10.3					79.7	1.7			7.8		
Sebastes constellatus	Starry rockfish	Adults		100.0	99.7	100.0	65.8	73.7	73.7	100.0	100.0	59.2					55.9	36.7			12.2		
Sebastes constellatus	Starry rockfish	Juveniles		100.0	100.0	100.0	83.2	56.5	56.6	100.0	100.0	37.3					95.3	11.0			19.5		
Sebastes saxicola	Stripetail rockfish	Adults		88.9	72.4	100.0	39.4	0.0	13.2	0.0	29.8	15.5					80.5	9.8			10.2		
Sebastes saxicola	Stripetail rockfish	Juveniles		100.0	95.4	100.0	65.5	2.4	2.4	6.0	6.0	10.4					97.1	6.4			7.3		
Sebastes nigrocinctus	Tiger rockfish	Adults		100.0	95.3	100.0	67.9	26.7	26.7	100.0	100.0	3.8					91.3	26.1			6.1		
Sebastes serriceps	Treefish	Adults		100.0	100.0	100.0	100.0	53.7	53.8	99.9	100.0	35.7					91.6	8.4			24.2		

SpeciesSci	SpeciesCommon	Lifestage	Alt 1 S Quo	Alt 2, Opt 1, trawl	Alt 2, Opt 1 & 2, fixed	Alt 2, Opt 2 & 3, trawl	Alt 2, Opt 3, fixed	Alt 3, Opt 1	Alt 3, Opt 2	Alt 3, Opt 3	Alt 3, Opt 4	Alt 4, Opt 1	Alt 4, Opt 2	Alt 5	Alt 6, Opt 1	Alt 6, Opt 2	Alt 7	Alt 8, Opt 1 or 2	Alt 9, Opt 1 or 2	Alt 10	Alt 11	Alt 12	Alt 13
Sebastes miniatus	Vermilion rockfish	Adults		84.8	78.2	100.0	51.3	55.6	55.6	100.0	100.0	31.8					56.4	38.5			15.4		
Merluccius productus	Pacific hake	Adults		59.7	50.7	100.0	32.4	4.6	25.1	7.5	54.0	22.6	0.0				53.5	10.9	0.0		12.2		
Merluccius productus	Pacific hake	Eggs		100.0	100.0	100.0	75.5	3.1	3.1	6.0	6.0	14.8					96.7	3.9			12.5		
Merluccius productus	Pacific hake	Juveniles		61.4	52.8	100.0	34.8	4.4	24.2	7.2	51.9	21.7	0.0				52.2	10.4	0.0		11.7		
Merluccius productus	Pacific hake	Larvae		100.0	99.3	100.0	68.0	2.4	2.4	6.1	6.1	10.6					96.9	5.8			7.7		
Sebastes entomelas	Widow rockfish	Adults		97.7	88.7	100.0	50.7	50.3	50.3	100.0	100.0	33.5					61.1	37.9			5.3		
Sebastes ruberrimus	Yelloweye rockfish	Adults		90.2	82.6	100.0	51.7	50.9	50.9	100.0	100.0	30.8					59.1	36.1			8.6		
Sebastes ruberrimus	Yelloweye rockfish	Juveniles		100.0	100.0	100.0	81.1	37.3	37.3	100.0	100.0	14.1					97.7	24.0			9.0		
Sebastes reedi	Yellowmouth rockfish	Adults		99.9	33.2	100.0		1.0	1.0	99.9	100.0	0.0											
Sebastes reedi	Yellowmouth rockfish	Juveniles		100.0	52.9	100.0	0.1	0.1	0.5	3.3	37.2	0.6					95.3	11.1					
Sebastes flavidus	Yellowtail rockfish	Adults		100.0	97.9	100.0	55.8	5.7	5.7	11.5	12.0	6.8					96.3	9.0			5.7		
Sebastes flavidus	Yellowtail rockfish	Juveniles		100.0	100.0	100.0	100.0	59.4	59.5	99.9	100.0	27.6					94.4	6.5			19.7		

4.3 Consequences of the Alternatives on Pacific Coast Fisheries

4.3.1 Evaluation Criteria for Assessing the Consequences of the Alternatives on Pacific Coast Fisheries

The consequences of each alternative on Pacific Coast Fisheries is assessed in the sections below. The assessment includes a summary of past, present, and reasonably foreseeable effects and the predicted direction of the fishery under implementation of the alternative. Each alternative is scored as No Change (0), Environmentally Positive (E+), Environmentally Negative (E-), or Unknown (U). A summary of the analyses is presented in Table 4-14 and Table 4-15.

4.3.2 Effects of the Alternatives on West Coast Trawl Fisheries

4.3.2.1 Summary of Past and Present Effects on West Coast Trawl Fisheries

Trawl fisheries along the Pacific west coast have been constrained by rebuilding species concerns, and as a result, opportunities for harvesting groundfish and other bottom tending species have been reduced, resulting in decreased revenues for many vessels in the trawl sector. Some examples of constraints include large closed areas (RCA's) which were historically areas that generated revenues for the groundfish trawl fleet that were not inconsequential, reductions in cumulative limits for target species that co-occur with rebuilding species, and the requirement that pink shrimp trawl vessels have rockfish excluder devices. As a result of restrictions, the Pacific groundfish fishery was declared a disaster, and in 2003, a trawl vessel and permit buyback went into effect to reduce the number of participants in the limited entry trawl fishery and to increase revenues to those remaining in that fishery. It is unknown how habitat impacts have effected, or are effecting, production of fishery resources and thereby limited available harvest (E-/U).

4.3.2.2 Summary of Reasonably Foreseeable Effects on West Coast Trawl Fisheries

Rebuilding species are expected to continue to play a central role in the management of west coast trawl fisheries. Although the manner in which rebuilding species are managed may presumably change, in the short run, closed areas, constraining cumulative limits, and various gear requirements are expected to be central tools for management. Gear requirements are expected to allow larger cumulative limits of shelf flatfish species for the trawl sector. In the long run, different bycatch management tools may play a larger role. For example, as part of its preferred alternative for managing bycatch, the PFMC adopted an individual quota system as a long term strategy for managing bycatch. In the long run, an Individual Quota system may allow closed areas, gear requirements, and constraining cumulative limits to be of less importance as a management tool. Further, as the Council refines its approach to EFH conservation, habitat protection may have long-term positive effects on groundfish fisheries through the potential for healthier habitats to lead to an increase in groundfish production. At present, the science is not there to determine if, or to what extent, an increase in production is possible. The Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may address the link between habitat and stock productivity, the requirement to consider practicability in designing EFH conservation strategies, and increased opportunities for shelf flatfish species due to changes in gear requirements, the short and long-term outlook is positive (E+).

4.3.2.3 Effects of the EFH Designation Alternatives on West Coast Trawl Fisheries

Designation of EFH in itself is not expected to have any effect on trawl fisheries. That is, designating an area as EFH does not create an effect upon trawl fisheries. It is the action associated with minimizing impacts to EFH that may have an effect upon trawl fisheries (0).

4.3.2.4 Effects of the HAPC Designation Alternatives on West Coast Trawl Fisheries

Designation of HAPC's are not expected to have any effect on trawl fisheries. That is, designating an area as an HAPC does not create an effect upon trawl fisheries. It is the action associated with minimizing impacts to HAPC that may have an effect upon trawl fisheries (0).

4.3.2.5 Effects of the Impacts Minimization Alternatives on West Coast Trawl Fisheries

Alternative 1: Status Quo – The status quo alternative is, by definition, an alternative that will have no additive regulation upon the affected environment, and thus, will have no effect upon entities associated with the trawl sector. It is unknown how habitat impacts have effected, or are effecting, production of fishery resources and thereby limited available harvest (0/U).

Alternative 2: Depth Based gear restrictions for large footrope trawl gear
Large footrope trawl gear differs in functionality from small footrope trawl gear by keeping the trawl from digging into soft sediment (which is more often found along the continental slope and deep shelf) and by allowing the trawl to more easily access relatively rocky areas. A large footrope restriction would tend to reduce the amount of trawlable area by reducing access to relatively rocky and more severe substrate, and would tend to increase concerns about safety and damage to trawling equipment which may occur if a trawl were to dig into soft ocean floor sediment.

<u>Option 1: Prohibit the use of large footrope trawl gear shoreward of 200 fathoms</u>

This option is expected to behave in a manner similar to status quo. Although large footrope trawl gear was permitted to depths of 150 fathoms in portions of 2004, large amounts of trawl effort – and catch - have occurred at depths of 200 fathoms or more in recent years. If the seaward closed area boundary is set at depths shallower than 200 fathoms in the future, trawl vessels may not be able to access as much area as they would with large footrope gear, and small footrope trawl gear may be more prone to dig into the ocean floor due to the soft sediment found at deeper depths which may cause damage to gear and safety concerns (Brown, 2004. personal communication) (E-/U).

Option 2 and 3: Prohibit the use of large footrope trawl gear throughout the EEZ

This option is expected to have a negative effect on the trawl sector by reducing the amount of area accessible to trawlers, and increasing safety concerns for trawl vessels fishing at depths where soft sediment is found. Over a four year period approximately $37,724,435 amount of trawl gross revenues could be generated in areas that would be subject to restriction under these options.

Alternative 3: Control-rule based area closures using habitat sensitivity index values.

This alternative is expected to have a negative effect on trawl vessels by eliminating trawlable areas to further trawl effort and displacing revenues that have historically been generated in those areas. Displacing revenues and effort may have several impacts upon trawl sectors. Displaced effort may relocate to other areas, resulting in higher competition, and/or lower catch per unit effort in areas remaining open. This may result in lower gross revenues per vessel in some areas and/or higher costs as a result of searching in an attempt to make up those revenues. (E-)

Over a four year period approximately $1,011,952 amount of trawl gross revenues could be generated in areas that would be subject to restriction under option3a. Under 3b, $1,531,975 would be subject to restriction; under option 3c, $47,115,054 would be subject to restriction, and under option 3d, $82,895,532 would be subject to restriction.

In the longer term, the effect may be positive by enhancing the amount of groundfish available for harvest. The level of the potential enhancement is unknown due to scientific limitations. (E+)

Alternative 4: Restrict the potential for commercial fisheries to expand into areas that are currently unimpacted or have not been fished between 2000 and 2002

Option 1: Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000 – 2002

According to trawl logbook data, in 2003 the trawl footprint included areas that were not trawled during the 2000 – 2002 seasons. Although relatively minor, the effort and revenue generated in these areas in 2003 would be eliminated under this alternative, and would cause an undesirable effect if trawlers are intending to continue fishing these areas in the future. Whether those areas that were trawled in 2003 and untrawled in 2000 – 2002 period was the result of exploratory fishing, or whether it is an indicator of a shift in effort by trawl vessels is unknown, and therefore, whether eliminating these areas from trawl fishing in the future will create a slightly undesirable effect is largely unknown. Under this option, approximately $88,941 in trawl gross revenues would be subject to restriction (0).

<u>Option 2: Apply the expansion limit to all bottom-tending gear types. Due to the absence of geo-referneced fishing effort data for fixed-gear fisheries, 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.</u>

The impact to fixed gear fisheries is largely unknown due to the lack of appropriate data, however trawl fisheries will be subject to displaced revenue as some trawl effort and revenue has historically occurred at depths greater than 2,000 meters. A four year period could generate approximately $4,246,377 in areas that would be subject to restriction under this option (E-)

Alternative 5: Prohibit development of the krill fishery

There are no known fisheries for krill along the Pacific coast, and therefore, this alternative is not expected to have any direct effect upon trawl fisheries. To the extent that a krill fishery prohibition insures prey is available for species that are the target of trawl fisheries, then this alternative may have benefits in the form of insurance to trawlers that target species that rely on krill as a primary food source since the existence of that food source may be one factor in insuring future populations of target species are healthy. (0)

Alternative 6: Close 25% of representative habitat to all fishing

The closure of areas to trawl gear would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort – as a result of localized depletion – and may result in higher costs if vessels fish more intensely to make up those revenues. In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations (E-/E+)

Alternative 7: Prohibit bottom trawling in "hotspot" areas.

The closure of areas to trawl gear would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort – as a result of localized depletion – and may result in higher costs if vessels fish more intensely to make up those revenues. In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations (E-/E+)

Alternative 8: Limit fishing impacts in areas of interest

The closure of areas to trawl gear would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort – as a result of localized depletion – and may result in higher costs if vessels fish more intensely to make up those revenues. Over a four year period approximately $78,094,177 of trawl gross revenues could be generated in areas that are subject to restriction under option 8.1. Under 8.2 and 8.3, a potential $29,471,349 could be generated over a four year period in areas that would be subject to restriction. In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations (E-/E+)

Alternative 9: Zoning Alternative

In the short run, this alternative would act in a manner similar to status quo, though some trawl revenues would be displaced as logbook data shows trawling has occurred at depths greater than 2,000 meters. In the long run, the impact of this alternative on the trawl sector is unknown since this alternative relies on future research to determine whether trawling is permissible in various areas.

Alternative 10: Establish impact-reducing fishing gear requirements

The impact of this alternative upon trawl vessels is largely conditional upon the option, or set of options, considered. The prohibition of roller gear larger than 15 inches would tend to have a minimal effect since most trawlers use large footrope gear that is equal to or less than 15 inches (Brown, 2004. personal communication). However, limiting the flexibility of trawlers to use gear that is larger than 15 inches may eliminate possible future opportunities. The requirement to use weak links on tickler chains would likely be a minimal accounting cost. Depending on how the gear is set up, if a weak link were to break at sea, the vessel may incur costs in the form of time required to fix the chain. Requiring the use of cambered doors would tend to impact shrimp trawlers more than groundfish trawlers as most groundfish trawlers currently use cambered doors. Requiring aluminum trawl doors would affect all trawl vessels in the short run since aluminum doors are typically not used. In the long run, aluminum trawl doors are likely to impact bottom trawl and shrimp trawl vessels since aluminum trawl doors are likely to be less durable than steel doors and may require additional maintenance, repair, and replacement as they are subjected to the stress of bottom trawling. The prohibition of beam trawl gear is likely to have a negative impact as vessels that have historically used beam trawl gear would be displaced and forced to use other types of gear. (C)

Alternative 11: Designate a no-trawl zone on the central California coast.

This alternative would be accommodated with a buyout of trawl vessels that have historically fished in the proposed closed area. Assuming that buyout represents the net present value of future revenues to those vessels, then this alternative would have no economic impact upon those trawl vessels. Vessels outside the proposed closed area are unlikely to be affected. Over a four year period, $5,886,370 in trawl gross revenues could be generated in areas that are put under restriction in this alternative. (0)

Alternative 12: Allow fish to be harvested by any legal gear without regard to gear endorsement

This alternative is likely to have a beneficial economic impact on trawl vessels since vessels that target sablefish with trawl gear would be allowed to target sablefish with fixed gear – a gear type that commands a higher price per pound than trawl gear – and sablefish is allocated across sectors, therefore eliminating the possibility of competition between vessels that were historically trawlers and those that were historically fixed gear vessels (E+).

It is possible that this alternative could result in some undesirable effects as well if fixed gear vessels participate in trawl fisheries, thus increasing the number of participants in the trawl sector and decreasing trawl opportunities for vessels that have historically been trawlers. (E-)

Alternative 13: Oceana Alternative

4.3.2.6 Effects of the Research and Monitoring Alternatives on the West Coast Trawl Fisheries

The research and monitoring alternatives 1 through 3 are expected to have largely no effect on the trawl sector since trawl vessels are currently required to use logbooks and vessel monitoring systems. A system of research closures may have a negative effect upon trawl vessels since these research closures may overlap with areas that are desirable for fishing from the standpoint of trawl vessels.

In the longer term, the improved knowledge base that would result from research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are difficult or impossible to factor in to management may more easily be addressed with additional research and information (E+).

4.3.3 Effects of the Alternatives on West Coast Fixed Gear Fisheries

4.3.3.1 Summary of Past and Present Effects on West Coast Fixed Gear Fisheries

Fixed gear fisheries along the Pacific west coast have been constrained by rebuilding species concerns, and as a result, opportunities for harvesting groundfish and other bottom tending species have been reduced, resulting in decreased revenues for many vessels. Some examples of constraints include large closed areas (RCA's) which were historically areas that generated relatively large revenues and reductions in cumulative limits for target species that co-occur with rebuilding species. However, the tier system and permit stacking provisions have allowed the limited entry fixed gear fleet to consolidate and "rationalize" and – as a result – to increase revenues. Other groundfish fixed gear sectors have been less successful, and have largely been subject to increasing restriction and reductions in non-sablefish cumulative limits. Non-groundfish fixed gear fisheries have been more successful than groundfish fixed gear fisheries. For example, the Dungeness crab fishery has seen some of the largest gross revenues ever in recent years. It is unknown how habitat impacts have effected, or are effecting, production of fishery resources and thereby limited available harvest (E-/U).

4.3.3.2 Summary of Reasonably Foreseeable Effects on West Coast Fixed Gear Fisheries

Rebuilding species are expected to continue to play a central role in the management of west coast fixed gear fisheries, though this is likely to impact the various fixed gear sectors relatively differently. Although the manner in which rebuilding species are managed may presumably change, in the short run, closed areas and constraining cumulative limits are expected to be central tools for management. Further, as the Council refines its approach to EFH conservation, habitat protection may have long-term positive effects on groundfish fisheries through the potential for healthier habitats to lead to an increase in groundfish production. At present, the science is not there to determine if, or to what extent, an increase in production is possible. The Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.3.3.3 Effects of the EFH Designation Alternatives on West Coast Fixed Gear Fisheries

Designation of EFH in itself is not expected to have any effect on fixed gear fisheries. That is, designating an area as EFH does not create an effect upon fixed gear fisheries. It is the action associated with minimizing impacts to EFH that may have an effect upon those fisheries. (0)

4.3.3.4 Effects of the HAPC Designation Alternatives on West Coast Fixed Gear Fisheries

Designation of HAPC's are not expected to have any effect on fixed gear fisheries. That is, designating an area as an HAPC does not create an effect upon fixed gear fisheries. It is the action associated with minimizing impacts to HAPC that may have an effect upon fixed gear fisheries. (0)

4.3.3.5 Effects of the Impacts Minimization Alternatives on West Coast Fixed Gear Fisheries

Alternative 1: Status Quo – The status quo alternative is, by definition, an alternative that will have no effect upon the affected environment, and thus, will have no affect upon fixed gear vessels. It is unknown how habitat impacts have affected, or are affecting, production of fishery resources and thereby limited available harvest (0/U).

Alternative 2: Depth Based gear restrictions for fixed gear

Depth based fixed gear restrictions would tend to reduce the catch of shelf groundfish species and may eliminate some non-groundfish fixed gear fisheries such as the Dungeness crab fishery for example. The elimination of opportunities to target shelf groundfish and non-groundfish species that reside on the shelf would have an undesirable effect upon the fixed gear sector. (E-)

Alternative 3: Control-rule based area closures using habitat sensitivity index values.

This alternative is expected to have a negative effect on fixed gear vessels by displacing effort and revenues that have historically been generated in those areas. Displacing revenues and effort may have several impacts upon fixed gear sectors. Displaced effort may relocate to other areas, resulting in higher competition, and/or lower catch per unit effort in areas remaining open. This may result in lower gross revenues per vessel in some areas and/or higher costs as a result of searching in an attempt to make up those revenues. (E-)

In the longer term, the effect may be positive by enhancing the amount of groundfish available for harvest. The level of the potential enhancement is unknown due to scientific limitations. (E-/E+)

Alternative 4: Restrict the potential for commercial fisheries to expand into areas that are currently unimpacted or have not been fished between 2000 and 2002

The impact to fixed gear fisheries under this alternative is designed to function largely as status quo. Assuming fixed gear fisheries do not operate at depths greater than 2,000 meters, this option should have no effect on fixed gear fishers, other than eliminating the opportunity to expand into areas that have not previously been fished. (0)

Alternative 5: Prohibit development of the krill fishery

There are no known fisheries for krill along the Pacific coast, and therefore, this alternative is not expected to have any direct effect upon fixed gear fisheries. To the extent that a krill fishery prohibition insures prey is available for species that are the target of fixed gear fisheries, then this alternative may have benefits in the form of insurance to fixed gearers that target species that rely on krill as a primary food source since the existence of that food source may be one factor in insuring future populations of target species are healthy. (0)

Alternative 6: Close 25% of representative habitat to all fishing

The closure of areas to fixed gear would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort – as a result of localized depletion – and may result in higher costs if vessels fish more intensely to make up those revenues. (E-)

In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations (E+)

Alternative 7: Prohibit bottom trawling in "hotspot" areas.

This alternative is not expected to have any direct effect upon fixed gear fisheries. If gear conflicts exist in those areas defined as hotspots, then fixed gear fishers may see an indirect beneficial effect in those areas where gear conflicts are eliminated. (0)

Alternative 8: Limit fishing impacts in areas of interest

The closure of areas to fixed gear would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort – as a result of localized depletion – and may result in higher costs if vessels fish more intensely to make up those revenues. (E-)

In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations (E+)

Alternative 9: Zoning Alternative

In the short run, this alternative would act in a manner similar to status quo for fixed gear fishers. In the long run, the impact of this alternative on the fixed gear sector is unknown since this alternative relies on future research to determine whether fishing with fixed gear is permissible in various areas. (U)

Alternative 10: Establish impact-reducing fishing gear requirements

The impact of this alternative upon fixed gear vessels is largely conditional upon the option, or set of options, considered. Limiting groundline to 3 nautical miles is intended to act in a manner similar to status quo. Habitat friendly anchoring systems may require some fixed gear vessels to incur some additional cost if they are required to purchase new anchors. The prohibition of stick gear and weights with hooks on the bottom may displace some revenues and effort. The prohibition of dingle bar gear may displace some revenues and would also make it difficult to re-establish the directed lingcod fishery when the lingcod stock is fully rebuilt. (C)

Alternative 11: Designate a no-trawl zone on the central California coast.

This alternative is not expected to have a direct effect upon fixed gear fishers in the area, however this alternative may have indirect benefits by eliminating gear conflicts between fixed gear and trawl fishers that have occurred – and may continue to occur – in the proposed closed area. (0)

Alternative 12: Allow fish to be harvested by any legal gear without regard to gear endorsement

This alternative is likely to have a beneficial economic impact to some fixed gear vessels since vessels that have traditionally used fixed gear would now be able to switch gears and target shelf flatfish with trawl gear for example, while retaining their sablefish allocation. (E+)

Alternative 13: Oceana Alternative

4.3.3.6 Effects of the Research and Monitoring Alternatives on West Coast Fixed Gear Fisheries

The research and monitoring alternatives 2 through 4 are expected to have some undesirable effects upon fixed gear fishers since some vessels currently do not participate in the logbook program or carry vessel monitoring systems. A system of research closures may have a negative effect upon fixed gear vessels since these research closures may overlap with areas that are desirable for fishing from the standpoint of those vessels.

In the longer term, the improved knowledge base that would result from research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are difficult or impossible to factor in to management may more easily be addressed with additional research and information (E+).

4.3.4 Effects of the Alternatives on West Coast Recreational Fisheries

4.3.4.1 Summary of Past and Present Effects on West Coast Recreational Fisheries

Recreational fisheries targeting groundfish have generally been expanding with the exception of the most recent years. More recent years have resulted in some contraction and restrictions on recreational fishing in the form of reduced bag limits, length restrictions on the size of retained fish, shorter seasons, and closed areas. These restrictions have been due to concerns over the take of rebuilding species and the take of species with state specific management targets (such as black rockfish). It is unknown how habitat impacts have effected, or are effecting, production of fishery resources and thereby limited available harvest (E-/U).

4.3.4.2 Summary of Reasonably Foreseeable Effects on West Coast Recreational Fisheries

Restrictions on the recreational fishery due to rebuilding species concerns are expected to continue. Catch sharing agreements between states are also expected to continue, and both of these concerns means that it is likely restrictions and current tools used to manage recreational groundfish fisheries will continue. Further, as the Council refines its approach to EFH conservation, habitat protection may have long-term positive effects on groundfish fisheries through the potential for healthier habitats to lead to an increase in groundfish production. At present, the science is not there to determine if, or to what extent, an increase in production is possible. The Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.3.4.3 Effects of the EFH Designation Alternatives on West Coast Recreational Fisheries

Designation of EFH in itself is not expected to have any effect on recreational fisheries. That is, designating an area as EFH does not create an effect upon recreational fisheries. It is the action associated with minimizing impacts to EFH that may have an effect upon those fisheries (0).

4.3.4.4 Effects of the HAPC Designation Alternatives on West Coast Recreational Fisheries

Designation of HAPC’s are not expected to have any effect on recreational fisheries. That is, designating an area as an HAPC does not create an effect upon recreational fisheries. It is the action associated with minimizing impacts to HAPC that may have an effect upon recreational fisheries (0).

4.3.4.5 Effects of the Impacts Minimization Alternatives on West Coast Recreational Fisheries

Most impact minimization alternatives are targeted toward commercial gear types, and therefore are not expected to have a direct effect upon recreational fisheries. The exceptions to this are impact minimization alternatives 3, 6, 8.2, and 9.2. These alternatives all tend to have the same influence in that they may eliminate recreational fishing from areas that have previously been a focus of the recreational fishing fleet.

Impacts that may affect nearshore fixed gear fisheries (alternatives 2, 3, 6, 7, 9) may have a beneficial indirect effect if those alternatives eliminate fixed gear effort in areas that are fished by recreational fishers. Alternatives that may affect trawl fisheries are not expected to indirectly affect recreational fisheries as trawl effort and recreational effort tend not to overlap. It is unknown how habitat impacts have effected, or are effecting, production of fishery resources and thereby limited available harvest.

4.3.4.6 Effects of the Research and Monitoring Alternatives on West Coast Recreational Fisheries

The research and monitoring alternatives 2 through 4 are expected to have some short term undesirable effects upon recreational fishers since charter vessels currently are not required to participate in the logbook program or carry vessel monitoring systems. A system of research closures may have a negative effect upon recreational fishers since these research closures may overlap with areas that are desirable for fishing from the standpoint of recreational fishers.

In the longer term, the improved knowledge base that would result from research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are difficult or impossible to factor in to management may more easily be addressed with additional research and information (E+).

4.3.5 Effects of the Alternatives on Tribal Fisheries

Analyses Pending.

4.3.6 Effects of the Alternatives on "Other" Fisheries

4.3.6.1 Summary of Past and Present Effects on "Other" Fisheries

Groundfish fisheries and fisheries that contact the ocean bottom other than those covered in the trawl, fixed gear, recreational, and tribal sectors may include gear types such as set gillnet, diving, or dredge. Dredge gear is typically used to harvest species such as scallops. Set gillnet gear has historically been used to target groundfish, though recent restrictions have all but eliminated this fishery. Dive gear is used to harvest species such as abalone, geoduck, and sea urchin. In general, dive fisheries have grown along the Pacific coast as the demand for species such as sea urchins have grown. It is unknown how habitat impacts have affected, or are affecting, production of fishery resources and thereby limited available harvest (U).

4.3.6.2 Summary of Reasonably Foreseeable Effects on "Other" Fisheries

The future trend of other fisheries of interest to groundfish EFH is largely conditional upon the particular fishery and future management related to that fishery. The sea urchin fishery has been the topic of recent discussions on limiting harvest to insure that harvest levels are at sustainable levels. The abalone fishery has recently been subject to poaching concerns, and in September of 2003, the CDFG arrested several individuals suspected of poaching red abalone along the northern California coast. Whether poaching will continue to be a concern is unknown. In recent years the Washington geoduck TAC has been growing as new geoduck beds are discovered. It is expected that this trend of increasing TAC may reverse as decreases in biomass from fishing outpace discovery of new beds and increased fishing areas from health classification upgrades (Sizemore, 2004). Further, as the Council refines its approach to EFH conservation, habitat protection may have long-term positive effects on groundfish fisheries through the potential for healthier habitats to lead to an increase in groundfish production. At present, the science is not there to determine if, or to what extent, an increase in production is possible. The Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.3.6.3 Effects of the EFH Designation Alternatives on “Other” Fisheries

Designation of EFH in itself is not expected to have any effect on other fisheries. That is, designating an area as EFH does not create an effect upon other fisheries. It is the action associated with minimizing impacts to EFH that may have an effect upon those fisheries (0).

4.3.6.4 Effects of the HAPC Designation Alternatives on “Other” Fisheries

Designation of HAPC’s are not expected to have any effect on other fisheries. That is, designating an area as an HAPC does not create an effect upon other fisheries. It is the action associated with minimizing impacts to HAPC that may have an effect upon other fisheries (0).

4.3.6.5 Effects of the Impacts Minimization Alternatives on “Other” Fisheries

The impact minimization alternatives are largely targeted toward fixed gear and trawl gear types with the exception of alternatives 3, 6, 8.2, 9, and 10.7, 10.9, and 10.11. These alternatives will either exclude these other gears from various areas or eliminate certain gears from being used. Eliminating the use of these gears in certain areas or eliminating them entirely will displace revenues from those gear types, and those displaced revenues may either move to other areas, or into other gear types or sectors. In the long term, habitat protection may have beneficial impacts due to higher stock productivity, though the level of increased productivity is unknown due to scientific limitations.

4.3.6.6 Effects of the Research and Monitoring Alternatives on “Other” Fisheries

In the short-term, the research and monitoring alternatives may have an undesirable effect on other fisheries since not all vessels are required to participate in the logbook program or carry vessel monitoring systems. A system of research closures may have a short-term undesirable effect on other fisheries since research closures may displace revenues being generated from vessels participating in other fisheries.

In the longer term, the improved knowledge base that would result from research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are difficult or impossible to factor in to management may more easily be addressed with additional research and information (E+).

4.4 Consequences of the Alternatives on Buyers and Processors

4.4.1 Summary of Past and Present Effects on Buyers and Processors

Buyers and processors of Pacific coast groundfish have been consolidating in recent years. This consolidation has been in large part due to reductions in the quantity of landed catch of valuable species – such as rockfish – due to sustainability and rebuilding species constraints on the Pacific coast groundfish fishery. Some processors have diversified and expanded into other fisheries such as the sardine fishery which has been expanding in recent years, however these other fisheries are not managed to provide buyers and processors with a year round supply, as is the case with groundfish. . It is unknown how habitat impacts have affected, or are affecting, production of fishery resources and thereby limited available harvest (U).

4.4.2 Summary of Reasonably Foreseeable Effects on Buyers and Processors

Buyers and processors of groundfish are largely affected by the quantity and type of groundfish being landed, and the distribution of that quantity throughout the year. In the foreseeable future, landings of shelf flatfish are expected to increase as a result of new trawl technology, thus making the future more positive for buyers and processors of Pacific coast groundfish. Further, as the Council refines its approach to EFH conservation, habitat protection may have long-term positive effects on groundfish fisheries through the potential for healthier habitats to lead to an increase in groundfish production. At present, the science is not there to determine if, or to what extent, an increase in production is possible. The Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.4.3 Effects of the Alternatives on Buyers and Processors

Alternatives which disrupt product quantity, change the mix of species being landed, or the flow of groundfish being landed throughout the year are likely to affect buyers and processors. The designation of HAPC or EFH areas does not constitute an action that will affect any of the above factors, and therefore, will not affect buyers or processors of Pacific groundfish. In large part, the impact minimization alternatives are not expected to affect the total quantity of groundfish being landed, though alternative 2.2 and 2.3 are likely to affect processors and buyers purchasing fixed gear caught shelf species since large portions of the shelf would be closed to fixed gear fishing under this alternative. Alternative 11 would affect buyers purchasing trawl caught groundfish in the Monterey bay area unless those buyers are compensated through the buyback as well. Other alternatives are not expected to have any effect on buyers and processors, or the effect is unknown.

4.5 Consequences of the Alternatives on Fishing Communities

4.5.1 Summary of Past and Present Effects on Fishing Communities

Communities along the Pacific coast that have historically been involved in West coast groundfish activities have generally been increasing in size and economic diversity. That portion of those communities that have remained engaged in fishing have – in recent years – been the subject of processing industry consolidation, fishing fleet consolidation, and a decline in the demand for fisheries related services such as net manufacture and vessel construction. Non-groundfish fisheries such as sardines and Dungeness crab have augmented some of the losses attributed to declines in groundfish industry revenues, though consolidation has occurred nevertheless. The recent trawl vessel buyback had a negative effect on some communities that have historically participated in the west coast trawl fishery as some of those communities lost the majority of their trawl fleet. Some vessels have been returning to those ports as vessel and permit ownership is redistributed due to permit transfers and vessel sales. (E-/U)

4.5.2 Summary of Reasonably Foreseeable Effects on Fishing Communities

Communities along the Pacific coast are expected to continue growing and expanding their economic base. This should reduce the reliance those communities have on fishing. The portion of communities engaged in fishing will likely remain tied to the profitability and size of the fishing fleet, the quantity of fish being landed, and the profitability and number of shoreside processors. Further, the Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.5.3 Effects of the Alternatives on Fishing Communities

In general, alternatives are expected to have little to no impact on coastal communities unless revenues generated by fishers residing in those communities change, processing of catch within those communities is altered, or fishing effort in waters adjacent to those communities changes substantially. EFH Designation alternatives are not expected to effect communities (0). HAPC Designation alternatives may negatively affect communities in the short term if commerce is inhibited through the consultation process (E-). However, in the long-term, HAPC Designation and consultation may result in local benefits to habitat and by extension improved community life (E+).

The impacts to fishing communities are a balance between the extent to which short-term revenue generated by fishers is altered with the long-term potential for an alternative to improve fishery conditions and enhance revenue.

In general, alternatives are expected to have little to no impact on coastal communities unless revenues generated by fishers residing in those communities change, processing of catch within those communities is altered, or fishing effort in waters adjacent to those communities changes substantially., alternative 11 is likely to have a negative effect on communities adjacent to the no-trawl zone since the trawl sector is likely to be eliminated and landings to those communities are likely to decrease (E-). The elimination of the trawl sector in those areas would tend to reduce the demand for vessel services, reduce the need for processing capacity and labor necessary to process that catch, and reduce the number of crewmembers and skippers employed in the fishing industry. Assuming alternative 12 has positive effects on vessel revenues, those revenues would tend to have positive effects on communities as that additional revenue is circulated through the local economy (E+). Other alternatives are expected to have no effect on communities, or the effect upon communities is unknown (O/U).

4.6 Consumers

4.6.1 Summary of Past and Present Effects on Consumers

Consumers have been consuming seafood products at an increasing rate on a global scale (FAO, 2004), and in 2003 the U.S. consumed record quantities of seafood (NOAA, 2004). West coast groundfish make up a small portion of seafood consumed at the global level, and groundfish caught along the west coast are easily substituted for – and by – groundfish caught in other parts of the world.

4.6.2 Summary of Reasonably Foreseeable Effects on Consumers

Based on past trends in seafood consumption, it is expected that consumers will continue consuming additional quantities of seafood in the future.

4.6.3 Summary of the Effects of the Alternatives on Consumers

The West coast groundfish fishery makes up a small component of global seafood production, and there are many substitutes for groundfish species caught along the Pacific coast. Based on these two notions, it is unlikely that any alternative will have an impact upon seafood consumers.

4.7 Consequences of the Alternatives on Safety

4.7.1 Summary of Past and Present Effects of the Alternatives on Safety

Fishing has historically been one of the most hazardous occupations in the U.S. Requirements that vessels carry safety equipment and perform safety drills have reduced the number of incidents related to fishing activity. However, in an environment with declining revenues, some vessels may find it difficult to afford general maintenance and maintenance of safety equipment and this equipment may fall into a state of neglect where it no longer serves its purpose. It is plausible that some vessels involved in west coast groundfish commercial fishing activities – particularly those sectors hardest hit by rebuilding species restrictions – have allowed their safety equipment and vessels to degrade in recent years.

4.7.2 Summary of Reasonably Foreseeable Effects on Safety

Improvements in safety equipment and reductions in fishing related accidents are expected to continue to occur. Revenues for the groundfish trawl fishery – a sector hit hard by rebuilding species restrictions – are expected to increase relative to past years as a result of the vessel buyback and higher cumulative limits because of the selective flatfish trawl, and these higher revenues should decrease the likelihood that some trawl vessel operators and/or owners will neglect vessel and safety equipment.

4.7.3 Consequences of the Alternatives on Safety

The alternatives analyzed in this section should have little to no effect upon safety. The one exception may be the options in alternative 2 that restrict groundfish footrope. A restriction that eliminates the use of large footrope gear in areas that have relatively soft sediment (deep shelf and slope) may create some safety hazards if the small footrope trawl digs into the sediment. This may cause a tow rope to break, placing uneven pressure on the vessel which may cause that vessel to capsize.

4.8 Consequences of the Alternatives on Management and Enforcement

4.8.1 Summary of Past and Present Effects on Management and Enforcement

Management has been increasing in complexity in large response to rebuilding species concerns. Management complexity has included such things as cumulative limits that have become increasingly species-specific and RCA’s whose boundaries are dynamic and may change across time periods. Other management and enforcement tools have included the recent requirement that many vessels carry a vessel monitoring system (VMS) for the purposes of tracking and verifying that vessels do not violate the RCA boundaries while fishing. The increase in management complexity has placed an increase in the demand for resources necessary for enforcement of these regulations.

4.8.2 Summary of Reasonably Foreseeable Effects on Management and Enforcement

In the short term, management of west coat groundfish is not expected to simplify, and therefore, the burdens placed on management and enforcement is not expected to diminish. In the longer term, an individual quota system – which is part of the council's preferred alternative for managing bycatch – has the potential to alleviate some of the burden placed on management and enforcement, though whether this ultimately becomes the case or not is largely dependent upon the design of that system.

4.8.3 Consequences of the Alternatives on Management and Enforcement

In general, any alternative that requires consulting on the part of management or that adds an additional layer of complexity is likely to have an undesirable effect upon management and enforcement. In general, all EFH and HAPC designation alternatives – except for status quo – in this document are likely to require additional consulting on the part of various agencies, and are therefore likely to have an undesirable effect. Research and impact minimization alternatives are all likely to add an additional layer of complexity to the system with the exception of the status quo alternatives, and alternative 12, which has the potential to eliminate some complexity. Alternative 12 could eliminate some complexity by eliminating the need of enforcement to verify the type of gear being used, though it may increase the difficulty managers have in predicting the amount of catch occurring in the groundfish fishery, and therefore may make it difficult to establish effective cumulative limits and RCA boundaries.

4.9 Non-Fishing Activities

4.9.1 Summary of Past and Present Effects on Non-Fishing Activities

Insufficient data and information is available about the numerous non-fishing activities discussed in Appendix ____ to adequately assess past and present trends in those industries.

4.9.2 Summary of Reasonably Foreseeable Effects on Non-Fishing Activities

Insufficient data and information is available about the numerous non-fishing activities discussed in Appendix ____ to adequately assess reasonably foreseeable trends in those industries.

4.9.3 Consequences of the EFH Designation Alternatives on Non-Fishing Activities

Designation of EFH in itself is not expected to have any direct effect on non-fishing activities. Designating an area as EFH does not necessarily create an effect upon non-fishing activities. It is the action associated with consultations regarding EFH designations that may have an effect upon non-fishing activities. If the non-fishing entity participates in consultations with NMFS, then they will suffer negative effects associated with time and effort expanded in consultation. Costs associated with consultations will likely vary depending on how many species under EFH and the extent of habitat designated as EFH. If the non-fishing entity chooses not to participate in consultations, then the EFH designation will ultimately have no effect on that entity. If consultations result in mitigation measures, then the effects are likely to be negative in the short-term and either negative or positive in the long-term depending on the entities use of the marine environment in that they may benefit from enhanced habitat productivity resulting from EFH designation.

4.9.4 Consequences of the HAPC Designation Alternatives on Non-Fishing Activities

Designation of HAPC in itself is not expected to have any direct effect on non-fishing activities. Designating an area as HAPC does not necessarily create an effect upon non-fishing activities. It is the action associated with consultations regarding HAPC designations that may have an effect upon non-fishing activities. If the non-fishing entity participates in consultations with federal agencies, then they will suffer negative effects associated with time and effort expanded in consultation. Costs associated with consultations will likely vary depending on how many species under HAPC and the extent of habitat designated as HAPC. If the non-fishing entity chooses not to participate in consultations, then the HAPC designation will ultimately have no effect on that entity. If consultations result in mitigation measures, then the effects are likely to be negative in the short-term and either negative or positive in the long-term depending on the entities use of the marine environment in that they may benefit from enhanced habitat productivity resulting from HAPC designation.

4.9.5 Consequences of the Impacts Minimization Alternatives on Non-Fishing Activities

It is not known what effect impact minimization requirements placed on commercial fishing operations will have on non-fishing activities in the short-term. In the long-term, benefits associated with a decrease in damage to habitat may create a positive effects for certain non-fishing entities that benefit from enhanced habitat productivity.

4.9.6 Consequences of the Research and Monitoring on Non-Fishing Activities

It is not known what effect research and monitoring options will have on non-fishing activities in the short-term. In the long-term, benefits associated with a better fisheries management as a result of improved collection of scientific data may create a positive effect for certain non-fishing entities.

4.10 Consequences of the Alternatives on Non-Fishing Values

4.10.1 Summary of Past and Present Effects on Non-Fishing Values

Damage to habitat decreases welfare to those who value marine resources. Although the number of individuals valuing marine resources and the magnitude of change in that value is unknown, in general, it is likely that there has been a decrease in non-fishing values in the past. Insufficient data and information is available to adequately assess past and present trends in non-fishing values. Theoretically, increasing (decreasing) scarcity of marine resources is associated with a decrease (increase) in passive use value (existence value, bequest value, etc). An increasing (decreasing) scarcity of marine resources is also likely associated with a decrease (increase) in value to non-consumptive resource users (those participating in wildlife viewing activities).

4.10.2 External and Non-Fishing Factors

It is not known how external and non-fishing factors affect non-fishing values due to a lack of information and data specific to the Pacific marine environment. If the external and non-fishing factors have a negative (positive) effect on the marine environment, then they will have an overall negative (positive) effect on passive use values and an overall negative (positive) effect on non-consumptive resource usage.

4.10.3 Summary of Reasonably Foreseeable Effects on Non-Fishing Values

Insufficient data and information is available to adequately assess the reasonably foreseeable future trends in non-fishing values. However, in general, increasing (decreasing) scarcity of marine resources is theoretically associated with a decrease (increase) in passive use value (existence value, bequest value, etc). An increasing (decreasing) scarcity of marine resources is also likely associated with a decrease (increase) in value to non-consumptive resource users (those participating in wildlife viewing activities). As noted in the Affected Environment section, although overall effects may be positive and increasing, for example, theoretically, the incremental effects will increase at a decreasing rate. Further, the Council and NMFS are however required to utilize new information as it becomes available to protect habitat in practicable manner. Because of ongoing research that may answer these questions, and the requirement to consider practicability in designing EFH conservation strategies, the long-term outlook is positive (E+).

4.10.4 Effects of EFH Designation Alternatives on Non-Fishing Values

EFH designation options may have an unknown effect on short-term non-fishing values. Positive effects are anticipated if designations are perceived as leading to future action toward protection. In the short-term, non-consumptive use values may increase if the EFH designation in itself has an effect. That is, marine wildlife viewing operations may be able to attract more customers or charge a higher fee if an EFH designation is perceived by the consumer as an enhancement to the marine environment. It is likely that restaurant, hotels and other entities located in coastal communities will indirectly benefit from these options. In the short-term, passive use values may increase due to a possible increase in bequest value if people anticipate that the designations will ensure an improved marine environment for their future generations. In the long-run, EFH designations are anticipated to have an unknown effect on non-consumptive use and passive use values for the same reasons as those given above.

4.10.5 Effects of HAPC Designation Alternatives on Non-Fishing Values

In general, the HAPC designation alternatives are expected to have an unknown effect on short-term non-fishing values. Positive effects are anticipated if designations are perceived as leading to future action toward protection. In the short-term, non-consumptive use values may increase if the HAPC designation in itself has intrinsic value. That is, marine wildlife viewing operations may be able to attract more customers or charge a higher fee if an HAPC designation is perceived by the consumer as an enhancement to the marine environment. It is likely that restaurant, hotels and other entities located in coastal communities will indirectly benefit from these options. In the short-term, passive use values may increase due to a possible increase in bequest value if people anticipate that the designations will ensure an improved marine environment for their future generations. In the long-run, HAPC designations are anticipated to have an unknown effect on non-consumptive use and passive use values for the same reasons as those given above.

4.10.6 Effects of Impacts Minimization Alternatives on Non-Fishing Values

Impact minimization requirements placed on commercial fishing operations are anticipated to have an unknown effect on non-fishing values in the short-term. Positive effects are anticipated if impact minimization options are perceived as permanent, beneficial management actions that will improve habitat productivity. These positive effects will likely result from an increase in bequest value.

In the long-term, benefits associated with a decrease in damage to habitat are expected to have an unknown overall effect on non-fishing value. A positive value may result due to enhanced habitat productivity. For example, if impact minimization options lead to increased habitat productivity, dive trip operators will likely benefit due to their ability to provide for an enhanced experience. Passive use values are also expected to increase due to a potential increase in biodiversity, existence value and bequest value. However, an overall negative value may result if there is a large decrease in social and cultural value due to loss of certain gear groups or fishing industry in coastal communities.

4.10.7 Effects of Research and Monitoring Alternatives on Non-Fishing Values

In the short-term, the research and monitoring options are anticipated to have an unknown effect on non-fishing activities. In the long-term, benefits associated with a decrease in damage to habitat, resulting from better management enabled by enhanced biological data collection, may create a positive effect for non-consumptive use value and passive use values due to enhanced habitat productivity.

In the longer term, the improved knowledge base that would result from research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are difficult or impossible to factor in to management may more easily be addressed with additional research and information (E+).

Table 4-14: Summary of the Social and Economic Consequences of the EFH and HAPC Designation Alternatives

Direction of Alternative Impacts on the Socioeconomic Environment

Environmental Component	Past and Present	External and Non-Fishing Factors	Reasonably Foreseeable Future	EFH Designation								HAPC Designation								
				1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
Trawl Fisheries	Many trawl fisheries have been constrained by rebuilding species. Buyback will help many vessels increase revenues. Effects of habitat impacts unknown.	Unknown	Rebuilding species constraints are expected to continue. Shelf flatfish opportunities are expected to increase. Research may lead to practicable conservation strategies (E+)	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Fixed Gear Fisheries	Fixed gear revenues have increased due to tier and permit stacking. Rebuilding species constraints are expected to continue. Effects of habitat impacts unknown.	Unknown	Constraints due to rebuilding species are expected to continue. Research may lead to practicable conservation strategies (E+)	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Recreational Fisheries	Recreational fisheries have been expanding, but are constrained by rebuilding species. Effects of habitat impacts unknown.	Unknown	Recreational fisheries will continue to be constrained by rebuilding species. Future growth is unknown. Research may lead to practicable conservation strategies (E+)	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Tribal Fisheries	Tribal groundfish fisheries have been expanding. Effects of habitat impacts unknown.	Unknown	Tribal fisheries are expected to continue expanding. Research may lead to practicable conservation strategies (E+).	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Other Fisheries	Conditional. Some fisheries have been expanding, while some have been contracting due to rebuilding species concerns. Effects of habitat impacts unknown.	Unknown	Research may lead to practicable conservation strategies (E+)	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Consumers	Consumers have been consuming increasing amounts of seafood. Effects of habitat impacts unknown.	Unknown	Consumers are expected to continue consuming more seafood. Research may lead to practicable conservation strategies (E+)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Safety	Safety has been generally increasing	Unknown	The number of fishing related accidents are expected to continue decreasing. Research may lead to practicable conservation strategies (E+)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buyers and Processors	Groundfish buyers and processors have been consolidating in recent years	Unknown	The supply of groundfish to buyers and processors is expected to increase	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U	0/U
Communities	Many coastal communities are becoming less reliant on fishing-related activity. Effects of habitat impacts unknown.	Unknown	As coastal economies grow and diversify, their reliance on fishing will continue to decrease. Research may lead to practicable conservation strategies (E+)	0	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	0	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+	E-/E+

Management and Enforcement	The level of management and enforcement needed for recent management actions have been increasing in complexity	Unknown	The current level of management and enforcement is expected to continue	0	E-	E-	E-	E-	E-	E-	E-	0	E-	E-	E-	E-	E-	E-	E-	E-
Non-Fishing Activities	The trends in non-fishing activities are unknown.	NA	Research may lead to practicable conservation strategies (E+)	0	0/E-	0/E-	0/E-	0/E-	0/E-	0/E-	0/E-	0	0/E-	0/E-	0/E-	0/E-	0/E-	0/E-	0/E-	0/E-
Non-Fishing Values	The trend in non-fishing values has likely been negative.	Unknown	Research may lead to practicable conservation strategies (E+)	U	U/E+	U/E+	U/E+	U/E+	U/E+	U/E+	U/E+	U	U/E+	U/E+	U/E+	U/E+	U/E+	U/E+	U/E+	U/E+

Table 4-15: Summary of the Social and Economic Consequences of the Impacts Minimization and Research and Monitoring Alternatives.

Direction of Alternative Impacts on the Socioeconomic Environment (cont.)

Environmental Component	Past and Present	External and Non-Fishing Factors	Reasonably Foreseeable Future	Impact Minimization														Research and Monitoring			
				1	2	3	4a	4b	5	6	7	8	9	10	11	12	13	1	2	3	4
Trawl Fisheries	Many trawl fisheries have been constrained by rebuilding species. Buyback will help many vessels increase revenues. Effects of habitat impacts unknown.	Unknown	Rebuilding species constraints are expected to continue. Shelf flatfish opportunities are expected to increase. Research may lead to practicable conservation strategies (E+)	0/U	E-/U	E-/E+	0	E-	0	E-/E+	E-/E+	E-/E+	U	C	0	E+/E-		0	0/E+	E-/E+	E-/E+
Fixed Gear Fisheries	Fixed gear revenues have increased due to tier and permit stacking. Rebuilding species constraints are expected to continue. Effects of habitat impacts unknown.	Unknown	Constraints due to rebuilding species are expected to continue. Research may lead to practicable conservation strategies (E+)	0/U	E-	E-/E+	0	0	0	E-/E+	0	E-/E+	U	C	0	E+		0	E-/E+	E-/E+	E-/E+
Recreational Fisheries	Recreational fisheries have been expanding, but are constrained by rebuilding species. Effects of habitat impacts unknown.	Unknown	Recreational fisheries will continue to be constrained by rebuilding species. Future growth is unknown. Research may lead to practicable conservation strategies (E+)	0	0	0	0	0	0	E-	0	E-	U	C	0	0		0	E-/E+	E-/E+	E-/E+
Tribal Fisheries	Tribal groundfish fisheries have been expanding. Effects of habitat impacts unknown.	Unknown	Tribal fisheries are expected to continue expanding. Research may lead to practicable conservation strategies (E+)	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Other Fisheries	Conditional. Some fisheries have been expanding, while some have been contracting due to rebuilding species concerns. Effects of habitat impacts unknown.	Unknown	Rebuilding species will continue to be a constraint. Research may lead to practicable conservation strategies (E+)	0	0	E-	0	0	0	E-	0	E-	U	C	0	E+		0	E-/E+	E-/E+	E-/E+
Consumers	Consumers have been consuming increasing amounts of seafood	Unknown	Consumers are expected to continue consuming more seafood. Research may	0	0	0	0	0	0	0	0	0	U	0	0	E+	U	0	0/E+	0/E+	0/E+

			lead to practicable conservation strategies (E+)																		
Safety	Safety has been generally increasing	Unknown	The number of fishing related accidents are expected to continue decreasing. Research may lead to practicable conservation strategies (E+)	0	E-	0	0	0	0	0	0	0	U	0	0	0	U	0	0	0	0
Buyers and Processors	Groundfish buyers and processors have been consolidating in recent years	Unknown	The supply of groundfish to buyers and processors is expected to increase	0	E-	0	0	0	0	0	0	0	0	0	E-	0	0	0	0/E+	E-/E+	E-/E+
Communities	Many coastal communities are becoming less reliant on fishing-related activity	Unknown	As coastal economies grow and diversify, their reliance on fishing will continue to decrease. Research may lead to practicable conservation strategies (E+)	0	0	0	0	0	0	0	0	0	U	0	E-	E+	U	0	0/E+	0/E+	U/E+
Management and Enforcement	The level of management and enforcement needed for recent management actions have been increasing in complexity	Unknown	The current level of management and enforcement is expected to continue	0	U	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	E+	U	0	E-	E-	E-
Non-Fishing Activities	The trends in non-fishing activities are unknown.	NA	Unknown	0	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	U/E-	0	U/E-	U/E-	U/E-
Non-Fishing Values	The trend in non-fishing values has likely been negative.	Unknown	Unknown	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

4.11 Consequences of the Alternatives on Protected Species

Analyses Pending

4.12 Interplay Among the Alternatives

Table 4-16 Table 4-17 show where the EFH designation alternatives may limit the potential to implement the HAPC designation and Impacts Minimization Alterantives. HAPC must be a subset of EFH. Actions to minimize adverse impacts is limited to impacts on designated EFH.

Table 4-16: HAPC Alternatives That Would be Limited by EFH Designation Alternatives (no=the HAPC Alternative would not be limited; Yes=the HAPC Alternative Would be Limited).

	EFH 1	EFH 2	EFH 3	EFH 4	EFH 5	EFH 6	EFH 7	EFH 8
HAPC 1	No	No	No	No	No	No	No	No
HAPC 2 - Estuaries	No	No	No	No	No	No	No	No
HAPC 3 - Kelp	No	No	Yes	Yes	Yes	Yes	Yes	Yes
HAPC 4 - Seagrass	No	No	No	No	No	No	No	No
HAPC 5 - OF/PRC Core	No	No	No	No	No	No	No	No
HAPC 6 - Nshr Rocky	No	No	No	No	No	No	No	Yes
HAPC 7 - AOI	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HAPC 8 - Oil Rigs	No							

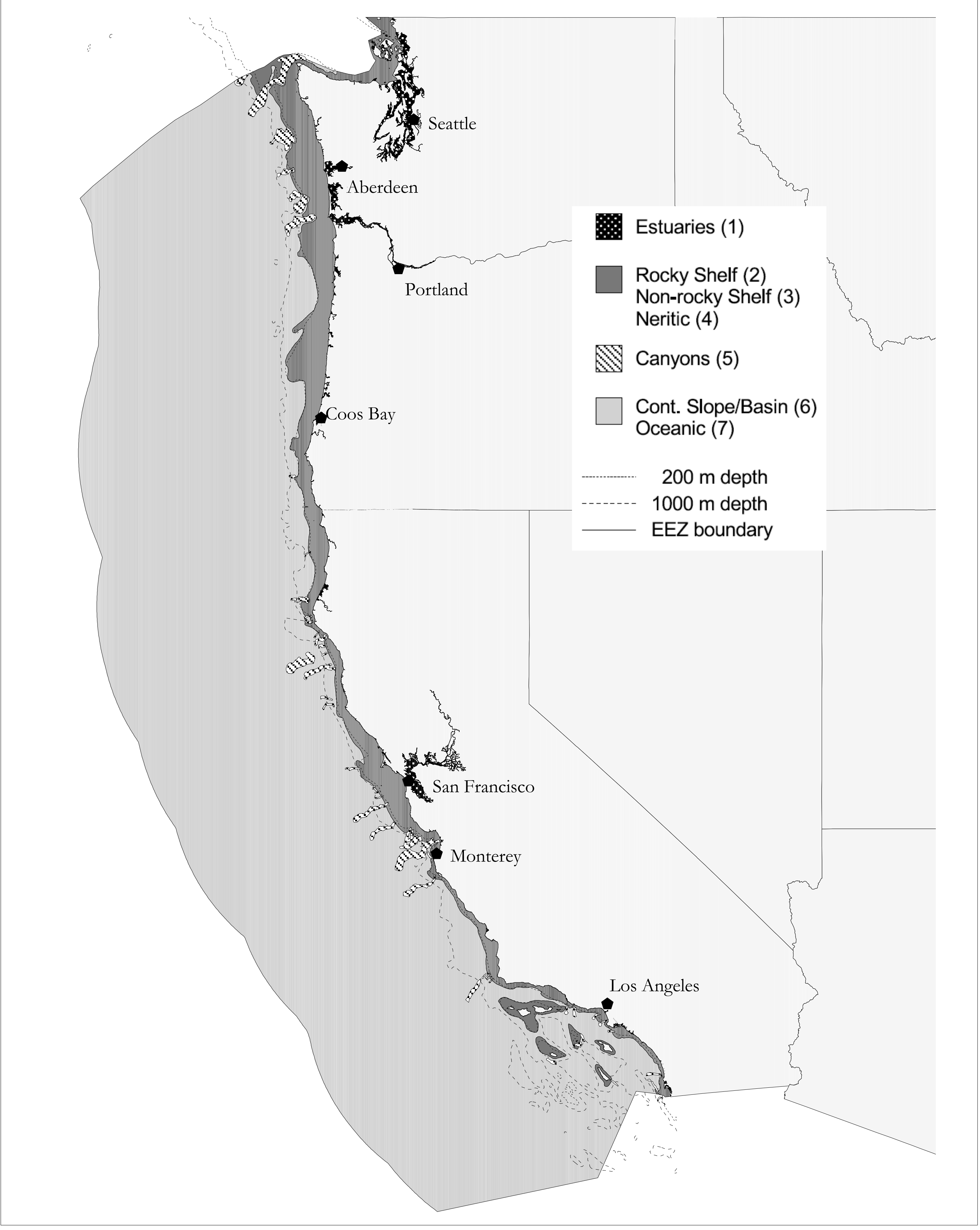
Table 4-17: Impacts Alternatives that would be Limited by EFH Alternatives (no=the HAPC Alternative would not be limited; Yes=the Alternative Would be Limited).

	EFH 1	EFH 2	EFH 3	EFH 4	EFH 5	EFH 6	EFH 7	EFH 8
Minimize Impacts Alt 1, Status Quo	No							
Minimize Impacts Alt 2, Option 1, trawl	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 2, Option 1, fixed	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 2, Option 2, trawl	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 2, Option 2, fixed	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 2, Option 3, trawl	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 2, Option 3, fixed	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 3, Option 1	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 3, Option 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 3, Option 3	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 3, Option 5		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 4, Option 1	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 4, Option 2	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

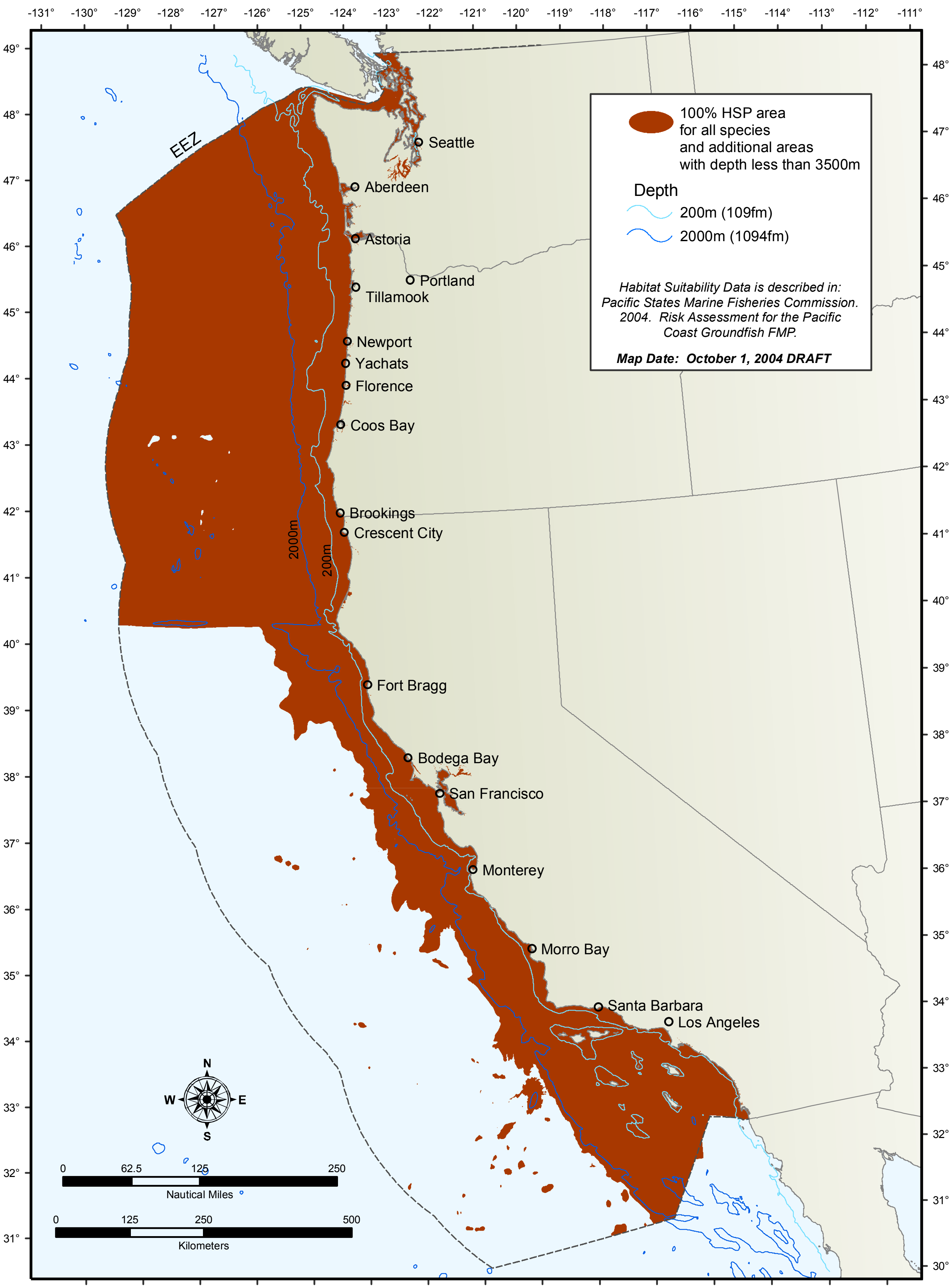
Minimize Impacts Alt 5	No							
Minimize Impacts Alt 6, Option 1	No							
Minimize Impacts Alt 6, Option 2	No							
Minimize Impacts Alt 7	No	No	No	No	No	No	No	No
Minimize Impacts Alt 8, Option 1 or 2	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 9, Option 1 or 2	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 10	No	No	No	No	No	No	No	No
Minimize Impacts Alt 11	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Minimize Impacts Alt 12	No	No	No	No	No	No	No	No

Supplemental Figures

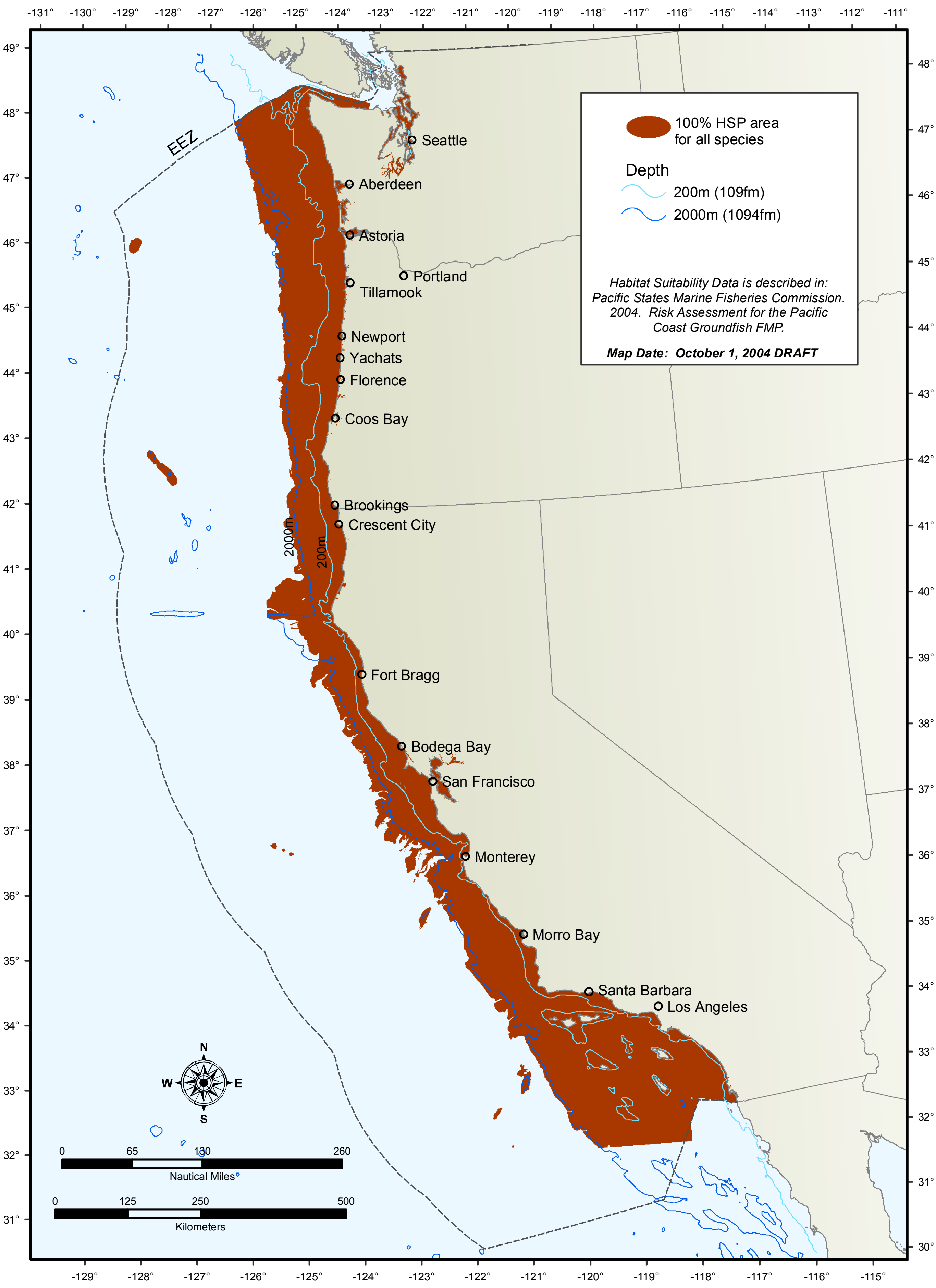
Output From the Comprehensive Risk Assessment



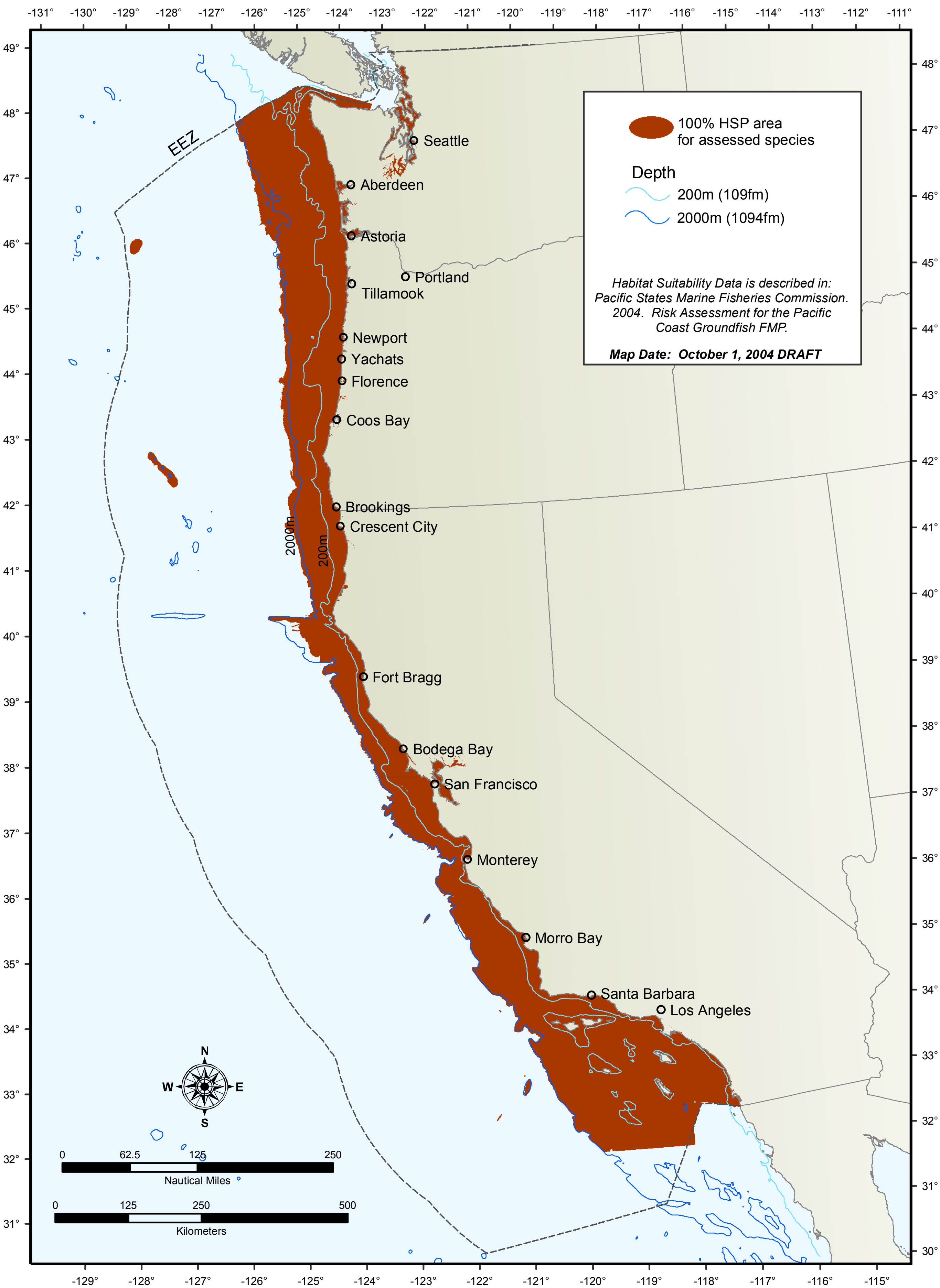
EFH Alternative 1 (Status Quo): Maintain current designation (i.e. whole EEZ), based on the following seven habitat composites: Estuarine; Rocky Shelf; Nonrocky Shelf; Canyon; Continental Slope/Basin; Neritic Zone; and , Oceanic Zone.



