Agenda Item E.1
Situation Summary
June 2009

GROUNDFISH ESSENTIAL FISH HABITAT (EFH) MODIFICATIONS

In March, 2009, Council staff solicited proposals for the modification of Groundfish Essential Fish Habitat (EFH) that were to comply with the Council approved Terms of Reference (Agenda Item E.1.a, Attachment 1). Two proposals were received, one to reduce the Eel Canyon EFH conservation area closed to bottom trawl gear (Agenda Item E.1.a, Attachment 2), and one to expand both the Olympic 2 and Grays Canyon conservation area closed to bottom trawl gear and to add areas closed to bottom contact gear within the Olympic 2 area (Agenda Item E.1.a, Attachment 3).

The Ad Hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) met May 12-13 to review and evaluate the proposal for consistency with the Terms of Reference (Attachment 1) and to develop recommendations to the Council for further consideration of the proposals. The proposals were also posted on the Council website and notice was provided to Council advisory bodies to facilitate additional opportunity for review.

At this time the Council will determine if the proposals have sufficient merit to warrant further consideration. The Council should also identify additional information and potential sources to supplement the proposals as needed. The Council would then take final action in November 2009 to approve proposals for subsequent analysis in the biennial management specifications process, or another process as appropriate.

Council Action:

1. **Recommend proposals for further consideration at the November 2009 Council Meeting.**
2. **Identify information gaps.**
3. **Identify potential sources for supplementing proposal contents.**

Reference Materials:

1. Agenda Item E.1.a, Attachment 1: EFHRC Terms of Reference.
2. Agenda Item E.1.a, Attachment 2: Proposal to Modify the Northeast Boundary of the Eel River EFH No-trawl Area.
3. Agenda Item E.1.a, Attachment 3: Proposal to the Pacific Fishery Management Council to Modify Groundfish EFH Conservation Areas - Juan De Fuca Coral Canyons and Grays Canyon Sponge Reefs Important Ecological Areas.
4. Agenda Item E.1.b, EFHRC Report: EFHRC Evaluation of Proposals to Modify Areas Closed to Bottom Trawl Fishing Gear.

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Report of the EFH Review Committee — Brad Pettinger
c. Reports and Comments of Management Entities and Advisory Bodies
d. Public Comment
e. **Council Action:** Consider Adoption of Proposed Changes to EFH for Public Review

PFMC
05/26/09

GROUNDFISH ESSENTIAL FISH HABITAT REVIEW COMMITTEE TERMS OF REFERENCE

PROTOCOL FOR CONSIDERATION OF GROUNDFISH ESSENTIAL FISH HABITAT MODIFICATION PROPOSALS

BACKGROUND

The Pacific Fishery Management Council's (Council) groundfish fishery management plan (FMP) provides designations of Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), and Ecologically Important Habitat Closed Areas (HCAs) to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities. The FMP requires review and update of these designations during a periodic five-year review process, and also allows for reviews as needed during interim periods.

Section 7.2 and Appendix B in the FMP describes groundfish EFH, which is generally between the shore line or limit of saltwater intrusion out to depths of 3,500 m as well as seamounts in depths greater than 3,500 m. HAPC have been identified for four habitat types (Estuaries, Canopy Kelp, Seagrass, and Rocky Reefs) and several Areas of Interest. Figure 7.2 in the FMP is a map of the approximate location of habitat types identified as HAPC. The coordinates defining Area of Interest HAPC are presented in FMP Appendix B. HCAs are currently categorized as either Bottom Trawl Closed Areas or Bottom Contact Closed Areas. There are currently 50 HCAs on the West Coast; maps showing their locations and coordinates defining their boundaries are presented in FMP Appendix C. The FMP is available on the Council website at: http://www.pcouncil.org/groundfish/gffmp/fmpthru19.html.

PURPOSE

The purpose of this document is to provide guidance on the content of proposals to change, add, or delete groundfish EFH, HAPC, HCA, and other areas as appropriate, to ensure proposals have the necessary biological, ecological, and socioeconomic information for the Council to decide if they should undergo additional consideration and analysis in either the periodic or interim review process. This document will also guide the process and criteria by which proposals are evaluated by the Council and its advisory bodies.

PROTOCOL

A. Submission

1. Following a request by the Council for proposals to modify, add, or delete protected groundfish habitat, the Council's ad hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) will provide an initial evaluation of such proposals to the Council with regard to the technical sufficiency and potential biological, ecological, and

socioeconomic significance of the proposal. The evaluation will include identifying any deficiencies that should be addressed if the Council desires a full assessment of the proposal for potential adoption. The Groundfish Management Team (GMT), Groundfish Advisory Subpanel (GAP), Habitat Committee (HC), Enforcement Consultants (EC), and Scientific and Statistical Committee (SSC) may also review initial proposals and provide comments on methodology and relevance to management issues, and make recommendations to the Council accordingly. Public comment will also be accepted at Council meetings.

2. Initial proposals for Council review and consideration must be received at the Council office by May 1, 2009.

3. Proposals may originate from individuals, non-government organizations, federal, state, or tribal agencies.

B. Proposal Contents

It is recognized that some applicants may not have access to proprietary information or sufficient resources to address all of the information needs listed below, and that some needs will not be relevant to specific proposals, however, this should not preclude consideration of such proposals if the information necessary for analysis can be obtained from other sources later in the process. In as much as possible, applicants must submit a completed proposal in writing that includes, but is not limited to, the following information:

1. Date of application.

2. Applicant's name, mailing address, email address, and telephone number, including contacts for any cooperating agencies or entities.

3. A statement of the problem and the proposed action.

4. An explanation why the proposal is warranted, including:

   a. How it is consistent with the Council's requirement to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities.

   b. Why an interim review is necessary prior to the periodic 5-year review.

5. A detailed description of the proposed action(s), including:

   a. Spatial changes to currently protected areas such as boundary modifications, elimination of current areas of EFH, HAPC, and HCA or addition of new areas of EFH, HAPC, or HCA. Latitude and longitude coordinates (DDD° mm.mmm′) and maps, including before and after change, and digital files if available (e.g., GIS shape files, navigation plotter data).

b. Gear regulation changes, (e.g., allowing or disallowing gear types, tow technique, mesh size, weight of gear, time of bottom contact, tow time, number of pots or hooks).

c. Other changes.

6. All relevant and applicable information on the following characteristics, including the attendant impacts of the proposed action:

   a. Biological and ecological characteristics (e.g., habitat function, vulnerability, index of recovery, species associations, including reference to any ESA-listed species, and biogenic components).

   b. Geological characteristics (e.g., substrate type, grain size, relief, morphology, depth).

   c. Physical oceanographic characteristics (e.g., temperature, salinity, circulation, waves).

   d. Chemical characteristics (e.g., nutrients, dissolved oxygen).

   e. Socioeconomic characteristics (see 7.e below).

7. A discussion of the following topics as relevant to the proposed actions:

   a. The importance of habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity.

   b. The presence and location of important habitat (as defined in 7.a above).

   c. The presence and location of habitat that is vulnerable to the effects of fishing and other activities as relevant.

   d. The presence and location of unique, rare, or threatened habitat.

   e. The socioeconomic and management-related effects of proposed actions, including changes in the location and intensity of bottom contact fishing effort, the displacement or loss of revenue from fishing, and social and economic effects to fishing communities attributable to the location and extent of closed areas. Applicants are encouraged to collaborate with socioeconomic experts as well as affected fishermen and communities in order to identify socioeconomic costs and benefits.

C. Review and Approval

1. The EFHRC will review proposals prior to the June 2009 Council meeting and provide an evaluation for the briefing materials. The Council is scheduled to take preliminary action

at the June 2009 meeting and may request additional information on proposals in time for evaluation prior to final action at the November 2009 Council meeting.

2. For the November 2009 meeting the EFHRC and other appropriate Council advisory bodies review the scientific and technical merits of proposals, including any new information incorporated since the initial proposal was submitted the preceding June. Only those proposals that were considered in June may be considered in November.

3. The Council determines an appropriate process (e.g., biennial specifications, periodic EFH review, etc.) for further analysis and consideration of proposals adopted at the November 2009 meeting.

4. The EFHRC initial review will consider, at a minimum, the following questions:

   a. Is the application complete?

   b. Are the coordinates consistent with the proposed actions and do they map out correctly?

   c. What habitat types are affected by the proposal?

   d. Are the data sufficient to evaluate the proposal effects and objectives, and if not why?

   e. What are the biological, ecological, and socioeconomic effects (beneficial and detrimental) of the proposal? For example:

      i. What is the importance of affected habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity?

      ii. What is the distribution and abundance of important habitat?

      iii. Is that habitat vulnerable to the effects of fishing and other activities?

      iv. Is there unique, rare, or threatened habitat?

      v. What are the changes in location and intensity of bottom contact fishing effort?

      vi. What is the displacement or loss of revenue from fishing?

      vii. Has there been collaboration with affected fishermen and communities to identify socioeconomic costs and benefits?

   f. If models are used in the proposal are they consistent with the best available information?

   g. Is the proposal consistent with the goals and objectives of the FMP?

h. How will fishing communities and other stakeholders be affected by the proposal?

i. How are tribal Usual and Accustomed Areas affected by the proposal, and how was that determined?

j. How are overfished stocks affected by the proposal?

k. Is a monitoring plan part of the proposal?

l. Has there been coordination with appropriate state, tribal, and federal enforcement, management, and science staff?

m. Are there components of the proposal that require additional expertise beyond the EFHRC for a comprehensive evaluation?

PFMC
05/26/09

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Proposal to modify the northeast boundary of the Eel River EFH no-trawl area

Date: April 28, 2009

Applicant: Peter Leipzig
Executive Director
Fishermen's Marketing Association
1585 Heartwood Dr.
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McKinleyville, CA 95519

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pete@trawl.org

Problem: At the time that the PFMC was adopting the specific EFH closures, there were at least two sets of competing proposals for specific areas to be closed for trawling. One had been developed by the fishing industry with considerable input throughout the industry and another was developed by Oceana with input from other environmental organizations. There was a concerted effort by both parties to combine the two proposals the evening prior to the action taken by the Council.

One area that was that was contained within both these two sets of proposals was a large area in the Eel River Canyon. The motion passed by the Council combined the two proposals. The western portion of the Industry proposal (attachment 1) was combined with the Eastern half of the area as proposed by Oceana (attachment 2). The Oceana proposal covered a broader area of the canyon and extended much further onshore into shallow water. This combination resulted in the adopted Eel River EFH no-trawl area (attachment 3).

This proposal is to move the eastern boundary of the Eel River EFH area to the west so that it conforms to the existing 75 fm RCA boundary (attachment 4).

In this area being proposed to be changed, Oceana had identified an area as being untrawlable. This is not the case. There is a sunken barge in the area which can cause problems for research vessels, but local fishermen have fished this area without problems for many years.

Given the immense size of the entire EFH process, little attention was given to the exact location of the boundaries of the proposed closure of the Eel River Canyon as proposed by Oceana. Further, there was no opportunity to respond to the blending of the two proposals as occurred in the motion.

The adopted closure cut off the tows by trawlers fishing on the beach on sandy bottom in shallow water.

Why warranted:

This slight modification of the Eel River closure would allows trawlers to once again tow for flatfish on the beach in shallow water over flat sandy bottom. The use of the existing RCA boundary would continue restrict trawling in the Eel River canyon, but would greatly minimize the enforcement of the boundary by eliminating multiple sets of closure boundaries.

This modification would continue to provide protection to the Eel River Canyon while at the same time restoring the shallow water area to trawlers that have lost access to nearshore flatfish in the area because the closure. The closed area is located midway through existing tows. The remaining segments of the tows are too small to be accessed separately.

The loss of this area has had negative economic impacts upon the small beach trawlers operating out of Eureka and restoring the area would not jeopardize the protections of the Eel River Canyon. Delaying action until the five year review is therefore not warranted.

Proposed Action:

Move eastern waypoints to conform to the 75 fms RCA boundary (attachment 5). The resulting coordinates for the Eel River EFH area would be as follows:

Original Boundary							Proposed Boundary						
Point #	Longitude			Latitude			Point #	Longitude			Latitude		
1	40	38.270	N	124	27.160	W	***1***	***40***	***38.750***	***N***	***124***	***29.214***	***W***
2	40	35.600	N	124	28.750	W	***2***	***40***	***37.500***	***N***	***124***	***28.680***	***W***
							3	***40***	***35.806***	***N***	***124***	***29.214***	***W***
3	40	37.520	N	124	33.410	W	4	40	37.520	N	124	33.410	W
4	40	37.470	N	124	40.460	W	5	40	37.470	N	124	40.460	W
5	40	35.470	N	124	42.970	W	6	40	35.470	N	124	42.970	W
6	40	32.780	N	124	44.790	W	7	40	32.780	N	124	44.790	W
7	40	24.320	N	124	39.970	W	8	40	24.320	N	124	39.970	W
8	40	23.260	N	124	42.450	W	9	40	23.260	N	124	42.450	W
9	40	27.340	N	124	51.210	W	10	40	27.340	N	124	51.210	W
10	40	32.680	N	125	5.630	W	11	40	32.680	N	125	5.630	W
11	40	49.120	N	124	47.410	W	12	40	49.120	N	124	47.410	W
12	40	44.320	N	124	46.480	W	13	40	44.320	N	124	46.480	W
13	40	40.750	N	124	47.510	W	14	40	40.750	N	124	47.510	W
14	40	40.650	N	124	46.020	W	15	40	40.650	N	124	46.020	W
15	40	39.690	N	124	33.360	W	16	40	39.690	N	124	33.360	W
16	40	38.270	N.	124	27.160	W.	***17***	***40***	***38.750***	***N.***	***124***	***29.214***	***W.***

Relevant and Applicable Information:

The area that would be opened to trawling is a sandy bottom habitat similar to the area further east as well as to the north and south. The area important for the trawling of English sole, Petrale sole, Dover sole, and other nearshore flatfish. There are roughly three trawlers fishing out of the port of Eureka that have been prevented from fishing in this area. These are smaller vessels common referred to as “beach boats”.

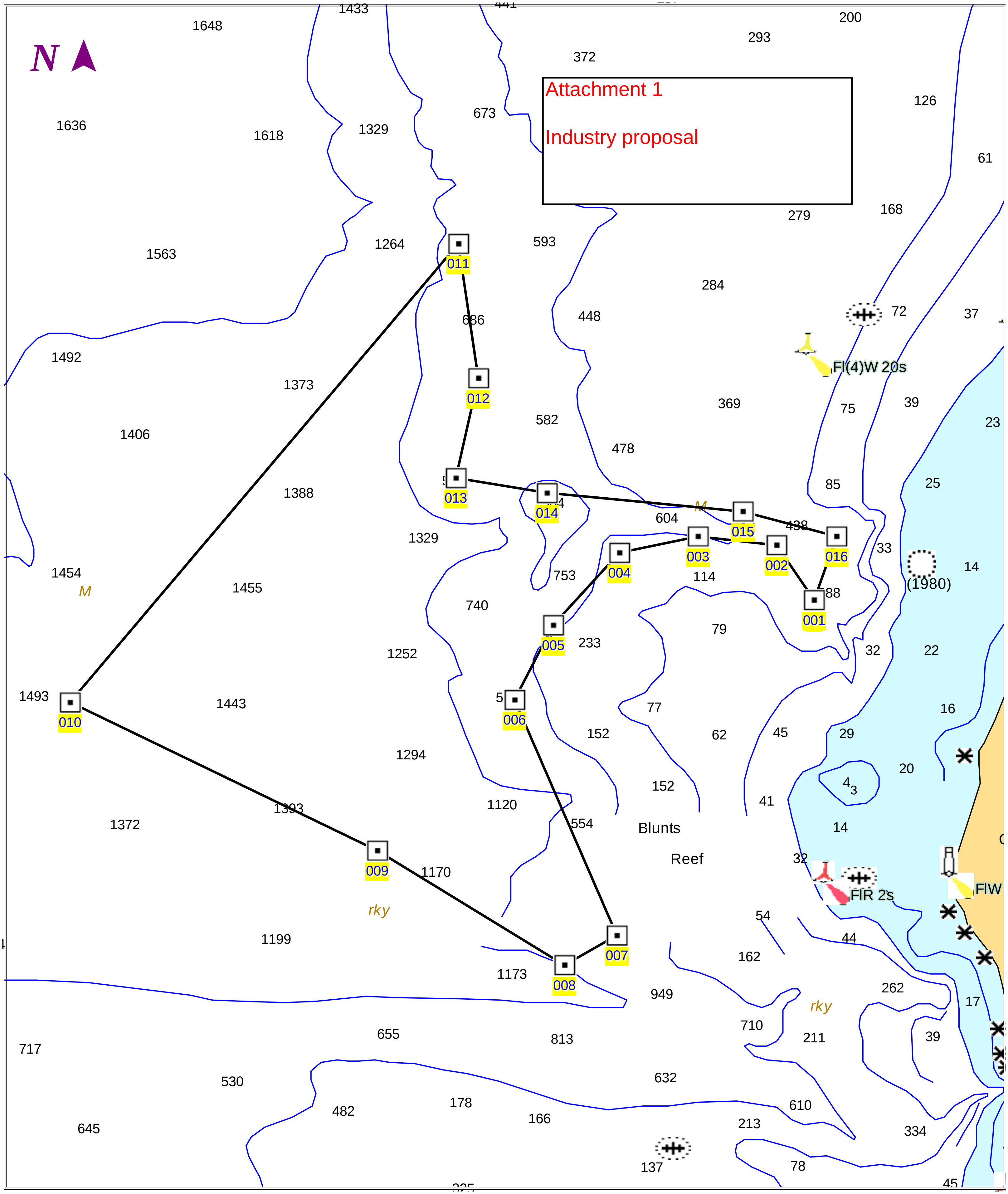
Discussion:

This area is the flat sandy bottom area above the Eel River Canyon. This is the area where flatfish that are undergoing their season migration from deeper water will travel to reach shallower areas on the continental shelf. This is an important area to fishermen fishing for nearshore flatfish. The habitat type is similar to most of the sandy bottom continental shelf; however, the closed area divides historic tow locations into halves. Each of these remaining portions are so small that the entire area north and south of the closed area has become economically inefficient to trawling. Opening the relative small closed area will allow a much larger area to once again be economical to be fished.

This area is not known to be vulnerable to the effects of fishing and contains no unique, rare, or threatened habitat.

Opening this area is will not have a huge impact upon the value of fisheries as a whole, but to the few fishermen that historically fished through this area, the economic benefit of the modification would be tremendous.

WEST COAST OF NORTH AMERICA. MEXICAN BORDER TO DIXON ENTRANCE. - 1 : 1,088,000
(Passport World Charts - vector format) Chart #U501 - Depth Units: Fathoms



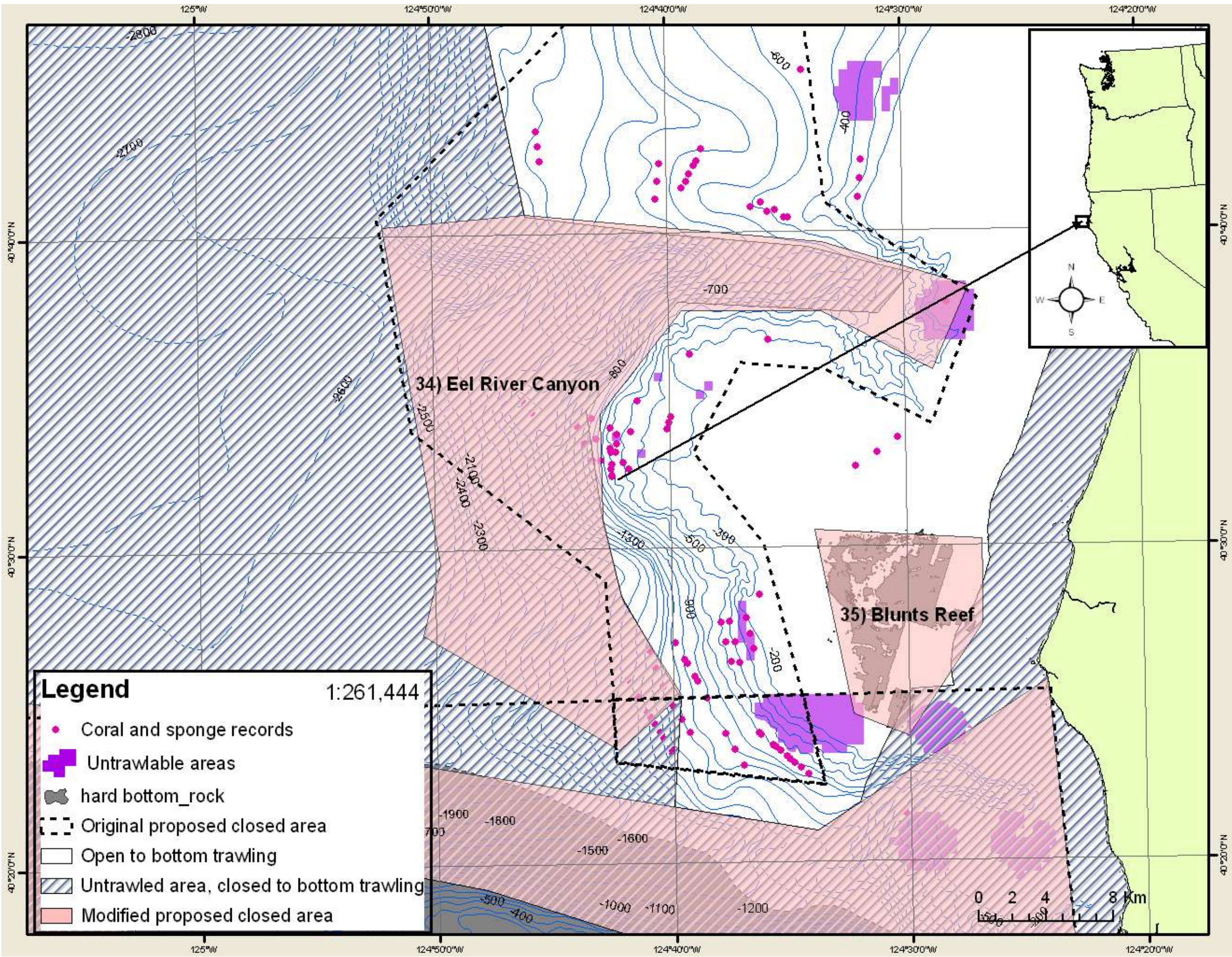
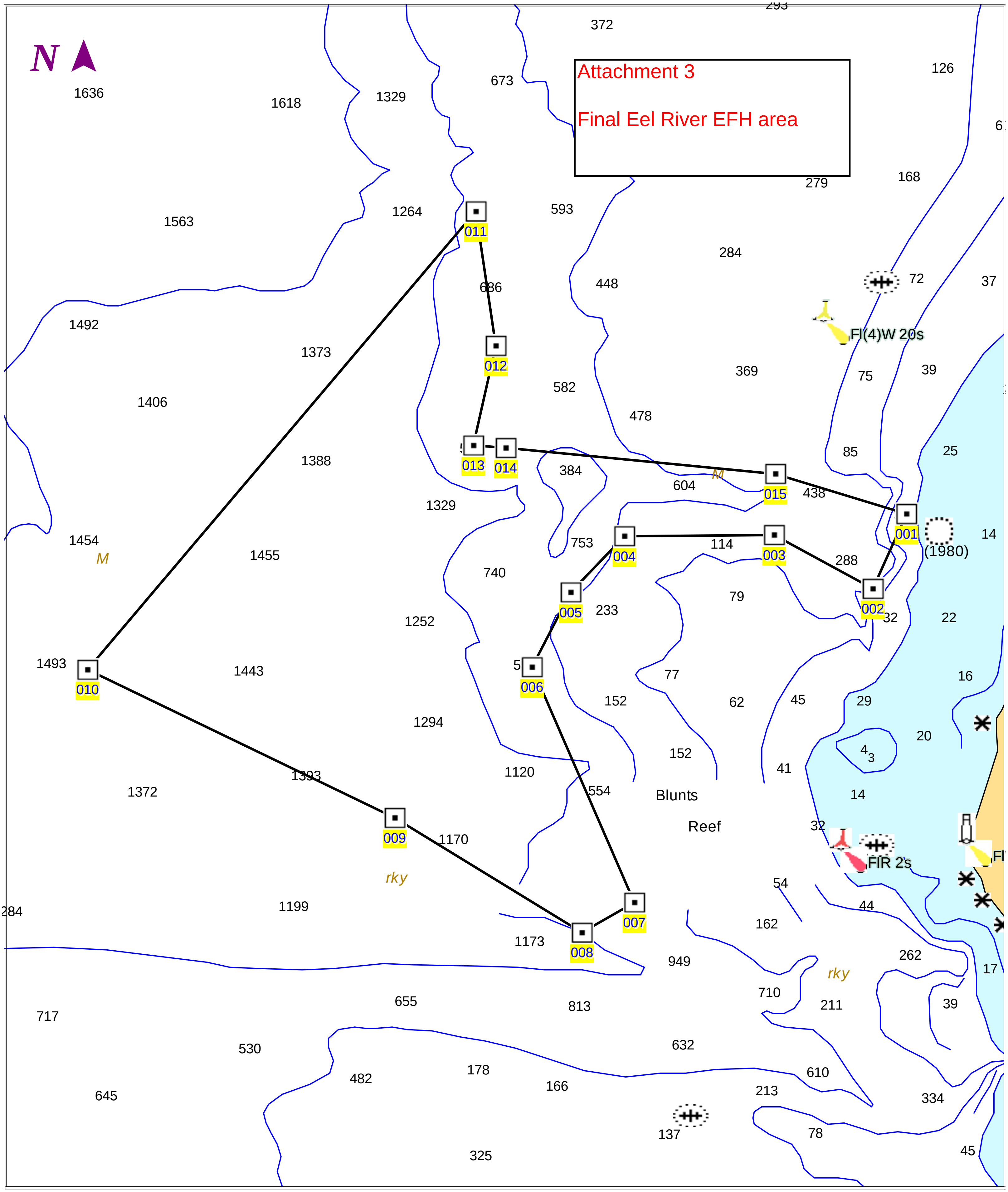


Figure 37: Eel River Canyon

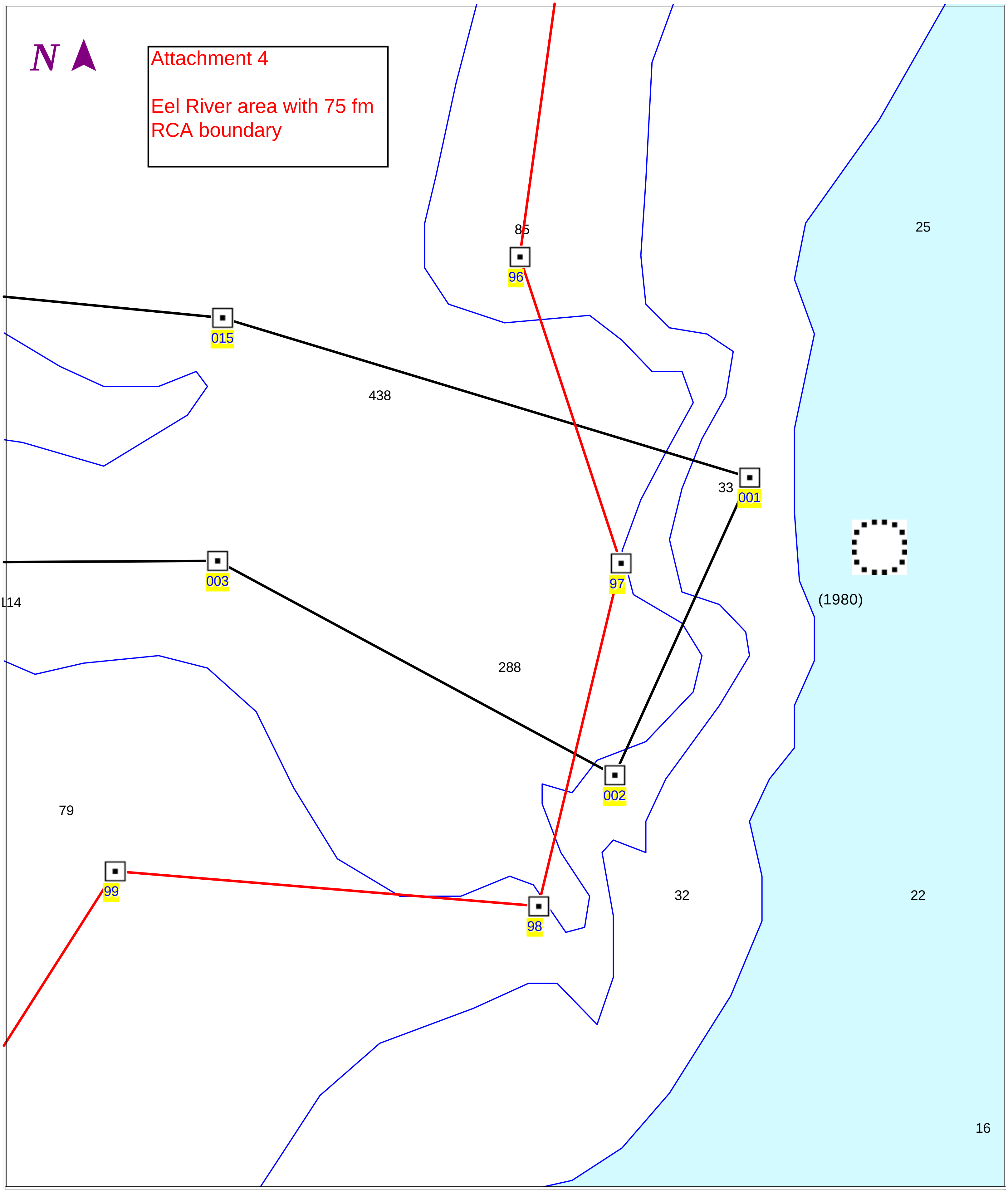
Attachment 2

Oceana proposal

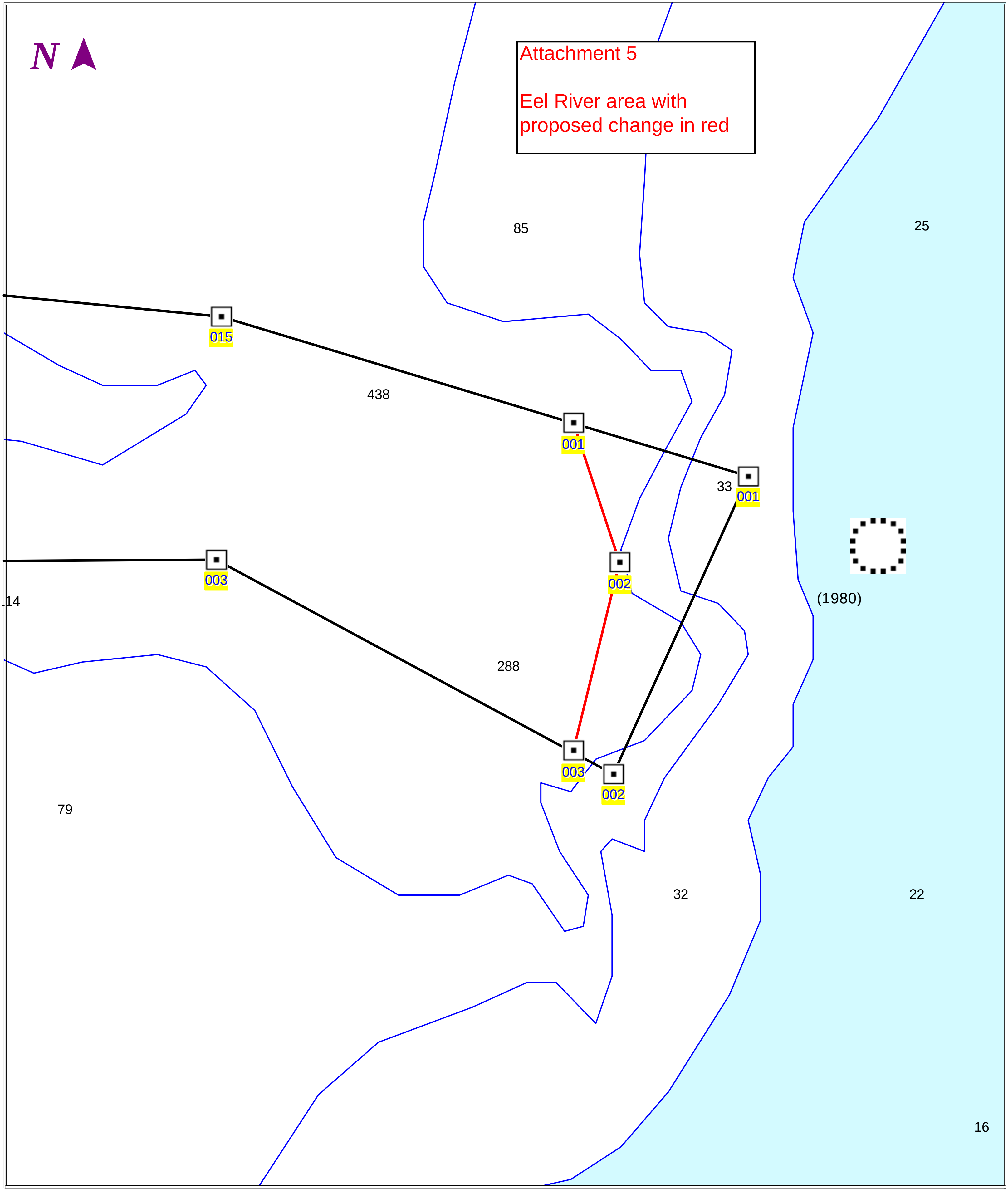
WEST COAST OF NORTH AMERICA. MEXICAN BORDER TO DIXON ENTRANCE. - 1 : 1,088,000
(Passport World Charts - vector format) Chart #U501 - Depth Units: Fathoms



U.S. - WEST COAST. CALIFORNIA - OREGON. MONTEREY BAY TO COOS BAY. - 1 : 272,000
(Passport World Charts - vector format) Chart #U18010 - Depth Units: Fathoms



U.S. - WEST COAST. CALIFORNIA - OREGON. MONTEREY BAY TO COOS BAY. - 1 : 272,000
(Passport World Charts - vector format) Chart #U18010 - Depth Units: Fathoms



Agenda Item E.1.a
Attachment 3
June 2009

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May 1, 2009

Dr. Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Proposal to the Pacific Fishery Management Council To Modify Groundfish Essential Fish Habitat Conservation Areas: Juan De Fuca Coral Canyons & Grays Canyon Sponge Reefs Important Ecological Areas

Dear Dr. McIsaac:

We are submitting the attached proposal in response to the Pacific Fishery Management Council's call for proposals for changes to Groundfish Essential Fish Habitat (EFH). We recommend modification to the Olympic 2 and Grays Canyon EFH closures to increase protections for identified deep-sea coral and sponge habitat from bottom trawling and, in Juan de Fuca Canyon, from other bottom contact gear. This proposal follows the 2004 and 2006 research on deep sea coral and sponge communities in the Olympic Coast National Marine Sanctuary (OCNMS) and the 2007 and 2008 discoveries of glass sponge reef habitat near Grays Canyon. We have used the best available science, social and economic information, and direction provided by the law to design a practicable management approach that protects essential fish habitat while maintaining vibrant fisheries.

As you know, Oceana was actively engaged in the 2005 Pacific Groundfish EFH process, which resulted in significant conservation measures for EFH off the U.S. West Coast. In that process, the Council recognized the need for an adaptive management approach to modify EFH identification and conservation measures as new information becomes available. Thus, in 2006 and again in 2007, we brought to the Council's attention the discovery of coral and sponge habitat inside and outside the Olympic 2 EFH Conservation Area and outside the Grays Canyon EFH Conservation Area.

Scientific understanding of the ecological importance of deep-sea coral and sponge ecosystems has continued to increase. In *State of Deep Coral Ecosystems of the United States* (Lumsden et al. 2007), NOAA scientists state, "Deep coral communities can be hot-spots of biodiversity in the deeper ocean, making them of particular conservation interest." The authors find that the "three-dimensional structure of deep corals may function in very similar ways to their tropical counterparts, providing enhanced feeding opportunities for aggregating species, a hiding place from predators, a nursery area for juveniles, fish spawning aggregation sites, and attachment substrate for sedentary invertebrates (Fossa et al. 2002; Mortensen 2000; Reed 2002b)."

Further, the vulnerability of coral and sponge habitats to fishing gear impacts, particularly bottom trawling, remains high and the biological impacts severe and lasting. This is evidenced by the numerous studies conducted off the West Coast, Alaska and around the world, that are documented in the National Academy of Sciences, National Research Council report, *Effects of Trawling and Dredging on Seafloor Habitats* (NRC 2002). Perhaps most telling in this case is the likely destruction of a small *Lophelia* coral reef that, in 2004, was the first documented occurrence of this rare coral species in the OCNMS. Sadly, when scientists returned in 2006 to further study the corals at this site, live *Lophelia* corals could not be found and only rubble remained (Brancato et al. 2007). Lost fishing gear and bycatch records from the site suggest commercial fishing operations were responsible. The loss of the first *Lophelia* reef found off the West Coast is a poignant example of the reasons for which we must act quickly and decisively to protect corals and sponges.

Hard data documents the presence of corals and sponges in the Grays Canyon and Juan de Fuca Canyon areas. It is our responsibility as an ocean conservation organization, and the responsibility of the PFMC, National Marine Fisheries Service (NMFS), and National Marine Sanctuary (NMS) Program as ocean stewards, to ensure a comprehensive and permanent solution for habitat protection in and outside the sanctuaries and current EFH conservation areas. This approach must include protective measures, monitoring, research and enforcement. This proposal is our best attempt to achieve protection for these areas while minimizing short-term impacts on the groundfish fishery. We hope that, in addition to this work by the Council, the OCNMS will also consider these issues in their management plan process.

This proposal is intended to respect and honor the authorities and responsibilities of the Council, National Marine Fisheries Service, OCNMS, and Pacific Northwest Tribes. We recognize that the treaty rights of the Tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

We look forward to working with you to protect the corals and sponges in the waters off Washington State.

Sincerely,

Jim Ayers

Jim Ayers
Vice-President

Brancato, M.S., C.E. Bowlby, J. Hyland, S.S. Intelmann, and K. Brenkman. 2007. Observations of deep coral and sponge assemblages in Olympic Coast National Marine Sanctuary, Washington. Cruise Report: NOAA Ship *McArthur II* Cruise AR06-06/07. Silver Spring, Maryland. July 2007.

Lumsden SE, Hourigan TF, Bruckner AW, Dorr G (eds.) 2007. The State of Deep Coral Ecosystems of the United States. NOAA Technical Memorandum CRCP-3. Silver Spring MD

NRC (2002). Effects of Trawling and Dredging on Seafloor Habitat. Washington, D.C, National Academy of Sciences, National Research Council.

Proposal to the Pacific Fishery Management Council
To Modify Groundfish Essential Fish Habitat Conservation Areas

Juan De Fuca Coral Canyons & Grays Canyon Sponge Reefs
Important Ecological Areas

Top: Darkblotched and redbanded rockfish nestled in gorgonian coral in the Olympic Coast National Marine Sanctuary.
Bottom: Glass sponge at 160m depth on Washington outer continental shelf
All images courtesy of OCNMS and University of Washington

May 1, 2009

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Proposal to the Pacific Fishery Management Council To Modify Groundfish Essential Fish Habitat Conservation Areas: Juan De Fuca Coral Canyons & Grays Canyon Sponge Reefs Important Ecological Areas

Deep-sea corals and sponges provide three-dimensional structures that form habitat for groundfish, shellfish, and other marine life. They generally occur in diverse biological communities with other invertebrates such as crinoids, basket stars, ascidians, annelids, and bryozoans. Scientists consider them as important to the biodiversity of the oceans and the sustainability of fisheries as coral reefs in shallow tropical seas. Corals and sponges are among the longest lived animals on Earth, and recovery from loss is on the order of decades to centuries or more. These long-lived habitat forming filter feeders may be important indicators of areas in the ocean that have consistently favorable ecological conditions, such as areas of high upwelling along the continental shelf break and submarine canyons.

This proposal recommends modification to the Olympic 2 and Grays Canyon EFH closures, s*ee* 50 C.F.R. §§ 660.306(h)(8) & 660.397(a), (d), to increase protections for identified deep-sea coral and sponge habitat from bottom trawling and, in Juan de Fuca Canyon, from other bottom contact gear. We have focused on areas where researchers have recently identified significant and important biogenic habitat outside of Essential Fish Habitat (EFH) closures recommended by the Pacific Fishery Management Council (PFMC) in 2005 and implemented by the National Marine Fisheries Service (NMFS) in 2006 as Amendment 19 to the Pacific Coast Groundfish Fishery Management Plan. 71 Fed. Reg. 27,408 (May 11, 2006) (codified at 50 C.F.R. Part 660). This proposal would protect sensitive coral and sponge habitats from bottom trawling and is consistent with the legal requirements of the Magnuson-Stevens Fishery Conservation and Management Act to minimize the adverse effects on EFH caused by fishing and to identify actions to encourage the conservation and enhancement of such habitat. *See* 16 U.S.C. § 1853(a)(7).

The proposal follows the structure of the EFH Review Committee Terms of Reference.

1. Date of application.

May 1, 2009

2. Applicant's name, mailing address, email address, and telephone number, including contacts for any cooperating agencies or entities.

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3. A statement of the problem and the proposed action.

According to scientists, "deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas" (MCBI and Oceana 2004). Dive surveys have recently discovered complex deep-sea corals and glass sponge reefs vulnerable to disturbance that are outside of areas currently closed to protect habitat.

NOAA has identified that fishing operations along the narrow continental shelf off the Pacific coast, "particularly bottom trawling, pose the most immediate and widespread threats to deep coral communities" (Whitmire and Clarke 2007). The adverse impacts of bottom trawling on seafloor habitat include changes in physical habitat and biological structure of ecosystems, as well as reductions in benthic habitat complexity and biodiversity (NRC 2002). These impacts are far more pronounced in areas of biogenic habitat, such as coral and sponge, where longevity and recovery times can be on the order of centuries or more. The likely consequence of bottom trawling in these areas is the loss of these unique and fragile living marine resources as well as the benefits they provide to the rest of the ecosystem—including the long-term sustainability of commercial fisheries targeting species that use coral and sponge habitat.

The proposed action would modify the boundaries of the Olympic 2 and Grays Canyon EFH Closed Areas, *see* 50 C.F.R. § 660.397(a), (d) (current boundaries for Olympic 2 and Grays Canyon), to encompass and protect identified coral and sponge habitat as well as additional suitable habitat in the surrounding Grays and Juan de Fuca submarine canyons. In addition, two areas in the Juan De Fuca Canyon with documented coral habitat would be closed to all fixed or anchored non-trawl bottom contact gear, such as bottom longlines, gillnets and pots and traps.[1] The current measures prohibiting the use of bottom trawl gear in these ecologically important closed areas would be maintained. *Id.* at § 660.306(h)(8) (prohibition for fishing in conservation areas, including Olympic 2 and Grays Canyon). We recognize that the treaty rights of Pacific Northwest Tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

4. An explanation why the proposal is warranted, including:

a. How it is consistent with the Council's requirement to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires the National Marine Fisheries Service (NMFS) and fishery management councils to "describe and identify essential fish habitat" and "minimize to the extent practicable adverse effects on such habitat caused by fishing" while also identifying "other actions to encourage the conservation and enhancement of such habitat." 16 U.S.C. § 1853(a)(7). Essential fish habitat is defined as "those

[1]"*Fixed gear (anchored nontrawl gear)* includes the following gear types: longline, trap or pot, set net, and stationary hook-and-line (including commercial vertical hook-and-line) gears." 50 C.F.R. § 660.302

waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." *Id*. at § 1802(a)(10). The EFH implementing regulations define "waters" to include "aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish" and "substrate" to include "sediment, hard bottom, structures underlying the waters, and associated biological communities." 50 C.F.R. § 600.10. "'Necessary' means "the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle." *Id.*

To protect EFH, Councils are required to "prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature…[.]" *Id.* at § 600.815(a)(2)(ii). Adverse effects mean "any impact that reduces quality and/or quality of EFH" and may include "direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH." *Id*. at § 600.810(a).

To implement these requirements, the Pacific Council developed Amendment 19 to the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP), which protected many of the coral and sponge hotspots known at that time. In finalizing Amendment 19, NMFS concluded that "adverse impacts to habitat were possible [from fishing] that could impair the ability of fish to carry out basic biological functions and potentially have long-lasting or permanent implications at the scale of the ecosystem." 71 Fed. Reg. 27,408, 27,410 (May 11, 2006). Therefore, "to protect EFH from the adverse effects of fishing, the Council … identified areas that are closed to bottom trawling …." Pacific Coast Groundfish FMP (Groundfish FMP), Section 6.2.4, at72 (2006); *see also id.*, Sections 6.8 and 7.4. The precautionary management measures were carried out in the agency's final rule implementing Amendment 19. 71 Fed. Reg. 27,408 (May 11, 2006) (codified at 50 C.F.R. § 660.396).

NMFS and the Council's responsibilities to protect EFH do not end at the implementation of Amendment 19. The Pacific Council clearly recognizes its continuing responsibility through initiation of this review process for groundfish EFH. As the FMP states, "[p]rotecting, conserving, and enhancing EFH are long-term goals of the Council, and these EFH provisions … are an important element in the Council's commitment to a better understanding, and conservation and management, of Pacific Coast groundfish populations and their habitat needs." Groundfish FMP, Section 7.0, at 106.

Since the Council's original EFH action, NOAA has further clarified the need for protection of sensitive deep water corals. "Over the past decade, science has demonstrated that deep corals are often extremely long-lived, slow-growing animals, characteristics that make them particularly vulnerable to physical disturbance, especially from activities such as bottom trawling." (Whitmire and Clarke 2007). That report also states "deep coral habitats appear to be much more extensive and important than previously known, particularly with respect to supporting biologically diverse assemblages." Deep-sea sponges often share these same characteristics.

Finally, NOAA has identified that fishing operations along the narrow continental shelf off the Pacific coast, "particularly bottom trawling, pose the most immediate and widespread threats to deep coral communities" (Whitmire and Clarke 2007). As this proposal details, the best scientific information available supports the protection for the coral and sponge communities identified for addition to the currently protected Olympic 2 and Grays Canyon Important Ecological Areas.

Modifying these areas to include additional deep-sea coral and sponge habitat is clearly consistent with the Council's responsibilities. The law requires the Council to minimize to the extent practicable adverse effects of fishing on EFH. As stated above, NOAA has clearly identified that coral communities are particularly vulnerable to activities like bottom trawling. The potential adverse impacts to sensitive deep-sea coral and sponge alone, based on the rationale used in Amendment 19 justify adding the proposed areas. Moreover, corals identified in this area have likely already been adversely affected by fishing (see 4.b below), amplifying the need for protecting these habitats before additional impacts occur. Finally, protecting these habitats from fishing is also practicable, as it would have minimal economic impact on the fishery (see 6.e and 7.e below). Therefore, adding the proposed areas of sensitive habitat known to be important groundfish habitat is clearly consistent with the Council's obligations and previous actions to protect EFH from the adverse effects of groundfish fishing activities.

b. Why an interim review is necessary prior to the periodic 5-year review.

As laid out in this document, biogenic habitat such as coral and sponge is among the most vulnerable habitat to bottom trawling and the slowest to recover from disturbance. Their fragility, slow growth, and longevity means that even a single pass of a bottom trawl can destroy centuries of growth. Dive surveys have already documented *Lophelia pertusa* banks that have been reduced to rubble in the Olympic Coast National Marine Sanctuary (OCNMS). Permanent closures are needed to protect this habitat.

The current boundaries (2009-2010 schedule) of the groundfish trawl Rockfish Conservation Area (RCA) encompass the area bounded by this proposal (with small exceptions). The RCA closure, put into place to reduce the catch of overfished rockfish, is a temporary and variable bycatch control measure not designed to protect habitat. Although it does restrict bottom trawling in the area, it can and does change temporally and spatially as frequently as every two months. Accordingly, it does not afford the permanent protection needed to protect long-lived and fragile coral and sponge habitat. Even if the current schedule stays in place through the end of 2010, there is no guarantee the boundaries will remain the same from 2011 onwards. As the five-year review is not scheduled for completion until the beginning of 2013, it is imperative that these closures are implemented through the interim review process.

5. A detailed description of the proposed action(s), including:

a. Spatial changes to currently protected areas such as boundary modifications, elimination of current areas of EFH, HAPC, and HCA or addition of new areas of EFH, HAPC, or HCA. Latitude and longitude coordinates (DDD° mm.mmm′) and maps, including before and after change, and digital files if available (e.g., GIS shape files, navigation plotter data).

The attached maps (Figures 1-3) and Table 1 detail the proposed area modifications. In addition to the referenced reports and literature, the following GIS datasets were among those used in this analysis:

Habitat and substrate data

1. OCNMS 2006 ROV dive location data from Figure 4 in Brancato et al (2007).
2. Grays Canyon ROV dive location data from Bjorklund et al (2008).
3. NMFS bottom trawl survey data coral and sponge observations, 1977-2006 (Alaska Fisheries Science Center slope and shelf trawl surveys, 1977 to 2001, and Northwest Fisheries Science Center slope and shelf trawl surveys, 2001 to 2006). Sponge data was available through 2003 only. Coral data was available from 1980 onwards. Latter from Curt Whitmire, NOAA (July 7, 2008).
4. Surficial Geologic Habitat version 3. Downloaded from PacOOS West Coast Habitat Server, February 2009.
5. Proxy for complex bathymetry and substrate based on trawl hang location data from Zimmerman (2003).

Trawling data

6. All non-confidential bottom trawl catch data from fish tickets for 2005. Data from PacFIN, January 29, 2007.
7. All non-confidential bottom trawl track (set and haulout) data for 2005. Data obtained from PacFIN, August 28, 2006.

b. Gear regulation changes, (e.g., allowing or disallowing gear types, tow technique, mesh size, weight of gear, time of bottom contact, tow time, number of pots or hooks).

The current bottom trawl gear restrictions in the Olympic 2 and Grays Canyon EFH closures would be maintained. Bottom trawling would be a prohibited activity in the areas proposed at Grays Canyon and Juan de Fuca Canyon. No bottom contact (trawls, longlines, pots) would be permitted in the sites with the Juan de Fuca Canyon proposed for no bottom contact (see figures 1-3).

c. Other changes.

None.

Table 1: Latitude and longitude coordinates of proposed area modifications.

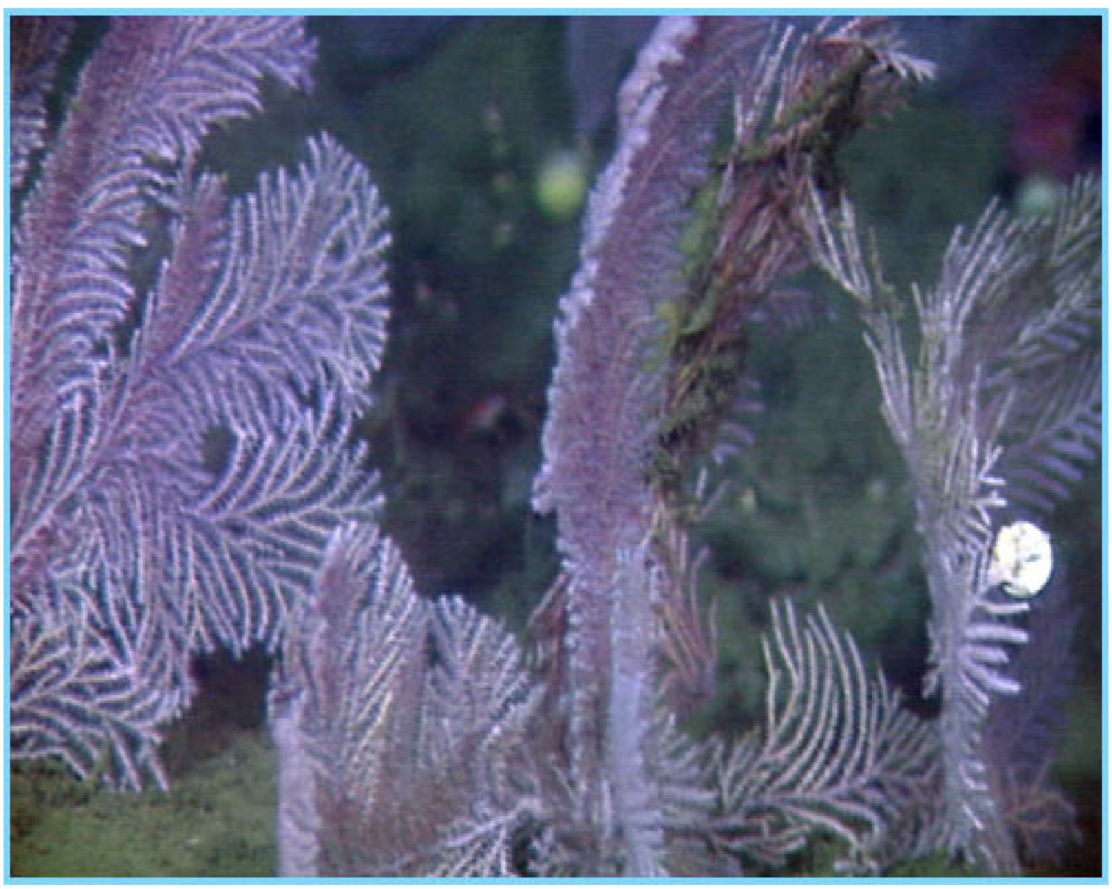
Area	Prohibited Gear	longitude	latitude
Juan De Fuca Coral Canyons	bottom trawl	125° 9.820' W	48° 22.570' N
		125° 3.550' W	48° 21.420' N
		124° 59.290' W	48° 22.990' N
		124° 54.370' W	48° 23.890' N
		124° 51.610' W	48° 21.460' N
		124° 55.473' W	48° 17.099' N
		124° 57.540' W	48° 10.002' N
		124° 59.400' W	48° 5.100' N
		125° 2.000' W	48° 4.500' N
		125° 19.760' W	48° 3.260' N
		125° 20.650' W	48° 3.980' N
		125° 21.840' W	48° 3.600' N
		125° 22.900' W	48° 2.040' N
		125° 24.629' W	48° 0.571' N
		125° 24.830' W	48° 0.400' N
		125° 25.875' W	47° 59.049' N
		125° 26.805' W	47° 57.911' N
		125° 27.807' W	47° 57.359' N
		125° 30.369' W	47° 56.671' N
		125° 36.628' W	47° 57.584' N
		125° 38.284' W	48° 1.023' N
		125° 36.969' W	48° 1.589' N
		125° 36.047' W	48° 3.089' N
		125° 36.663' W	48° 4.159' N
		125° 27.500' W	48° 6.339' N
		125° 23.611' W	48° 15.688' N
		125° 29.966' W	48° 18.367' N
		125° 22.800' W	48° 20.267' N
		125° 17.667' W	48° 22.706' N
		125° 11.594' W	48° 17.360' N
	bottom contact	125° 12.737' W	48° 11.158' N
		125° 2.901' W	48° 10.022' N
		125° 3.497' W	48° 6.820' N
		125° 13.685' W	48° 7.941' N
	bottom contact	125° 1.712' W	48° 18.102' N
		124° 55.373' W	48° 17.161' N
		124° 56.799' W	48° 12.087' N
		125° 3.384' W	48° 13.185' N
Grays Canyon Sponge Reefs	bottom trawl	124° 47.548' W	47° 7.847' N
		124° 47.515' W	46° 48.178' N
		125° 10.771' W	46° 48.170' N
		125° 17.444' W	46° 49.498' N
		125° 3.793' W	47° 4.731' N
		125° 8.562' W	47° 7.902' N
		124° 47.548' W	47° 7.847' N

6. All relevant and applicable information on the following characteristics, including the attendant impacts of the proposed action:

a. Biological and ecological characteristics (e.g., habitat function, vulnerability, index of recovery, species associations, including reference to any ESA-listed species, and biogenic components).

Research in the Juan de Fuca Canyon

Most of the available information for Juan de Fuca Canyon is from surveys conducted in 2004 and 2006. A pilot project was conducted in the area in June 2004 (Hyland et al. 2005). NOAA then led a follow-up research cruise from May 22 to June 4, 2006 to conduct a series dives in the OCNMS with the goal of documenting deep coral and sponge communities (Brancato et al. 2007). The survey locations included sites both inside and outside the Olympic 2 EFH conservation area. Several species of corals and sponges were documented at 14 of 15 survey sites including gorgonians, stony corals and reef building sponges. The researchers also documented dead gorgonians, lost fishing gear and coral rubble supporting concerns over the risk of disturbance to coral health (Brancato et al. 2007).

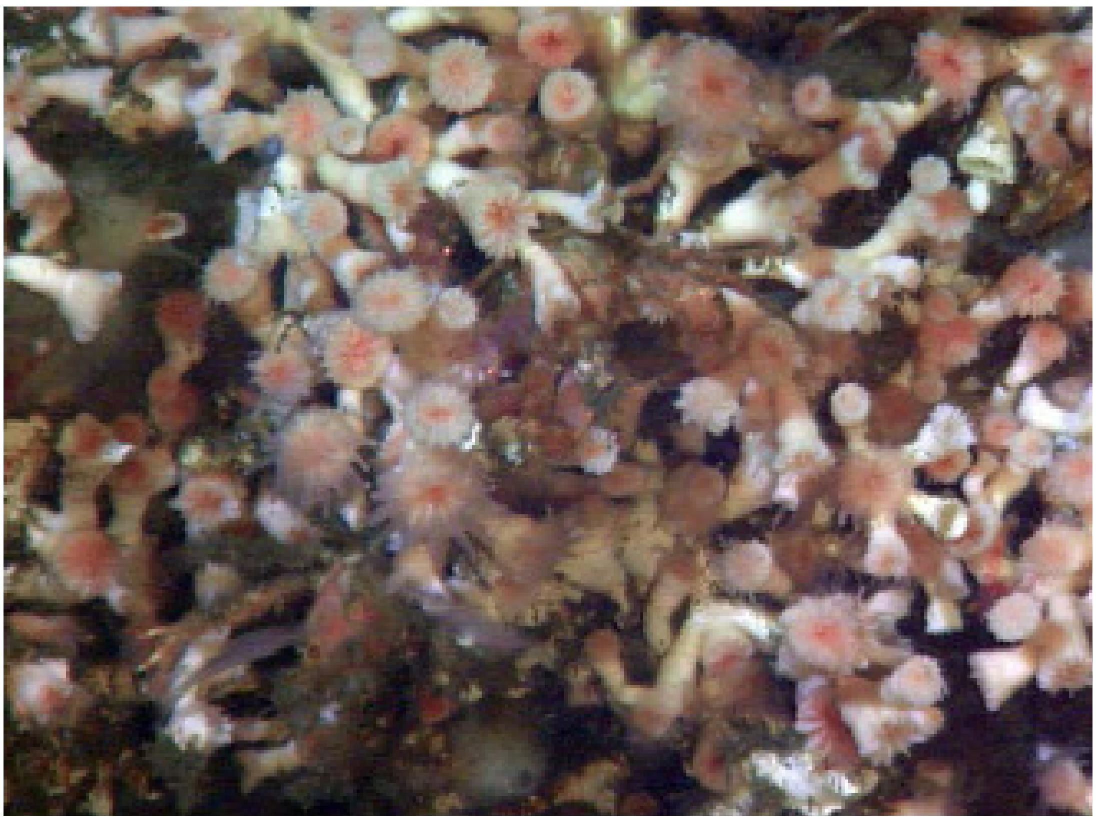


Callogorgia sp. in OCNMS

The 2004 dives discovered colonies of the scleractinian coral species *Lophelia pertusa*, the first to be found in the sanctuary (Hyland et al. 2005). This species had been documented off the west coast before these dives, but not in the large bank-like complexes (lithoherms) found throughout the Atlantic, including the Darwin Mounds off of Ireland and in the Norwegian fjords. In the sanctuary, *L. pertusa* was observed on rock faces with lithoherms forming at the base of the rock face (Brancato et al. 2007). These more recent dives also discovered several other species, including the cup coral *Desmophyllum dianthus,* a potentially undescribed species of hydrocoral (*Stylaster* sp.) and small patches of the reef-building sponge *Farrea occa* (OCNMS 2008). In the 2006 dives, corals were found at 14 of the 15 sites surveyed, both within and outside the Olympic 2 EFH conservation area (Brancato et al. 2007).

Darkblotched rockfish and red tree coral (*Primnoa* sp.) in OCNMS

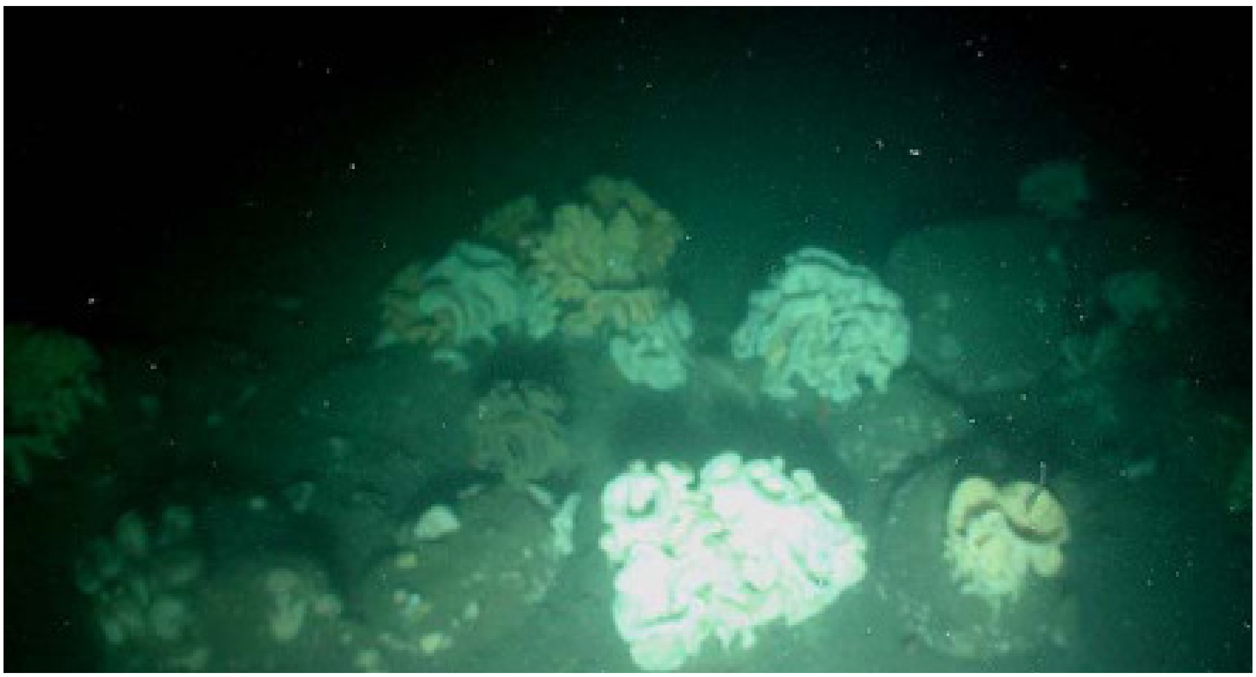
Prior to the 2004 and 2006 dives to document hard substrate and associated communities, information on habitat-forming corals in the sanctuary was extremely limited and was based on observations from NMFS trawl surveys and occasional observations by academic institutions. At that time, the only species of zoantharian coral that had been documented in the literature in sanctuary waters was a black coral (*Bathypathes* sp.) (Etnoyer and Morgan 2003; Etnoyer and Morgan 2005). Sanctuary dive surveys to document recovery along a fiber optic cable route from 2000-2004 identified several other species including gorgonians (*Paragorgia* sp., *Swiftia* sp. and an unidentified paramuriceid coral), hydrocorals (*Stylaster venustus*), cup corals (*Balanophyllia* sp.) and numerous sponges (Brancato et al. 2007).



Colony of apparently healthy ivory tree coral (*L. pertusa*) in OCNMS

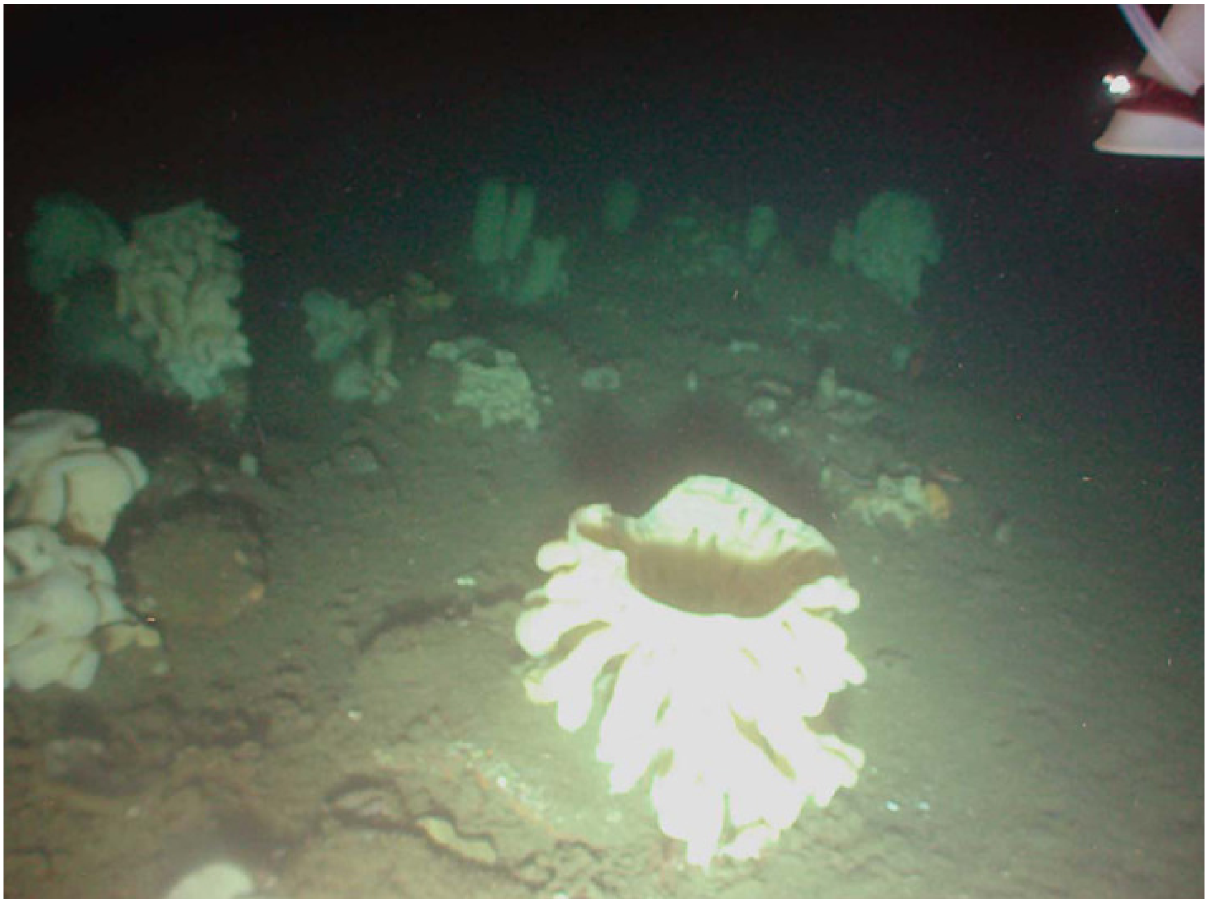
Research in the vicinity of Grays Canyon

Recent research, including ROV surveys off of the Washington Coast have uncovered glass sponge reefs (Class Hexactinellida) in the vicinity of Grays Canyon (Johnson et al. 2007, Bjorklund et al. 2008). Glass sponges are remarkable benthic suspension feeders. Despite being single-celled animals, individuals produce a skeleton made of nearly pure silica that can reach a meter or more in height (Leys et al. 2004; Yahel et al. 2005; Conway et al. 1991, 2004). Although individual glass sponges can be found in the deep oceans at 500 to 3000 meters, they are found in relatively shallow waters in only a few areas of the world—Antarctica, New Zealand, a few caves in the Mediterranean, and in the Pacific Northwest (Johnson 2006).



Glass sponges off the Washington outer continental shelf

Until very recently, glass sponge reefs in the northwest Pacific were known to occur only off British Columbia (e.g. Conway et al. 1991, 2001, 2004, 2005: Cook 2005). These sponge reefs are among the largest known biomasses of sponges anywhere on Earth, covering thousands of kilometers along the coastline in the Hecate Strait and Strait of Georgia (Whitney et al. 2005; Leys et al. 2004; Yahel et al. 2005). Almost identical environmental conditions between the Straight of Georgia and the continental margins of Washington and Oregon, coupled with sidescan sonar data and NMFS trawl bycatch records suggested the presence of glass sponge reefs in the Grays Canyon area (Johnson 2006). A 2008 cruise by scientists from Washington Sea Grant and the University of Washington (Bjorklund et al. 2008) was the first to formally document the existence of these ancient reefs off the U.S. West Coast. The dive also recorded the existence of methane seeps in the vicinity of the coral reefs as well as swarms of krill.



Glass sponge (*H. calyx*) on glacial erratic

There are three known reef building glass sponge species: *Aphrocallistes vastus* (vase sponge), *Heterochone calyx*, and *Farrea occa* (Cook 2005). Data from the 2008 cruise (Bjorklund et al. 2008) and NMFS trawl surveys indicate the presence of at least *A. vastus* and *H. calyx* in the vicinity of Grays Canyon, while *F. occa* has been recorded during the OCNMS dives further north. Many species of non-reef building sponges are also known from bycatch records in the area, such as the cloud sponge *Rhabdocalyptus* sp., the hermit sponge *Suberites* sp., the ball sponge *Tethya* sp., the tree sponge *Mycale loveni*, the spiny vase sponge *Leucandra heathi*, the fibreoptic sponge *Hylonema* sp., and the barrel sponge *Halichondria panice*. In addition, many bycatch records only identify to the level of 'glass sponge' or even simply 'sponge' (NMFS 2007).

Deep-sea corals and sponges: Ecological importance and species associations

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 there, and consequently in the wider marine ecosystem (Thrush et al. 2001).

Deep-sea corals and sponges provide three-dimensional structures that form habitat for groundfish, shellfish, and other marine life (Husebo et al. 2002; Krieger and Wing 2002; Malecha et al. 2002; Heifetz 2002). Deep-sea corals and sponges are found at depths from 30 meters to over 3,000 meters (Krieger and Wing 2002). Many cup corals, hydrocorals, and *Metridium* anemones are found at depths as shallow as 15 m. Some larger species of deep-sea corals, such as *Paragorgia* sp. can grow to over 3 m tall. Because these long-lived filter feeders are attached to the seafloor, they may be important indicators of areas in the ocean that have consistently favorable ecological conditions, such as areas of high upwelling that are worth protecting for other reasons as well.

Based on the best available science, cold water coral and sponge habitat is an important component of Essential Fish Habitat vulnerable to the impacts of bottom trawling. In February 2004, over 1,100 scientists signed a consensus statement declaring that "In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas" (MCBI and Oceana 2004). This statement is corroborated by numerous scientific studies documenting the importance of cold-water corals as habitat for fish and invertebrates. Here are 12 examples:

1. Hyland et al. (2004) conclude that coral and sponge ecosystems in the Olympic Coast National Marine Sanctuary are valuable habitat for demersal fisheries on the U.S. West Coast and important "reservoirs of marine biodiversity." This study documented bottom trawl marks in the vicinity and a large proportion of dead or broken corals.
2. Krieger and Wing (2002) identified 10 megafaunal groups associated with *Primnoa* sp. deep-sea corals that use the corals for feeding, breeding and protection from predators. Six rockfish species were either beneath, among, or above the coral colonies. Shrimp were among the coral polyps, and a pair of mating king crabs was hiding beneath the coral. The authors conclude that removal of these slow-growing corals could cause long-term changes in associated megafauna.
3. Dr. Milton Love (pers. comm.) identified large schools of juvenile rockfish (including widow and squarespot rockfish) closely associated among the branches of the Christmas tree coral, likely using the coral for protection. This deep-sea coral species was named based on the numerous associated species that clung to the branches like Christmas ornaments (Opresko 2005).
4. Mortensen et al. (1995) identified megafauna associated with deep-sea coral bioherms in Norway, including redfish, saithe, squat lobsters, sponges and gorgonians (*Paragorgia arborea, Paramuricea placomus, Primnoa resedaeformis*).