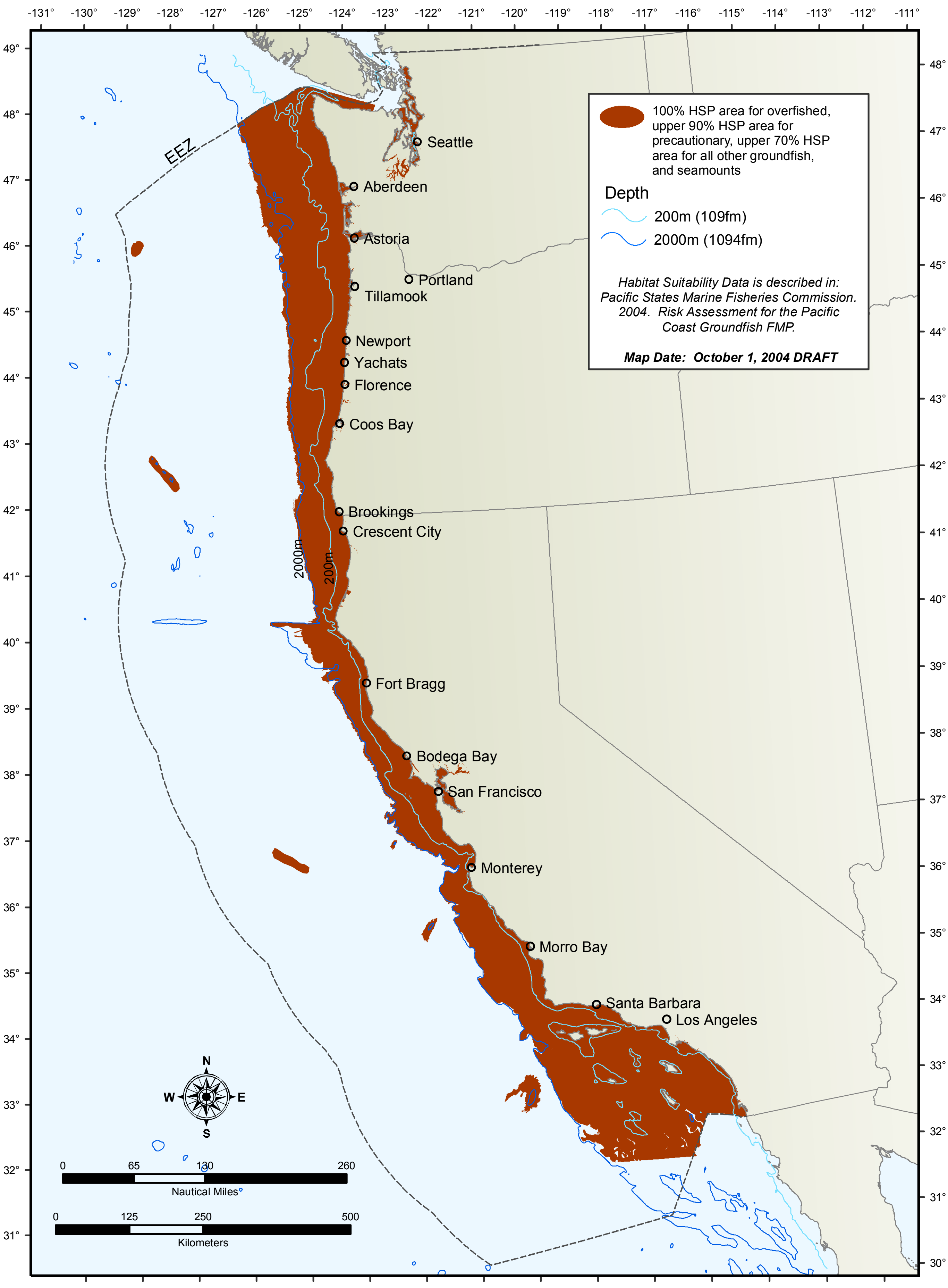
EFH Alternative 2: Designate 100% of the area where HSP is greater than zero for all species and any additional area in depths <= 3,500m(1900 fm)



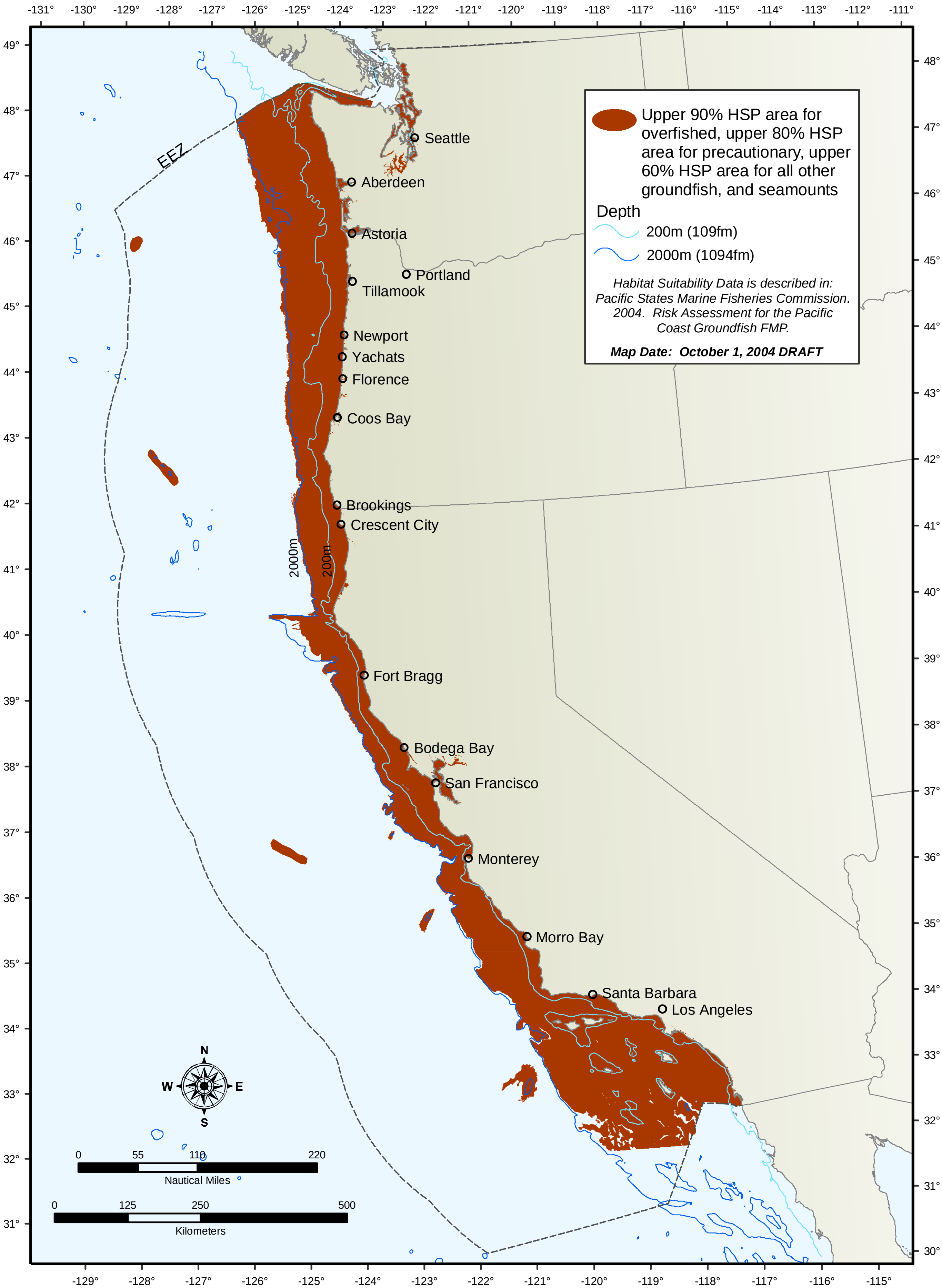
EFH Alternative 3: Designate 100% of the area where HSP is greater than zero for all species.



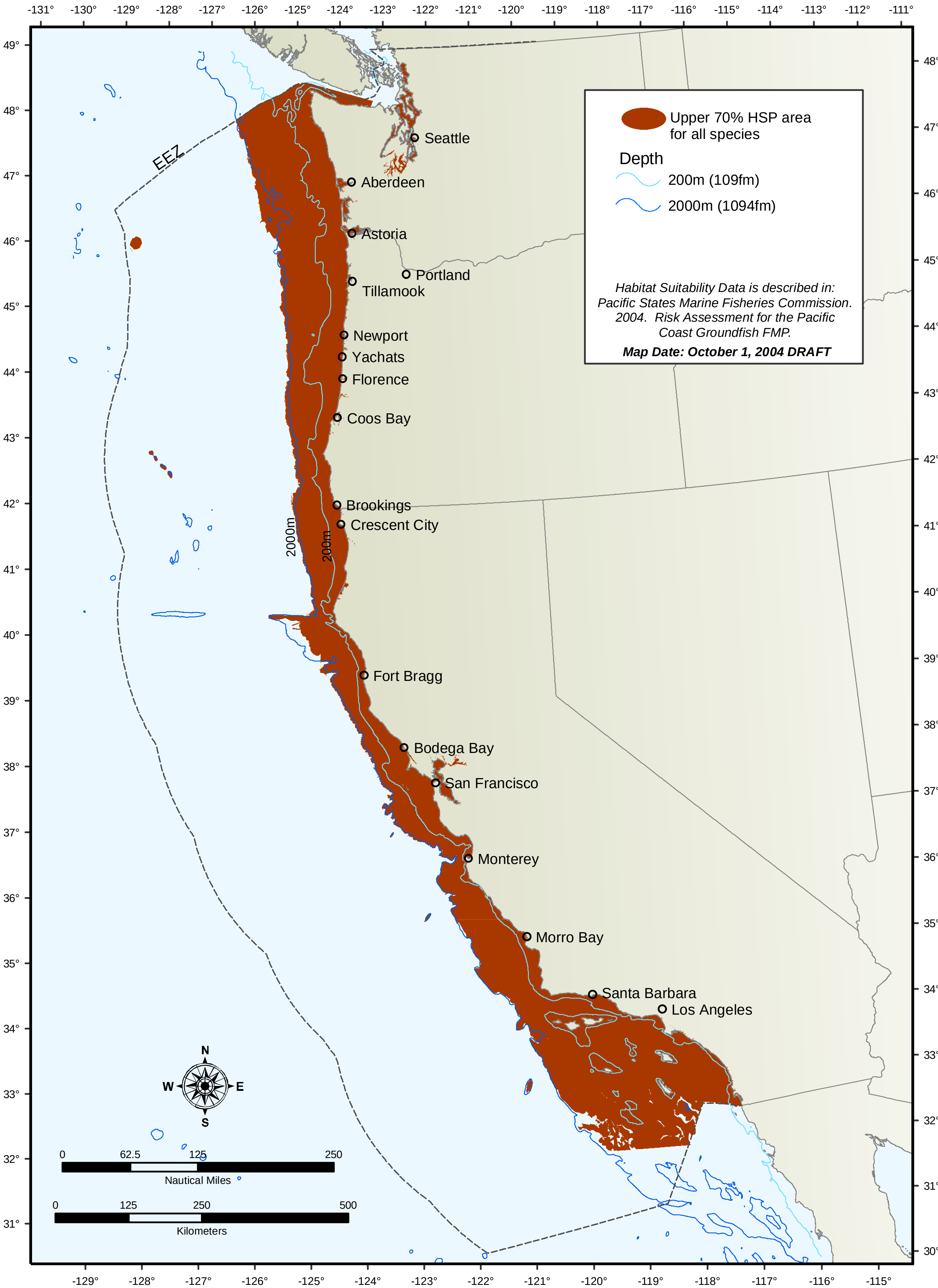
EFH Alternative 4: Designate 100% of the area where
HSP is greater than zero for assessed species only.



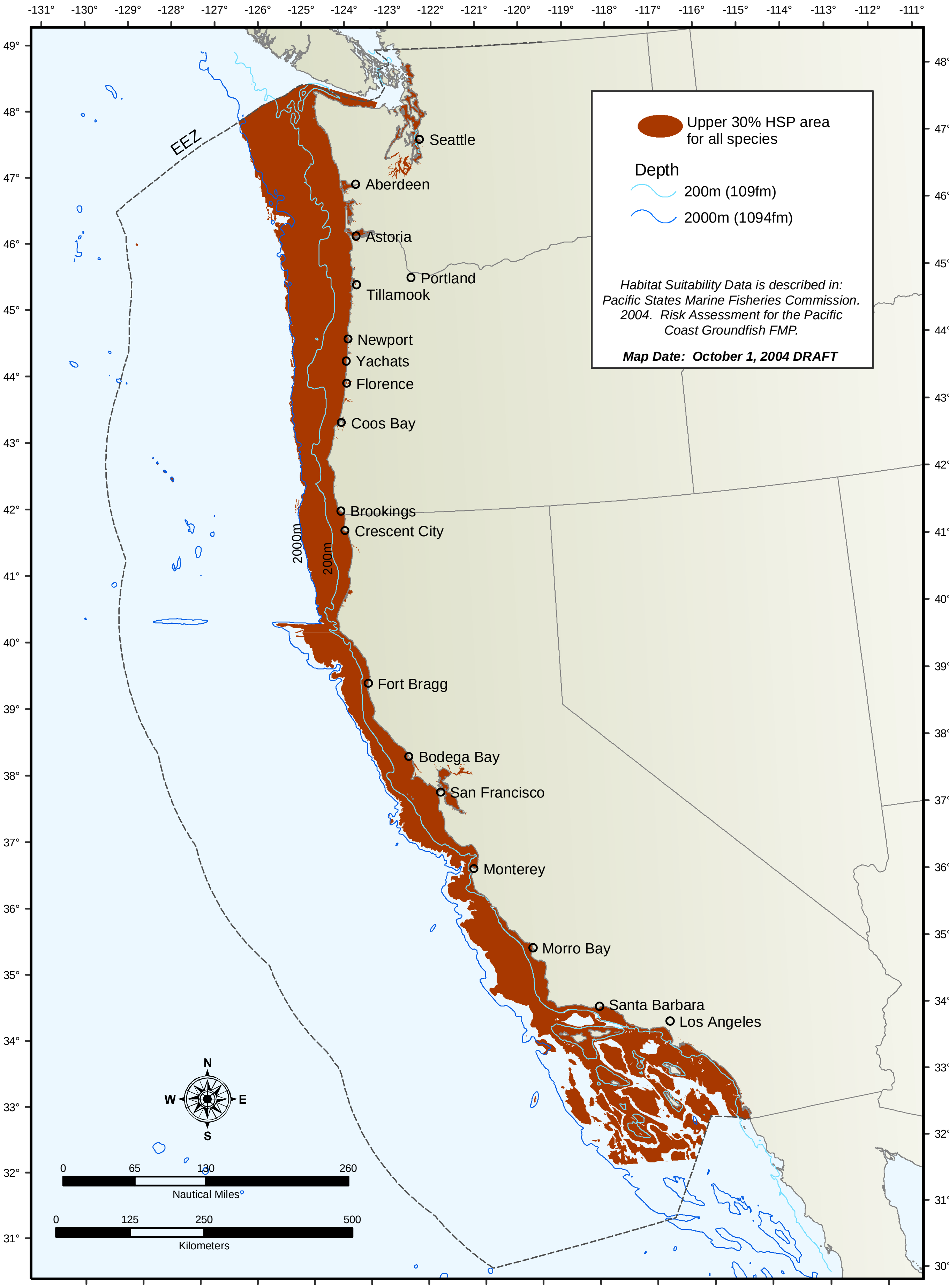
EFH Alternative 5: Designate 100% of the HSP area of overfished species, upper 90% of the HSP area for precautionary zone species, and upper 70% of the HSP area for all other groundfish, and all seamounts.



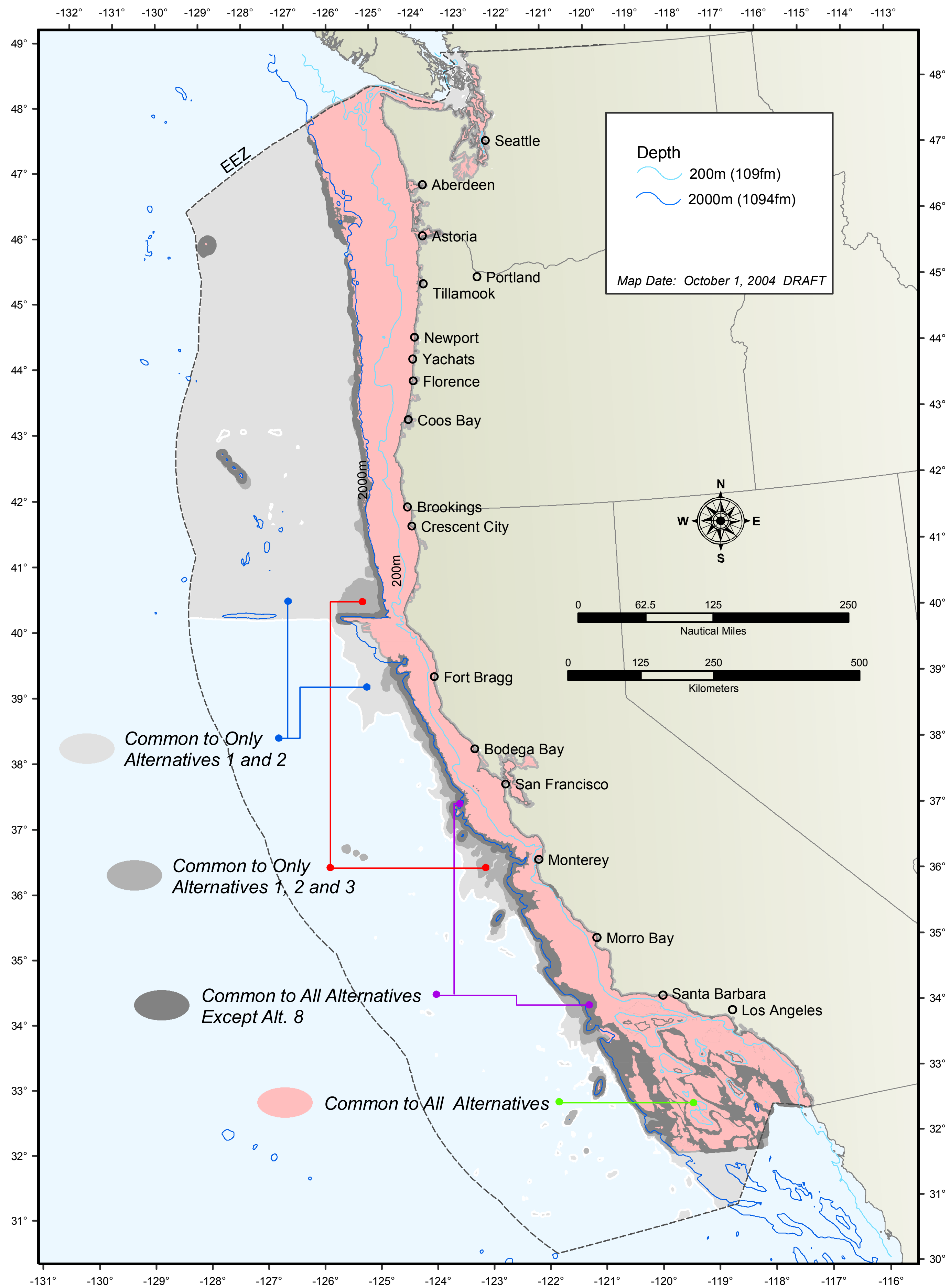
EFH Alternative 6: Designate upper 90% area of overfished species habitat suitability probability (HSP) greater than zero, 80% area greater than zero for precautionary zone species, and upper 60% of HSP area for all other groundfish, and all seamounts.



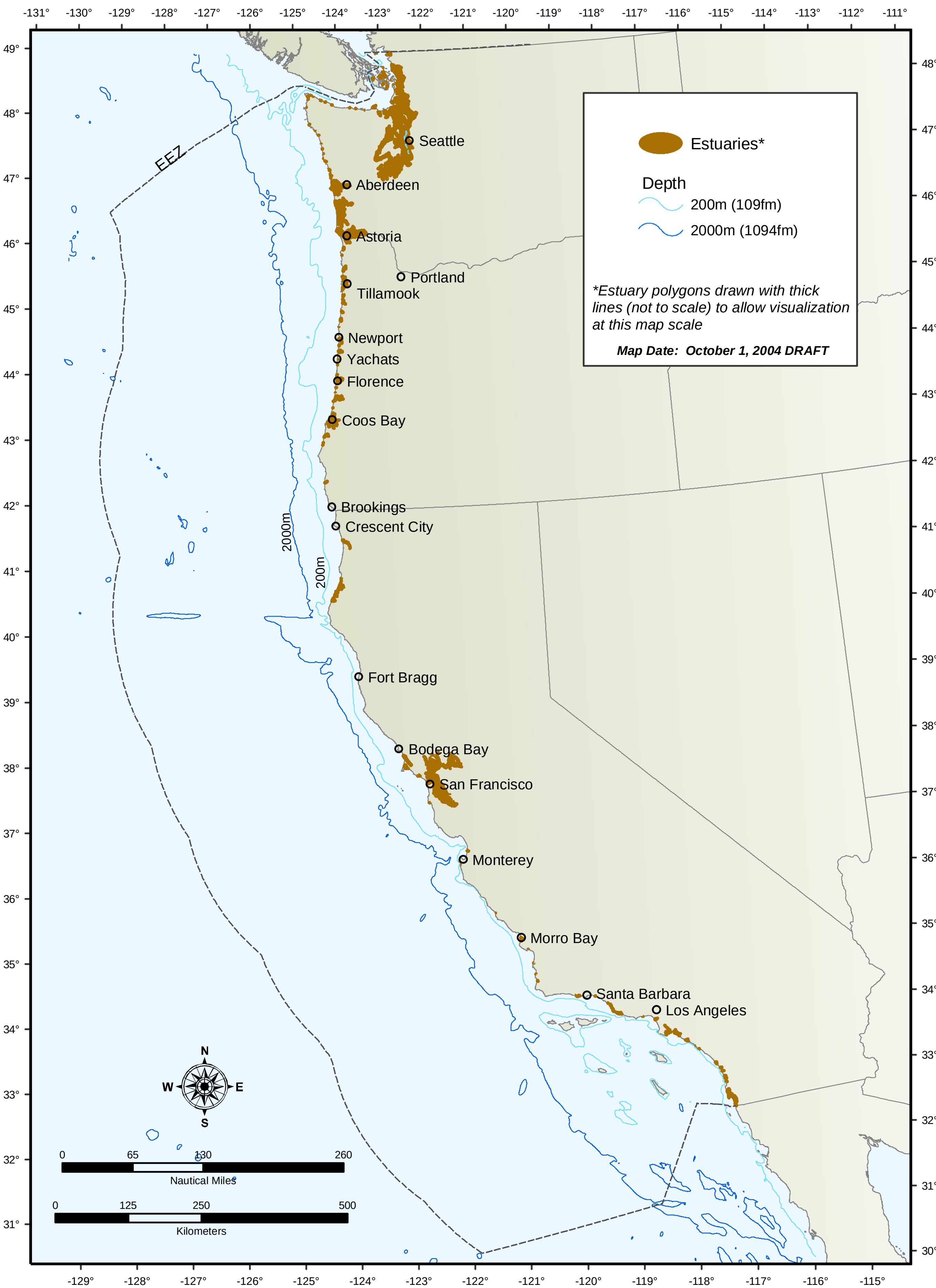
EFH Alternative 7: Designate upper 70% of the area where HSP is greater than zero.



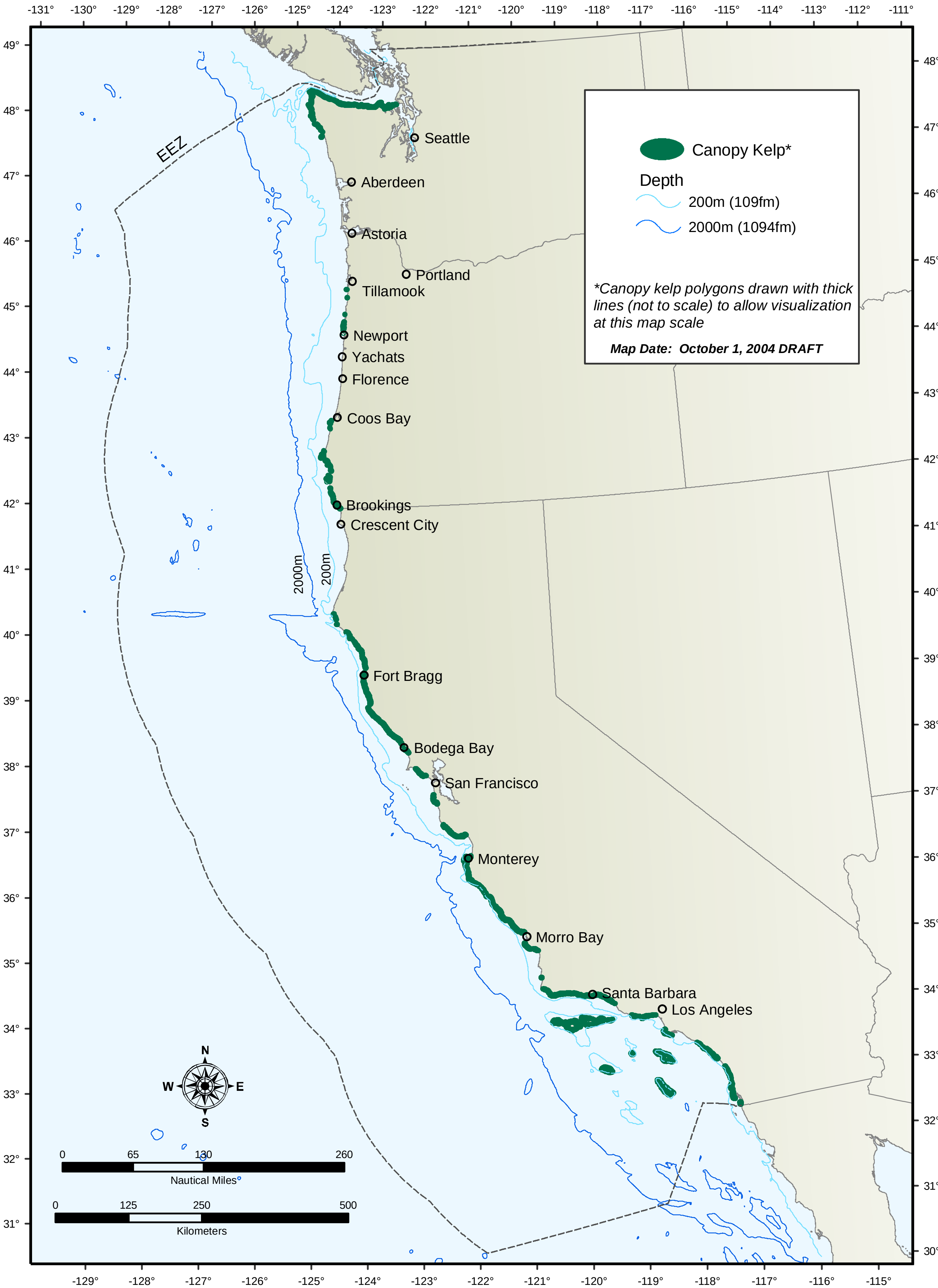
EFH Alternative 8: Designate upper 30% of the area where HSP is greater than zero for all species.



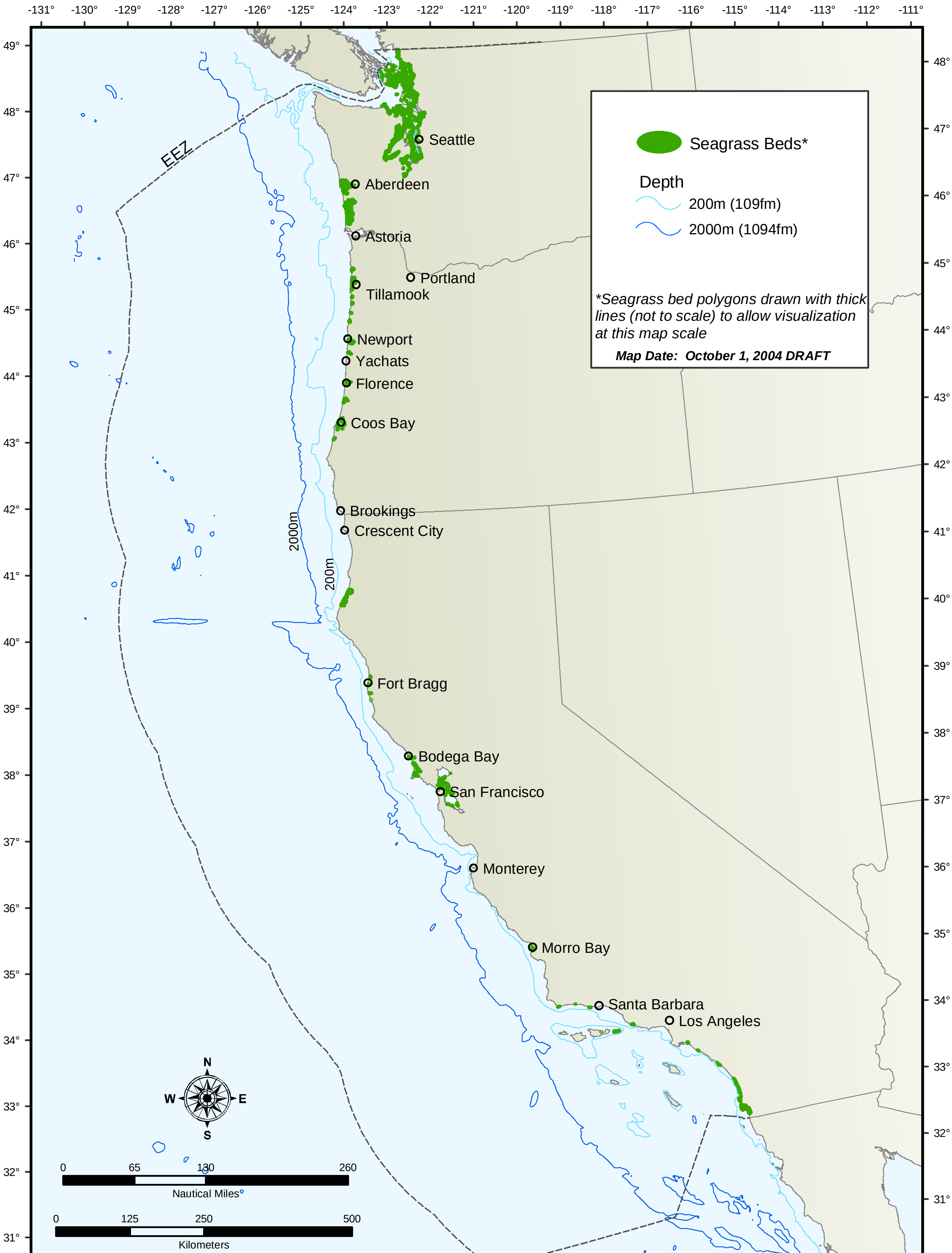
Spatial Comparison of All EFH Alternatives



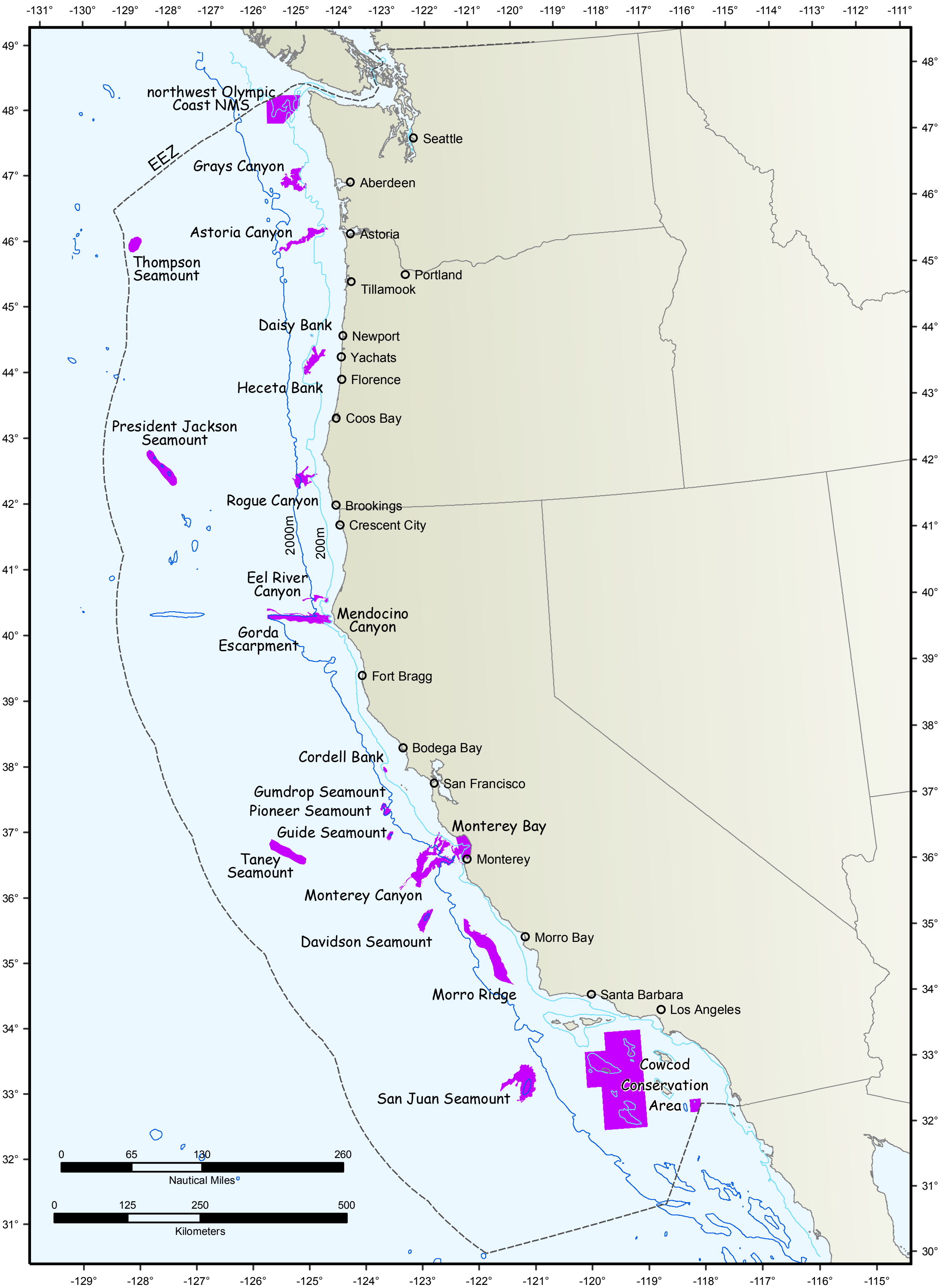
HAPC Alternative 2: Designate estuaries as HAPC.



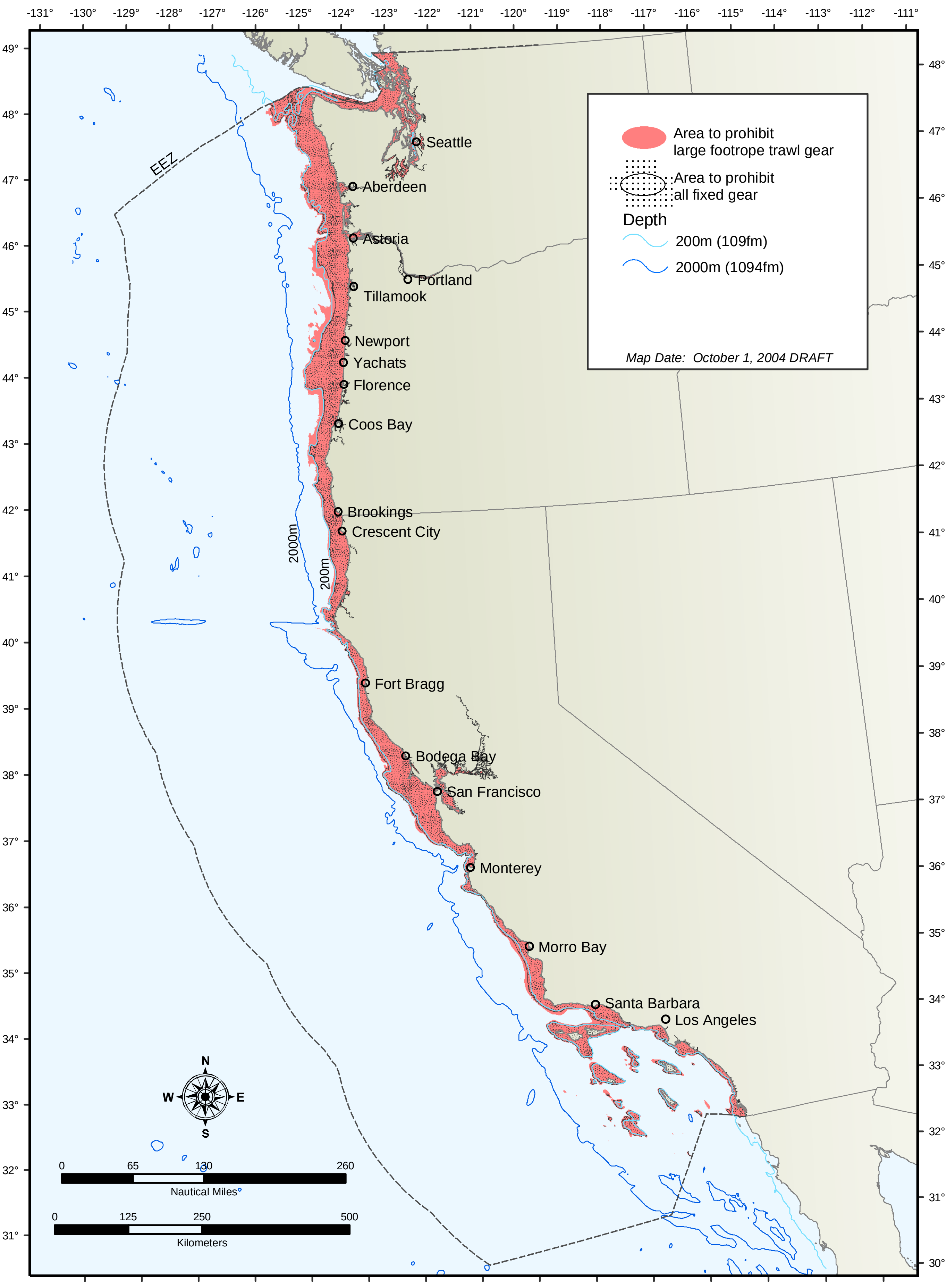
HAPC Alternative 3: Designate canopy kelp as HAPC.



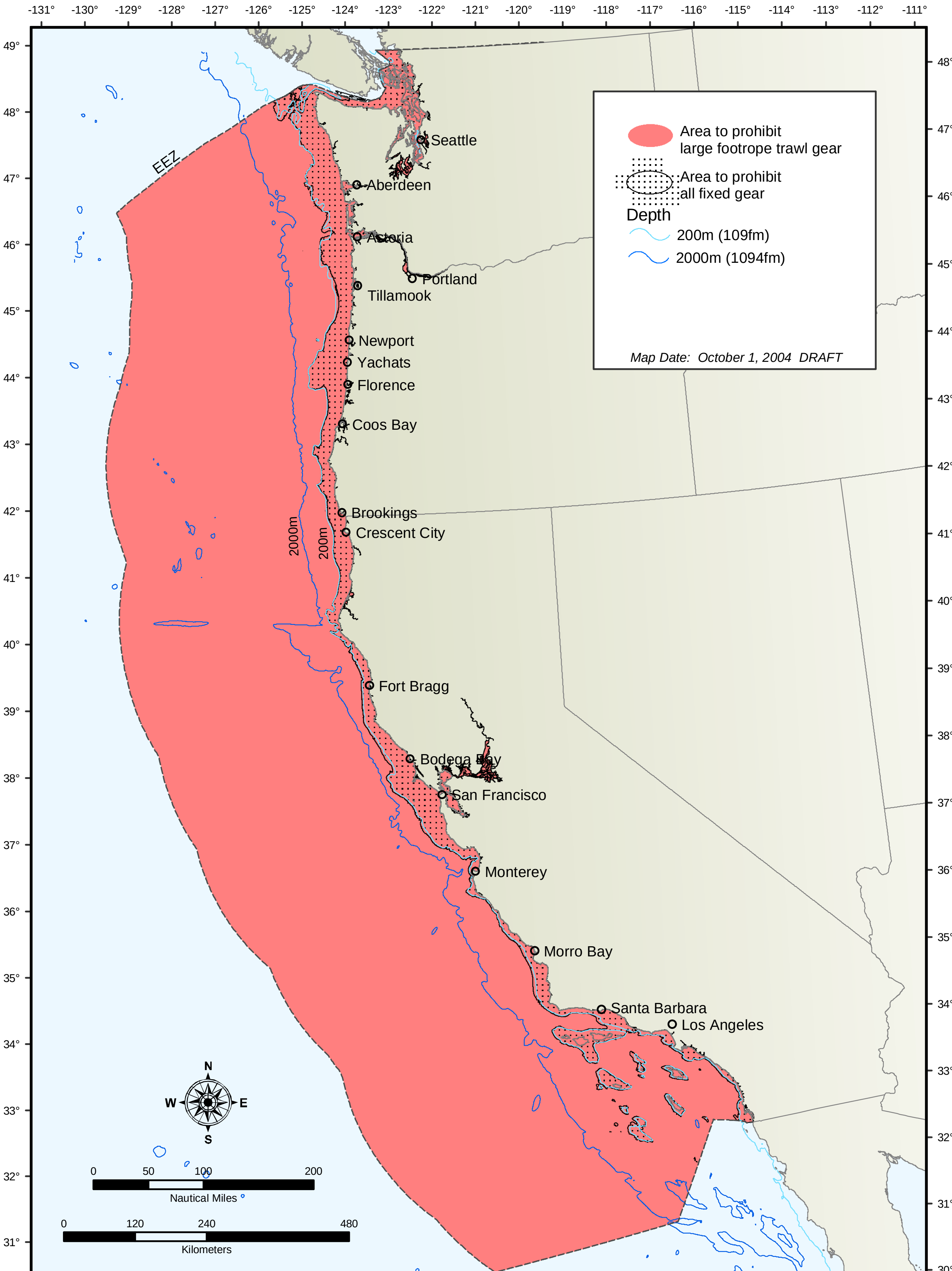
HAPC Alternative 4: Designate seagrass beds as HAPC.



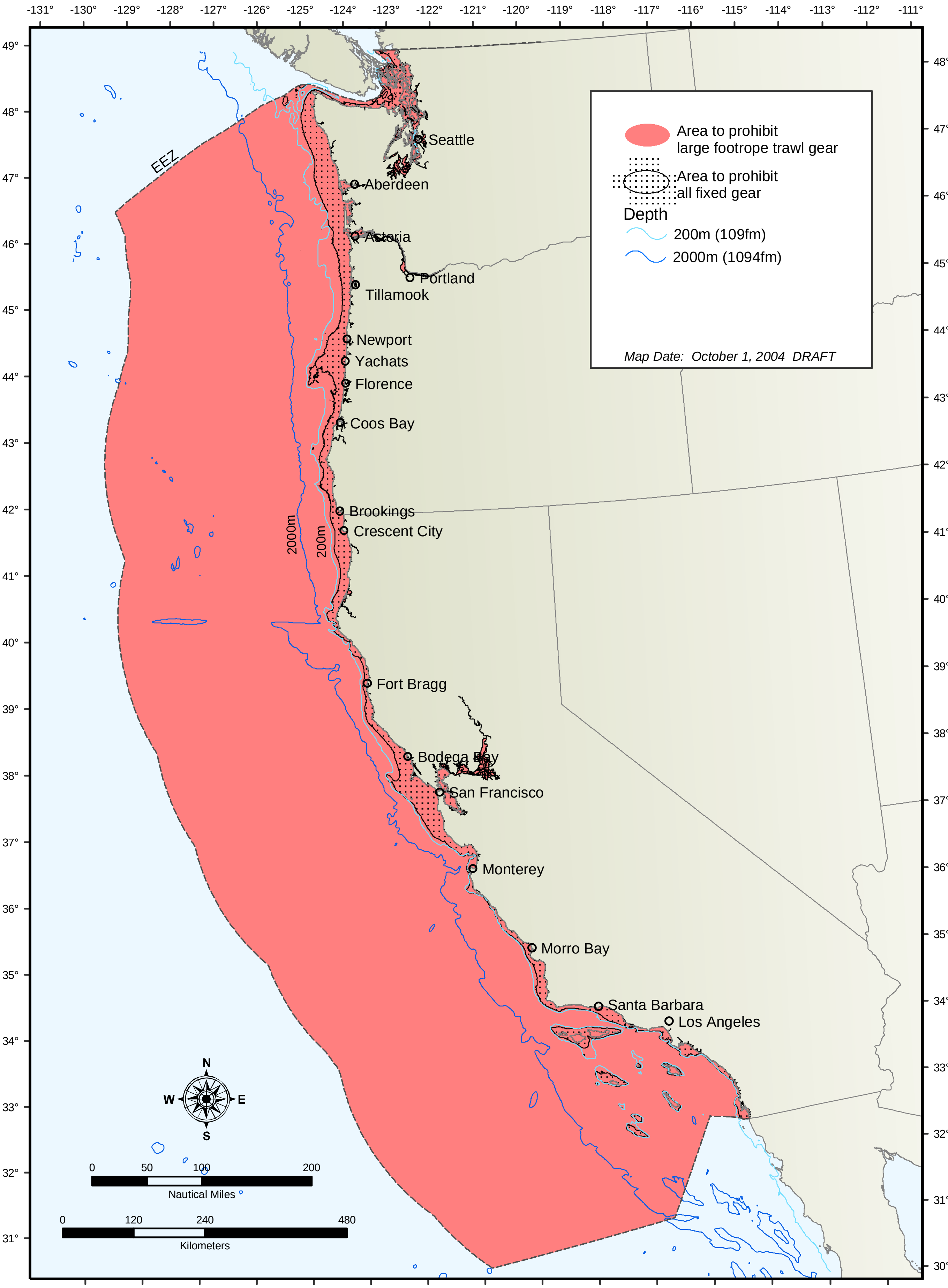
northwest Olympic Coast NMS
EEZ
Grays Canyon
Astoria Canyon
Thompson Seamount
Daisy Bank
Heceta Bank
President Jackson Seamount
Rogue Canyon
2000m
200m
Eel River Canyon
Mendocino Canyon
Gorda Escarpment
Cordell Bank
Gumdrop Seamount
Pioneer Seamount
Guide Seamount
Taney Seamount
Monterey Bay
Monterey Canyon
Davidson Seamount
Morro Ridge
San Juan Seamount
Cowcod Conservation Area
Seattle
Aberdeen
Astoria
Portland
Tillamook
Newport
Yachats
Florence
Coos Bay
Brookings
Crescent City
Fort Bragg
Bodega Bay
San Francisco
Monterey
Morro Bay
Santa Barbara
Los Angeles
0 65 130 260
Nautical Miles
0 125 250 500
Kilometers



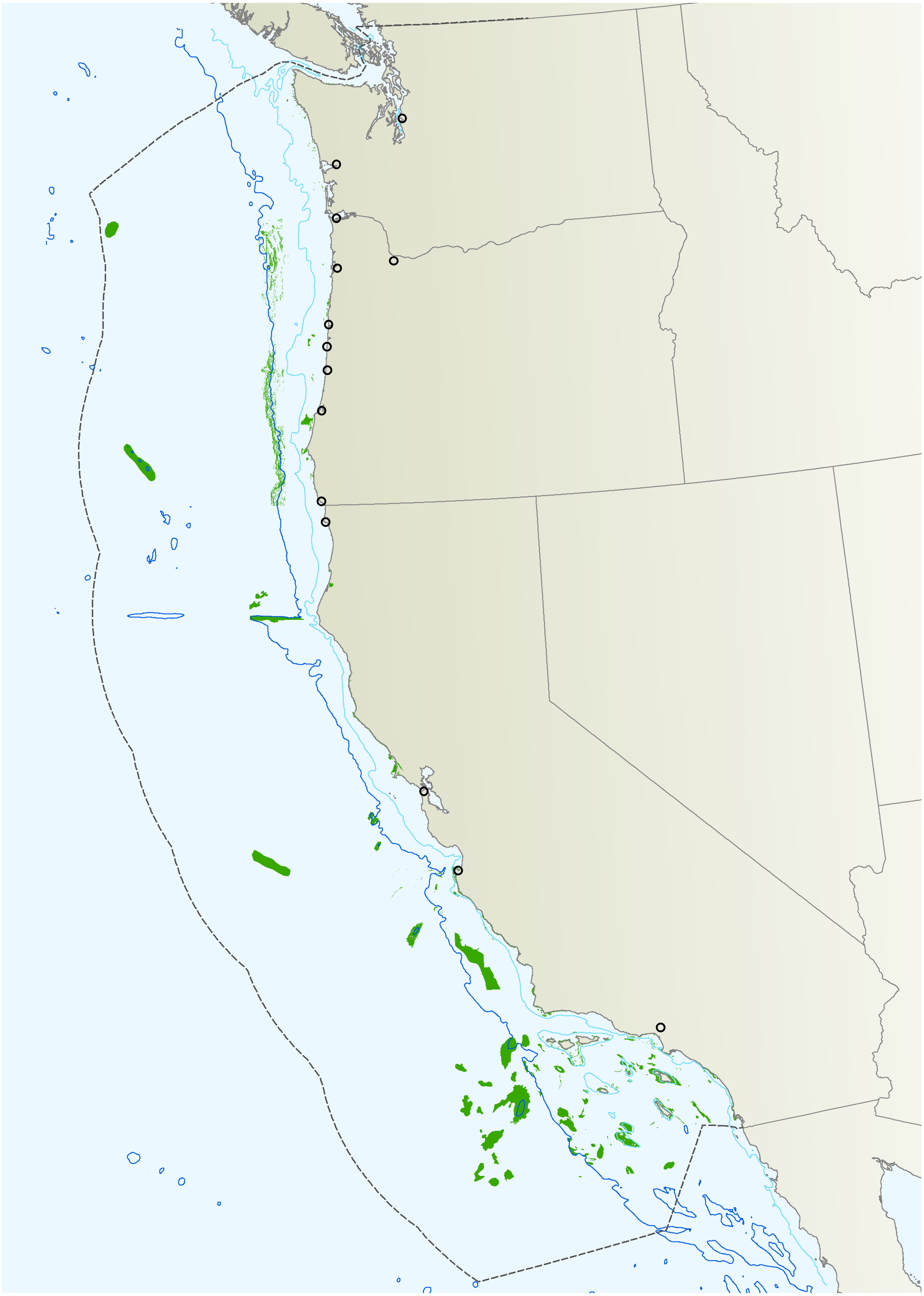
Minimize Impacts Alternative 2: Depth-based gear restrictions for large footrope trawl gear and fixed gear. Option 1

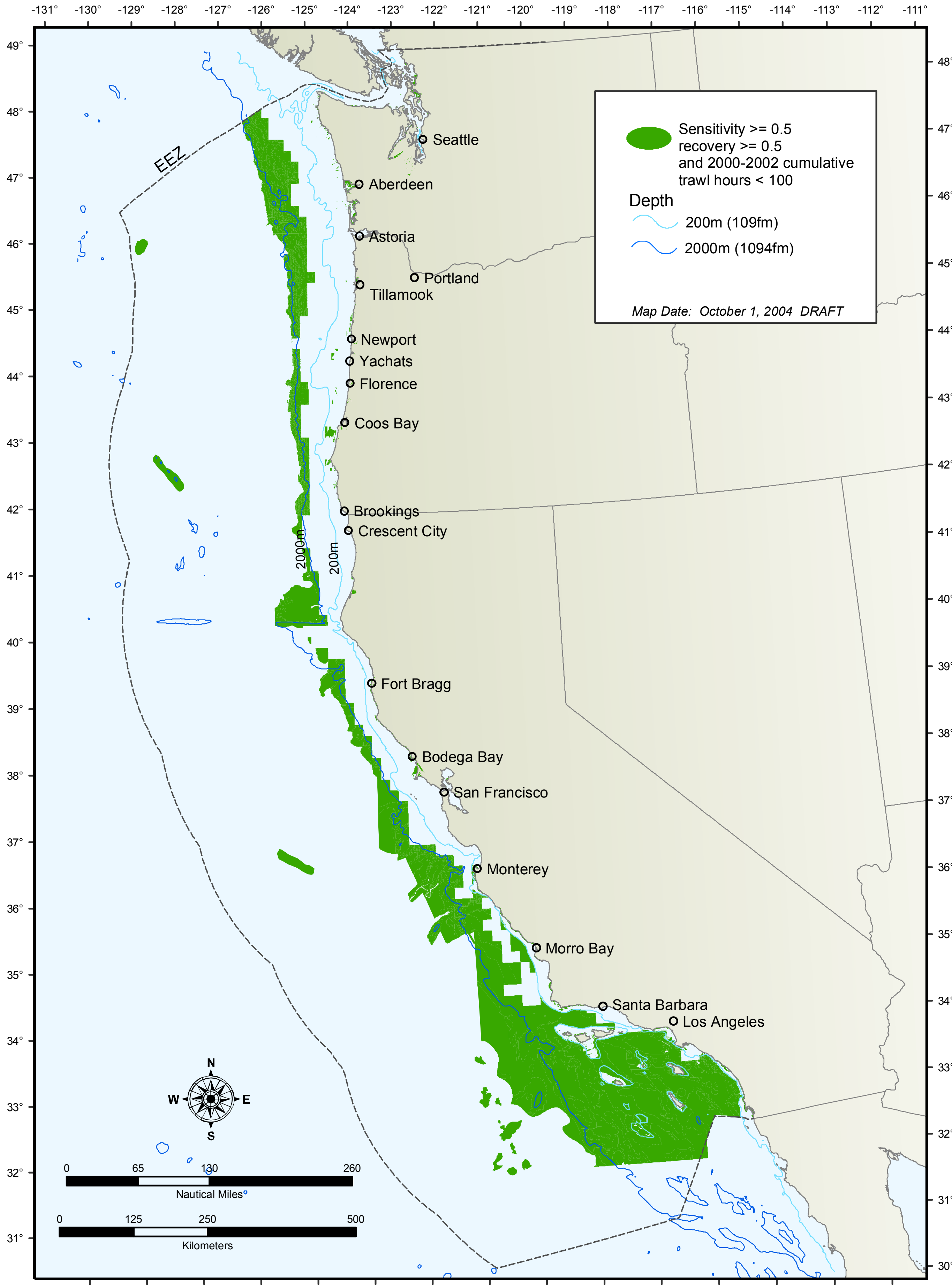


Minimize Impacts Alternative 2: Depth-based gear restrictions
for large footrope trawl gear and fixed gear. Option 2

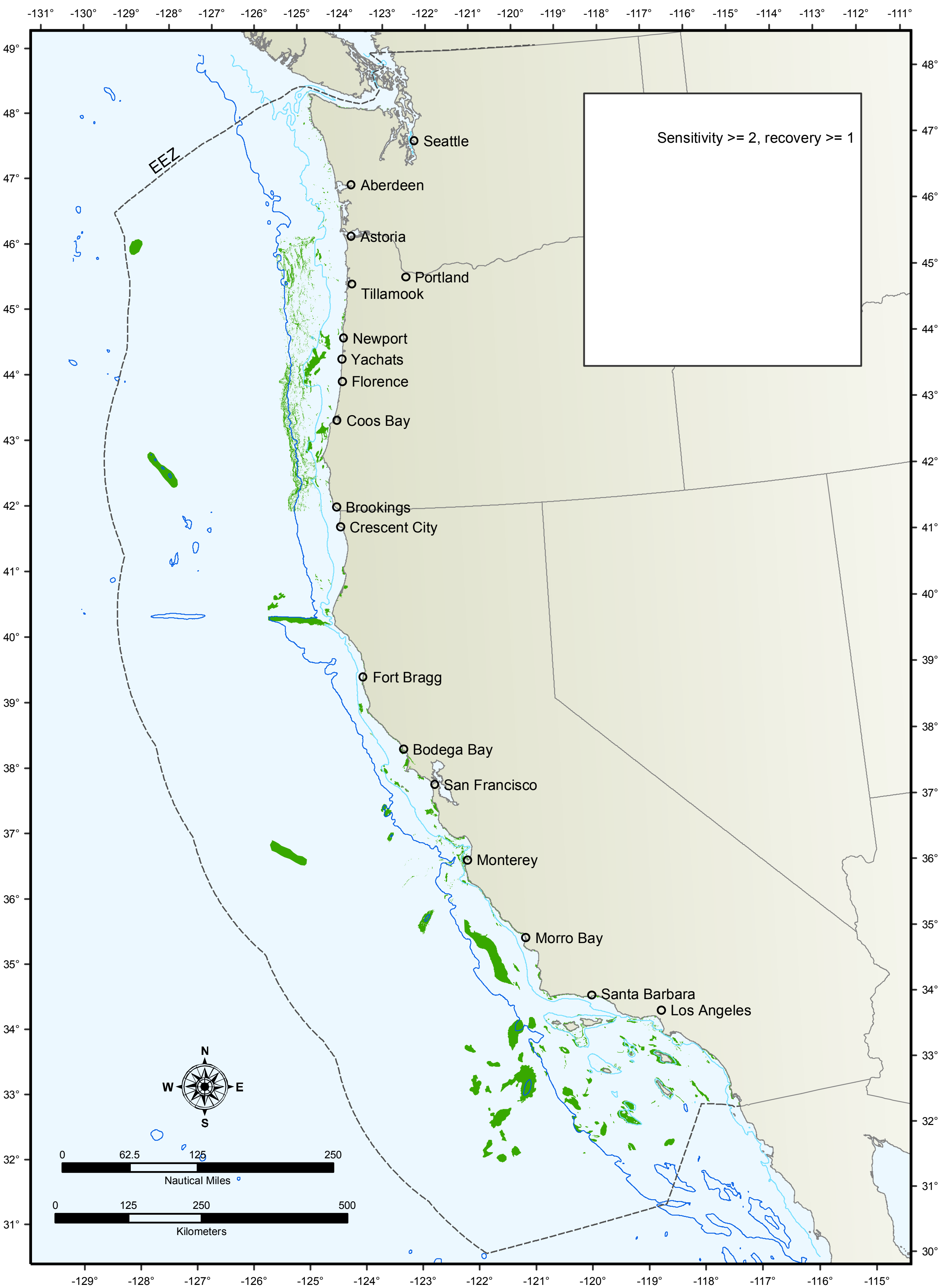


Minimize Impacts Alternative 2: Depth-based gear restrictions for large footrope trawl gear and fixed gear. Option 3