5. Buhl-Mortensen and Mortensen (2004) documented 17 crustacean species associated with cold-water gorgonian corals off Canada, most of which were using the habitat as protection from predators. Some species were obligate to the corals. This study suggests corals provide habitat for commercial fish prey.
6. Husebo et al. (2002) found that the largest catches of redfish (*Sebastes marinus*) were made by long-line fleets set in deep-sea coral reef habitats. Fish caught in coral habitats tended to be larger in size than in non-coral habitats. Reasons given for the associations were feeding and physical structure of coral.
7. Christiansen and Lutter (2003) cite evidence that commercially caught demersal and pelagic fish species, mainly redfish, saithe, ling and tusk, have a higher abundance near deep-sea coral reefs and patches.
8. Costello et al. (2003) found that fish species and abundance was greater on the deep-sea coral habitat than surrounding seabed; 69% of species and 79% of abundance was associated with the reefs.
9. Koenig et al. (2003) state that important predatory fish species have been seen aggregating around the larger structures of *Oculina* sp. deep-sea corals off Florida and that small fish have taken up residence inside the modules.
10. Scott and Risk (2003) found many fish associated with *Primnoa* which are not common in areas where coral is absent. The authors state that deep-sea corals off Canada are being rapidly depleted by bottom trawling, which in turn appears to have an impact on fish stocks.
11. Sulak et al. (2003) listed economically important fish species observed in deep-sea coral habitat, several of which were restricted to this habitat. The authors also found several poorly known fish species associated with deep-sea corals.
12. Brodeur (2001) documented Pacific Ocean perch using sea whip forest habitat in the Pribilof Canyon in the Bering Sea as resting areas.

Hexactinellid sponges and demosponges have not received the same level of attention as corals. However, sponges are a diverse group of large, slow-growing seafloor animals that provide habitat for fish and invertebrates on the U.S. West Coast. Reef-forming glass sponges in particular are considered ‘foundation species’ in that through modification, maintenance and creation of a habitat they exert a disproportionately large influence on the structure of the associated biological community (Jones et al., 1997, Dayton et al. 1975). The marine reef-forming foundation species, which include both glass sponges and corals, reduce both physical and biological stresses within a semi-closed environment, limit the intensity of bottom boundary currents, modify the sedimentation regime, reduce biological competition and predation, increase or decrease the bacterial cell counts, and in some cases, change the chemistry of the near-bottom seawater, particularly the dissolved oxygen levels. Studies have demonstrated that glass sponge reefs produce a biological environment of richness, high individual abundance, and diversity of megafaunal groups (e.g., Cook 2005).

Like corals, the new and complex habitat created by glass sponges extends beyond the areas with live individuals to regions of the reef with dead sponges and areas adjacent to the reefs (Cook 2005). In British Columbia sponge reefs for example, sponge skeletons provide a variety of physical niches that support a varied diversity of organisms such as crabs, shrimp, prawns, krill, squat lobsters and juvenile rockfish (Conway et al. 2005; Whitney et al. 2005; Leys et al. 2004; Cook 2005). Several studies have documented the importance of sponges as fish habitat:

1. Freese and Wing (2003) documented that *Aphrocallistes* sponges provide habitat for juvenile red rockfish in the Gulf of Alaska. The authors state that the fish observed in the study benefited from the sponges through predator avoidance and that bottom trawl damage to sponge communities would be expected to have a negative impact on juvenile red rockfish survival rates.
2. Eastman and Eakin (1999) documented that fishes of the genus *Artedidraco* are associated with sponge beds in the Ross Sea of Antarctica.
3. Tokranov (1998) described the association of the sponge sculpin (*Thyriscus anoplus*) with sponge beds in the northern Kuril Islands.
4. Konecki and Targett (1989) found that cod icefish (*Lepidonotothen larseni*) lay their eggs on the biogenic substrate provided by the spongocoel of the hexactinellid sponge *Rossella nuda* off Antarctica. The authors state that glass sponges serve as important nesting and refuge sites for Antarctic fishes and that destruction of sponge communities by bottom trawling could have an adverse impact of the fish ecology of the region.
5. Moreno (1980) and Daniels (1978) documented several species of fishes known to utilize sponges as spawning and nesting sites and for predator avoidance.
6. Munehara (1991) established that silverspotted sculpin (*Blepsias cirrhosus*) use the sponge *Mycale adhaerens* as a spawning bed and that the eggs benefit from the association through predator avoidance, oxygen supply and the antibacterial and antifungal properties of the sponges.
7. Herrnkind and Butler (1994) identified sponges as "benthic juvenile shelter" for spiny lobster in Florida Bay, documenting them as among the most productive sites for survival of postlarvae.
8. Rocha et al. (2000) found that sponges are habitat 'oases' in a desert of rubble and flat rocky bottoms in Brazil. The study identified fish associations with shallow and deepwater sponges, including several obligate associations and four endemic species of fishes.
9. Cook (2005) and Cook et al. (2008) documented that glass sponge reefs in the Queen Charlotte Basin, British Columbia support diverse megafaunal communities distinct from surrounding habitats and act as juvenile nursery habitat for rockfish (*Sebastes* sp.).

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 (2006) found that 85% of the economically important fish species observed on dive transects were associated with corals and other emergent epifauna. 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. In a study of deep water *Oculina* reefs along eastern Florida, Reed (2002) noted extensive areas of *Oculina* rubble as the result, in part, 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 have a positive impact on the stocks by increasing the amount of protective cover available to slope rockfish and increasing survival of juvenile fish (NMFS 2005a).

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 (NMFS 2005b).

Longevity and recovery rates

It is clear that corals and sponges have growth rates on the order of millimeters per year, living to be hundreds to thousands of years old. The large glass sponges found off the coast of British Columbia have been age dated to be 220 years old, and the average age based on current knowledge of growth rates is 35 years (Leys and Lauzon 1998). The largest of the mounds formed by these sponges has been estimated at 9000 years old (Jamieson and Chew 2002), although evidence of iceberg gouges in the sponge reefs at the Grays Canyon site indicate these may date back to the last glacial period, 125,000 years ago (Bjorklund et al. 2008). Studies to date indicate the extreme longevity and slow recovery rates for many of these species, including:

1. Andrews et al. (2003) found growth rates of 1.74 cm/yr for *Primnoa*, 1 cm/yr for *Corallium*, and ages of 30 to over 200 years for deep-sea coral species of Davidson Seamount.
2. Cordes et al. (2001) found ages of 25-30 years for the deep-sea coral *Anthomastus ritteri* in California's Monterey Bay, noting that the results agree with the general notion that growth rates are reduced and longevity increased in deep-sea species.
3. Roark et al. (2003) sampled corals from Hawaii and the Gulf of Alaska and dated a living *Gerardia* sp. to be 2700 years old and a black coral to be 2200 yrs old, using radiocarbon dating techniques.
4. Leys and Lauzon (1998) found large deep water Hexactinellid sponges to be 220 years old with average growth rates of 1.98 cm/yr.
5. Probert et al. (1997) found recovery times greater than 100 years for deep-sea corals.
6. Jones (1992) review of trawl impact literature revealed that recovery time for deep-sea benthos with little natural disturbance is on the scale of decades.
7. Koslow et al. (2000) discusses the higher longevity and vulnerability of deepwater

ecosystems to trawling, particularly on seamounts, which are known to have benthic fauna (i.e. corals) with high levels of endemism.
8. Risk et al. (2002) found ages of over 300 years for *Primnoa resedaeformis*.
9. Heikoop et al. (2002) found that deep-sea corals (*Primnoa*) in Alaska and elsewhere have lifespans of several centuries. The authors describe the potential of these corals to contain extended records of surface productivity, deep ocean temperature and chemistry that are of value to climatologists and fisheries managers.
10. Reed (2002) noted extensive areas of *Oculina* rubble as the result, in part, of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990. Coral growth rates averaged 16.1 mm/yr.

In addition, the estimated ages of biogenic habitats may underestimate their actual recovery time because it omits the time necessary for recolonization. If corals and sponges take a long time to settle and begin growth in damaged areas, overall recovery is much longer. Evidence for long recolonization times is presented in Koenig et al. (2003), which found no evidence of recolonization of *Oculina* deep-sea corals into denuded areas and offered two explanations: continued trawling and the fact that rubble areas do not provide suitable substrate for planular settlement of coral larvae. Additionally, the Krieger (2002) study cited in NMFS (2005a) found no evidence for recolonization of corals seven years after trawling.

b. Geological characteristics (e.g., substrate type, grain size, relief, morphology, depth).

Juan De Fuca Canyon: The mean depths of the sites surveyed ranged from 89 to 313m, with the majority of sites in the 200-300m range. Roughly 6 percent of the seafloor in the sanctuary is hard substrate with the potential to host biologically structured habitat (OCNMS 2008). Table 2 provides a summary of the mean depth, substrate types, and biogenic habitat discovered at each site, provided in more detail in Brancato et al (2007).

Grays Canyon: The Grays Canyon area proposed for expanded protections has very similar geological, physical oceanographic, and chemical characteristics to the areas of sponge reef in British Columbia. The seafloor morphology consists of elevated banks or pre-existing ridges, rising above the near-bottom transport of muddy sediment at the continental margin at 150-200m. Sediment type is coarse/immobile sediment stable against transport by nearbottom currents for hundreds to thousands of years, such as glacial till/diamictite; also a small amount of continuous clay sedimentation.

c. Physical oceanographic characteristics (e.g., temperature, salinity, circulation, waves).

Juan De Fuca Canyon: Mean temperature and salinity varied little between sites, with the shallower sites being predictably slightly warmer, and with slightly higher dissolved oxygen levels (DO) than the deeper sites. Temperature ranged from 6.5 to 7.9 C, with shallower sites (89-131m depth) about one half degree warmer than deeper sites. Salinity ranged from 32.0 to 34.0 psu, except at survey sites 30 and 40, at which the mean salinity was low, measuring 30.1 and 26.7 psu, respectively (Brancato et al. 2007). See Table 3 for the mean temperature, salinity and current speed values for each site.

Grays Canyon: Similar to the British Columbia reef areas. Bottom currents in the range of 10 to 25 cm/second. Sediment content of < 7 mg/L and >35% transmissivity (Johnson 2006).

d. Chemical characteristics (e.g., nutrients, dissolved oxygen).

Juan De Fuca Canyon: Mean DO values also varied little between the dive sites, ranging from 2.2 to 4.6 mg/L (all sites included) and from 2.2 to 3.4 mg/L with the two shallowest sites excluded (Brancato et al. 2007). See Table 3 for the mean DO value for each site.

Grays Canyon: Similar to British Columbia Reef sites. A minimum of 43 to 70 µmol/L of dissolved silica, and a minimum of 62 to 152 µmol/L DO (Johnson 2006).

e. Socioeconomic characteristics (see 7.e below).

The proposed closures have been designed to protect coral and sponge habitat while continuing to allow fishing in areas where non-confidential trawl track and trawl catch data indicate areas of high economic value. In the long term, biogenic habitat protection would likely maintain or improve fishing opportunities for other gear types.

Table 2: Geological and Biogenic Habitat Characteristics of the OCNMS dive sites, 2006. Of the complete universe of 55 sites, the 20 sites below were preselected randomly before the cruise (Brancato et al. 2007).

Survey Site	Inside Olympic2	Depth (m)	Substrate	Biogenic habitat
0	y	313	cobble, pebbles, scattered boulders	*L. pertusa, Stylaster sp., P. arborea pacifica, Swiftia sp.*
1	y	249	rock outcrop, boulders, cobble and clay, and a steep, crumbly wall with benches.	*P. arborea pacifica, Plumarella longispina, Primnoa pacifica, Swiftia sp., Muriceides, Desmophyllum dianthus, Stylaster sp.*
2	y	276	glacial erratic more than 8m tall, sand, clay, occasional boulder.	*L. pertusa, P. pacifica, D. dianthus*
3	y	245	low relief site, muddy bottom, occasional cobble, boulders, rocky ledge forming a small wall.	*Swiftia pacifica, Swiftia beringi, P. arborea pacifica*
6	n	232	long rock wall, steep on its eastern side, occasional boulders	*L. pertusa rubble, L. pertusa, five gorgonian coral species incl. two Swiftia species, D. dianthus*
7	n	193	small wall of clay pavement, riddled with burrows, hard rock outcrop	*Cup corals, Swiftia sp.*
11	y	280	sand, occasional boulder	*L. pertusa (dead), D. dianthus (dead), P. arborea pacifica (broken), P. longispina, P. pacifica, Stylaster sp*
12	n	289	no hard substrate, soft sediment pockets, silt, gravel	*no corals*
13	y	247	cobble, boulders, silty seafloor, small rock outcrop	*four gorgonian corals, D. dianthus, Stylaster sp., Farrea occa (sponge)*
18	n	131	boulder field, cobble, trawl tracks	*one coral species, sponge*
20	n	103	boulders, cobble, sand waves	*sea pens, sponges and corals (bycatch)*
30	y	173	pebble, cobble, boulders	*sponges and corals (bycatch), P. arborea pacifica, Swiftia sp., P. longispina, hydrocoral, Paragorgia (dead, damaged)*
31	y	205	pebble, cobble, boulders, mud	*sea pens, hydrocorals, P. arborea pacifica, P. longispina*
40	y	201	muddy mixed, pebble, gravel, occasional boulders	*P. arborea pacifica, Swiftia sp., S. beringi*
45	n	89	cobble, boulders, rock outcrop	*S. venustus, B. elegans, Swiftia spauldingi, hydroids, bryozoan Myriozoum*
Sites Attempted But Not Completed				
8	y	290		
10	y	261		*Primnoa pacifica*
17	n	107		
44	n	121		
49	n	318		

Table 3: Physical Oceanography Characteristics of the OCNMS dive sites, 2006 (Brancato et al. 2007)

Survey Site	DO (mg/L)	Salinity (psu)	Temp (ºC)	Typical Current Speed
0	3.0	32.0	6.9	3/4 knot to 2 knots
1	3.3	33.9	6.8	<0.75 knots
2	ND1	ND	ND	<1 knot
3	3.0	33.2	7.0	2 to 2.5 knots
6	2.9	33.8	6.9	<0.5 knots
7	3.4	33.8	7.2	<0.5 knots
11	2.9	33.6	6.5	1.25 knots
12	2.2	34.0	6.5	<0.5 knots
13	2.6	33.7	6.7	<0.5 knots
18	4.5	33.7	7.7	1 to 1.25 knots
20	ND	ND	ND	negligible
30	3.0	30.1	6.8	<1 knot
31	3.4	33.9	6.7	<0.5 knots
40	3.0	26.7	6.8	0.2 knots
45	4.6	33.3	7.9	0.5 to 3 knots
Sites Attempted But Not Completed				
8	ND	ND	ND	
10	2.5	34.0	6.6	
17	ND	ND	ND	
44	3.7	33.8	7.2	
49	2.7	34.0	6.5	

7. A discussion of the following topics as relevant to the proposed actions:

a. The importance of habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity.

See 6.a above.

b. The presence and location of important habitat (as defined in 7.a above).

See 6.a above.

c. The presence and location of habitat that is vulnerable to the effects of fishing and other activities as relevant.

The literature documenting the effects of bottom trawling, dredging and other fishing on seafloor habitat is substantial, consisting of well over 100 studies globally (Johnson 2002 in NMFS 2005b, Appendix C). There is general scientific consensus that bottom trawling has wide-ranging effects on habitats and ecosystems. According to the National Research Council (2002)

Report on the Effects of Trawling and Dredging on Seafloor Habitat, these adverse impacts include:

- changes in physical habitat of ecosystems
- changes in biologic structure of ecosystems
- reductions in benthic habitat complexity
- changes in availability of organic matter for microbial food webs
- changes in species composition
- reductions in biodiversity

Bottom trawling is the leading, most widespread cause of reduced habitat complexity in the major fishing grounds along the North American continental shelf. As trawl gear can crush, displace, expose and bury marine life on the sea floor, habitats that are trawled are far more likely to have reduced overall species diversity. Those organisms remaining after extensive periods of trawling tend to be "comprised of large numbers of a few opportunistic species" (Norse and Watling 1999). That study found that the extent of disruption to habitat complexity is dependent upon how long the area has to recover between trawls, how extensive the damage is from the trawling gear, and whether the habitat is constituted primarily of quick-recovering, short-lived species or of slow growing, long-lived species.

Ivory tree coral (*L. pertusa*) rubble in OCNMS

The National Research Council (2002) report concluded that the impacts of trawling can lead to measurable changes in benthic habitats over time, with the greatest impact on those communities which are ecologically most complex. Extended trawling over the same habitat can lead to "a shift from communities dominated by species with relatively large adult body size towards dominance by high abundances of small-bodied organisms." More significantly, areas of intense trawling activities have the potential to be permanently affected and will lead to the emergence of short-lived organisms which are "readapted to conditions of frequent physical disturbance" (NRC 2002).

Biogenic habitat, such as corals and glass sponge reefs are particularly vulnerable to bottom trawling (Conway et al. 1991; Cook 2005; N. Lowrie, pers. comm. 2005: Whitmire and Clarke 2007). Many studies corroborate this conclusion, for example:

1. Hyland et al. (2004) documented bottom trawl marks in the vicinity of coral and sponge beds in the OCNMS and observed a large proportion of dead or broken corals.
2. Engel and Kvitek (1998) compared heavily trawled and lightly trawled areas in otherwise similar regions off Big Sur, CA, finding lower epifaunal invertebrate densities at the more heavily trawled site. The authors conclude that intensive trawling significantly decreased physical habitat heterogeneity and biodiversity.
3. Grehan et al. (2003) found evidence that deep-sea corals are being destroyed by trawling, as evidenced by trawl scars, flattened coral rubble, barren sediment and lost trawl gear. The authors state that this provides irrefutable proof of a serious threat to the marine ecosystem caused by fishing that warrants immediate emergency measures to protect the remaining corals.
4. Conway et al. (2003) studied the environmental conditions where sponge reefs are found and discovered that like deep-sea coral reefs, many of the hexactinosan sponge reefs in British Columbia have been damaged or destroyed by the groundfish trawl fishery.
5. Hall-Spencer et al. (2002) document widespread trawling damage to cold-water coral reefs at 840-1300m depth along the West Ireland continental shelf break and at 200m depth off West Norway. The trawled coral matrix was at least 4550 years old. The authors discuss the need for urgent conservation measures to protect these corals.
6. Lundalv and Jonsson (2003) found about that 50% of investigated coral sites in the Kosterfjord area were destroyed by recent bottom trawling, while the remaining areas exhibit major signs of trawl damage.
7. Mortensen et al. (2003) found signs of fishing impact such as broken live corals, tilted corals and scattered skeletons. Broken or tilted corals were observed along 29% of the transects. A total of 4 % of the coral colonies observed were impacted.
8. Fossa et al. (2002) estimated that 30-50% of the deep-sea coral *Lophelia* reefs in Norway have been damaged by bottom trawling and stated that fishermen claim that catches are significantly lowered in areas where the reefs are damaged.
9. Koslow et al. (2001) sampled the benthic fauna of Tasmanian seamounts and found high abundance and diversity of hard and soft corals, hydroids, sponges, ophiuroids, and sea stars, a large fraction of which were new to science. This study also found that heavy trawling has completely removed the reef aggregations.
10. Wassenberg et al. (2002) documented direct removal of sponges caused by trawling, accompanied by long-term changes in species composition over time.
11. Ardizzone and Pelusi (1983) and Ardizzone et al. (2000) found that bottom trawling reduced the quality and quantity of *Posidonia oceania* beds, a biogenic habitat in the Mediterranean Sea.
12. Hall-Spencer and Moore (2000) found a 70% reduction in maerl thalli habitats, which

have important ecological functions, with no recovery after four years.

13. Kaiser et al. (1996) conducted a multivariate analysis showing that both beam trawling and dredging reduce the abundance of most epifaunal species in the Irish Sea.
14. Kaiser et al. (2000a) found that chronic fishing has caused a shift from communities dominated by relatively sessile, emergent, high biomass species to communities dominated by infaunal, smaller-bodied fauna. Removal of emergent fauna has thus degraded the topographic complexity of seabed habitats in areas of high fishing effort. The authors note that communities within these areas currently may be in an alternative stable state.
15. Ault et al. (1997) found conspicuous long-term damage to sponges and soft corals after one pass of a trawl and that the sponge *Ircina felix* and corals of the genus *Pseudoplexaura* appeared to be the taxa most vulnerable to breakage or dislodgement by trawling.
16. Collie et al. (1996), Collie et al. (1997), and Collie et al. (2000) found significantly reduced abundance of colonial epifaunal species that provide complex habitat for shrimp, polychaetes, brittle stars, and small fish at sites disturbed by bottom fishing in Georges Bank. These studies found that many species whose abundances were reduced were also prey for commercial fish.
17. DeAlteris et al. (2000) discuss physical impacts and biological alterations in community structure caused by trawling in New England and recommend closure areas to reduce the impact of mobile fishing gear on habitat and biodiversity.
18. Magorrian (1995) found otter trawling to remove emergent epifauna and reduce the structural complexity of mussel beds in Strangford Lough, and recommended marine reserves as a management tool.
19. McAllister and Spiller (1994) found that trawling and dredging have major impacts on marine habitats by removing protruding invertebrate animal life including sea anemones, sponges, sea squirts, crinoids and many others which provide shelter and food sources for juvenile fish and shellfish. Specific trawling effects in the study included shearing off higher hummocks, filling in low spots, changing the configuration of the bottom, removing areas more exposed to or protected from the current, exposing shellfish, worms and other sediment dwelling species to predation and stirring up clouds of mud and other sediment that plug gills and similar structures of filter feeders. The authors recommend closures, control areas and conversions to less damaging gear types.
20. Norse and Watling (1999) state that trawling damages refuges from predation and feeding places for demersal fish, which are correlated with species diversity and post settlement survivorship of some commercial species.
21. Pitcher et al. (2000) found that total annual removal of benthic fauna ranged from very low to over 80% in areas of highest trawl intensity in Australia's Great Barrier Reef. These studies found that highly vulnerable populations of epifaunal species may be depleted by about 55% overall and that there will be a substantial alteration in most trawled grids with a shift to less vulnerable species.
22. Reed (2002), in a study of deep water *Oculina* reefs along eastern Florida, noted extensive areas of *Oculina* rubble and major declines in commercial fish populations in the reefs from 1970-1990.
23. Rumohr et al. (1994) found reductions in abundance of epifauna and absence of inner

structures (feeding burrows, living chambers, tubes) in areas impacted by trawling in the German Bight.

24. Bavestrello et al. (1997) found fishing damage to gorgonian corals in the Ligurian Sea and slow recolonization and recovery rates for these corals, and recommended special protection for these corals as a Natural Marine Park.
25. Stone and Malecha (2003) state that "gardens of corals, sponges, and other sessile invertebrates" were similar in structural complexity to tropical coral reefs with which they shared several important characteristics including complex vertical relief and high taxonomic diversity. The authors note the particular sensitivity of these habitats to disturbance and observed anthropogenic disturbance to corals.
26. Wheeler et al. (2003) found broken coral rubble and dead coral in areas of higher trawl intensity, whereas untrawled areas had a much higher abundance of undisturbed upright coral colonies.
27. Van Santbrink and Bergman (1994) documented 70% mortality to anthozoans after two passes of a beam trawl in the southern North Sea.
28. The NMFS Alaska Fisheries Science Center website (NMFS 2004) shows several underwater video clips taken with a Remotely Operated Vehicle. Clip 9 shows heavily trawled coral habitat containing "broken-up coral debris in this area -- heavily damaged" (http://www.afsc.noaa.gov/race/media/videos/vids_habitat.htm).
29. Anderson et al. (2003) documented high levels of coral and sponge bycatch in the New Zealand orange roughy trawl fishery.
30. MacDonald et al. (1996) made several estimates of habitat sensitivities to physical disturbance, concluding that fragile, slow recruiting animals are the most susceptible to disturbance.

The effects of fishing gears other than bottom trawling on seafloor habitat are not as well documented in the literature (NMFS 2005b, Appendix C). Bottom (set) longlines and gillnets can affect structure-forming biogenic habitat through direct contact with weights or anchors and by hooking or otherwise catching corals and sponges in the line itself (NMFS 2005a, Appendix B). Observers in Alaska have recorded anemones, corals, sea pens, sea whips, and sponges being brought to the surface hooked on longline gear, indicating that the lines move some distance across the seafloor and can affect benthic organisms (NMFS 2005a, Appendix B). These activities result in corals that are broken, tipped over or dragged along the seafloor (71 Fed. Reg. 36,694, 36,697 (June 28, 2006)). Photographic evidence from the OCNMS dives and elsewhere indicates lost longline gear caught on dead corals (Brancato et al. 2007), a phenomenon also documented with longlines and gillnets elsewhere in the world (e.g., Fossa 2004, Sulak 2003). Pots and traps can also disturb coral and sponge habitat by direct contact as the pot is dropped to the seafloor or when the pot is dragged across the seafloor by bad weather, currents or hauling (NMFS 2005a, Appendix B).

Longline gear wrapped around the stalk of a dead gorgonian coral in OCNMS

d. The presence and location of unique, rare, or threatened habitat.

See 6.a above.

e. The socioeconomic and management-related effects of proposed actions, including changes in the location and intensity of bottom contact fishing effort, the displacement or loss of revenue from fishing, and social and economic effects to fishing communities attributable to the location and extent of closed areas. Applicants are encouraged to collaborate with socioeconomic experts as well as affected fishermen and communities in order to identify socioeconomic costs and benefits.

As noted in 4.b and 6.e above, we have strived to ensure this proposal will protect coral and sponge habitat while continuing to allow fishing in areas that generate substantial economic revenue. Pertinent datasets available to us were the 2009-2010 RCA schedules, 2005 trawl tracks (set and haulout points) from logbooks, and 2005 trawl catch data summarized by 10x10 minute block from fish tickets. These latter two datasets were obtained from PacFIN in 2007. These three datasets provide an indication of the important trawl grounds before the original

EFH closures went into place in 2006 and the trawl grounds now inside and outside the groundfish trawl RCA.

Both habitat conservation areas were designed to avoid areas of heavy bottom trawling. Further, the proposed modification at Juan De Fuca Canyon falls almost entirely within the current groundfish trawl RCA. Thus, we expect there to be little short term economic impact to the commercial bottom trawl fleet by implementation of both habitat conservation areas, as the areas are for the most part currently untrawled. Accordingly, there should be little economic impact to fishing communities reliant on the catch from the bottom trawl fleet.

Due to confidentiality issues, the data we used in our analysis to evaluate the economic value of groundfish trawl areas may be incomplete. We have requested updated groundfish trawl data from PacFin so that we can conduct further economic analyses using the most recent non-confidential data available to the public. This additional analysis of fishing data may elucidate a more optimal design. In addition, we expect further analysis by the PFMC and NMFS to be able to provide a more complete picture of any social and economic impacts associated with these proposed habitat protection areas as the interim process moves forward.

Again, we recognize that the treaty rights of Pacific Northwest Tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection. In the future, we believe biogenic habitat protection will likely improve long-term sustainable fishing opportunities for other gear types.

References

Anderson, O. F. and M. R. Clark (2003). Analysis of bycatch in the fishery for orange roughy, *Hoplostethus atlanticus*, on the South Tasman Rise. Marine Freshwater Research 54: 643-652.

Andrews, A. H., L. A. Kerr, G. M. Cailliet and K. H. Coale (2003). Determining the age and growth of three species of deep-sea coral from the Davidson Seamount off Central California. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Ardizzone, G. D. and P. Pelusi (1983). Regression of a Tyrrhenian *Posidonia oceanica* prairie exposed to nearshore trawling. Rapports et Proces-Verbaux des Reunions Conseil International pour l'Exploration Scientifique de la Mer Mediterranee. 28(3): 175-177.

Ardizzone, G. D., P. Tucci, A. Somaschini and A. Belluscio (2000). Is bottom trawling partly responsible for the regression of *Posidonia oceanica* meadows in the Mediterranean Sea? Effects of fishing on nontarget species and habitats: biological, conservation and socioeconomic issues. Oxford, UK., Blackwell Science Ltd.: 37-46.

Ault, J., J. Serafy, D. DiResta and J. Dandelski (1997). Impacts of commercial fishing on key habitats within Biscayne National Park. Annual Report. Cooperative Agreement No. CA-5250-6-9018: iii + 80 p.

Bavestrello, G., C. Cerrano, D. Zanzi and R. CattaneoVietti (1997). Damage by fishing activities in the Gorgonian coral *Paramuricea clavata* in the Ligurian Sea. Aquatic Conservation-Marine And Freshwater Ecosystems 7(3): 253-262.

Beaulieu, S. (2001). Life on glass houses: sponge stalk communities in the deep-sea. Marine Biology 138(4): 803-817.

Bjorklund, T., Crandall, R., Johnson, P., Lilley, M., McGinnis, T. (2008). Sponge Cruise (2008) presentation . University of Washington and Washington SeaGrant. Available at: http://www.wsg.washington.edu/research/ecohealth/ecosystem/glass_sponge/WASG2008CruiseRep.pdf

Brancato, M.S., C. E. Bowlby, J. Hyland, S.S. Intelmann, and K. Brenkman. (2007). Observations of Deep Coral and Sponge Assemblages in Olympic Coast National Marine Sanctuary, Washington. Cruise Report: NOAA Ship McArthur II Cruise AR06-06/07. Marine Sanctuaries Conservation Series NMSP-07-03. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 48 pp.

Brodeur, R. (2001). Habitat-specific distribution of Pacific ocean perch (*Sebastes alutus*) in Pribilof Canyon, Bering Sea. Continental Shelf Research 21(3): 207-224.

Buhl-Mortensen, L. and P. Mortensen (2004). Crustaceans associated with the deep-water gorgonian corals *Paragorgia arborea* (L., 1758) and *Primnoa resedaeformis* (Gunn., 1763). Journal Of Natural History 38(10): 1233-1247.

Buhl-Mortensen, L. and P. B. Mortensen (2003). Distribution and diversity of species associated with deep-sea gorgonian corals off Atlantic Canada. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Christiansen, S. and S. Lutter (2003). Is there any hope for the conservation of cold-water corals in Europe? Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Collie, J. S., G. A. Escanero, L. Hunke and P. C. Valentine (1996). Scallop dredging on Georges Bank: photographic evaluation of effects on benthic epifauna. ICES C.M. 1996/Mini:9.: 14 p.

Collie, J. S., G. A. Escanero and P. C. Valentine (1997). Effects of bottom fishing on the benthic megafauna of Georges Bank. Marine Ecology Progress Series 155: 159-172.

Collie, J. S., S. J. Hall, M. J. Kaiser and I. R. Poiner (2000). A quantitative analysis of fishing impacts on shelf-sea benthos. Journal of Animal Ecology v.69(no.5): p.785-798.

Collie, J. S. E., Galo A.; Valentine, Page C. (2000). Photographic evaluation of the impacts of bottom fishing on benthic epifauna. ICES Journal of Marine Science v.57(no.4): p.987-1001.

Conway, K. W., J. V. Barrie, W. C. Austin, and J. L. Luternauer. (1991). Holocene sponge bioherms on the Western Canadian continental shelf. Continental Shelf Research 11: 771-790.

Conway, K. W., M. Krautter, J. V. Barrie, and M. Neuweiler. (2001). Hexactinellid sponge reefs on the Canadian continental shelf: A unique "living fossil". Geoscience Canada 28: 71-78.

Conway, K. W., M. Krautter, J. V. Barrie, F. Whitney, R. E. Thomson, G. Mungov and M. Bertram (2003). Sponge reefs in the Queen Charlotte Basin, Canada: Oceanographic and geological controls on growth and development. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Conway, K. W., J. V. Barrie, and M. Krautter. (2004). Modern siliceous sponge reefs in a turbid, siliciclastic setting: Fraser River delta, British Columbia, Canada. N. Jb. Geol. Palaont. Mh. 2004: 335-350.

Conway, K., M. Krautter, J. V. Barrie, F. Whitney, R. E. Thomson, H. Reiswig, H. Lehnert, G. Mongov, and M. Bertram. (2005). Sponge reefs in the Queen Charlotte Basin, Canada: controls on distribution, growth and development. Pages 601-617 in A. Freiwald and J. M. Roberts, eds. Cold-water Corals and Ecosystems. Springer-Verlag, Berlin Heidelberg.

Conway, K. W., J. V. Barrie, and M. Krautter. (2005). Geomorphology of unique reefs on the western Canadian shelf: sponge reefs mapped by multibeam bathymetry. Geo-Marine Letters, in press (available on-line).

Cook, S.E. (2005). Ecology of the Hexactinellid Sponge Reefs on the Western Canadian Continental Shelf, MS thesis, Dept of Biology, University of Victoria, Victoria, BC, 2005.

Cook, S.E., K. W. Conway, and B. Burd. (2008). Status of the glass sponge reefs in the Georgia Basin. Marine Environmental Research 66: S80–S86.

Cordes, E., J. Nybakken and G. VanDykhuizen (2001). Reproduction and growth of *Anthomastus ritteri* (Octocorallia : Alcyonacea) from Monterey Bay, California, USA. Marine Biology 138(3): 491-501.

Dayton, P. K., G. A. Robilliard, R. T. Paine, and L. B. Dayton. (1974). Biological accommodation in the benthic community at McMurdo Sound, Antarctica. Ecological Monographs 44: 105-128.

DeAlteris, J. T., L. G. Skrobe and K. M. Castro (2000). Effects of mobile bottom fishing gear on biodiversity and habitat in offshore New England waters. Northeastern Naturalist v.7(no.4): p.379-394.

de Marignac, J., J. Hyland, J. Lindholm, A. DeVogelaere, W.L. Balthis, and D. Kline. (2008). A comparison of seafloor habitats and associated benthic fauna in areas open and closed to bottom trawling along the central California continental shelf. Marine Sanctuaries Conservation Series ONMS-09-02. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 44 pp.

Eastmann, J. T. and R. R. Eakin (1999). Fishes of the genus *Artedidraco* (Pisces, Artedidraconidae) from the Ross Sea, Antarctica, with the description of a new species and color morph. Antarct. Sci. 11(1): 13-22.

Else, P., L. Haldorson and K. J. Krieger (2002). Shortspine thornyhead (*Sebastolobus alascanus*) abundance and habitat associations in the Gulf of Alaska. Fisheries Bulletin 100(2): 193-199.

Engel, J. and R. Kvitek (1998). Effects of otter trawling on a benthic community in Monterey Bay National Marine Sanctuary. Conservation Biology v.12(no.6): 1204-1214.

Etnoyer, P. and L. Morgan (2003). Occurrences of habitat-forming deep-sea corals in the northeast Pacific Ocean. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Fossa, J. H., P. B. Mortensen and D. M. Furevik (2002). The deep-water coral *Lophelia pertusa* in Norwegian waters: Distribution and fishery impacts. Hydrobiologia 471(1): 1-12.

Fossa, J.H. 2004. Institute of Marine Research, Norway. At http://www.imr.no/coral/fishery_impact.php.

Freese, J. L. and B. L. Wing (2003). Juvenile red rockfish, *Sebastes* sp., associations with sponges in the Gulf of Alaska. Marine Fisheries Review 65(3): 38-42.

Grehan, A. J., V. Unnithan, A. J. Wheeler, F. X. Monteys, T. Beck, M. Wilson, J. Guinan, J. H. Hall-Spencer, A. Foubert, M. Klages and J. Thiede (2003). Evidence of major fisheries impact on cold-water corals off the Porcupine Bank, West Coast of Ireland: Implications for offshore coral conservation within the European Union. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Hall-Spencer, J. M., V. Allain and J. H. Fossa (2002). Trawling damage to Northeast Atlantic ancient coral reefs. Proceedings Of The Royal Society Of London Series B-Biological Sciences 269(1490): 507-511.

Hall-Spencer, J. M. and P. G. Moore (2000). Scallop dredging has profound, long-term impacts on maerl habitats. ICES Journal of Marine Science 57(5): 1407-1415.

Heifetz, J. (2002). Coral in Alaska: Distribution, abundance, and species associations. Hydrobiologia 471: 19-28.

Heikoop, J., D. Hickmott, M. Risk, C. Shearer and V. Atudorei (2002). Potential climate signals from the deep-sea gorgonian coral *Primnoa resedaeformis*. Hydrobiologia 471, SI: 117-124.

Henry, L. (2001). Hydroids associated with deep-sea corals in the boreal north-west Atlantic. Journal Of The Marine Biological Association Of The United Kingdom 81(1): 163-164.

Herrnkind, W. and M. Butler (1994). Settlement Of Spiny Lobster, *Panulirus-Argus* (Latreille, 1804) in Florida - Pattern Without Predictability. Crustaceana 67(1): 46-64.

Husebo, A., L. Nottestad, J. Fossa, D. Furevik and S. Jorgensen (2002). Distribution and abundance of fish in deep-sea coral habitats. Hydrobiologia 471, SI: 91-99.

Hyland, J., C. Cooksey, E. Bowlby and M. S. Brancato (2004). A pilot survey of deepwater coral/sponge assemblages and their susceptibility to fishing/harvest impacts at the Olympic Coast National Marine Sanctuary (OCNMS). Cruise Report-NOAA Ship McArthur Cruis AR-04-04:Leg 2: 23 pp.

Johnson, H. P. 2006. Glass Sponge Reef Habitat in the Pacific Northwest. University of Washington Cruise Plan for 2007.

Johnson, H. Paul, S. L. Hautala, T.A. Bjorklund, and M. R. Zarnetske. (2006). Quantifying the North Pacific Silica Plume, in press in Geochemistry, Geophysics, and Geosystems.

Jones, J. B. (1992). Environmental impact of trawling on the seabed: a review. New Zealand Journal of Marine and Freshwater Research 26(1): 59-67.

Jones, C. G., J. H. Lawton, and M. Shachak. (1997). Positive and negative effects of organisms as physical ecosystem engineers. Ecology 78: 1946-1957.

Kaiser, M. J., K. Ramsay, C. A. Richardson, F. E. Spence and A. R. Brand (2000a). Chronic fishing disturbance has changed shelf sea benthic community structure. Journal of Animal Ecology v.69(no.3): p.494-503.

Kaiser, M. J. and B. E. Spencer (1996). The effects of beam-trawl disturbance on infaunal communities in different habitats. Journal of Animal Ecology 65(3): 348-358.

Koenig, C. C., A. N. Shepard and S. Brooke (2003). Oculina Banks Restoration Project: Description and preliminary assessment. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Konecki, J. T. and T. Targett (1989). Eggs and larvae of *Nototheniops larseni* from the spongocoel of a hexactinellid sponge near Hugo Island, Antarctic Peninsula. Polar Biology 10: 197-198.

Koslow, J. A., G. W. Boechlert, D. M. Gordon, R. L. Haedrich, P. Lorance and N. Parin (2000). Continental slope and deep-sea fisheries: Implications for a fragile ecosystem. ICES Journal of Marine Science 57(3): 548-557.

Koslow, J. A., K. Gowlett-Holmes, J. K. Lowry, T. O'Hara, G. C. B. Poore and A. Williams (2001). Seamount benthic macrofauna off southern Tasmania: Community structure and impacts of trawling. Marine Ecology Progress Series 213: 111-125.

Krieger, K. J. and B. L. Wing (2002). Megafauna associations with deepwater corals (*Primnoa* spp.) in the Gulf of Alaska. Hydrobiologia v.471: p.83-90.

Leys, S. P. and N. R. J. Lauzon (1998). Hexactinellid sponge ecology: growth rates and seasonality in deep water sponges. Journal Of Experimental Marine Biology And Ecology 230(1): 111-129.

Leys, S. P., K. Wilson, C. Holeton, H. M. Reiswig, W. C. Austin, and V. Tunnicliffe. (2004). Patterns of glass sponge (Porifera, Hexactinellida) distribution in coastal waters of British Columbia, Canada. Marine Ecology Progress Series 283: 133-149.

Lundalv, T. and L. Jonsson (2003). Cold-water corals in the Skagerrak- more significant than expected but in deep peril. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

MacDonald, D. S., M. Little, N. C. Eno and K. Hiscock (1996). Disturbance of benthic species by fishing activities: A sensitivity index. Aquatic Conservation: Marine and Freshwater Ecosystems 6(4): 257-268.

Magorrian, B. H. (1995). The impact of commercial trawling on the benthos of Strangford Lough. Dissertation. i-v + 218 p.

McAllister, D. E. a. S., G. (1994). Trawling and dredging impacts on fish habitat and bycatch. Coastal Zone Canada '94, Cooperation in the Coastal Zone: Conference Proceedings, Volume 4. Coastal Zone Canada Association, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada.: 1709-1718.

MCBI and Oceana (2004). Scientists' Statement on Protecting the World's Deep-sea Coral and Sponge Ecosystems. Available online http://www.mcbi.org/what/dscstatement.htm

Malecha, P. W., R. J. Stone and J. Heifetz (2002). Living substrate in Alaska: Distribution, abundance, and species associations. Manuscript submitted at the Symposium on Effects of Fishing Activities on Benthic Habitats, Tampa, Florida, November 12-14, 2002.

Moreno, C. (1980). Observations on food and reproduction in *Trematomus bernacchi* (Pisces: Nototheniidae) from the Palmer Archipelago, Antarctica. Copeia 1980(1): 171-173.

Mortensen, P., M. Hovland, T. Brattegard and R. Farestveit (1995). Deep-Water Bioherms Of The Scleractinian Coral *Lophelia-Pertusa* (L) At 64-Degrees-N On The Norwegian Shelf - Structure And Associated Megafauna. Sarsia 80(2): 145-158.

Mortensen, P. B., L. Buhl-Mortensen, D. C. J. Gordon, G. B. J. Fader, D. L. McKeown and D. G. Fenton (2003). Evidence of fisheries damage to deep-water gorgonians in the Northeast Channel between Georges and Browns Banks, Nova Scotia. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Munehara, H. (1991). Utilization and ecological benefits of a sponge as a spawning bed by little dragon sculpin *Blepsias cirrhosus*. Jpn. J. Ichthyol. 38(2): 179-184.

NMFS (2004). Website: Resources Assessment and Conservation EngineeringField Videos--Underwater Habitat Footage, Alaska Fisheries Science Center: http://www.afsc.noaa.gov/race/media/videos/vids_habitat.htm. Access Date: April 5, 2004.

NMFS (2005a). Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. (April 2005). Available at: http://www.fakr.noaa.gov/habitat/seis/efheis.htm

NMFS (2005b). Final Groundfish Essential Fish Habitat (EFH) Environmental Impact Statement. (December 2005). Available at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/EFH-Final-EIS.cfm

Norse, E. A. and L. Watling (1999). Impacts of mobile fishing gear: the biodiversity perspective. Fish habitat: essential fish habitat and rehabilitation. P.-i. L. R. B. (ed.). Bethesda, Maryland., American Fisheries Society, Symposium 22.

NRC (2002). Effects of Trawling and Dredging on Seafloor Habitat. Washington, D.C, National Academy of Sciences, National Research Council.

Olympic Coast National Marine Sanctuary (OCNMS). 2008. Office of National Marine Sanctuaries. Olympic Coast National Marine Sanctuary Condition Report 2008. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 72 pp.

Opresko, D. M. (2005). A new species of antipatharian coral (Cnidaria: Anthozoa: Antipatharia) from the southern California Bight. Zootaxa 852: 1-10.

Pitcher, C. R., I. R. Poiner, B. J. Hill and C. Y. Burridge (2000). Implications of the effects of trawling on sessile megazoobenthos on a tropical shelf in northeastern Australia. ICES Journal of Marine Science 57(5): 1359-1368.

Probert, P. K., D. G. McKnight and S. L. Grove (1997). Benthic invertebrate bycatch from a deep-water trawl fishery, Chatham Rise, New Zealand. Aquatic Conservation: Marine and Freshwater Ecosystems 7(1): 27-40.

Reed, J. K. (2002). Deep-water *Oculina* coral reefs of Florida: Biology, impacts, and management. Hydrobiologia 471(1): 43-55.

Risk, M. H., JM ; Snow, MG ; Beukens, R (2002). Lifespans and growth patterns of two deep-sea corals: *Primnoa resedaeformis* and *Desmophyllum cristagalli*. Hydrobiologia v.471, SI: 125-131.

Roark, E. B., T. Guilderson, S. Flood-Page, R. B. Dunbar and B. L. Ingram (2003). Radiocarbon based age and growth rates estimates on deep-sea corals from the Pacific. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Rocha, L., I. Rosa and B. Feitoza (2000). Sponge-dwelling fishes of northeastern Brazil. Environmental Biology Of Fishes 59(4): 453-458.

Rumohr, H., H. Schomann and T. Kujawski (1994). Environmental impact of bottom gears on benthic fauna in the German Bight. Environmental impact of bottom gear on benthic fauna in relation to natural resources management and protection of the North Sea. NIOZ Rapport 1994-11. S. J. a. L. Pages 75-86 in de Groot, H.J. (eds.). Texel, The Netherlands.

Scott, D. B. and M. J. Risk (2003). End moraines on the upper Scotian slope: relationship to deep-sea coral and fish habitats. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Stone, R. P. and P. W. Malecha (2003). Deep-sea coral habitat in the Aleutian Islands of Alaska. Second

International Symposium on Deep-sea Corals, Erlangen, Germany.

Stone, R.P. (2006). Coral habitat in the Aleutian Islands of Alaska: depth distribution, fine-scale species associations, and fisheries interactions. Coral Reefs. Volume 25, Number 2

Sulak, K.J. 2003. Presentation to the House of Representatives Ocean Caucus and NMFS, (March 14 2003), background materials.

Sulak, K. J., S. W. Ross and M. S. Nizinski (2003). Ichthyofauna of deep-sea coral banks on the continental slope off the southeastern United States. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Tokranov, A. M. (1998). Some features of the biology of *Thyriscus anoplus* (Cottidae) in the Pacific waters of the northern Kuril Islands. J. Ichthyol. 38(3): 677-679.

Thrush, S. F., J. E. Hewitt, G. A. Funnell, V. J. Cummings, J. Ellis, D. Schultz, D. Talley and A. Norkko (2001). Fishing disturbance and marine biodiversity: the role of habitat structure in simple soft-sediment systems. Marine Ecology Progress Series 223: 277-286.

Wassenberg, T., G. Dews and D. Cook (2002). The impact of fish trawls on megabenthos (sponges) on the north-west shelf of Australia. Fish Res. 58: 141-151.

Wheeler, A. J., B. J. Bett, D. S. M. Billett, D. G. Masson and A. J. Grehan (2003). The impact of demersal trawling on NE Atlantic coral ecosystems with particular reference to the Northern Rockall Trough. Second International Symposium on Deep-sea Corals, Erlangen, Germany.

Whitmire, C.E., and M.E. Clarke (2007). State of Deep Coral Ecosystems of the U.S. Pacific Coast: California to Washington. pp. 109-154. In: SE Lumsden, Hourigan TF, Bruckner SW and Dorr G (eds.) The State of Deep-sea Coral Ecoystems of the United States. NOAA Technical Memorandum CRCP-3. Silver Spring MD 365pp.

Whitney F, Conway KW, Thomson RE, Barrie JV, Krautter M, Mungov G. 2005. Oceanographic habitat of sponge reefs on the western Canadian continental shelf. Cont Shelf Res 25:211--226.

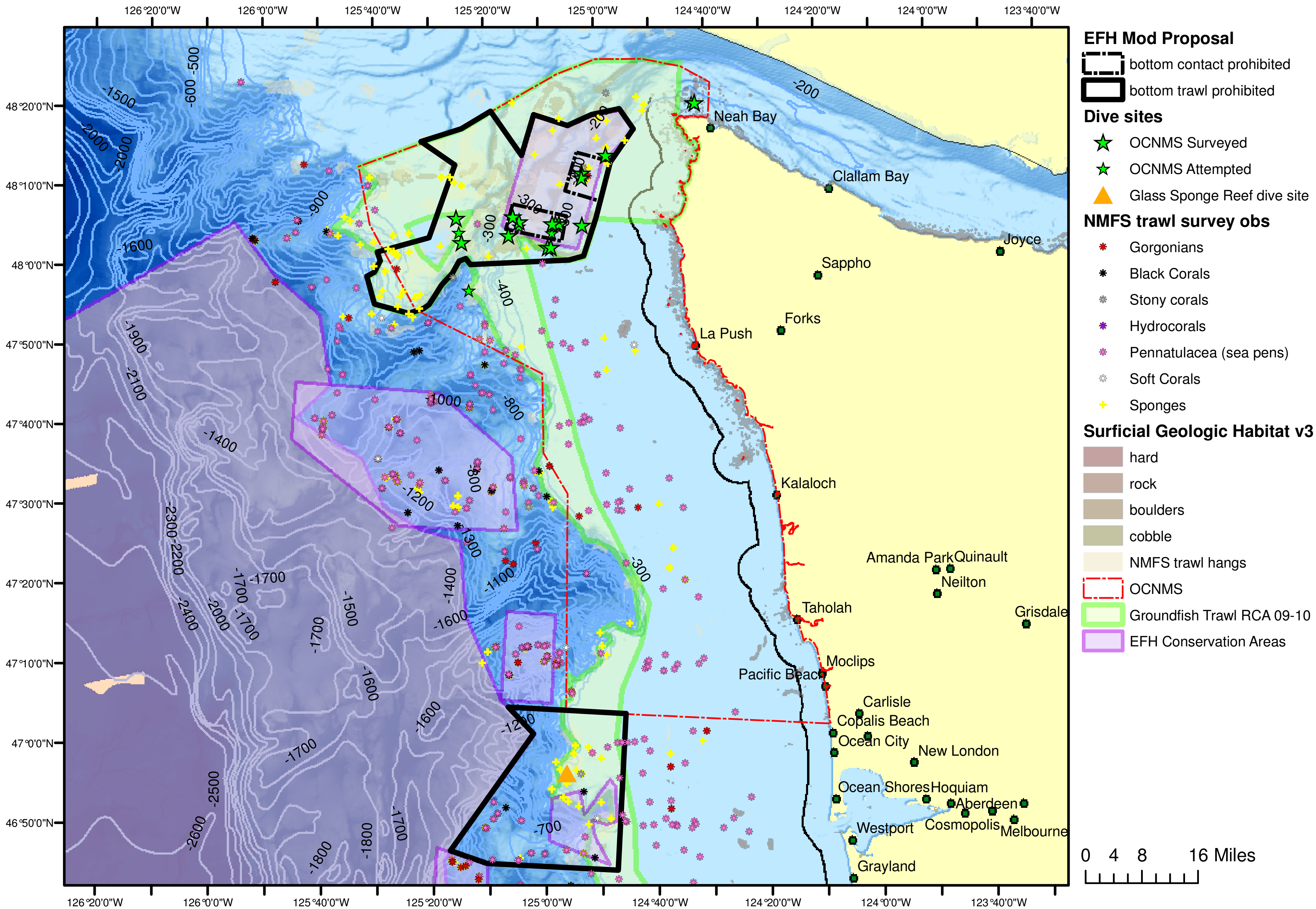
Whitney, F.A., Crawford, W.R., Harrison, P.J. (2005). Physical processes that enhance nutrient transport and primary productivity in the coastal and open ocean of the Subarctic Pacific. Deep-Sea Research II, 52 (1-2).

van Santbrink, J. W. and M. J. N. Bergman (1994). Direct effects of beam trawling on macrofauna in a soft bottom area in the southern North Sea. Environmental impact of bottom gear on benthic fauna in relation to natural resources management and protection of the North Sea. NIOZ Rapport 1994-11. S. J. a. L. Pages 147-178 in de Groot, H.J. (eds.). Texel, The Netherlands.

Yahel G., Whitney F., Reiswig H.M., Eerkes-Medrano D. I , Leys S. P. 2005. In situ feeding and metabolism of glass sponges (Hexactinellida, Porifera) studied in a deep temperate fjord, submitted, Aquatic Microbial Ecology.

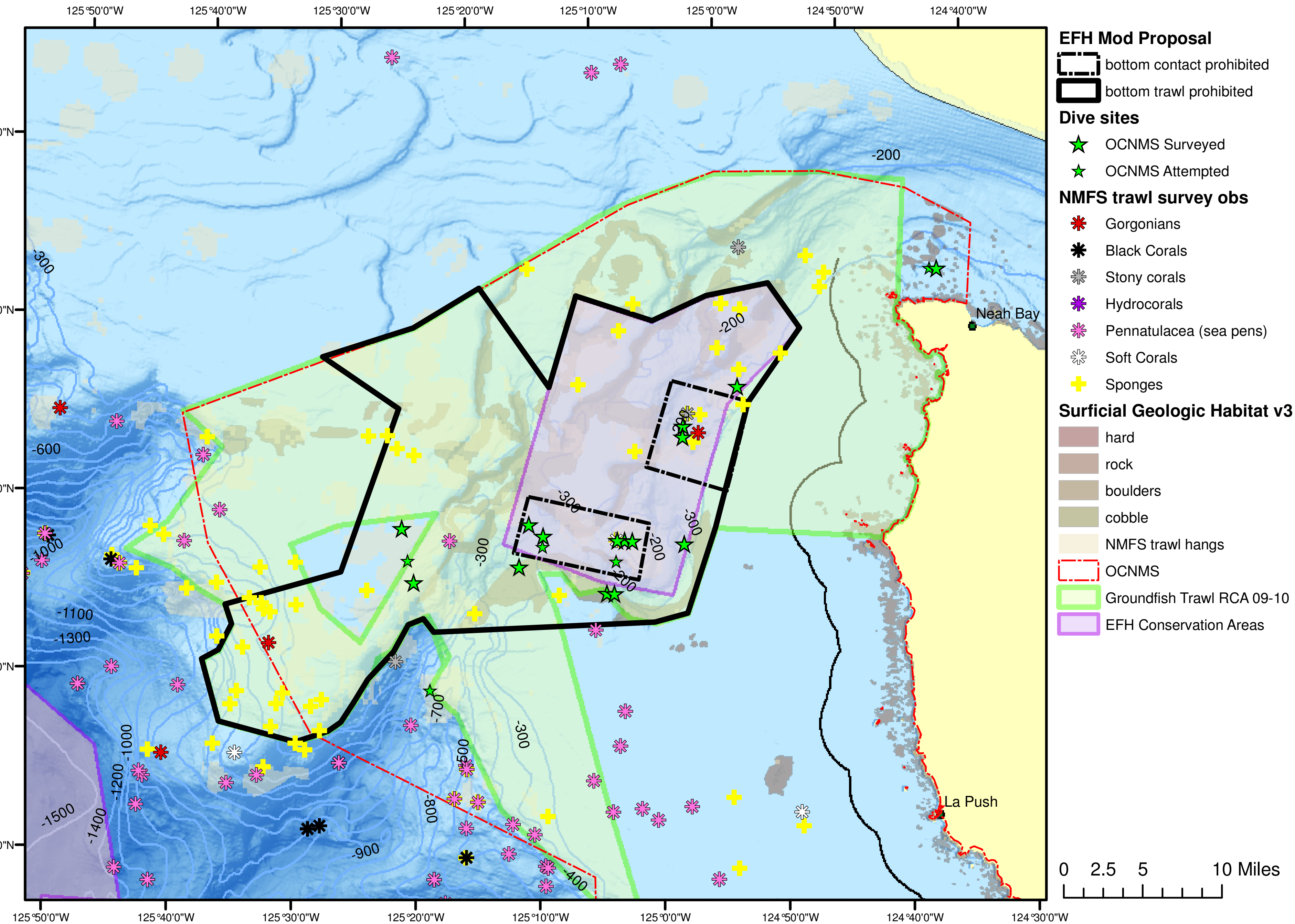
Zimmerman, M. (2003). Calculation of untrawlable areas within the boundaries of a bottom trawl survey. Canadian Journal Of Fisheries And Aquatic Sciences 60: 657-669

Figure 1: Proposed modifications to two EFH Closed Areas off the Washington Coast



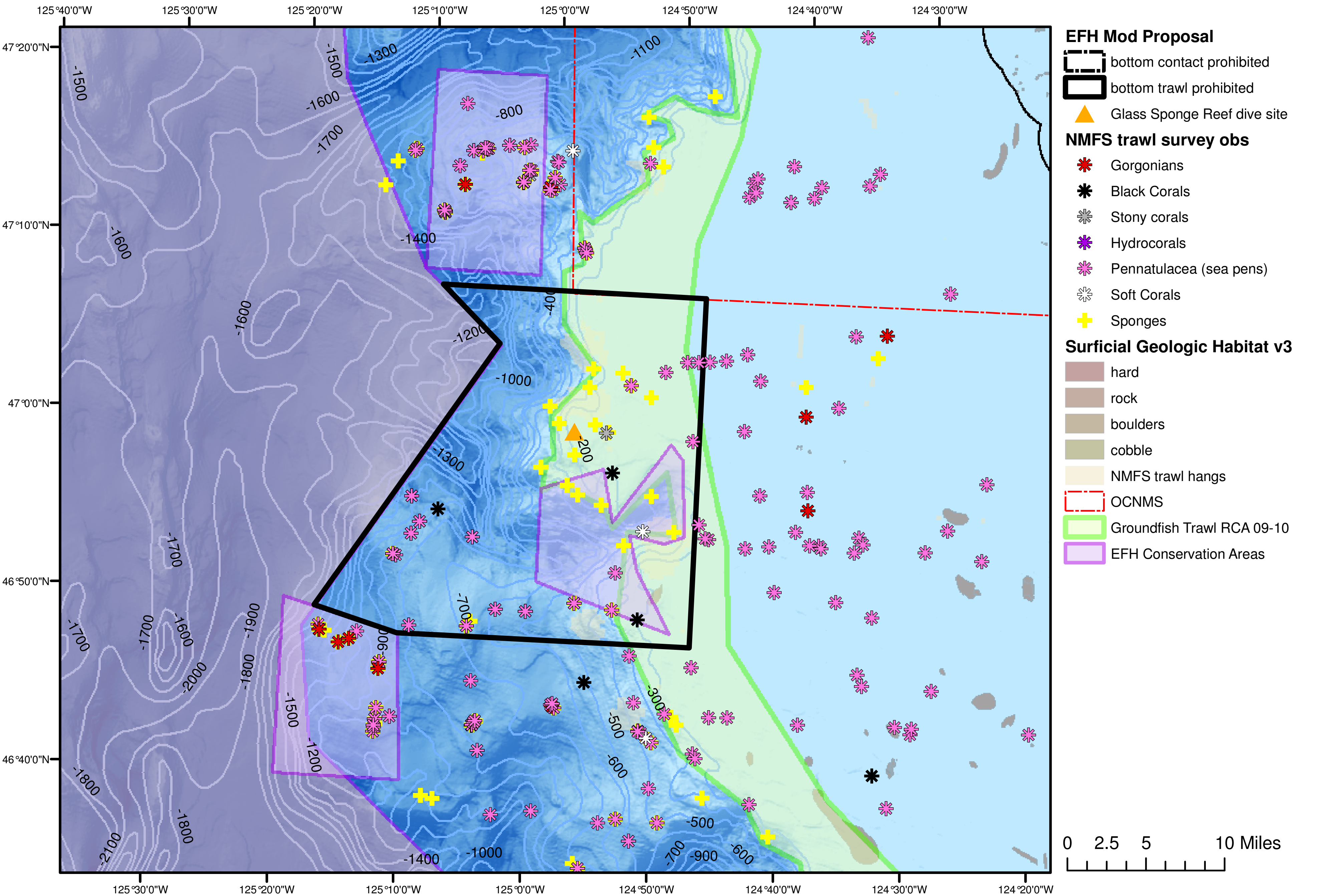
Oceana recognizes that the treaty rights of Pacific Northwest tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

Figure 2: Juan De Fuca Coral Canyons Important Ecological Area Proposed EFH Closure Modification



Oceana recognizes that the treaty rights of Pacific Northwest tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

Figure 3: Grays Canyon Sponge Reefs Important Ecological Area Proposed EFH Closure Modification



OCEANA

Oceana recognizes that the treaty rights of Pacific Northwest tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

GROUNDFISH ESSENTIAL FISH HABITATREVIEW COMMITTEE EVALUATION OF PROPOSALS TO MODIFY AREAS CLOSED TO BOTTOM TRAWL FISHING GEAR

PROPOSAL TO MODIFY THE EEL RIVER CANYON CLOSED AREA

Submitted by Peter Leipzig, Executive Director, Fishermen's Marketing Association.

The Ad Hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) conducted a thorough review of the information presented in the proposal, including an informal presentation from the applicant. The EFHRC concluded the proposal had sufficient technical merit for further consideration; however the EFHRC identified a number of areas that would benefit from additional information. This evaluation will focus on those areas, with the intent of improving the content of the proposal and the ability of the Council and its advisory bodies to further evaluate and analyze the effects of the proposal.

Based on the evaluation criteria in sections B. and C. of the Terms of Reference (TOR), the EFHRC considered the following questions:

a. Was the application complete?
   - The proposal included information for some sections listed in the TOR; however, there were several sections that would benefit from additional information.
   - The proposal provided an adequate statement of the problem and description of the proposed action. The proposal noted that the current eastern boundary was assumed to encompass untrawlable areas; the EFHRC, however, thinks that the proposal would benefit from a description of the original rationale for establishing the current eastern boundary in the 2005 Amendment 19 process.
   - The proposal did not explicitly describe how it was consistent with the Council's requirement to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities.
   - The proposal included a justification for the interim review process. While the EFHRC recognized this decision lies ultimately with the Council, there was some discussion of this justification. The EFHRC was unable to achieve consensus on whether the justification was sufficient.

b. Were the coordinates consistent with the proposed actions and do they map out correctly?
   - The EFHRC verified the points provided in the proposal, which were accurate. A shape file for use in GIS applications was also created by the EFHRC.

c. What habitat types are affected by the proposal?
   - The proposal would benefit from more detailed topographic/geologic maps. The proposal would open an area suspected to be complex habitat in 2005 (i.e., Zimmerman trawl hangup areas; Zimmermann 2003). The proposal indicates the area is sand habitat on the shelf, which is corroborated by recent scientific studies (e.g., Drexler et al. 2006, Mullenbach et al. 2004, Lamb et al. 2008). However, the proposed open area also includes a portion of the head of the Eel River Canyon, which was not apparent in the

proposal; additional information presented by EFHRC members at the EFHRC meeting confirmed this.

- The proposal would benefit from an assessment of the canyon habitat, and a full analysis of substrate type, including the sites specified in the literature above. Alternative boundary lines only opening sandy shelf habitat could be considered during further analysis.
- The proposal could benefit from additional information on physical process, such as sediment transport, and possibly chemical processes, in the canyon area, which may be available from the STRATA FORmation on Margins (STRATAFORM) project (Nittrouer and Kravitz 1996.), and other recent studies.
- The proposal could benefit from a review of recent literature on the effects of mobile fishing gear on soft bottom sediment habitats, although because the area is relatively shallow and dynamic (e.g., area is adjacent to Eel River outflow), it is likely that negative effects of mobile fishing gear would be less than those in stable deep-water habitats.
- The proposal had no information on structure forming invertebrates; The EFHRC recommended reviewing Amendment 19 for possible additional information.

d. Are the data sufficient to evaluate the proposal effects and objectives, and if not why?
   - The proposal would benefit from specific information regarding the areal extent of the trawlable area that will be opened by the proposed boundary changes.
   - The proposal should differentiate between what information was available in 2005 and what new information has been developed in the interim.

e. What are the biological, ecological, and socioeconomic effects (beneficial and detrimental) of the proposal? For example:

   i. What is the importance of affected habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity?
      - The proposal would benefit from an assessment of habitat suitability probabilities, which are available in Amendment 19.

   ii. What is the distribution and abundance of important habitat?
      - Moving the boundary would open a portion of canyon habitat that was not indicated in the proposal. Supplemental information was available to the EFHRC that should be included in the proposal to help determine the habitat types affected by the proposed boundary modification.

   iii. Is that habitat vulnerable to the effects of fishing and other activities?
      - The proposal states that the area is not known to be vulnerable to the effects of fishing. However, there is no further discussion of the effects of trawling or fishing with fixed gear on the shelf habitat, nor is there discussion of the effects of fishing on canyon habitat.

   iv. Is there unique, rare, or threatened habitat?
      - The proposal indicated there are no unique, rare, or threatened habitats that will be affected by the proposed boundary change. As indicated above, the proposal would benefit from a more thorough assessment of the canyon habitats that would become available to mobile bottom contact fishing gear.

v. What are the changes in location and intensity of bottom contact fishing effort?
   - The proposal would benefit from trawl track information to help identify areas that were fished in the recent past. The proposal would open up 13 km^2 of a currently closed area to trawling. Trawling would presumably return to pre EFH closure levels.
   - The proposal would benefit from information on displacement of current fixed bottom contact fishing gear effort.

vi. What is the displacement or loss of revenue from fishing?
   - The proposal would benefit from better quantification of socioeconomic impacts to the three trawlers that fished the area prior to establishing the Eel Canyon closed area, and subsequently the impacts of allowing all bottom contact fishing gear vs. only fixed bottom contact fishing gear.

vii. Has there been collaboration with affected fishermen and communities to identify socioeconomic costs and benefits?
   - The proposal considers the benefits to the mobile gear community but fails to consider the costs to fixed gear fisheries in terms of competition and gear conflict. Further interaction with the affected communities is likely to occur in the Council process.

f. If models are used in the proposal are they consistent with the best available information?
   - The proposal did not include a description of, or results from, any models that may have been used.

g. Is the proposal consistent with the goals and objectives of the FMP?
   - The proposal did not specifically address FMP goals and objectives.

h. How will fishing communities and other stakeholders be affected by the proposal?
   - The proposal would benefit from an analysis of the socioeconomic effects of the proposed boundary change. The analysis should include impacts on access to adjacent fishing areas.
   - The EFHRC was unsure at which stage such a socioeconomic analysis would occur and who might be involved in conducting the analysis, including the role of NMFS and Council staff.

i. How are Tribal Usual and Accustomed Areas affected by the proposal, and how was that determined?
   - Tribal Usual and Accustomed Areas are not affected by the proposal.

j. How are overfished stocks/ESA listed species affected by the proposal?
   - The proposal does not include a statement on the adverse effects on ESA listed species that addresses new information post Amendment 19.
   - The proposal does not include a statement on the effects of the proposal on overfished stocks.

k. Is a monitoring plan part of the proposal?
   - The proposal did not include a monitoring plan, but the EFHRC noted that the ongoing groundfish observer and vessel monitoring programs would provide some elements of a monitoring plan.

l. Has there been coordination with appropriate state, tribal, and Federal enforcement, management, and science staff?
   - The proposal did not include details on coordination with tribes or other agencies. The EFHRC expects some level of coordination to occur through the Council process.

m. Are there components of the proposal that require additional expertise beyond the EFHRC for a comprehensive evaluation?
   - If this proposal moves forward in the process, there will be a need for additional socioeconomic expertise; however, the EFHRC had sufficient expertise to evaluate the proposal at this decision point.

References

Drexler T.M., C.A. Nittrouer, and B.L. Mullenbach. 2006. Impact of local morphology on sedimentation in a submarine canyon, ROV studies in Eel River Canyon, Northern California.

Lamb, M.P., J.D. Parsons, B.L. Mullenbach, D.P. Finlayson, D.L. Orange and C.A. Nittrouer. 2008. Evidence for super elevation, channel incision, and formation of cyclic steps by turbidity currents in Eel Canyon, Geological Society of America Bulletin 2008;120;463-475.

Mullenbach, B.L., C.A. Nittrouer, P. Puig, D.L. Orange. 2004. Sediment deposition in a modern submarine canyon: Eel Canyon, northern California. Marine Geology 211 (2004) 101–119

Nittrouer, C.A. and J. H. Kravitz. 1996. Strataform: A program to study the creation and interpretation of sedimentary strata on continental margins. Oceanography 9:146-152.

Zimmerman, M. 2003. Calculation of untrawlable areas within the boundaries of a bottom trawl survey. Canadian Journal of Fisheries and Aquatic Sciences. 60: 657–669.

PROPOSAL TO MODIFY
THE OLYMPIC 2 AND GRAYS CANYON CLOSED AREAS

Submitted by Ben. Enticknap and Santi. Roberts, Oceana

The EFHRC conducted a thorough review of the information presented in the proposal, including an informal presentation from the applicant. The EFHRC concluded the proposal had sufficient technical merit for further consideration; however the EFHRC identified a number of areas that would benefit from additional information. This evaluation will focus on those areas with the intent of improving the content of the proposal and the ability of the Council and its advisory bodies to further evaluate and analyze the effects of the proposal.

Based on the evaluation criteria in sections B. and C. of the Terms of Reference, the EFHRC considered the following questions:

a. Was the application complete?
   - The proposal included information for all sections listed in the TOR; however, there were several sections that would benefit from additional information.
   - The proposal provided an adequate statement of the problem and description of the proposed action; no additional information was necessary.
   - The proposal described how it was consistent with the Council's requirement to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities.
   - The proposal included a justification for the interim review process. While the EFHRC recognized this decision lies ultimately with the Council, there was some discussion of the justification provided. The EFHRC was unable to achieve consensus on whether the justification was sufficient. Some of the discussion points central to the debate were: (1) whether the proposal adequately distinguished between new information and that which was available in 2005 (when Amendment 19 to the Groundfish Fishery Management Plan (FMP) was approved by the Council); (2) whether there was adequate information about the risks associated with fixed, bottom-contact fishing gear; and (3) whether the proposal would benefit from including estimates of the areal extent of new coral/sponge observations.

b. Were the coordinates consistent with the proposed actions and do they map out correctly?
   - The EFHRC verified some but not all of the points provided in the proposal, which appeared accurate. The applicants also provided a shape file for use in GIS applications, however, the EFHRC was not equipped to verify all the points during its meeting, and recommends a complete verification of points should be conducted using appropriate mapping tools.

c. What habitat types are affected by the proposal?
   - The proposal would benefit from an estimate of the areal extent of additional hard substrate, by type, that would be protected if the proposal was adopted.
   - The proposal would benefit from additional information on seafloor lithology for the two areas in question. In particular, clarification of the description of geological characteristics for Grays Canyon, which may be available from updated geological maps (e.g., Paul Johnson, University of Washington).

d. Are the data sufficient to evaluate the proposal effects and objectives, and if not why?
   - The proposal would benefit from specific information about the size of the areas involved in boundary changes (i.e., how many km^2 are being proposed for protection).
   - The proposal should differentiate between what information was available in 2005 and what new information has been developed in the interim.
   - Evaluation of the proposal would benefit from inclusion of new information on sea floor mapping and 2008 dive sites available from the Olympic Coast National Marine Sanctuary (OCNMS).
   - The proposal should include maps that indicate Rockfish Conservation Areas (RCA) for fixed gear and Yelloweye Rockfish Conservation Areas as well as trawl gear RCA,

e. What are the biological, ecological, and socioeconomic effects (beneficial and detrimental) of the proposal? For example:

   i. What is the importance of affected habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity?
      - The proposal would benefit from estimates of coral and sponge abundance at each site where they have been observed, not simply presence. This would help correlate fish densities associated with this type of habitat, as well as help inform decision makers on the spatial significance of the habitat.

   ii. What is the distribution and abundance of important habitat?
      - Information should be presented on the areal extent of structure forming invertebrates at each dive site. This would supplement photos/video of individual organisms/colonies.
      - The maps should be modified to indicate the locations of images of the seafloor and associated organisms in the figures, and should include the dive-site numbers from Table 2.
      - The proposal relies on the use of hard substrate as a proxy for occurrence of structure forming invertebrates; the validity of this assumption would benefit from further justification. Overall, the proposal would benefit from a more transparent description of how habitat areas for structure forming invertebrates were determined, including data used and assumptions that were made.
      - The proposal's current maps should display the locations of all NMFS bottom trawl survey hauls, not just those that included structure forming invertebrates – the current figures do not show the distribution of trawl sampling effort. This information is important to the evaluation of coral/sponge distributions as well as the areal extent of important habitat.

   iii. Is that habitat vulnerable to the effects of fishing and other activities?
      - The effects of fishing and other activities on the coral and sponge habitat type that the proposal is intended to protect is well documented, particularly for mobile bottom contact fishing gear, but the proposal would benefit from additional information on the effects of fixed bottom contact fishing gear.

iv. Is there unique, rare, or threatened habitat?
    - Yes, based on best available information, deep-sea corals and sponges appear to have limited/patchy distribution, and they can be threatened by bottom contact fishing effort. However further studies are ultimately needed to determine their areal extent.

v. What are the changes in location and intensity of bottom contact fishing effort?
    - During an oral PowerPoint presentation, the applicants presented information to the EFHRC on the distribution of mobile bottom-contact fishing effort; this was not included in the proposal. Including this information would help identify areas that were fished in the recent past, as well as give us some understanding of the associated seafloor substratum types. In particular, the EFHRC requests clarification about the extensive 2005 trawl tracks within the 2009 RCA in the western portion of proposed closure in Juan de Fuca Canyon area.
    - The proposal would benefit from information on displacement of fixed bottom contact fishing gear effort.

vi. What is the displacement or loss of revenue from fishing?
    - The proposal would benefit from better quantification of socioeconomic impacts of prohibiting all bottom contact fishing gear vs. only mobile bottom contact fishing gear.
    - The proposal would benefit from more specific information on the socioeconomic hardship of closure of the areas in question (both the closed area and impacts on access to adjacent fishing areas).

vii. Has there been collaboration with affected fishermen and communities to identify socioeconomic costs and benefits?
    - Further collaboration with the tribes was encouraged, particularly on an individual tribal level as opposed to tribal commission level.

f. If models are used in the proposal are they consistent with the best available information?
    - The proposal did not include a description of, or results from, any models that may have been used.

g. Is the proposal consistent with the goals and objectives of the FMP?
    - Yes, see a. above.

h. How will fishing communities and other stakeholders be affected by the proposal?
    - The proposal would benefit from an analysis of the socioeconomic hardship of the proposed area closures. The analysis should include impacts on access to adjacent fishing areas.
    - The EFHRC was unsure at which stage such a socioeconomic analysis would occur and who might be involved in conducting the analysis, including the role of NMFS and Council staff.

i. How are Tribal Usual and Accustomed Areas affected by the proposal, and how was that determined?
   - The proposal defers these issues to the consultation process between the tribes and NOAA.

j. How are overfished stocks/ESA listed species affected by the proposal?
   - The proposal does not include a statement on the adverse effects on ESA listed species that addresses new information post Amendment 19.
   - The proposal does not include a statement on the effects of the proposal on overfished stocks.

k. Is a monitoring plan part of the proposal?
   - The proposal did not include a monitoring plan, but the EFHRC noted that the ongoing groundfish observer and vessel monitoring programs would provide some elements of a monitoring plan.

l. Has there been coordination with appropriate state, tribal, and Federal enforcement, management, and science staff?
   - The proposal reflected coordination with the OCNMS; the proposal did not include details on coordination with the tribes or other agencies. The EFHRC expects some level of coordination to occur through the Council process.

m. Are there components of the proposal that require additional expertise beyond the EFHRC for a comprehensive evaluation?
   - If this proposal moves forward in the process, there will be a need for additional socioeconomic expertise; however, the EFHRC had sufficient expertise to evaluate the proposal at this decision point.

n. Other Points of Discussion
   - There was a discussion of non-fishing anthropogenic impacts (e.g., sedimentation, hypoxia, and ocean acidification) that were not considered in the 2005 EFH EIS but could be relevant to future proposals.