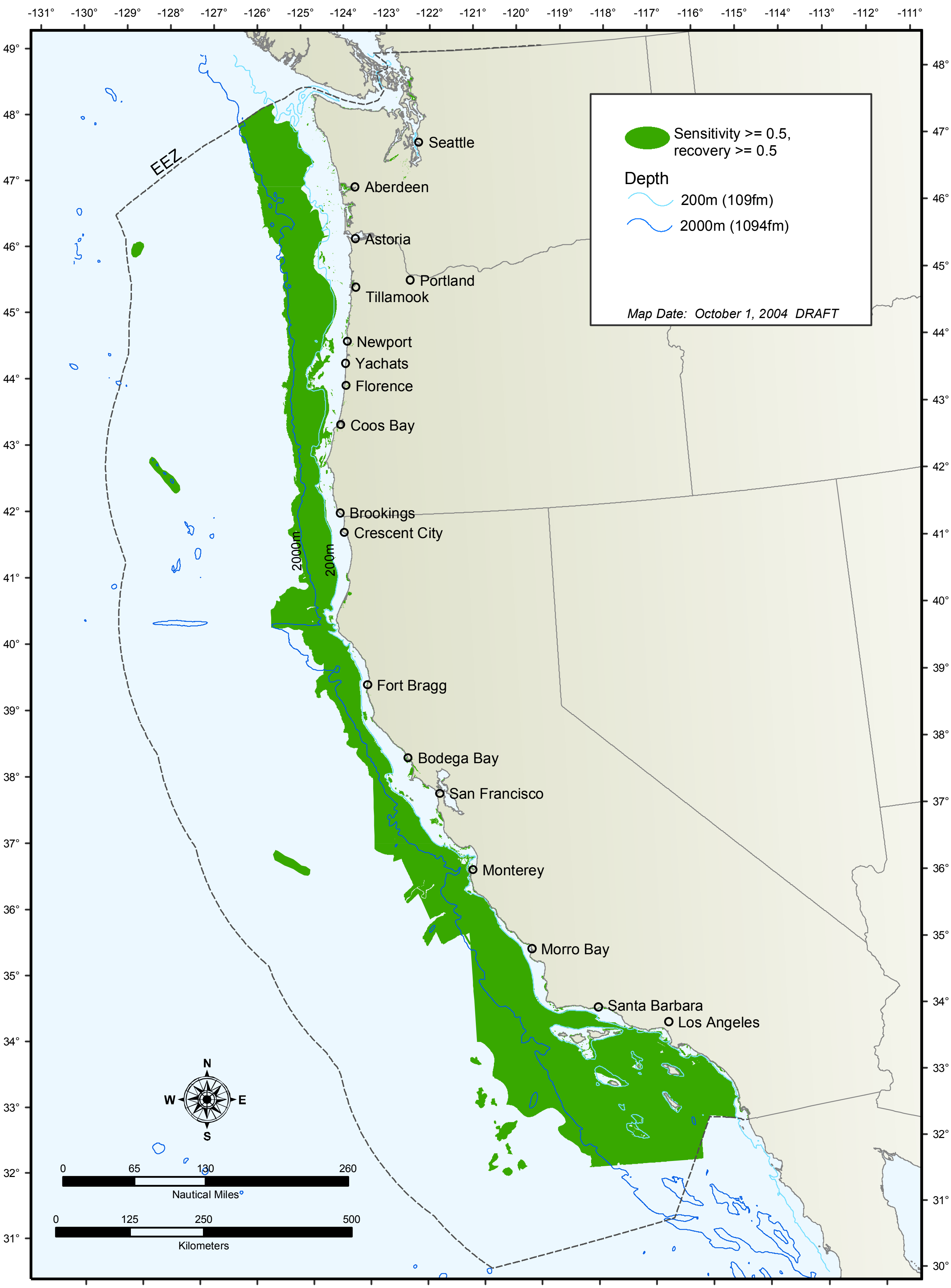




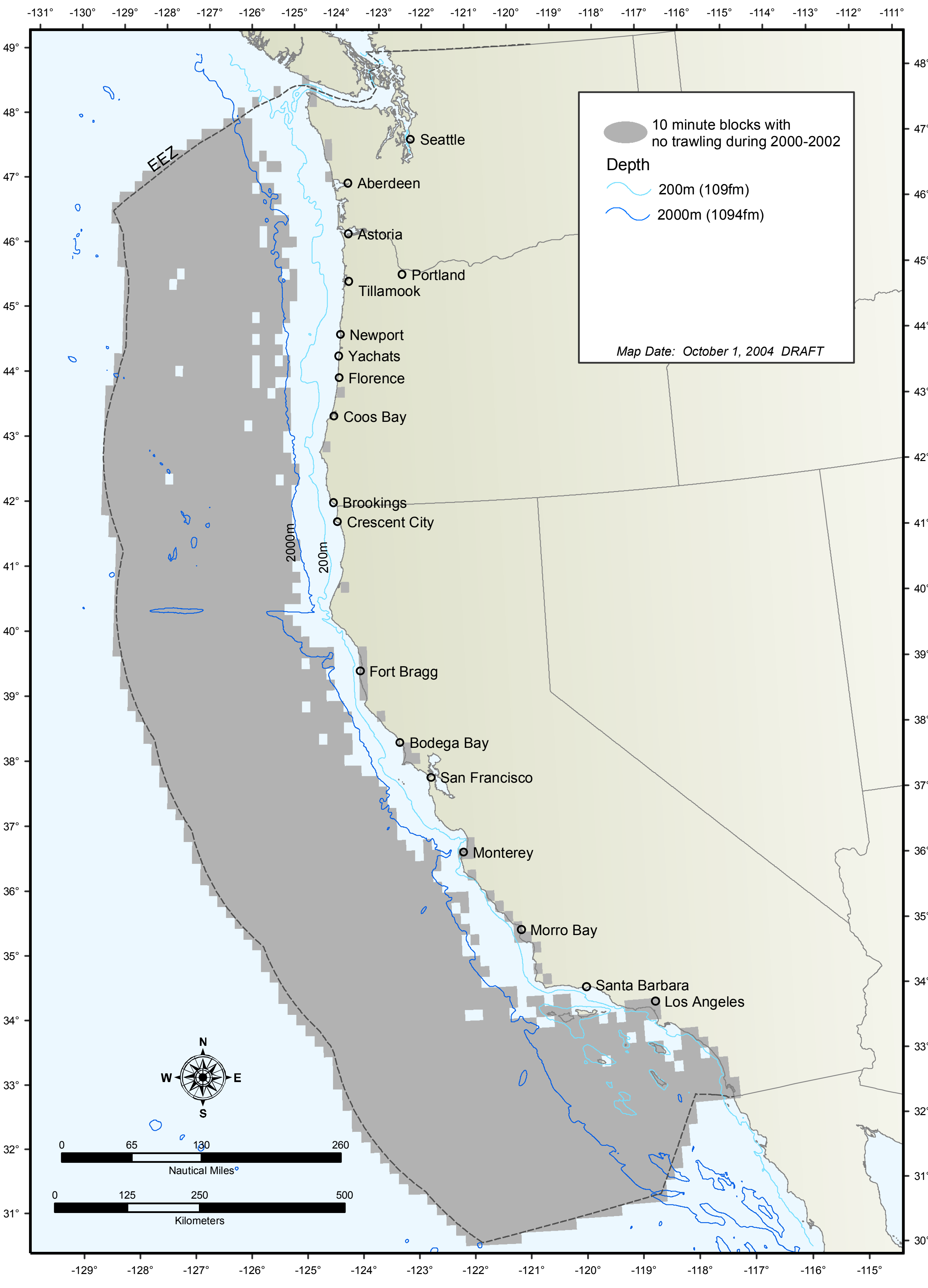
Minimize Impacts Alternative 3: Control-rule based area closures
using habitat sensitivity index values. Option 2



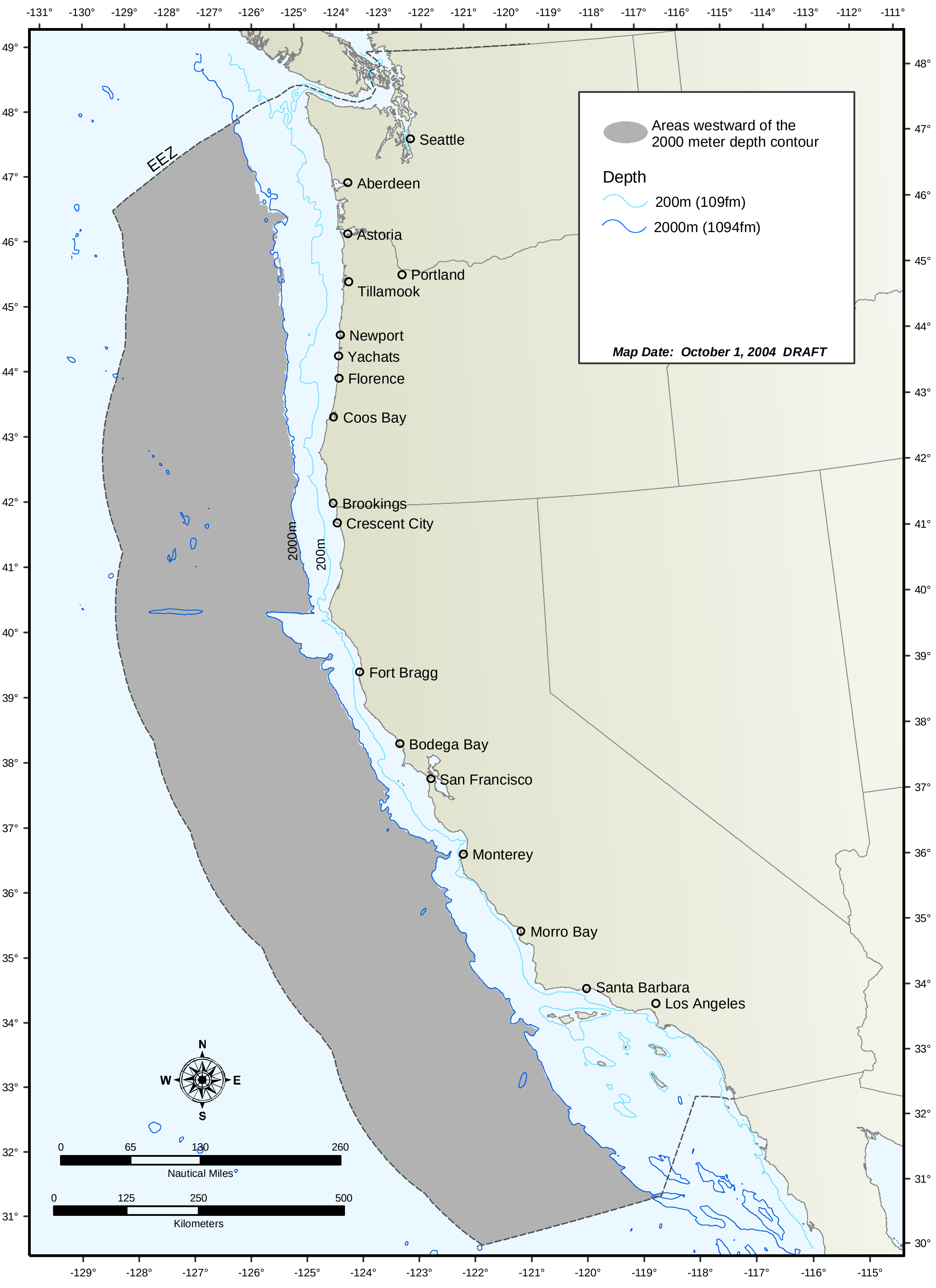
Minimize Impacts Alternative 3: Control-rule based area closures
using habitat sensitivity index values. Option 3



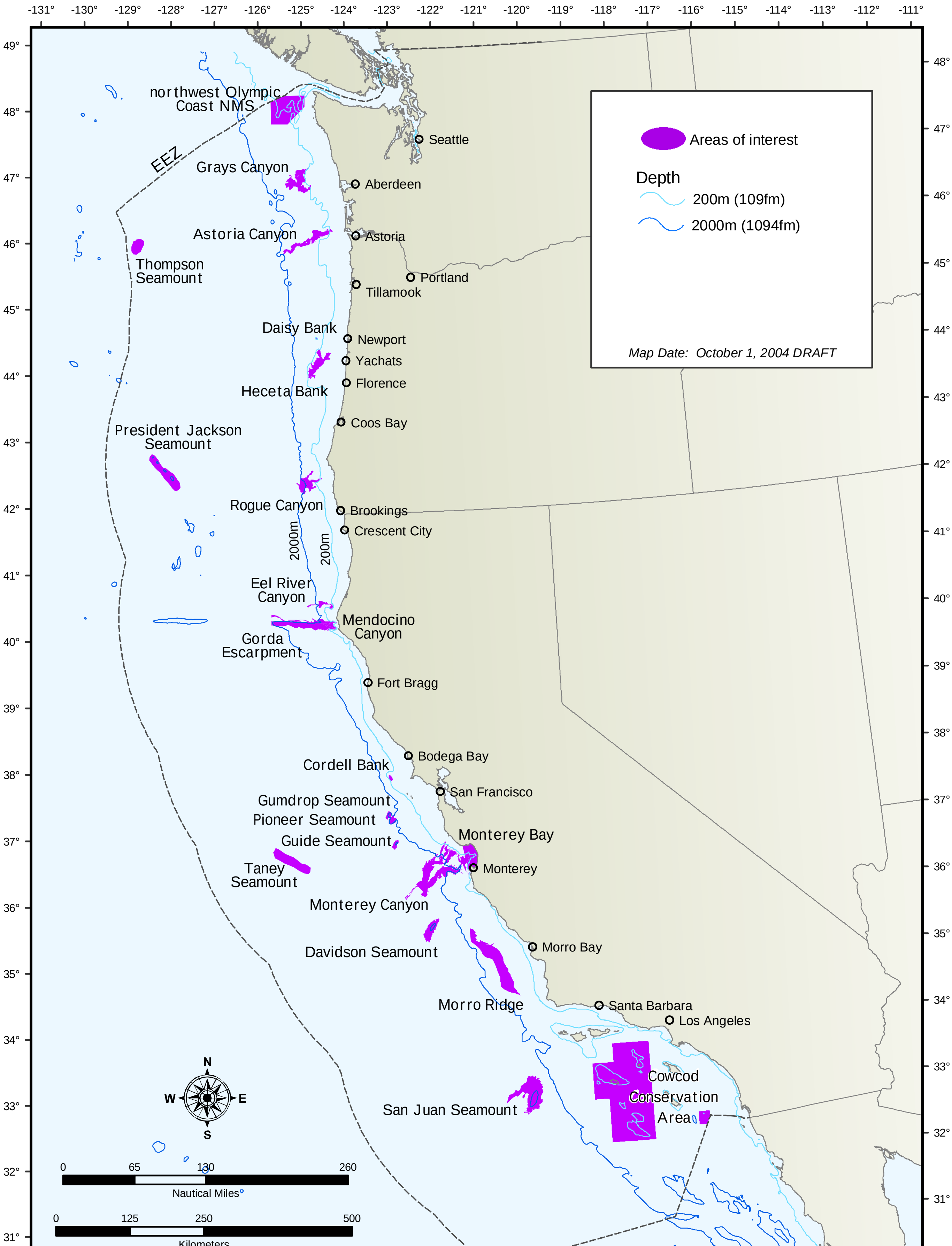
Minimize Impacts Alternative 3: Control-rule based area closures using habitat sensitivity index values. Option 4



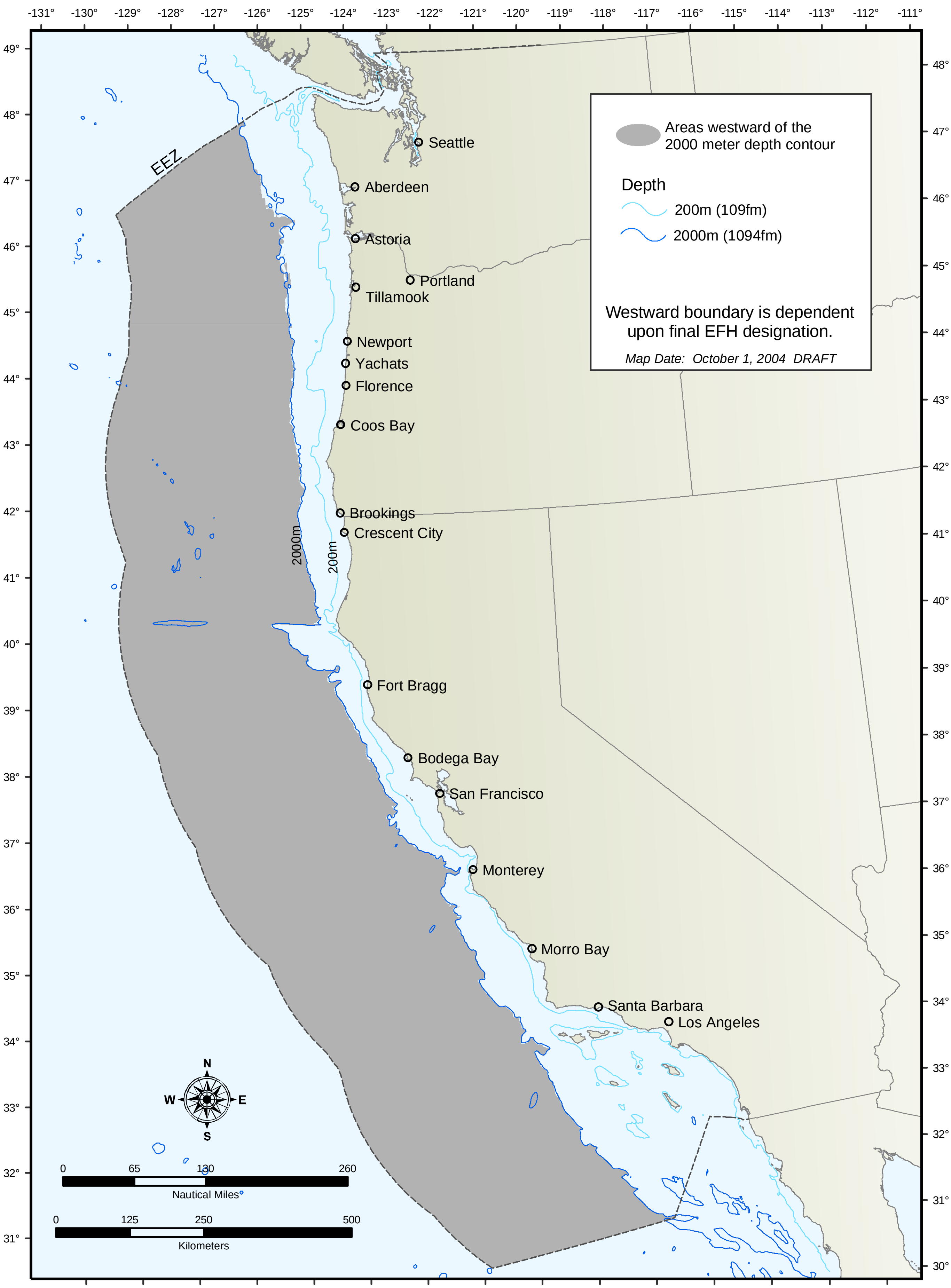
Minimize Impacts Alternative 4: Restrict the expansion of commercial fisheries. Option 1



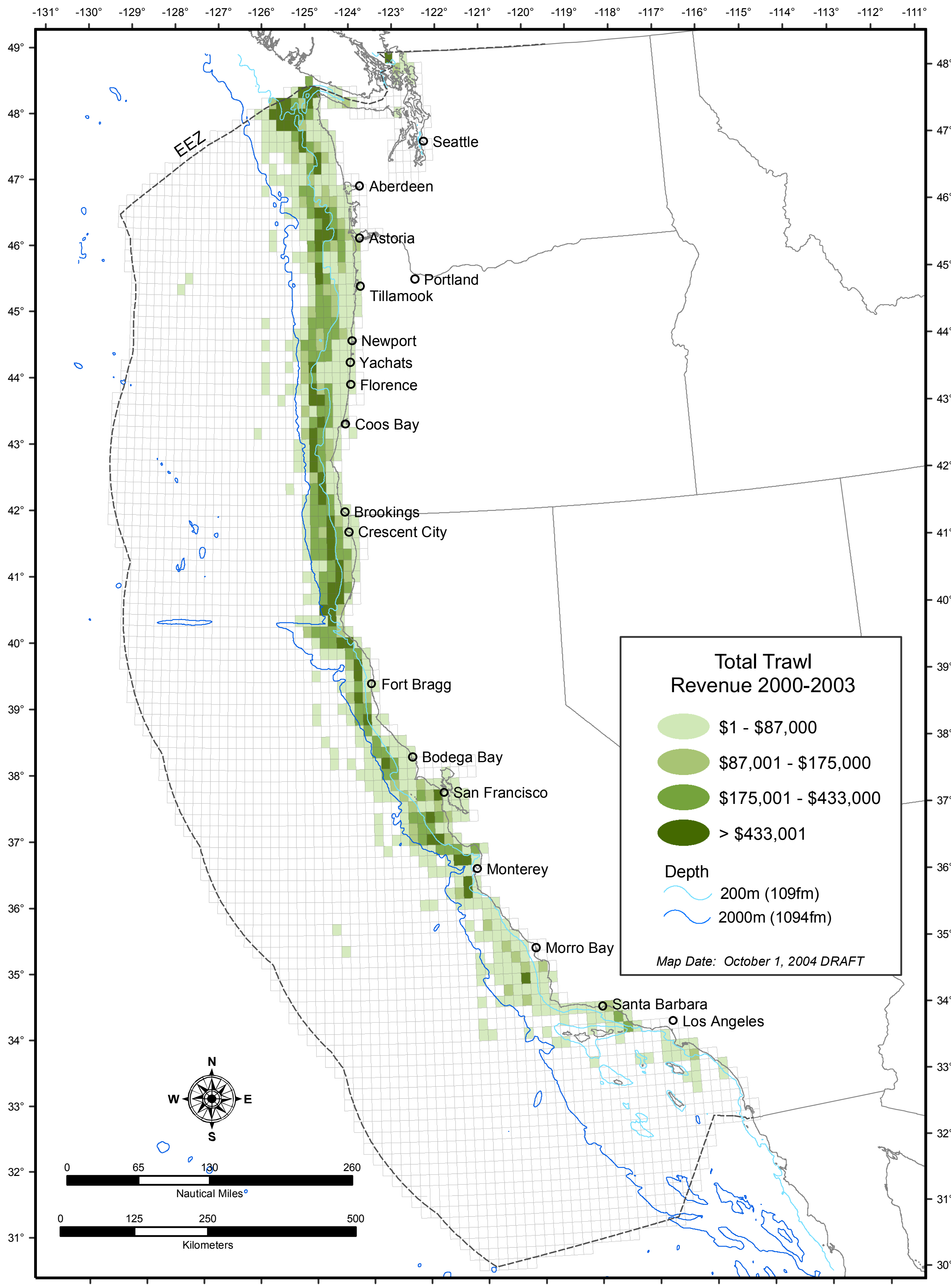
Minimize Impacts Alternative 4: Restrict the expansion of commercial fisheries. Option 2



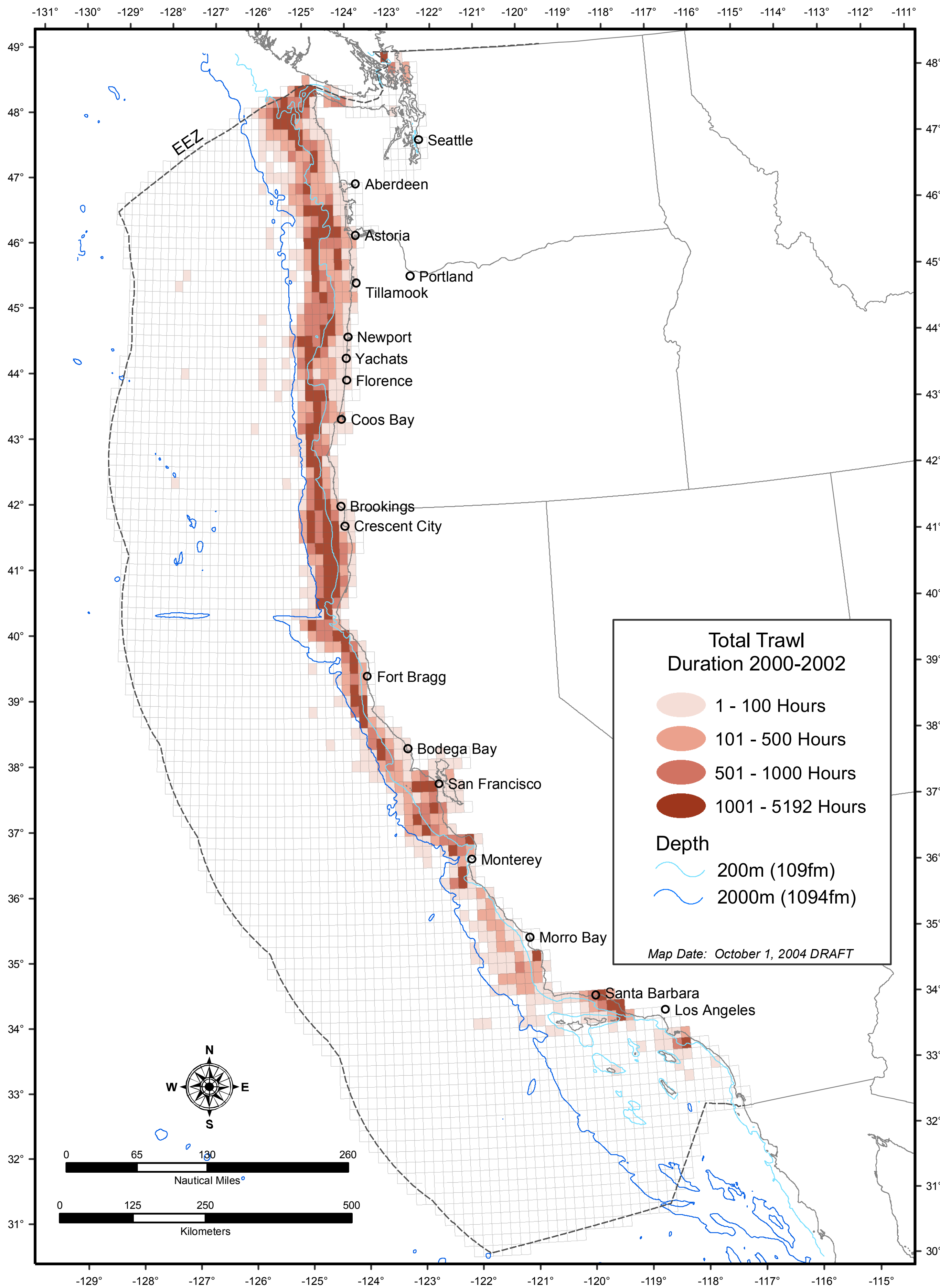
Minimize Impacts Alternative 8: Limit fishing impacts in areas of interest.



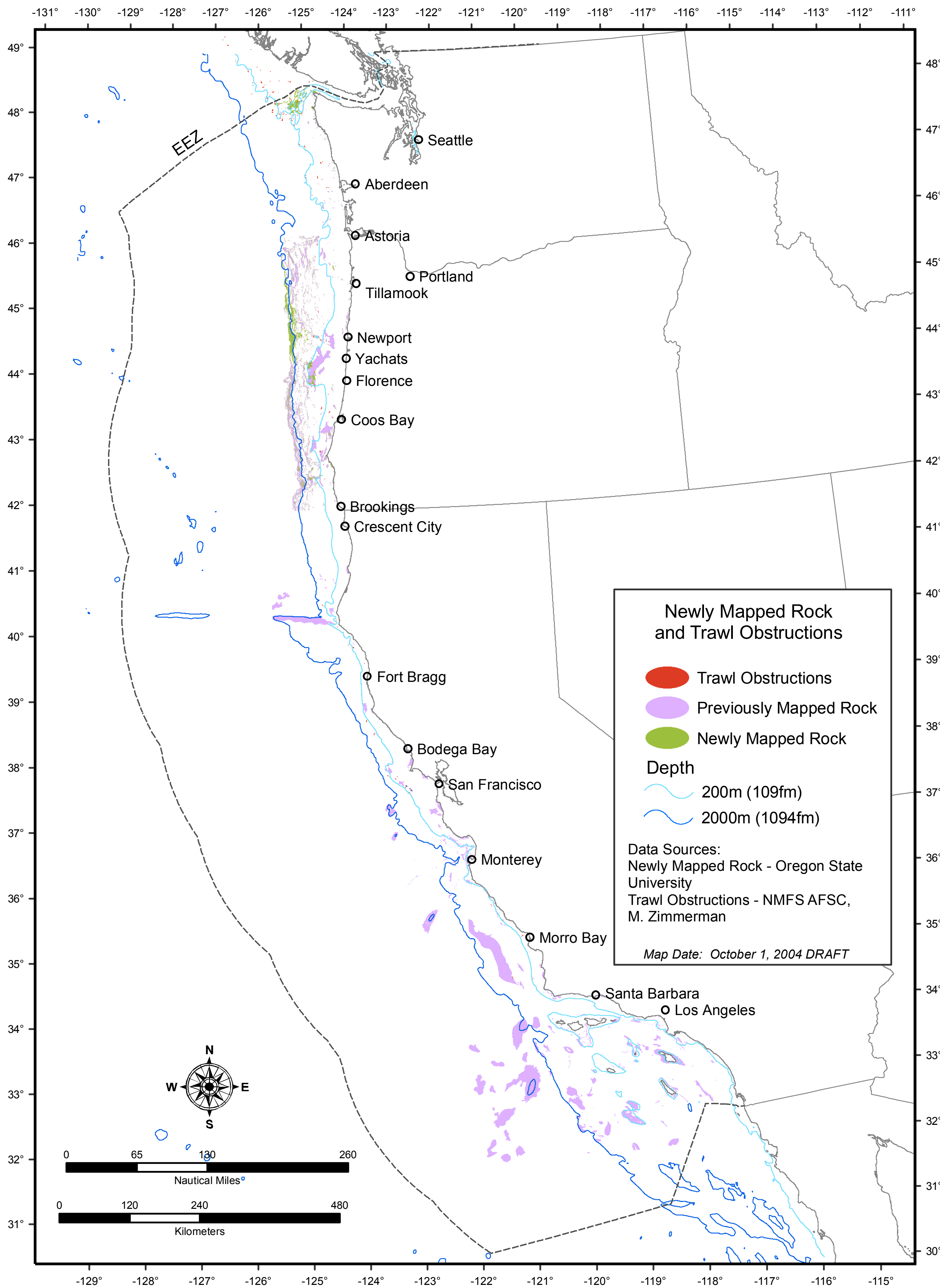
Minimize Impacts Alternative 9: Zoning alternative.



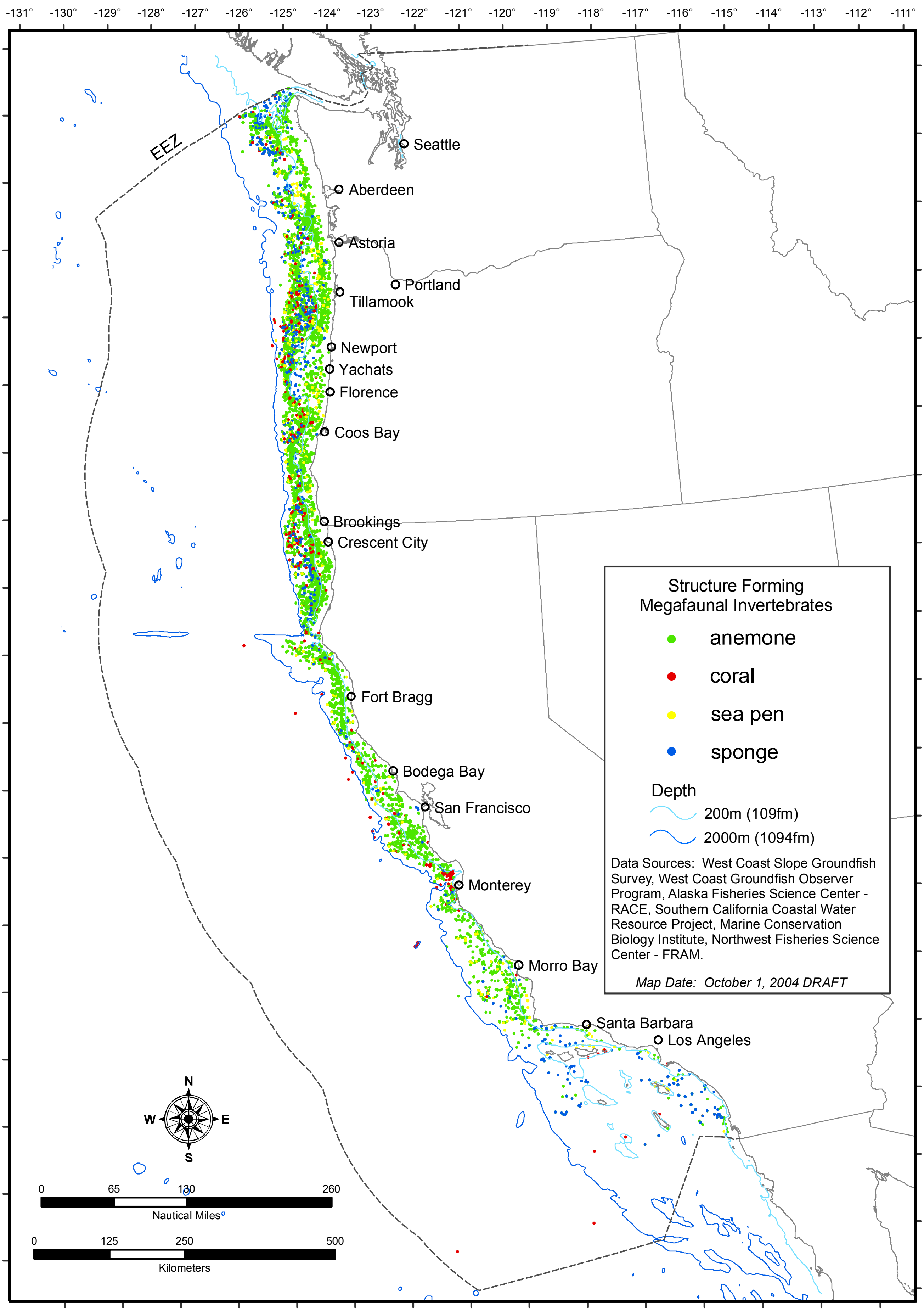
Cumulative Groundfish Trawl Revenue, 2000 - 2003



Cumulative Groundfish Trawl Effort, 2000 - 2002

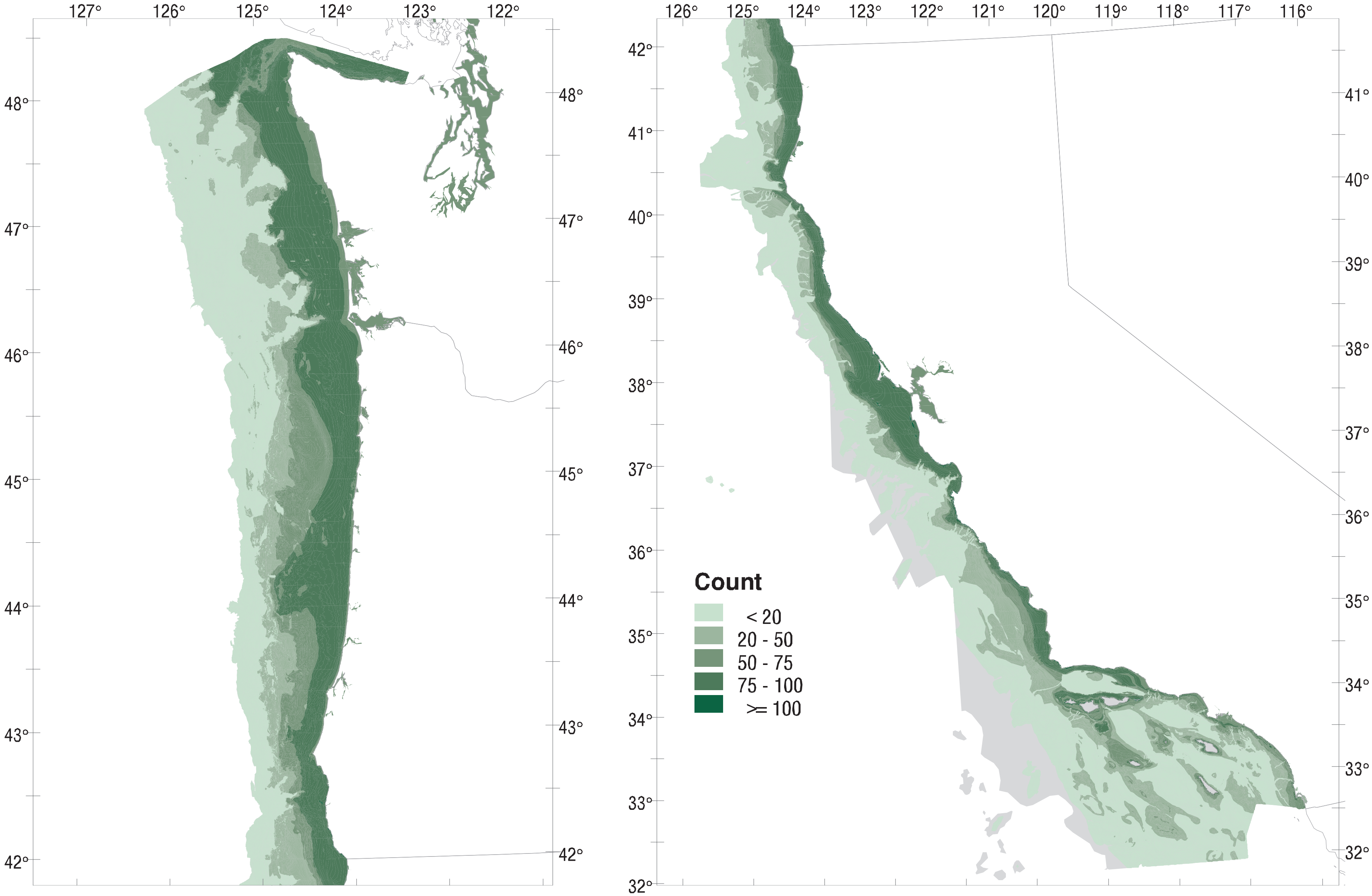


Newly Mapped Rock Substrate and Areas of Trawl Obstructions

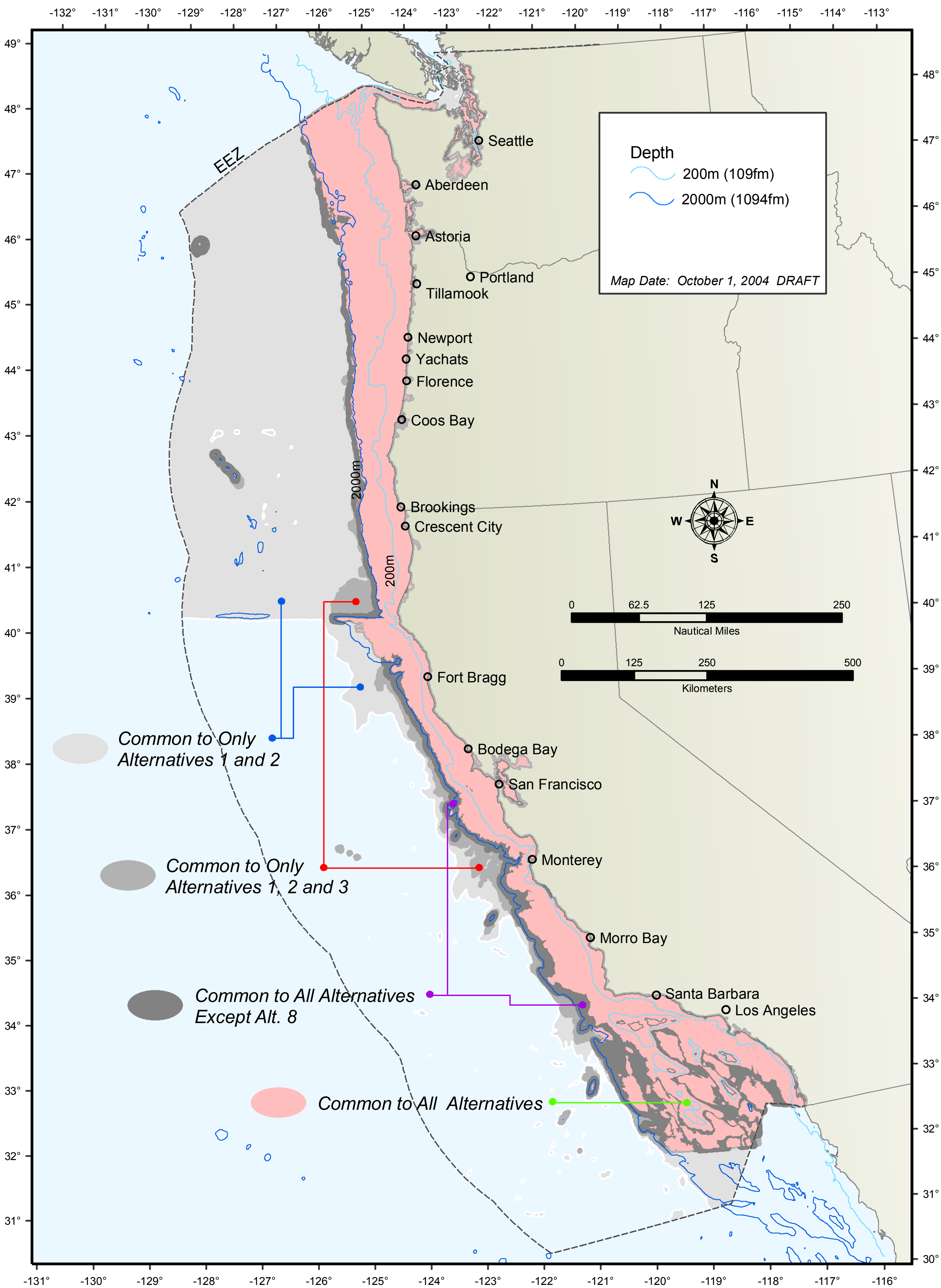


Occurrences of Structure-Forming Megafaunal Invertebrates

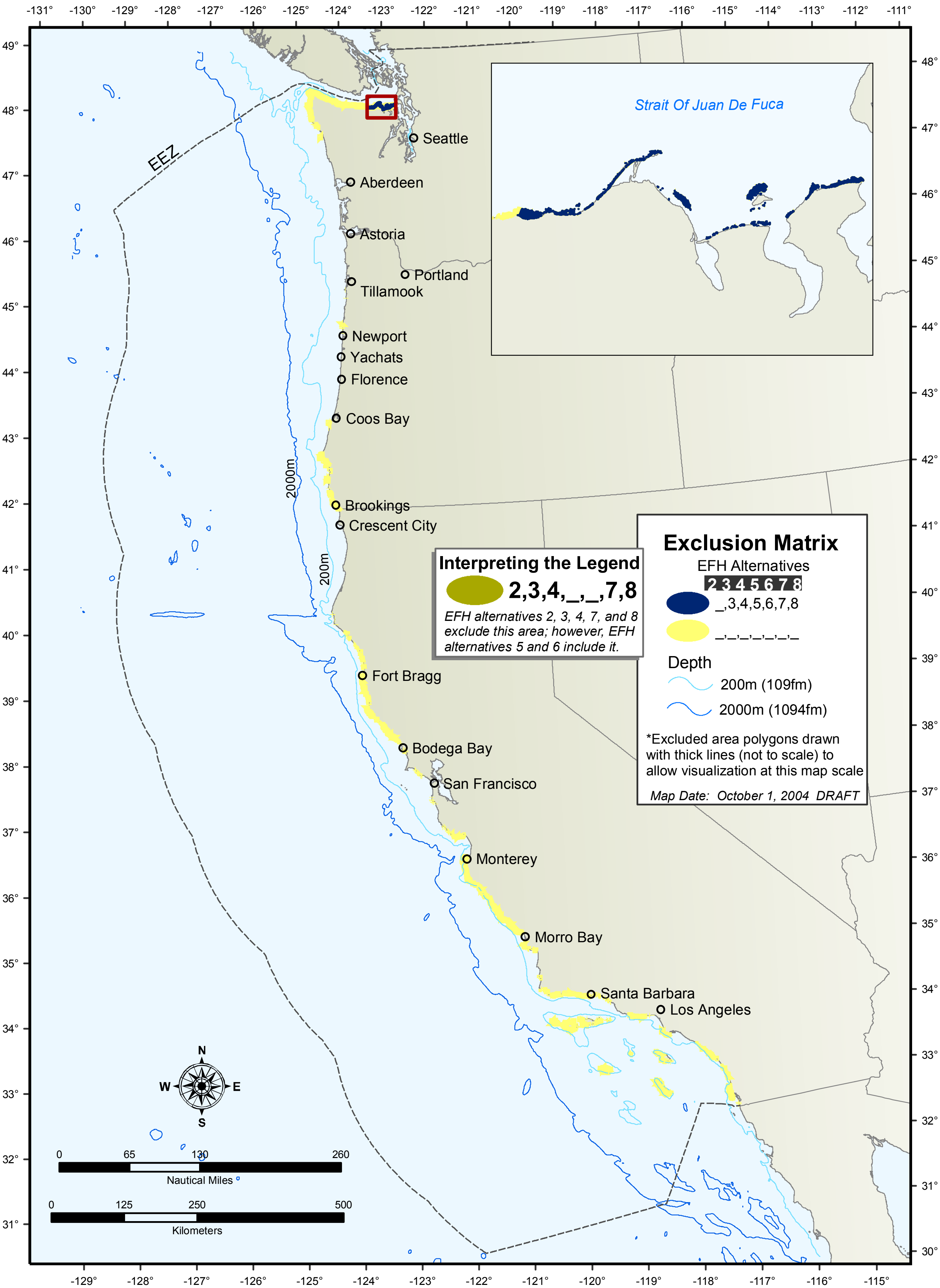
Count of Species/Lifestage Combinations for Top 100% of HSP Area for All Species



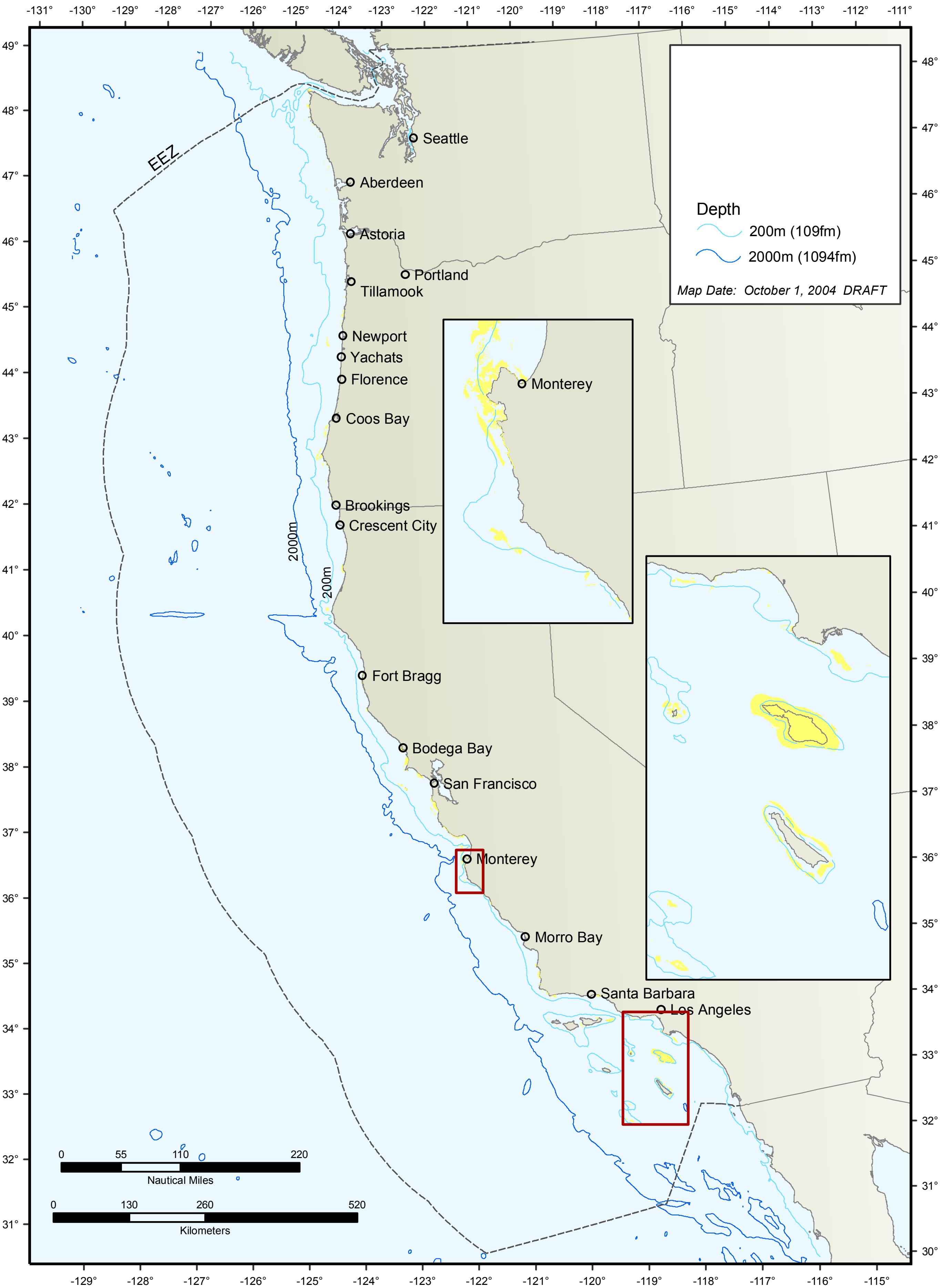
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Terralogic GIS, map date: October 06, 2004, DRAFT



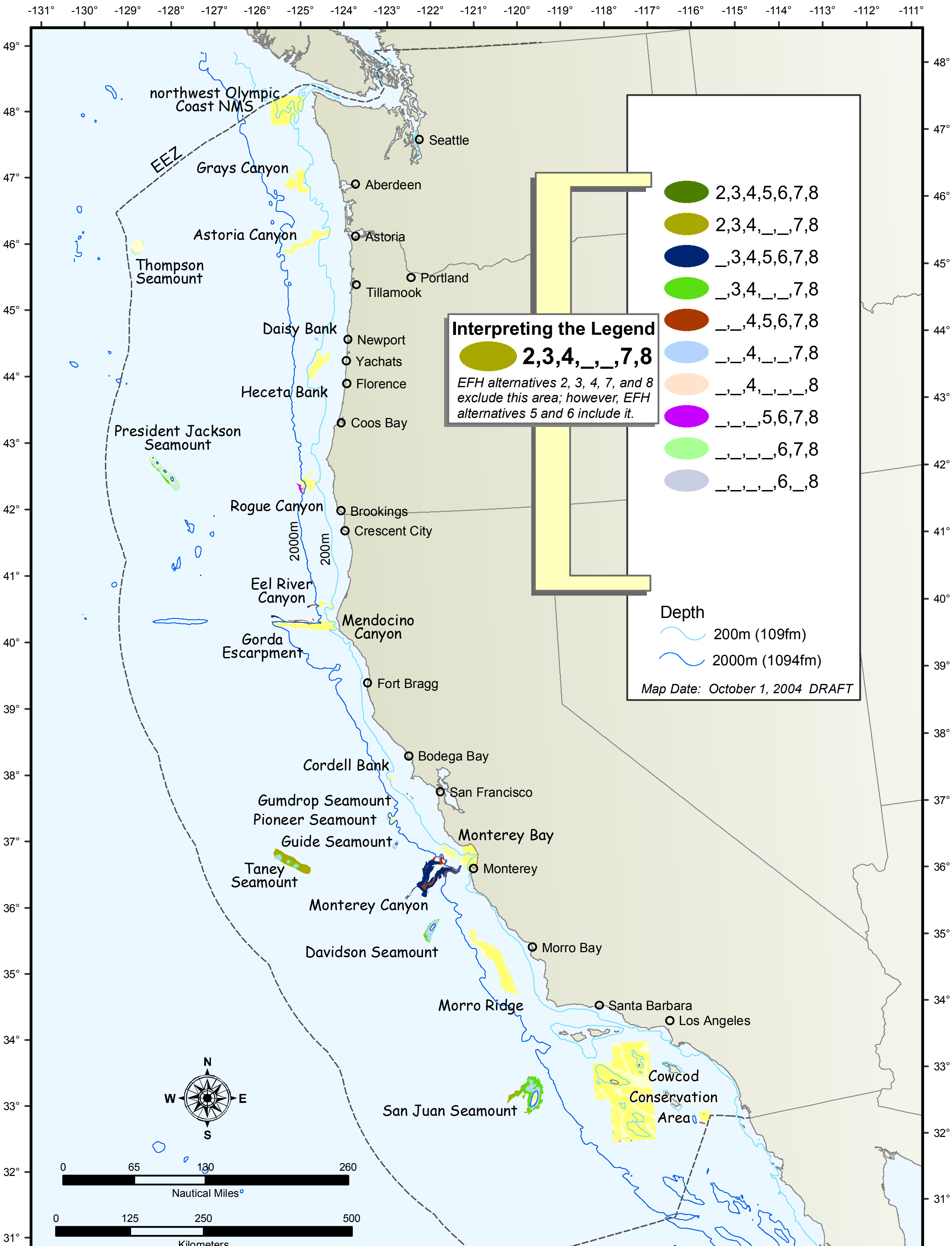
Spatial Comparison of All EFH Alternatives



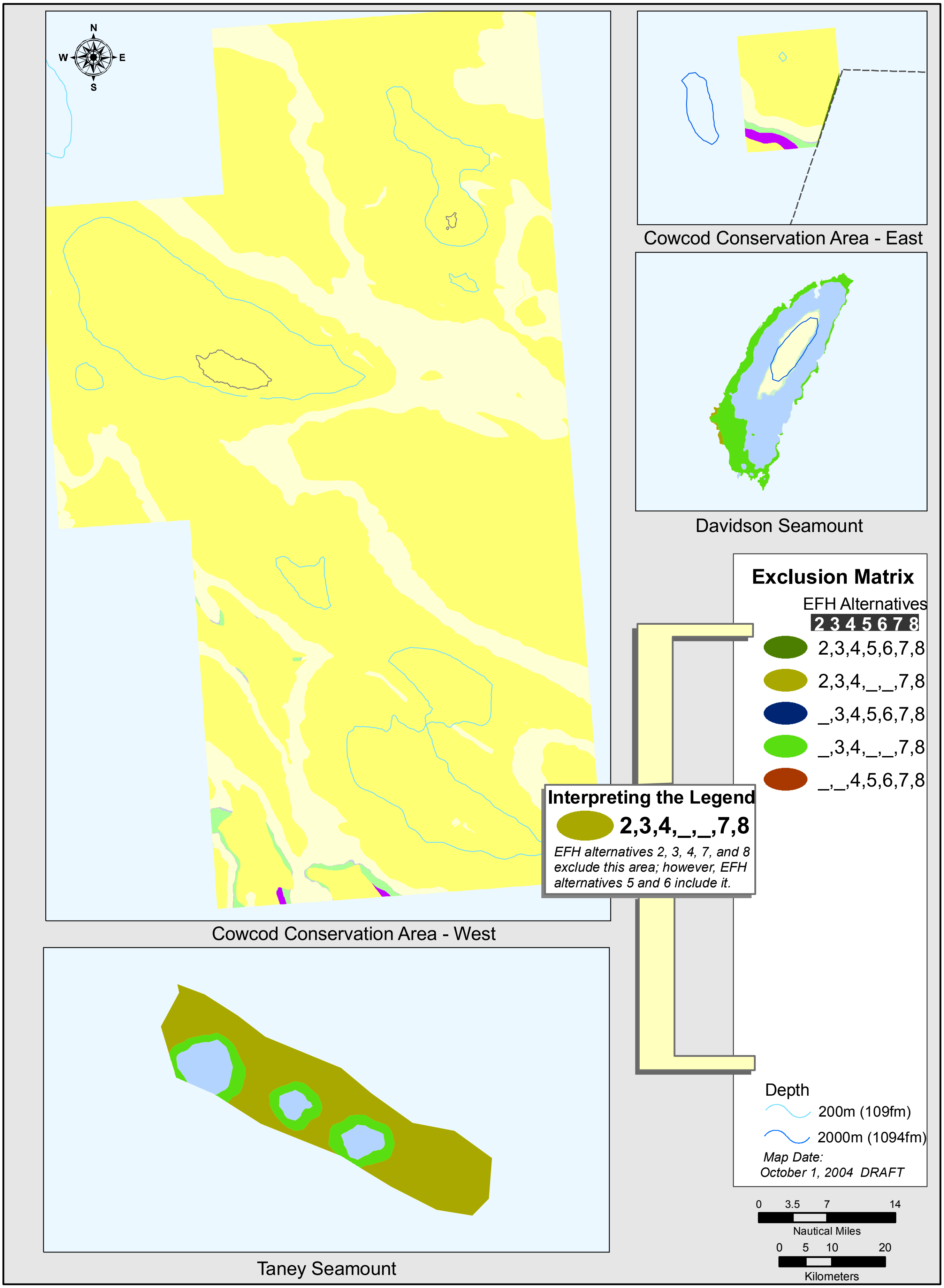
HAPC Alternative 3: Areas excluded by EFH Alternatives



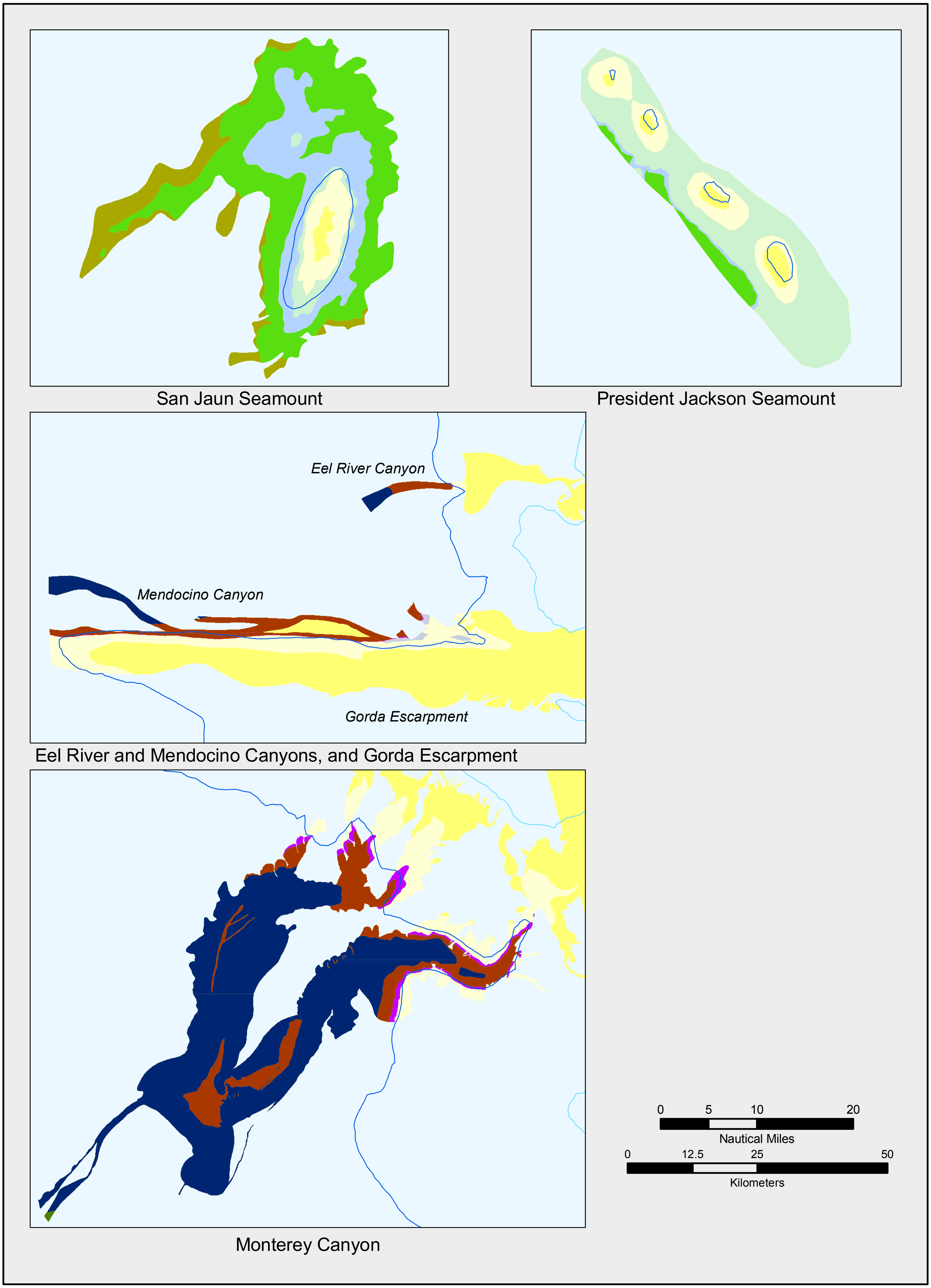
HAPC Alternative 6: Areas excluded by EFH Alternatives



HAPC Alternative 7: Areas excluded by EFH Alternatives



HAPC Alternative 7 Sub-Areas 1,
Cowcod Conservation Area, Davidson and Taney Seamounts:
Areas excluded by EFH Alternatives