PFMC
5/27/2009

Agenda Item E.1.c
Supplemental GAP Report
June 2009

GROUNDFISH ADVISORY SUBPANEL REPORT ON GROUNDFISH ESSENTIAL FISH HABITAT (EFH) MODIFICATIONS

The Groundfish Advisory Subpanel (GAP) heard from Mr. Brad Pettinger concerning two Essential Fish Habitat (EFH) proposals that have been submitted. One from the Fisherman's Marketing Association (FMA) and the other from Oceana.

The GAP discussed the FMA, Eel River Canyon proposal and concluded that it should be approved for further consideration. It is believed that this is a minor modification and results in a situation more closely related to original agreements between trawl and conservation representatives during original actions for EFH. This would restore original trawl areas frequented by locally based vessels.

Next was a discussion of the Oceana proposal, Grays Canyon and Olympic2. It was viewed as a very aggressive expansion of existing EFH. This would remove trawl area in which most has very little sponge habitat. It was also noted that most of the proposed area is within the tribal U & A and therefore would only affect non-tribal fishermen should the tribes choose not to honor these new closures. This could result in limited or no actual habitat protection. There was little evidence contained within the proposal referring to socioeconomic impacts or any comprehensive collaborative efforts involving area harvesters. These areas are important to the trawl fleet. Lastly this EFH expansion was not viewed as an emergency situation as it is now protected in part by the rockfish conservation area (RCA) and therefore could be adequately addressed at the normal 5 year review of EFH. The GAP recommends that this proposal not be approved for further consideration.

There was some discussion in reference to expansion of EFH in general. How much protection does the EEZ need? How much shift in areas of effort will trigger further reduction of fleet sizes caused by local depletion? The GAP feels that there will always be a marine resource that needs protection through fishery closures. It is requested that the Council address the issue of limits to habitat protection closures. The original agreement on EFH closures was said to protect the trawl footprint as well as habitat. The GAP believes any expansion of EFH should not be considered until a full analysis of the status of existing EFH is completed.

PFMC
06/12/09

Agenda Item E.1.c
Supplemental HC Report
June 2009

HABITAT COMMITTEE REPORT ON GROUNDFISH ESSENTIAL FISH HABITAT (EFH) MODIFICATIONS

The Habitat Committee supports the Essential Fish Habitat Review Committee's (EFHRC) determination that the Eel River Canyon and Olympic 2/Grays Canyon proposals have sufficient technical merit to warrant further consideration. The EFHRC did a good job of identifying ways the proposals could be improved and recommending additional sources of information.

These first two proposals are instructive in that one is a request to expand a boundary, another to reduce the closure area. This will help provide guidance for adjustments to the Terms of Reference (TOR) document and the process that may be needed in the future.

A mechanism for evaluating the urgency of socio-economic and natural resource impacts is needed in order to assess the appropriateness for addressing the proposals in the interim process. HC suggests the Council consider these proposals in light of their socio-economic or natural resource impacts, and in consideration of the precautionary principle.

The HC noted that the EFHRC review provided the following suggestions to current applicants. These issues may need to be emphasized in future proposal requests:

- ☐ Differentiate between information that was available in 2005 and information that has been developed in the interim.
- More investigation into the effects of specific gear types on specific habitat types. For Eel River Canyon, effects of mobile fishing gear on soft bottom sediment habitats were recommended for investigation; for Olympic 2/ Grays Canyon, the EFHRC recommended more literature review on effects of fixed bottom contact gear on coral and sponge habitat.
- Proponents should provide specific information regarding the size of the geographic area involved in the proposal. (The HC also commented that fishing effort as well as geographic extent was relevant).
- Both proposals fail to consider the costs to fixed-gear fisheries in terms of competition, displacement, and gear conflict.
- In general, additional information about socioeconomic effects should be requested from the applicant.
- Applicants should be asked to develop a plan to monitor the success of the action, if taken. The EFHRC noted that ongoing groundfish observer and vessel monitoring programs would provide some elements of a monitoring plan.

In the case of Olympic 2/Grays Canyon, the HC notes that this proposal for boundary updates provides a focus for coordination and collaboration on research along the coast of Washington, especially within the Olympic Coast National Marine Sanctuary (OCNMS). The EFHRC made several specific recommendations for ways in which the applicants can use other research data to improve the proposal. The OCNMS is currently undergoing a management plan review in which research coordination is a major topic under consideration. HC also notes the NOAA activity around deep sea corals that provides another forum for coordination. HC urges Oceana, OCNMS, NOAA, state fish and wildlife, tribes, and others to take this opportunity to come together to coordinate research to the mutual benefit of all data users.

In summary, the HC supports moving both proposals forward in the interim review process, but withholds judgment on whether we believe habitat is appropriately protected by either proposal until we have further information.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON GROUNDFISH ESSENTIAL FISH HABITAT (EFH) MODIFICATIONS

Mr. Brad Pettinger, Chairman of the Essential Fish Habitat Review Committee (EFHRC), presented the two proposals to modify EFH closed areas; 1) "Proposal to modify the northeast boundary of the Eel River EFH no-trawl area," submitted by Peter Leipzig, Executive Director of the Fishermen's Marketing Association; and 2) "Proposal to the Pacific Fishery Management Council To Modify Essential Fish Habitat Conservation Areas: Juan De Fuca Coral Canyons & Grays Canyon Sponge Reefs Important Ecological Areas," submitted by Oceana. Mr. Chuck Tracy of the Council Staff was also present to answer questions, and the EFHRC evaluation of the proposals was available to inform the discussion.

The first proposal suggests reducing the size of the Eel River EFH no-trawl area by excluding the area shoreward of the 75 fm rockfish conservation area (RCA) boundary (although these lines do not closely follow the 75 fm bathymetric curve). This request was made to allow fishing on the shallow sandy areas which were included in the no-trawl area in 2005, but which are not actually part of the Eel River Canyon. There is some concern that the 75 fm RCA boundary excludes part of the canyon head from the EFH closed area. A line that more closely followed the actual 75 fm curve would lead to less concern about potential impacts to the canyon itself.

The second proposal suggests increasing the size of the Juan de Fuca and Grays Canyon EFH conservation areas (no-trawl areas) and adding no bottom contact areas within the new Juan de Fuca EFH conservation area. These changes were proposed in order to protect benthic invertebrates and associated biogenic habitat. While the proposal contains a wealth of information from research around the globe, it is not clear from the document exactly how the boundaries of the proposed closed areas were arrived at, although new data from dive sites, data on catch of corals and sponges from Northwest Fisheries Science Center (NWFSC) trawl survey, and hard substrate distribution data were all considered.

Some information is still needed before these proposals can be fully evaluated. For example, socio-economic information is lacking at this point for both proposals.

The SSC concurs that both proposals have merit, contain rational reasons for modifying EFH, and should go forward for consideration. The urgency of these proposals has yet to be evaluated. More information would be needed before the SSC could make a recommendation regarding whether the interim proposals are necessary as opposed to waiting for the scheduled 5-year EFH review process to begin. The SSC notes that the probability that the RCA would be relaxed in the next several years is quite low, so much of the Oceana proposal may not be urgent. However, the protection of glass sponges in the vicinity of Grays Canyon, given their rarity and the potential damage to habitat and organisms, is more likely to merit consideration under the interim process. Depending upon the socio-economic impacts, the proposal to modify the Eel River closed area may also merit consideration under the interim process.

PFMC
06/13/09

MAKAH, QUILEUTE, HOH, AND QUINAULT TRIBES' COMMENTS ON OCEANA'S PROPOSALS TO MODIFY GROUNDFISH EFH CLOSURES

The treaty tribes of the Washington coast (Makah, Quileute, and Hoh Tribes and Quinault Indian Nation) are deeply offended by the proposal put forth by Oceana to expand two existing Groundfish Essential Fish Habitat (EFH) areas within our treaty fishing areas. The Oceana proposals, brought forth with a false sense of urgency, are nothing less than an assault on the treaty rights of the Washington coast tribes.

Within the Usual and Accustomed harvest areas (U&As) of the coastal tribes extending north from the mouth of Grays Harbor to the Canadian border, the four treaty tribes co-manage our fishery resources with the U.S. government and the state of Washington. The tribes continue to work with NOAA and WDFW to develop comprehensive habitat mapping, data compilation, and management strategies to ensure that habitat, including groundfish EFH, is maintained as an integral part of healthy ecosystems in perpetuity. Treaty fisheries managers utilize a number of habitat conservation measures including gear and area restrictions developed in consultation with NOAA. Habitat management is not just considered in the context of the EFH review process developed by the Council, but in the biennial management cycle and inseason tribal regulations as well.

Oceana met with representatives of the four coastal tribes in Lacey, Washington on April 28, 2009 and shared their proposal for expansion of the two areas, Olympic 2 and Grays Canyon two days before the submission deadline to the PFMC. The tribes were shocked to discover the proposal was for extraordinary expansions of both of these areas based on photo evidence of corals and sponges gathered since 2006. This piecemeal approach for protectionism is unacceptable to the coastal treaty tribes. The tribes are fearful that this will set a precedent for taking action based on each additional data point, rather than managing based on distribution, density, and abundance. Every summer, surveys will discover more coral and sponge resulting in more cries for protecting them. Bringing this proposal forward in the interim rather than the five-year EFH review period is nothing less than a test case for Oceana to determine if this strategy will work within the Council process.

The proposal was for extraordinary expansions of both of these areas, based primarily on two studies: "Observations of Deep Coral and Sponge Assemblages in Olympic Coast National Marine Sanctuary", in Marine Conservation Series NMSP-07-04 and "Grays Canyon Glass Sponge Reefs", by P. Johnson PhD, both undertaken since 2006. Both of these studies were limited in their design to simply document the presence of corals and sponges. Specific to the Grays Canyon research, a large part of that effort was focused on the presence of methane production from the earth's crust and not the distribution or abundance of sponges. These data highlight the need to design research specific to management decisions on habitat. At a minimum, the distribution, condition, abundance and the ecological role of coral and sponge assemblages needs to be described based on rigorous science and not “snapshots”.

In recent years, bottom trawling on the west coast has been limited to discreet areas through federal, tribal, and state regulatory action to protect species and habitats. Because of these relatively new restrictions following decades of unrestricted bottom trawling, it is highly unlikely that there is an urgent need to protect every new coral and sponge finding that has survived this past activity. According to Olympic Coast National Marine Sanctuary scientists who collected the data, the occurrence of coral rubble presented by Oceana in the Olympic 2 area cannot be definitely attributed to recent bottom trawls. The additional glass sponge findings in the Grays Canyon area have also survived decades of activity yet are now being presented as needing urgent protection using the interim review process.

The coastal treaty tribes of Washington State have only those areas north of Grays Harbor to maintain their cultural, subsistence and commercial fisheries. Continuing expansions of regulatory closures in those areas is simply painting the tribes into a corner. They have nowhere else to go. If forced to fish in those expanding closed areas, the tribes will be vilified for exercising their reserved treaty rights. It is inevitable. Any perception that the Oceana proposal for expansions of closures within the tribes’ U&As does not affect us is completely false. Native Americans have witnessed time and again groups and governments drawing new boundary lines within our areas some with good, some with bad intentions. The Oceana proposal is yet another example of well-meaning individuals forgetting about the importance of the limited areas left to the tribes and neglecting to work with them on protecting necessary habitat. The tribes are disappointed in Oceana and this proposal for these reasons.

Pretty pictures are not science. Work must be done to detail the distribution, density and diversity of the organisms and habitats throughout the coastal area. This data should then be examined in light of the state of fisheries and other management measures in place, including all area closures and the level of protection they afford habitat. The coastal tribes in conjunction with the state of Washington have developed the strategies to collect the necessary information through our Ocean Research and Monitoring Initiative. We will continue to work with our co-mangers in the state and federal governments to do the scientific work necessary to map the seafloor and catalog the corals and sponges present off our coast. With this information we will develop and refine comprehensive management and conservation plans to protect our fisheries and the habitats that support them forever.

May 27, 2009

Mr. Donald K. Hansen
Chair, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda Item E.1. Groundfish Essential Fish Habitat Review

Dear Chairman Hansen and Council Members:

Ocean Conservancy, Natural Resources Defense Council, Oceana, and the Marine Fish Conservation Network request that the Pacific Fishery Management Council (Council) move forward with analysis and review of the Oceana proposal to protect sensitive coral and sponge habitat in the Juan de Fuca and Grays Canyon areas off the Washington coast. The Council's Essential Fish Habitat (EFH) interim review process provides an important opportunity to take an adaptive management approach to improve the conservation and management of EFH.[1] Importantly, the astonishing discoveries of diverse deep sea coral communities, including *Lophelia* coral not previously known to exist in the Olympic Coast National Marine Sanctuary, and ancient glass sponge reefs at Grays Canyon, combined with the fragility of these habitats, makes this proposal especially timely for Council review and consideration.

Darkblotched rockfish in red tree coral. OCNMS.

In 2006, research on deep sea corals in the Olympic Coast National Marine Sanctuary (OCNMS) greatly increased scientific knowledge of the importance, distribution and sensitivity of coral habitat in the Juan de Fuca Canyon area. OCNMS researchers documented eighteen species of corals plus reef building sponges at 14 of 15 dive locations, both inside and outside of the Olympic 2 EFH Conservation Area (Brancato et al. 2007). The researchers' observations included aggregations of rockfish nestled among coral and sponge structures (including overfished

[1] 50 C.F.R. § 600.815(a)(10). "Councils and NMFS should periodically review the EFH provisions of FMPs and revise or amend EFH provisions as warranted based on available information. … The review of information should include, but not be limited to, evaluating published scientific literature and unpublished scientific reports; soliciting information from interested parties; and searching for previously unavailable or inaccessible data."

darkblotched rockfish), plus shark egg cases attached to coral colonies. Unfortunately, researchers also documented coral rubble in areas impacted by bottom trawling, trawl tracks in the seafloor, plus lost longline gear wrapped in corals and around boulders. It is clear that many of these habitats have already been degraded by fishing and if action is not taken to protect them, they will be further degraded or lost.

In late June 2007, University of Washington scientists made an exciting and important discovery of an enormous reef of glass sponges in the Grays Canyon area, about 30 miles west of Grays Harbor—the only known reef of its kind in U.S. West Coast waters. Previously, the only known glass sponge reefs on the West Coast were reported in Canadian waters. University of Washington scientist Paul Johnson continues to make important discoveries on the relationship between these sponge communities and methane seeps, saying, "It's a whole ecosystem that people didn't know about" (Stiffler 2007).


Glass Sponge, Grays Canyon. Paul Johnson UW.

While individual sponges may take a hundred years or more to grow, a reef like the one discovered may take thousands of years to develop as layers of sponges accumulate upon one another. Unfortunately, no permanent habitat closures exist to protect this incredible sponge reef from bottom trawling.

In light of these new and unique discoveries, as well as clear evidence of destruction of coral and sponge habitats, we request that you fully consider and analyze the Oceana proposal to protect coral and sponge habitats off the Washington coast during this EFH interim review. It is the Council and the National Oceanic Atmospheric Administration's responsibility to ensure that fishing activities do not destroy these fragile and unique habitats.[2] We urge the

[2] "NOAA will continue to support the Councils by providing information on DSCS [Deep Sea Coral and Sponge] location and function as potential habitat for Federally managed species. NMFS will encourage Councils in each region to use all available information to describe and identify such EFH, and to identify specific areas as HAPCs where appropriate." In addition, "NMFS will work with each Council to evaluate and take action, where applicable, to prevent or prohibit expansion of mobile bottom-tending gear into new areas that may support substantial DSCS, until NMFS has determined through necessary discovery, mapping, and research that such fishing activities would not be likely to damage major DSCS habitats." And, "…the NMSP [National Marine Sanctuary Program] intends to initiate deep-sea coral surveys at all the national marine sanctuaries, and where appropriate, seek to protect these fragile sanctuary resources through regulation, education, research, monitoring and enforcement." 70 Fed. Reg. 39,700, 39,702, 39,705 (July 11, 2005).

Council to move forward with this proposal in the interim review so that all options can be considered to protect these habitats, not only for their importance as Essential Fish Habitat, but also for opportunities to continue to advance science, and to ensure healthy ocean habitats for this and future generations. Importantly, we recognize that the treaty rights of Pacific Northwest Tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

Failure to act on the best available scientific information would mean continued habitat degradation if not irrevocable loss of these valuable habitats.

Sincerely,

Jen Kassakian
Pacific Fishery Sustainability Manager
Ocean Conservancy

Ben Enticknap
Pacific Project Manager
Oceana

Laura Pagano
Oceans Attorney
Natural Resources Defense Council

Bruce J. Stedman
Executive Director
Marine Fish Conservation Network

Citations:

Brancato, M.S., C. E. Bowlby, J. Hyland, S.S. Intelmann, and K. Brenkman. (2007). Observations of Deep Coral and Sponge Assemblages in Olympic Coast National Marine Sanctuary, Washington. Cruise Report: NOAA Ship McArthur II Cruise AR06-06/07. Marine Sanctuaries Conservation Series NMSP-07-03. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 48 pp.

Stiffler, L. (July 28, 2007). Reef of glass sponges found off Washington's coast. 'Living hotels' are rich with sea life. *Seattle Post Intelligencer*.

May 26, 2009

Mr. Donald K. Hansen
Chair, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

Re: Essential Fish Habitat Modification

Dear Chairman Hansen and Council Members:

Marine Conservation Biology Institute (MCBI) is pleased that the Pacific Fishery Management Council is conducting a biennial review of the Essential Fish Habitat (EFH). We strongly urge you to take this opportunity to strengthen biogenic habitat protection in the existing EFH trawl closures and expand the closures to include deep sea corals and sponge reefs that have been scientifically documented since the 2006 EFH designation.

As you are aware, section 303(b) of the Magnuson-Stevens Act, reauthorized in 2007, grants the Council the authority to designate zones to protect deep sea corals from fishing impacts. However, in its 2008 report to Congress on the implementation of the Deep Sea Coral Research and Technology Program, NOAA found that fishery management councils nationwide have not yet used their new discretionary authority to recommend designating zones to prevent interactions between deep sea corals and fishing gears. The report also identified the coral habitats discovered in 2006 outside of the Olympic 2 trawl closure off Washington as insufficiently protected from fishing activities, and recommended the Council evaluate this area for protection. Therefore, a careful review of these coral habitats is warranted and pursuant to NOAA policies and Congress guidance.

Like deep sea corals, glass sponge reefs are important three-dimensional habitat providers. Though little is known about their ecology, their brittle structures are just as vulnerable to contact with bottom-tending gears, according to NOAA's draft Deep-Sea Coral and Sponge Research and Management Strategic Plan (2008). Hence, the recently described sponge reefs in Grays Canyon deserve the Council's attention as you consider modifying EFH closures to improve habitat protection.

In 2006, you received a peer-reviewed national status assessment of deep sea corals that MCBI had produced. As you may recall, our assessment found bottom fishing to be a major threat to seafloor communities and deep sea corals. Based on the longevity and vulnerability of deep sea corals and sponges, as well as their medical, scientific and habitat values, we recommended that fishery management councils take immediate steps to prohibit bottom fishing in coral areas while integrating new coral findings into the crafting of conservation measures in an on-going, adaptive manner. The corals and sponge reefs off Washington that have since come to light present an opportunity to implement this adaptive approach.

We urge the Council to elevate the EFH modification proposal submitted by Oceana, focusing on the corals and sponge reefs in Juan de Fuca and Grays Canyons, into a full analysis at the June 2009 Council meeting. These deep sea coral and sponge areas should be closed to bottom gears as ecologically important areas within the EFH or as coral closure zones authorized by the 2007 MSA amendment.

Thank you for your consideration. Please do not hesitate to contact us if we can be of assistance in the Council's EFH review process.

Sincerely,

Sandra Brooke, Ph.D.
Coral Conservation Director

Fan Tsao
Conservation Scientist

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Supplemental Information to the May 1, 2009 Juan De Fuca Coral Canyons & Grays Canyon Sponge Reefs Important Ecological Areas Modification Proposal

June 8, 2009

In its evaluation of Oceana's proposal to modify the Grays Canyon and Olympic 2 EFH Conservation Areas, the Essential Fish Habitat Review Committee (EFHRC) recommended additional information be included for analysis. This document serves to provide additional or clarifying information on these points:

- New information since 2005 used in this proposal
- A map indicating dive site numbers, the 75 fathom rockfish conservation area (RCA) boundary, and fixed gear RCA boundary (2009-2010 schedule) (See Figure 1)
- Trawl tracks and trawl catch-by-block information, including maps (See Figures 2-4)
- A list of references on the effects of trawls and dredges on seafloor habitat not included in the Final EFH EIS (Dec 9, 2005) or completed after that date.

This document also provides recommendations on additional information that the National Marine Fisheries Service (NMFS) and the Olympic Coast National Marine Sanctuary (OCNMS) could provide in the interim evaluation to meet other suggestions by the EFHRC.

In situ observations

- New data: the 2006 OCNMS dive sites (15 in total) in the Juan de Fuca Coral Canyon proposal and the 2007 Grays Canyon dive site (1 in total).
- Recommended for interim review evaluation: 2008 OCNMS dive report, Washington Sea Grant and University of Washington August 22-27 2008, Glass Sponge Cruise Report.

In situ observations of West Coast seafloor habitat using drop cameras, submersibles, and ROVs are the most direct evidence of the presence of deep water coral and sponge communities. Such surveys tend to focus on rocky, high relief structures that often support diverse benthic communities. Examples include rocky banks, canyons, escarpments, seamounts and other rocky features (references in Whitmire and Clark 2007).

In-the-water observation is expensive and so requires careful planning and dive site prioritization. For the 2006 dives, OCNMS scientists prioritized sites using several datasets, including hard substrate from side-scan sonar, multi-beam bathymetry, and locations of untrawlable habitat as defined by NOAA (Zimmerman 2003) and the

Washington Department of Fish and Game (see Brancato et al 2007). Corals were found at 14 of the 15 sites for which successful dives were conducted, lending credence to the prioritization methodology for identifying likely coral areas (Brancato et al 2007). These data, supplemented with observations of coral and sponge bycatch records from NMFS trawl surveys and West Coast Groundfish Observer Program (WCGOP) bycatch records, also formed the foundation of our proposal.

Trawl survey observation data

- New data: NWFSC trawl survey coral observations (2004-2006). Of the 3001 records of coral observations from 1980-2006, 1007 were from 2004-2006. One 2004-2006 record is within the current closure, and twelve are within the modified closures (eleven in Grays Canyon).
- Recommended for interim review evaluation: NMFSC trawl survey sponge observations (2004-2006), and invertebrate bycatch data from the West Coast Groundfish Observer Program.

Coral and sponge records from NMFS trawl surveys must be considered a conservative estimate of the presence of biogenic habitat. More than 95% of these tows are limited to low relief, sedimentary substrates that support relatively few habitat-forming invertebrates relative to hard-bottom seafloor habitats (Whitmire and Clark 2007). Of 10,526 trawl records queried from 1980-2005, 16% were found to have documented pennatulacean records, while less than 2% had gorgonians, black corals, soft corals, stony corals or hydrocorals, all groups typically found on hard substrate (Whitmire and Clark 2007). Trawl surveys are not designed to catch benthic invertebrates, and identification of corals and sponges is limited by the expertise of the biologists aboard (Whitmire and Clark 2007).

The West Coast Groundfish Observer Program may provide additional information on the location of coral and sponge habitat. 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 was not analyzed, utilized, or incorporated (Drinkwater 2004). Specifically, the Center for Independent Experts recommended that NMFS "…analyze catch and effort data, observer bycatch data, field studies and consult with the industry to assess the damage done to the long-lived corals and sponges as well as the possible encroachment of fishing trawls into new areas containing corals and sponges." Thus, we recommend these data also be analyzed during the interim review process.

Hard and complex substrate data

- New data: Surficial Geologic Habitat v3 (obtained from PaCOOS in March 2009). Further analysis of the geologic dataset will need to be conducted to identify exactly which data have been updated since 2005.

- Recommended for interim review evaluation: OCNMS high-resolution substrate data.

In addition to providing a substrate for corals and sponges to recruit to, structurally complex hard habitat is among the most important habitats for fishes (Pacific EFH PDEIS). Knowledge of the substrate composition of West Coast waters is currently limited. Only about 21% of the OCNMS has been mapped with side-scan sonar (Brancato et al 2007). For this reason, we (like the OCNMS) supplemented the substrate dataset (Surficial Geological Habitat v3) with the NMFS West Coast Triennial Trawl Survey major trawl net hangs data (Zimmerman 2003). Since these areas are considered unsuitable for NMFS trawling, the assumption is that they are likely areas of high structural complexity, such as boulders or rock outcrops (Zimmerman, pers.com.). However, some commercial gear configurations (such as using roller gear) may allow commercial access to some of these areas. 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).

Bathymetry data

- New data: Bathymetry data from the ETOPO1 1 Arc-Minute Global Relief Model (most recently updated on August 29, 2008, and obtained from NOAA in March 2009 from http://www.ngdc.noaa.gov/mgg/global/global.html). Further analysis of the bathymetry dataset will need to be conducted to identify exactly which data have been updated since 2005.

The proposed Olympic 2 and Grays Canyon modifications also include the majority of canyon habitat in the vicinity of the new dive sites (i.e. Juan de Fuca Canyon and Grays Canyon). Because submarine canyons are typically upwelling zones, they often contain higher abundances of filter feeding invertebrates, including corals, sponges, tunicates, and bryozoans, which contribute to the structural complexity of the seafloor. As documented and referenced in the Comprehensive Collaborative Alternative for Protecting Essential Fish Habitat in the Pacific While Maintaining Fisheries, October 2004, 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). West Coast studies indicate the importance of at least some canyons to commercially important groundfish such as Pacific ocean perch in the

Bering Sea (Brodeur 2001), Pacific hake and turbot in Southern California (Vetter and Dayton 2001), green-spotted rockfish and bocaccio in Monterey Bay (Starr 2002) and other rockfish in Soquel Canyon (Yoklavich et al 2000).

Trawl Activity

- New data: Commercial bottom trawl set and haul-out data from logbooks for 2005 (non-confidential data only) and commercial bottom trawl catch and revenue data by 10*10 minute block from fish tickets for 2005 (non-confidential data only) (See Figures 2 and 4)
- New data received since proposal was submitted: Commercial bottom trawl set and haul-out data from logbooks submitted to WDFW 2007-2008 (non-confidential data only), commercial bottom trawl catch and revenue data by 10*10 minute block from fish tickets for 2007-2008 (non-confidential data only) (See Figures 3 and 5)
- Recommended for interim review evaluation: Analysis of complete commercial bottom trawl datasets, including confidential data from WDFW and all data from ODFW and CDFG, and finer resolution catch/revenue fish ticket data.

Non-confidential 2005 trawl track and catch-by-block data was used to identify the most effective boundaries for meeting the objective of protecting coral and sponge habitat while minimizing impact on the fishing industry. Data received since the proposal was submitted provides an idea of trawling activity off the coast of Washington after (2007-2008) the EFH closures were implemented (2006 data were omitted as the EFH closures went into place June 12 that year). Several caveats should be considered in interpreting the attached maps (Figures 2-5) depicting trawl effort and activity:

- Discrepancies between total catch by the bottom trawl fishery in logbooks vs fish tickets. For the years 2007 through 2008, for example, total catch (mt) for logbook data is on average 5% lower than in fish ticket catch data.
- Confidentiality concerns. For logbook data, summed logbook catch-by-block data for the bottom trawl fishery is on average 8% lower than the total catch for 2007-2008. Also, ODFW and CDFG declined to provide set and haulout data from logbooks, citing confidentiality concerns. Thus, data from out of state vessels (i.e. California or Oregon) operating in Washington waters was not available.
- Inaccuracies in set/haulout location from logbooks. All trawl tows greater than 10nm have been removed for illustration purposes.
- 2008 data may be incomplete at this time.

The interim review evaluation should therefore use the most complete data to date in order to paint as precise a picture as possible for Council review. A more complete data set may provide additional insight as to further boundary modifications.

Attached: Figures 1-5

References

The primary literature, reports and reviews listed below (1) are cited in this supplement or (2) should be taken as an update to the references listed in the Final EFH EIS (December 9, 2009).

This additional body of research reaffirms the conclusions of the NRC (2002) report. The overall patterns in direct impacts of trawling and dredging on seafloor habitats described by the NRC include reduced habitat complexity, changes in benthic community structure, reduced productivity of benthic habitats, and the observation that fauna living in low natural disturbance regimes are generally more vulnerable to disturbance from fishing gear.

References denoted with an asterisk (*) were cited in the Final EFH EIS (Dec 9, 2005).

Ardizzone GD, Tucci P, Somaschini A, Belluscio A (2000) Is bottom trawling partly responsible for the regression of *Posidonia oceanica* meadows in the Mediterranean Sea? In: Kaiser MJ, de Groot SJ (eds) Effects of Fishing on Non-Target Species and Habitats. Oxford, UK: Blackwell Science Ltd.

Asch RG (2006) A photographic analysis of bottom fishing disturbance and microhabitat associations among the colonial epifauna of Georges Bank. Masters Thesis, University of Rhode Island.

Ball B, Munday B, Tuck I (2000b) Effects of otter trawling on the benthos and environment in muddy sediments. In: Kaiser MJ, de Groot SJ (eds) Effects of Fishing on Non-Target Species and Habitats. Oxford, UK: Blackwell Science Ltd.

Ball BJ, Fox G, Munday BW (2000a) Long-and short-term consequences of a *Nephrops* trawl fishery on the benthos and environment of the Irish Sea. ICES Journal of Marine Science 57: 1315-1320

Barnette MC (2001) A review of the fishing gear utilized within the Southeast Region and their potential impacts on essential fish habitat. NOAA Technical Memorandum NMFS-SEFSC-449

Bergman MJN, van Santbrink JW (2000) Fishing mortality of populations of megafauna in sandy sediments. In: Kaiser MJ, de Groot SJ (eds) Effects of Fishing on Non-Target Species and Habitats. Oxford, UK: Blackwell Science Ltd.

Bordehore C, Ramos-Espla AA, Riosmena-Rodriguez R (2003) Comparative study of 2 maerl beds with different otter trawling history, southeast Iberian Peninsula. Aquatic Conservation: Marine and Freshwater Ecosystems 13: S43-S54

Brancato MS, Bowlby CE (2005) Survey of fishing gear and fiber optics cable impacts to benthic habitats in the Olympic Coast National Marine Sanctuary (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 629-630

Brancato, M.S., C. E. Bowlby, J. Hyland, S.S. Intelmann, and K. Brenkman. (2007). Observations of Deep Coral and Sponge Assemblages in Olympic Coast National Marine Sanctuary, Washington. Cruise Report: NOAA Ship McArthur II Cruise AR06-06/07. Marine Sanctuaries Conservation Series NMSP-07-03. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 48 pp.

Broadhurst MK, Suuronen P, Hulme A (2006) Estimating collateral mortality from towed fishing gear. Fish and Fisheries 7: 180-218

Brodeur, R. D. and W. G. Pearcy (1984). Food habits and dietary overlap of some shelf rockfishes (Genus Sebastes) from the northeastern Pacific Ocean. Fishery Bulletin 82: 269-29

* Brodeur, R. (2001). Habitat-specific distribution of Pacific ocean perch (Sebastes alutus) in Pribilof Canyon, Bering Sea. Continental Shelf Research 21(3): 207-224

Brown EJ, Finney B, Dommisse M, Hills S (2005a) Effects of commercial otter trawling on the physical environment of the southeastern Bering Sea. Continental Shelf Research 25(10): 1281-1301

Brown EJ, Finney B, Hills S, Dommisse M (2005b) Effects of commercial otter trawling on benthic communities in the southeastern Bering Sea. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 439-460

Burridge CY, Pitcher CR, Hill BJ, Wassenberg TJ, Poiner IR (2006) A comparison of demersal communities in an area closed to trawling with those in adjacent areas open to trawling: A study in the Great Barrier Reef Marine Park, Australia. Fisheries Research 79(1-2): 64-74

Burridge CY, Pitcher CR, Wassenberg TJ, Poiner IR, Hill BJ (2003) Measurement of the rate of depletion of benthic fauna by prawn (shrimp) otter trawls: an experiment in the Great Barrier Reef, Australia. Fisheries Research 60: 237-253

Cahoon LB, Posey MH, Daniels WH, Alphin TD (2005) Shrimp and crab trawling impacts on estuarine soft-bottom organisms (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 630

* Cartes, J. E., J. B. Company and F. Maynou (1994). Deepwater decapod crustacean communities in the Northwestern Mediterranean: influence of submarine canyons and season. Marine Biology 120: 221- 229

Chess, J. R., S. E. Smith and P. C. Fischer (1988). Trophic relationships of the shortbelly rockfish, Sebastes jordani, off Central California. California Cooperative Oceanic Fisheries Investigations Reports 29:129-136

Chiarella LA, Stevenson DK, Stephan CD, Reid RN, McCarthy JE, Pentony MW, Hoff TB, Selberg CD, Johnson KA (2005) Results of a workshop on the effects of fishing gear on benthic habitats off the Northeastern United States (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 833-834

Chuenpagdee R, Morgan LE, Maxwell SM, Norse EA, Pauly D (2003) Shifting gears: Assessing collateral impacts of fishing methods in US waters. Frontiers in Ecology and Environment 1(10): 517-524

Clark M, O'Driscoll R (2003) Deepwater fisheries and aspects of their impact on seamount habitat in New Zealand. Journal of Northwest Atlantic Fisheries Science 31: 441-458

Clark MR, Rowden AA, O'Shea S (2005) Effects of Fishing on the Benthic Habitat and Fauna of Seamounts on the Chatham Rise, New Zealand (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 593

Cogswell CL, Hecker B, Michael A, Mirarchi F, Ryther J Jr, Stevenson D, Valentine R, Wright C (2005) Effects of smooth bottom trawl gear on soft bottom habitat (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 594

Collie JS, Hermsen JM, Valentine PC, Almeida FP (2005) Effects of Fishing on Gravel Habitats: Assessment and Recovery of Benthic Megafauna on Georges Bank. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 325-343

Colman JG, Gordon DM, Lane AP, Forde MJ, Fitzpatrick JJ (2005) Carbonate mounds off Mauritania, Northwest Africa: status of deep-water corals and implications for management of fishing and oil exploration activities. In: Freiwald A, Roberts JM (eds) Cold-water Corals and Ecosystems. Spinger-Verlag Berlin Heidelberg, pp 417-441

Conway KW, Krautter M, Barrie JV, Whitney F, Thomson RE, Rieswig H, Lehnert H, Mungov G, Bertram M (2005) Sponge reefs in the Queen Charlotte Basin, Canada: controls on distribution, growth and development. In: Freiwald A, Roberts JM (eds) Cold-water Corals and Ecosystems. Spinger-Verlag Berlin Heidelberg, pp 605-621

Cryer M, Harthill B, O'Shea S (2002) Modification of marine benthos by trawling: toward a generalization for the deep ocean? Ecological Applications 12(6): 1824-1839 De Biasi AM (2004) Impact of experimental trawling on the benthic assemblage along the Tuscany coast (north Tyrrhenian Sea, Italy). ICES Journal of Marine Science 61: 1260-1266

Cryer M, Hartill B, O'Shea S (2005) Deepwater trawl fisheries modify benthic community structure in similar ways to fisheries in coastal systems (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 695-696

DeAlteris JT, Skrobe LG, Castro KM (2000) Effects of mobile bottom fishing gear on biodiversity and habitat in offshore New England waters. Northeastern Naturalist 7(4): 379-394

Drabsch SL, Tanner JE, Connell SD (2001) Limited infaunal response to experimental trawling in previously untrawled areas. ICES Journal of Marine Science 58: 1261-1271

Drinkwater, K. (2004). Summary Report: Review on evaluation of fishing activities that may adversely affect Essential Fish Habitat (EFH) in Alaska. Council of Independent Experts. Report available at: www.fakr.noaa.gov/habitat/cie/review.htm

Fossa JH, Mortensen PB, Furevik DM (2000) *Lophelia* coral reefs in Norway: distribution and the effects of fishing. Fisken og Havet 2: 1-94

Fossa JH, Mortensen PB, Furevik DM (2002) The deep-water coral *Lophelia pertusa* in Norwegian waters: distribution and fishery impacts. Hydrobiologia 471: 1-12

* Freeland, H. and K. Denman (1982). A topographically controlled upwelling center off Southern Vancouver Island. Journal of Marine Research 40: 1069-1093

Freese JL (2001) Trawl-induced damage to sponges observed from a research submersible. Marine Fisheries Review 63(3): 7-13

Freese JL (2005) Impacts of mobile fishing gear on sponges and Gorgonian corals in the Gulf of Alaska (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 596

Freiwald A, Fossa JH, Grehan A, Koslow T, Roberts JM (2004) Cold-water coral reefs: out of sight – no longer out of mind. UNEP-WCMC, Cambridge, UK

Fujioka JT (2006) A model for evaluating fishing impacts on habitat and comparing fishing closure strategies. Canadian Journal of Fisheries and Aquatic Sciences 63(10): 2330-2342

Gage JD, Roberts JM, Hartley JP, Humphery JD (2005) Potential impacts of deep-sea trawling on the benthic ecosystem along the northern European continental margin: a review. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 503-517

* Genin, A., L. Haury and P. Greenblatt (1988). Interactions of migrating zooplankton with shallow topography: predation by rockfishes and intensification of patchiness. Deep-Sea Research 35: 151-175

Gonzalez-Correa JM, Bayle JT, Sanchez-Lizaso JL, Valle C, Sanchez-Jerez P, Ruiz JM (2005) Recovery of deep *Posidonia oceanica* meadows degraded by trawling. Journal of Experimental Marine Biology and Ecology 320(1): 65-76

Gordon DC Jr, Gilkinson KD, Kenchington ELR, Prena J, Bourbonnais C, MacIsaac K, McKeown DL, Vass WP (2002) Summary of the Grand Banks otter trawling experiment (1993-1995): Effects on benthic habitat and communities. Canadian Technical Report of Fisheries and Aquatic Sciences 2416

Gray JS, Dayton P, Thrush S, Kaiser MJ (2006) On effects of trawling, benthos and sampling design. Marine Pollution Bulletin 52: 840-843

Grehan AJ, Unnithan V, Olu-Le Roy K, Opderbecke J (2005) Fishing impacts on Irish deepwater coral reefs: making a case for coral conservation. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 819-832

Grehan AJ, Unnithan V, Wheeler AJ, Monteys FX, Beck T, Wilson M, Guinan J, Hall-Spencer JH, Foubert A, Klages M, Thiede J (2003) Evidence of major fisheries impact on cold-water corals off the Porcupine Bank, west coast of Ireland: implications for offshore coral conservation within the European Union. Erlanger Geol. Abh. Sonderbd. 4:42

* Haedrich, R. L., G. T. Rowe and P. T. Polloni (1980). The megabenthic fauna in the deep sea south f New England, USA. Marine Biology 57(165-179)

Hall-Spencer J, Allain V, Fossa JH (2002) Trawling damage to Northeast Atlantic ancient coral reefs. Proceedings of the Royal Society of London Series B-Biological Sciences 269(1490): 507-511

Hamilton AN Jr. (2000) Gear Impacts on Essential Fish Habitat in the Southeastern Region. Southeast Fisheries Science Center, National Marine Fisheries Service

Hansson M, Lindegarth M, Valentinsson D, Ulmestrand M (2000) Effects of shrimp-trawling on abundance of benthic macrofauna in Gullmarsfjorden, Sweden. Marine Ecology Progress Series 198: 191-201

Henry L, Kenchington ELR, Kenchington TJ, MacIsaac KG, Bourbonnais-Boyce C, Gordon DC (2006) Impacts of otter trawling on colonial epifaunal assemblages on a cobble bottom ecosystem on Western Bank (northwest Atlantic). Marine Ecology Progress Series 306: 63-78

Hermsen JM, Collie JS, Valentine PC (2003) Mobile fishing gear reduces benthic megafaunal production on Georges Bank. Marine Ecology Progress Series 260: 97-108

Hixon MA, Tissot BN (2007) Comparison of trawled vs. untrawled mud seafloor assemblages of fishes and macroinvertebrates at Coquille Bank, Oregon. Journal of Experimental Marine Biology and Ecology 344: 23-34

ICES (2001) Effects of different types of fisheries on North Sea and Irish Sea Benthic Ecosystems. Report of the ICES Advisory Committiee on the Marine Environment, 2000. ICES Cooperative Research Report Number 241, 278 pp

Jennings S, Freeman S, Parker R, Duplisea DE, Dinmore TA (2005) Ecosystem consequences of bottom fishing disturbance. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 73-90

Kaiser MJ (2003a) Detecting the effects of fishing on seabed community diversity: importance of scale and sample size. Conservation Biology 17(2): 512-520

Kaiser MJ, Collie JS, Hall SJ, Jennings S, Poiner IR (2003b) Impacts of Fishing Gear on Marine Benthic Habitats. Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem. Reykjavik, Iceland, 1-4 October 2001

Kaiser MJ, Clarke KR, Hinz H, Austen MCV, Somerfield PJ, Karakassis I (2006) Global analysis of response and recovery of benthic biota to fishing. Marine Ecology Progress Series 311: 1-14

Kaiser MJ, Collie JS, Hall SJ, Jennings S, Poiner IR (2002) Modification of marine habitats by trawling activities: prognosis and solutions. Fish and Fisheries 3: 114-136

Kenchington ELR, Gilkinson KD, MacIsaac KG, Bourbonnais-Boyce C, Kenchington TJ, Smith SJ, Gordan DC Jr. (2006) Effects of experimental otter trawling on benthic assemblages on Western Bank, northwest Atlantic Ocean. Journal of Sea Research 56(3): 249-270

* Kenney, R. D. and H. E. Winn (1987). Cetacean biomass densities near submarine canyons compared to adjacent shelf/slope areas. Continental Shelf Research 7(107-114)

Knight E, Watling L, McLellan C (2005b) Assessment of Benthic Recovery in the Western Gulf of Maine Closed Area. National Marine Fisheries Service, Cooperative Research Partners Program. Contract No. EA 133F-03-CN-0054

Knight EP (2005a) The effects of trawling on benthic habitats: an analysis of recovery in the western Gulf of Maine closure. Masters Thesis, University of Maine.

Koenig CC (2001) *Oculina* Banks: Habitat, fish populations, restoration, and enforcement. Report to the South Pacific Fishery Management Council. December 2001

Koslow JA, Gowlett-Holmes K (1998) The seamount fauna off southern Tasmania: Benthic communities, their conservation and impacts of trawling. Final report to Environment Australia and The Fisheries Research Developing Corporation. Project 95/058, 104 pp

Koslow JA, Boehlert GW, Gordon JDM, Haedrich RL, Lorance P, Parin N (2000) Continental slope and deep-sea fisheries: implications for a fragile ecosystem. ICES Journal of Marine Science 57: 548-557

Koslow JA, Gowlett-Holmes K, Lowry JK, O'Hara T, Poore GCB, Williams A (2001) Seamount benthic macrofauna off southern Tasmania: Community structure and impacts of trawling. Marine Ecology Progress Series 213: 111-125

Koslow T (2007) Deepwater Fisheries: No More an Oxymoron. In: The Silent Deep: The Discovery, Ecology and Conservation of the Deep Sea. Sydney, Australia: University of New South Wales Press Ltd. pp 197-224

Koulouri PT, Dounas CG, Eleftheiou AS (2003) A new apparatus for the direct measurement of otter trawling effects on the epibenthic and hyperbenthic macrofauna. Journal of the Marine Biological Association of the United Kingdom 83(6): 1363-1368

Koulouri PT, Dounas CG, Eleftheriou A (2005) Preliminary results on the effect of otter trawling on hyperbenthic communities in Heraklion Bay, Cretan Sea, Eastern Mediterranean. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 529-537

Kutti T, Hoisaeter T, Rapp HT, Humborstad O-B, Lokkeborg S, Nottestad L (2005) Immediate effects of experimental otter trawling on a sub-arctic benthic assemblage inside Bear Island Fishery Protection Zone in the Barents Sea. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 519-528

Libralato S, Torricelli P, Pranovi F (2006) Exergy as ecosystem indicator: An application to the recovery process of marine benthic communities. Ecological Modeling 192(3-4): 571-585

Lindegarth M, Valentinsson D, Hansson M, Ulmestrand M (2000) Interpreting large-scale experiments on effects of trawling on benthic fauna: an empirical test of the potential effects of spatial confounding in experiments without replicated control and trawled areas. Journal of Experimental Marine Biology and Ecology 245: 155-169

Lindholm J, Auster P, Valentine P (2004) Role of a large marine protected area for conserving landscape attributes of sand habitats on Georges Bank (NW Atlantic). Marine Ecology Progress Series 269: 61-68

Lindholm JB, Auster PJ, Valentine P (2005) A comparison of habitat structure in fished and unfished, mobile and immobile sand habitats on Georges Bank (Northwest Atlantic) (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 600

* Link, J. S. and C. Demarest (2003). Trawl hangs, baby fish, and closed areas: a win-win scenario. ICES Journal of Marine Science 60: 930-938.

Link J, Almeida F, Valentine P, Auster P, Reid R, Vitaliano J (2005) The effects of area closures on Georges Bank. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 345-368

Lokkeberg S (2005) Impacts of trawling and scallop dredging on benthic habitats and communities. FAO Fisheries Technical Paper No. 472

* Macquart-Moulin, C. and G. Patriti (1996). Accumulation of migratory micronekton crustaceans over the upper slope and submarine canyons of the northwestern Mediterranean. Deep-Sea Research 43: 579-601.

McConnaughey RA, Mier KL, Dew CB (2000) An examination of chronic bottom trawling effects on soft-bottom benthos of the eastern Bering Sea. ICES Journal of Marine Science 57: 1377-1388

McConnaughey RA, Syrjala SE, Dew CB (2005) Effects of chronic bottom trawling on the size structure of soft-bottom benthic invertebrates. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 425-437

Morais P, Borges TC, Carnall V, Terrinha P, Cooper C, Cooper R (2007) Trawl-induced bottom disturbances off the south coast of Portugal: direct observations by the ‘Delta’ manned-submersible on the Submarine Canyon of Portimao. Marine Ecology 28(Suppl. 1): 112-122

Moran MJ, Stephenson PC (2000) Effects of otter trawling on macrobenthos and management of demersal scalefish fisheries on the continental shelf of north-western Australia. ICES Journal of marine Science 57: 510-516

Morgan LE, Chuenpagdee R (2003) Shifting Gears: Addressing the Collateral Impacts of Fishing Methods in US Waters. Island Press, Washington, DC.

Morgan LE, Etnoyer P, Scholz AJ, Mertens M, Powell M (2005) Conservation and management implications of deep-sea coral and fishing effort distributions in the Northeast Pacific Ocean. In: Freiwald A, Roberts JM (eds) Cold-water Corals and Ecosystems. Spinger-Verlag Berlin Heidelberg, pp 1171-1187

Morgan LE, Tsao C, Guinotte JM (2006) Threats to Deep Sea Corals. In: Status of Deep Sea Corals in US Waters. Bellevue, WA: Marine Conservation Biology Institute. pp. 27-37

Mortensen PB, Buhl-Mortensen L, Gordon DC Jr, Fader GBJ, McKeown DL, Fenton DG (2005) Effects of fisheries on deepwater Gorgonian corals in the Northeast Channel, Nova Scotia. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 369-382

Norse EA, Watling L (1999) Impacts of Mobile Fishing Gear: The Biodiversity Perspective. American Fisheries Society Symposium 22: 31-40

* NRC (2002). Effects of Trawling and Dredging on Seafloor Habitat. Washington, D.C, National Academy of Sciences, National Research Council.

Palanques A, Guillen J, Puig P (2001) Impact of bottom trawling on water turbidity and muddy sediment of an unfished continental shelf. Limnology and Oceanography 46: 1100-1110

Pereyra, W. T., W. G. Pearcy and C. J. F.E. (1969). Sebastodes flavidus, a shelf rockfish feeding on mesopelagic fauna, with consideration of the ecological implications. Journal of the Fisheries Research Board of Canada 26: 2211-2215.

Pitcher CR, Burridge CY, Wassenburg TJ, Smith GP (1999) The impact of trawling on some tropical sponges and other sessile fauna. Memoirs of the Queensland Museum 44(455): 30

Pitcher CR, Poiner IR, Hill BJ, Burridge CY (2000) Implications of the effects of trawling on sessile megazoobenthos on a tropical shelf in northeastern Australia. ICES Journal of Marine Science 57: 13591368

Pranovi F, Raicevich S, Libralato S, Da Ponte F, Giovanardi O (2005) Trawl fishing disturbance and medium-term macroinfaunal recolonization dynamics: a functional approach to the comparison between sand and mud habitats in the Adriatic Sea (Northern Mediterranean Sea). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 545-569

Quiros Espinosa A, Perdomo Lopez ME, Arias Barreto R (2005) Controversy about trawling and Santa Maria Key's causeway effects on seagrass (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 634

Ragnarsson SA, Steingrimsson SA (2003) Spatial distribution of otter trawl effort in Icelandic waters: comparison of measures of effort and implications for benthic community effects of trawling activities. ICES Journal of Marine Science 60: 1200-1215

Reed JK (2002) Deep-water Oculina coral reefs of Florida: biology, impacts, and management. Hydrobiologia 471: 43-55

Reed JK, Koenig C, Shepard A (2007) Effects of bottom trawling on a deep-water *Oculina* coral ecosystem. In: George RY, Cairns SD (eds) Proceedings of the Third International Symposium on Deep-Sea Corals. Bulletin of Marine Science 81(3)

Reed JK, Shepard AN, Koenig CC, Scanlon KM, Gilmore RG Jr. (2005) Mapping, habitat characterization, and fish surveys of the deep-water *Oculina* coral reef Marine Protected Area: a review of historical and current research. In: Freiwald A, Roberts JM (eds) Cold-water Corals and Ecosystems. Springer-Verlag Berlin Heidelberg, pp 443-465

Roberts CM (2002) Deep impact: the rising toll of fishing in the deep sea. Trends in Ecology and Evolution 17(5): 242-245

Roberts JM, Harvey SM, Lamont PA, Gage JD, Humphrey JD (2000) Seabed photography, environmental assessment and evidence of deep-water trawling on the continental margin west of the Hebrides. Hydrobiologia 441: 173-183

Rogers AD (1999) The biology of *Lophelia pertusa* (Linnaeus 1758) and other deep-water reef-forming corals and impacts from human activities. International Review of Hydrobiology 84(4): 315-406

Rose C, Carr A, Ferro D, Fonteyne R, MacMullen P (2000) Using gear technology to understand and reduce unintended effects of fishing on the seabed and associated communities: background and potential directions. ICES Working Group on Fishing Technology and Behaviour, Haarlem, The Netherlands, 9-14 April 2000

Rose CS, Jorgensen EM (2005) Spatial and temporal distribution of bottom trawling off Alaska: consideration of overlapping effort when evaluating the effects of fishing on habitat. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 679-690

Rosenburg R, Nilsson HC, Gremare A, Amouroux JM (2003) Effects of demersal trawling on marine sedimentary habitats analysed by sediment profile imagery. Journal of Experimental Marine Biology and Ecology 285-286: 465-477

Rumohr H, Kujawski T (2000) The impact of trawl fishery on the epifauna of the southern North Sea. ICES Journal of Marine Science 57: 1389-1394

Sanchez P, Demestre M, Ramon M, Kaiser MJ (2000) The impact of otter trawling on mud communities in the northwestern Mediterranean. ICES Journal of Marine Science 57: 1352-1358

* Sarda, F., J. E. Cartes and J. B. Company (1994). Spatio-temporal variations in megabenthos abundance in three different habitats of the Catalan deep-sea (Western Mediterranean). Marine Biology 120(211-219).

* Schoenherr, J. R. (1991). Blue whales feeding on high concentrations of euphausiids around Monterey Submarine Canyon. Canadian Journal of Zoology 69(583-594).

Sheppard C (2006) Trawling the sea bed. Marine Pollution Bulletin 52: 831-835

Sheridan P, Caldwell P (2002) Compilation of data sets relevant to the identification of essential fish habitat on the Gulf of Mexico continental shelf and for the estimation of the effects of shrimp trawling gear on habitat. Galveston, TX: National Marine Fisheries Service. NOAA Technical Memorandum NMFSSEFSC-483

Sheridan P, Doerr J (2005) Short-term effects of the cessation of shrimp trawling on Texas benthic habitats. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 571-578

Simpson AW, Watling L (2005) Physical and biological effects of shrimp trawling on soft sediment habitats in the Gulf of Maine (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 602

Simpson AW, Watling L (2006) An investigation of the cumulative impacts of shrimp trawling on mud-bottom fishing grounds in the Gulf of Maine: effects on habitat and macrofaunal community structure. ICES Journal of Marine Science 63: 1616-1630

Smith CJ, Papadopoulou KN, Diliberto S (2000) Impact of otter trawling on an eastern Mediterranean commercial trawl fishing ground. ICES Journal of Marine Science 57: 1340-1351

Smith CJ, Rumohr H, Karakassis I, Papadopoulou KN (2003) Analysing the impact of bottom trawls on sedimentary seabeds with sediment profile imagery. Journal of Experimental Marine Biology and Ecology 285-286: 479-496

Sparks-McConkey PJ, Watling L (2001) Effects on the ecological integrity of a soft-bottom habitat from trawling disturbance. Hydrobiologia 456: 75-85

Starr, R. M., J. N. Heine, J. M. Felton and G. M. Cailliet (2002). Movement of boccacio (Sebastes paucispinis) and greenspotted (S. chlorostictus) rockfishes in a Monterey submarine canyon: implications for the design of marine reserves. Fisheries Bulletin 100: 324-337

* Stefanescu, C., B. Morales-Nin and E. Massuti (1994). Fish assemblages on the slope in the Catalan Sea (Western Mediterranean): Influence of a submarine canyon. Journal of the Marine Biological Association of the UK 74(499-512).

Stevenson D, Chiarella L, Stephan D, Reid R, Wilhelm K, McCarthy J, Pentony M (2004) Characterization of the Fishing Practices and Marine Benthic Ecosystems of the Northeast US Shelf, and an evaluation of the Potential Effects of Fishing on Essential Fish Habitat. Gloucester (MA): National Marine Fisheries Service. NOAA Technical Memorandum NMFS-NEFSC-181 http://www.nefsc.noaa.gov/nefsc/publications/tm/tm181/index.htm

Stone RP (2006) Coral habitat in the Aleutian Islands of Alaska: depth distribution, fine-scale species associations, and fisheries interactions. Coral Reefs 25: 229-238

Stone RP, Masuda MM, Malecha PW (2005) Effects of bottom trawling on soft-sediment epibenthic communities in the Gulf of Alaska. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 461-475

Stoner AW, Ryer CL, McConnaughey RA (2005) Ecological consquences of lost habitat structure for commercially significant flatfishes: habitat choice and vulnerability to predators (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 602-603

Tanner JE (2003) The influence of prawn trawling on sessile benthic assemblages in Gulf St. Vincent, South Australia. Canadian Journal of Fisheries and Aquatic Sciences 60(5): 517-526

Thrush SF, Dayton PK (2002) Disturbance to marine benthic habitats by trawling and dredging: implications for marine biodiversity. Annual Review of Ecology and Systematics 33: 449-473

Turner SJ, Thrush SF, Hewitt JE, Cummings VJ, Funnell G (1999) Fishing impacts and the degradation or loss of habitat structure. Fisheries Management and Ecology 6(5): 401-420

Valentine PC, Lindholm JB, Auster PJ (2005) Bottom trawling effects on Cerianthid burrowing anemone aggregations and Acadian redfish habitats in mud to muddy gravel seabeds of the Stellwagen Bank National Marine Sanctuary Region, Gulf of Maine (Northwest Atlantic) (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 603-604

Vetter, E. W. and P. K. Dayton (1998). Macrofaunal communities within and adjacent to a detritus-rich submarine canyon system. Deep-Sea Research II 45(25-54).

* Vetter, E. and P. Dayton (1999). Organic enrichment by macrophyte detritus, and abundance patterns ofmegafaunal populations in submarine canyons. Marine Ecology Progress Series 186: 137-148

Waller R, Watling L, Auster P, Shank T (2007) Anthropogenic impacts on the Corner Rise seamounts, north-west Atlantic Ocean. Journal of the Marine Biological Association of the United Kingdom 87: 1075

Wassenberg TJ, Dews G, Cook SD (2002) The impact of fish trawls on megabenthos (sponges) on the north-west shelf of Australia. Fisheries Research 58: 141-151

Watling L (2007) Impacts of Mobile Fishing Gear on Continental Shelf Sedimentary Habitat Characterization. In: Todd BJ, Greene HG (eds) Mapping the Seafloor for Habitat Characterization: Geological Association of Canada Special Paper 47: 421-425

Watling L, Pugh A (2005) Reduction of species diversity in a cobble habitat subject to long-term fishing activity (abs). In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 605

Wheeler AJ, Beck T, Theide J, Klages M, Grehan A, Monteys FX, Polarstern ARK XIX/3a Shipboard Party (2005a) Deep-water coral mounds on the Porcupine Bank, Irish Margin: preliminary results from the Polarstern ARK-XIX/3a ROV cruise. In: Freiwald A, Roberts JM (eds) Cold-water Corals and Ecosystems. Springer-Verlag Berlin Heidelberg, pp 393-402

Wheeler AJ, Bett BJ, Billett DSM, Masson DG, Mayor D (2005b) The impact of demersal trawling on Northeast Atlantic deepwater coral habitats: the case of the Darwin Mounds, United Kingdom. In: Barnes PW, Thomas JP (eds) Benthic Habitats and the Effects of Fishing, Bethesda (MD) American Fisheries Society Symposium 41: 807-817

Whitmire, C.E., and M.E. Clarke (2007). State of Deep Coral Ecosystems of the U.S. Pacific Coast: California to Washington. pp. 109-154. In: SE Lumsden, Hourigan TF, Bruckner SW and Dorr G (eds.) The State of Deep-sea Coral Ecoystems of the United States. NOAA Technical Memorandum CRCP-3. Silver Spring MD 365 pp

Wilson WJ (2003) Summary of information on groundfish fishery interactions with marine mammals, seabirds, and ESA listed salmonids in the Gulf of Alaska and Bering Sea and Aleutian Islands, with specific emphasis on proposed alternatives for minimizing impacts of fishing on essential fish habitat. North Pacific Fishery Management Council, Protected Resources Technical Report No. 1. 169 pp

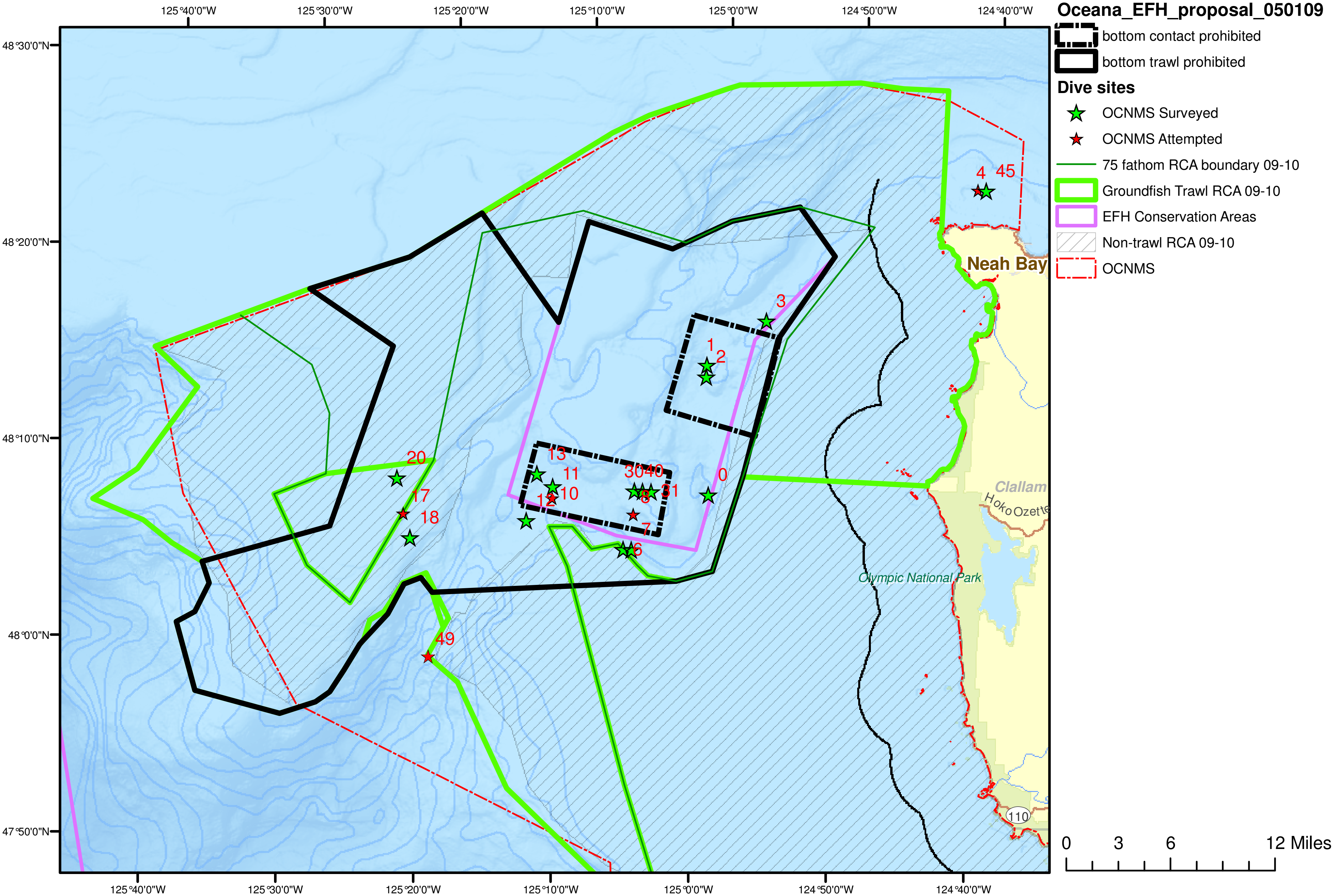
Witherell D (2002) A preliminary evaluation of fishery effects on essential fish habitat off Alaska. North Pacific Fishery Management Council, Anchorage, AK. Unpublished draft manuscript

Witherell D, Coon C (2001) Protecting Gorgonian corals off Alaska from fishing impacts. In: Willison JHM, Hall J, Gass SE, Kenchington ELR, Butler M, Doherty P (eds) Proceedings of the First International Symposium on Deep-Sea Corals. Halifax, Nova Scotia: Ecology Action Center and Nova Scotia Museum

Yoklavich, M. M., H. G. Greene, G. M. Cailliet, D. E. Sullivan, R. N. Lea and M. S. Love (2000). Habitat associations of deep-water rockfishes in a submarine canyon: An example of a natural refuge. Fishery Bulletin (Washington D C) v.98(no.3): p.625-641

* Zimmerman, M. (2003). Calculation of untrawlable areas within the boundaries of a bottom trawl survey. Canadian Journal Of Fisheries And Aquatic Sciences 60: 657-669

Figure 1. Juan de Fuca Canyon RCAs, EFH closure, and OCNMS 2006 dive sites



OCEANA

Oceana recognizes that the treaty rights of Pacific Northwest tribes require that any protective measure affecting treaty areas is a matter for consultation between NOAA and the Tribes and we encourage the on-going consultation on such matters of habitat protection.

Figure 2. Juan de Fuca Canyon Bottom Trawl Activity 2005

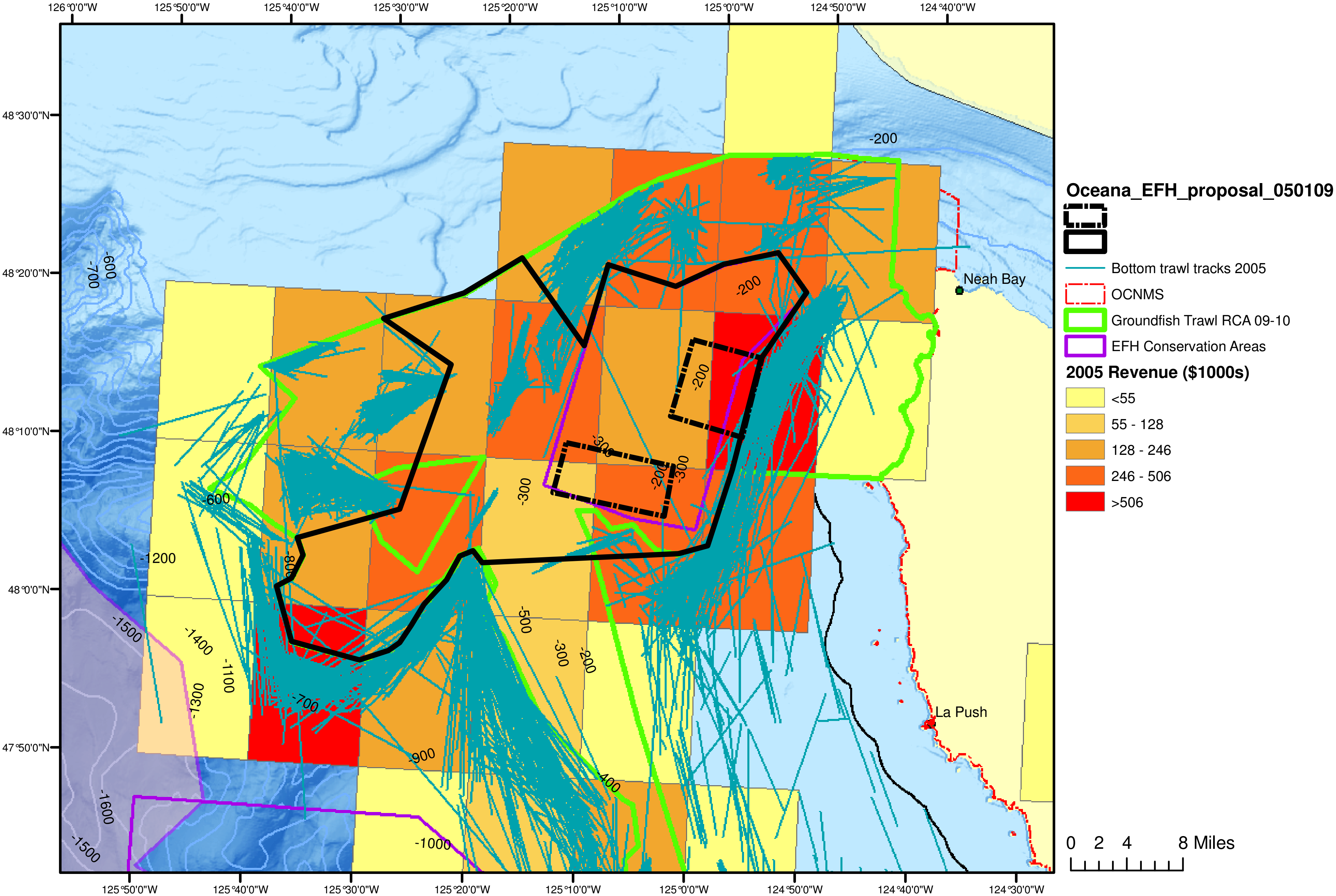


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Figure 3. Juan de Fuca Canyon Bottom Trawl Activity 2007-2008 (Track Data from WDFW logbooks only)

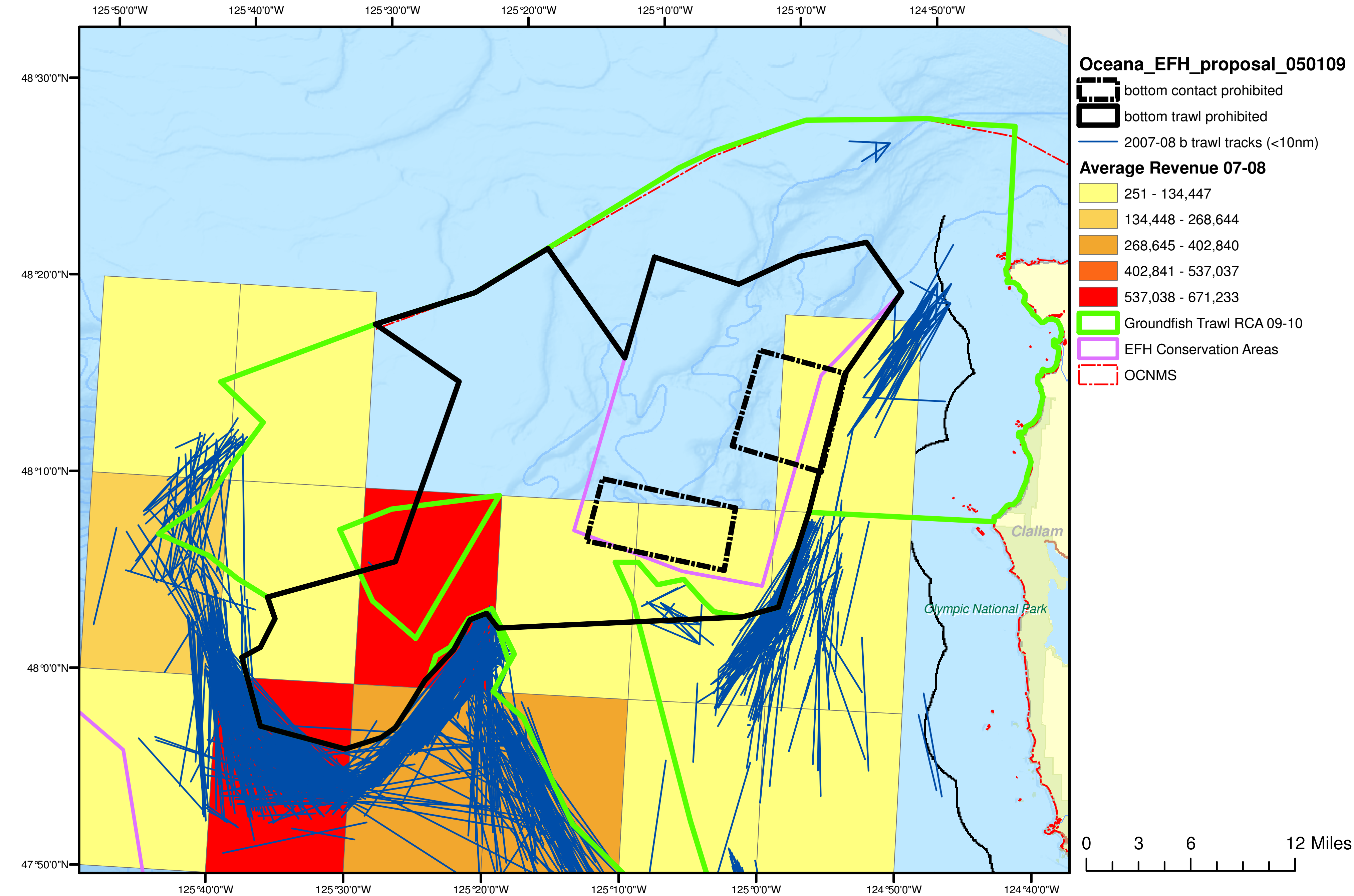

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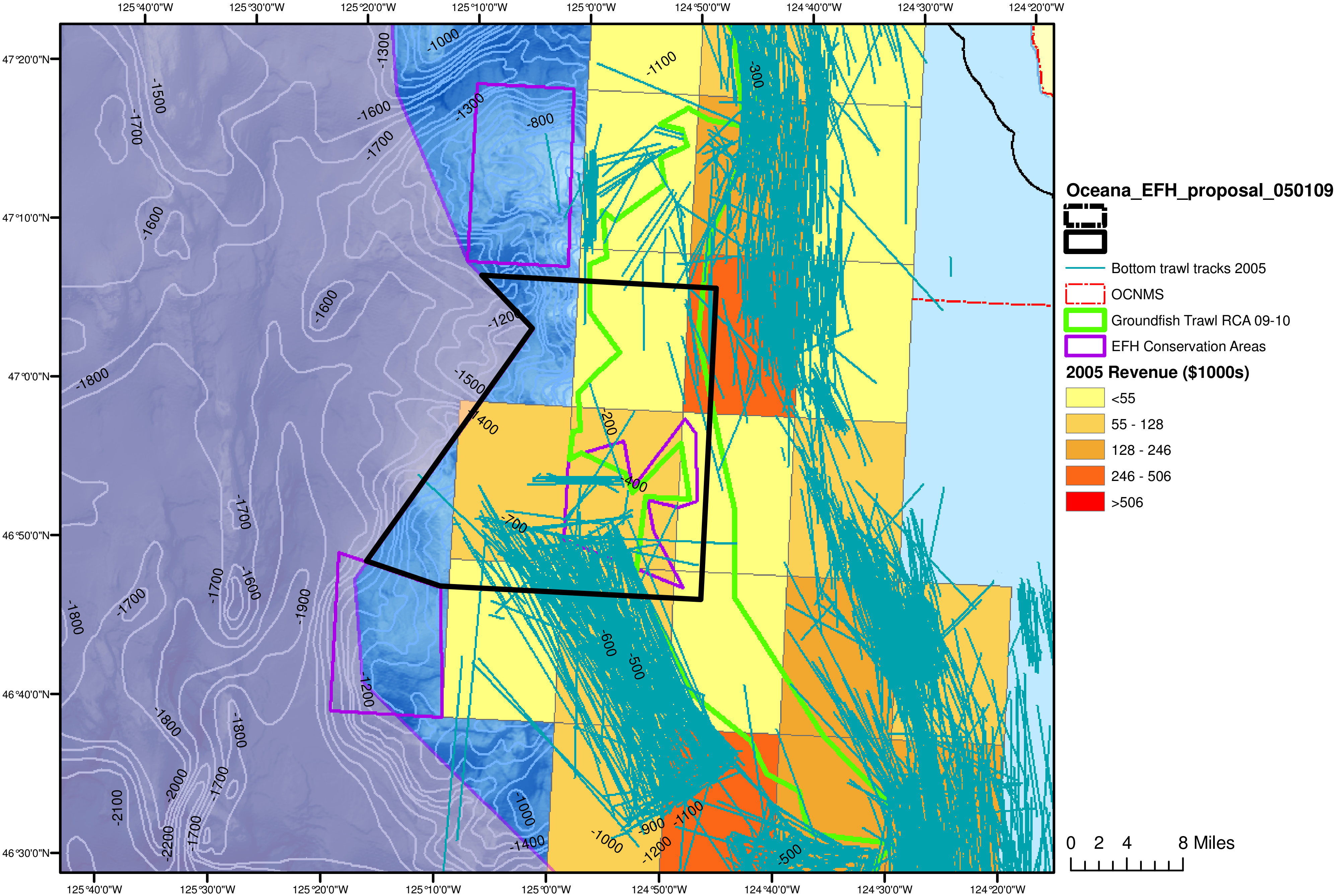
Figure 4. Grays Canyon Bottom Trawl Activity 2005