San Jaun Seamount
President Jackson Seamount
Eel River Canyon
Mendocino Canyon
Gorda Escarpment
Eel River and Mendocino Canyons, and Gorda Escarpment
Monterey Canyon
0
5
10
20
Nautical Miles
0
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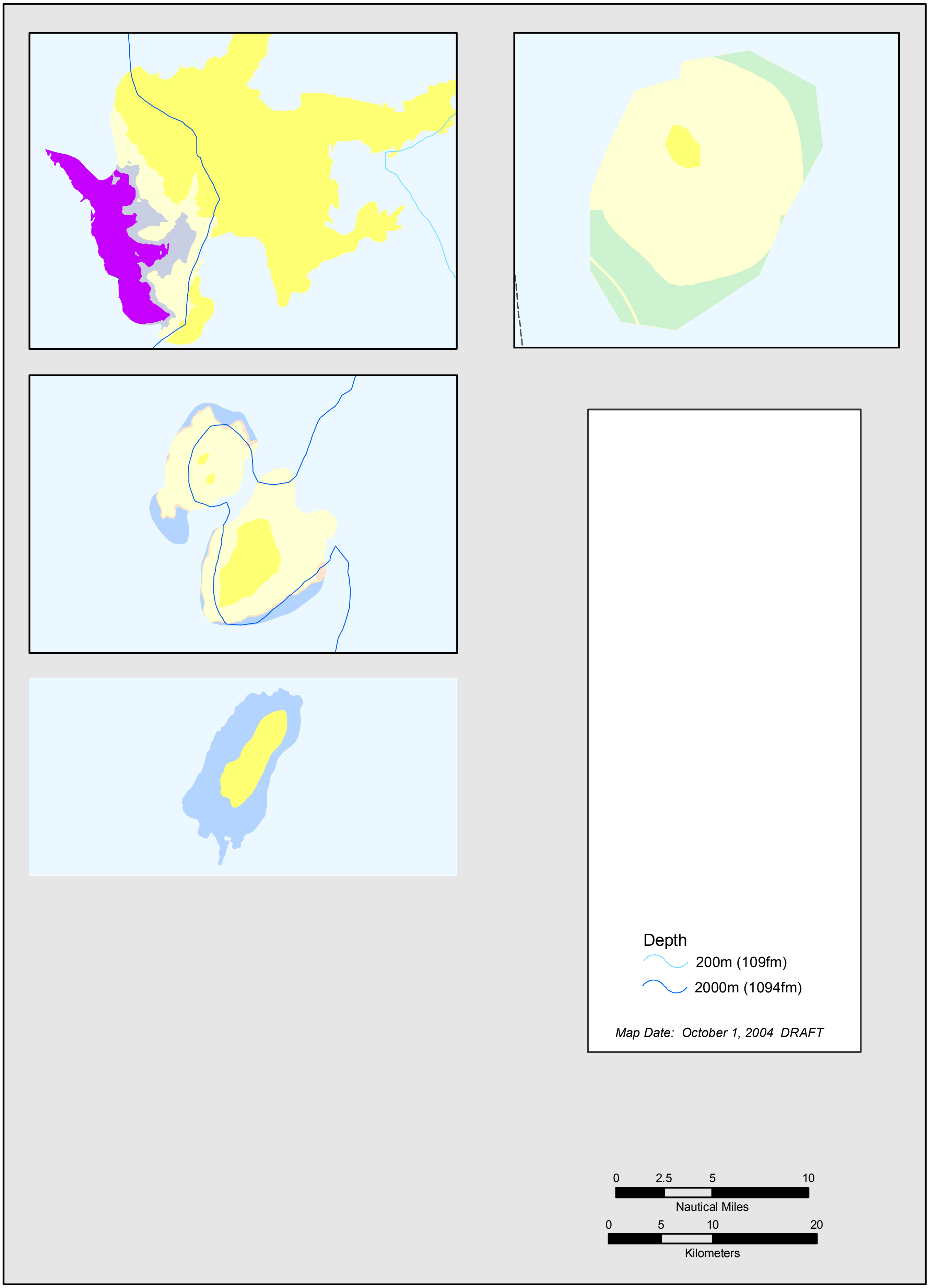
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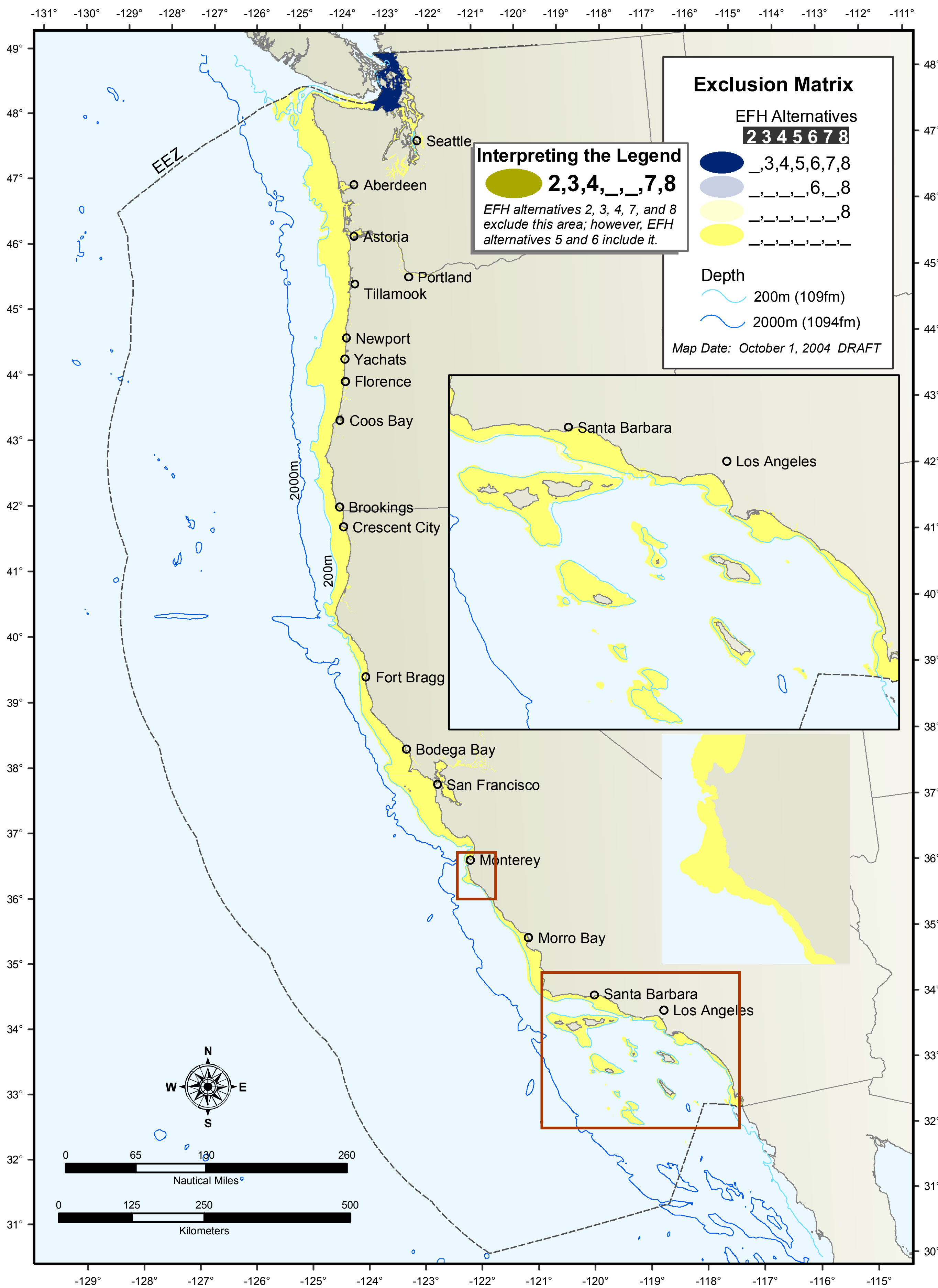
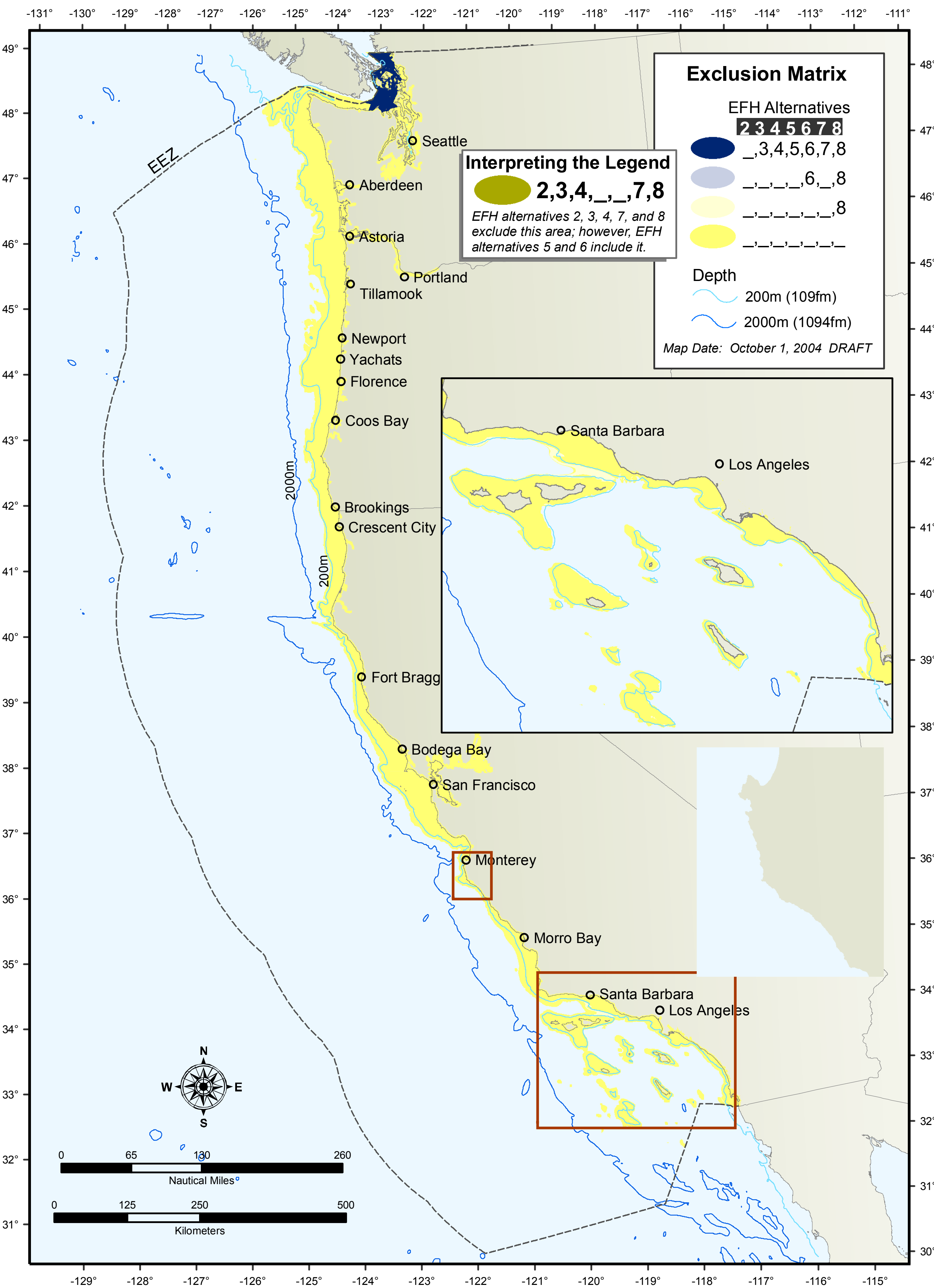
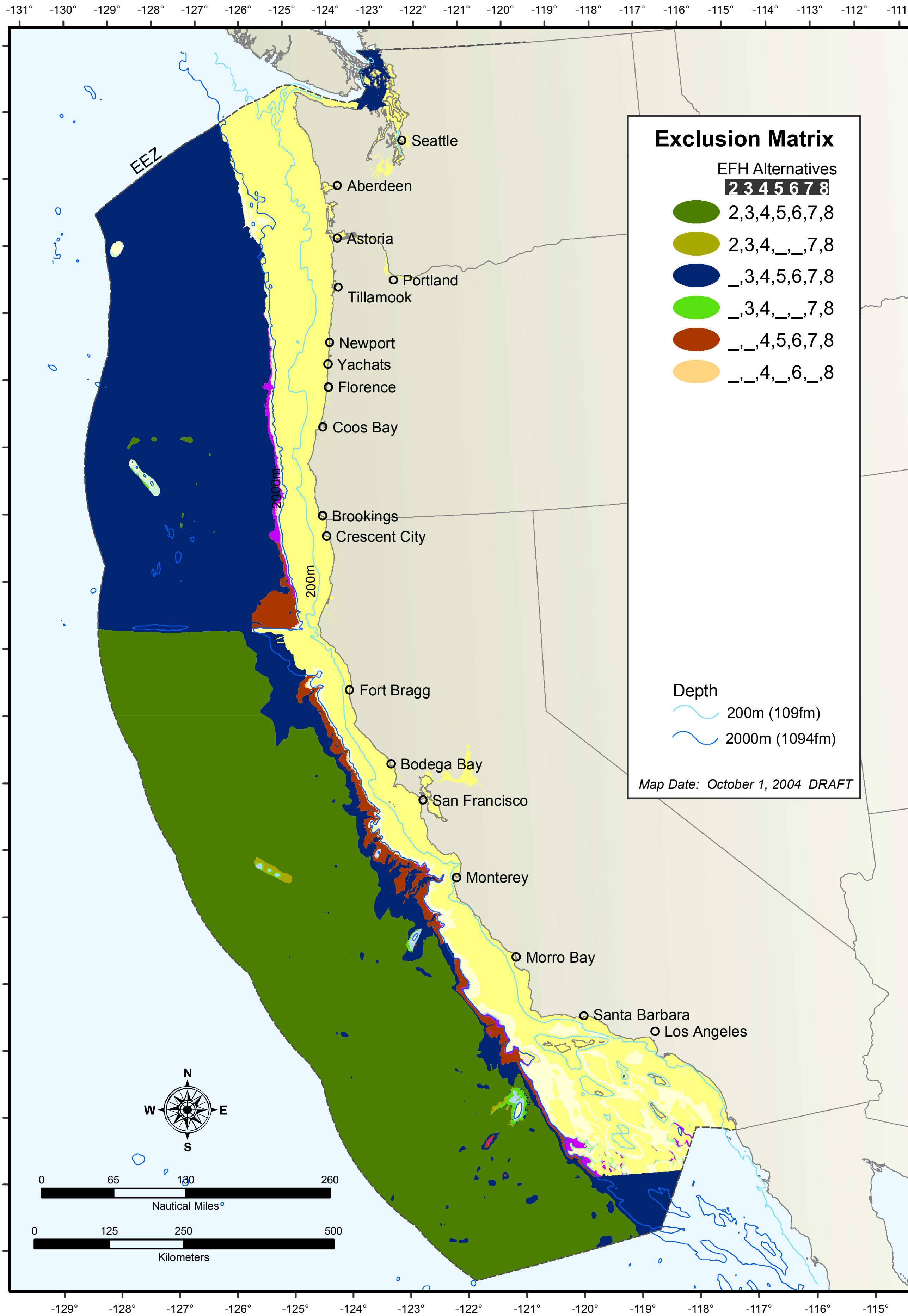


Minimize Impacts Alternative 2, Options 1 and 2, Fixed Gear:
Areas excluded by EFH Alternatives



Minimize Impacts Alternative 2, Option 1, Large Footrope Trawl Gear:
Areas excluded by EFH Alternatives



Exclusion Matrix
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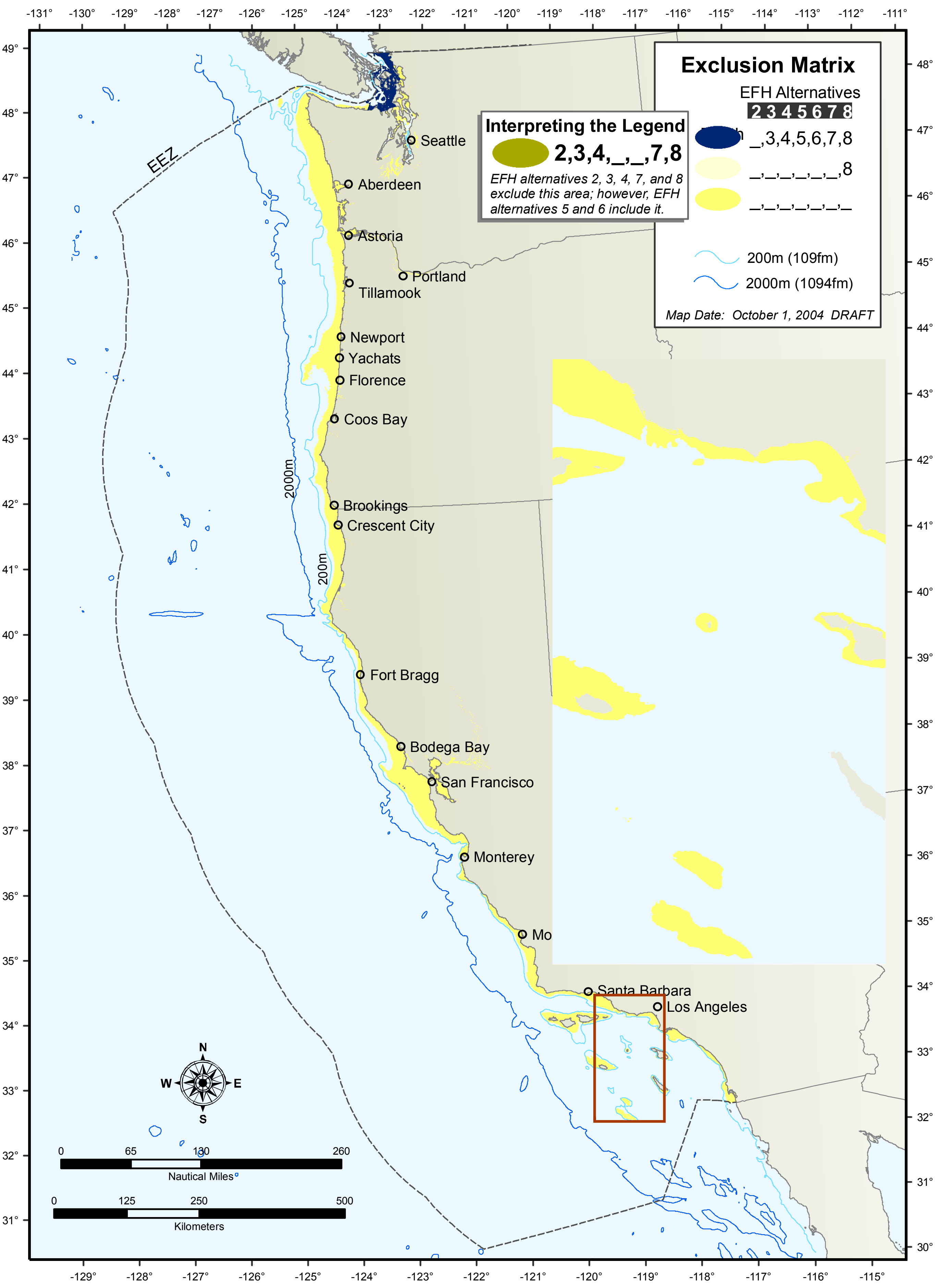

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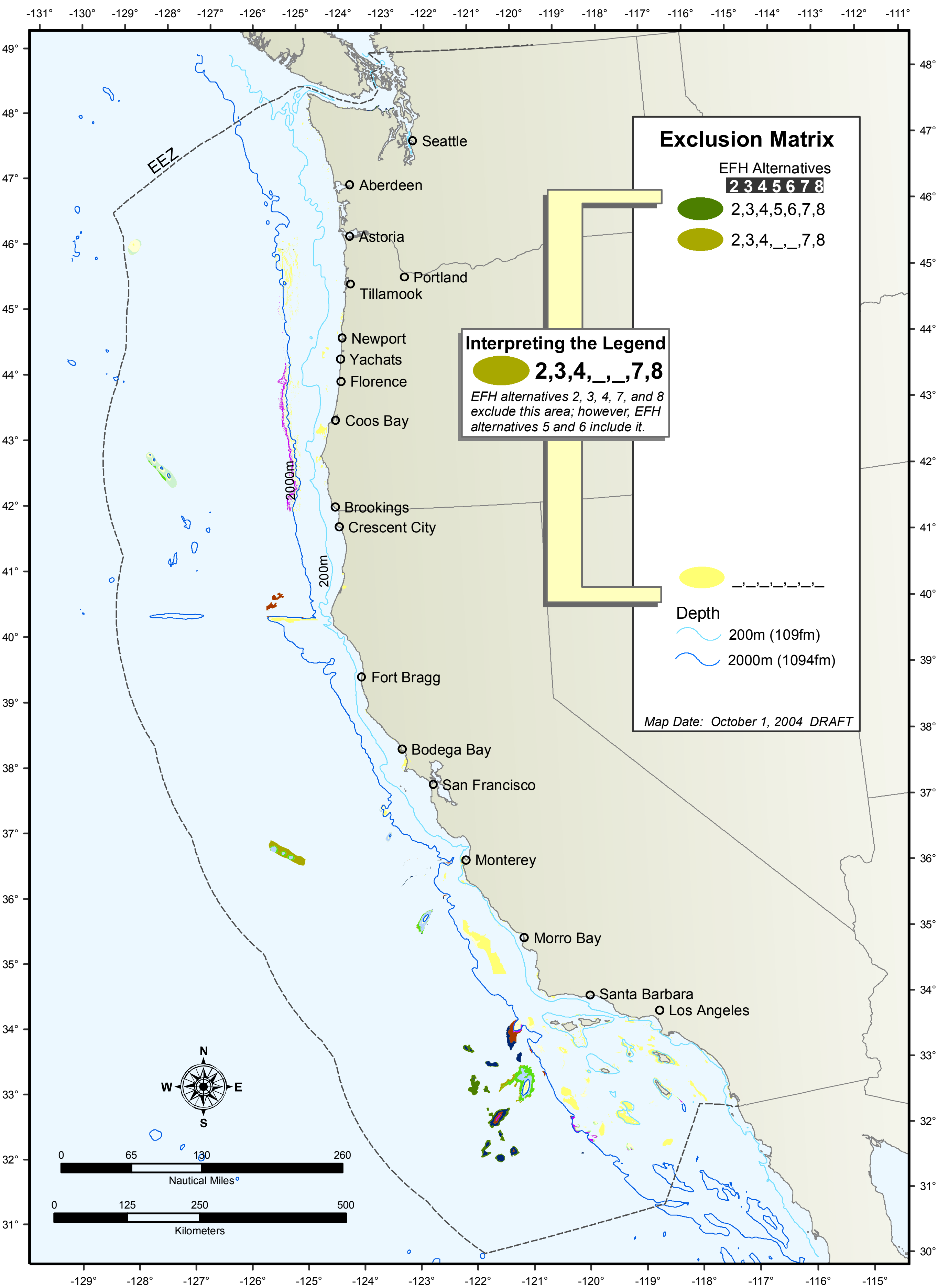
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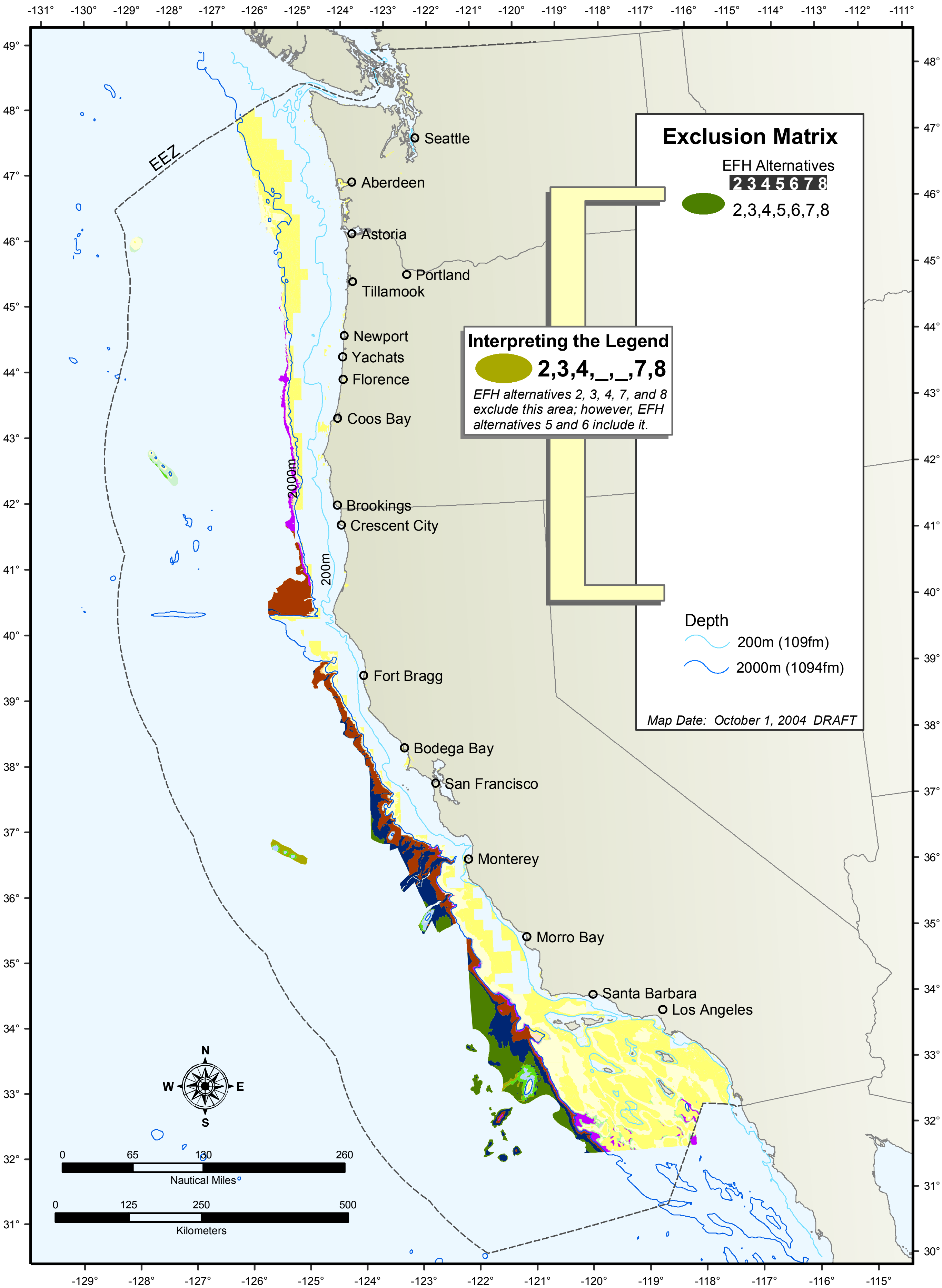

Exclusion Matrix
EFH Alternatives
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Interpreting the Legend
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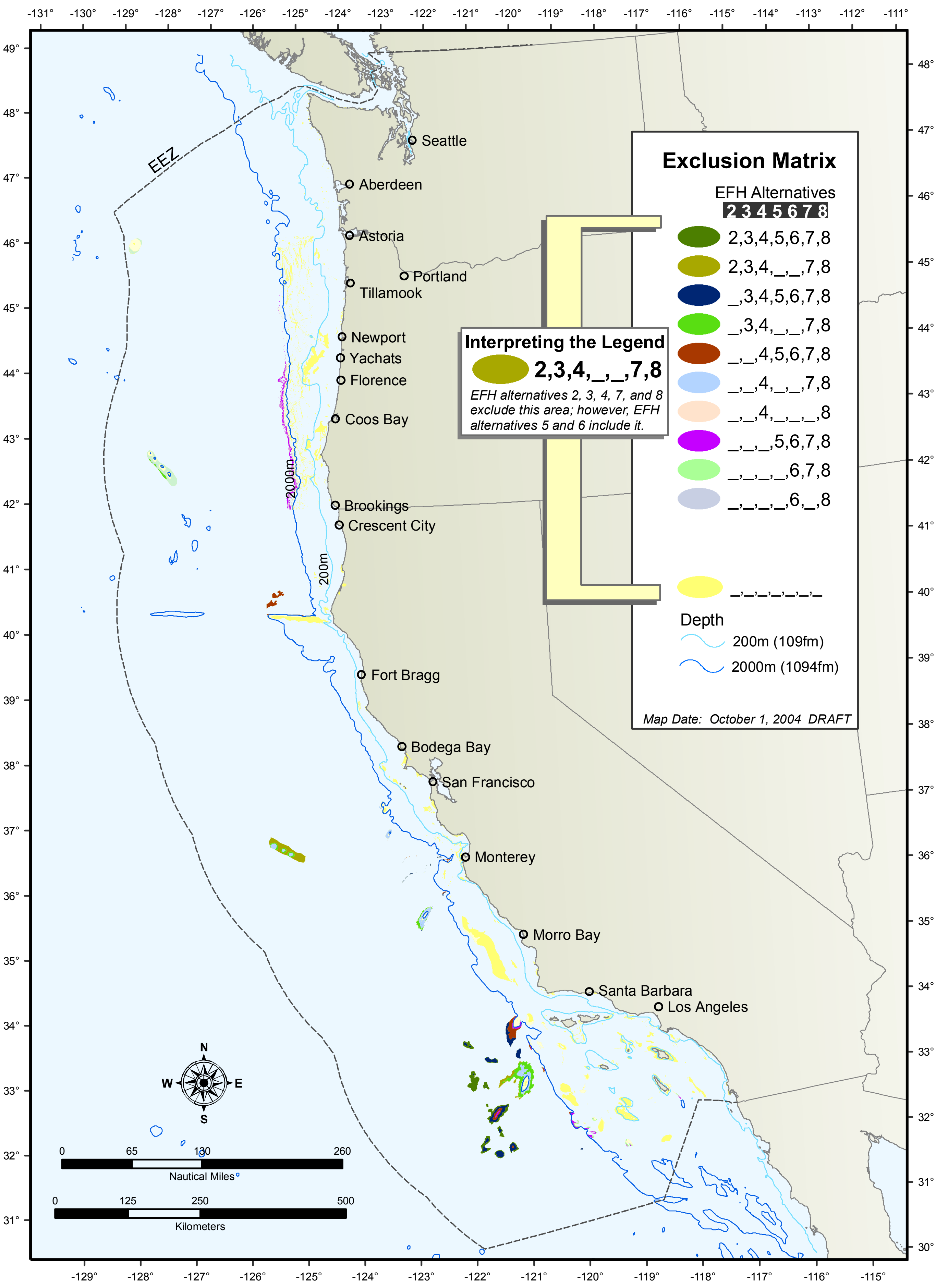

Exclusion Matrix
EFH Alternatives
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Map Date: October 1, 2004 DRAFT
Interpreting the Legend
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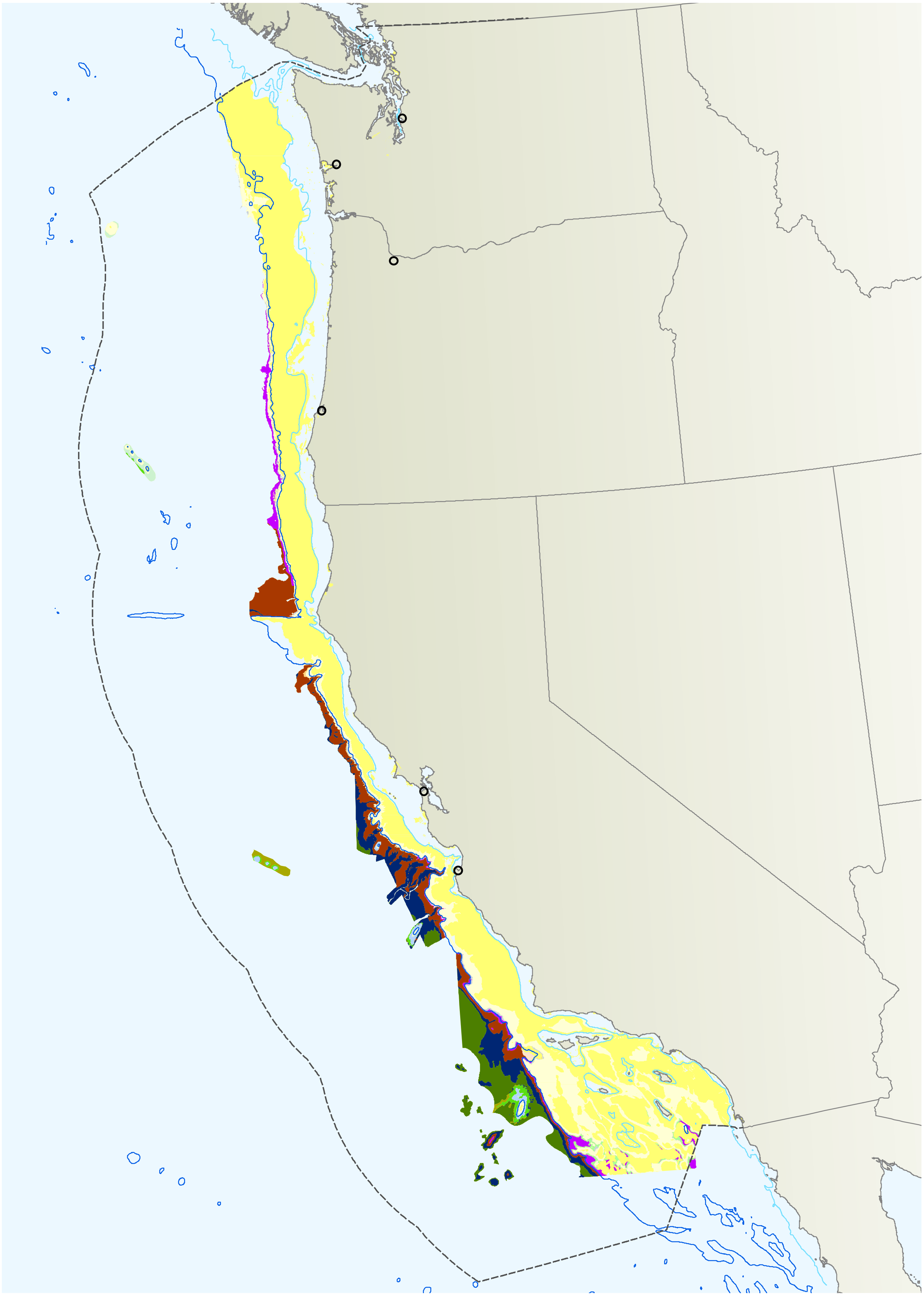

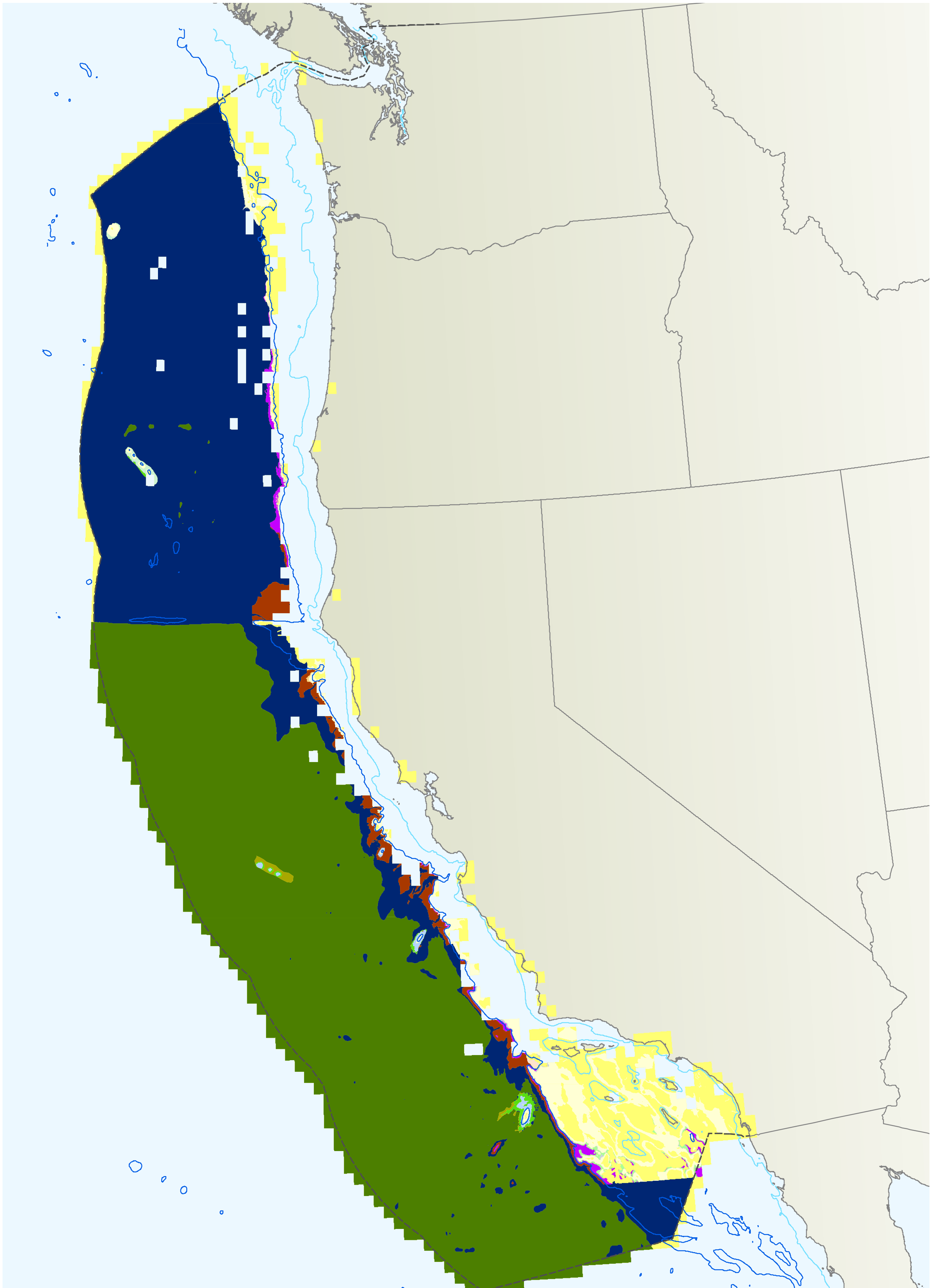

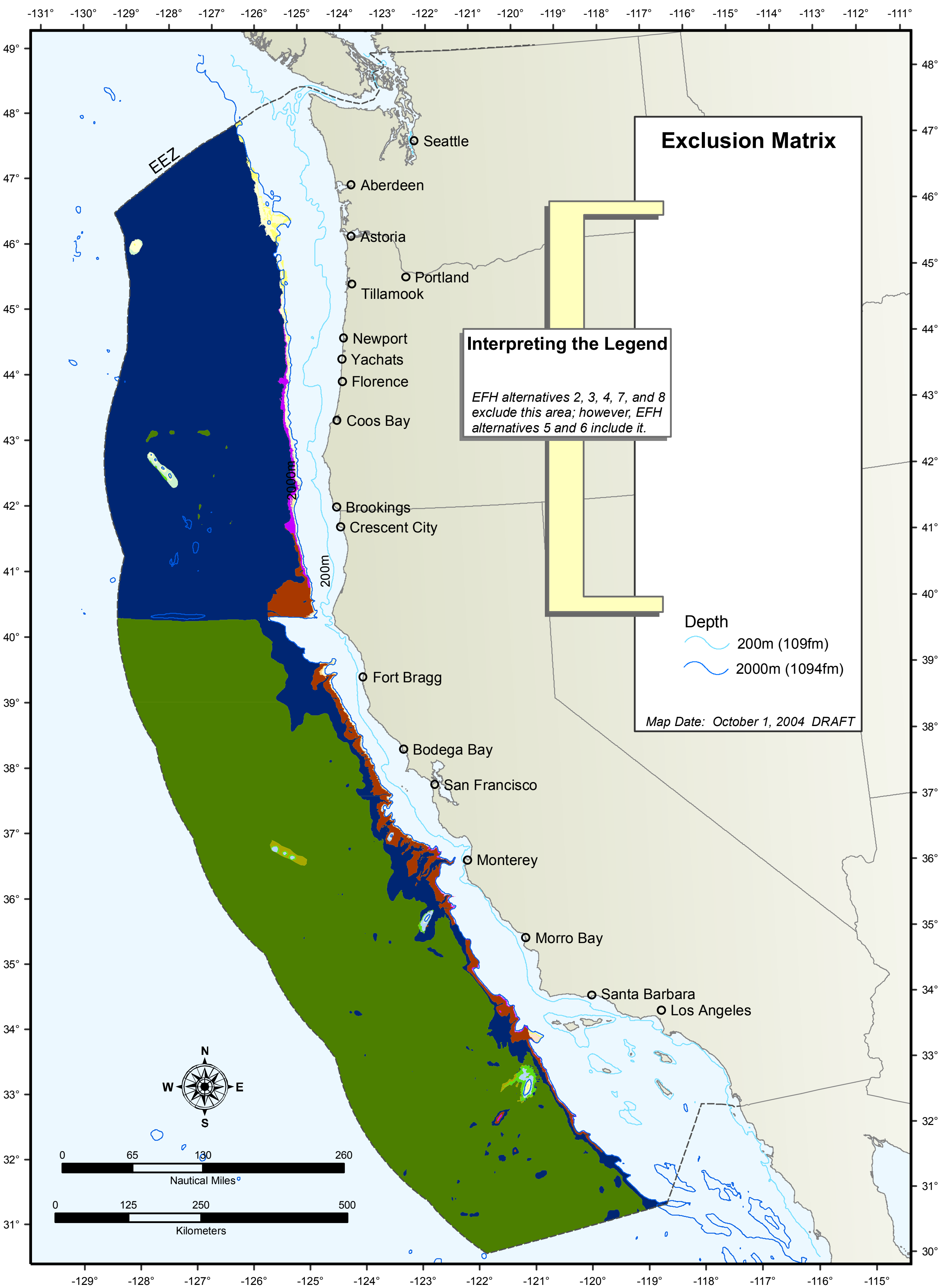

Exclusion Matrix
Interpreting the Legend
EFH alternatives 2, 3, 4, 7, and 8 exclude this area; however, EFH alternatives 5 and 6 include it.
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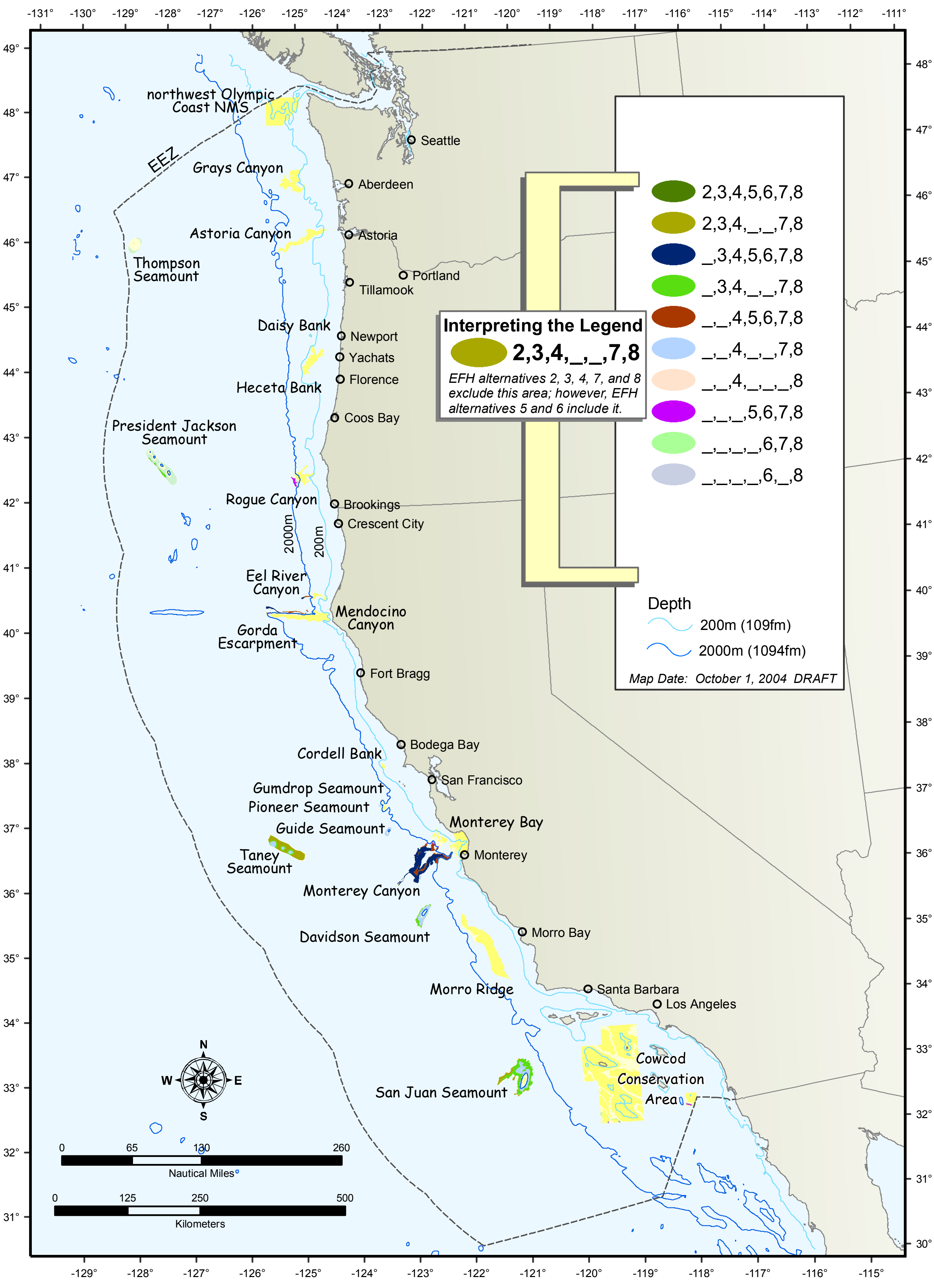
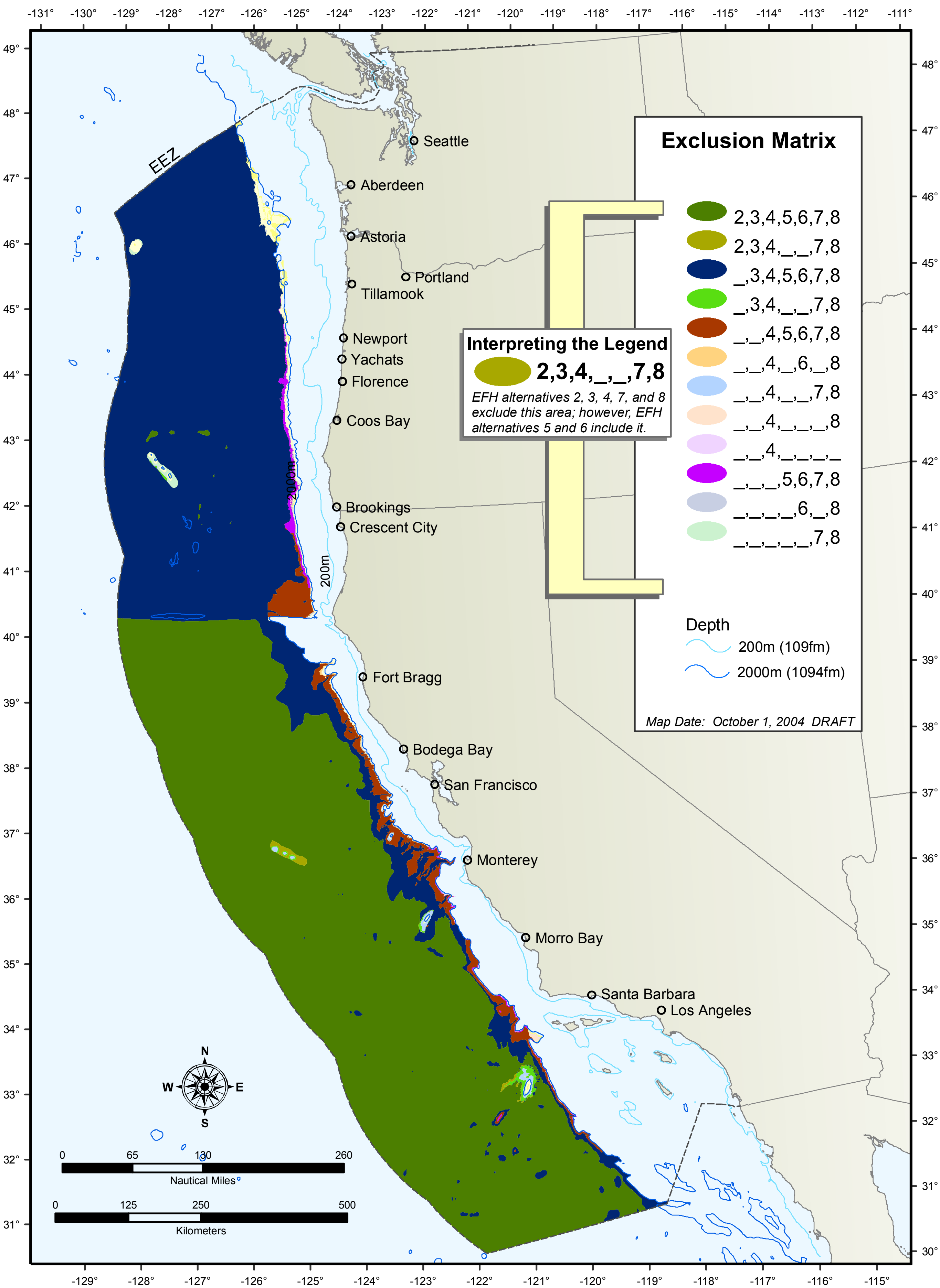


Minimize Impacts Alternative 8: Areas excluded by EFH Alternatives


Exclusion Matrix
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Interpreting the Legend
2,3,4,_,_,7,8
EFH alternatives 2, 3, 4, 7, and 8 exclude this area; however, EFH alternatives 5 and 6 include it.
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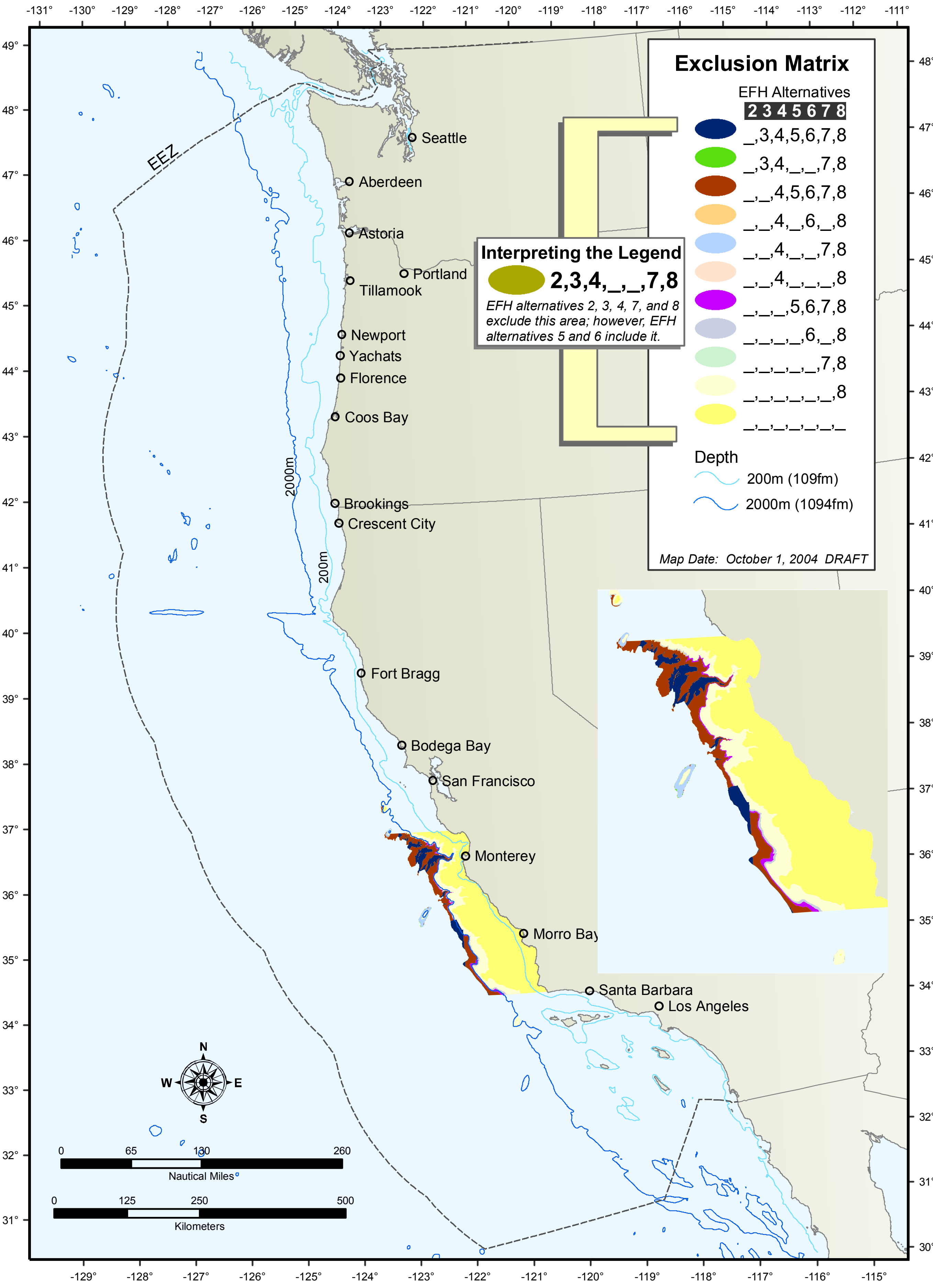

Exclusion Matrix
EFH Alternatives
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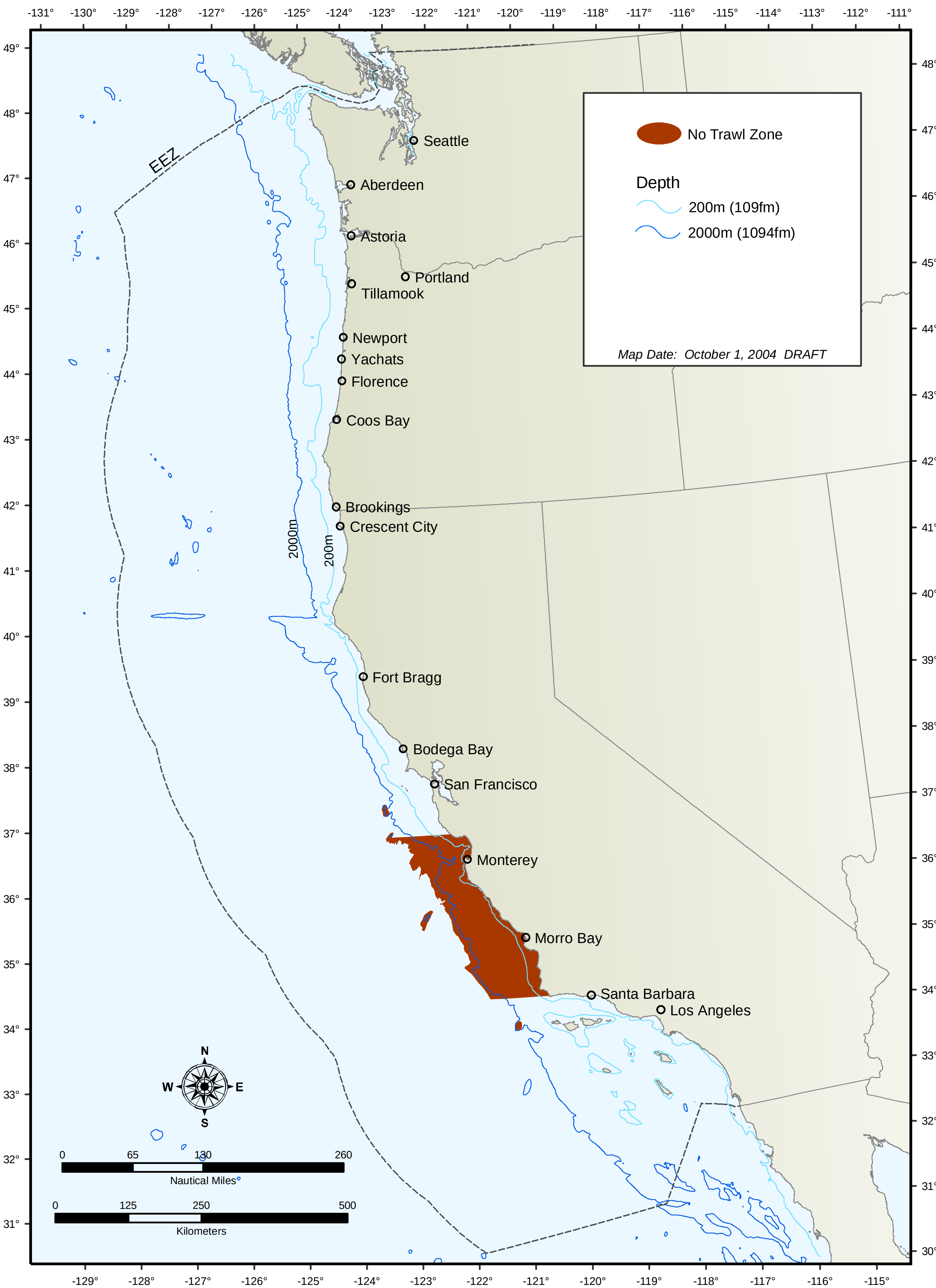

Minimize Impacts Alternative 11: Designate a no-trawl zone on the central California coast (Santa Cruz to Point Conception) in cooperation with The Nature Conservancy and tied to a privately funded buyout of eligible fishing permits in the designated no-trawl zone.

ENFORCEMENT CONSULTANTS REPORT ON GROUNDFISH ESSENTIAL FISH HABITAT - ENVIRONMENTAL IMPACT STATEMENT

The Enforcement Consultants (EC) have reviewed the alternatives listed in the Preliminary Draft Environmental Impact Statement (DEIS). We have the following comments.:

General Comments on Options:

Describe all areas using latitude and longitude coordinates.

Enforcing small area closures will require changes to the current Vessel Monitoring System (VMS) program to make sure there is adequate polling. GEO fencing may be required. This will likely drive up costs for the fisher. One larger area encompassing many small areas is preferable to reduce complexity and confusion in the regulations.

2.4.2.1 Background and identification of Trawl Footrope Restrictions

Option 1, 2, and 3 are all enforceable, but will likely require expansion of the current VMS program to cover vessels currently not required to carry units. It also appears this would include gear used primarily in state-managed fisheries (i.e., crab pots). Review of the current definition of fixed gear will need to be made to ensure it is adequate.

2.4.3 Impacts Minimization Alternative 3

See general comments.

2.4.6 Impacts Minimization Alternative 6

Areas should be kept as contiguous as possible. Do not create a checker board effect where you have blocks of open and closed waters. Try to eliminate as much as possible the need to transit through closed areas to reach an open area. See general comments.

2.4.7 Impacts Minimization Alternative 7

Same comments as 2.4.6.

2.4.8 Impacts Minimization Alternative 8

Option 1: Same comments as 2.4.6.

Option 2: In order to properly evaluate this alternative, a definition of " bottom-contacting activity" is required. It may be preferable to describe specific gear types that would be prohibited. How fishing gear is used is much more difficult to enforce than prohibiting the use of a specific gear type. For example, If a fisher has any kind of weight on his gear, he could potentially contact the bottom and it would be very difficult for enforcement to detect contact. See general comments related to enforcing "areas."

2.4.9 Impacts Minimization Alternative 9

To properly evaluate this alternative, "bottom-tending fishing gear" needs to be defined.

2.4.10 Impacts Minimization Alternative 10

Option 2: To properly evaluate the alternative, the EC needs a clear definition of what a weak link is. Measuring breaking strength could prove challenging? In this situation, we suggest using terminology defining the type of material used to connect the chain to the foot rope (i.e., twine, diameter, etc).

Option 3: To properly evaluate the alternative, a definition of "flat trawl door" is required. Along with prohibiting the use of flat trawl doors, we recommend the prohibition include the possession of them onboard a vessel.

Option 5: Regarding enforcing the length of longline gear, it might be possible to measure the distance between buoys attached to the terminal ends of the gear; however, this distance would not necessarily reflect the length of gear.

Option 7: To properly evaluate the alternative, the EC needs a clear definition of "dredge gear."

Option 10: Same as 2.4.8.

2.4.11 Impacts Minimization Alternative 11

See general comments.

PFMC
11/03/04

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

The Groundfish Advisory Subpanel (GAP) spent several hours debating the preliminary Draft Environmental Impact Statement (DEIS) on essential fish habitat (EFH), including the proposal presented by Oceana. Several attempts were made to choose a set of preferred alternatives, or at least, narrow the range.

The GAP was extremely frustrated, not only by the time line constraints imposed by the court order, but, more importantly, by the data (or lack thereof) available and used to draft the proposed alternatives. Many of the GAP members believe the data are incomplete and, in some cases, incorrect. In the case of the Oceana alternative, there was insufficient time to fully examine the proposal and understand how it fits within the EIS framework. In addition, the Oceana proposal addressed only one gear type and needs further development.

As a result, in spite of extended discussion and debate and consultation with representatives of NMFS and Oceana, the majority of the GAP believes they are unable to choose among the alternatives shown and, thus, will not forward any recommendations to the Council at this time.

A minority of the GAP believes options can be identified and will submit those to the Council as public comment.

PFMC
11/03/04

GROUNDFISH MANAGEMENT TEAM REPORT ON ESSENTIAL FISH HABITAT ENVIRONMENTAL IMPACT STATEMENT

The Groundfish Management Team (GMT) attended the joint presentation on the essential fish habitat (EFH) environmental impact statement (EIS) on Monday and had a discussion with Mr. Steve Copps, NMFS, on the preliminary range of alternatives. The GMT reviewed the EFH Draft EIS and notes that the GMT's recommendations from September have been addressed. While the GMT provided some suggested refinements to the Draft EIS, the GMT believes the current document contains sufficient information for the Council to consider and recommends the Council adopt preferred alternatives at this meeting.

In general, the GMT notes there are other groundfish initiatives (e.g., Bycatch Programmatic EIS, the current and potential use of "hotspots," and area management) with management tools that overlap those contained in the EFH Draft EIS and identified the need for coordination in applying these tools to avoid inconsistency. The GMT also has the following specific comments and recommendations:

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 Draft EIS is a thorough compilation of existing groundfish habitat data, the quantity of data in many instances is sparse. Given the purpose of designating EFH and the sparseness of the data, the GMT recommends the area defined as groundfish EFH be fairly broad in geographic scope.

The GMT also believes that habitat for all groundfish species in the fishery management plan (FMP) needs to be protected, regardless of status (i.e., overfished and non-overfished stocks). As a reminder, there are nearly 90 species in the FMP, and less than 25% of them have been assessed (and, of those assessed, eight have been declared overfished). Therefore, the status of most of the groundfish stocks on the West Coast is unknown.

Alternatives to Designate Habitat Areas of Particular Concern (HAPCs)

The GMT recommends the Council consider selecting a combination of HAPC alternatives (e.g., core habitat for juvenile and adult overfished and precautionary zone groundfish species, as well as nearshore rocky reef areas), even if the resulting maps of the areas overlap one another. The reason for this is that, 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.

The GMT also recommends there be consistent criteria applied and a common purpose to the areas designated as HAPCs (e.g., core habitat for juvenile and adult overfished and precautionary zone groundfish species). Specifically, with regard to HAPC alternative 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.

Also, since the September meeting, the GMT received clarification that the five-year review period is not limited to EFH designation and includes "EFH components" (such as HAPCs). However, it is unclear as to whether the maps depicting the areas designated as HAPCs would automatically be updated as more habitat data becomes available. If the maps are automatically revised with new data, then the GMT does not believe that alternative # 9 (a process to consider proposals for HAPC designation outside the five-year review period) would be necessary.

Alternatives to Minimize Adverse Impacts to EFH

The GMT would like to clarify that the commercial (and, in most cases, recreational) area closures 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 Rockfish Conservation Area (RCA) boundaries–both trawl and nontrawl–are proxies for the areas in which specific rockfish species occur (based on fishing and research 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. As such, the GMT does not believe the RCA boundaries should form the bases for habitat protection measures, such as those specified in alternative 2.

Also, the GMT does not support alternative 6 (close 25% of representative habitat to all fishing) as the GMT does not believe there is sufficient data 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 7), 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 7, and in the EFH EIS in general, is different because it refers to areas of high biodiversity.

The GMT does not support alternative 8 as it is linked with HAPC alternative 7 for the reasons described above.

With regard to alternative 9 (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 6, this alternative may be better addressed as part of the Council's consideration of marine reserve initiatives.

GMT Recommendations

The GMT recommends the Council adopt preferred alternatives for EFH Draft EIS analysis based on the recommendations described above.

PFMC
11/04/04

HABITAT COMMITTEE COMMENTS ON GROUNDFISH ESSENTIAL FISH HABITAT B PREFERRED ALTERNATIVES

The Habitat Committee (HC) has reviewed the alternatives identified for analysis in the draft environmental impacts statement (DEIS). Our recommendations build upon our observations in September 2004, however we are concerned, in general, that lack of data limits the Councils ability to provide the comprehensive habitat protection needed to help ensure the continued productivity of groundfish resources. With limited data, we urge the Council to take a precautionary approach to these decisions.

Essential Fish Habitat (EFH) Designation:

The HC recommends adopting EFH Alternative 2 (currently 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) as the preliminary Preferred Alternative. This recommendation reflects our beliefs that the maximum probabilistic approach to determining EFH, as is represented in this alternative, is reasonable, given data uncertainties; and the added precaution of including some areas beyond depths where data become particularly uncertain is also wise. This alternative would also minimize restrictions to subsequent selections of Habitat Areas of Particular Concern (HAPCs) by the Council.

It is our understanding the proposed EFH designation includes not only substrate, but also the water column above that substrate, including surface waters.

HAPC Designation:

The purpose of HAPCs 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. In September, the HC suggested that means be identified to evaluate whether or not an alternative meets one or more of these criteria. A table relating the HAPC alternatives to these criteria would be useful.