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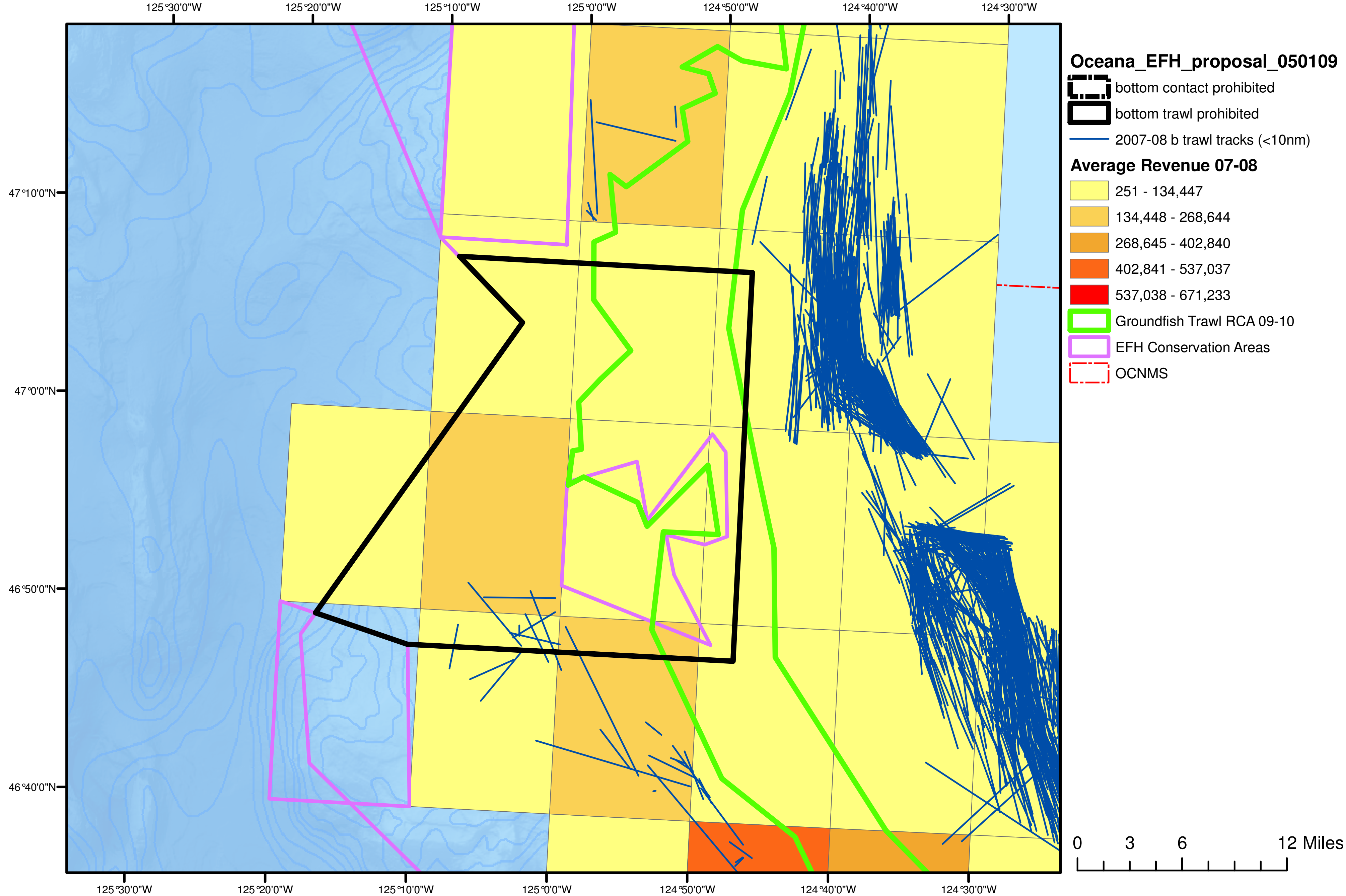
OCEANA

Figure 5. Grays Canyon Bottom Trawl Activity 2007-2008 (Track Data from WDFW logbooks only)



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Quileute Natural Resources
QUILEUTE INDIAN TRIBE

401 Main Street • Post Office Box 187
LaPush, Washington 98350
Phone: (360) 374-5695 • Fax: (360) 374-9250

The Quileute Indian Tribe of the Washington coast finds that the proposals put forth by Oceana to expand two existing Groundfish Essential Fish Habitat areas (Olympic 2 and Grays Canyon), one of which is located within our treaty fishing area lack adequate foundation from a scientific standpoint. The Oceana proposals, brought forth with a premature urgency, should not be grounds for a decision on fishing practices at this time.

Within the collective Usual and Accustomed harvest areas (U&As) of the coastal tribes extending north from Pt Chehalis to the Canadian border, four treaty tribes (Makah, Quileute, Hoh, and Quinault) co-manage their fishery resources with the U.S. government and the state of Washington. The tribes continue to work with NOAA and WDFW to develop comprehensive habitat mapping, data compilation, and management strategies to ensure that habitat, including groundfish EFH, is maintained as an integral part of healthy ecosystems in perpetuity. Treaty fisheries managers utilize a number of habitat conservation measures including timing, gear and area restrictions developed in consultation with NOAA. Habitat management is not just considered in the context of the Essential Fish Habitat review process developed by the Council, but in the biennial management cycle and in-season tribal regulations as well.

Oceana met briefly with representatives of the four coastal tribes in Lacey, Washington on April 28, 2009 and shared their proposal for expansion of the two areas, Olympic 2 and Grays Canyon two days before the submission deadline to the PFMC. The proposal was for extraordinary expansions of both of these areas, based primarily on two studies: "Observations of Deep Coral and Sponge Assemblages in Olympic Coast National Marine Sanctuary" Marine Conservation Series NMSP-07-04 and: "Grays Canyon Glass Sponge Reefs", P. Johnson PhD, both undertaken since 2006. Both of these studies were limited in their design to simply document the presence of corals and sponges. The data from both of these efforts is still undergoing analysis and has not yet been published in peer review reports. Also noteworthy is that the survey conducted in Olympic 2 occurred during the same year that it was designated as such, this clearly does not provide time for this management action to have an effect. While the proposal proponents have expressed these data as if they describe the areal extent of coral and sponge assemblages, by design these efforts cannot provide that information. Specific to the Grays Canyon research, a large part of that effort was focused on the presence of methane production from the Earth's crust and not the distribution or abundance of sponges. Neither of the proposed boundary changes are substantiated by datasets that are rigorously populated. Further, as described, they potentially contain areas not likely to have these species present, due to substrate types. This characterization of the data highlights the need to design research that can provide information useful to management decisions. At a minimum, the distribution, condition, abundance and the ecological role of coral and sponge assemblages needs to be described based on rigorous science and not "snapshot science".

Every survey will discover more coral and sponge resulting in more cries for protecting them. If management decisions are to be based on individual "discoveries" then managers will quickly be locked into cycles of reacting to each new data point instead of working towards creative solutions that take into account not only the ecological needs of sustainable fisheries but also the socioeconomic needs of human populations. The appropriate time frame for bringing a proposal forward is the (five-year) EFH periodic review scheduled for 2011. Instead, Oceana is presenting its case with only interim data, before actual numbers, occurrence, and habitat needs can be demonstrated. This is not an acceptable process.

While supporters of this proposal have pointed out that "fishery management councils (FMC) nationwide have not utilized their authorities to recommend designating zones to prevent interactions between deep sea corals and fishing gears" (e.g., MCBI May 26, 2009), that is simply not the case. NOAA in their 2008 report to Congress ("Implementation of the Deep Sea Coral Research and Technology Program") cited numerous actions by regional FMC to protect deep sea corals. Specific to our region, more than 130,000 square miles of habitat are protected through marine protected areas; bottom trawling being limited to discreet areas; and the overall fishing effort has been reduced ("NOAA Report to Congress", 2008). This is a result of federal, tribal, and state regulatory actions to protect species and habitats. Because of these relatively new restrictions following decades of unrestricted bottom trawling, it is highly unlikely that there is an urgent need to protect every new coral and sponge finding that has survived these past activities. Presumed evidence of coral rubble presented by Oceana in the Olympic 2 area cannot be definitely attributed to bottom trawls and as revealed by sanctuary scientists the rubble could be the result of changes in ocean chemistry or currents (http://olympiccoast.noaa.gov/research/research_feat/coral_graveyard.html). The glass sponge findings in the Grays Canyon area have also survived decades of activity, yet are now being presented as needing urgent protection using the EFH interim review process.

The coastal treaty tribes of Washington State have only those areas north of Point Chehalis to maintain their cultural, subsistence and commercial fisheries. They are restricted to these areas as a matter of law (*United States v. Washington)*. They cannot fish outside of these waters, unlike the non-Indian fishers. But tribes will be questioned by the general public if forced to fish in those expanding closed areas to exercise their reserved treaty rights. Native Americans have witnessed time and again groups and governments drawing new boundary lines within their areas, for a variety of purposes. The Oceana proposal may be well- intended but does not consider the restricted condition of treaty fishing under which the tribes must operate. It is especially for that reason that the Quileute Indian Tribe requires sound science and due process as bases for any decision impacting treaty fishing. Coastal Treaty Tribes are engaged in conservation practices with methods effective to their respective fisheries compositions.

In a letter of May 27, 2009, to Donald K. Hansen, Chair of the PFMC, Oceana and others cited the Olympic Coast National Marine Sanctuary survey of 2006 as providing "greatly increased scientific knowledge of the importance, distribution and sensitivity of coral habitat in the Juan de Fuca Canyon area." The coastal treaty tribes are well aware of this survey, and had several subsequent discussions with Sanctuary staff about it. This information was not definitive, and therefore should not be the premise for policy or rule-making. The series of pictures do not show scale and often show matters out of context to "make a point" (e.g., some fishing gear near a broken coral, but no stated frequency of such occurrences.) Samples are seen in isolation, in the absence of context, and the data have yet to be fully correlated. Work must be done to detail the distribution, density and diversity of the organisms and habitats throughout the coastal area. The coastal tribes in conjunction with the state of Washington have developed the strategies to collect the necessary information through our Ocean Initiative. We will continue to work with our co-managers in the state and federal governments to do the scientific work necessary to map the seafloor and catalog the marine life present off our coast. With this information it will be possible to develop comprehensive management and conservation plans to protect our fisheries and the habitats that support them forever.

In closing, Quileute Indian Tribe believe it is critical that the PFMC not formulate policy reactively as being requested, as this will set the precedent for fisheries management recommendations and/or decisions to be based on each data point. Reactive management will only hinder the collective creative process that takes into account both the results of fisheries management actions and the knowledge of marine ecosystems functions and processes. We urge the PFMC to follow due process and the technical protocols already guiding management of other marine resources.

Agenda Item E.1.d
Supplemental Public Comment 4
June 2009

PROPOSAL TO THE PACIFIC FISHERY MANAGEMENT COUNCIL TO MODIFY GROUNDFISH ESSENTIAL FISH HABITAT CONSERVATION AREAS

Juan de Fuca Coral Canyons and Grays Canyon Sponge Reefs

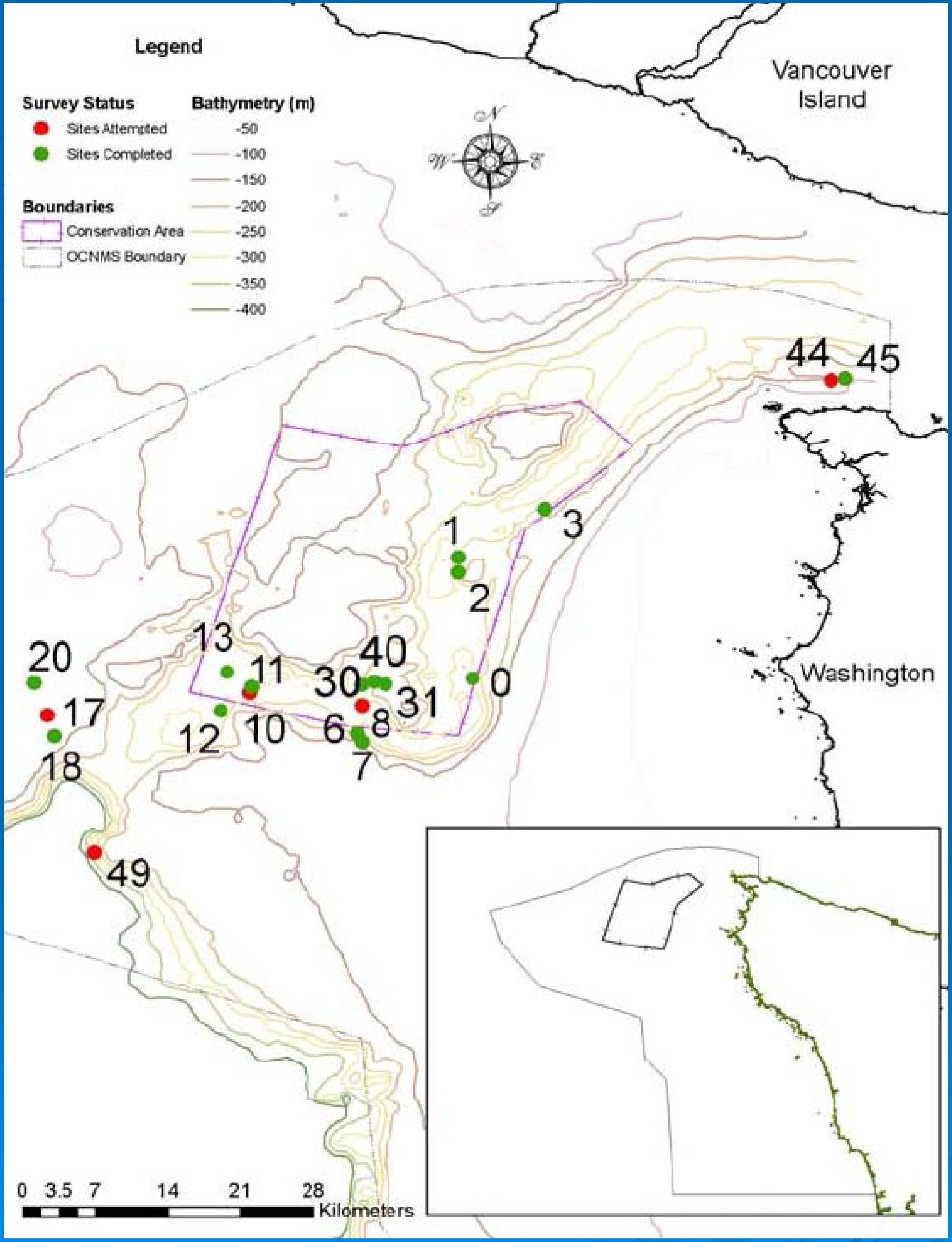
OCEANA | Protecting the World's Oceans

Ben Enticknap, Oceana

PFMC. June 13, 2009

"The three dimensional structure of deep corals may function in very similar ways to their tropical counterparts, providing enhanced feeding opportunities for aggregating species, a hiding place from predators, a nursery area for juveniles, fish spawning aggregation sites, and attachment substrate for sedentary invertebrates."

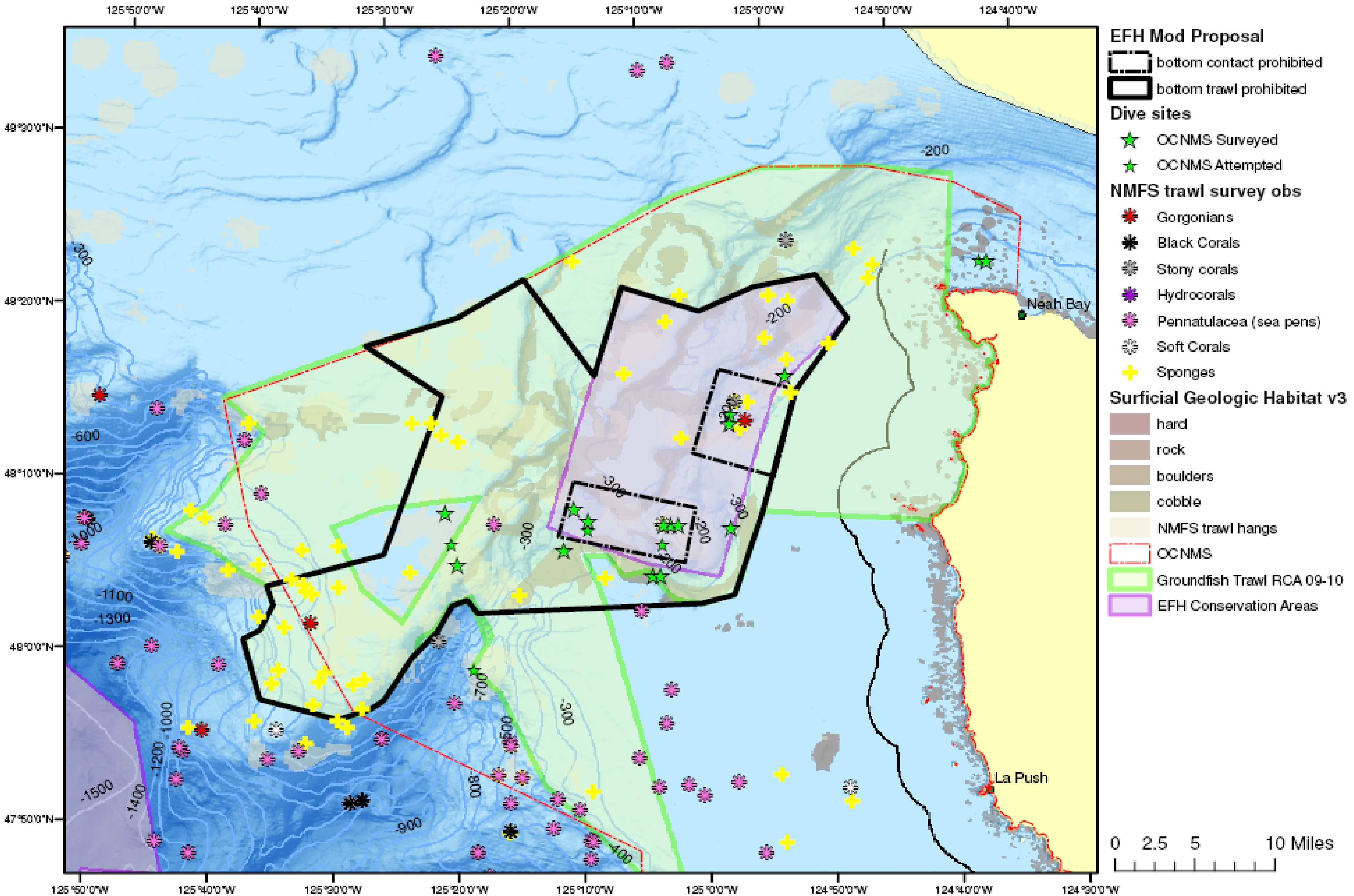
NOAA 2007. State of Deep Coral Ecosystems of the United States



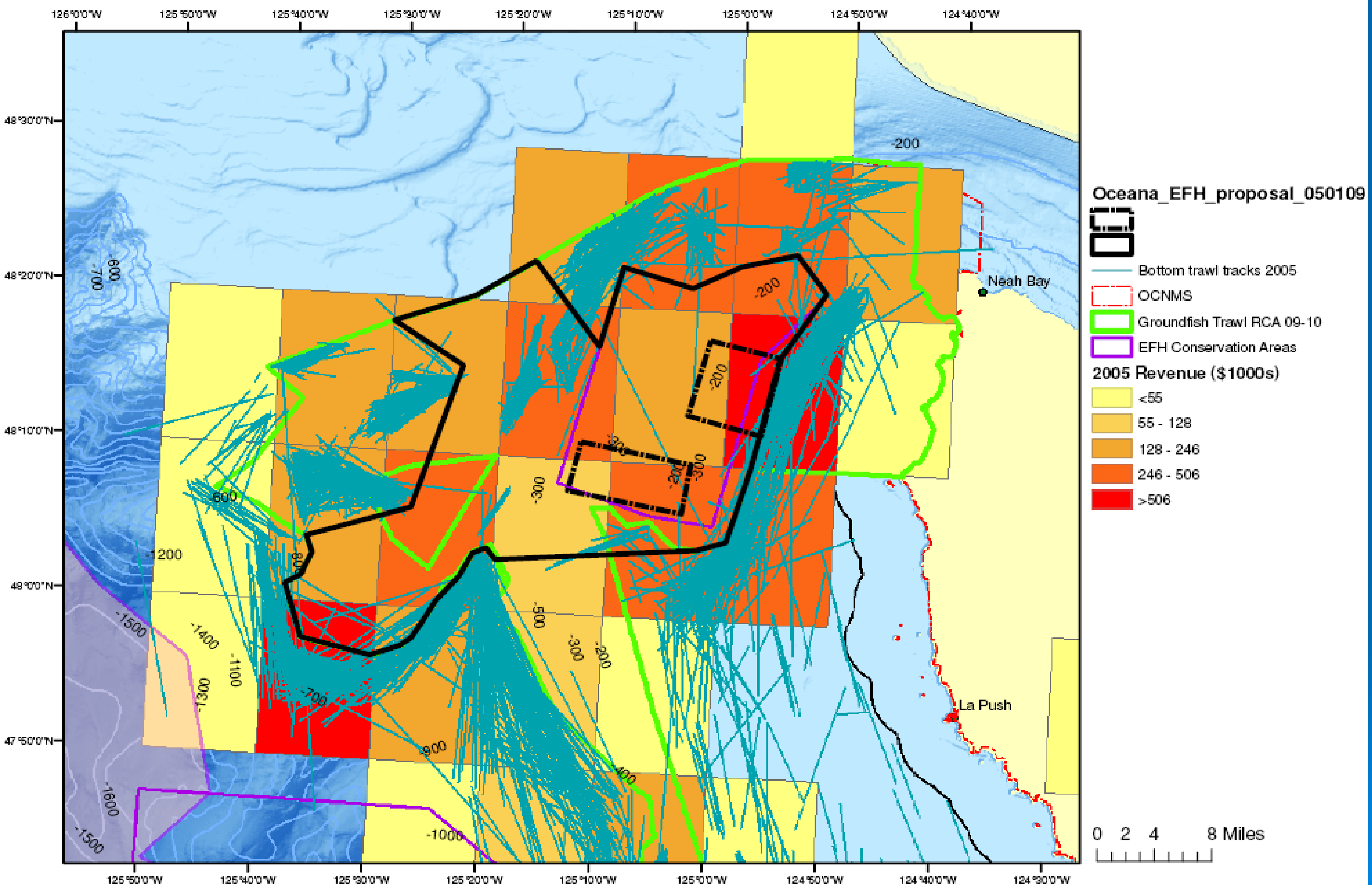
OCNMS Research Dives 2006

- Coral and sponge communities at 14 of 15 dive sites
- 17 coral species
- Reef building sponges
- Evidence of fishing induced habitat damage

Figure 2: Juan De Fuca Coral Canyons Important Ecological Area Proposed EFH Closure Modification



Juan De Fuca Trawling Activity (2005) and Management Map



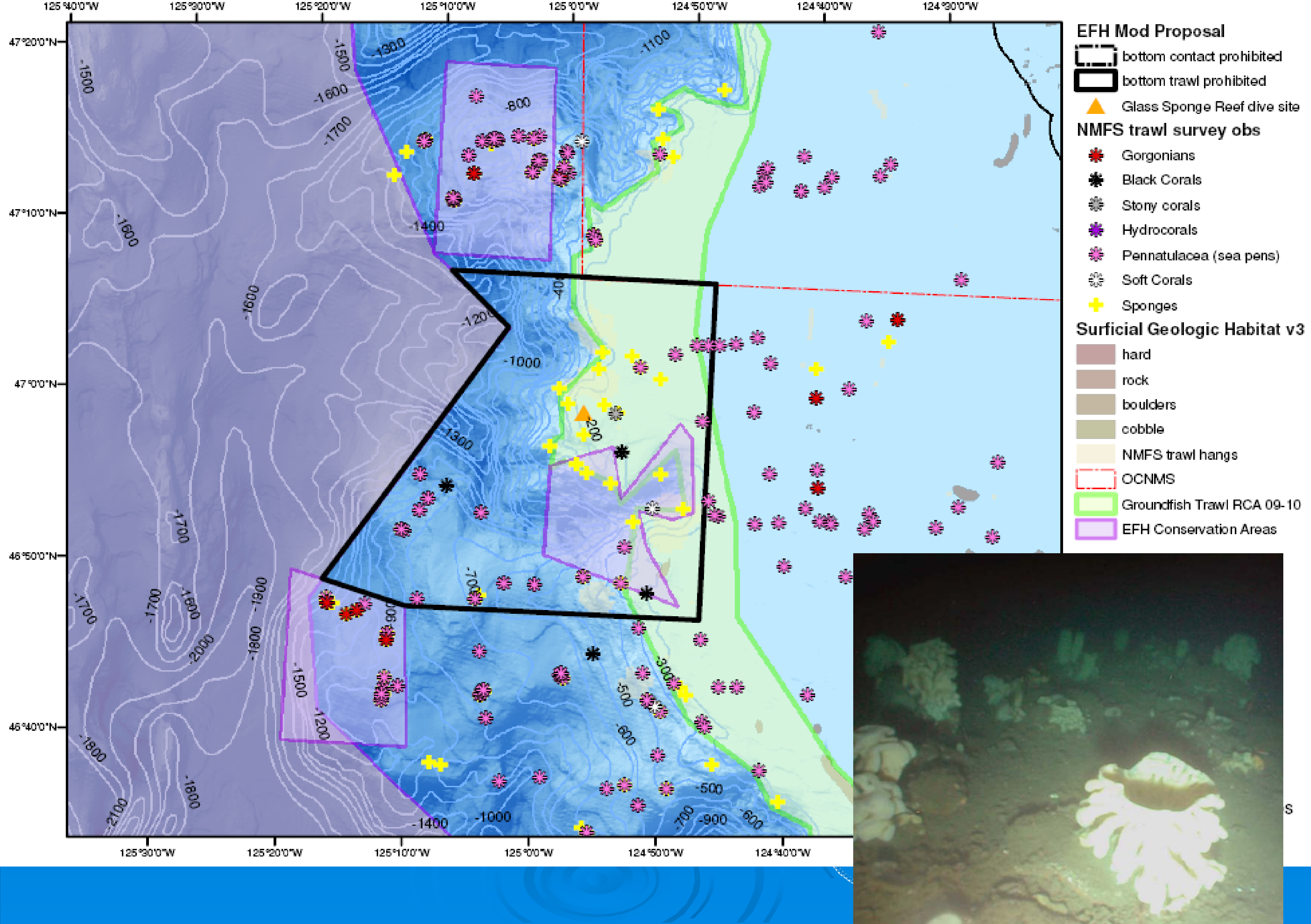
Gray's Canyon

Glass Sponge Reef

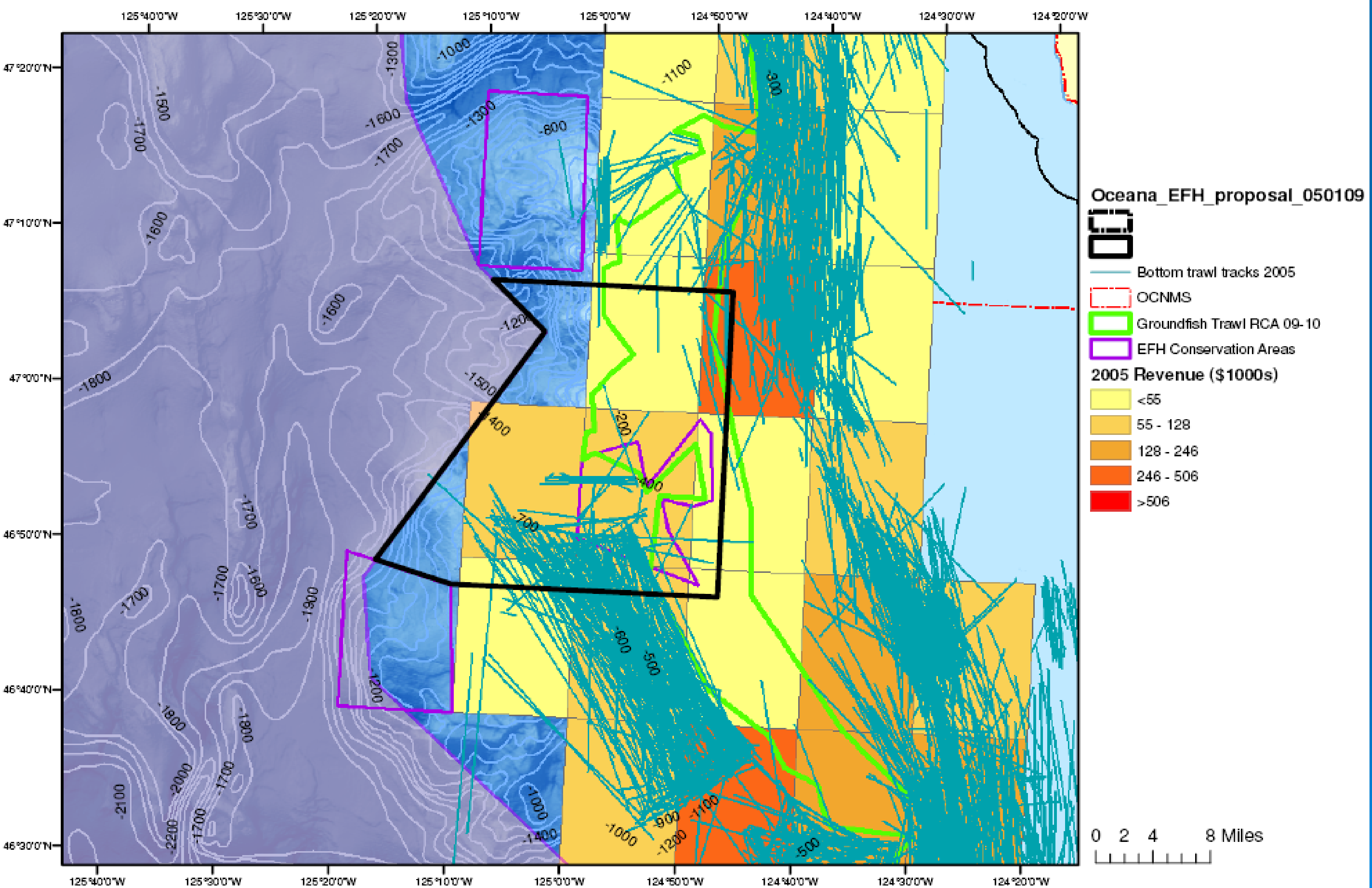
"The Washington reef is at least 2,000 feet long and up to 10 feet tall."
– Seattle P.I. July 28, 2007.

"The Queen Charlotte Basin [sponge] reef complexes support diverse communities that are distinct from surrounding shelf communities and play a role as nursery habitats for rockfish (*Sebastes* spp.)." Cook et al. 2008

Figure 3: Grays Canyon Sponge Reefs Important Ecological Area Proposed EFH Closure Modification



Grays Canyon Trawling Activity (2005) and Management Map




PROPOSED PROCESS AND SCHEDULE FOR DEVELOPING 2011-2012 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

Amendment 17 to the Groundfish Fishery Management Plan (FMP) established the process to set biennial groundfish harvest specifications and management measures which was first used to set 2005-2006 harvest specifications and management measures and again used for the same purpose for the past two management cycles. The process accommodated several important sequential decision-making steps, including scientific peer review of data and analyses used for management decision-making; preparation of either an environmental assessment (EA) or environmental impact statement (EIS) as required by the National Environmental Policy Act (NEPA) to analyze alternative harvest specifications and management measures; the opportunity for constituent meetings sponsored by state agencies to solicit public input on a preferred management alternative; and full notice and comment rulemaking to implement new biennial regulations. All of these steps need to be timed so that the new regulations can be implemented January 1 in the first year of the subsequent management cycle, in this case 2011.

A draft schedule and process for developing the 2011-2012 groundfish harvest specifications and management measures is provided as Agenda Item E.2.a, Attachment 1. This process and schedule is modeled after the process used to develop 2009-2010 specifications and management measures. Council and National Marine Fisheries Service (NMFS) staffs will coordinate responsibilities for addressing the processes and actions to implement the Council's decision. In the past, Council staff has taken lead responsibility in preparing an EIS to support Council decision-making and inform the public about the proposed action. NMFS staff has been responsible for drafting the regulations necessary to implement the action. NMFS is also responsible for managing the implementation process, such as undertaking the steps required in rulemaking and filing the draft and final EIS (if prepared) with the Environmental Protection Agency.