The HC recommends that HAPC Alternatives 2, 3, 4, and 6 (estuary, canopy kelp, seagrass beds, and nearshore rocky reef areas) be combined and identified as HAPCs for Pacific Coast groundfish. Further, we recommend Alternative 6 be broadened to include all rocky reef areas in waters deeper than 35 fathoms that are outside of three nautical miles from shore, not just nearshore rocky reefs. The HC makes these recommendations because we believe these habitat types are particularly susceptible to degradation from human activities, and our intent would be to highlight the importance of the habitats as well as the relative risk.

In March 2004, the HC conveyed to the Council our concern regarding the need for protection of deepwater corals and other biogenic habitat as vulnerable habitat that may provide important fishery (and other) benefits. Because rocky banks serve as substrate for biogenic habitat, designating them as HAPCs would accomplish this goal.

The HC recommends the specific sites in HAPC Alternative 7 that are not already encompassed in Alternatives 2, 3, 4, and 6 be included in the Preferred Alternative, based on their status as sensitive and rare habitat types. In addition, the HC suggests canyons be included in the HAPC Preferred Alternative, because they are especially vulnerable and rare habitat types.

In addition, the HC recommends the Council include Alternative 9 in its Preferred Alternative as a mechanism to streamline future HAPC designations based on new information.

The HC wishes to emphasize that designating HAPC serves to concentrate attention on potential threats to these habitats, but provides no explicit protection.

<u>Impacts Minimization</u>:

The Council, the scientific community, and the public are developing an increasing awareness that complex habitats of relief, including biogenic habitats such as seagrasses and kelp, are important to the growth and survival of managed species. Consequently, the HC recommends the Council=s Preferred 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 zoning measures that would prohibit fishing with mobile bottom tending gear in these areas.

A comprehensive alternative that addresses habitat protection goals would involve zoning restrictions. Several of the alternatives include elements that would be useful in identifying zoning criteria. These include:

_ Alternative 3 (use of habitat sensitivity values).
_ Alternative 4 (limit expansion of bottom trawl fisheries).
_ Alternative 8 (areas of interest as identified by HAPCs).
_ Alternative 13 (Oceana alternative) (criteria used to select areas for protection; however, this alternative does not seem to protect some areas identified as HAPCs).

While the HC thinks Alternative 9 has merit as a zoning alternative, the issue of requiring NMFS to do extensive research without available funds makes it impractical.

Alternative 11 has merit and is progressive in its approach, but is limited in geographic scope. However, if the private parties involved (fishermen and the Nature Conservancy) jointly agree this is a productive proposal, we believe there are habitat benefits that deserve support.

In addition, the HC notes that several of the alternatives to protect habitat from adverse impacts due to fishing incorporate gear restrictions, but the HC feels it is not able to adequately evaluate the efficacy of these measures.

The HC notes the public and the fishing industry will provide additional insight and information on the efficacy of gear restrictions, and all alternatives should be made available for public review in order to take advantage of this broader pool of expertise.

<u>Research and Monitoring</u>:

For research and monitoring, the HC recommends the Council designate a combination of Alternative 2, Option 1 (mandatory logbooks for all groundfish operations) and Alternative 4 (a system of research closures to provide areas for experimentation and observation of habitat condition in open and closed areas) as a Preferred Alternative.

Evaluation of the Council=s measures to protect habitat from adverse effects of fishing is essential to understanding whether any restrictions to fishing activities are warranted and justified. Developing these evaluations through carefully structured comparisons of open and closed areas that are matched for habitat type 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 changes in oceanographic conditions and recruitment events that may take place over broader areas.

Clearly, implementation of research closures requires that goals and objectives be identified, as well as mechanisms for siting and monitoring. This is a topic the Council has endorsed for inclusion in a recommended Marine Protected Area policy white paper.

Additionally, as the technology becomes available and affordable, adoption of an electronic logbook format would facilitate more broad and rapid use of logbook data.

PFMC
11/03/04

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

The Scientific and Statistical Committee (SSC) discussed the Draft Environmental Impact Statement (DEIS) for Essential Fish Habitat. Mr. Steve Copps (NMFS-Northwest Region) and analysts from Oceana were present for discussions and responded to SSC questions. The DEIS for Essential Fish Habitat (EFH) is a complex and lengthy document, with alternatives for EFH designation, Habitat Areas of Particular Concern (HAPC) designation, and mitigation of adverse impacts.

Comparison of alternatives is the core of an EIS, and it is important the criteria by which alternatives are ranked be carefully defined and clearly articulated. EFH designation alternatives were evaluated with respect to geographic resolution and scientific uncertainty with scores ranging from environmentally positive to negative (E+ + + to E-). It was not clear to the SSC how to interpret these scores, nor how the different alternatives were scored. A similar lack of clarity is present in the scoring of HAPC alternatives and mitigation alternatives.

The main body of the EIS lacks any discussion of the link between impacts on EFH and the productivity of Council-managed groundfish, and does not address why impact mitigation measures are needed. While definitive proof would be difficult to demonstrate, the EIS should make a reasoned argument that fishing impacts on habitat are more than minimal and not temporary in nature, and thus require mitigation measures. Some of this rationale may be available in the Comprehensive Risk Assessment, and could be brought forward in the main EIS document.

A document describing a mitigation alternative developed by Oceana was distributed during the meeting, so the SSC was unable to conduct a comprehensive review of the analytical approach. However, the Oceana proposal is the only one to contain an alternative that deals explicitly with protection of habitat-forming invertebrates, such as deep-water corals and sponges. The introduction to the Oceana proposal lists five categories of management measures, including closed areas, catch restrictions, gear restrictions, and enhanced monitoring and research. Only measures relating to closed areas are developed and analyzed in the document, so at this point the alternative cannot be considered fully developed.

Economic impacts of mitigation alternatives involving spatial closures were evaluated using "revenue at risk" derived from logbook data by 10-minute blocks. Different methods were used for the Oceana alternative and other alternatives. The Oceana alternative assigned revenue to a closed area proportionately according to the fraction of the 10-minute block inside the closed area, while other alternatives used the entire revenue associated with the block. For the comparisons across alternatives to be meaningful, the same methods need to be used for all alternatives. Using the revenue for the entire block gives an upper bound on the potential revenue at risk, but the Oceana approach is likely to be more accurate. It is not clear whether the Oceana approach would tend to underestimate or overestimate revenue at risk, as fishing could be concentrated in, or avoid, the area proposed for closure.

The SSC notes that the research and monitoring alternatives deal primarily with collection of new data on spatially-explicit fishing impacts. Notwithstanding previous SSC criticism of particular fishing impact models, the SSC encourages further work on developing spatial models for fishing impacts, as these issues are ongoing, and a suitable modeling tool would be extremely valuable.

The SSC highlights its previous recommendation for a logbook program for nontrawl fisheries. The SSC suggests the alternatives for research and monitoring should include increased observer coverage. Research reserves would be needed to determine the effects of fishing gear on habitat. However, establishment of such reserves would be a major undertaking and would require that areas be left open for several years to establish a baseline. The SSC's white paper on marine reserves discusses design considerations for research reserves.

PFMC
11/04/04

Mr. Chairman,

The tribes would like to reiterate that treaty fisheries be recognized as exempt from any fishing impact mitigation alternative that would negatively impact treaty fishing rights. It is our understanding that all of the Council-developed alternatives currently contain this exemption even if not explicitly stated in the current draft of the EIS; however, it should be noted that this would apply to all alternatives going forward in the EFH DEIS. We will continue working with NOAA Northwest Region Staff to develop and/or specify appropriate habitat protections.

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175 South Franklin Street, Suite 418 +1.907.586.4050
Juneau, AK 99801 USA www.oceana.org

October 13, 2004

Mr. Donald Hansen, Chairman
Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Chairman Hansen and Dr. McIsaac:

Thank you for your commitment to assess a comprehensive approach to meet the Sustainable Fisheries Act's Essential Fish Habitat mandates off the Pacific coast. We appreciate the opportunity to work with you in the development of the Essential Fish Habitat Environmental Impact Statement that will be used to build a preferred alternative to protect and conserve ocean habitat while maintaining vibrant fishing opportunities.

We will be submitting supplemental materials describing our Comprehensive Alternative before the November Council meeting. A brief description of this Comprehensive Alternative is provided below. Unfortunately, circumstances have precluded us from providing a fuller description and analysis at this time.

As you know, members of the public, like us, are not privy to the full suite of fishery information, and so we must rely on NOAA to analyze the data it collects, and use those analyses to construct our Comprehensive Alternative. In particular, we have had to rely on the agency for fishery effort data, even in the aggregate. NOAA Fisheries was able to provide us with preliminary economic analysis information today, but obviously we are not able to process and modify in time to make today's deadline for materials to be included in the briefing book for Council review.

In addition, and more importantly we do not have the full suite of fishery information that relates to biogenic habitat available to us. The NWFSC's *Preliminary Report on Occurrences of Structure-Forming Megafaunal Invertebrates off the West Coast of Washington, Oregon and California* (2004) was constructed using data and information from trawl surveys, observer data, and submersible dives. The information and data referenced in the report can and should be used in the development of alternatives to mitigate fishing effects on this sensitive habitat. For example, NOAA trawl surveys off the coast of Oregon document over three and a half metric tons (3,600 kg) of *Hexactinellid* glass sponges, clay pipe sponges, and other sponges in a 25 km^2 area. According to science and law, this area should receive some focus and protection. We continue to work on defining "hotspots" of biogenic habitat that warrant protection. But quite simply that is extremely difficult since we do not have the full suite of information and data.

We are frustrated that the agency is apparently uninterested in exploring ways that we suggest to use the NWFSC's available data to develop mitigation measures. In our efforts to develop ways to best use this available information, we were told by that agency that in order to analyze the data, we would have to contract privately with the GIS firm performing the EFH analyses; but the contractor would not be permitted to use the trawl observer bycatch data in any such analyses. This makes it substantially more difficult to review the actual occurrences, identify clusters of structure forming invertebrates and explore ways to use the data to address adverse impacts. Nevertheless, we will continue our efforts to do so, for your review, discussion and ultimate consideration in building a preferred alternative.

We are in this process today because the law mandates that NOAA protect habitat. Specifically, the Sustainable Fisheries Act requires NOAA to describe and identify essential fish habitat (EFH); minimize to the extent practicable adverse effects on essential fish habitat caused by fishing; and identify other actions to encourage the conservation and enhancement of such habitat. By law, essential fish habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Because NOAA was not complying with federal law in satisfying these requirements, Oceana and others were forced to sue the agency and compel the EFH Environmental Impact Statement currently in progress.

If the law is the direction, science is the compass that sets the course. Concerning habitat destruction, the National Academy of Sciences, National Research Council, 2002 report *The Effects of Trawling & Dredging on Seafloor Habitat* states that bottom trawling reduces the complexity and biodiversity of seafloor habitat and is especially harmful in areas of corals and sponges. The Academy recommends three management measures to mitigate the destructive impacts of bottom trawling: closures, gear modifications, and effort reduction.

Using these guiding management principles, we developed the approach which we are now applying to the EFH EIS process on the Pacific Coast. This approach uses science by gathering and mapping all available data and information on important seafloor habitat as well as on bottom trawling fishing effort. Using this information, we then freeze the existing bottom trawling footprint, close areas within the existing footprint that have important seafloor habitat, establish bycatch caps for corals and sponges, make commensurate effort reduction, employ appropriate gear modifications, and finally, set in place ongoing research and monitoring. Thus, this scientific approach both provides information for management decisions and allows for protection of habitat while maintaining vibrant fisheries.

The approach is both necessary and timely. The Center for Independent Experts is the formalized body that provides this quality assurance for NMFS. A CIE panel comprised of internationally recognized experts with expertise in benthic ecology, fisheries oceanography, fishery biology, fisheries assessment, fishing gear technology, and biophysical modeling recently reviewed the Alaskan region habitat models and conclusions used in their EFH EIS process. The CIE report states: “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 at 21)

Both the U.S. Commission on Ocean Policy and the Pew Oceans Commission reports state that our oceans are in peril and we need to immediately change the way we manage our oceans. The above outlined approach manages for the health of the biodiversity of the ocean ecosystem instead of for the productivity of single species money fish. It is the kind of approach we must adopt if we are to save our oceans from further decline and ultimate collapse.

Sincerely,

Jim Ayers

Jim Ayers
Director, Pacific Region

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

California Regional Office
201 Mission Street, Fourth Floor
San Francisco, CA 94105

tel [415] 777-0487
fax [415] 777-0244

nature.org
nature.org/california

October 13, 2004

Mr. Donald Hansen
Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland Oregon 97220-1384

Dear Chairman Hansen:

At its September 15-16, 2004 meeting in San Diego, the Pacific Fisheries Management Council identified and adopted a preliminary range of alternatives for its Essential Fish Habitat [EFH] Environmental Impact Statement. These alternatives address designation of EFH and Habitat Areas of Particular Concern, minimization of adverse impacts of fishing on EFH and research and monitoring. The Nature Conservancy and Environmental Defense have put forward an alternative to minimize adverse effects of fishing on EFH [Alternative 11] in our project area; and here we attach information we believe will be useful in your analysis of this alternative during the NEPA process. In addition, we would request that the relevant portions of this information be included in the briefing book for the November PFMC meeting in Portland.

In the process of compiling data to analyze both the economic and ecological impacts of our alternative, we have discovered that much of the necessary information is either not yet available or confidential. For example, we would like to have access to NOAA Fisheries' HSP GIS data for the species and life stages that are available, so that either TNC/ED can analyze that data or have NOAA do that analysis for us. Secondly, for us to do a thorough job of determining the economic costs for fishers if certain areas are closed to bottom trawling, we need better data that reflects their preferred and traditional trawling grounds. And finally, as more information about the negative impacts of fishing gears on benthic habitats, particularly bottom trawl gear, becomes available, we would greatly appreciate you sharing that information with us as well.

Many thanks for your consideration,

Sincerely,

Chuck Cook
Director, Coastal and Marine Program
The California Nature Conservancy
111 Topa Topa Street
Ojai, California, 93023

Rod Fujita
Senior Scientist / Marine Ecologist
Environmental Defense
5655 College Ave.
Oakland, CA 94618

Analysis of Alternative 11 to Minimize Adverse Impacts to Essential Fish Habitat: Buyout and Establishment of No-Trawl Zones off the Central California Coast

The Nature Conservancy of California
and
Environmental Defense

Chuck Cook and Mary Gleason (The Nature Conservancy)
Rod Fujita (Environmental Defense)

October 13, 2004

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Analysis of Alternative 11 to Minimize Adverse Impacts to Essential Fish Habitat: Buyout and Establishment of No-Trawl Zones off the Central California Coast

The Nature Conservancy of California
Environmental Defense

Chuck Cook and Mary Gleason (The Nature Conservancy)
Rod Fujita (Environmental Defense)

October 13, 2004

PROJECT DESCRIPTION

In July 2003, The Nature Conservancy [TNC] of California and Environmental Defense initiated exploratory discussions with participants in the bottom trawling industry (fishermen and processors) along the Central Coast of California. TNC, Environmental Defense, and many of the participants began to explore and understand how, together, we might protect benthic habitat for groundfish and move towards more sustainable fisheries, including bottom trawling, in marine waters extending from Point Conception to Sand Hill Bluff near Davenport, California (Figure 1).

The project aims to protect biodiversity and promote recovery of groundfish stocks through the establishment of large no-trawl zones in waters between Point Conception and Sand Hill Bluff. The concept that emerged is for private funders to purchase a significant majority of the bottom trawlers in the project area contingent upon a commitment from NOAA Fisheries and the Pacific Fishery Management Council to establish substantial no-trawl zones to protect high-value conservation areas within the project area. Participatory research would be conducted to take advantage of the no-trawl zones to investigate their effects on ecosystem structure and function, including groundfish population dynamics. While our mission is the protection and conservation of biodiversity, we strive to employ innovative strategies that engage stakeholders and minimize conflicts with resource users.

Project Area Description

The Central Coast project area extends from Point Conception to Davenport, California and includes the offshore seamounts (Gumdrop, Guide, Pioneer, Davidson, and Rodriguez). This area was selected because of its incredible biological diversity and ecological value. It contains nearly the full range of habitat types found on the continental shelf and slope, including estuaries, nearshore rocky reefs, kelp forests, highly diverse soft and mixed bottom habitats, deep canyons, offshore banks, and seamounts. These diverse habitat types are critical for the support of a correspondingly rich array of species, including 21 cetacean species, 6 pinniped species, 184 species of shore and sea birds, and hundreds of fish and invertebrate species. In addition, there is evidence suggesting that benthic biodiversity peaks in upwelling zones at the shelf/slope break in 200 – 300 m of water in this area.

NEED FOR ACTION

The National Academy of Sciences has stated that "…there is an extensive literature on the effects of fishing on the seafloor. It is both possible and necessary to use this existing information to more effectively manage the effects of fishing on habitat" (NRC 2002). They recommend that management of the effects of trawling should be accomplished by a combination of:

- Fishing effort reductions
- Modification of gear design or gear type
- Establishment of closed areas to fishing

Bottom-trawling has become a source of concern because of the size of the affected fishing grounds, the modification of the substrate, disturbance of benthic communities and removal of non-target species (NRC 2002).

The draft risk analysis for Pacific groundfish included an evaluation of the sensitivity of different habitat types to fishing impacts from 5 major gear types, including bottom trawling, and ranked portions of the project area, especially the slope, with the highest sensitivity ranking (2.26-3.0) and longest recovery times (Risk Assessment for the Pacific Groundfish FMP, v. 4. August 2004).

Few studies of the impacts of trawling have been conducted in the project area; however, the scientific consensus (including the expert opinion of scientists serving on the Pacific Fishery Management Council's technical advisory committee on Essential Fish Habitat, which is charged in part with assessing the impacts of fishing in federal waters off the US Pacific coast) is that inferences about the impacts of trawling in a particular place can be made from the dozens of studies of trawl impacts conducted throughout the world, with appropriate adjustments made for differences in habitat type, biota, and fishing practices. More background information is provided in an addendum to this document.

PROJECT IMPLEMENTATION

Despite some differences of opinion concerning the validity of scientific issues that have guided or misguided past management protocols, trawl fishermen, processors, TNC, and Environmental Defense have moved forward in our discussions concerning a private sector purchase of numerous federal bottom trawling permits and vessels.

TNC and Environmental Defense have a working list of fishermen who we think regularly trawl the project area (23 permit holders) and we have met with all of those owners or their representatives. Most of the fishermen home port in Morro Bay, Moss Landing, Monterey or Half Moon Bay. We are also meeting with local processors and open-access fishery representatives to gauge potential impacts on these sectors and develop solutions to address their concerns. Our project approach would be to purchase a significant majority of the bottom trawling permits and vessels in this region in exchange for a significant portion of the project area designated as no-bottom-trawl zones. The no-trawl zones would be sited using a participatory process with the goal of maximizing conservation gains while minimizing adverse socioeconomic impacts on processors and fishermen remaining in the fishery.

It is important to note that while this project could potentially result in the establishment of large no-trawl zones, it is being considered only as a mitigation alternative. The project is site-specific and will not apply to the entire area of PFMC's jurisdiction and so should not be construed as a full EFH designation alternative. Rather, it is intended to complement a broader-scale EFH alternative with a geographic scope that is consonant with the PFMC's jurisdiction.

The following project components are being explored and discussed amongst the parties. This summary does not imply that any agreements have been reached or decisions have been made by any of the parties.

Protection of Essential Fish Habitat, Conservation of Biodiversity, and Scientific Research Objectives for the Project

The project aims to protect biodiversity and promote recovery of groundfish stocks through the establishment of large no-trawl zones in federal waters between Point Conception and Sand Hill Bluff. The no-trawl zones would include representative benthic habitats (hard, soft, and mixed substrates in several depth ranges) as well as important benthic features such as submarine canyons, sea-mounts, the shelf-slope break, and offshore reefs and banks that are important components of EFH for multiple species of groundfish and their various life stages. These no-trawl zones should comprise a significant but yet-to-be-determined percentage of the project's geographical area. This proposal aims to protect representative seafloor habitats at sites currently not impacted by bottom trawling and to allow previously trawled areas to recover.

Another important project objective is to be able to scientifically evaluate the ecosystem recovery process, if any, by monitoring, observing and documenting what happens to the benthic habitats, and the biodiversity they support, post-trawling. In discussions amongst industry participants and conservation groups, it is clear that both camps distrust the "science" of the other side and this sticking point has been a major impediment to moving forward on an acceptable management plan for groundfish. This proposal, if successful, will provide a unique "living laboratory" for scientific research opportunities aimed at objectively determining the impacts, if any, on dragging the seafloor in the Central Coast of California. Through careful siting and monitoring of replicated no–trawl zones, the scientific community and industry can address critical questions that need to be answered to guide adaptive management of marine resources.

The Nature Conservancy and Environmental Defense have Attempted to Identify the Fishermen's Objectives for the Project

While we clearly do not pretend to represent Central Coast trawlers, we have been informed about many of the fishermen's concerns with our proposal. The most frequently heard concerns include:

1. Fishermen who wish to remain in the industry are concerned that their "rights" to trawl in their fishing grounds through the establishment of designated bottom trawl zones between Point Conception and Sand Hill Bluff are protected. These areas should

comprise a yet to be determined percentage of the project area and be located in areas that can sustain their businesses financially.

2. Fishermen want to eliminate current and future contradictions and confusion between the Rockfish Closure Areas, potential Essential Fish Habitat designations, potential marine reserves and potential no-trawl zones. In other words, they wish to simplify the rules for bottom trawlers and remove some of the uncertainty going forward.

3. Fishermen want an equitable formula for valuing the permits and vessels that can be agreed upon by buyer and sellers.

4. Fishermen want flexibility in the private acquisition process by giving consideration for allowing fishers to retain their vessels for future participation in NON-bottom trawl related fisheries, especially where they already own permits for different fisheries.

5. Fishermen want readily available landings, processors, and markets to sell their fish.

<u>Mechanism of Transactions and Potential Council Actions; Projected Timelines</u>

There are many project components that need to be executed between the fishers and TNC/Environmental Defense, as well as by the Council and NMFS, for this private buyout endeavor to be successful. Many of these actions are explicitly linked and will require extraordinary coordination and cooperation amongst the private and government parties. Our current thinking includes the following recommended sequence of actions:

Recommended Actions	Timeline
1. PFMC chooses The Nature Conservancy/Environmental Defense proposal as a preferred mitigation alternative to be analyzed in the EFH –EIS; NOAA assists with detailed socioeconomic and ecological analysis.	November, 2004
2. The Council and NMFS work with TNC/Environmental Defense and the fishermen to establish a control date that helps identify the number of participants eligible for the private buyout. Only those fishermen with a bona fide history of trawling in the project area should be eligible.	November, 2004
3. The Council and NMFS work with TNC/Environmental Defense and the fishermen to designate a geographical project boundary for our alternative	November, 2004
4. TNC/Environmental Defense and industry participants continue discussions and negotiations on key issues of valuation and attempt to reach agreement.	Nov. – Dec., 2004
5. TNC/Environmental Defense and industry participants identify and negotiate trawl and no- trawl zones and make a joint recommendation to NMFS and the Council	Nov. – Dec., 2004
6. The Council approves the trawl and no-trawl zones contingent upon	To be determined

TNC/Environmental Defense successfully negotiating an option to purchase or contract to purchase at least 50% of the eligible permits in the project area and TNC/Environmental Defense having a proven line of credit available to close those transactions. The contracts would be required to be consummated before or soon after the no-trawl zones went into effect.	

Identification of Proposed No-Trawl Zones and Designated Trawl Zones
TNC and Environmental Defense want to work with the trawlers and the agencies to jointly develop a benthic habitat map that includes the fishermen's first hand knowledge of the seafloor and the best available information from relevant agencies and informed scientists. Constructing a map of this quality could be useful for all parties in determining EFH in the Central Coast of California. We would work with NOAA to incorporate information on habitat suitability for groundfish and other data and models developed through the EFH process.

In addition to the Greene benthic habitat dataset (Figure 2), TNC has developed a benthic habitat map based on depth, substrate type and topographic position (flats, ridges, canyons, slopes) and compiled a GIS database of important biodiversity targets in the project area for our ecoregional scale conservation planning. Through our ecoregional planning process, TNC has identified areas important for conserving elements of biodiversity such as representative benthic habitats, kelp forests, estuaries, upwelling zones, submarine canyons, seamounts, seabird colonies, and many other targets. We can overlay those important conservation areas with other information or data sources relevant to groundfish such as (Figure 3):

- Top 20th percentile fish diversity (from the NOAA biogeographic assessment)
- Top 20th percentile fish density (from the NOAA biogeographic assessment)
- Shelf-slope break (200-300m)
- Rocky substrate (from Greene)
- Bathymetric complexity (from NOAA biogeographic assessment).

TNC/Environmental Defense proposes to use both a site-selection algorithm, such as MARXAN, and expert/fisher input to identify appropriate trawl and no-trawl zones. These would be the primary inputs into a participatory, facilitated process involving TNC, Environmental Defense, trawlers willing to sell, representatives of trawlers and other sectors that would remain, and processors aimed at maximizing the conservation benefits while accommodating the varied interests of these parties, including: (1) ensuring that sufficiently productive grounds remain open to fishing; (2) minimizing the impacts of changes in fish supply on processors; (3) minimizing adverse impacts on other fishery sectors..

We do not currently have all the information needed to fully analyze this alternative. In particular, the additional data needed to identify no-trawl and trawl zones and analyze conservation and economic impacts include:

- Identification of important sites for conservation (to be compiled from expert input of regional scientists and and fishers). Regional-scale benthic maps do not adequately capture areas of biodiversity importance known from submersible dives and years spent fishing in the region.

- Habitat suitability for groundfish (NMFS models)
- Habitat sensitivity rankings and estimated recovery times for habitats in the project area (from the draft Risk Assessment)
- Identification of areas important for economic sustainability of the fishery (to be compiled from fishers)
- Trawling effort (from confidential trawling logbooks compiled by NMFS)

CONSERVATION IMPACT

Since the no-trawl zones would be sited through a participatory process aimed at minimizing socioeconomic costs and maximizing conservation benefits (and because we do not have access to confidential trawl track information), we cannot provide an accurate appraisal of these costs and benefits at this time.

Designating a significant majority of the project area as no-trawl zones would result in a significant reduction in adverse impacts to habitats important for groundfish and other species. We anticipate a high conservation impact from this alternative, if large areas of high conservation value are protected from trawling impacts, due to the abundance of important biodiversity resources in the project area.

Many economic costs will be minimized by the nature of the project (private sector buyout); we will strive to minimize other costs (e.g., to remaining trawlers, other gear sectors, and processors) through equitable siting of remaining trawlable areas.

Advantages

While this alternative was placed in the context of impacts mitigation, it also addresses other core components of the EFH-EIS process:

- Designation and Protection of Essential Fish Habitat: Identification of a large part of the shelf and slope as no-trawl zones would provide protection for EFH for several life stages of multiple species. Identification of these no-trawl areas would be accomplished in conjunction with the Council and would be based on Habitat Suitability models for groundfish and other data compiled during the EIS, fisher knowledge, and other sources of information that TNC has compiled for our ecoregional planning.
- Identification of Habitat Areas of Particular Concern (HAPCs): TNC has compiled data on representative benthic habitats, seamounts, structure-forming invertebrates, canyon heads, estuaries, kelp beds, and many other components of biodiversity and we will work with the Council and fishers to identify HAPCs as core components of the no-trawl zones.
- Minimization of Economic Impacts: TNC/Environmental Defense will use private funds to purchase permits and vessels, and will work with the Council to identify trawlable zones that would promote economic sustainability for the remainder of the fleet and the processors who buy from them.

- Reduced Conflict: The proposed buyout of willing sellers will be contingent upon a set of no-trawl zones, agreed upon through a participatory and deliberative process, potentially reducing conflict over measures to reduce the impacts of trawling in the project area at the Council level.
- Adaptive Management: The identification of trawlable and no-trawl zones in a replicated and scientific manner and the implementation of scientific studies and monitoring will provide much-needed data for adaptive management of the groundfish fishery.

<u>Disadvantages</u>:
Disadvantages of this alternative include:

- Incomplete geographic scope: While the project area contains important fishing grounds, this project would designate only a portion of the PFMC's area of jurisdiction (about 5%) and so does not constitute a full EFH designation and protection alternative. It should be analyzed as a mitigation alternative.

- Paucity of socioeconomic data: We anticipate that this will be rectified through confidential discussions with fishermen aimed at understanding where critically important areas for economic viability are. In addition, we anticipate that NOAA Fisheries will use existing information on trawl intensity to assist with this effort.

- Incomplete impact protection: The project focuses on reducing the impacts of bottom trawling exclusively, due to the preponderance of evidence suggesting that bottom trawling damages bottom habitats. It does not afford protection from other kinds of fishing, for which there is less empirical evidence of habitat impacts.

CONSEQUENCES

<u>Effects on Fishery</u>

Ecosystem recovery, increased fish size, increased fish fecundity, and increased larval survivorship due to higher egg viability may result from the establishment of no-trawl zones (provided that these benefits are not dissipated by increased fishing effort by other gear sectors). These effects would be expected to enhance larval export and recruit/spawner ratio. Sport fisheries may benefit from larger fish size and higher encounter rates (due to increased fish population density).

Displacement of Effort: Displacement of fishing effort should be minimal due to purchase of trawlers and careful siting of no-trawl zones. However, there is potential for displacement north of Davenport into the northern section of Monterey Bay National Marine Sanctuary and parts of the Gulf of the Farallones National Marine Sanctuary that contain areas of very high conservation value (Figure 3).

Remaining fishery may shift to fishing to maximize value (e.g., by landing live fish) as a result of reduced tonnage and reduced fishing area.

Inelastic effort: Trawl effort (e.g., for flatfish) cannot necessarily shift into other gear sectors (e.g., hook/line, pots for rockfish), potentially reducing supply of flatfish to processors.

Increased costs of federal buyout by remaining trawlers: Existing trawlers are obligated to pay back a share of the federal buyout loan. Because the project would remove some of these trawlers from the fleet, the loan obligation for the remaining trawlers would increase proportionally. Our intent is to include this obligation in our valuation analysis.

Fate of fish "released" through buyout unclear: If all of the fish that was caught by the bought-out trawlers were re-allocated to remaining trawlers, this might compensate for reduced trawlable area; however, it may not be possible for the trawlers remaining in the project area to catch all of this allocation due to the reduced area available for trawling. In addition, if the re-allocated fish were caught somewhere else, this would reduce supply to local processors.

Effects on Other Fisheries

Potential increase in revenues for other gear sectors targeting the same fish (e.g., fixed gear sablefish, thornyhead, rockfish).

Reduced gear conflict (potentially increasing area available for other gear sectors within the project area).

Effects on Protected Species

There are numerous protected species of fish, seabirds, sea turtles and marine mammals that occur in the project area. There are no anticipated adverse impacts to protected species from this alternative. Potential benefits to protected species include: reductions in incidental bycatch or injury of protected species in trawl nets and increases in prey species abundances with habitat recovery and recovery of groundfish populations.

Effects on Non-Fishing Activities

Harbors and ports receive federal dredging funds in proportion to the tonnage of fish landed. Buying out a significant number of trawlers may reduce landings and dredging funds unless legislative changes are made.

Increased species diversity, abundance, and ecosystem recovery could enhance nearshore ecotourism.

Existence value, option value, heritage value of no-trawl zones would be enhanced.

SUMMARY

TNC/Environmental Defense proposes to work with the bottom trawling industry and the Council to develop a private buy-out program that is contingent on the establishment of permanent no-trawl zones covering a large portion of the area between Point Conception and Davenport (including portions of the Monterey Bay National Marine Sanctuary) and nearby seamounts to protect EFH and other important biodiversity targets in the project area of Central California.

CONTACT INFORMATION

Chuck Cook, Director
California Marine and Coastal Program
The Nature Conservancy
111 West Topa Topa Street
Ojai, California 93023
Tel: 805-646-8820
Email: ccook@tnc.org

Mary Gleason, Marine Scientist and Conservation Planner
The Nature Conservancy
201 Mission St, 4th floor
San Francisco, CA 94105
Tel: 415-281-0472
Email: mgleason@tnc.org

Rod Fujita, Senior Scientist/Marine Ecologist
Environmental Defense
5655 College Avenue
Oakland, CA 94618
Tel: 510 658-8008
Email: rfujita@environmentaldefense.org

RELEVANT LITERATURE

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Figure 1. Central California Project Area

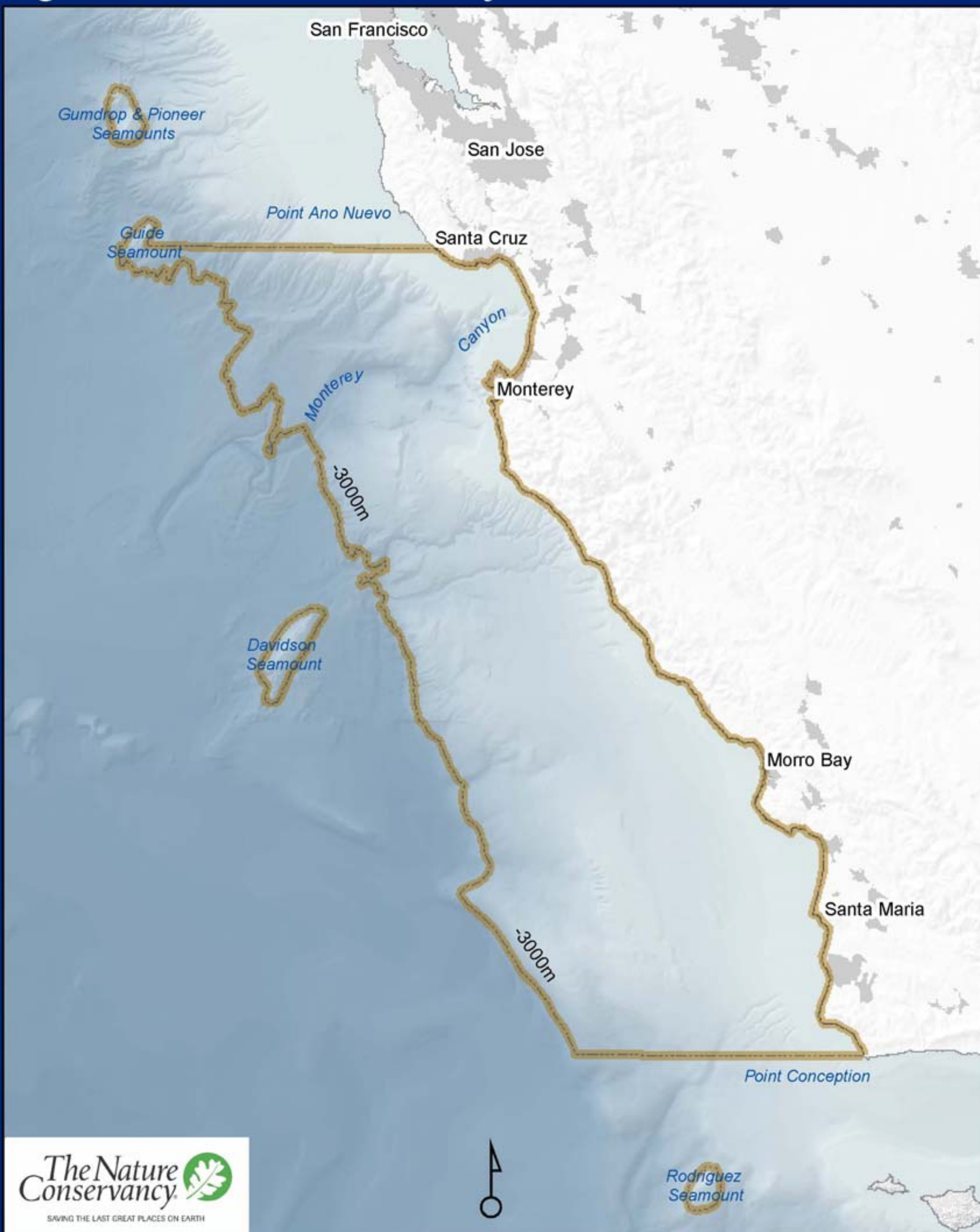


Figure 2. Benthic Habitats

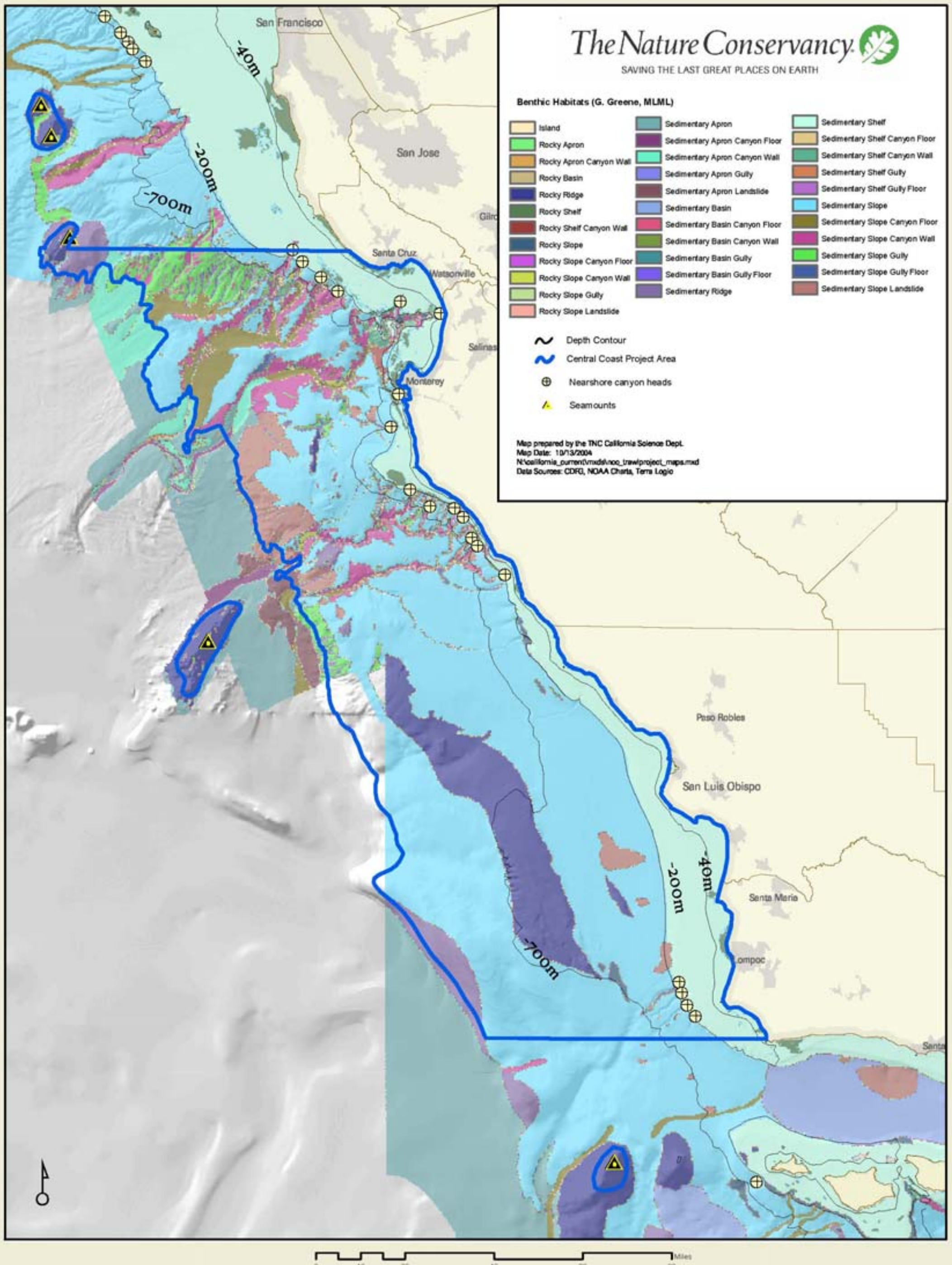
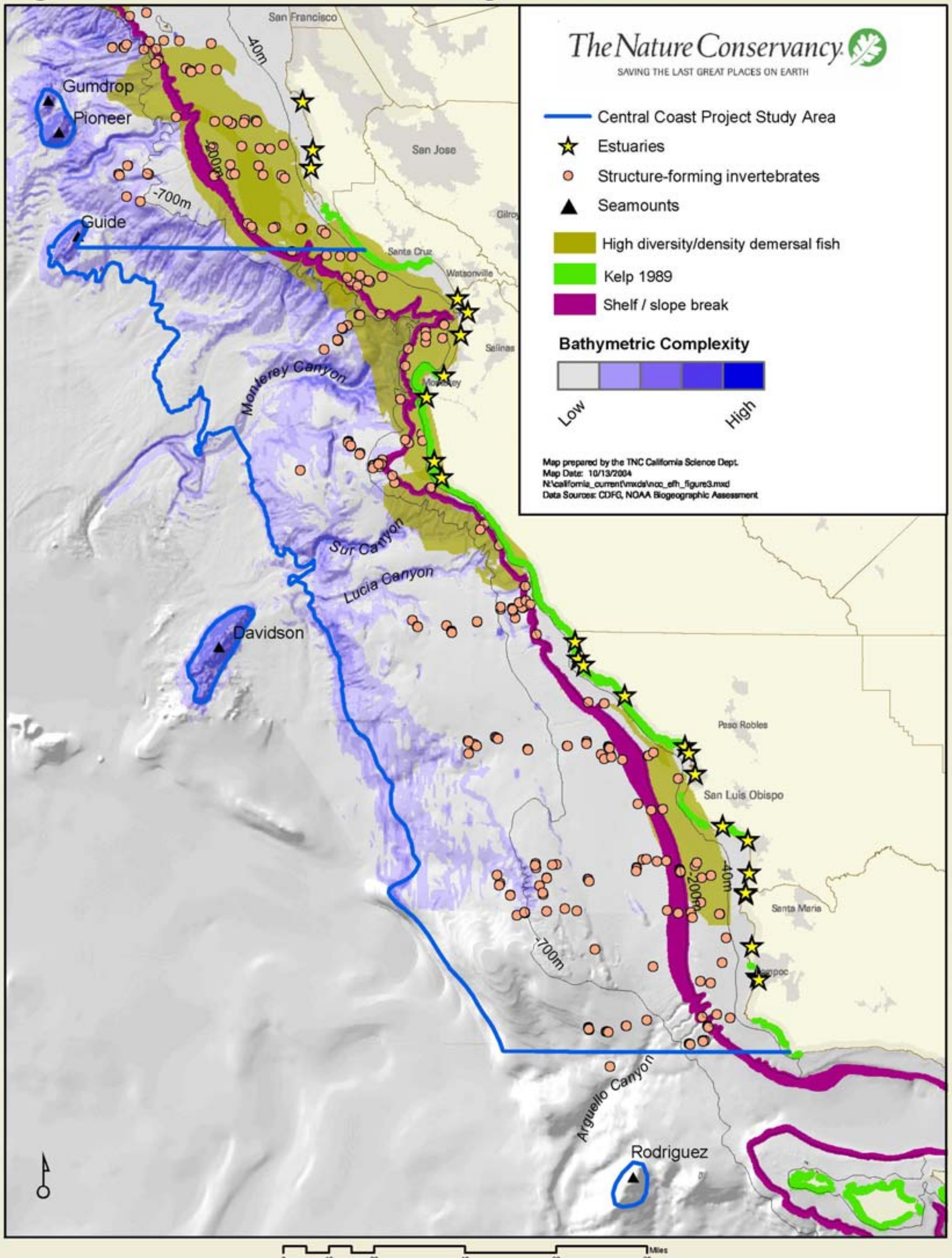


Figure 3. Other Conservation Targets



ADDENDUM: IMPACTS OF BOTTOM TRAWLING

Few studies of the impacts of trawling have been conducted in the project area; however, the scientific consensus (including the expert opinion of scientists serving on the Pacific Fishery Management Council's technical advisory committee on Essential Fish Habitat, which is charged in part with assessing the impacts of fishing in federal waters off the US Pacific coast) is that inferences about the impacts of trawling in a particular place can be made from the dozens of studies of trawl impacts conducted throughout the world, with appropriate adjustments made for differences in habitat type, biota, and fishing practices. Studies off the US Pacific coast have documented many of the impacts of bottom trawling, including substantial losses of biodiversity, reduction of habitat complexity, and changes in species composition. Video cameras attached to trawls operating off the US Pacific coast show, anecdotally, resuspension of sediment and the removal of biogenic structure.

Direct Impacts of Bottom Trawling

While the project area comprises only about 5% of the PFMC's jurisdiction, it supports important commercial fisheries, particularly for sardines, squid, roundfish, flatfish and rockfish. These species occupy a diverse range of habitats including soft sediment, rocky bottom varying in relief from low to high, seamounts, and submarine canyons to depths reaching 3,000 ft. The project is focused on buying bottom trawlers because the best available science strongly indicates that bottom trawling can damage certain kinds of habitats, particularly biogenic habitat such as corals and sponges. The draft risk analysis for the Pacific Coast included an evaluation of the sensitivity of different habitat types to fishing impacts from 5 major gear types, including bottom trawling, and ranked portions of the project area, especially the slope, with the highest sensitivity ranking (2.26-3.0) and longest recovery times (Risk Assessment for the Pacific Groundfish FMP, v. 4. August 2004). In addition, available evidence demonstrates that bottom trawling has significant ecological impacts in unconsolidated soft sediments, due to the removal of small-scale biogenic and physical structure, resuspension of sediments, and exposure of species living in the sediments to higher predation rates.

Bottom-trawling has become a source of concern because of the size of the affected fishing grounds, the modification of the substrate, disturbance of benthic communities and removal of non-target species (NRC 2002). One study suggests that a typical trawl fishery in northern California trawls the seafloor about 1.5 times per year, with some areas being trawled as much as 3 times per year. Considering the slow recovery times of these benthic communities, this level of disturbance is sufficient to result in a vastly altered community (Friedlander et al., 1999).
The repeated use of bottom-tending gear such as trawls can cause long-term biological and physical changes in the marine environment (depending on substrate type, abundance of habitat-forming invertebrates like corals and sponges, and other factors) that can be orders of magnitude greater in intensity and spatial extent than natural disturbances (Watling & Norse 1998).

Alteration of Physical Structure. Trawl gear can scrape, plough, bury mounds, smooth sand ripples, remove stones or drag boulders, remove species that produce structure, and remove or shred submerged aquatic vegetation (Johnson 2002, Kasier et al. 2000). The structural complexity of rocky outcrops, critical for biodiversity, can be reduced substantially by trawling. These physical alterations reduce the heterogeneity of the sediment surface, alter the texture of the sediments and reduce the structure available to biota as habitat (Johnson 2002), resulting in a concomitant decrease in the quality of habitat for some species (NRC 2002). Rocks and mounds contribute to the structural complexity of the bottom, and are very important to many different kinds of organisms that are found only in association with such structures. Exposed sediments tend to be poorer in food quality than sediments that are covered with encrusting organisms or held together by tube-forming organisms; hence, productivity is usually lower. Debris (usually fragments of kelps, marine "snow", fecal material, and the like) is a critically important food source for many benthic organisms. Not surprisingly, a study in the Monterey Bay National Marine Sanctuary (MBNMS) showed that sea pens, sea stars, sea anemones, sea slugs, and most polychaete worms were all far less abundant in the highly trawled area. Nematode and oligochaete worms (opportunistic species) were more abundant in the highly trawled area, but overall, trawling clearly reduced overall biodiversity (Engel and Kvitek, 1998).

Trawling also alters the structure of soft sediments. In shallower depths, organic-silty sand may become sandy gravel littered with shell fragments (Dayton et.al., 1995; see also Langton & Robinson, 1990). Deep shelf trawling induces sediment changes by transporting fine sediments to regions where currents do not naturally carry them (Churchill, 1989; Churchill et.al., 1994). By increasing turbidity in benthic habitats (via anthropogenically-transported sediments and the re-suspension of naturally-occurring sediments), trawls indirectly smother suspension feeders, kill larvae, and eliminate deep-water corals (Jones, 1992). After intense trawling disturbances, suspension-feeding groups generally become replaced by detritus feeding populations. Rarely do these community structural changes revert back to their initial suspension-feeding dominance because suspension-feeding recruits are frequently smothered or consumed by detritus feeders.

<u>Changes to the Benthic Community</u>. Trawling results in acute effects on resident populations, the range of which depends on the life history, ecology, and physical characteristics of the biota present. In general, species that are larger, less mobile, longer-lived, and experience low rates of natural disturbance appear to sustain longer term damage from bottom trawling. The following trends are observed in repeated or intensively fished areas:

<u>Reduced Biomass</u>: Trawling is capable of removing large amounts of biomass. When the species affected are long-lived and slow-growing, recovery can be slow. Off southern Tasmania, for example, fished seamounts had 83% less biomass than similar lightly fished sites (Dayton et al. 2002).

<u>Reduced Species Diversity</u>: Large, non-mobile, slow growing bottom-dwelling species recover less quickly than species that exhibit high fecundity and rapid generation times or that can adapt to frequent physical disturbance. There is evidence that trawling reduces the abundance and diversity of bottom-dwelling species such as anemones, sponges, and snow crab. In the Monterey Bay National Marine Sanctuary, heavily trawled areas exhibited about half the species diversity of lightly trawled areas (Engel and Kvitek, 1998). Another Pacific study found significant differences in demersal rockfish assemblages between trawled and untrawled areas (Matthews & Richards, 1991). The rockfish assemblages differed significantly in species composition, biodiversity, and biomass, with the untrawlable regions having significantly larger catches than

the trawlable habitats (Matthews & Richards, 1991). This finding indicates that as more regions become trawlable and benthic habitats are altered, there may well be significant changes in species composition and biomass.

Shift in community dominance: Some areas historically dominated by low-productivity, long-lived species are now dominated by high-productivity, short-lived, fast growing species (Kaiser et al. 2000). These species are able to capitalize on the changes in habitat resulting from trawling. For example, heavily trawled areas support low biomass levels of hydroids, soft coral and urchin and high levels of brittlestar, scavenging hermit crab, and masked crab. After trawling exposure, numerous benthic species die, with the greatest injury inflicted upon sessile organisms, including (but not limited to) polychaetes, bryozoans, echinoderms, and mollusks (Jones, 1992; Northridge, 1991; Bullimore, 1985; and Holme, 1983). Trawls remove organisms at the top of the substrate and expose animals which normally live buried in the sediments. These community alterations make many benthic organisms more susceptible to predation. In effect, trawling alters trophic dynamics by creating new food sources for opportunistic species such as scavenger starfish and crabs (Thrush, et.al., 1995; Dayton et.al., 1995). In addition to showing that high levels of trawling reduce overall marine biodiversity, Engel and Kvitek (1998) showed that heavy trawling can increase the abundance of certain kinds of organisms. In this case, the polychaete worm *Chloeia pinnata* achieved very high densities in the heavily trawled area. Many commercially important flatfish feed on this worm as adults, such as sanddab, English sole, and Dover sole. While trawling could thus increase food for adult fish, it could simultaneously decrease food and shelter for more sensitive life stages. This conclusion is supported by other research cited in the study.

Changes in species distribution: Intensively fished areas are likely to remain permanently altered, inhabited by fauna that can cope with frequent physical disturbance (NRC 2002). In the MBNMS, heavily trawled areas support opportunistic species such as oligochaete worms (pioneer species known to be early colonizers in frequently disturbed areas and scavengers that feed on dead organic matter) and nematodes (one of the most abundant animals on earth, often found in extremely harsh environments) (Engel & Kvitek 1998).

Indirect Effects of Bottom Trawling

Trawling directly impacts species diversity and habitat structure and function; but it also has several important indirect effects on marine ecosystem dynamics (NRC 2002).

Sediment Suspension: the drag of the gear along the seafloor can suspend large amounts of sediment in the water, resulting in the reduction of light available for photosynthetic organisms, burial of benthic biota, smothering of spawning areas, and effects on feeding and metabolic rates of species (Johnson 2002).

Nutrient Cycling: trawling can increase or decrease the exchange rate of nutrients between the sediment and water column and the suspension or burial of biologically recyclable organic material, thus changing the flow of nutrients through the food web (NRC 2002).

Ecosystem Processes: trawling can remove species responsible for water purification, substrate stabilization, and structure formation, thus altering these important ecological processes/services (NRC 2002).

The potential of trawl fishing to damage marine habitats has greatly increased (and continues to increase) with technological advances, absent performance standards. For example, beam trawlers (an older, less damaging type of technology than otter trawls) with tickler chains caught 10 times the amount of seabed material in their trawls as did the beam trawls without tickler chains; the amount of debris caught in trawls positively correlates with the number of benthic organisms adversely affected. As engines have become more powerful, synthetic materials have grown stronger, and new gears (e.g. bobbins, rollers, rock hopper sweeps, chains) are developed fishermen gain access to previously un-trawlable, rocky bottoms (Dayton et.al., 1995; Matthews & Richards, 1991).

Because all trawling is not destructive, we favor the implementation of performance standards for gear impacts on habitats would be developed that would apply to all gear types, so as to create incentives for innovative gear designs and practices that will minimize impacts everywhere. Such standards would complement Essential Fishing Habitat (EFH) regulations very well. In addition, we anticipate that over the long-term, other gear sectors will be rationalized in some way, whether through stackable permits, cooperatives, Individual Fishing Quotas (IFQs), or other mechanisms. In this way, capacity issues associated with spatial management in the form of marine reserves, EFH, or Habitat Areas of Particular Concern (HAPC) designations and regulations can be addressed.

HABITAT AREAS OF PARTICULAR CONCERN (HAPC) DESIGNATIONS FOR OFFSHORE OIL & GAS PLATFORMS IN SOUTHERN CALIFORNIA

October 5, 2004

Submitted by:

California Artificial Reef Enhancement Program (CARE)
1008 Tenth Street #298
Sacramento, CA 95814
www.calreefs.org

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.

References:

1. Gebauer, D., C. Hoffman, E. L. Lim, et. al. 2004. Offshore Facility Decommissioning Costs, Pacific OCS Region, September 17, 2004.
2. Love, M. S., J. Caselle and L. Snook. 1999. Fish assemblages on mussel mounds surrounding seven oil platforms in the Santa Barbara Channel and Santa Maria Basin. Bulletin of Marine Science 65:497-513.
3. Love, M. S., J. E. Caselle and L. Snook. 2000. Fish assemblages around seven oil platforms in the Santa Barbara Channel. National Marine Fisheries Service Fishery Bulletin 98:96-117.
4. Love, M. S., M. Nishimoto, and Donna Schroeder. 2001. The ecological role of natural reefs and oil and gas production platforms on rocky reef fishes in southern California: 1998-1999 Survey Report. OCS Study MMS 2001-028.
5. Love, M. S., D. M. Schroeder, and M. M. Nishimoto. 2003. The ecological role of oil and gas production platforms and natural outcrops on fishes in southern and central California: a synthesis of information. U. S. Department of the Interior, U. S. Geological Survey, Biological Resources Division, Seattle, Washington, 98104. OCS Study MMS 2003-032.

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

Agenda Item E.7.d
Supplemental Public Comment
November 2004

Minority Views of Groundfish Advisory Subpanel Members on Groundfish Essential Fish Habitat EIS

The following recommendations for preferred alternatives under the Groundfish Preliminary Draft EFH EIS (Agenda item E.7.b - NMFS Report - EFH EIS) are forwarded by a minority of the members of the Groundfish Advisory Subpanel (GAP):

Alternatives for EFH Designation
Adopt a new alternative #7A which would designate the upper 50% of the area where HSP for all groundfish species is greater that zero.

If you assume that habitat suitability probability (HSP) is a good proxy for habitat, then you need to consider how much is truly essential. Using 100% leaves you in approximately the same situation as the status quo, where almost all water is considered essential. Given the wide range of groundfish, we believe that 30% is too conservative, yet 70% likely encompasses more area than is truly essential. We are thus suggesting a median figure.

Alternatives for HAPC Designation
Include a streamlined process for consideration of HAPC designation proposals as new information becomes available (Alternative 9), but include areas 100 yards around oil production platforms (Alternative 8).

In September, discussion in the GAP centered around these two alternatives. Rather than trying to immediately include a class of area (estuaries, grass beds, etc.), it makes more sense to establish a process for quickly identifying HAPCs so that all potential types of habitat can be covered if appropriate. We have included Alternative 8 for immediate coverage based on the data presented to the Council on numerous occasions showing the high correlation between mature rockfish and oil production platforms. These areas would meet HAPC criteria under Alternative 9 and so ought to be included now.

Alternatives to Minimize Adverse Impacts
Establish impact-reducing fishing gear requirements based on Alternative 10 with the following changes:
Option 1 - change "15" to "24"
Option 3 - delete
Option 4 - delete
Option 5 - delete
Option 6 - delete "assess potential to"
Option 9 - Prohibit set gillnets in waters deeper than 80 fathoms.
All other options in Alternative 10 would remain as shown.

As with the case of HAPC designation, we believe that the Council would be better served to have a variety of tools available to address EFH issues. This option was also the center of GAP discussion in September and the changes we are suggesting here reflect changes that individual GAP members had recommended in the alternative.

The change in option 1 was recommended because there appeared to be no discernable difference in environmental impacts on using roller gear larger than 8". Since the alternative contemplates that large footrope gear will be safe to use in some areas, we have included the size known to have been used on the west coast.

We recommend deletion of options 3 and 4 because the data used to support these options came from the Gulf of Mexico and involved shrimp trawl studies. There is no evidence that aluminum or cambered trawl doors provide any less impact on the environment than the various door configurations currently used on the west coast.

We recommend deleting option 5 because it can have a greater adverse impact on essential fish habitat. Longline groundlines on the west coast can be up to 9 miles long. Limiting them to 3 miles will simply mean that a longline vessel will make three 3-mile sets - which means using 3 times as many anchors.

Option 6 was changed because we assume that any of these management measures will have to be analyzed before being used. The deleted wording is confusing and superfluous.

Option 9 uses the deeper depth that was recommended by the GAP in September, based on information provided by gillnet fishermen.

<u>Alternatives for Research and Monitoring</u>
Expand current research and monitoring programs to ensure precise delineation of HSPs and HAPCs (modified Alternative 1).

Our current research and monitoring system - given proper funding - is more than adequate to keep track of fishing impacts on EFH and the social and economic cost/benefits of addressing those impacts in order to judge practicalability. What we are lacking is adequate capability to delineate HSPs and HAPCs, which are the areas that are essential fish habitat.

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175 South Franklin Street, Suite 418 +1.907.586.4050
Juneau, AK 99801 USA www.oceana.org

October 26, 2004

Mr. Donald Hansen, Chairman
Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Chairman Hansen and Dr. McIsaac:

Thank you for the opportunity to participate in the protection of Pacific Essential Fish Habitat. Attached please find a Comprehensive Collaborative Alternative for Maintaining Fisheries and Protecting Essential Fish Habitat in the Pacific, to be considered in the Essential Fish Habitat Environmental Impact Statement (EFH EIS) for the Pacific.

As documented in the recent U.S. Commission on Ocean Policy Report, our oceans are in peril, and we must immediately take steps to change the way we manage them. To be a part of this solution, a coalition of conservation groups and commercial and recreational fishermen including Oceana, The Ocean Conservancy, Natural Resources Defense Council, Pacific Marine Conservation Council, United Anglers, and the Pacific Coast Federation of Fishermen's Association is working together to provide fishery management solutions on the West Coast that both protect habitat and maintain opportunities for fishermen.

Many of the members of this coalition recently won a victory to pass Senate Bill 1459 in California. Signed into law by Governor Schwarzenegger in late September, this law restricts and regulates bottom trawling in California state waters, while still allowing opportunity for commercial bottom trawl fisheries. It's a win-win solution that can also be applied to federal waters.

Congress, in its wisdom, enacted the Sustainable Fisheries Act of 1996 which among other actions, requires the National Oceanographic and Atmospheric Association (NOAA) to describe and identify Essential Fish Habitat, minimize to the extent practicable the adverse impacts of fishing on this habitat, and take other actions to encourage the conservation and enhancement of EFH.

Inaction on the part of NOAA to follow this law prompted a successful lawsuit by Oceana and others which requires the agency to prepare Essential Fish Habitat Environmental Impact Statements (EFH EISs) in five of the eight fishery management regions, including the Pacific. These EFH EISs must consider an adequate range of alternatives to address the Sustainable Fisheries Act's obligations.

Using all of the available science and information, and guided by the law, the coalition of groups mentioned above is developing an option for the agency and the Council to consider in this EIS process. Consistent with the available and increasing body of scientific literature, the alternative focuses on minimizing the adverse effects of bottom trawling on sensitive and important habitats. The National Academy of Sciences in its 2002 publication, *The Effects of Trawling & Dredging on Seafloor Habitat*, offers reasonable, doable management measures to help solve this problem: closures, gear restrictions or modifications, and effort reduction. Consistent with this guidance, we developed the following approach, described in general below, and in more detail in the attachment.

The first step was to gather and map all known information on seafloor habitat and on bottom trawling effort. We then identified sensitive habitats using five criteria: areas identified by NOAA as high relief substrate and sensitive habitat; other complex hard substrate (Zimmerman, 2003); the 20% highest suitability habitat areas of overfished groundfish species (NOAA); clusters of biogenic habitat (NOAA, Observer data, MCBI, dives); and other areas identified by local knowledge, existing designations, and scientific literature.

We documented bottom trawl effort using PACFIN data from 2000 to 2003 to establish the bottom trawl footprint. The next step is to freeze the bottom trawl footprint until such time as research and mapping can show that expansion of the fishery would not be harmful to the seafloor. Then, within the existing footprint, known areas of sensitive habitat, as identified above, should be closed to bottom trawling.

The end result is an area open to bottom trawling that has been historically productive for the fleet, and protected areas of sensitive habitat that provide breeding, feeding, spawning, resting, and nursery grounds for a host of ocean creatures including commercially important fish.

The ongoing development of this alternative is an iterative process that should continue with further input from fishermen, NOAA, and local communities to ensure maximum protection of seafloor habitat while still maintaining vibrant commercial fisheries.

Using this approach, we help ensure our oceans and our commercial fisheries have a chance for a healthy future.

Sincerely,

Jim Ayers

Jim Ayers
Director, Pacific Region

Attachment

Comprehensive Collaborative Alternative
Protecting Essential Fish Habitat in the Pacific While Maintaining Fisheries

October 2004

Comprehensive Collaborative Alternative
Protecting Essential Fish Habitat in the Pacific While Maintaining Fisheries

Summary

The Comprehensive Alternative represents a thorough and practicable suite of fishery management measures designed using the best available scientific and economic data available to the public to mitigate the adverse effects of bottom trawling on Essential Fish Habitat off the U.S. West Coast. The approach protects habitat most at risk from bottom trawl damage and provides continued opportunity for commercial bottom trawl fisheries. The Alternative represents the best attempt to develop a practical management with the limited data provided by NMFS. The alternative meets these objectives by combining the following management measures:

1. **Spatial management** of bottom trawling by determining open and closed areas based on benthic habitat type, current trawl closures, distribution of vulnerable fish habitats, unique geological and topographic features, and the value of bottom trawl catch in each area.
2. **Catch reductions** which may be determined by the Council as appropriate.
3. **Expansion of current gear restrictions** to set maximum footrope sizes of 8 inches throughout the PFMC region.
4. **Monitoring of habitat damage** using Vessel Monitoring Systems and onboard observers that report bycatch of habitat-forming invertebrates, enabling fishery managers and the public to accurately evaluate the habitat impacts of individual trawl vessels and the trawl fleet as a whole.
5. **Benthic research and mapping** program to improve the spatial resolution of benthic habitat distribution and provide habitat use information for all life stages of all FMP species and other ecosystem indicator species to the highest degree possible.

The remainder of this document provides a detailed description of the methodology and the scientific justification for each module of the Comprehensive Alternative.

Need for Action

Bottom trawling off the Pacific Coast causes long-term, adverse impacts to fish habitat. There is general scientific consensus that bottom trawling has wide ranging effects on habitats and ecosystems. These 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[1]

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[1] National Research Council, "Effects of Trawling & Dredging on Seafloor Habitat" at 29.

Bottom trawling removes epifauna, thereby reducing habitat complexity and species diversity of the benthic community (Collie et al. 2000, Kaiser et al. 2000). According to the National Academy of Sciences, if disturbance from trawling exceeds the resiliency threshold, then irrevocable long-term ecological effects will occur (NAS 2002). Gravel pavement substrate disturbed by bottom trawling on Georges Bank in the Northeast Atlantic, for example, had significantly less emergent epifauna, shrimp, polychaetes, brittlestars, and small fish than undisturbed sites (Collie et al., 2000).

Bottom trawling decreases benthic productivity. Trawled areas of the North Sea, off the coast of Ireland, were significantly less productive when compared to untrawled areas of similar habitat type (Jennings et al. 2001). Areas disturbed by mobile fishing gear on Georges Bank had lower levels of benthic production (both biomass and energy) when compared to undisturbed areas (Hermsen et al. 2003).

Research from around the world indicates the destruction of living seafloor negatively impacts fish populations. Destruction of bryozoan growths by trawling in Tasman Bay, New Zealand resulted in a marked reduction in numbers of associated juvenile fish (Turner et al. 1999). Predation rate on juvenile Atlantic cod (*Gadus morhua*) increases with decreasing habitat complexity (Walters & Juanes 1993). Case studies in New Zealand and Australia suggested that loss of habitat structure through removal of large epibenthic organisms by fishing had negative effects on associated fish species (Turner et al. 1999). Dense aggregations of Pacific ocean perch (*Sebastes alutus*) and euphausiids were associated with biogenic habitats (sea whip groves) 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 (Brodeur 2001). Removal of epifaunal organisms may lead to the degradation of habitat such that it is no longer suitable for associated fish species (Auster et al. 1996).

In order to ensure long-term sustainability of our fisheries, management measures to protect habitat from the adverse effects of bottom trawling must be instituted now.

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 additive to existing closures. These areas are currently 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 closely follow the habitat features. The overall formulation of the spatial management measures is based on a combination of various data layers provided by NMFS and other data sources.

Areas Open to Bottom Trawling

The objective of defining areas in which bottom trawling is permitted is twofold:

1. To prevent further geographic expansion of bottom trawling, and
2. Limit the bottom trawl footprint to historically trawled areas of the most economic importance

This objective is driven by studies that demonstrate that the relative impacts of trawling are greater when areas are trawled for the first time or trawled infrequently (for example Dinmore et al. 2003).

To define the open bottom trawl areas, we examined bottom trawl records of groundfish catch occurring from 2000-2003 from the PACFIN dataset aggregated to 10-minute blocks with species or species group resolution and excluding any information which the Fisheries Service asserted is confidential. 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 less than 3 fishing vessels operate in the area for which fishing information is requested. Given the constraints placed upon the data by the Fisheries Service, 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. A span of years from 2000-2003 was selected to reflect variability in annual trawl effort and the effort under current conditions. In 2000, a footrope restriction in some areas altered the distribution of trawl effort (Bellman and Heppell, in press). Trawl restrictions in the Rockfish Conservation Areas (RCA) also altered distribution of trawl effort over this period.

Areas of the open bottom trawl footprint do not supercede existing management closures, such as where the bottom trawl footprint overlaps areas of the RCA.

Areas Closed to Bottom Trawling

Closed areas can protect living habitats from damage by bottom trawling. In addition, closed areas can promote recovery in habitats already impacted by bottom trawling. Ideally placement of closed areas would occur across a range of vulnerable, representative habitat types (NRC 2002). Only year round bottom trawl closures for all species are considered to provide protection to EFH.

Within the area currently being bottom trawled, 41 areas of importance were identified using the following criteria:

- Hard substrate
- Habitat-forming invertebrates
- Canyons and Gullies
- Rocky Ridges
- Rocky Slopes
- Trawl hangs and abandoned trawl survey stations (“untrawlable area”)
- Seamounts
- Highest 20% habitat suitability for overfished groundfish species

Pursuant to this draft Comprehensive Alternative, no bottom trawling would be permitted within the following 41 areas (Fig. 42). Table 42 shows the criterion used in the selection and boundary determination of each area. Appendix 1 provides a map and description of each area. Appendix 3 describes the latitude and longitude points of the vertices of the boundaries of the areas.

Figure 42: Map of proposed areas open and closed to bottom trawling.

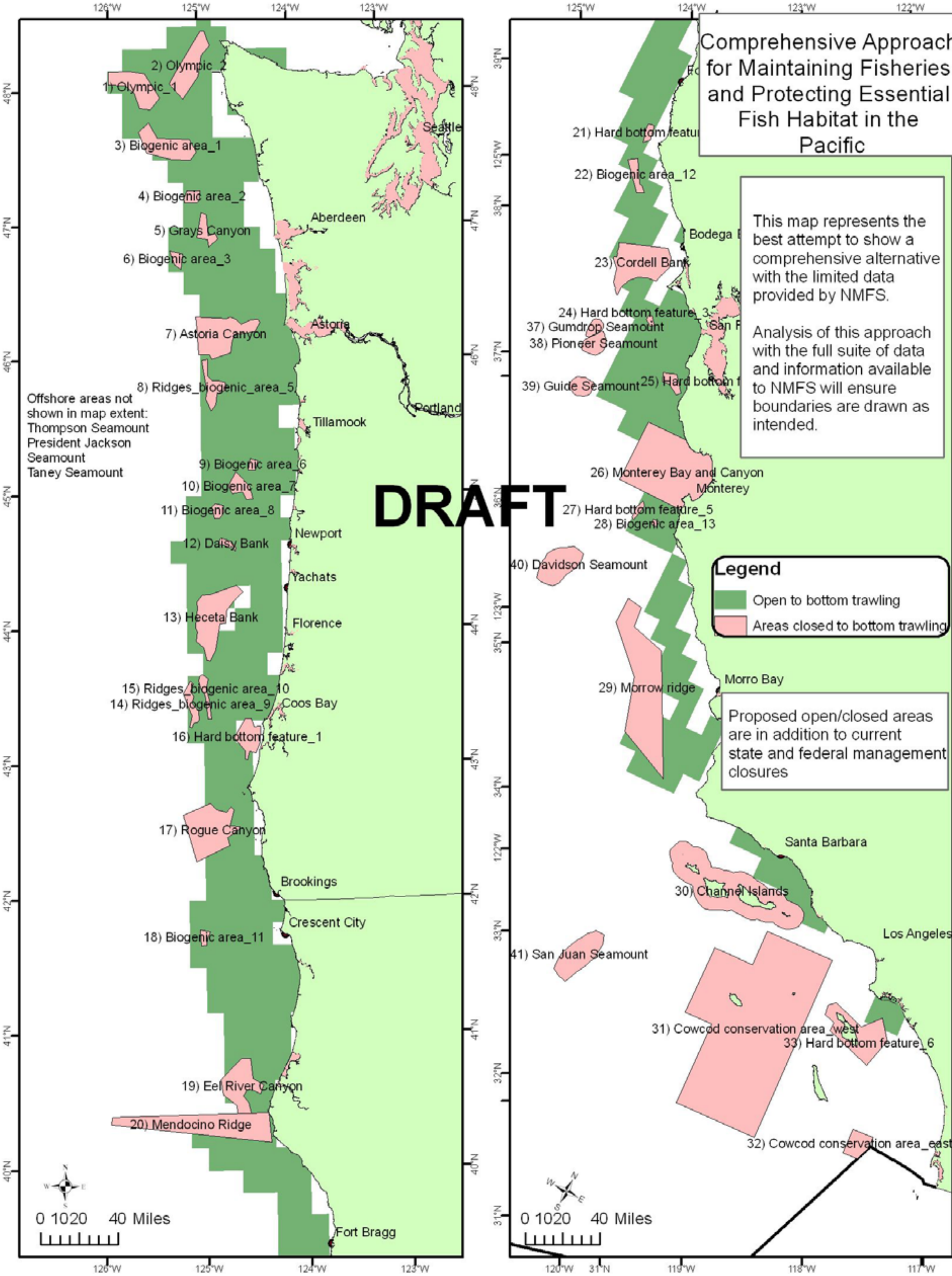


Table 42: Criterion for identifying areas of interest

	Proposed closed area	Hard substrate[1]	Documented structure forming invertebrates[2]	Canyon or gully habitat[1]	Rocky ridge habitat[1]	Rocky slope habitat[2]
1	Olympic_1	no*	yes	yes	no	no
2	Olympic_2	no*	yes	yes	no	no
3	Biogenic area_1	no	yes	yes	no	no
4	Biogenic area_2	no	yes	yes	no	no
5	Grays Canyon	no	yes	yes	no	no
6	Biogenic area_3	no	yes	no	no	no
7	Astoria Canyon	yes	yes	yes	yes	yes
8	Ridges_biogenic_area_5	yes	yes	no	yes	yes
9	Biogenic area_6	no	yes	no	no	no
10	Biogenic area_7	no	yes	no	no	no
11	Biogenic area_8	yes	yes	no	yes	yes
12	Daisy Bank	yes	yes	no	yes	yes
13	Heceta Bank	yes	yes	yes	yes	yes
14	Ridges_biogenic area_9	yes	yes	no	no	yes
15	Ridges_biogenic area_10	yes	yes	no	yes	yes
16	Hard bottom feature_1	yes	yes	no	no	yes
17	Rogue Canyon	yes	yes	yes	no	yes
18	Biogenic area_11	no	yes	yes	no	no
19	Eel River Canyon	yes	yes	yes	yes	no
20	Mendocino Ridge	yes	yes	yes	yes	no
21	Hard bottom feature_2	yes	no	no	no	no
22	Biogenic area_12	yes	yes	no	no	no
23	Cordell Bank	yes	yes	yes	no	no
24	Hard bottom feature_3	yes	yes	yes	no	no
25	Hard bottom feature_4	yes	no	no	no	no
26	Monterey Bay and Canyon	yes	yes	yes	no	yes
27	Hard bottom feature_5	yes	no	yes	yes	no
28	Biogenic area_13	yes	yes	no	no	no
29	Morro ridge	yes	yes	no	yes	yes
30	Channel Islands	yes	yes	yes	yes	yes
31	Cowcod conservation area_west	yes	yes	yes	yes	yes
32	Hard bottom feature_6	yes	yes	yes	yes	yes
33	Cowcod conservation area_east	no	no	no	yes	no
34	Thompson Seamount	unk**	no	unk**	unk**	unk**
35	President Jackson Seamount	unk**	no	no	no	no
36	Taney Seamount	unk**	no	no	no	no
37	Gumdrop Seamount	yes	yes	yes	yes	no
38	Pioneer Seamount	yes	yes	yes	yes	no
39	Guide Seamount	yes	no	yes	yes	yes
40	Davidson Seamount	yes	yes	yes	yes	no
41	San Juan Seamount	yes	no	no	yes	no

Table 42: Continued….

	Proposed closed area	Trawl hangs[3]	Abandoned survey stations[3]	Highest 20% habitat suitability for overfished species[4]
1	Olympic_1	yes	yes	yes
2	Olympic_2	yes	yes	yes
3	Biogenic area_1	yes	no	yes
4	Biogenic area_2	no	no	yes
5	Grays Canyon	yes	yes	yes
6	Biogenic area_3	n/a	n/a	yes
7	Astoria Canyon	yes	yes	yes
8	Ridges_biogenic_area_5	yes	no	yes
9	Biogenic area_6	no	no	yes
10	Biogenic area_7	yes	yes	yes
11	Biogenic area_8	yes	yes	yes
12	Daisy Bank	yes	no	yes
13	Heceta Bank	yes	yes	yes
14	Ridges_biogenic area_9	n/a	n/a	yes
15	Ridges_biogenic area_10	n/a	n/a	yes
16	Hard bottom feature_1	yes	yes	yes
17	Rogue Canyon	yes	yes	yes
18	Biogenic area_11	n/a	n/a	yes
19	Eel River Canyon	yes	yes	yes
20	Mendocino Ridge	yes	yes	yes
21	Hard bottom feature_2	no	no	yes
22	Biogenic area_12	yes	yes	yes
23	Cordell Bank	yes	yes	yes
24	Hard bottom feature_3	n/a	n/a	yes
25	Hard bottom feature_4	yes	no	yes
26	Monterey Bay and Canyon	yes	yes	yes
27	Hard bottom feature_5	n/a	n/a	yes
28	Biogenic area_13	no	no	yes
29	Morro ridge	yes	yes	yes
30	Channel Islands	n/a	n/a	yes
31	Cowcod conservation area_west	n/a	n/a	yes
32	Hard bottom feature_6	n/a	n/a	yes
33	Cowcod conservation area_east	n/a	n/a	yes
34	Thompson Seamount	n/a	n/a	no
35	President Jackson Seamount	n/a	n/a	no
36	Taney Seamount	n/a	n/a	no
37	Gumdrop Seamount	n/a	n/a	yes
38	Pioneer Seamount	n/a	n/a	no
39	Guide Seamount	no	no	yes
40	Davidson Seamount	n/a	n/a	yes
41	San Juan Seamount	n/a	n/a	no

[1] Evidence of hard substrate and habitat types as defined by and documented in the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk*

[2] *Preliminary Report on Occurrences of Structure-Forming Megafaunal Invertebrates off the West Coast of Washington, Oregon and California*, 2004, Fishery Resource and Monitoring Division NWFSC. Associated datasets from AFSC trawl surveys 1977-2001, NWFSC trawl surveys 2001-2003, MCBI database of deep-sea corals (Etnoyer and Morgan 2002), submersible dive data (Wakefield, unpublished data). Does not include database of habitat-forming invertebrate bycatch from West Coast Observer Program
[3] Zimmerman, M. 2003.
[4] Pacific EFH Risk Assessment

* Localized multi-beam mapping of the area was not integrated into the EFH habitat map, possibly due to compatibility of data (Steve Intelmann, GIS analyst, Olympic Marine Sanctuary, pers. com.). As a result, the EFH habitat polygons show an area known to contain pinnacles and high relief, rocky habitat displayed as "sedimentary shelf" (Steve Intelmann, pers. com.)

** These areas have not been multi-beam mapped

Description of Selection Criterion

Hard Substrate

Hard substrates are one of the least abundant benthic habitats, yet they are among the most important habitats for fishes (Pacific EFH PDEIS). Hard substrates are also the seafloor substrate most sensitive to bottom trawling (NAS 2002, Pacific EFH PDEIS).

Many groundfish species managed by the PFMC use hard bottom habitats during one or more of their life stages. These include 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 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 (Pacific EFH PDEIS).

Location of hard substrate polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS to identify sensitive habitat and determine boundaries of areas closed to bottom trawling.

Habitat-forming invertebrates

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.

Structure-forming invertebrates (or biogenic habitat) are sensitive to impacts from bottom trawl gear (NAS 2002, Anderson et al. 2002, Krieger 1999, MacDonald et al. 1996, Van Santbrink and Bergman 1994). Deep-sea corals and sponges are long-lived and are not resilient to anthropogenic disturbance. Hexactinellid sponges can be up to 220 years old with average growth rates of 1.98 cm/year (Leys and Lauzon 1998). The colonies of the deep sea coral

Primnoa resedaeformis, have been aged to over 300 years old, suggesting recovery rates of over 100 years or more (Risk et al. 2002). The estimated age of the deep sea coral *Anthomastus ritteri* was 25-30 years in California's Monterey Bay (Cordes et al. 2001).

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). They 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.

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 (North Pacific 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 PDEIS).

Bycatch of habitat-forming invertebrates is the most direct evidence of adverse impacts of fishing to biogenic habitat. 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 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). Specifically, the Center for Independent Experts recommended that NMFS "…analyze catch and effort data, observer by catch 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."

Due to apparent confidentiality constraints, NMFS has not shared the Pacific observer bycatch dataset with the public. At the September 2004 PFMC meeting, we specifically requested NMFS to conduct an analysis of observer data on biogenic habitat bycatch before the November 2004 meeting so it could be incorporated into the Comprehensive Alternative. However, this analysis has not been conducted by NMFS to our knowledge. Therefore, the map showing locations of proposed closures based on presence of biogenic habitat may be incomplete because it does not incorporate data on biogenic habitat bycatch from the WCGOP. We expect NMFS to fully utilize and incorporate the observer dataset on biogenic habitat bycatch to identify additional closure areas to the proposed alternative prior to analysis. Since we do not have access to this data, we expect NMFS to conduct a point density analysis similar to what we conducted for the trawl survey data in the paragraphs below.

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 (Fig. 43). 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. We recognize that there are some limitations the coral and sponge data, as the all with all marine and fisheries databases. Nevertheless, given the importance and sensitivities of these habitats, and the recognized need to be precautionary in management decisions we developed what we believe is a responsible and reasonable approach to consider all available data in making management decisions.

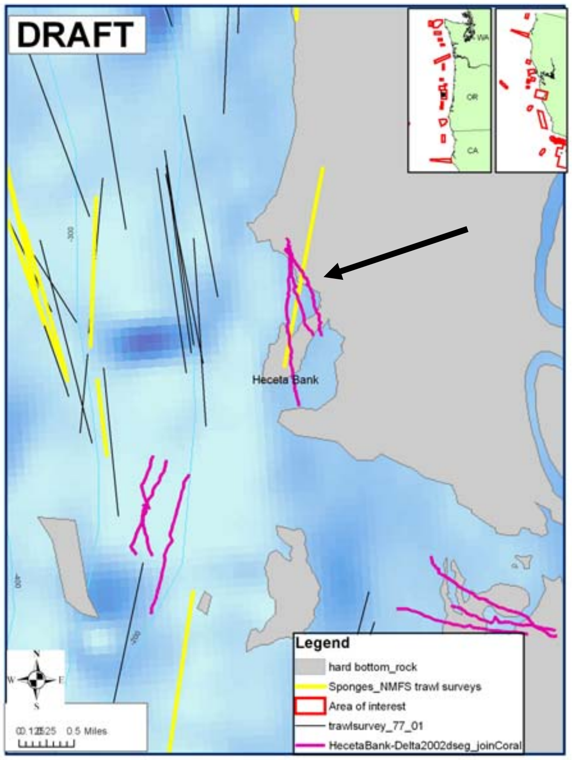


Figure 43: Trawl survey track crossed by Delta submersible transects on Heceta Bank

An extensive database was used to determine “hotspots” where the presence of habitat-forming invertebrates was frequently recorded or large samples of these invertebrates occurred. The database comprised records from AFSC slope and shelf trawl surveys from 1977 to 2001, NWFSC slope and shelf trawl surveys from 2001 to 2003, and MCBI’s database of deep-sea coral records. MCBI’s database includes coral records from the California Academy of Science, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003). For purposes of the analyses and site selection, only records of corals (including sea whips and sea pens) and sponges were considered. Habitat-forming anemones appear to have a ubiquitous distribution (Liz Clarke, NWFSC, pers. com) and were excluded from the analysis.

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. The utility is to identify 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. The utility of this exercise is to identify, at least qualitatively, those areas which had documented records of high densities of habitat-forming invertebrates. Both analyses were useful for identifying "hotspots" of records of habitat-forming invertebrates.

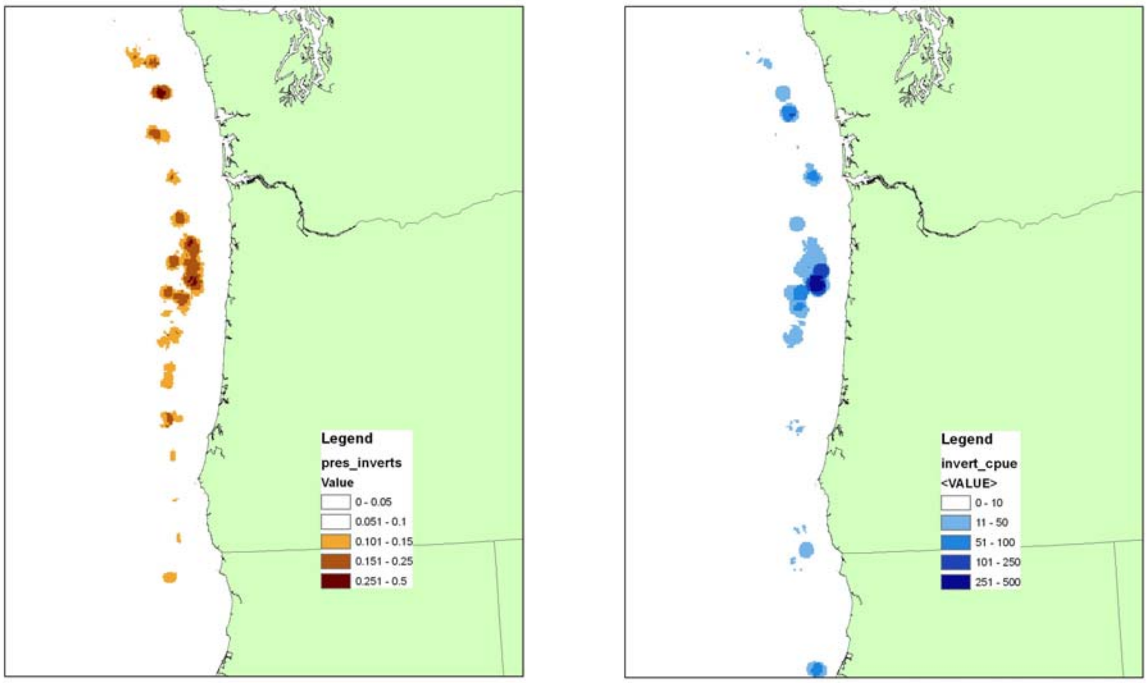


Figure 44: Point density analysis of coral and sponge records. The figure on the left displays output when all points are weighted equally. The legend shows density of points per square kilometer. The figure on the right displays output from point density analysis with points weighted by CPUE. The legend shows mean CPUE per square kilometer.

The point density analysis provided a focus for using documented records of coral and sponge in the selection and boundary determination of the areas closed to bottom trawling. Of these records, 1,553 documented occurrences of coral and sponge were contained within the proposed closed areas (Table 43). These locations also included the highest densities of corals and sponges recorded. Of the over 16,000 kg of corals and sponges sampled during trawl surveys, the closed areas encompass areas where 10,000 kg of these samples were recorded.

Table 43: Number of coral and sponge observations within closed bottom trawl areas

Area	Number of coral and sponge observations
1) Olympic_1	62
2) Olympic_2	18
3) Biogenic area_1	126
4) Biogenic area_2	88
5) Grays Canyon	20
6) Biogenic area_3	46
7) Astoria Canyon	101
8) Ridges_biogenic_area_5	68
9) Biogenic area_6	20
10) Biogenic area_7	83
11) Biogenic area_8	39
12) Daisy Bank	7
13) Heceta Bank	99
14) Ridges_biogenic area_9	17
15) Ridges_biogenic area_10	31
16) Hard bottom feature_1	2
17) Rogue Canyon	50
18) Biogenic area_12	35
19) Eel River Canyon	50
20) Mendocino Ridge	19
22) Biogenic area_12	40
23) Cordell Bank	28
24) Hard bottom feature_3	3
26) Monterey Bay and Canyon	336
27) Hard bottom feature_6	10
28) Biogenic area_13	22
29) Morrow ridge	89
30) Channel Islands	10
33) Cowcod conservation area_west	5
37) Gumdrop Seamount	1
38) Pioneer Seamount	1
40) Davidson Seamount	27
Grand Total	1553

Untrawlable areas

The Zimmerman (2003) database includes all records from the NMFS West Coast Triennial Trawl Survey where major trawl net hangs were recorded. Since these areas are considered unsuitable for trawling, the assumption is that these records indicate areas of high structural complexity, such as boulders or rock outcrops (Zimmerman, pers.com.). Trawl hangs (or substrate/structure that induces a trawl hang) provide habitat for juvenile fish. A study off the coast of New England determined that significantly higher densities of juvenile groundfish occurred in areas with records of trawl hangs (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 obtained and plotted in GIS. The GIS polygons of untrawlable areas were considered in the selection and placement of boundaries of the areas closed to bottom trawling.

Submarine canyons

Submarine canyons are known to be areas of enhanced productivity due to topographically induced upwelling along their axes (Freeland and Denman 1982). For this reason, canyons show enhanced concentrations of macrobenthos (Haedrich et al. 1980; Sarda et al. 1994; Vetter and Dayton 1998), micronekton (Cartes et al. 1994; Macquart-Moulin and Patriti 1996), demersal fishes (Stefanescu et al. 1994), and cetaceans (Kenney and Winn 1987; Schoenherr 1991) relative to surrounding areas on the slope and shelf. 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). Brodeur (2001) found dense aggregations of Pacific ocean perch (*Sebastes alutus*) and euphausiids 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. 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 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.

The deepest and largest submarine canyon on the coast of North America is the Monterey Canyon, just south of San Francisco, California. This canyon is 470 km long, approximately 12 km wide at its widest point, and has a maximum rim to floor relief of 1,700 m, making it much larger than Arizona's Grand Canyon. The largest submarine canyon in the Pacific Northwest is Astoria Canyon, off the mouth of the Columbia River. Other major submarine canyons on the U.S. West Coast include Grays Canyon, Rogue Canyon, and Eel River Canyon, which are also included in this alternative. Portions of other canyon habitats are also included in many of the other closed areas.

Location of canyon habitat polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS to identify and determine boundaries of areas closed to bottom trawling.

Seamounts

A seamount is an area of volcanic origin rising over 1,000 meters above the surrounding seafloor. Using the polygons developed by NOAA in the EFH process, we have identified 8 seamounts in this alternative. Recent studies conducted by the Monterey Bay Aquarium Research Institute on West Coast seamounts have documented unique and diverse biological communities. 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. Seamounts provide an area of vertical relief from the relatively flat and featureless abyssal plain.[2] As such, seamounts are sites of enriched biological activity with enhanced biomass of pelagic and benthic organisms relative to the surrounding waters.[3] Studies indicate that seamounts function as deep sea islands of localized species distributions, dominated by suspension feeders like corals and sponges[4] which can be easily damaged by fishing gear that makes contact with the bottom.

On the U.S. West Coast, the major seamounts include Thompson Seamount (428 km^2), San Juan Seamount (940 km^2), Davidson Seamount (600 km^2), Gumdrop Seamount (149 km^2), Pioneer

[2] Airame, S., S. Gaines and C. Caldow. 2003. Ecological Linkages: Marine and Estuarine Ecosystems of Central and Northern California. NOAA, National Ocean Service. Silver Spring, MD. 164 p.
[3] Mullineaux and Mills. 1997.; Dower and Perry. 2001; Haury et. al. 2000).
[4] Monterey Bay National Marine Sanctuary, Sanctuary Integrated Monitoring Network at www.mbnms-simon.org/sections/seamounts/overview.php

Seamount (295 km^2), Guide Seamount (270 km^2), President Jackson Seamount (986 km^2), and Taney Seamount (978 km^2). This represents a total area of 4,639 km^2 of seamounts on the west coast within the U.S. EEZ. Current PACFIN data documents 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 geological features.

Location of seamounts from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS to identify and determine boundaries of areas closed to bottom trawling.

EFH habitat types of the Areas Closed to Bottom Trawling

The tables below display the area coverage of habitat types as defined by the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* in the areas closed to bottom trawling. The shape of all 41 areas closed to bottom trawling were clipped from the habitat polygons and the resulting polygon area was calculated. The total area of all habitat types identified off the Pacific Coast (PFMC Region) was summed for comparison.

Habitat Composition of Areas Closed to Bottom Trawling

Table 44: Proportion of hard and soft substrate within proposed areas

Substrate type (from EFH GIS data)	Substrate type within closed areas (km^2)	Total area (km^2) of identified substrate off Pacific Coast	Percent of total within closed area
Hard	8378	19549	42.9%
Soft	31334	222321	14.1%
(blank)	805	1254	64.1%
Grand Total	40517	243124	16.7%

The proposed closed areas cover 42.9% of all identified hard benthic substrate off the Pacific coast. Hard substrate was a primary factor in the consideration of the boundaries of the proposed areas.

Table 45: Proportion of identified habitat types within proposed areas

HAB_TYPE	Habitat type within closed area (km^2)	Total area (km^2) of identified habitat type off Pacific Coast	Percent of identified habitat closed
Rocky Slope Canyon Floor	98.5	104.0	94.7%
Rocky Slope Gully	26.8	28.4	94.3%
Rocky Shelf Canyon Wall	52.7	60.0	87.9%
Sedimentary Basin Gully Floor	4.2	5.0	85.5%
Island	764.0	915.5	83.5%
Rocky Apron	1.0	1.3	77.2%
Rocky Slope Canyon Wall	281.0	405.5	69.3%
Sedimentary Shelf Gully	215.2	373.4	57.6%
Sedimentary Shelf Canyon Wall	200.6	426.6	47.0%
Rocky Slope	603.6	1297.8	46.5%
Rocky Ridge	5691.7	13038.9	43.7%
Rocky Shelf	1372.1	3160.3	43.4%
Sedimentary Glacial Shelf Deposit	390.0	1016.9	38.4%
Sedimentary Basin Canyon Floor	2.1	5.8	35.6%
Sedimentary Slope Canyon Wall	2046.9	7274.6	28.1%
Sedimentary Shelf Canyon Floor	22.4	79.8	28.0%
Sedimentary Basin Gully	2.0	8.1	24.3%
Sedimentary Basin	5494.2	27332.3	20.1%
Sedimentary Slope Gully Floor	72.3	373.1	19.4%
Sedimentary Ridge	5927.6	31664.9	18.7%
Rocky Slope Landslide	250.9	1383.0	18.1%
Sedimentary Slope Canyon Floor	940.0	5653.3	16.6%
Sedimentary Slope	8933.2	65902.6	13.6%
Sedimentary Slope Landslide	809.3	6221.7	13.0%
no data	40.6	338.8	12.0%
Sedimentary Apron Canyon Floor	38.5	338.3	11.4%
Sedimentary Shelf	5550.7	52306.2	10.6%
Sedimentary Basin Canyon Wall	1.5	18.8	7.7%
Sedimentary Slope Gully	293.6	5072.0	5.8%
Sedimentary Shelf Gully Floor	0.7	19.5	3.6%
Sedimentary Apron Canyon Wall	32.4	904.0	3.6%
Sedimentary Apron	356.7	16932.2	2.1%
Rocky Basin	0.1	49.9	0.3%
Rocky Apron Canyon Wall	0.0	15.6	0.0%
Rocky Glacial Shelf Deposit	0.0	4.1	0.0%
Sedimentary Apron Gully	0.0	2.2	0.0%
Sedimentary Apron Landslide	0.0	389.5	0.0%

Preliminary Economic Analysis Based on Available Data

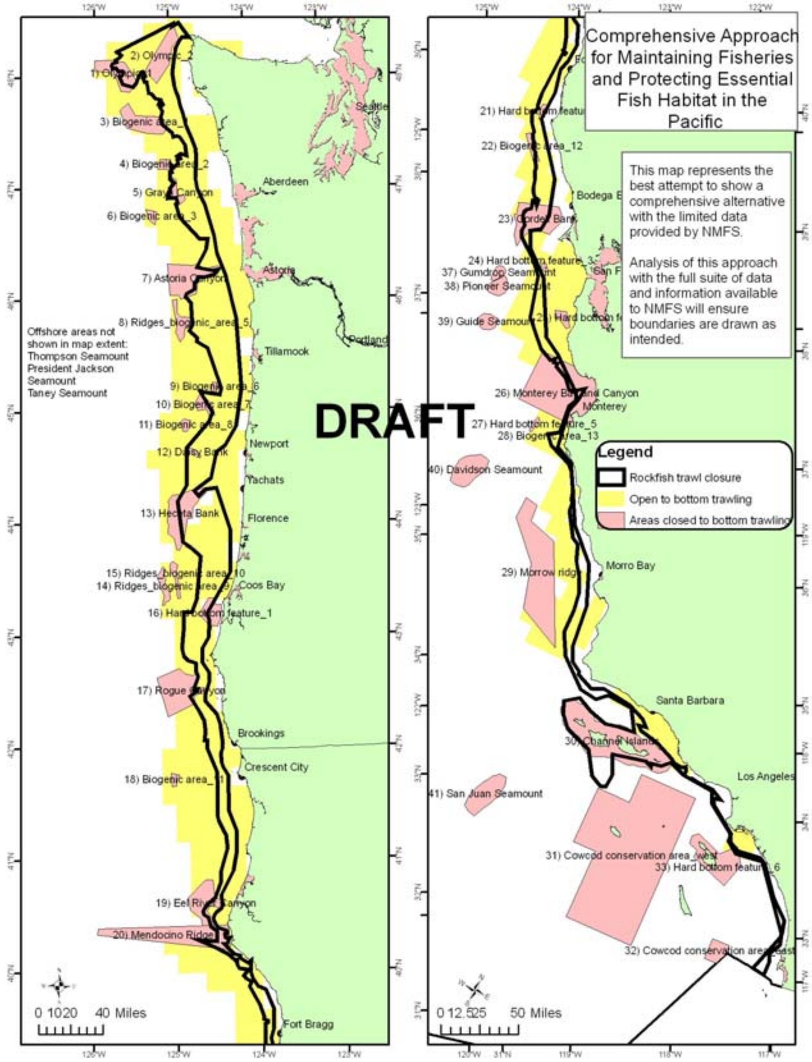
Determination of Trawl Footprint

The data available to us to conduct a preliminary economic analysis was limited. We examined bottom trawl records of groundfish catch occurring from 2000-2003 from the PACFIN dataset aggregated to 10-minute blocks with species or species group resolution and excluding any confidential data. 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. A span of years from 2000-2004 were selected to reflect variability in annual trawl effort and the effort under current conditions. In 2000, a footrope restriction in some areas altered the distribution of trawl effort (Bellman and Heppell, in press). Trawl restrictions in the Rockfish Conservation Areas also altered distribution of trawl effort over this period. It should be noted that our analysis did not include analysis of pre-existing closures and measures. With those measures taken into account, the economic impact will be considerably less.

Rockfish Conservation Areas and Economic Analysis

Some of the proposed areas closed to bottom trawling overlap the existing trawl closures within the Rockfish Conservation Areas (Fig.45). However, the proposed bottom trawl closures are not duplicative, since bottom trawling still occurs within the RCA. During the course of this analysis it was discovered that large catches of groundfish are still being reported within the Rockfish Conservation Area. Nonetheless, the economic analysis and calculation of displaced revenue for this mitigation alternative should take into account the reduction of trawl effort already in place within existing trawl closures. The present analysis does not take these closures into account, therefore the displaced revenue reported in Table 46 will be considerably less if existing closures are considered.

Figure 45: Overlap of Rockfish Conservation Area with Proposed Areas



Economic Analysis of Trawl Area Closures

Economic analysis is an important tool in evaluating the practicability of management measures that mitigate adverse fishing impacts to EFH. For this reason, it is essential that economic analysis of management measures reflect actual consequences as accurately as possible. The following discussion is provided in the spirit of helping ensure that the economic analysis conducted in the EFH DEIS is as accurate as possible given the data constraints.

The first decision point in economic analysis is the measurement unit of economic benefit in each area. The options appear to be total hours trawled, total catch, or revenue generated in each block. While the latter options may provide some useful information, the revenue generated appears to be the most relevant because it actually measures economic impacts in dollars. In this approach, an economic value is generated for each block by multiplying the weight of catch for each species by the ex-vessel value of each species and summing this product for all species. In other words, the economic revenue for each block in any given year is given by:

$$\sum_i C_i V_i$$

where i is each species, C_i is the catch of species i in pounds, and V_i is the ex-vessel value per pound of species i. This methodology outputs the economic revenue generated in each block and is more accurate than hours trawled or total catch because it takes into consideration differences in catch per unit effort, catch composition, and value of different species between each block.

NMFS staff have made it clear thus far that economic data on trawl catches will be queried by 10 x 10 minute block. However, the gear-specific area closures presented in the Comprehensive Alternative are at a much finer scale to reflect more adequately the habitat features identified through the EFH process in the most practicable way. Therefore, despite the coarse scale of the available economic data, every effort should be made to ensure that the displaced revenue calculations are based on the actual closure boundaries described in the alternative, rather than on the number of blocks wholly or partially encompassed by a closed area.

One methodology proposed by NMFS is to analyze the alternative as if all blocks with even a small percentage of area in a closure become completely closed. Since this method assumes closures are much larger than they actually are, the results will be systematically biased toward gross overestimation. This will only serve to confuse the public and decision makers.

Rather than assuming that an entire block becomes closed when there is any degree of overlap, a proportional approach will provide results based on the amount of area actually closed. A reasonable methodology is to calculate the proportion of each 10 x 10 minute block that is overlapped by an area closure and estimated displaced revenue in each block by this proportion.

$\sum_i C_i V_i * p$ where p = the proportion of the block proposed closed

The implicit assumption behind this approach is that revenue is generated equivalently throughout each area. In fact, even this assumption is likely to bias results toward overestimation simply because the closed areas within each block are focused on rocky, hard, biogenic, and complex substrate habitat, which are areas likely to have lower relative trawl effort than nearby areas within the block. For example, Bellman and Heppell (in press) found that trawl footrope restrictions displaced trawl effort out of areas of rocky, complex substrate. Therefore, it is likely that a formal area closure based on complex, sensitive substrate will cause less displaced revenue than if trawl effort were evenly distributed throughout each block. Thus, estimates of displaced effort using a proportional approach may be the best way to analyze data aggregated by 10 x 10 block, but they should be seen as “worst-case scenarios” because of the implicit assumptions (Table 46).

A further way to improve the economic analysis is to obtain data at a finer scale than 10 x 10 minutes. Vessel monitoring systems currently in place for trawl vessels have the ability to show trawl tracks at a much higher precision than logbook or fish ticket data. For example, Drouin (2001) found that VMS systems could more accurately show fishing locations in relation to area closures in the Bering Sea, where NMFS had previously been unable to track vessels with such precision. Incorporating VMS data to improve the spatial resolution of the economic analysis will greatly improve the validity of the results.

Our estimates almost surely overestimate the economic consequences by assuming that revenue from a closed area would be foregone. Because of this, and the spatial scale of the economic data used in the analyses, the preliminary economic estimates are almost certainty biased upward. More refined analyses would result in more accurate and smaller amounts. Finally, we must all recognize that economic analyses of fisheries management measures must include not only considerations of the short-term costs, but also of the long-term benefits of protecting important habitats. While we have not attempted to do so in our economic analysis, we expect that the Council and agency will ensure that such analyses are included in the public Draft EFH EIS.

Table 46: **Estimated annual displaced bottom trawl revenue (ex-vessel value in dollars) of closed areas using total block method and proportional closure method.**

	Area	Displaced Revenue determined by summation of all 10x10 aggregated fishing effort blocks that contact closed area regardless of degree of overlap	Displaced Revenue determined by proportional overlap of closed area with 10x10 minute aggregated fishing effort block
1	Olympic_1	1,662,559	829,413
2	Olympic_2	1,414,201	541,740
3	Biogenic area_1	200,763	119,392
4	Biogenic area_2	89,908	11,131
5	Grays Canyon	207,042	58,735
6	Biogenic area_3	confidential	confidential
7	Astoria Canyon	740,918	462,042
8	Ridges_biogenic_area_5	571,842	168,824
9	Biogenic area_6	41,779	9,278
10	Biogenic area_7	385,379	74,219
11	Biogenic area_8	100,377	18,980
12	Daisy Bank	143,262	11,514
13	Heceta Bank	654,137	349,105
14	Ridges_biogenic area_9	58,791	13,200
15	Ridges_biogenic area_10	240,080	39,830
16	Hard bottom feature_1	146,155	14,081
17	Rogue Canyon	779,441	278,924
18	Biogenic area_11	83,151	6,262
19	Eel River Canyon	943,159	622,250
20	Mendocino Ridge	482,048	282,791
21	Hard bottom feature_2	253,206	44,469
22	Biogenic area_12	230,710	60,066
23	Cordell Bank	405,821	138,984
24	Hard bottom feature_3	102,054	4,364
25	Hard bottom feature_4	251,224	38,892
26	Monterey Bay and Canyon	598,445	456,398
27	Hard bottom feature_5	40,468	3,158
28	Biogenic area_13	240,462	12,483
29	Morrow ridge	382,100	117,308
30	Channel Islands	58,061	16,593
31	Cowcod conservation area_west	confidential	confidential
32	Hard bottom feature_6	43,562	2,986
33	Cowcod conservation area_east	0	0
34	Thompson Seamount	0	0
35	President Jackson Seamount	0	0
36	Taney Seamount	0	0
37	Gumdrop Seamount	0	0
38	Pioneer Seamount	confidential	confidential
39	Guide Seamount	confidential	confidential
40	Davidson Seamount	0	0
41	San Juan Seamount	0	0
	Total w/out confidential data	11,551,105	4,807,410
	Grand Total	11,563,141	**4,810,730**

Table 47: Total Pacific Coast Bottom Trawl Fleet catches and ex-vessel revenue 2000-2003

Pacific Coast Bottom Trawl Fleet catches and ex-vessel revenue 2000-2003					
		YEAR			
Species	Data Aggregation	**2000**	**2001**	**2002**	**2003**
Arrowtooth Flounder	Landed weight (lbs)	7,170,535	5,425,216	4,582,835	5,103,482
	Exvessel revenue	831,860	648,699	498,703	554,443
Flatfish	Landed weight (lbs)	8,354,981	8,481,175	7,741,412	8,057,403
	Exvessel revenue	2,580,275	2,885,416	2,768,998	2,695,104
Dover Sole/ Thornyhead/ Sablefish (DTS)	Landed weight (lbs)	29,553,603	23,842,889	22,506,474	25,802,494
	Exvessel revenue	18,170,505	15,409,466	13,763,840	15,335,537
Petrale Sole	Landed weight (lbs)	4,155,603	4,036,024	3,936,352	4,394,213
	Exvessel revenue	4,215,263	4,045,334	3,606,273	4,374,169
Shelf Rock	Landed weight (lbs)	1,518,322	1,313,795	1,374,925	735,935
	Exvessel revenue	755,398	632,278	640,293	277,546
Slope Rock	Landed weight (lbs)	2,220,702	2,110,762	1,858,987	1,532,948
	Exvessel revenue	846,602	804,769	752,806	556,636
Nearshore Rock	Landed weight (lbs)	6,854	7,037	11,621	4,408
	Exvessel revenue	6,046	8,136	14,438	3,518
Other Groundfish	Landed weight (lbs)	221,850	238,368	313,064	327,130
	Exvessel revenue	141,014	161,835	224,873	169,197
Pacific Cod	Landed weight (lbs)	608,042	706,417	1,650,161	2,739,199
	Exvessel revenue	286,320	355,598	840,080	1,421,739
Total Landed weight (lbs)		53,810,492	46,161,683	43,975,831	48,697,212
Total Exvessel revenue		**27,833,283**	**24,951,531**	**23,110,305**	**25,387,890**
source: Merrick Burden, NOAA					

Conclusion

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 failure to comply with that obligation that resulted in a court order to prepare the EFH EIS now in progress. The Court emphasized that the "[m]ost significant[]" defect in the challenged documents was that "they fail to consider all relevant and feasible alternative." 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." American Oceans Campaign v. Daley, 183 F.Supp. 2d 1, 20 (D.C.C. 2000).

With input from a broad coalition of conservation organizations, recreational fishermen, and commercial fishermen, and based on all of the information we have available to us, we have developed a viable and practicable management alternative for the Pacific. This Comprehensive Alternative recognizes both the importance of corals, sponges, and other sensitive habitats as essential fish habitat, and the importance of maintaining healthy vibrant fisheries in the Pacific. We request the agency and Council adopt this Comprehensive Alternative as the preferred alternative in the Final EIS.

APPENDIX 1: Description of individual areas

The following figures display the GIS data layers that were used in the identification and boundary placement for each of the areas closed to bottom trawling. The tables reflect the number of habitat polygons and area of each habitat type wholly and in part within the boundaries of the area in question.

1) Olympic_1

The areas Olympic_1 and Olympic_2 encompass a portion of the Olympic National Marine Sanctuary. The five National Marine Sanctuaries on the U.S. west coast are "underwater parks" that "embrace part of our collective riches as a nation" (NOAA pamphlet). They were initially designated based on their biological importance and are clearly areas in the ocean deserving of special protection. The area defined as Olympic_1 contains the site of a rare discovery of Lophelia pertusa that represents one of the only discoveries of this reef-forming deep sea coral species in the Pacific Ocean. Both areas contain a high density of "untrawlable" areas as defined in the Zimmerman (2003) dataset. There are also numerous records of deep sea corals, including gorgonian corals, and sponges in this area from trawl survey records and the MCBI dataset.

Figure 1: Criterion used in determination of Olympic_1 area closed to bottom trawling

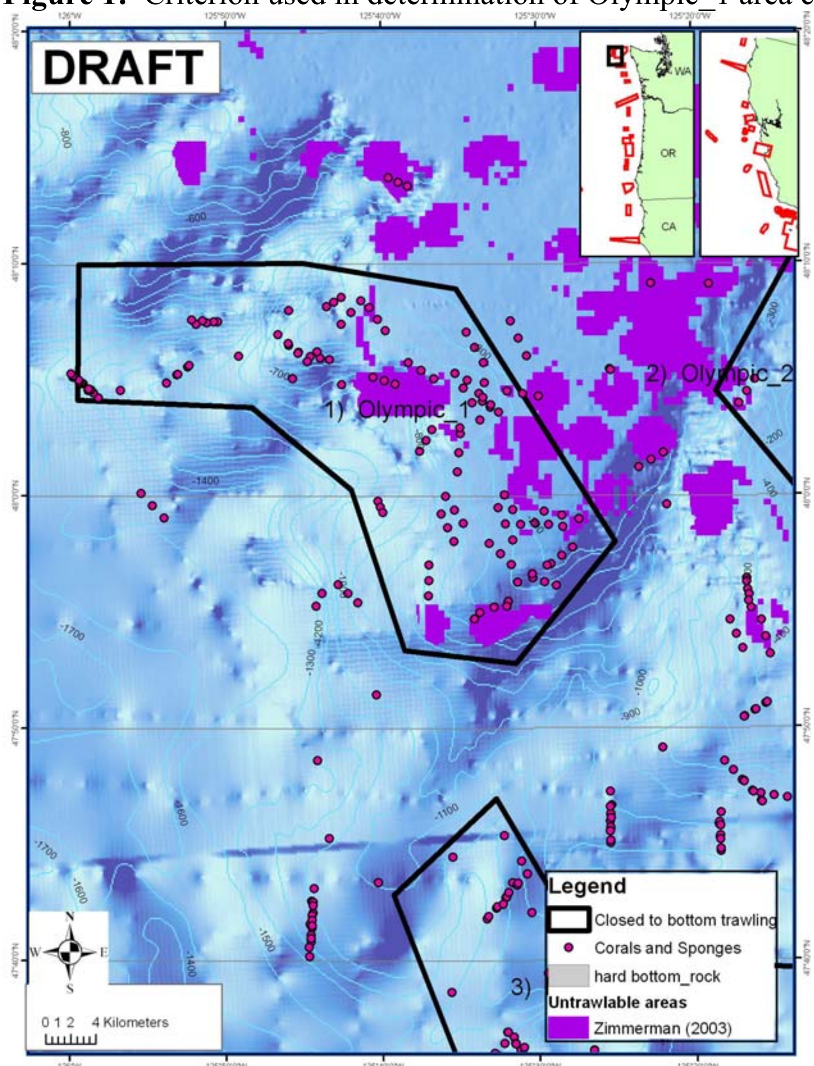


Table 1: Habitat types protected by Olympic_1 closed area, determined from EFH GIS data

HAB_TYPE*	Count_polygons	**Area (km2)**
Sedimentary Slope	5	331.4
Sedimentary Shelf	7	189.2
Sedimentary Slope Canyon Wall	5	97.7
Sedimentary Slope Canyon Floor	3	72.1
Sedimentary Shelf Canyon Wall	7	10.9
Sedimentary Shelf Canyon Floor	1	0.1
Grand Total	28	701.4

* Note: Habitat polygons as defined by the EFH GIS data in the Olympic Marine Sanctuary area are questionable. Localized multibeam mapping of the area was not integrated into the EFH habitat map, possibly due to compatibility of data (Steve Intelmann, GIS analyst, Olympic Marine Sanctuary, pers. com.). As a result, the EFH habitat polygons show an area known to contain pinnacles and high relief, rocky habitat displayed as "sedimentary shelf" (Steve Intelmann, pers. com.). In addition, Zimmerman (2003) showed a large proportion of the area to be untrawlable.

2) Olympic_2

Figure 2: Criterion used in determination of Olympic_2 area closed to bottom trawling

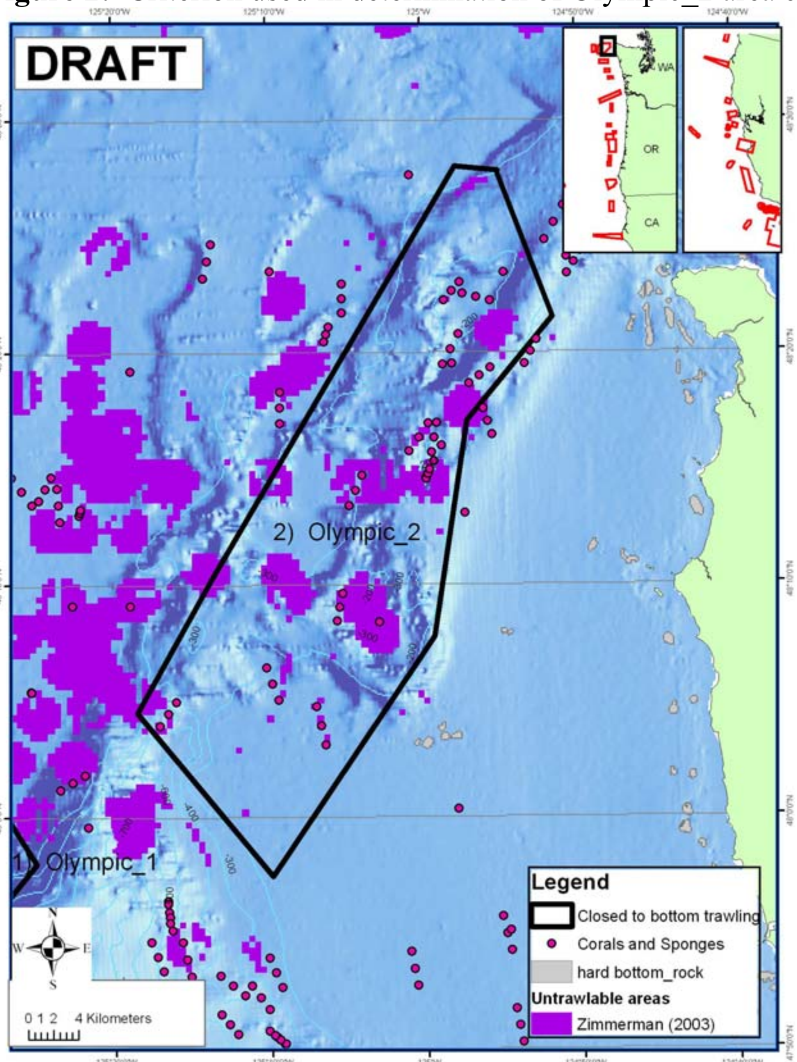


Table 2: Habitat types protected by Olympic_2 closed area, determined from EFH GIS data

HAB_TYPE*	Count_polygons	Area (km2)
Sedimentary Glacial Shelf Deposit	8	390.0
Sedimentary Shelf Gully	2	215.0
Sedimentary Shelf	5	155.0
Grand Total	15	760.0

*note-Habitat polygons as defined by the EFH GIS data in the Olympic Marine Sanctuary area are questionable. Localized multibeam mapping of the area was not integrated into the EFH habitat map, possibly due to compatibility of data (Steve Intelmann, GIS analyst, Olympic Marine Sanctuary, pers. com.). As a result, the EFH habitat polygons show an area known to contain pinnacles and high relief, rocky habitat displayed as "sedimentary shelf" (Steve Intelmann, pers. com.) . In addition, Zimmerman (2003) showed a large proportion of the area to be untrawlable.

3) Biogenic Area_1

This area, located off the slope and outside of Olympic Marine Sanctuary, contains deep-water biogenic habitat. The area encompasses 126 records of coral and sponge. While the number of documented records of corals and sponges has increased over the years, the CPUE of corals and sponges has decreased since 1992.

Figure 3: Criterion used in determination of Biogenic Area_1 area closed to bottom trawling

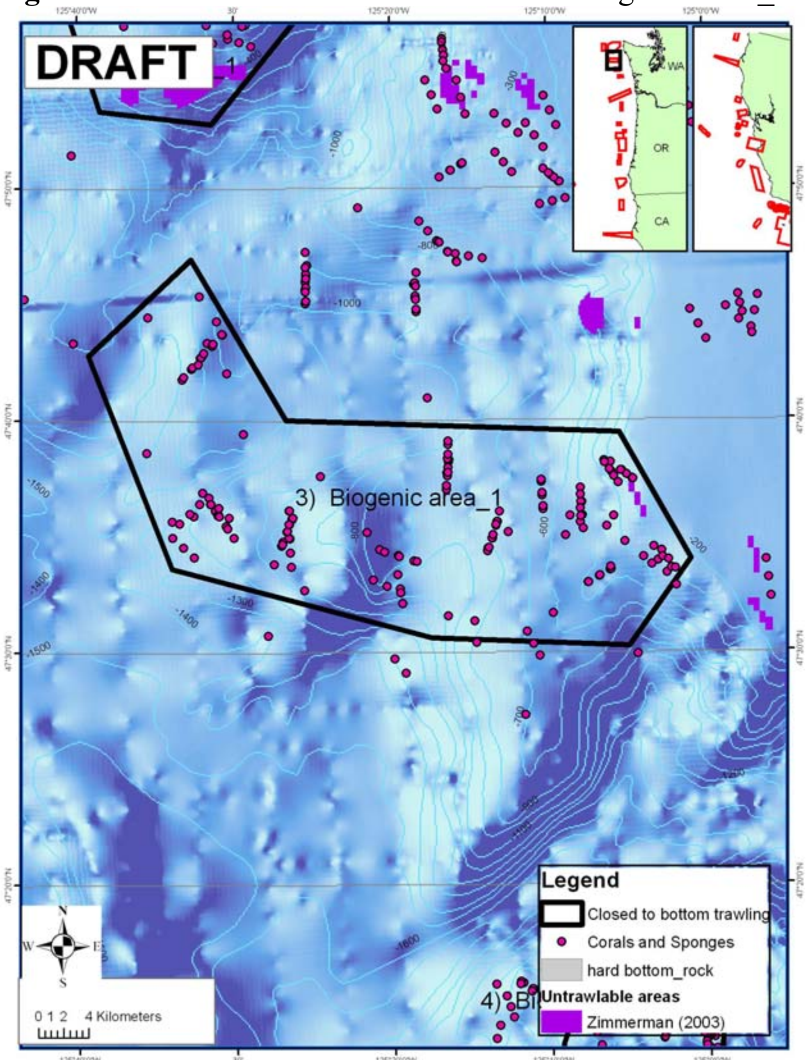


Table 3: Habitat types protected by Biogenic Area_1 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	401.5
Sedimentary Slope Canyon Wall	6	273.9
Sedimentary Basin	3	43.6
Sedimentary Slope Canyon Floor	3	20.4
Sedimentary Slope Gully	2	11.6
Grand Total	15	**751.1**

4) Biogenic Area_2

Figure 4: Criterion used in determination of Biogenic Area_2 area closed to bottom trawling

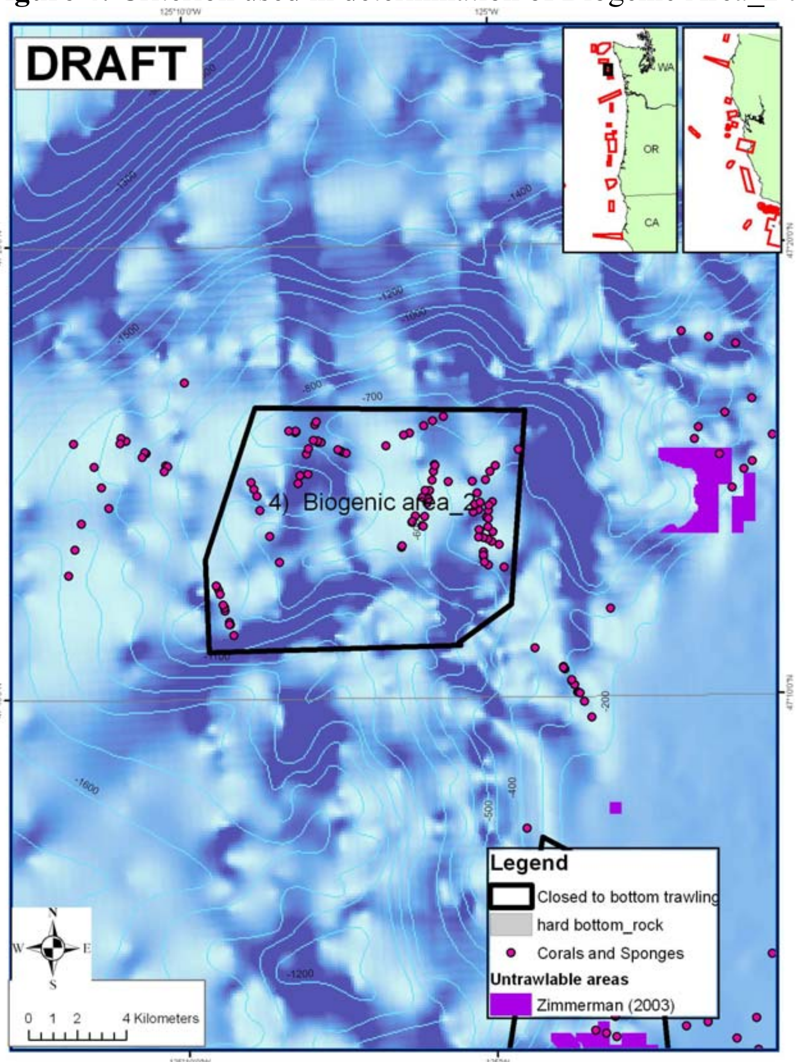


Table 4: Habitat types protected by Biogenic Area_2 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	93.2
Sedimentary Slope Canyon Wall	1	23.7
Grand Total	2	117.0

5) Grays Canyon

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.

Figure 5: Criterion used in determination of Grays Canyon area closed to bottom trawling

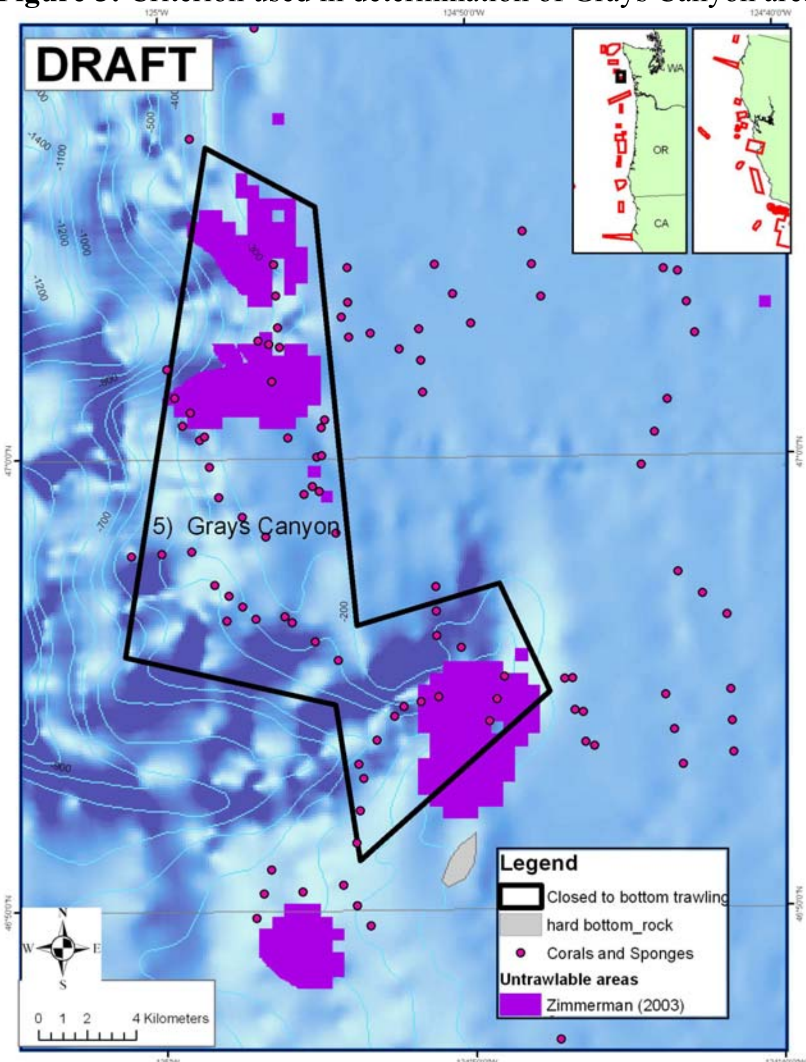


Table 5: Habitat types protected by Grays Canyon closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Shelf	2	90.3
Sedimentary Shelf Canyon Wall	3	55.4
Sedimentary Slope Canyon Wall	2	34.5
Sedimentary Slope	5	19.4
Sedimentary Shelf Canyon Floor	1	6.8
Grand Total	13	206.3

6) Biogenic Area_3

Figure 6: Criterion used in determination of Biogenic Area_3 area closed to bottom trawling

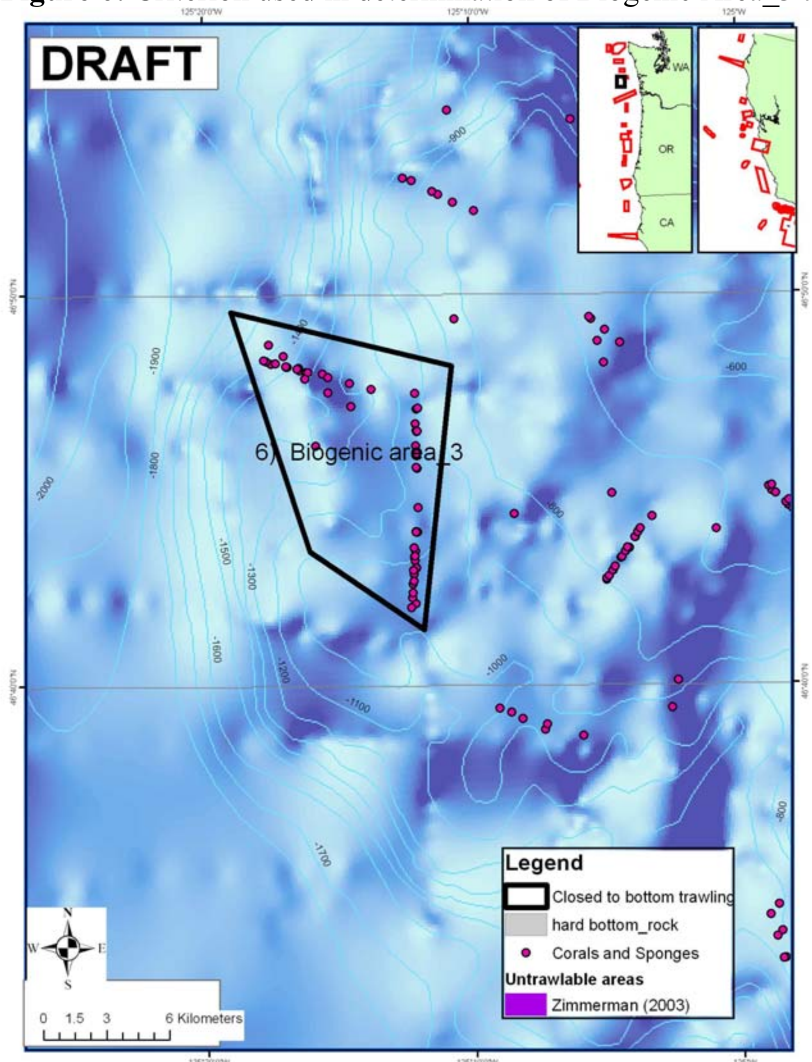


Table 6: Habitat types protected by Biogenic Area_3 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope	1	91.2
Grand Total	1	91.2

7) Astoria Canyon

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 sedimentary slopes to hard rock canyon walls. There are many records of biogenic habitats in this canyon (Clarke 2004, Etnoyer & Morgan 2003). Within the proposed Astoria Canyon closed area, 101 deep-sea coral and sponge records have been documented. This canyon has also been studied using ROPOS submersibles.

Figure 7: Criterion used in determination of Astoria Canyon area closed to bottom trawling

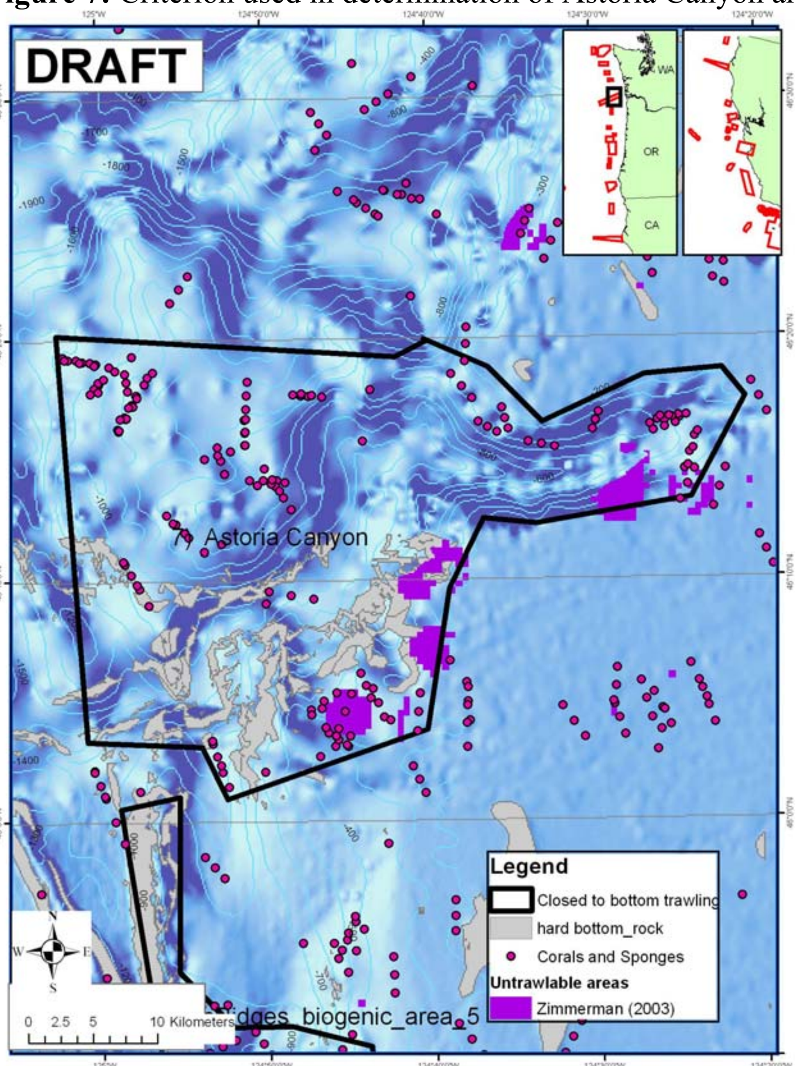


Table 7: Habitat types protected by Astoria Canyon closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope	24	412.9
Sedimentary Slope Canyon Wall	104	193.3
Sedimentary Slope Canyon Floor	9	159.6
Sedimentary Ridge	36	105.6
Rocky Slope Canyon Wall	56	63.7
Sedimentary Shelf Canyon Wall	13	49.6
Sedimentary Shelf	12	35.2
Sedimentary Basin	10	24.5
Rocky Ridge	8	22.8
Rocky Slope	47	21.9
Sedimentary Shelf Canyon Floor	1	14.5
Sedimentary Slope Landslide	10	11.9
Rocky Slope Landslide	2	8.3
Rocky Slope Canyon Floor	22	3.3
Rocky Basin	2	0.0
Grand Total	356	**1127.1**

8) Ridges_Biogenic Area_5

Figure 8: Criterion used in determination of Ridges_biogenic_area_5 area closed to bottom trawling

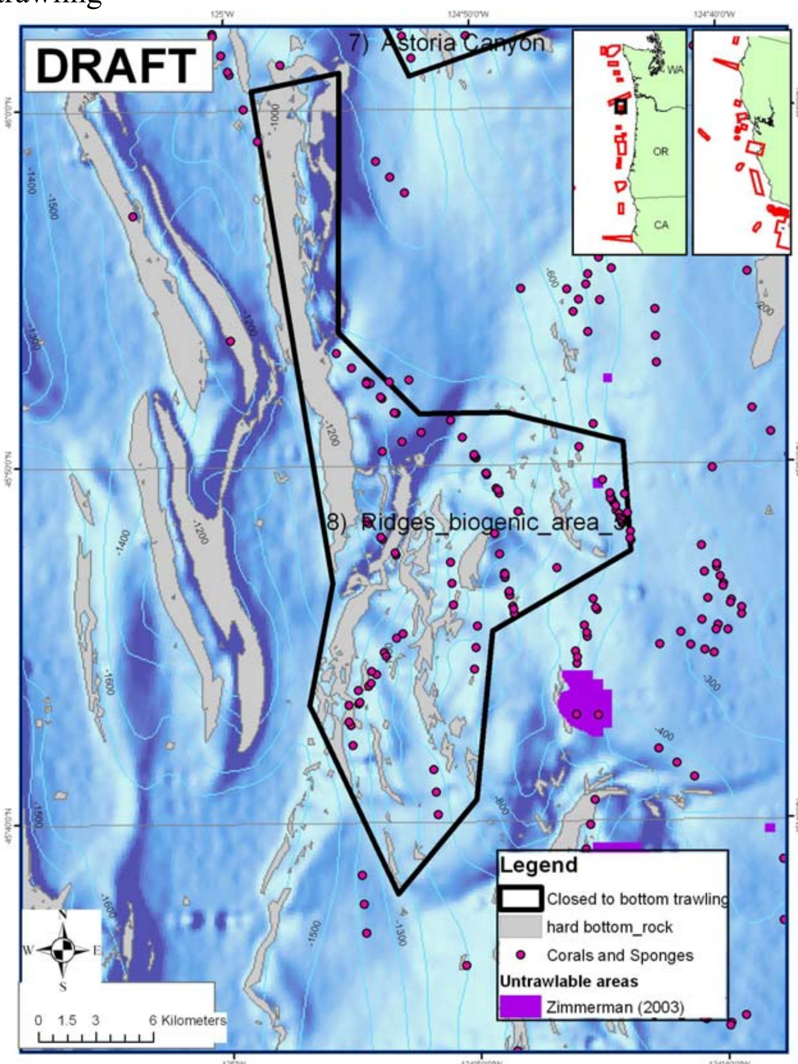


Table 8: Habitat types protected by Ridges_biogenic_area_5 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Ridge	30	179.8
Rocky Ridge	105	76.8
Sedimentary Slope	3	29.2
Sedimentary Shelf	1	15.9
Sedimentary Basin	3	13.4
Rocky Slope	12	0.6
Rocky Basin	2	0.1
Rocky Shelf	3	0.1
Grand Total	159	315.8

9) Biogenic Area_6

Figure 9: Criterion used in determination of Biogenic area_6 area closed to bottom trawling

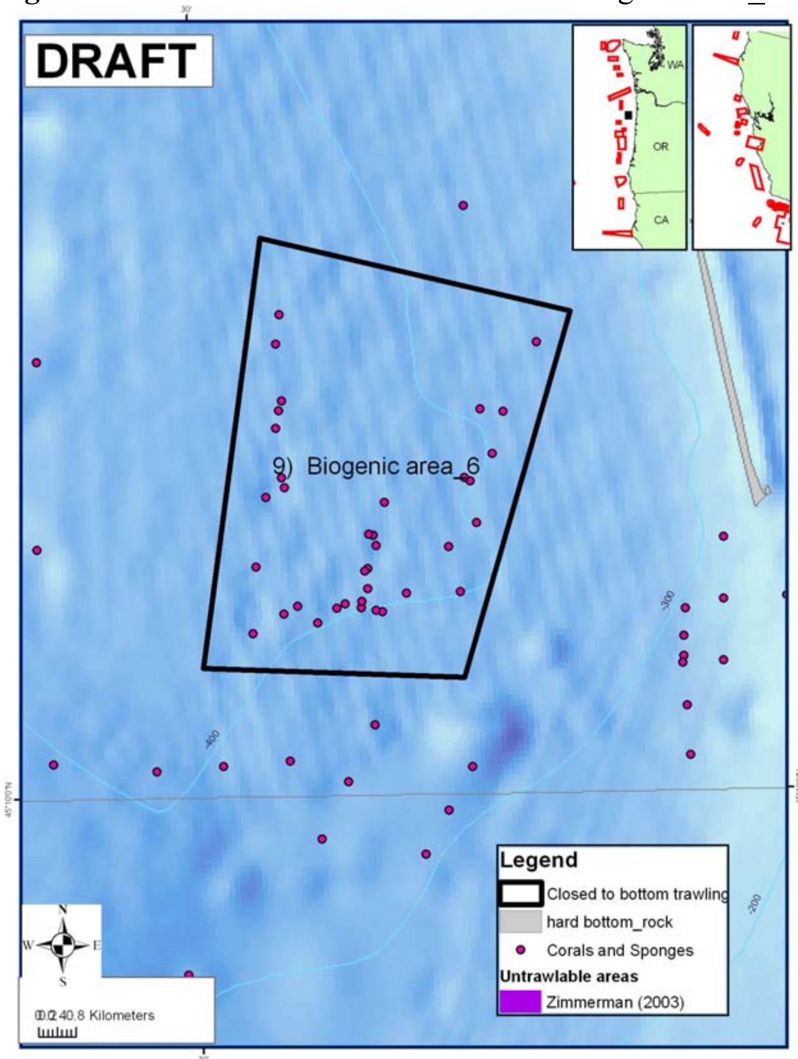


Table 9: Habitat types protected by Biogenic area_6 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	53.8
Grand Total	1	53.8

10) Biogenic Area_7

Figure 10: Criterion used in determination of Biogenic area_7 area closed to bottom trawling

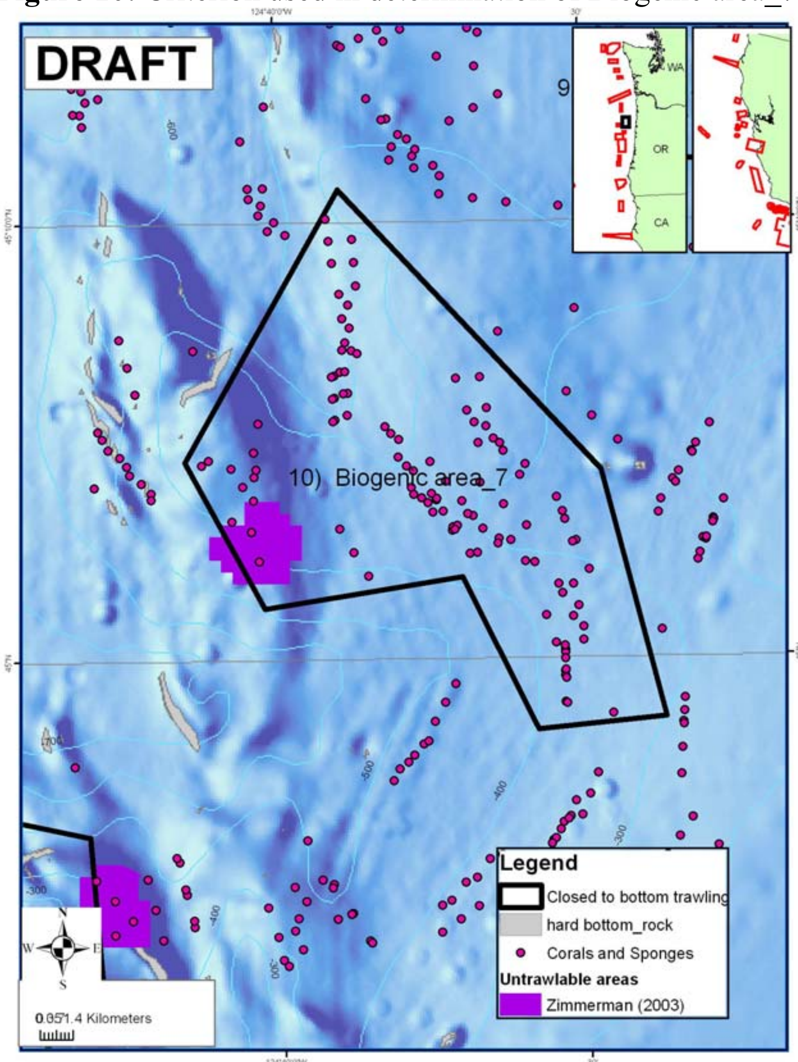


Table 10: Habitat types protected by Biogenic area_7 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	195.2
Sedimentary Ridge	2	35.5
Grand Total	3	230.7

11) Biogenic Area_8

Figure 11: Criterion used in determination of Biogenic_area_8 area closed to bottom trawling

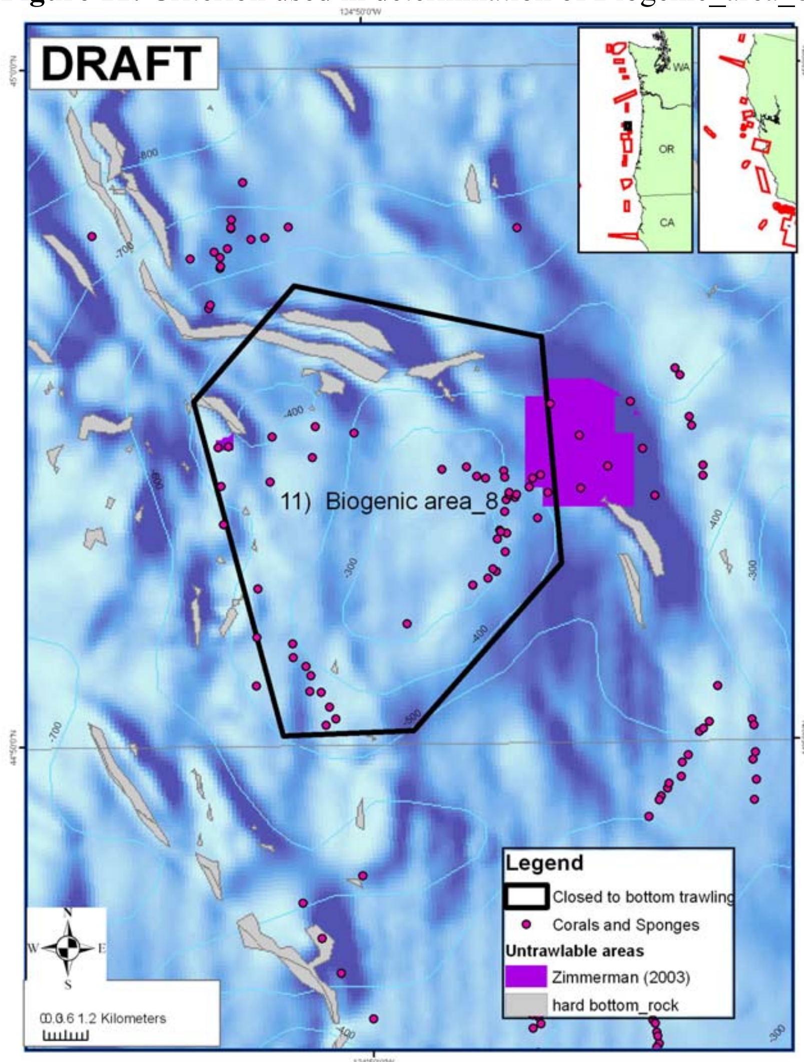


Table 11: Habitat types protected by Biogenic_area_8 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	71.5
Sedimentary Ridge	4	16.5
Rocky Ridge	11	3.8
Rocky Slope	10	0.2
Grand Total	26	92.1

12) Daisy Bank

Daisy Bank, north of Heceta Bank, has been less heavily fished and is also comprised largely of hard bottom habitat. Hixon (1991) documented large sponge beds on this bank. Daisy Bank has been likened to the "Sitka Pinnacles (a biodiverse MPA in Alaska) of the Pacific Northwest" (Hixon, pers. com.).

Figure 12: Criterion used in determination of Daisy Bank area closed to bottom trawling

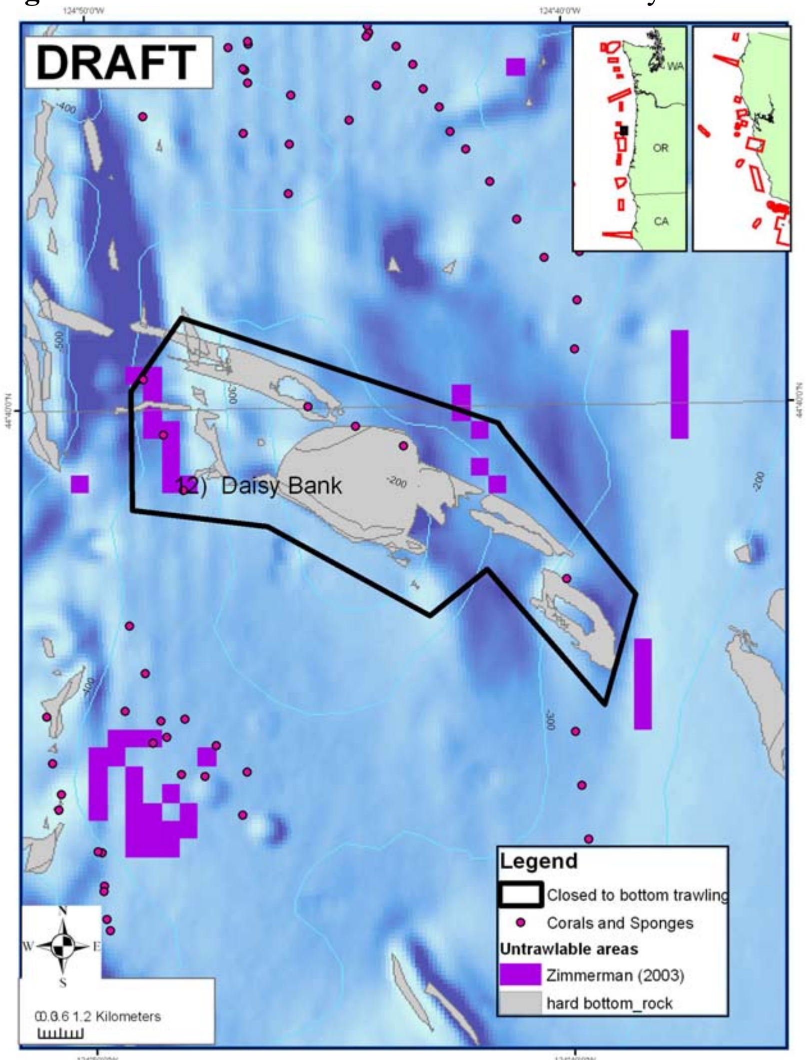


Table 12: Habitat types protected by Daisy Bank closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	12	37.8
Rocky Ridge	15	11.6
Rocky Slope	30	8.9
Sedimentary Ridge	6	7.6
Grand Total	63	65.9

13) Heceta Bank

Heceta Bank is the largest rocky reef in the Pacific northwest. This large bank off the coast of central Oregon is largely comprised of hard bottom substrate. Recent explorations have documented key areas of sponges and crinoids. Wakefield (unpublished data) discovered high abundances of crinoids and sponges creating biogenic habitat for groundfish in some areas of Heceta Bank.

Figure 13: Criterion used in determination of Heceta Bank area closed to bottom trawling

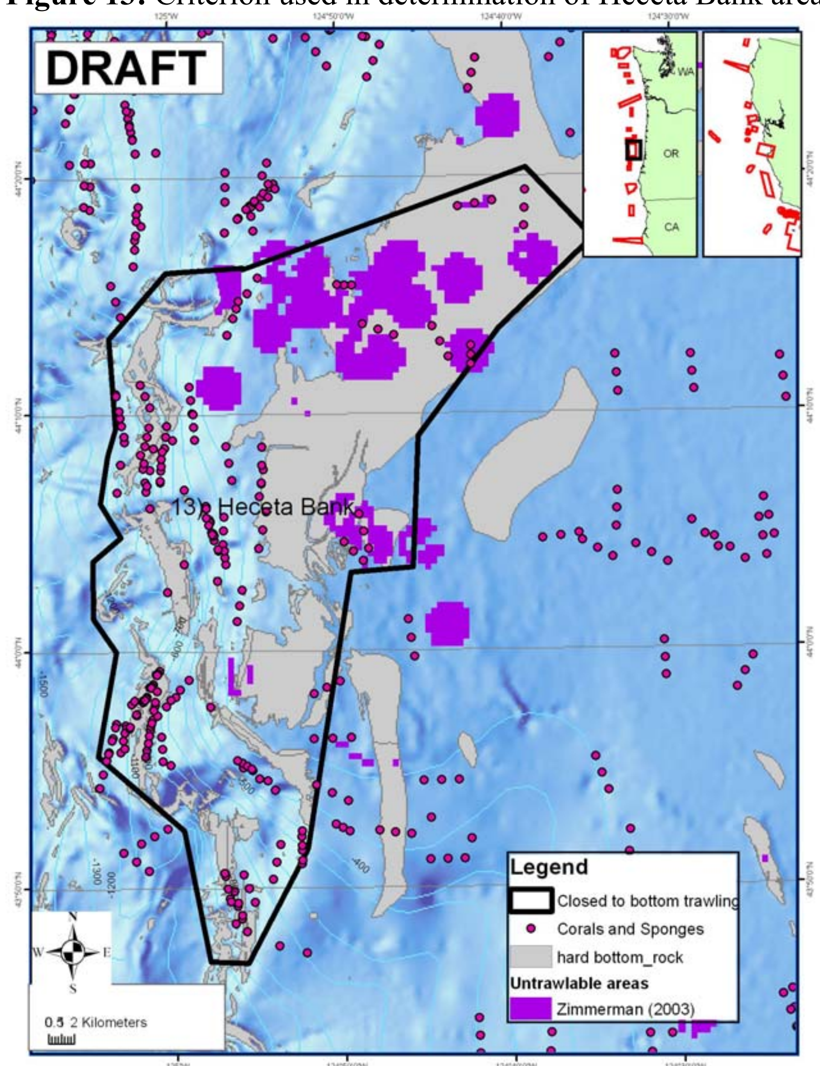


Table 13: Habitat types protected by Heceta Bank closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Rocky Shelf	39	429.3
Sedimentary Slope	22	266.7
Sedimentary Shelf	4	216.0
Sedimentary Slope Landslide	70	116.0
Rocky Slope Landslide	50	59.1
Rocky Slope	117	51.4
Rocky Ridge	5	9.1
Rocky Slope Canyon Wall	3	6.2
Sedimentary Ridge	13	4.5
Sedimentary Slope Canyon Floor	1	2.8
Sedimentary Slope Canyon Wall	16	1.8
Rocky Slope Canyon Floor	11	0.1
Grand Total	351	1163.0

14) Ridges_Biogenic Area_9

Figure 14: Criterion used in determination of Ridges_biogenic_area_9 area closed to bottom trawling

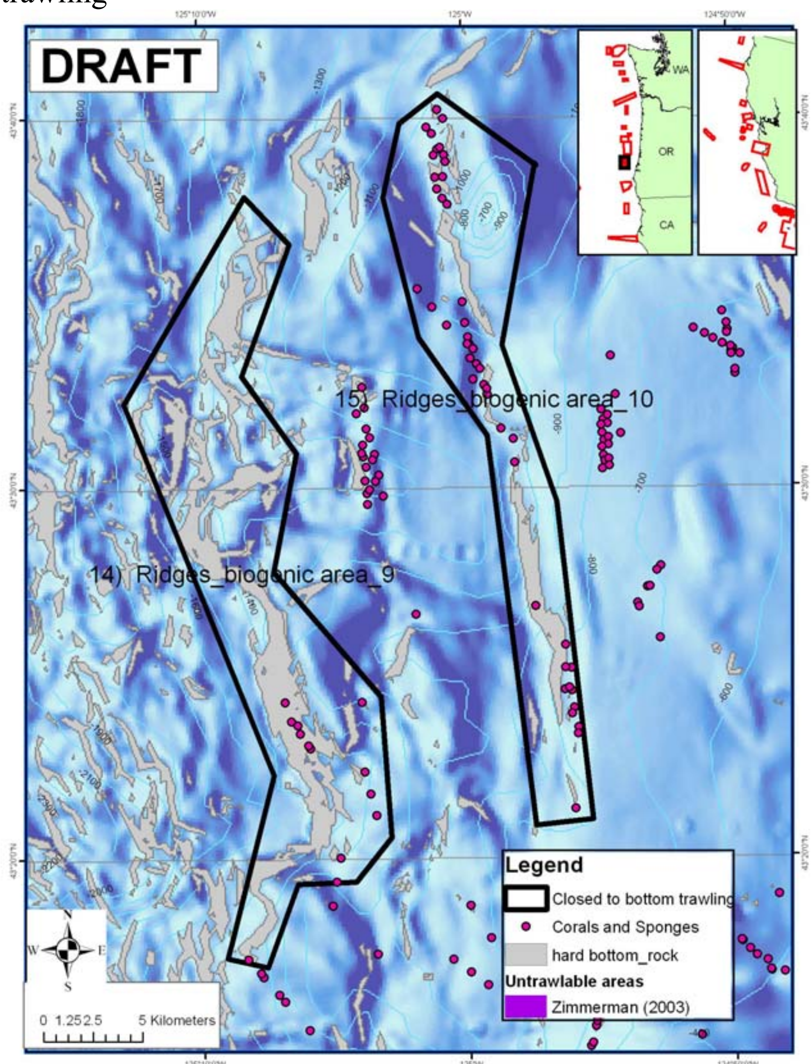


Table 14: Habitat types protected by Ridges_biogenic_area_9 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope Landslide	48	96.2
Rocky Slope Landslide	45	56.3
Sedimentary Slope	3	40.1
Rocky Slope	39	6.1
Grand Total	135	198.8

15) Ridges_Biogenic Area_10

Figure 15: Criterion used in determination of Ridges_biogenic_area_10 area closed to bottom trawling

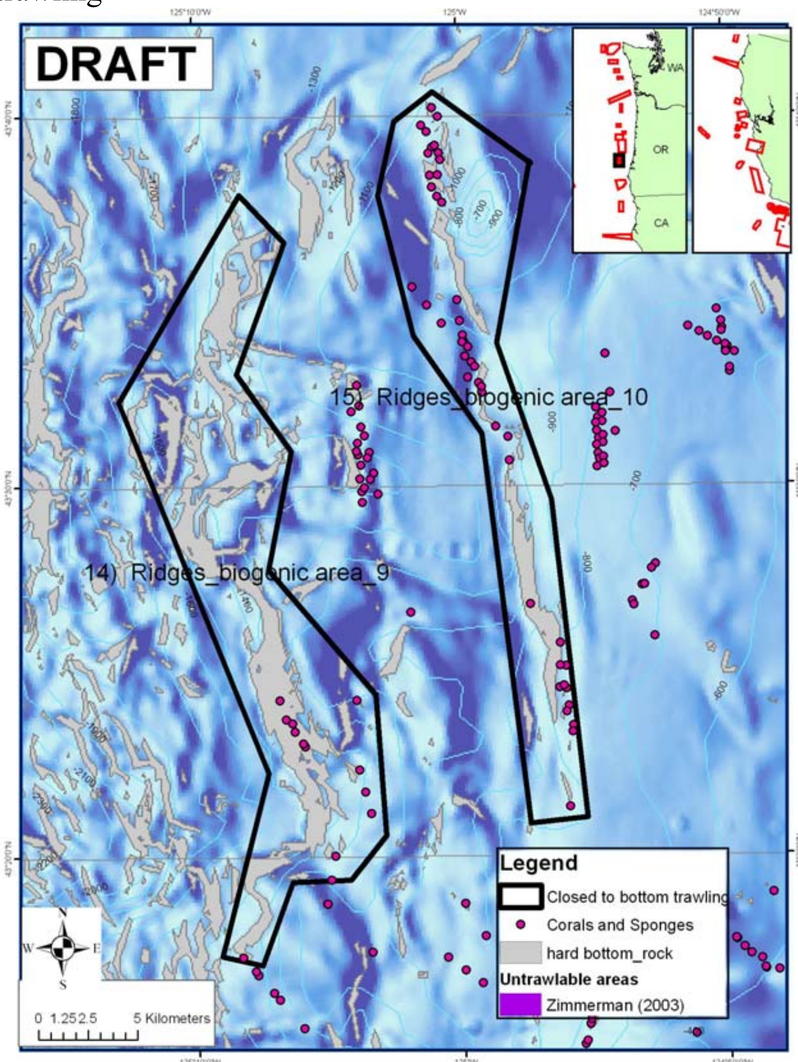


Table 15: Habitat types protected by Ridges_biogenic_area_10 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Ridge	7	62.1
Sedimentary Slope	1	56.1
Rocky Ridge	30	16.2
Sedimentary Basin	1	5.7
Rocky Slope	6	0.7
Sedimentary Slope Landslide	1	0.5
Grand Total	46	141.3

16) Hard Bottom Feature_1

Figure 16: Criterion used in determination of Hard bottom feature_1 area closed to bottom trawling

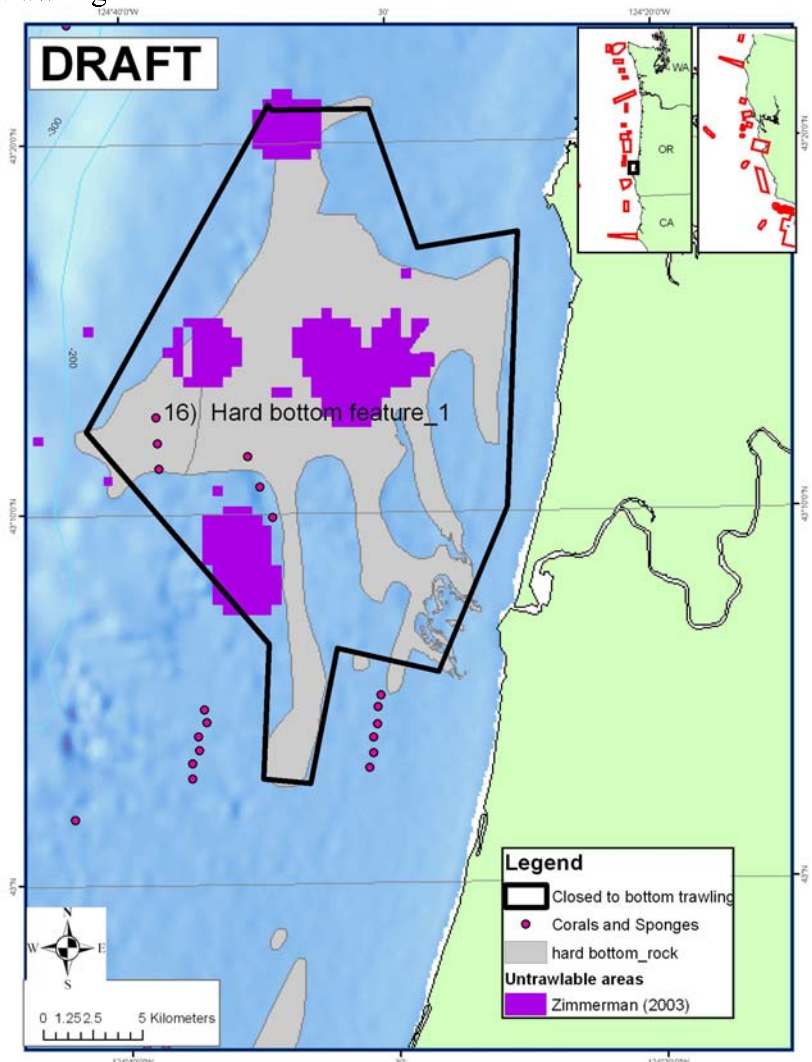


Table 16: Habitat types protected by Hard bottom feature_1 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Shelf	18	211.6
Sedimentary Shelf	8	171.1
Rocky Slope	1	24.8
Sedimentary Slope	2	22.0
Grand Total	29	429.5

17) Rogue Canyon

This submarine canyon contains high amounts of hard substrate (NOAA), a high relative density of megafaunal invertebrate records, and is known for its large canyon walls and ridges.

Figure 17: Criterion used in determination of Rogue Canyon area closed to bottom trawling

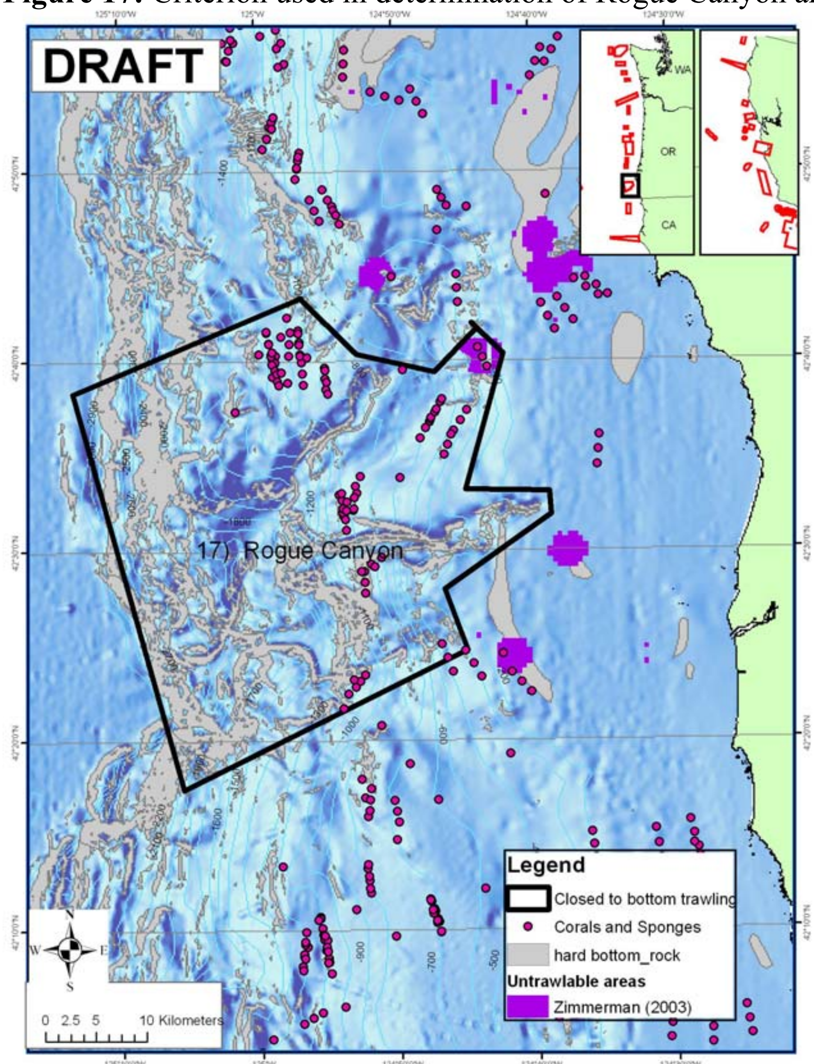


Table 17: Habitat types protected by Rogue Canyon closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope Landslide	77	545.2
Sedimentary Slope Canyon Wall	350	273.4
Rocky Slope Canyon Wall	171	126.3
Rocky Slope Landslide	241	123.3
Sedimentary Slope	6	95.3
Rocky Slope Canyon Floor	138	88.8
Sedimentary Slope Canyon Floor	48	61.4
Sedimentary Shelf	4	18.3
Sedimentary Shelf Canyon Wall	21	2.2
Rocky Slope	18	1.5
Rocky Shelf	5	0.9
Rocky Shelf Canyon Wall	1	0.2
Grand Total	1080	1336.7

18) Biogenic Area_11

Figure 18: Criterion used in determination of Biogenic area_11 area closed to bottom trawling

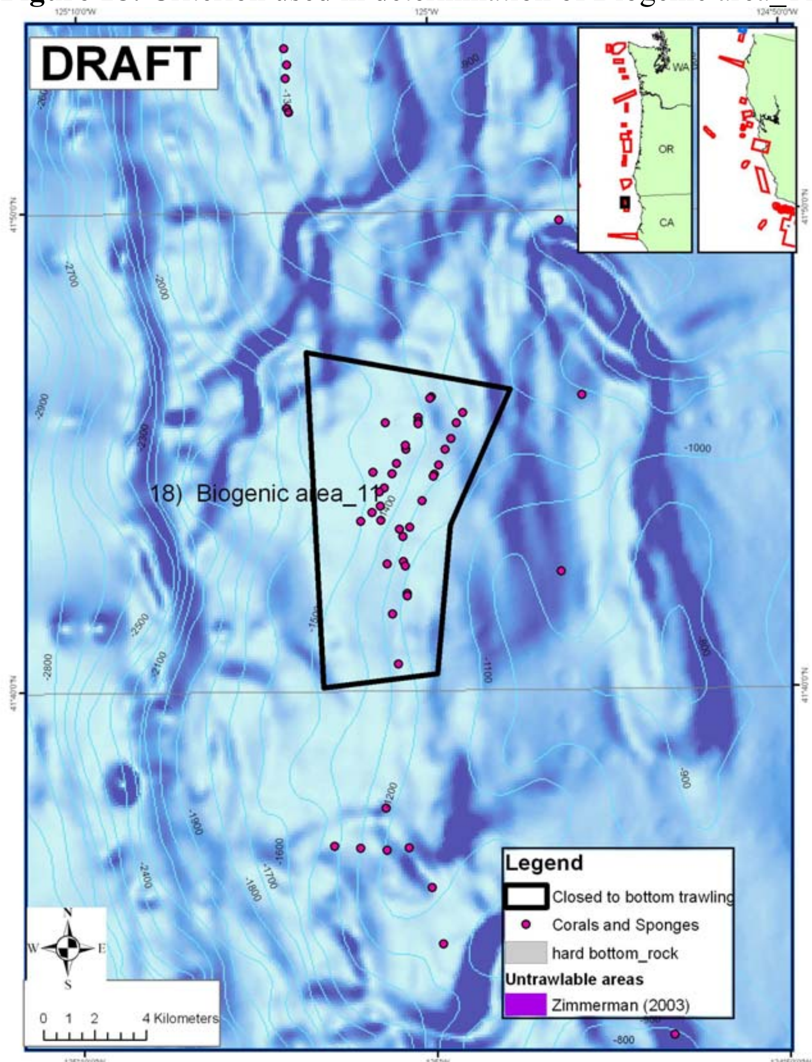


Table 18: Habitat types protected by Biogenic area_11 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	48.5
Sedimentary Slope Canyon Wall	3	12.3
Sedimentary Slope Canyon Floor	1	9.2
Grand Total	5	70.1

19) Eel River Canyon

Figure 19: Criterion used in determination of Eel River Canyon area closed to bottom trawling

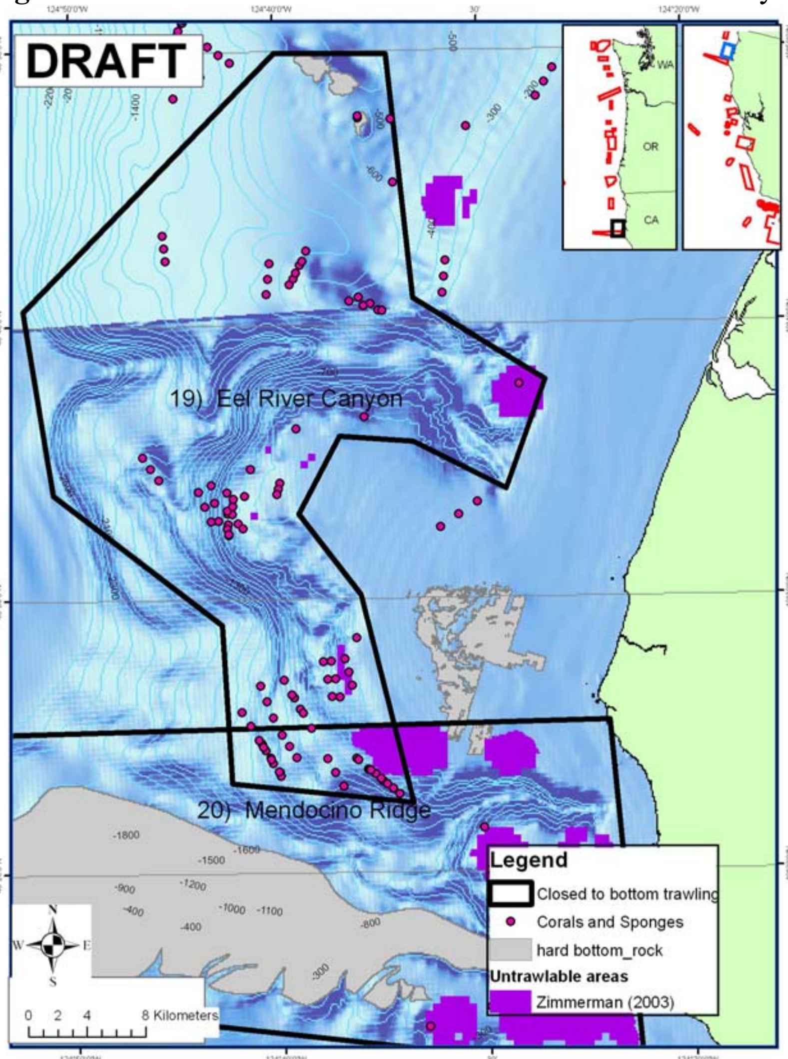


Table 19: Habitat types protected by Eel River Canyon closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	3	461.8
Sedimentary Slope Canyon Wall	7	146.6
Sedimentary Slope Gully	2	137.3
Sedimentary Slope Canyon Floor	5	89.6
Sedimentary Shelf	1	62.5
Sedimentary Apron	1	9.4
Rocky Ridge	3	5.8
Sedimentary Apron Canyon Floor	1	3.7
Grand Total	23	916.7

20) Mendocino Ridge

Mendocino Ridge, also known as the Gorda Escarpment, is a large underwater ridge running east to west separating two major marine ecological provinces.

Figure 20: Criterion used in determination of Mendocino Ridge area closed to bottom trawling

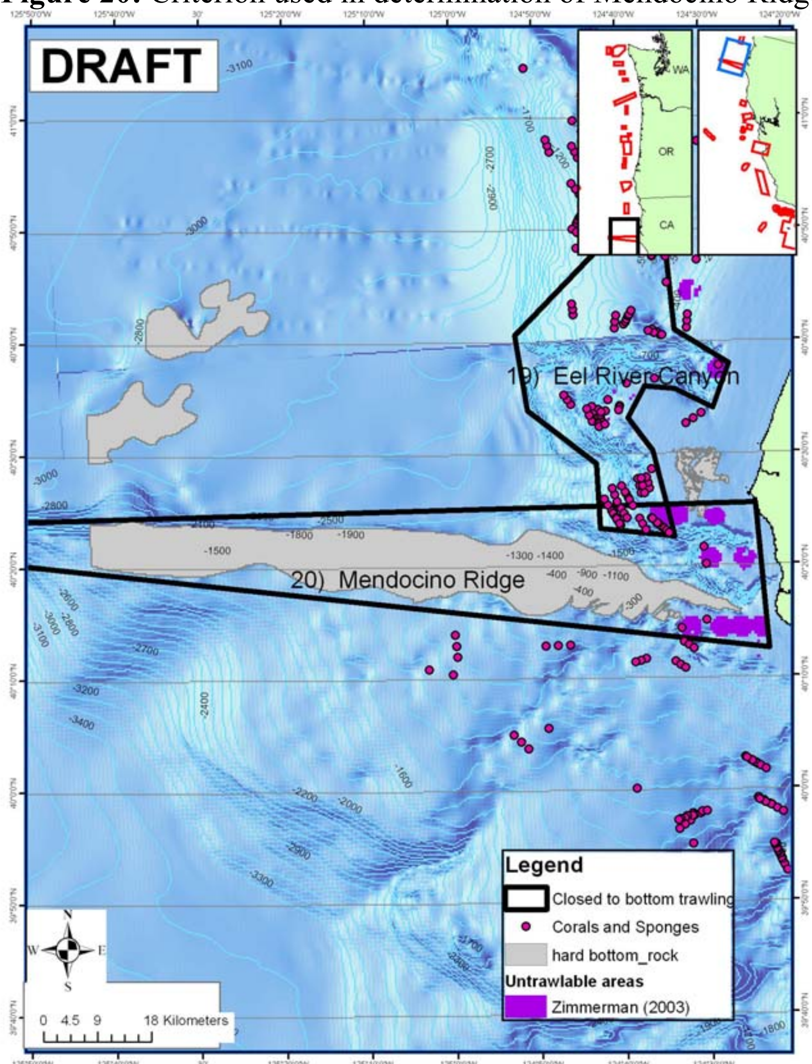


Table 20: Habitat types protected by Mendocino Ridge closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	1	909.4
Sedimentary Shelf	24	194.9
Sedimentary Slope Canyon Floor	5	192.5
Sedimentary Slope Canyon Wall	2	182.5
Sedimentary Slope	7	123.3
Sedimentary Apron	3	114.0
Rocky Shelf	5	3.3
Sedimentary Apron Canyon Floor	2	1.8
Grand Total	49	1721.7

21) Hard Bottom Feature_2

Figure 21: Criterion used in determination of Hard bottom feature_2 area closed to bottom trawling

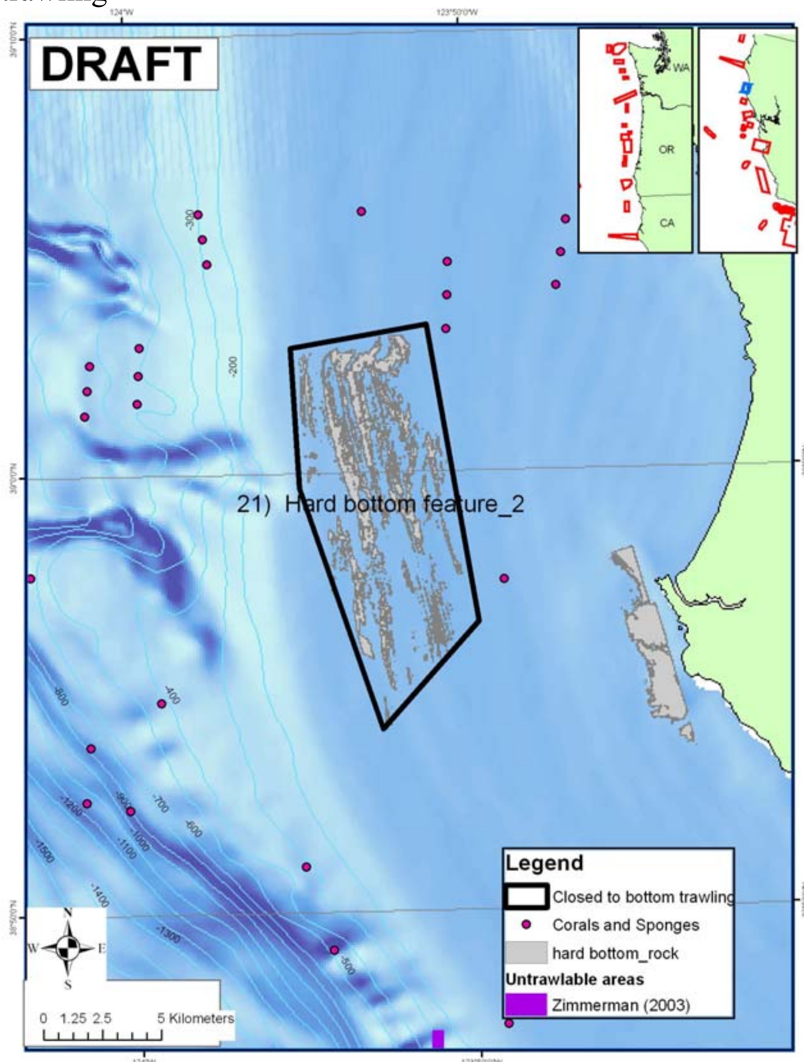


Table 21: Habitat types protected by Hard bottom feature_2 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Shelf	254	70.0
Rocky Shelf	1054	18.1
Grand Total	1308	88.0

22) Biogenic Area_12

Figure 22: Criterion used in determination of Biogenic area_12 area closed to bottom trawling

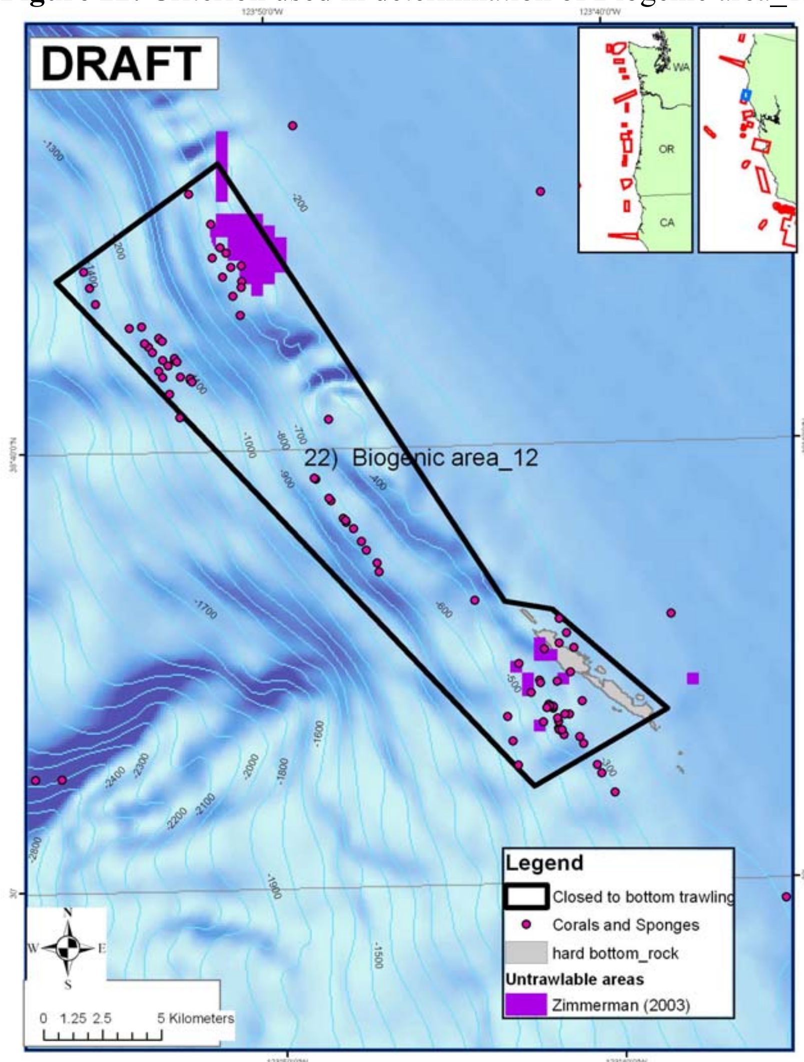


Table 22: Habitat types protected by Biogenic area_12 closed area, determined from EFH GIS data

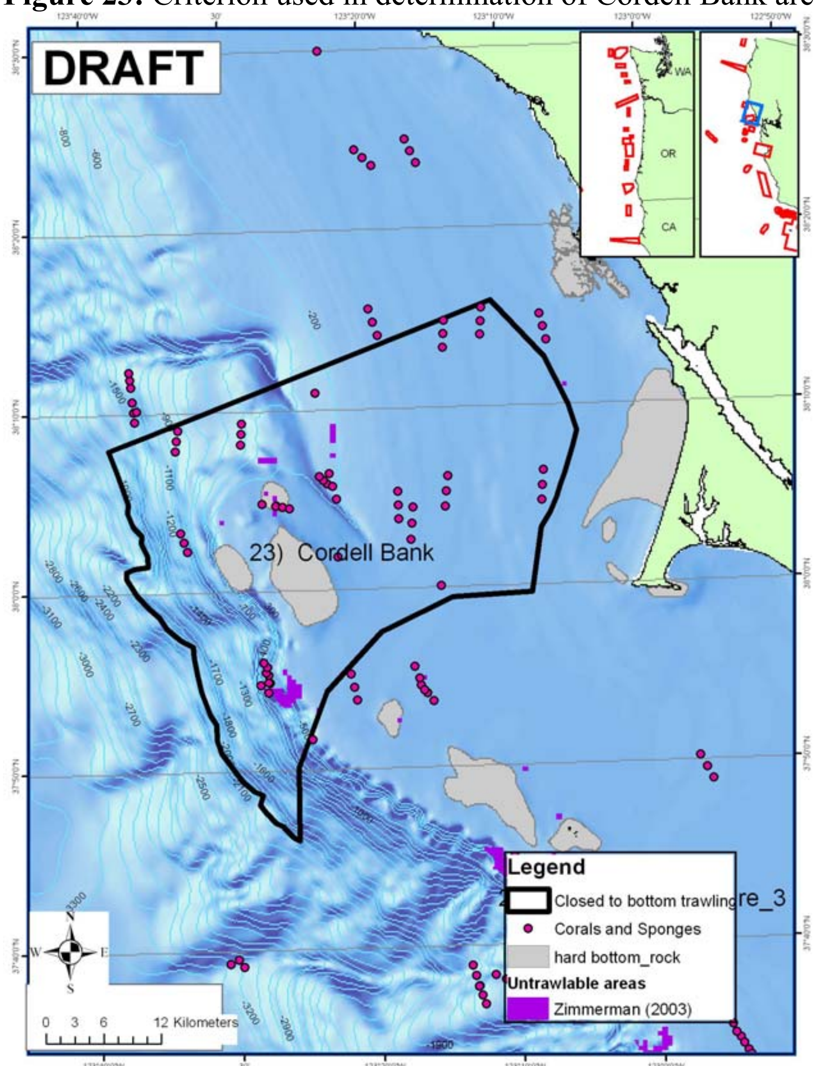
HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	179.2
Sedimentary Shelf	3	5.9
Rocky Shelf	8	3.3
Grand Total	12	188.3

23) Cordell Bank

Cordell Bank is an underwater island surrounded by deep water on three sides. At depths between 35 m and 50 m, 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.[5]

Figure 23: Criterion used in determination of Cordell Bank area closed to bottom trawling



[5] Cordell Bank State of the Sanctuary Report. http://sanctuaries.nos.noaa.gov/oms/omscordell/omscordell.html

Table 23: Habitat types protected by Cordell Bank closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Shelf	1	832.5
Sedimentary Slope	1	468.8
Rocky Shelf	3	63.3
Sedimentary Slope Canyon Floor	1	5.5
Grand Total	6	1370.1

24) Hard Bottom Feature_3

Figure 24: Criterion used in determination of Hard bottom feature_3 area closed to bottom trawling

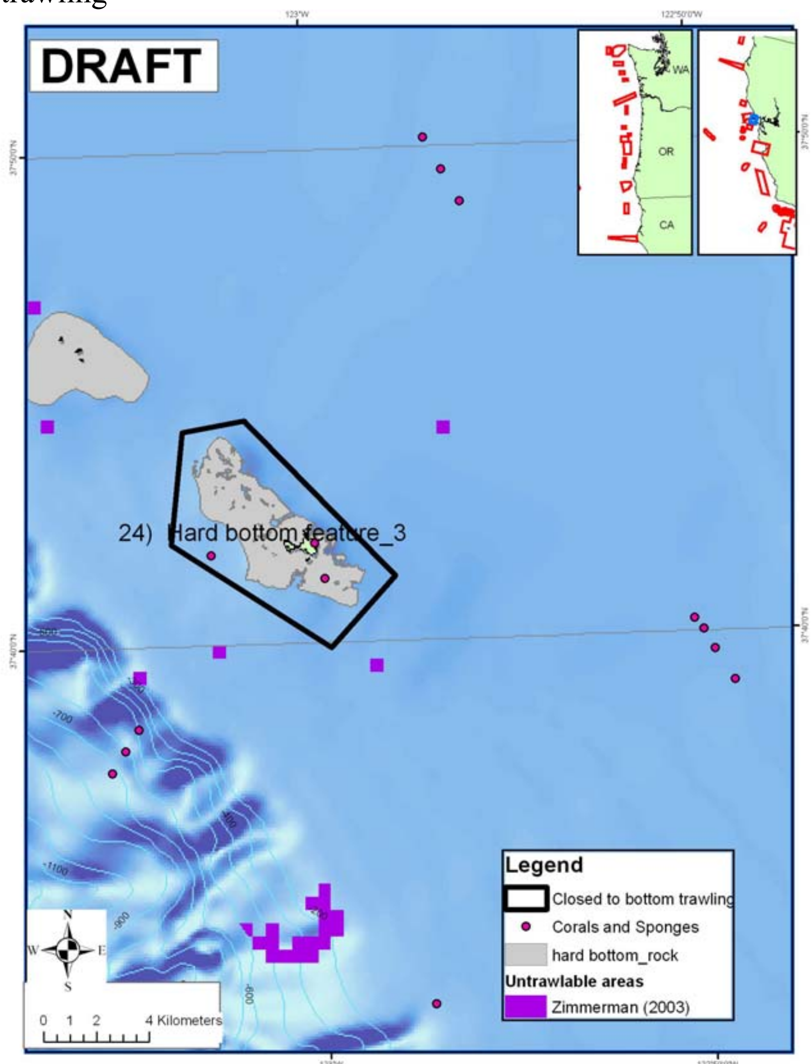


Table 24: Habitat types protected by Hard bottom feature_3 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Shelf	36	23.2
Rocky Shelf	24	15.5
Island	7	0.4
Sedimentary Shelf Gully	21	0.2
Grand Total	88	39.3

25) Hard Bottom Feature_4

Figure 25: Criterion used in determination of Hard bottom feature_4 area closed to bottom trawling

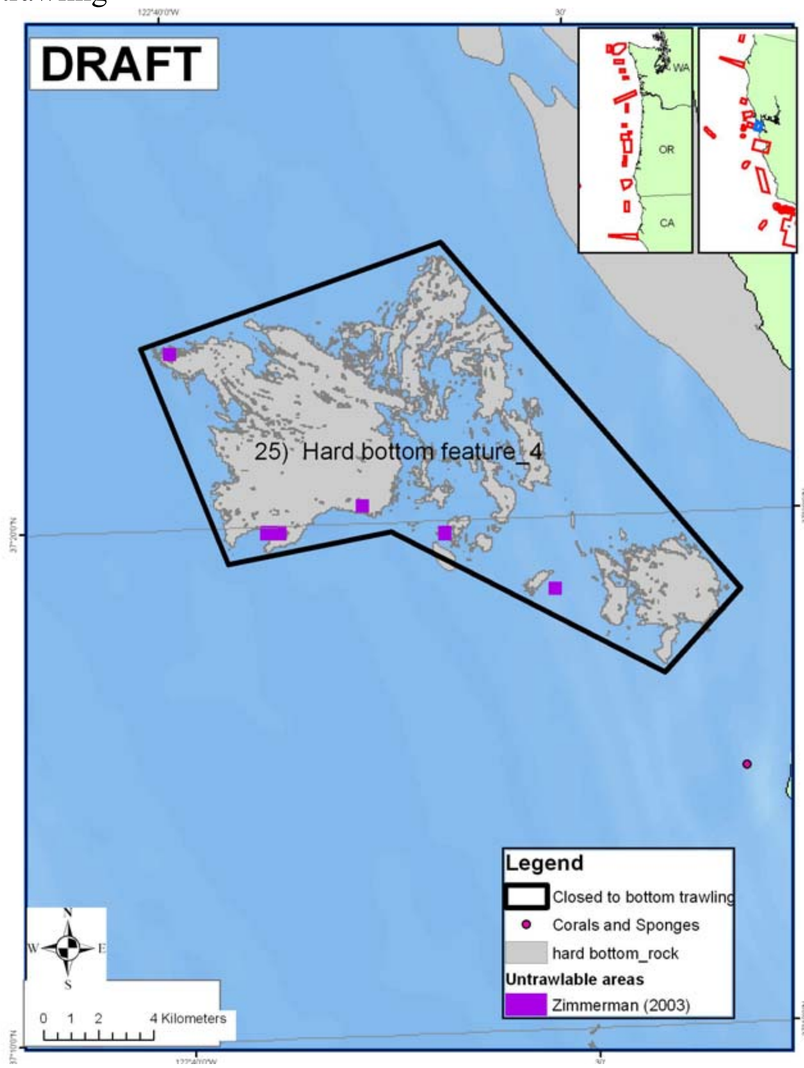


Table 25: Habitat types protected by Hard bottom feature_4 closed area, determined from EFH GIS data

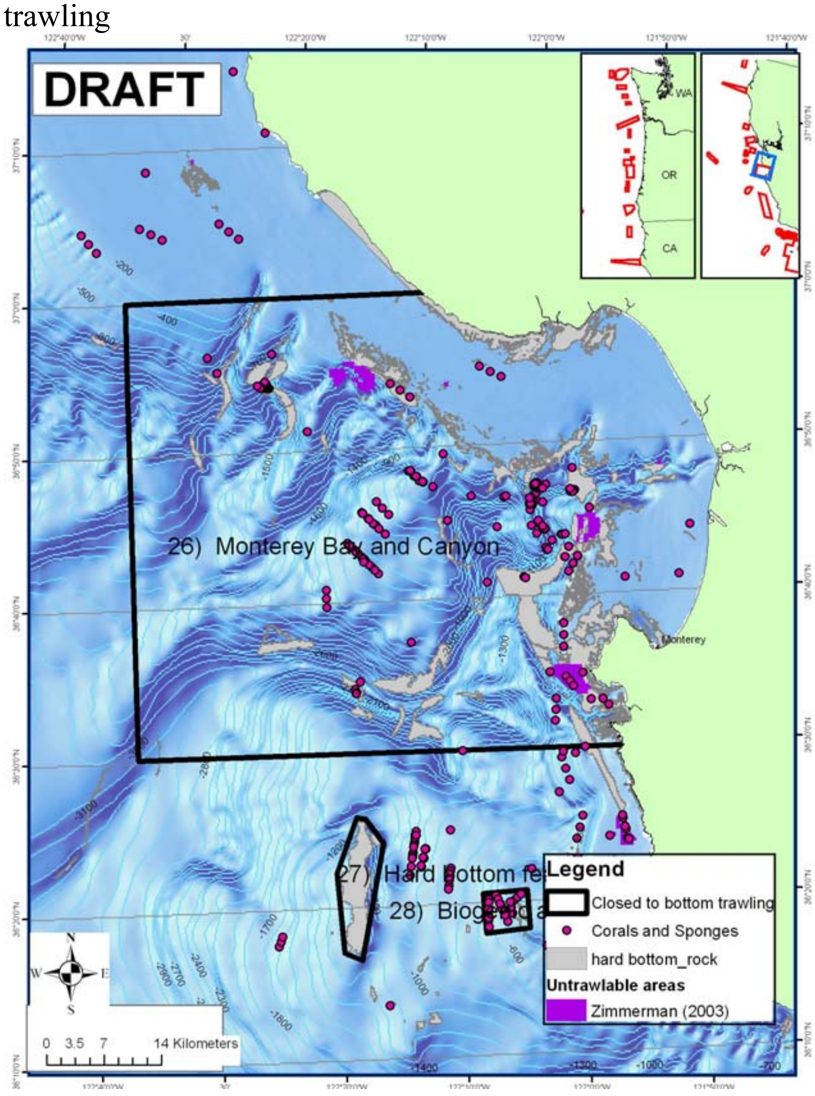
HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Shelf	318	100.7
Rocky Shelf	462	69.6
Grand Total	780	170.2

26) Monterey Bay and Monterey Canyon

The deepest and largest submarine canyon on the coast of North America is the Monterey Canyon, just south of San Francisco, California. This canyon is 470 km long, approximately 12 km wide at its widest point, and has a maximum rim to floor relief of 1,700 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.[6]

Figure 26: Criterion used in determination of Monterey Bay and Canyon area closed to bottom trawling



[6] State of the Sanctuary Report. Monterey Bay National Marine Sanctuary. http://www.mbnms.nos.noaa.gov

Table 26: Habitat types protected by Monterey Bay and Canyon closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope	23	1063.4
Sedimentary Shelf	487	930.1
Sedimentary Slope Canyon Wall	55	696.2
Sedimentary Slope Canyon Floor	5	276.2
Rocky Shelf	1565	169.9
Sedimentary Slope Gully	13	82.5
Sedimentary Shelf Canyon Wall	31	76.8
Sedimentary Slope Gully Floor	35	69.1
Rocky Slope Canyon Wall	26	61.0
Rocky Shelf Canyon Wall	38	52.5
Sedimentary Apron Canyon Wall	1	32.4
Sedimentary Slope Landslide	12	30.7
Rocky Slope	13	27.9
Rocky Slope Landslide	3	3.9
Sedimentary Shelf Canyon Floor	7	1.0
Rocky Slope Gully	53	0.8
Island	49	0.5
Sedimentary Apron	1	0.4
Grand Total	2417	3575.5

27) Hard Bottom Feature_5

Figure 27: Criterion used in determination of Hard bottom feature_5 area closed to bottom trawling

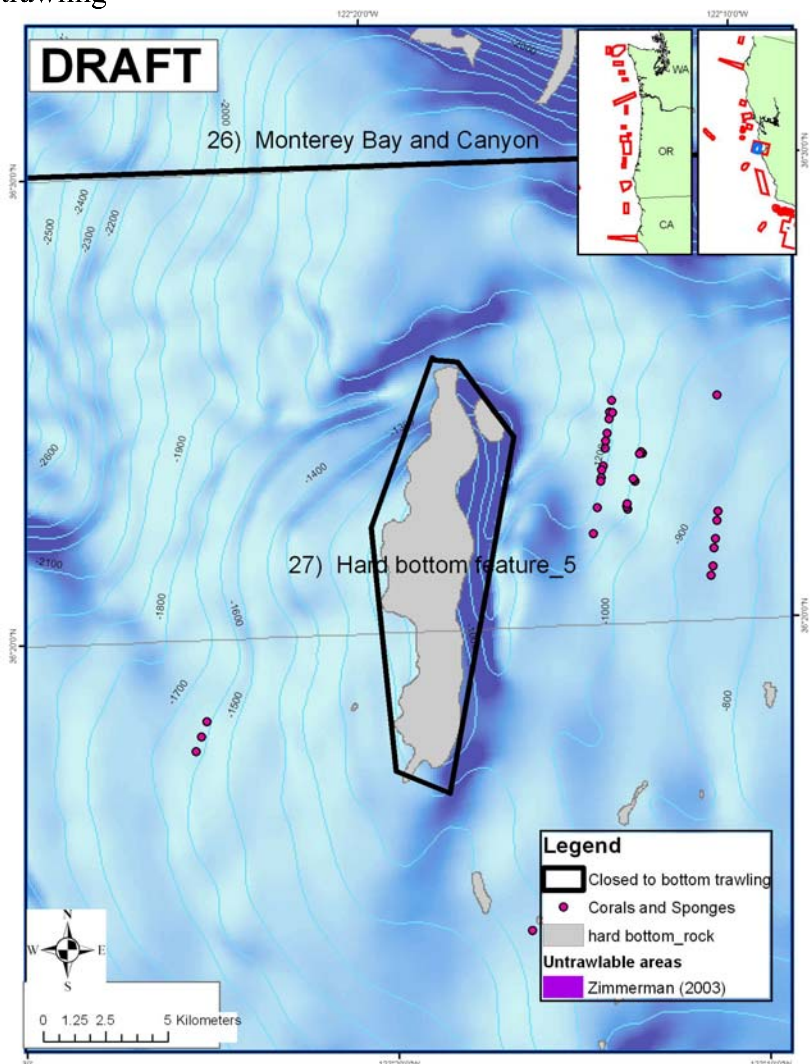


Table 27: Habitat types protected by Hard bottom feature_5 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	2	36.5
Sedimentary Slope	1	23.9
Sedimentary Slope Gully Floor	1	1.6
Sedimentary Slope Gully	1	0.5
Grand Total	5	62.6

28) Biogenic Area_13

Figure 28: Criterion used in determination of Biogenic area_13 area closed to bottom trawling

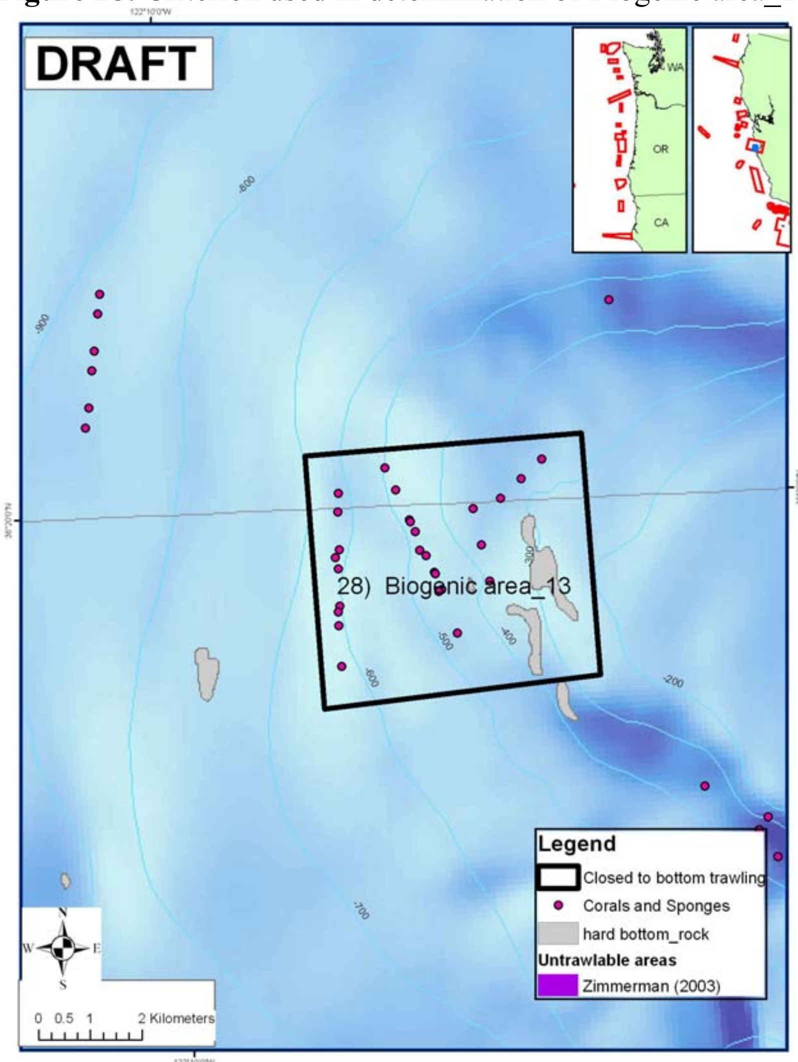


Table 28: Habitat types protected by Biogenic area_13 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Slope	1	24.6
Rocky Slope	4	1.0
Sedimentary Shelf	1	0.1
Grand Total	6	25.7

29) Morro Ridge

Morro Ridge is a long ridge of hard substrate off the Central California coast. It contains numerous records of megafaunal invertebrates from NOAA.

Figure 29: Criterion used in determination of Morro Ridge area closed to bottom trawling

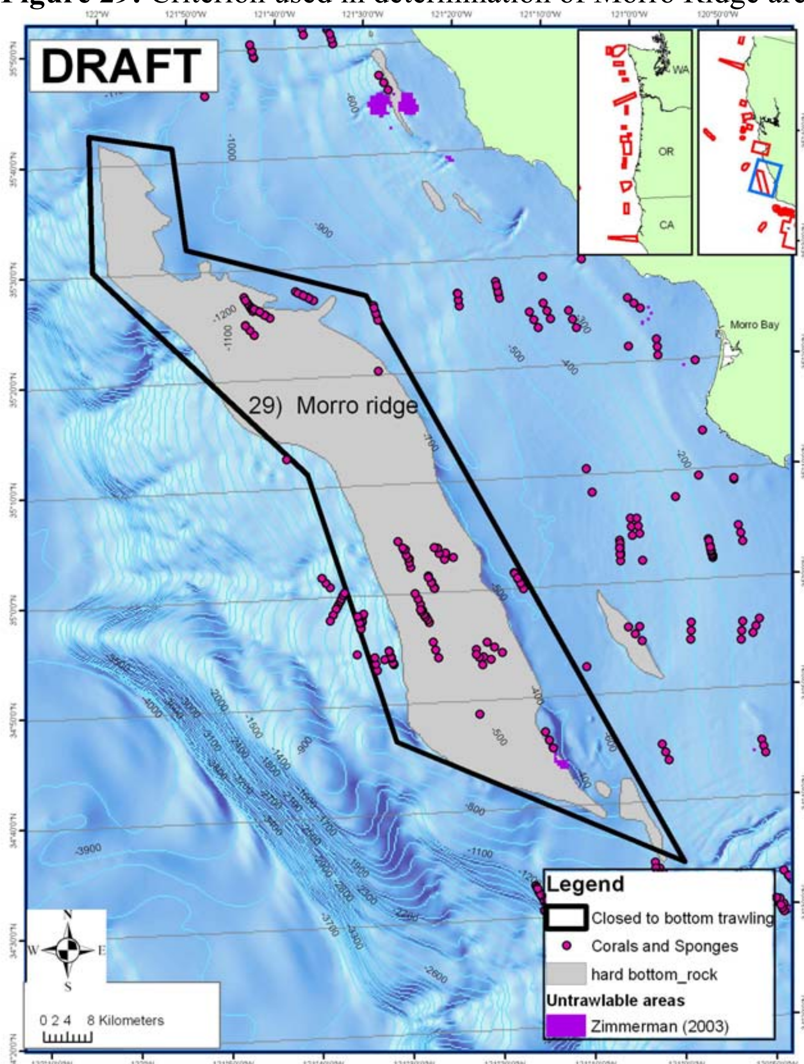


Table 29: Habitat types protected by Morro Ridge closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	1	2111.6
Sedimentary Slope	2	1190.9
Rocky Slope	2	39.0
no data	1	28.6
Grand Total	6	3370.1

30) Channel Islands

The Channel Islands National Marine Sanctuary contains numerous records of biogenic habitat, particularly gorgonian corals and sponges. 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.

Figure 30: Criterion used in determination of Channel Islands area closed to bottom trawling

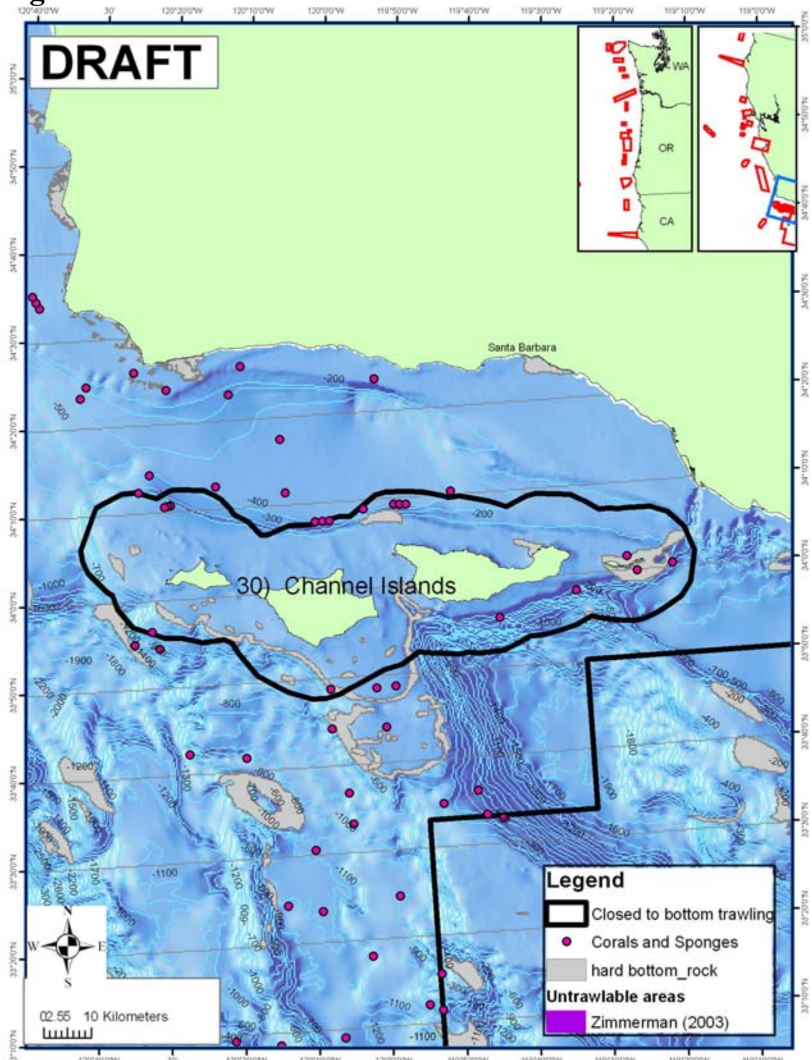
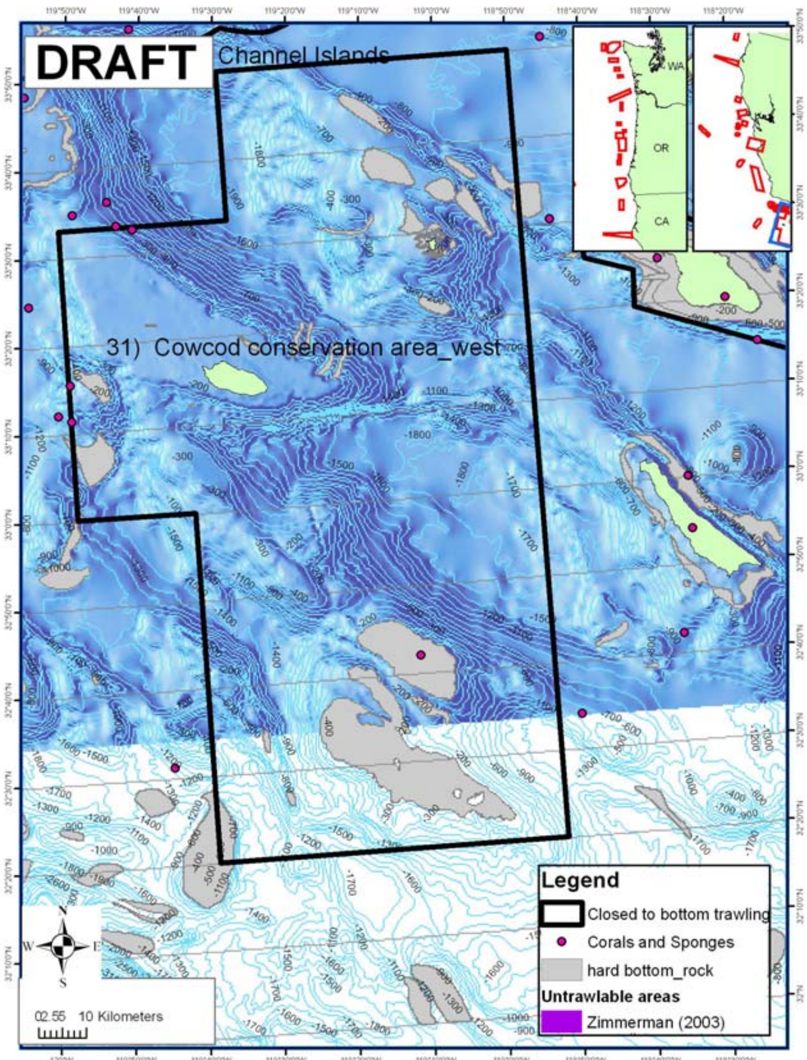


Table 30: Habitat types protected by Channel Islands closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Shelf	3	1805.1
Sedimentary Slope	7	796.6
Island	10	506.8
Sedimentary Basin	3	372.0
Rocky Shelf	13	99.9
Rocky Slope	3	95.9
Sedimentary Slope Canyon Wall	2	35.7
Sedimentary Slope Canyon Floor	1	21.5
Rocky Ridge	4	18.3
no data	2	11.6
Sedimentary Ridge	1	10.9
Sedimentary Shelf Canyon Wall	1	5.7
Grand Total	50	3780.1

31) Cowcod Conservation Areas
The Cowcod Conservation Areas were established in 2001 to help protect and rebuild cowcod stocks which have been driven down by eighty nine to ninety six percent of unfished levels. These areas contain hard bottom habitats including a number of offshore banks.[7] These areas also have documented occurrences of black corals.[8] Finally, these areas are extremely important for restoring depleted cowcod. Cowcod is a long lived species with low productivity requiring almost a century to rebuild the population.[9] Due to the low levels of allowable mortality necessary to rebuild cowcod, the primary rebuilding strategy is avoidance.[10]

Figure 31: Criterion used in determination of Cowcod conservation area_west area closed to bottom trawling



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7 Analysis provided by NMFS for the EIS Oversight Committee in Portland, OR on August 16-18, 2004.
8 Preliminary Report on Occurences of Structiure-Forming Megafaunal Invertebrates off the West Coast of Washington, Oregon and California. Northwest Fishery Science Center. August 2004.
9 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.
10 *Id*. at 45.

Table 31: Habitat types protected by Cowcod conservation area_west closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Ridge	7	4935.0
Sedimentary Basin	6	4841.3
Sedimentary Slope	5	1701.2
Rocky Ridge	19	918.0
Sedimentary Shelf	27	632.7
Sedimentary Slope Canyon Wall	2	75.2
Rocky Slope	6	74.4
Island	3	62.4
Rocky Shelf	17	37.6
Sedimentary Slope Canyon Floor	2	27.0
Rocky Slope Gully	4	26.0
Rocky Slope Canyon Wall	1	8.9
Sedimentary Shelf Gully Floor	43	0.7
no data	1	0.4
Grand Total	143	13340.7

32) Hard Bottom Feature_6

Figure 32: Criterion used in determination of Hard bottom feature_6 area closed to bottom trawling

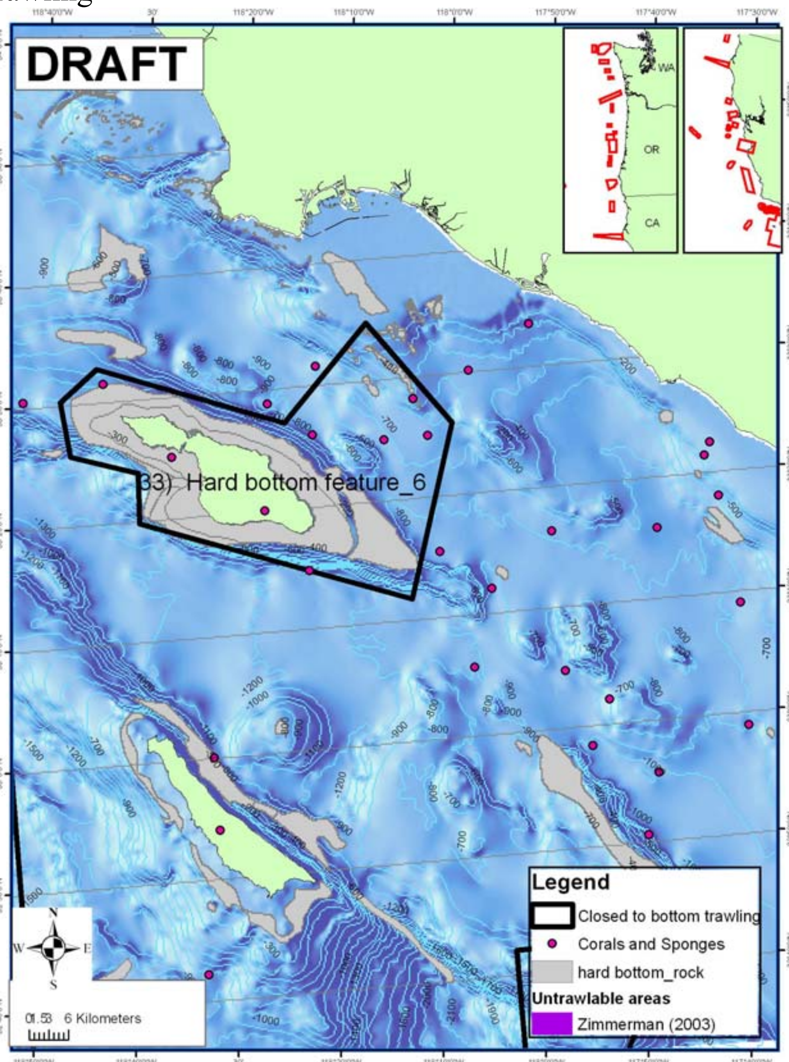

Table 32: Habitat types protected by Hard bottom feature_6 closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope	3	407.1
Rocky Shelf	82	249.8
Rocky Slope	10	249.1
Island	1	194.0
Sedimentary Basin	3	181.8
Sedimentary Ridge	2	52.7
Rocky Slope Canyon Wall	2	15.0
Sedimentary Slope Gully	2	11.6
Rocky Slope Canyon Floor	1	6.4
Sedimentary Basin Gully Floor	9	4.2
Sedimentary Shelf	4	2.2
Sedimentary Basin Canyon Floor	1	2.1
Sedimentary Basin Gully	4	2.0
Sedimentary Slope Canyon Floor	2	1.6
Sedimentary Slope Gully Floor	11	1.5
Sedimentary Basin Canyon Wall	2	1.5
Sedimentary Slope Canyon Wall	1	0.1
no data	2	0.0
Sedimentary Shelf Gully	1	0.0
Rocky Ridge	1	0.0
Grand Total	144	1382.6

33) Cowcod Conservation Areas_East

Figure 33: Criterion used in determination of Cowcod conservation area_east area closed to bottom trawling

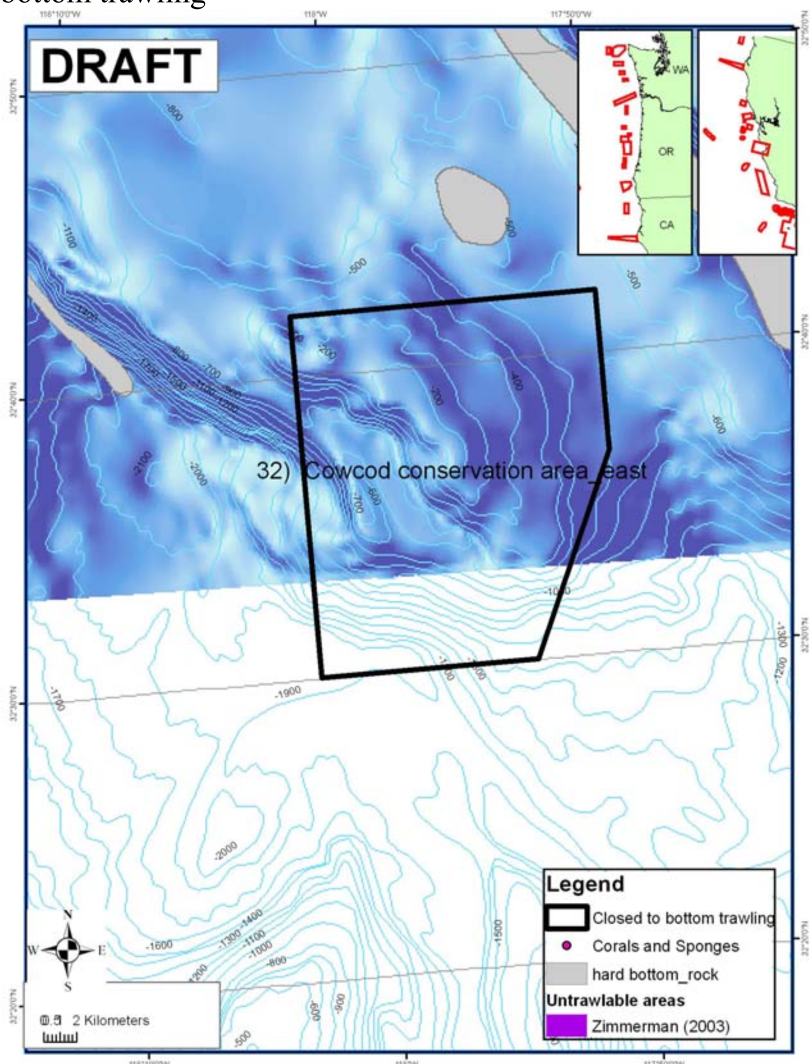

Table 33: Habitat types protected by Cowcod conservation area_east closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Sedimentary Ridge	1	366.2
Sedimentary Basin	1	11.9
Rocky Ridge	1	0.0
Grand Total	3	378.1

34-41) Seamounts

34) Thompson Seamount

Figure 34: Criterion used in determination of Thompson Seamount area closed to bottom trawling

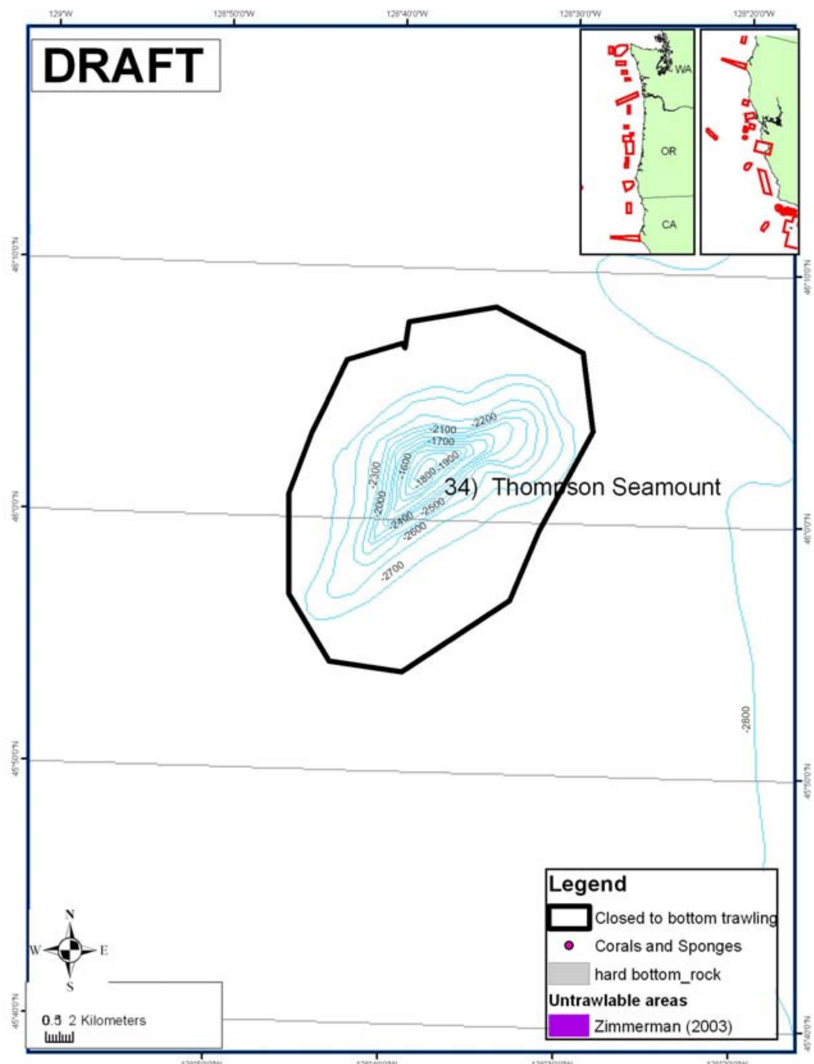

Table 34: Habitat types protected by Thompson Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
No data	n/a	428.2

35) President Jackson Seamount

Figure 35: Criterion used in determination of President Jackson Seamount area closed to bottom trawling

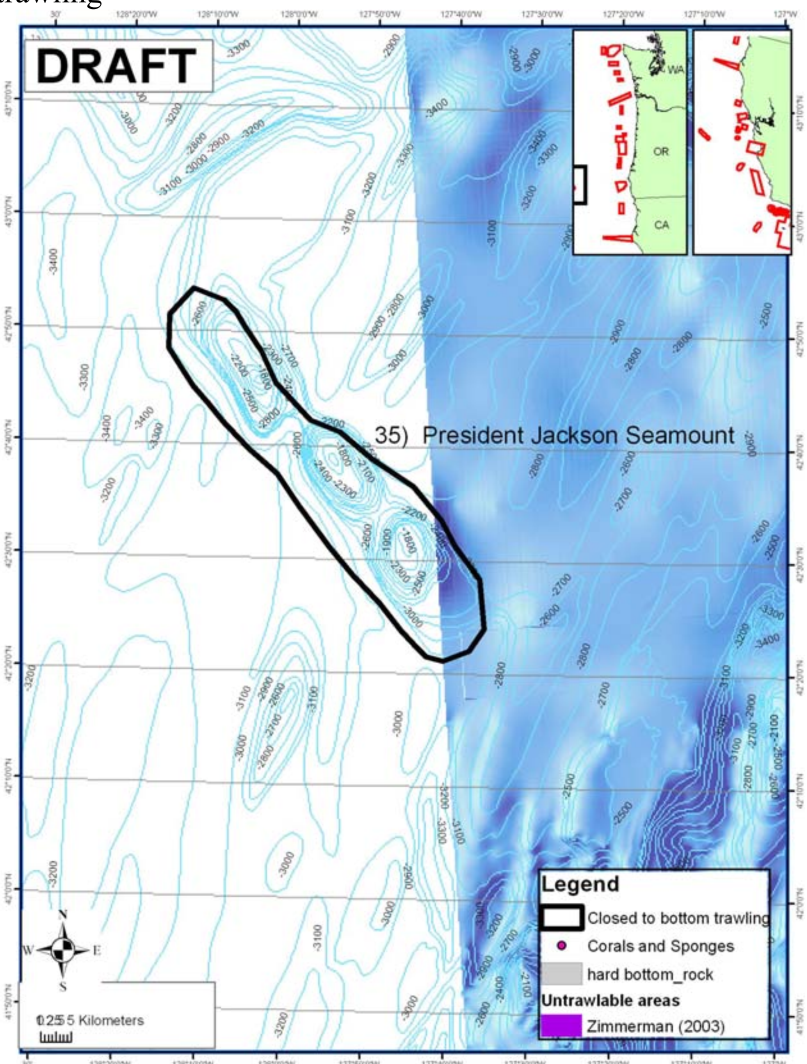

Table 35: Habitat types protected by President Jackson Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
No data	n/a	986.3

36) Taney Seamount

Figure 36: Criterion used in determination of Taney Seamount area closed to bottom trawling

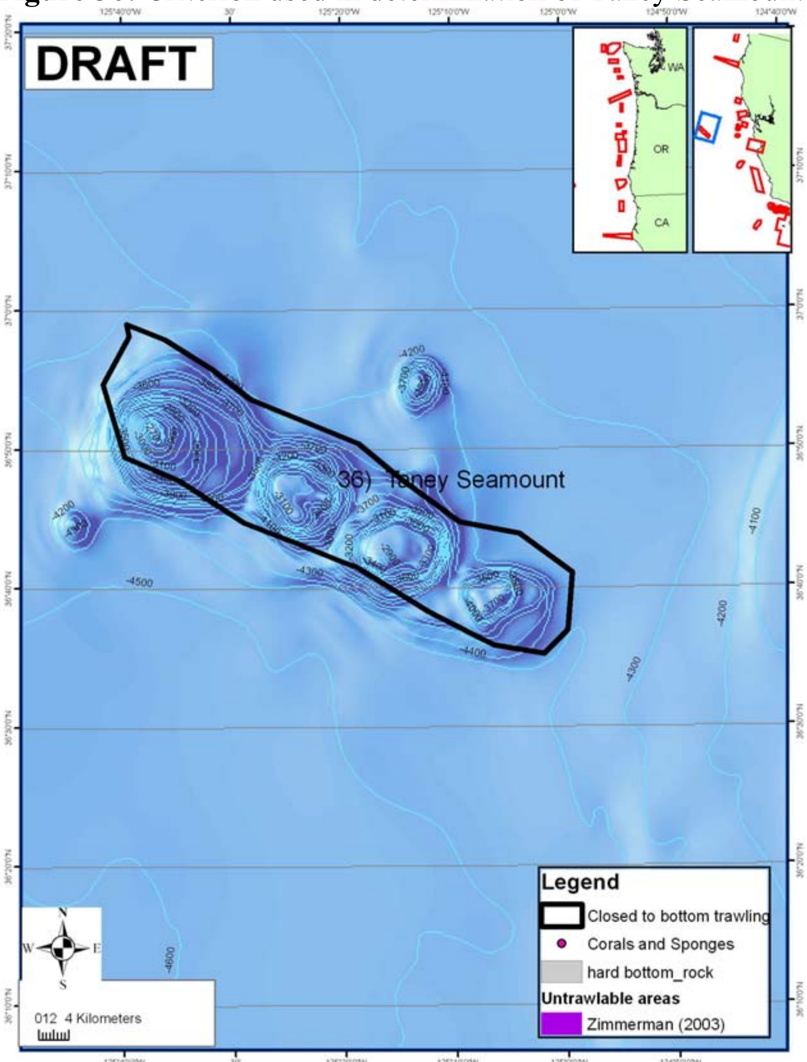

Table 36: Habitat types protected by Taney Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
No data	n/a	978.7

37) Gumdrop, (38) Pioneer and (39) Guide Seamount

Figure 37: Criterion used in determination of Gumdrop, Pioneer and Guide Seamount area closed to bottom trawling

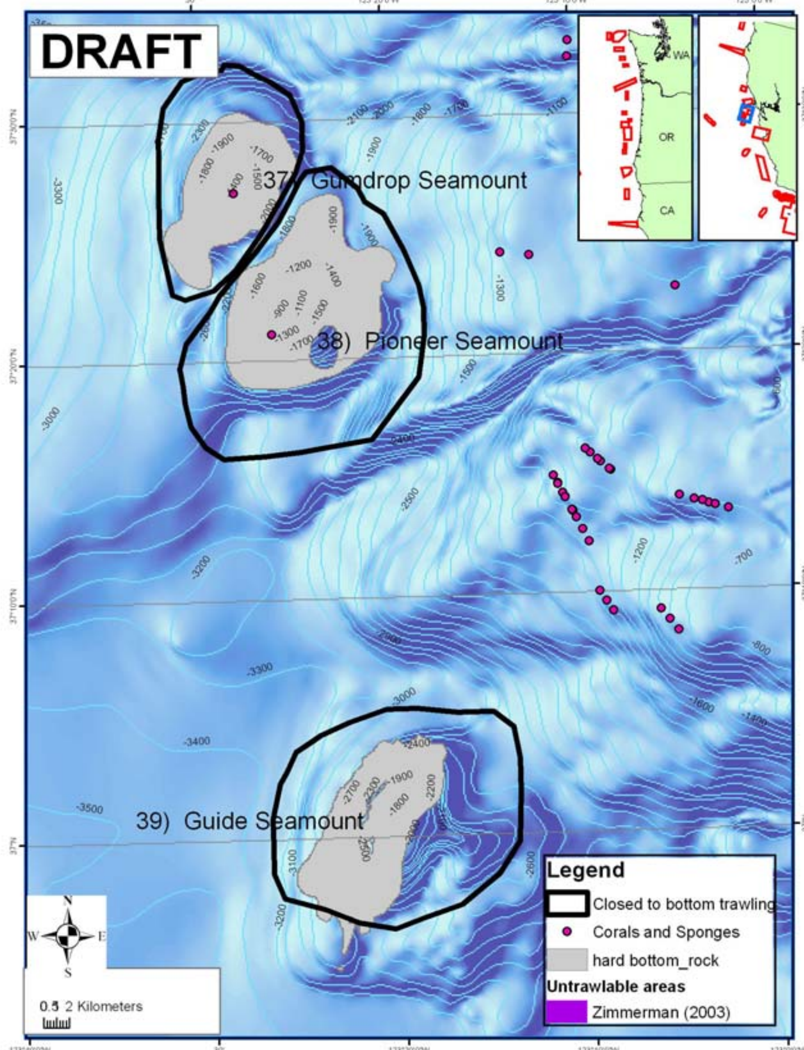

Table 37: Habitat types protected by Gumdrop Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	1	79.1
Sedimentary Slope	1	61.2
Sedimentary Slope Gully	1	8.9
Sedimentary Slope Canyon Floor	1	0.4
Grand Total	4	149.5

Table 38: Habitat types protected by Pioneer Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Slope	2	127.4
Rocky Ridge	1	125.7
Sedimentary Slope Gully	2	37.8
Sedimentary Slope Landslide	1	4.3
Sedimentary Slope Canyon Wall	1	0.0
Grand Total	7	295.3

Table 39: Habitat types protected by Guide Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	**Area (km2)**
Sedimentary Ridge	5	130.2
Rocky Ridge	1	95.0
Sedimentary Slope	2	37.7
Sedimentary Slope Landslide	1	4.4
Sedimentary Slope Gully	1	3.3
Rocky Slope	1	0.0
Grand Total	11	270.6

40) Davidson Seamount

Figure 40: Criterion used in determination of Davidson Seamount area closed to bottom trawling

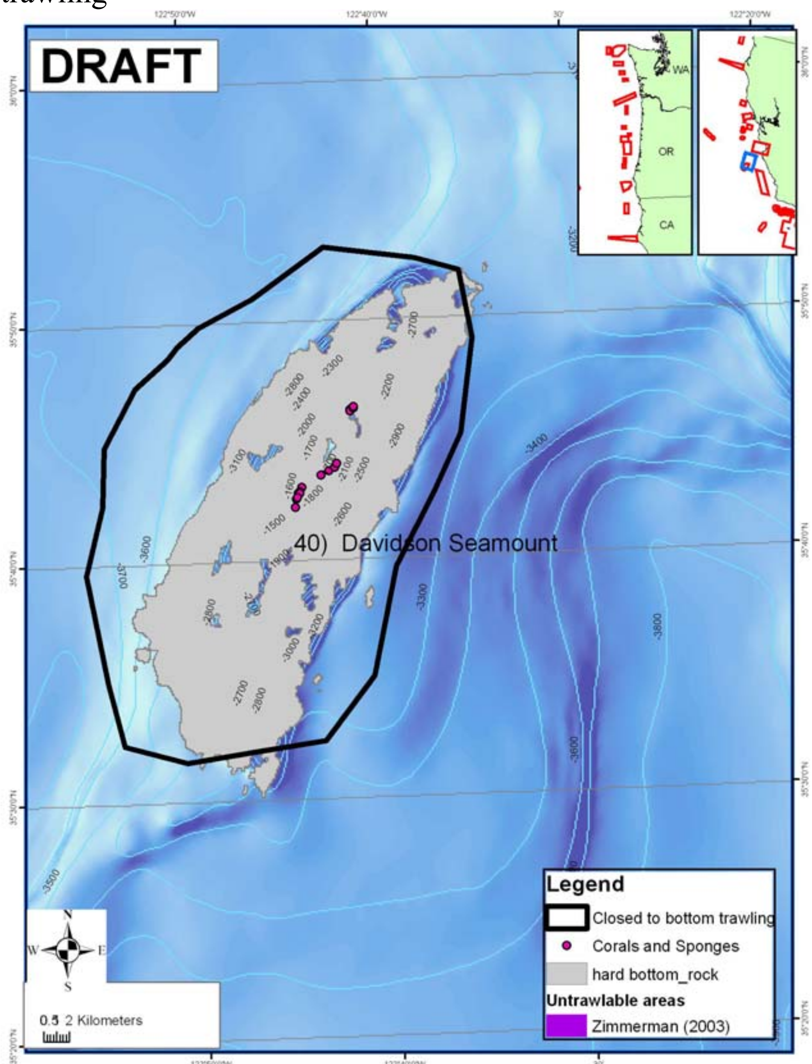

Table 40: Habitat types protected by Davidson Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	7	446.7
Sedimentary Apron	4	97.7
Sedimentary Apron Canyon Floor	1	33.1
Sedimentary Ridge	15	21.0
Rocky Apron	2	1.0
Grand Total	29	599.5

41) San Juan Seamount

Figure 41: Criterion used in determination of San Juan Seamount area closed to bottom trawling

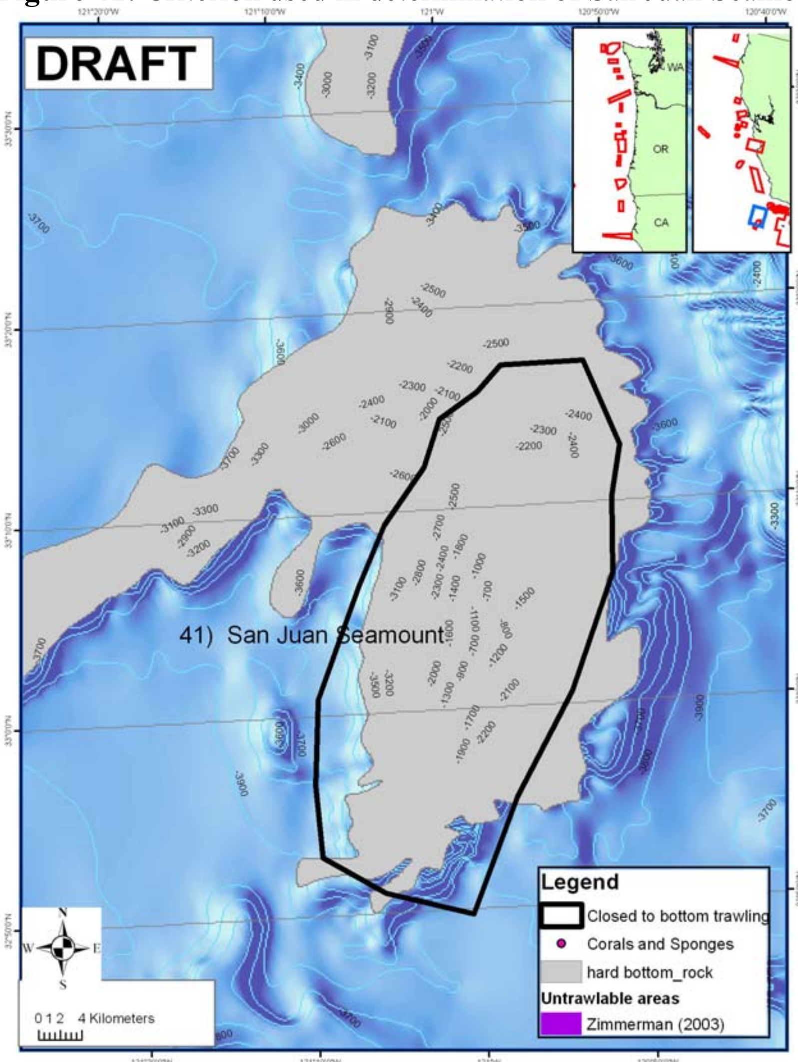

Table 41: Habitat types protected by San Juan Seamount closed area, determined from EFH GIS data

HAB_TYPE	Count_polygons	Area (km2)
Rocky Ridge	1	805.2
Sedimentary Apron	1	135.2
Grand Total	2	940.4

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APPENDIX 3: Points of Latitude and Longitude in Decimal Degrees (NAD 1983) Defining Vertices of Areas Closed to Bottom Trawling

Id	Name	Longitude	Latitude
1	Olympic_1	-125.991863	48.068618
1	Olympic_1	-125.990859	48.165925
1	Olympic_1	-125.750255	48.166567
1	Olympic_1	-125.586563	48.148036
1	Olympic_1	-125.417575	47.966531
1	Olympic_1	-125.523975	47.878908
1	Olympic_1	-125.642892	47.888296
1	Olympic_1	-125.699221	48.004083
1	Olympic_1	-125.805383	48.063409
1	Olympic_1	-125.991863	48.068618
2	Olympic_2	-124.918916	48.462917
2	Olympic_2	-124.860104	48.357674
2	Olympic_2	-124.952966	48.283384
2	Olympic_2	-124.990111	48.128613
2	Olympic_2	-125.165001	47.956818
2	Olympic_2	-125.308938	48.074444
2	Olympic_2	-125.228457	48.170401
2	Olympic_2	-124.963800	48.466013
2	Olympic_2	-124.918916	48.462917
3	Biogenic area_1	-125.017013	47.565969
3	Biogenic area_1	-125.082730	47.503381
3	Biogenic area_1	-125.292400	47.509640
3	Biogenic area_1	-125.567786	47.559710
3	Biogenic area_1	-125.655409	47.713050
3	Biogenic area_1	-125.545880	47.781897
3	Biogenic area_1	-125.445740	47.666109
3	Biogenic area_1	-125.092119	47.656721
3	Biogenic area_1	-125.017013	47.565969
4	Biogenic area_2	-125.019400	47.186269
4	Biogenic area_2	-125.154229	47.183772
4	Biogenic area_2	-125.155893	47.217895
4	Biogenic area_2	-125.128428	47.273658
4	Biogenic area_2	-124.981948	47.271993
4	Biogenic area_2	-124.990270	47.200417
4	Biogenic area_2	-125.019400	47.186269
5	Grays Canyon	-124.895177	46.851396
5	Grays Canyon	-124.907446	46.908964
5	Grays Canyon	-125.020803	46.927021
5	Grays Canyon	-124.974657	47.114612
5	Grays Canyon	-124.915471	47.092542
5	Grays Canyon	-124.895408	46.938056
5	Grays Canyon	-124.818164	46.953103
5	Grays Canyon	-124.791581	46.913113
5	Grays Canyon	-124.895177	46.851396
6	Biogenic area_3	-125.316522	46.825893
6	Biogenic area_3	-125.179197	46.802590

Id	Name	Longitude	Latitude
6	Biogenic area_3	-125.197507	46.690233
6	Biogenic area_3	-125.268250	46.723524
6	Biogenic area_3	-125.316522	46.825893
7	Astoria Canyon	-124.670219	46.330652
7	Astoria Canyon	-124.671703	46.332146
7	Astoria Canyon	-124.607751	46.312553
7	Astoria Canyon	-124.553330	46.273963
7	Astoria Canyon	-124.450004	46.306064
7	Astoria Canyon	-124.371758	46.310077
7	Astoria Canyon	-124.348685	46.290014
7	Astoria Canyon	-124.403859	46.220796
7	Astoria Canyon	-124.560352	46.203742
7	Astoria Canyon	-124.613519	46.207754
7	Astoria Canyon	-124.648630	46.159603
7	Astoria Canyon	-124.672706	46.062296
7	Astoria Canyon	-124.874341	46.015148
7	Astoria Canyon	-124.899420	46.051261
7	Astoria Canyon	-125.013781	46.055274
7	Astoria Canyon	-125.032841	46.244871
7	Astoria Canyon	-125.041869	46.336159
7	Astoria Canyon	-124.700794	46.320108
7	Astoria Canyon	-124.670219	46.330652
8	Ridges_biogenic_area_5	-124.921875	46.016777
8	Ridges_biogenic_area_5	-124.924121	45.895468
8	Ridges_biogenic_area_5	-124.870207	45.857278
8	Ridges_biogenic_area_5	-124.811799	45.857278
8	Ridges_biogenic_area_5	-124.732869	45.843004
8	Ridges_biogenic_area_5	-124.728694	45.792204
8	Ridges_biogenic_area_5	-124.822639	45.755322
8	Ridges_biogenic_area_5	-124.834469	45.676686
8	Ridges_biogenic_area_5	-124.888053	45.632844
8	Ridges_biogenic_area_5	-124.946508	45.721223
8	Ridges_biogenic_area_5	-124.929807	45.778286
8	Ridges_biogenic_area_5	-124.981303	46.008627
8	Ridges_biogenic_area_5	-124.921875	46.016777
9	Biogenic area_6	-124.396026	45.258719
9	Biogenic area_6	-124.426820	45.188807
9	Biogenic area_6	-124.498395	45.191304
9	Biogenic area_6	-124.480918	45.273700
9	Biogenic area_6	-124.396026	45.258719
10	Biogenic area_7	-124.490555	45.071018
10	Biogenic area_7	-124.456858	44.976667
10	Biogenic area_7	-124.526499	44.972174
10	Biogenic area_7	-124.566935	45.030582
10	Biogenic area_7	-124.674765	45.019350
10	Biogenic area_7	-124.717447	45.075511
10	Biogenic area_7	-124.632082	45.178848
10	Biogenic area_7	-124.631965	45.178774
10	Biogenic area_7	-124.490555	45.071018

Id	Name	Longitude	Latitude
11	Biogenic area_8	-124.772214	44.932966
11	Biogenic area_8	-124.771382	44.932966
11	Biogenic area_8	-124.765556	44.877203
11	Biogenic area_8	-124.817989	44.836422
11	Biogenic area_8	-124.863764	44.835590
11	Biogenic area_8	-124.893726	44.917985
11	Biogenic area_8	-124.857938	44.946282
11	Biogenic area_8	-124.772214	44.932966
12	Daisy Bank	-124.690490	44.662163
12	Daisy Bank	-124.688243	44.659917
12	Daisy Bank	-124.643314	44.619480
12	Daisy Bank	-124.654547	44.592523
12	Daisy Bank	-124.694983	44.626220
12	Daisy Bank	-124.715201	44.614987
12	Daisy Bank	-124.771362	44.637452
12	Daisy Bank	-124.818538	44.641945
12	Daisy Bank	-124.818538	44.671149
12	Daisy Bank	-124.800566	44.689120
12	Daisy Bank	-124.690490	44.662163
13	Heceta Bank	-124.927170	44.269081
13	Heceta Bank	-124.927126	44.268055
13	Heceta Bank	-124.645251	44.338272
13	Heceta Bank	-124.579574	44.288300
13	Heceta Bank	-124.674054	44.225314
13	Heceta Bank	-124.755037	44.149954
13	Heceta Bank	-124.761786	44.057723
13	Heceta Bank	-124.823648	44.054349
13	Heceta Bank	-124.869109	43.860116
13	Heceta Bank	-124.870324	43.858486
13	Heceta Bank	-124.929376	43.779906
13	Heceta Bank	-124.966493	43.781031
13	Heceta Bank	-124.991238	43.873262
13	Heceta Bank	-125.075595	43.926126
13	Heceta Bank	-125.056474	43.999236
13	Heceta Bank	-125.078970	44.022856
13	Heceta Bank	-125.078970	44.063347
13	Heceta Bank	-125.050851	44.080219
13	Heceta Bank	-125.071096	44.103839
13	Heceta Bank	-125.063223	44.137582
13	Heceta Bank	-125.055350	44.156703
13	Heceta Bank	-125.060973	44.219690
13	Heceta Bank	-125.003610	44.265805
13	Heceta Bank	-124.927170	44.269081
14	Ridges_biogenic area_9	-125.122602	43.371617
14	Ridges_biogenic area_9	-125.214152	43.538072
14	Ridges_biogenic area_9	-125.137583	43.631287
14	Ridges_biogenic area_9	-125.109286	43.609648
14	Ridges_biogenic area_9	-125.140080	43.550556
14	Ridges_biogenic area_9	-125.105957	43.515601

Id	Name	Longitude	Latitude
14	Ridges_biogenic area_9	-125.120938	43.462335
14	Ridges_biogenic area_9	-125.054356	43.405740
14	Ridges_biogenic area_9	-125.048530	43.342487
14	Ridges_biogenic area_9	-125.071001	43.322513
14	Ridges_biogenic area_9	-125.107621	43.321680
14	Ridges_biogenic area_9	-125.126763	43.284228
14	Ridges_biogenic area_9	-125.151732	43.288389
14	Ridges_biogenic area_9	-125.121770	43.370785
14	Ridges_biogenic area_9	-125.122602	43.371617
15	Ridges_biogenic area_10	-125.050194	43.630455
15	Ridges_biogenic area_10	-125.039375	43.663746
15	Ridges_biogenic area_10	-125.015239	43.677062
15	Ridges_biogenic area_10	-124.954574	43.645090
15	Ridges_biogenic area_10	-124.976122	43.563873
15	Ridges_biogenic area_10	-124.942831	43.493129
15	Ridges_biogenic area_10	-124.922024	43.349978
15	Ridges_biogenic area_10	-124.957812	43.347481
15	Ridges_biogenic area_10	-124.986109	43.523091
15	Ridges_biogenic area_10	-125.028555	43.567202
15	Ridges_biogenic area_10	-125.050194	43.630455
15	Ridges_biogenic area_10	-124.953650	43.644603
15	Ridges_biogenic area_10	-124.954574	43.645090
15	Ridges_biogenic area_10	-124.954482	43.645436
15	Ridges_biogenic area_10	-124.953650	43.644603
16	Hard bottom feature_1	-124.573674	43.350232
16	Hard bottom feature_1	-124.571428	43.347985
16	Hard bottom feature_1	-124.510773	43.347985
16	Hard bottom feature_1	-124.481569	43.285085
16	Hard bottom feature_1	-124.418669	43.291824
16	Hard bottom feature_1	-124.427654	43.168269
16	Hard bottom feature_1	-124.472584	43.094136
16	Hard bottom feature_1	-124.535484	43.105368
16	Hard bottom feature_1	-124.553456	43.044714
16	Hard bottom feature_1	-124.582660	43.046960
16	Hard bottom feature_1	-124.578167	43.107615
16	Hard bottom feature_1	-124.690490	43.204212
16	Hard bottom feature_1	-124.573674	43.350232
17	Rogue Canyon	-125.222900	42.638105
17	Rogue Canyon	-124.946586	42.721224
17	Rogue Canyon	-124.879192	42.671802
17	Rogue Canyon	-124.784841	42.656077
17	Rogue Canyon	-124.733356	42.694131
17	Rogue Canyon	-124.701722	42.671802
17	Rogue Canyon	-124.748898	42.552740
17	Rogue Canyon	-124.647807	42.550493
17	Rogue Canyon	-124.645561	42.530275
17	Rogue Canyon	-124.775855	42.465128
17	Rogue Canyon	-124.748898	42.411213
17	Rogue Canyon	-125.092606	42.289904

Id	Name	Longitude	Latitude
17	Rogue Canyon	-125.222900	42.638105
18	Biogenic area_11	-125.052170	41.667635
18	Biogenic area_11	-125.058909	41.784451
18	Biogenic area_11	-124.962311	41.770972
18	Biogenic area_11	-124.991515	41.723797
18	Biogenic area_11	-124.998255	41.672128
18	Biogenic area_11	-125.052170	41.667635
19	Eel River Canyon	-124.481520	40.565299
19	Eel River Canyon	-124.556417	40.594496
19	Eel River Canyon	-124.616081	40.598305
19	Eel River Canyon	-124.650356	40.551335
19	Eel River Canyon	-124.600848	40.501827
19	Eel River Canyon	-124.560225	40.374882
19	Eel River Canyon	-124.707481	40.387577
19	Eel River Canyon	-124.713828	40.484055
19	Eel River Canyon	-124.849659	40.564030
19	Eel River Canyon	-124.872509	40.675741
19	Eel River Canyon	-124.665589	40.831883
19	Eel River Canyon	-124.574189	40.830613
19	Eel River Canyon	-124.555148	40.682088
19	Eel River Canyon	-124.448514	40.631310
19	Eel River Canyon	-124.481520	40.565299
20	Mendocino Ridge	-125.947806	40.395299
20	Mendocino Ridge	-125.947194	40.399410
20	Mendocino Ridge	-125.947001	40.400702
20	Mendocino Ridge	-124.400023	40.423883
20	Mendocino Ridge	-124.376486	40.208258
20	Mendocino Ridge	-125.955242	40.345350
20	Mendocino Ridge	-125.947806	40.395299
21	Hard bottom feature_2	-123.852440	39.055301
21	Hard bottom feature_2	-123.829859	38.942400
21	Hard bottom feature_2	-123.878246	38.902078
21	Hard bottom feature_2	-123.916955	38.994012
21	Hard bottom feature_2	-123.920180	39.047237
21	Hard bottom feature_2	-123.852440	39.055301
22	Biogenic area_12	-123.642506	38.564678
22	Biogenic area_12	-123.708823	38.536356
22	Biogenic area_12	-123.938166	38.731850
22	Biogenic area_12	-123.857343	38.775370
22	Biogenic area_12	-123.721257	38.606816
22	Biogenic area_12	-123.697770	38.603363
22	Biogenic area_12	-123.642506	38.564678
23	Cordell Bank	-123.629554	38.135929
23	Cordell Bank	-123.600568	38.144206
23	Cordell Bank	-123.181380	38.263900
23	Cordell Bank	-123.119130	38.210010
23	Cordell Bank	-123.092070	38.165760
23	Cordell Bank	-123.082370	38.140720
23	Cordell Bank	-123.087420	38.128290

Id	Name	Longitude	Latitude
23	Cordell Bank	-123.098040	38.102150
23	Cordell Bank	-123.103870	38.090690
23	Cordell Bank	-123.109240	38.078980
23	Cordell Bank	-123.117110	38.065050
23	Cordell Bank	-123.128270	38.052020
23	Cordell Bank	-123.141370	37.992270
23	Cordell Bank	-123.236150	37.989470
23	Cordell Bank	-123.323120	37.958800
23	Cordell Bank	-123.389580	37.904640
23	Cordell Bank	-123.425790	37.834800
23	Cordell Bank	-123.426940	37.766870
23	Cordell Bank	-123.434660	37.770330
23	Cordell Bank	-123.446940	37.781090
23	Cordell Bank	-123.454660	37.783830
23	Cordell Bank	-123.467210	37.794870
23	Cordell Bank	-123.473130	37.800940
23	Cordell Bank	-123.468970	37.810260
23	Cordell Bank	-123.479060	37.813650
23	Cordell Bank	-123.492800	37.822960
23	Cordell Bank	-123.517490	37.849880
23	Cordell Bank	-123.521970	37.861890
23	Cordell Bank	-123.521920	37.876370
23	Cordell Bank	-123.529670	37.885410
23	Cordell Bank	-123.539370	37.907250
23	Cordell Bank	-123.543600	37.922880
23	Cordell Bank	-123.547010	37.938580
23	Cordell Bank	-123.547770	37.949010
23	Cordell Bank	-123.561990	37.955280
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26	Monterey Bay and Canyon	-122.597027	36.999724
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FINAL CONSIDERATION OF 2004 INSEASON ADJUSTMENTS

The Council set optimum yield (OY) levels and various management measures for the 2004 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 and the Groundfish Advisory Subpanel is expected to introduce any inseason issues for consideration at this Council meeting and may pose key policy questions and receive Council guidance on inseason actions under Agenda Item E.4. Under this Agenda Item, the Council is to consider advice from Council advisory bodies and the public 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 — Mike Burner
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Approve Inseason Adjustments in the 2004 Groundfish Fishery

PFMC
10/13/04

GROUNDFISH MANAGEMENT TEAM REPORT ON
FINAL CONSIDERATION OF 2004 INSEASON ADJUSTMENTS

In the wake of developments regarding darkblotched attainment that emerged at the September Council meeting, members of the Groundfish Management Team (GMT) met recently with Mr. William Daspit, manager of the Pacific Coast Fisheries Information Network (PacFIN), a program run by the Pacific States Marine Fisheries Commission. The focus of this meeting was to explore potential improvements in the Quota Species Monitoring (QSM) system, which is relied upon by the GMT for tracking inseason progress in the commercial groundfish fishery. Subsequently, Mr. Daspit met with the GMT on Monday this week to discuss changes in QSM that would enhance the ability of the GMT to monitor total catch in the shoreside groundfish fishery.

Historically, the QSM system evolved as a mechanism for providing the GMT with estimates of landed catch for key species in advance of the availability of fishtickets. It is important to note that while PacFIN has provided this service to the GMT, the GMT itself has been responsible for guiding the development of this tool. Since the inception of QSM, Mr Daspit and his staff have accommodated numerous GMT requests for changes to data processing methods or reporting that have improved the usefulness of this system for tracking inseason progress.

Over the past few years, the GMT has worked to incorporate improved accounting of discards into model projections of fishery performance and into management measure recommendations provided to the Council. However, the QSM reports provided to the GMT have continued to track only year-to-date **landed** catch. Working together, the GMT and PacFIN have developed a plan for enhancing this reporting system to combine landed catch estimates with discard rate information from the GMT's bycatch models. Procedures will be implemented to apply rates of discard only to fisheries and species where full retention is not required, and discard rates provided to PacFIN will reflect prevailing GMT assumptions regarding discard survival. These changes will allow QSM reports, beginning in 2005, to include estimates of **total,** as well as landed, catch for most included species. Tribal landings/catch will be separated from other State of Washington data. Commercial total catch targets will be included in each report to help ensure that attainment status is evaluated correctly. A prototype of the proposed report format is attached to this statement.

As a result of these improvements, it will be much easier for the GMT to identify situations in which early attainment of a commercial total catch target and/or a total catch OY appears likely. However, the GMT cautions that while this enhanced monitoring tool will reduce the likelihood of management surprises, it will not eliminate the possibility. Even prior to the heightened restrictions of the past five years, the June/September Council schedule, in conjunction with unexpectedly high summer landings, resulted in actions at past September meetings to close fisheries or dramatically reduce trip limits.

As stated in our September final inseason report to the Council, the GMT will communicate on a monthly basis via email to review commercial and recreational catches. The GMT is especially concerned about deviations from harvest targets that might occur between June and September. If there are any “red flags” that are identified between Council meetings via this email discussion, then the GMT will have a conference call work session to share data and communicate issues to Council staff. Council staff can then inform Council members of these issues to determine if there are recommendations for state and/or federal action. The Council could also implement a mechanism for NMFS to take management action during this interval if information reviewed by the GMT indicates that catches are tracking too far from anticipated targets.

The GMT discussed the appropriate timing of considering inseason actions which would liberalize management measures. The GMT recommends the Council adopt a policy such that, in general, inseason adjustments which would relax regulations not be considered prior to the June Council meeting. The GMT believes inseason adjustments should remain on every Council agenda, so the Council has the opportunity to adopt more restrictive measures, if necessary. As such, the Council would have the opportunity to consider liberalizing regulations in March and April, if there are exceptions to this policy which would warrant consideration (for example, in response to a data correction).

PFMC
11/04/04

	Landed Catch Wash	Ore	Calif	Discard Mortality	WA Tribal	At Sea	Total Mortality	2004 Target	TWL Model Proj thru period
Longspine THDS	X	X	X		X	X	X	X	X
Shortspine THDS (V&C&E&M)	X	X	X		X	X	X	X	X
TWL Sable (V&C&E&M)	X	X	X		X	X	X	X	X
Dover sole	X	X	X		X	X	X	X	X
Petrale	X	X	X		X	X	X	X	X
English Sole	X	X	X		X	X	X	X	X
Arrowtooth Flounder	X	X	X		X	X	X	X	X
Remaining Flatfish	X	X	X		X	X	X	X	X
Tribal Sablefish	X	X	X		X	X	X	X	
NTW Primary Sable*	X	X	X		X	X	X	X	
NTW DTL Sable*	X	X	X		X	X	X	X	
CP NTW Sabl Pri	X	X	X		X	X	X	X	
CP NTW Sabl DTL	X	X	X		X	X	X	X	
Sablefish Conception	X	X	X		X	X	X	X	
Lingcod	X	X	X		X	X	X	X	X
Spiny Dogfish	X	X	X		X	X	X	X	
Widow Rockfish	X	X	X		X	X	X	X	X
Darkblotched RCKFSH	X	X	X		X	X	X	X	X
Canary rockfish	X	X	X		X	X	X	X	X
POP (V&C&E)	X	X	X		X	X	X	X	X
Yellowtail (V&C&E)	X	X	X		X	X	X	X	
Cabezon (V&C&E)	X	X	X		X	X	X	X	
(V&C&E) UNSP RCKFSH	X	X	X		X	X	X	X	
Yelloweye (V&C&E&M)	X	X	X		X	X	X	X	X
Black Rockfish, Nor.	X	X	X		X	X	X	X	
Kelp Greenling, Nor.	X	X	X		X	X	X	X	
Near-shore RF, Nor.	X	X	X		X	X	X	X	
Shelf rockfish, Nor.	X	X	X		X	X	X	X	
Slope rockfish, Nor.	X	X	X		X	X	X	X	X
TWL Bocaccio (MT&CP)	X	X	X		X	X	X	X	X
NTW Bocaccio (MT&CP)	X	X	X		X	X	X	X	
Chilipepper (MT&CP)	X	X	X		X	X	X	X	
Splitnose RF (MT&CP)	X	X	X		X	X	X	X	
Cabezon (MT&CP)	X	X	X		X	X	X	X	
(MT&CP) UNSP RCKFSH	X	X	X		X	X	X	X	
Black Rockfish, So.	X	X	X		X	X	X	X	
Kelp Greenling, So.	X	X	X		X	X	X	X	
CA Scorpionfish, So.	X	X	X		X	X	X	X	
N-S RF: Shallow, So.	X	X	X		X	X	X	X	
N-S RF: Deep, So.	X	X	X		X	X	X	X	
Shelf rockfish, So.	X	X	X		X	X	X	X	
Slope rockfish, So.	X	X	X		X	X	X	X	X