The process for setting the 2011-2012 specifications and management measures has several unusual aspects. First, the management framework should be made compliant with revised National Standard 1 Guidelines specifying overfishing limits (OFLs), acceptable biological catches (ABCs), annual catch limits (ACLs), and accountability measures (AMs). Under the reauthorized MSA, these revisions are to be incorporated into the FMP by 2011, which means that decisions on harvest specifications for the next biennium need to be guided by, and be consistent with, the revised framework. Thus, the process for developing FMP Amendment 23, which will incorporate the revised framework into the groundfish FMP, must be closely coordinated with the harvest specifications process. Second, a target date of January 1, 2011, has been set for implementation of the Trawl Rationalization Program. This would change the management measures used in the groundfish limited entry trawl sector; for a combined whiting and nonwhiting shoreside sector individual fishing quotas (IFQs) would be used instead of bimonthly cumulative landing limits. The Pacific whiting mothership sector would be managed by a new obligatory cooperative structure. The catcher-processor sector would continue to function under the current, voluntary co-op. The Council also adopted a large number of fixed allocations of management units between the trawl sectors and other groundfish sectors to support Trawl Rationalization. Assuming the program is implemented, the kinds of management measures under consideration during the biennial process will change substantially. However, it may be necessary to consider as a contingency suitable measures employing the current management tools in case the trawl rationalization program cannot be implemented by January 1, 2011. Any decision on the range of measures to be considered probably does not need to be made until the April 2010 Council meeting (when management measure alternatives are slated for adoption), at which time NMFS will likely have a better idea of whether the trawl rationalization program will be in effect at the start of the next biennial cycle.

During past biennial cycles actions related to rebuilding plans for overfished species raised additional process issues. Although not known at this time, declaration of another species as overfished, triggering the need to develop a rebuilding plan, would necessitate preparation of an FMP amendment. Similarly, as in the 2008-2009 biennial cycle, substantial revisions to existing rebuilding plans required an FMP amendment (Amendment 16-4) accompanying the groundfish specifications regulatory action. This could introduce additional steps in the implementation process as described in Attachment 1.

Two years ago it was noted that §304(i) of the revised MSA, describing new MSA-specific environmental procedures could change the type of analytical document that may be required. In 2008 NMFS published a proposed rule to implement this provision. However, in December 2008 the proposed rule was withdrawn. The agency may address this outstanding issue in 2009, but it is unlikely to affect the form of documentation during this biennial cycle, because actions in process would likely be "grandfathered" under current requirements.

Attachment 2 is the scoping matrix included in the NMFS Northwest Region (NWR) Quality Assurance Plan, which specifies environmental procedures pursuant to regulatory streamlining. This scoping matrix helps to document the decision as to whether an EA or EIS should be prepared for a particular action. It is expected that NMFS NWR staff, with input from Council staff, will undertake this exercise in the near future, which, if necessary, would be followed by a Notice of Intent (NOI) to prepare an EIS. The NOI outlines the issues under consideration, invites public comment on the scope of the action and its effects, and announces a 30-day written public comment period on scoping issues. As indicated in Attachment 1, the NOI would be published in advance of the November 2009 Council meeting when decision-making on the range of alternatives begins. The Council may wish to provide comments related to the scoping matrix for consideration in the decision about the type of NEPA document to prepare.

The Council should consider the advice of its advisory bodies and the public before adopting a detailed schedule and process for the development of 2011-2012 groundfish harvest specifications and management measures.

Council Action:

Adopt a process and schedule for developing 2011-2012 groundfish harvest specifications and management measures.

Reference Materials:

1. Agenda Item E.2.a, Attachment 1: Pacific Fishery Management Council and National Marine Fisheries Service Schedule and Process for Developing 2011-2012 Groundfish Harvest Specifications and Management Measures.

2. Agenda Item E.2.a, Attachment 2: Scoping Matrix for 2001-12 Groundfish Biennial Specifications and Management Measures.

Agenda Order:

a. Agenda Item Overview — Kit Dahl, John DeVore
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action**: Adopt a Process and Schedule

PFMC
06/01/09

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Agenda Item E.2.a
Attachment 1
June 2009

PACIFIC FISHERY MANAGEMENT COUNCIL AND NATIONAL MARINE FISHERIES SERVICE SCHEDULE AND PROCESS FOR DEVELOPING 2011-2011 GROUNDFISH HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

June Council Meeting *June 13-18, 2009*	The Council and advisory bodies meet to adopt: 1. New stock assessments. 2. A schedule, process, and work plan for developing 2011-2012 groundfish harvest specifications and management measures.
Impact Analysis Planning *July-August, 2009*	Council staff and NWR staff develop: 1. An outline of the preliminary draft NEPA document. 2. Assignments and a schedule for preparing the NEPA document. 3. Analytical framework for analysis.
September Council Meeting *September 12-17, 2009*	The Council and advisory bodies meet in Foster City, California to adopt new stock assessments.
Notice of Intent *September-October, 2009*	NMFS/Council staffs conduct internal scoping to identify potential effects of the proposed action in order to determine whether to prepare an Environmental Impact Statement (EIS) or Environmental Assessment (EA). If an EIS is to be prepared, NMFS must publish a Notice of Intent (NOI) in the *Federal Register*, announcing the decision.
"Mop up" STAR Panel and Rebuilding Analyses *September 28-October 2, 2009*	The SSC Groundfish Subcommittee and members of the GMT and GAP meet to review any stock assessments recommended for further review by the SSC as well as rebuilding analyses prepared for overfished species.
GMT Meeting *October 2009* (exact dates to be determined)	The GMT, Council staff, and NWR staff meet in Seattle, Washington to review new stock assessments and rebuilding analyses and draft a recommended range of 2011-2012 groundfish harvest specifications (overfishing limits [OFLs] acceptable biological catches [ABCs] and annual catch limits [ACLs]) and preliminary management measures.
November Council Meeting *October 31-November 5, 2009*	The Council and advisory bodies meet in Costa Mesa, California to adopt: 1. Remaining stock assessments and rebuilding analyses. 2. Updated observer data and proposed methodologies to model bycatch in trawl and fixed gear fisheries and other impact analyses. 3. A range of preliminary 2011-2012 harvest specifications (OFLs, ABCs, and ACLs) and, if possible, preferred ACLs for some stocks and complexes. 4. Adopt, or give guidance on, a preliminary range of management measures, including initial allocations.
Preliminary Development of Impact Analyses *November 16, 2009- March 24, 2010*	The GMT, Council staff, NWR staff, and agency staff develop: 1. Preliminary impact analyses based on the range of OFLs, ABCs and, ACLs and guidance on management measures. 2. Task assignments for impact analyses.
Constituent Meeting Opportunity *November 9, 2009-April 9, 2010*	Opportunity for state and tribal agencies to hold constituent meetings to obtain input on final OFLs, ABCs, and ACLs and refinement of the range of management measures.

Preliminary Impact Analysis Completed for April Briefing Book *March 24, 2010*	Council / NWR staff completes preliminary impact analysis for inclusion in the April briefing book. This will include basic components of the NEPA analysis, including a description of the action, baseline data, preliminary alternatives, and preliminary impact analysis.
April Council Meeting *April 10-15, 2010*	Council and advisory bodies meet to: 1. Adopt final 2011-2012 harvest specifications (OFLs, ABCs, and ACLs). 2. Adopt a range of refined management measures and, if possible, a tentative preferred alternative of management measures.
Constituent Meeting Opportunity *April 19-June 11, 2010*	Opportunity for state and tribal agencies to hold constituent meetings to obtain input on a final preferred alternative of management measures.
Updated Preliminary Impact Analysis Completed for May Briefing Book *May 26, 2010*	Council staff or NWR staff delivers the preliminary NEPA document with a final range of alternatives (not necessarily including the preferred alternative) for the June briefing book and coordinates pre-submission internal review by NMFS.
June Council Meeting *June 12-17, 2010*	Council and advisory bodies meet to take final action on the 2011-2012 groundfish management measures.
Implementation Process *June-December 2010*	Council/NWR staffs complete NEPA analysis, which is then submitted to NMFS. A variety of applicable laws govern the implementation process, as discussed below.

After Council final action, the Council decision must be submitted for the implementation process conducted by NMFS. The objective is for the regulations for the next biennial period to become effective on January 1, 2011. The specifics of the process depend on the nature of the action and the level of analysis. The primary applicable laws affecting the process are as follows:

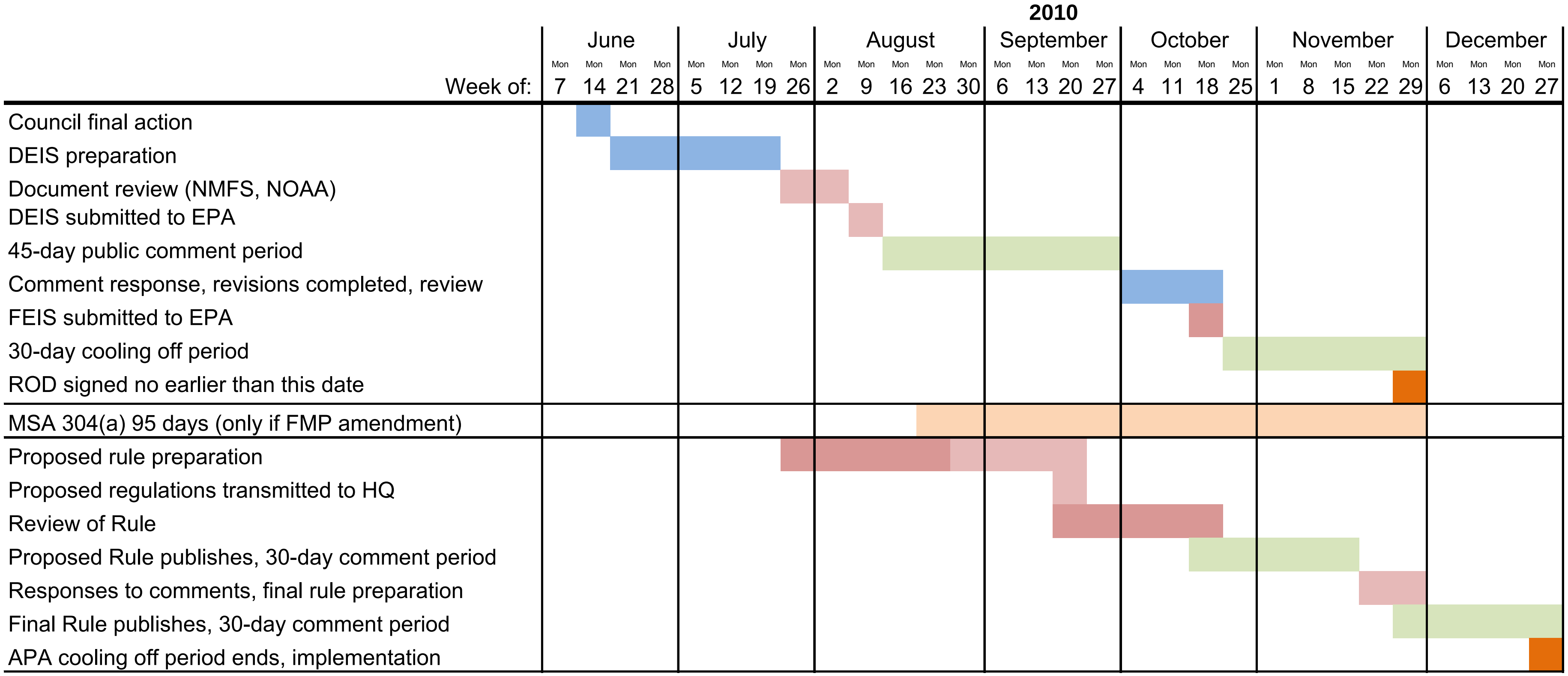
- The Administrative Procedures Act (APA) and Magnuson-Stevens Act (MSA) §304(b) govern the promulgation of regulations, which is the principal way in which harvest specifications and management measures are implemented. This includes a 15-day window for NMFS review of the proposed regulations, preparation of a proposed rule, which is published in the Federal Register and followed by a 30-day public comment period, publication of a final rule in the Federal Register and a 30-day cooling off period after publication before the regulations become effective. All together, once the regulations have been initially drafted, this process takes 90-120 days. (In unusual circumstances the process can take longer.)
- If the harvest specifications process also requires an FMP amendment (for example to incorporate a new rebuilding plan or revisions to existing plans) then MSA §304(a) comes into play. Once the proposed amendment is formally transmitted to NMFS by the Council NMFS must immediately publish a Notice of Availability for the amendment, which triggers a 60-day public comment period. NMFS must take a final decision on the amendment within 30 days of the end of the public comment period. Taken together 95 days are typically allotted for this process.
- NMFS has indicated that they may initiate formal consultation on the effect of the proposed action on species listed under the Endangered Species Act pursuant to section 7 of the Act. (In this case, NMFS Sustainable Fisheries Division would consult with the NMFS Protected Resources Division.) The NEPA document will serve as the biological assessment, which provides information necessary to determine whether to initiate formal consultation. Under formal consultation a Biological Opinion is prepared, which supports a determination on the effect of the action on listed species and may contain discretionary and nondiscretionary measures to address effects. Once formal consultation is initiated, it must be completed within 135 days (60 days for the consultation and 45 days to prepare the Biological Opinion) and the action cannot be implemented before the consultation process is concluded.
- NEPA provides an umbrella framework to incorporate analyses required under applicable law and support decision-making. Since 2003 an EIS has been prepared for annual and biennial harvest specifications and management measures. If an EIS is prepared, a two-stage process is required. A DEIS is filed with the Environmental Protection Agency. The EPA then publishes a Notice of

Availability, which triggers a minimum 45-day public comment period. Once this is concluded, any comments received must be addressed in a final EIS (FEIS), which is also filed with EPA. A 30-day cooling off period then ensues before the responsible official may sign the Record of Decision (ROD), which serves as the legal determination of the agency's action. The ROD must be signed before the final rule is published and in the case of a related FMP amendment, before the determination on approval of the amendment.

As can be seen from the above summary of the mandates governing the implementation process, there are a number of parallel processes which must be coordinated by NMFS in order to implement the action through regulations (and FMP amendment, if applicable). They are also time consuming, so Council and NMFS staffs have to start the work necessary for the implementation process immediately after the June Council meeting in order to have regulations implemented on January 1. From a Council staff perspective, the principal responsibility is to prepare a sufficient NEPA document based on the Council's final action. As part of the final stages of the drafting process, time is needed for internal review of the NEPA document as specified in agency procedures. This includes reviews by the NWR NEPA Coordinator, NOAA General Council, and the NOAA Office of Program Planning and Integration. Since the heart of the NEPA analysis is an evaluation of the effects of different alternatives, timely Council action to identify alternative harvest specifications and management measures will facilitate the process by allowing more of the analytical work to be completed during the decision process.

An indicative timeline showing the time periods and coordination of these various processes is shown on the next page. This timeline is predicated on the need for the NEPA process to be completed (indicated by signing of the ROD) before the final rule can be published.

Indicative timeline of implementation process. Note that the MSA §304(a) review is required only if the action includes an FMP amendment.



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Groundfish Matrix

Level of Potential Significant Impact by Resource Under the Proposed Action - [Insert Name of Action]

	Overfished Groundfish	Non-Groundfish Species (Non-Listed Salmonids, P&C Halibut, CPS, HMS, D crab, Shrimp/Prawns, Sea Cucumbers)	Groundfish at Health and Precautionary Levels	Listed Salmonids	Marine Mammals & Turtles	Seabirds	Marine Ecosystem & Fish Habitat (including wetlands, if applicable)	Community & Economic Impacts	Tourism & Recreation	Environmental Justice	Safety of Human Life at Sea
Proposed Action											
Rationale											

Level of Potential Significant Impact by Resource Under the Proposed Action - [Insert Name of Action]

	Air Quality	Geology, Soils, Groundwater & Hydrology	Water Quality	Listed Plants & General Vegetation	Cultural Resources	Noise	Aesthetics	Land Use & Ownership	Cumulative Impacts		
Proposed Action											
Rationale											

PREFERRED ALTERNATIVE DESIGNATIONS:

L=Low potential for significant impact H=High potential for significant impact

M=Moderate potential for significant impact N/A = Not applicable/no expected impact

Question asked: How does the change in [*what would action change?*] that could be created by this program affect [*insert resource name*]?

June 8, 2009

BY FAX AND EMAIL

Donald Hansen and Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Re: Public Comments on Proposed Process and Schedule for Developing 2011-2012 Biennial Harvest Specifications and Management Measures

Dear Mr. Hansen and Council members:

The Natural Resources Defense Council hereby submits the following comments concerning the Proposed Process and Schedule for Developing 2011-2012 Biennial Harvest Specifications and Management Measures.

We believe that the following analyses are required under the National Environmental Policy Act and the Magnuson-Stevens Act to appropriately evaluate the environmental impact of the proposed action. We therefore respectfully request that they be included in the EIS analysis.

1. Structure alternatives to analyze socio-economic impact of incremental increases in overfished species OY

Under the Magnuson-Stevens Act ("MSA"), overfished species must be rebuilt in a time period that is "as short as possible." 16 U.S.C. § 1854(e). The justification for this priority, even when it causes economic hardship, lies in the statutory recognition that a healthy, rebuilt fishery is in the interests of both fishing community and environmental goals. See 16 U.S.C. § 1801(a)(1) (noting that the nation's fishery resources "constitute valuable and renewable natural resources," that many of these species' survival is threatened and that others' survival will soon be threatened by "increased fishing pressure, . . . [and] the inadequacy of fishery resource conservation and management practices and controls."). Congress stated explicitly that it intended with the MSA "to take immediate action to conserve and manage the fishery resources." 16 U.S.C. § 1801(b)(1). These concerns and priorities remained unchanged by the 2006 MSA

Reauthorization which, in fact, created even stronger measures to protect overfished species. See, e.g., 16 U.S.C. § 1854(e) (requiring that overfishing be stopped "immediately"); 16 U.S.C. § 1854(4)(A) (eliminating language which allowed plans and regulations to specify a time period during which overfishing could occur).

The issue of how to interpret "considering the needs of the fishing community" in light of the MSA's mandate to "rebuild as quickly as possible" has been squarely considered by one federal Court of Appeals. In NRDC v. NMFS, the Ninth Circuit concluded that "Congress intended to ensure that overfished species were rebuilt as quickly as possible, but wanted to leave some leeway to avoid disastrous short-term consequences for fishing communities." 421 F.3d 872, 880 (9th Cir. 2005). The Court illustrated "disastrous short-term consequences" as a "total fishing ban." Id. It concluded that because a total ban would cause disastrous short-term consequences, the agency wasn't required to prohibit all fishing (which would rebuild the species the fastest), but could "set limited quotas that would account for the short-term needs of fishing communities." Id. "The purpose of the Act is clearly to give conservation of fisheries priority over short-term economic interests." Id. at 879.

Accordingly, to comply with the MSA's requirement to rebuild as quickly as possible, T_{target} must be set as close to T_{min} as possible. The leeway the agency has to extend T_{target} beyond T_{min} is limited to the amount of fish necessary to prevent disastrous short-term consequences to fishing communities. Therefore any T_{target} longer than T_{min} must be specifically demonstrated as necessary to prevent a short-term disaster to fishing communities. See NRDC, 421 F.3d at 880 (reiterating that although the agency is allowed to consider the needs of fishing communities in setting a rebuilding plan, "the time period must be *as short as possible*") (emphasis in original, internal quotations omitted).

The rebuilding alternatives must be constructed in a manner that allows managers to choose OYs which would rebuild overfished species as quickly as possible while avoiding a short-term disaster to the fishing communities. To determine the lowest level of OYs possible before triggering an economic disaster, the rebuilding alternatives should start with an analysis of zero fishing (which is likely to be disastrous) and then incrementally increase the OYs with each alternative. The economic analysis would then show the economic impacts of increasing the rebuilding times with higher OYs. The legally required alternative would be the one with the smallest OYs without causing an economic disaster.

The EIS for the 2009-2010 specifications failed to comply with this framework. Instead, the rebuilding alternatives were "strategically constructed suites of depleted species' OYs designed by the GMT to show how the available yields of these species constrain fishing opportunities by sector north and south of 40˚10′ N latitude and on the continental shelf and slope." DEIS at 29. After the zero harvest analysis, there was only one conservation alternative, Alternative 3, which was constructed with "relatively low OYs for all the depleted species." DEIS at 204. Thus, the DEIS has presumed a certain level of fishing activity and proceeded to examine how it should be allocated between different fisheries and geographies. This analysis, although interesting, did not answer the fundamental question of what minimum OY level of each species is necessary to avoid disastrous short term consequences to fishing communities.

The failure to construct alternatives which range from highly conservation-oriented to less conservation-oriented represents a departure from the structure of the 2007-2008 EIS analysis. The 2007-2008 DEIS organized three alternatives as follows: "Alternative 1 is intended to conform most closely to the preferred low OY values; catches under Alternative 2 are midrange in the high-low range; Alternative 3 is most consistent with the preferred high OY values." 2007-2008 DIES at vii. The EIS for the 2011-2012 specification cycle should return to the earlier framework. In addition, it should add more Alternatives of incrementally increased OYs to better refine where the minimum OYs necessary to avoid a disaster occur.

Because an analysis of how low OYs can be without causing a short-term disaster is at the heart of the environmental impact analysis (and compliance with the MSA and NEPA), we request that you re-instate analysis of alternatives which begin with low OYs and incrementally increases them with each alternative.

2. Analyze the threshold of economic activity below which a disaster would occur

An articulation of the disaster threshold appears necessary to comply with the MSA. In NRDC v. NMFS, 421 F.3d 872 (9th Cir. 2005), the Ninth Circuit specifically interpreted how the competing goals outlined in the MSA of "rebuilding as quickly as possible" and "taking into account the needs of the fishing community" interact. It concluded that the goal of rebuilding as quickly as possible takes priority and can be delayed only to the extent that it is necessary to avoid "disastrous short-term impacts" to the fishing community. Therefore, the agency must identify the disaster threshold it seeks to avoid so that it can be determined whether the agency is, in fact, rebuilding as quickly as possible.

Before decision-makers (and interested public) can determine whether a proposed OY of an overfished species would be so low that it would cause a "short term disaster" to fishing communities, they must know what level of economic activity is necessary to avert a short-term disaster. This must be a specific analysis –general references to the groundfish disaster declaration in 2000 as causing hardship to fishing communities in the past and pointing to other ailing fisheries, such as salmon (see the 2009-2010 DEIS at 546), are insufficient to establish this basic building block to the rebuilding period decisions.

Without a benchmark for disastrous consequences, evaluation of the agency's actions becomes an impermissibly murky target. Consider the following statement from the 2009-2010 FEIS, which lacked a specific disaster benchmark. "Although, as discussed above, lower OYs and associated management measures bring about less adverse impacts to overfished species, the Council also considered the needs of fishing communities in selecting its preferred alternative. The cumulative decline in revenue and income over the past decade have been significant. Additional substantial reductions in revenue due to management restrictions would likely have additional significant short-term socioeconomic impacts." FEIS at 612. This non-specific criterion appears to justify a very wide range of agency actions –including quite high OYs and long rebuilding times. Such a moving target does not comport with the MSA's requirement to rebuild overfished species in as short a time as possible.

3. Analyze the effect that the ITQ will have on communities identified as "vulnerable" in the 2011-2012 Biennial Harvest Specifications and Management Measures

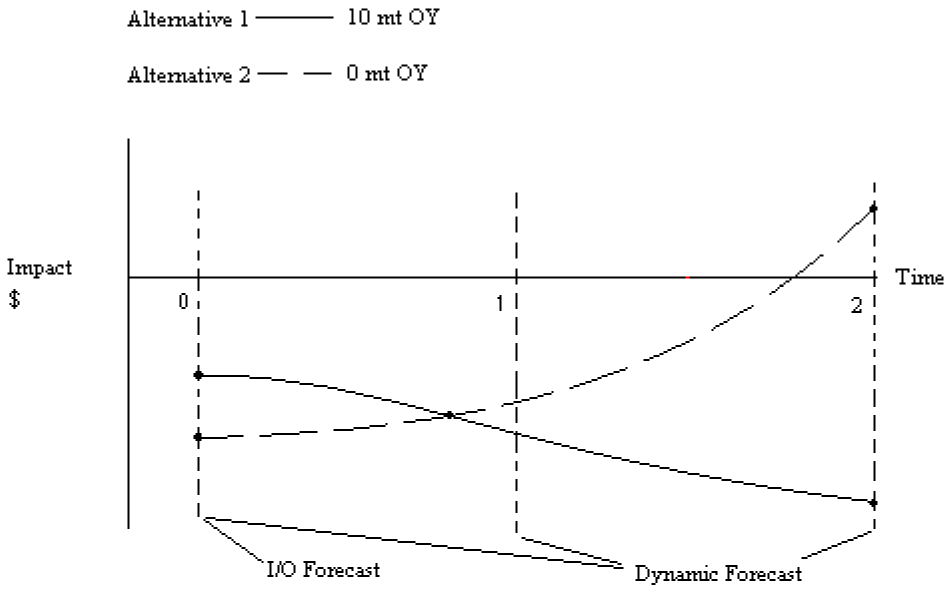
In the past, the agency has justified higher OYs of overfished species as necessary to preserve vulnerable fishing communities. See 2009-2010 DEIS Chapter 7. However, the agency has also recently identified likely impacts to many of these same communities from other programs, specifically the Trawl ITQ program, which is scheduled to be implemented in 2011. See Trawl Rationalization Appendix C: Description and Results of Analytical Tools (Attached as Exhibit A) at C-5 ("[I]t is reasonable to expect ports with vessels that have a relatively long travel time to fishing grounds, have relatively unsuccessful operators, relatively costly vessels, and relatively few support businesses to be at a disadvantage when compared to other regions. In addition, ports that are adjacent to fishing grounds with high constraining overfished species abundance would also tend to be at a disadvantage as the presence of constraining overfished species would encourage operators to move to areas with lower abundance."); C-10 ("This information shows that Bellingham, Neah Bay, Newport, and Princeton/Half Moon Bay have greater than 50 percent of their non-whiting trawl catch occurring in areas indentified as a moderately high or high bycatch area.").

It makes little sense to refuse to rebuild overfished species in as short a time as possible out of concern for vulnerable communities if those communities will not be preserved by the higher OYs. Such a decision would lack a rational basis. To show that it is preventing a disaster with higher OYs, decision-makers must consider the effect other agency programs will have on these communities, especially programs the agency has already identified as highly likely to adversely impact vulnerable communities.

4. Use the best available economic science

The 2011-2012 specifications EIS should use the best available science. First, like stock assessments, the economic analysis in the EIS should undergo review including rigorous panel and/or peer review scrutiny. Second, the EIS should use current data sets from IMPLAN instead of the badly outdated ones (from 1998) relied upon in the last two groundfish specifications cycles. Third, the EIS should base its analysis on a dynamic model instead of a static I/O model to appropriately calculate the impacts of the proposed action over its lifetime and to be able to fully calculate tradeoffs between options. See Figure 1, depicting the benefit of utilizing a dynamic model instead of an I/O one.

Figure 1: Example of Alternatives Evaluation with Dynamic Model



Fourth, the EIS should calculate all economic benefits of rebuilding, not just costs. The NOAA Guidelines lay out the following requirements for the "Summary of Expected Economic Effects: "(1) list all benefits and costs of each alternative, either monetized or non-monetized; (2) identify when the benefits and costs would occur; and (3) identify to whom the benefits and costs would accrue." (NOAA Guidelines at 18). The analysis must quantify both costs and benefits whenever possible. "Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider" (NOAA Guidelines at 7). The following are some of the benefits which the EIS should analyze:

1) Consumptive benefits of rebuilding quickly

The EIS must calculate the consumptive benefits of rebuilding, on a per year basis as the species is rebuilt. As part of the consumptive benefit of the rebuilt fishery, EIS must also calculate the benefit of the additional target species fish that can be taken which are currently limited by their co-occurrence with overfished species.

We suggest that in performing this analysis NMFS use methods such as those discussed in Sumaila (2005), "Fish Economics, the Benefits of Rebuilding U.S. Ocean Fish Populations.

2) Non-consumptive benefits of rebuilding quickly

The NOAA Guidelines "[r]ecognize the growing regulatory emphasis on protected resources and habitat by recommending that analysts highlight, where appropriate, the effects on the non-consumptive uses of fisheries, other living marine resources, and the benefits derived from these resources and their habitats" (NOAA Guidelines at 2). As part of this decision, NMFS must evaluate non-market goods as part of its decision-making process. According to the NOAA Guidelines, "[n]ot all goods and services important to consumers are exchanged through markets and receive market prices. These non-market goods include environmental amenities, other public goods and recreational experiences. . . . *Including these non-market goods is particularly important when considering habitat, ecosystem, and many marine mammal issues*" (NOAA Guidelines at 15) (emphasis added).

We suggest that the EIS utilize methods based on Farber (2006) to help evaluate non-consumptive uses. See Table1. Farber (2006) aligns each of the ecosystem services with a rating of amenability to economic valuation and the corresponding method of valuation. With this type of procedural outline, economic research on the Pacific groundfish fishery can focus on estimating the more plausible values.[1]

Table 1: Groundfish ecosystem services

Ecosystem service	Amenability to economic valuation	Most appropriate method for valuation
Nutrient cycling	Medium	Avoided Cost, Contingent Valuation
Nutrient regulation	Medium	Avoided Cost, Contingent Valuation
Biological regulation	Medium	Avoided Cost, Production Approach
Food	High	Market Pricing, Production Approach
Recreation	High	Travel Cost, Contingent Valuation, Ranking
Aesthetic	High	Travel Cost, Contingent Valuation, Ranking, Hedonic Pricing
Science	Low	Ranking

Adopted from Farber (2006)

The NOAA Guidelines provide additional guidance on how to evaluate non-market benefits, further underscoring the importance that this kind of analysis be undertaken. "Whenever practicable, these non-market goods should be given monetary values as a consumer's WTP using non-market valuation techniques such as travel cost, stated preference, and hedonic methods" (NOAA Guidelines at 15). Willingness to pay ("WTP") methods are also endorsed, to be used "when measuring benefits for increment in market or non-market goods." Id. at 13, 13 n.3.

[1] For further clarification of the general methods listed in this table see James (1994) or the NOAA Coastal Ecosystem Restoration webpages: http://www.csv.noaa.gov/coastal/economics/envvaluation.htm http://www.csv.noaa.gov/coastal/economics/methodsenvvaluation.htm

3) The cost of assemblage shifts:

The shifting assemblage of the Groundfish Fishery is a serious ecological side effect of traditional commercial fishery management.[2] These shifts are being amplified by competitive total allowable catches (TACs) and by regulations allowing the targeting of high value species.[3] According to Levin et al. (2006), the decades of concentrated fishing on rockfish (which NMFS and the Council permitted) has caused depletion of these species. This rockfish depletion has led to fundamental assemblage shifts at the population level (see Levin et al. 2006 ("Our analyses suggest that over the last 25 years there have been fundamental changes in the fish assemblage on the continental shelf of the U.S. Pacific coast.")). This depletion has also caused NMFS and the Council to curtail fishing of rockfish (as required under the MSA), which in turn has caused fishermen to then target the less commercially valuable roundfish.

Historically, fishery management choices that have maintained competitive, effort creeping behavior have permanently hindered the ability of fish stocks to rebuild.[4] We cannot disregard the economic costs associated with the negative externality of ecosystem decline. The assemblage shift caused by rockfish depletion is hardly a welcome event and should be calculated as part of the EIS analysis. It reflects a condition of significantly reduced biodiversity and the availability of fish for fishermen that are less commercially valuable. The EIS for the rebuilding amendment must account for the cost of the assemblage shift which is a direct result of fishing effort. See Levin et al. (2006) ("fishing has played a large role in the changes we documented").

We first requested that these net benefit calculations be part of the specifications evaluation in the 2007-08 specifications cycle and then repeated the request for the 2009-2010 specifications cycle. In response, the agency has stated that it lacks the sufficient information. See, e.g., 2007-08 EIS at 615 ("Unfortunately there is not sufficient information on West Coast groundfish fisheries for a complete enumeration of net economic benefits from the fishery").

As noted earlier, the EISs for previous cycles have produced in excess of 250 pages of economic analysis of costs. See, e.g., 2007-2008 EIS which, between Chapter 7 of the EIS (157 pages) and Appendix A (113 pages), generated 270 pages of almost exclusively short-term cost analysis. This effort focuses almost exclusively on the short-term costs of the alternatives. We respectfully suggest that two specifications cycles is more than sufficient time to obtain appropriate data for the net benefits calculations and that the EIS for the 2011-2012 specifications cycle should prioritize this analysis.

5. Present options for managing for the anticipated impacts of global warming on fisheries

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[2] Levin, Phillip et al. (2005)
[3] Grafton, R. Quentin et al. (2006)
[4] Imeson (2006) and Roy (1996).

Impacts from rising CO_2 emissions and ocean acidification to date have been largely unaccounted for in current fisheries management. As the 2009-2010 DEIS stated, "Future effects of ocean conditions on the status of affected species . . . are not encompassed within the analysis of the present action. Most notably, the criteria used to analyze impacts on depleted species, such as the time to rebuild under a constant harvest rate and the probability of successfully rebuilding the stock by T_{MAX}, do not account explicitly for the effects of climatological events." 2009-2010 DEIS at 239-40.

Given the mounting evidence that climate change and its effects are already occurring, decision-makers should have options to address these impacts - and the uncertainty that they bring - in the decision making process. For example, the current 'overfished' state and decades-long (20-50 year) rebuilding programs of many rockfish species put many west-coast fisheries in a vulnerable position. Rebuilding depressed populations quickly and promoting healthy, productive ecosystems will be the most important strategies to minimize the negative ecological and socio-economic effects of climate change on fisheries. IPCC 1995; FAO 2002 (www.fao.org/docrep/009/a0699e/A0699E00.HTM); ACIA 2005; WBGU 2006.

Accordingly, the EIS should include analysis on the following series of management changes recommended by scientists given the fisheries challenges and uncertainties that climate change and ocean acidification bring:

> 1) Confront the additional uncertainty that climate change brings to fisheries management by explicitly incorporating uncertainty from various sources including climate change into analyses and decision making. Pre-determined standards regarding uncertainty should be established.
>
> 2) Exercise precautionary management. Fisheries management decisions continue to err on the side of short-term economic interests at the expense of long-term ecological resilience. (Ludwig et al. 1993; WBGU 2006). Now, more than ever, management must favor decisions that are robust to uncertainty. A practical step to implementing a more effective precautionary regime is the use of a supplemental compulsory buffer between the maximum fishing mortality threshold and the annual catch limit. Such buffers can serve as 'climate' insurance.
>
> 3) Expand the definition of 'overfished' to include more criteria such as age structure. The restoration and maintenance of healthy (i.e., un-skewed) age distributions will help to maintain important genetic variation and reduce population variation during this period of shifting environmental conditions (Berkeley et al. 2004; Anderson et al. 2008; Stenseth and Rouyer 2008).
>
> 4) Conduct explicit spatial management of fish stocks with either permanent or temporary closed areas to ensure the preservation of locally adapted genomes as well as a diversity of spawning locations.

5) Develop precautionary forage fish standards (e.g., catch limits below MSY to account for the fact that small, fast-growing pelagic species often respond first to low-frequency climate changes (Murawski 1993; Perry et al. 2005; Rose 2005) and these species' importance in the food web.

6. Reinstate T_{min} in the analysis of rebuilding plans and OY options

For some unknown reason, the 2009-2010 EIS contained a dearth of T_{min} figures. This represents a change from the analysis provided in the 2007-2008 DEIS. For instance, compare Table 2-3 from the 2007-2008 Specs DEIS (includes the T_{min} figure) with Table 2-3 from the 2009-2010 Specs DEIS (omits the T_{min} figure). In addition, the analysis on alternatives and rebuilding strategies in chapter 4 of the 2009-2010 DEIS also omit T_{min} figures although T_{min} data were included in the analysis of the 2007-2008 DEIS.

T_{min} is a highly important figure in evaluating the rebuilding implications of an OY choice. As the 2009-2010 DEIS explains, "A target year closer to T_{MIN} implies reducing harvests to rebuild the stock in a shorter amount of time, while a target year closer to T_{MAX} favors higher harvest levels and a longer time to rebuild." 2009-2010 DEIS at 4. Without information about T_{min}, the public cannot effectively evaluate the rebuilding plans from a longer term perspective to understand overall how quickly the species is being rebuilt and instead has only comparisons to the last biannual cycle.

Therefore, we respectfully request that T_{min} be included in the 2011-2012 EIS analysis in the same places it was in the 2007-2008 EIS analysis, in particular in Table 2-3 and in the analysis on alternatives and rebuilding strategies in chapter 4.

7. Use the framework established by the Ninth Circuit, not the "multi-tiered" one which prevents meaningful evaluation

The MSA and the Ninth Circuit's NRDC v NMFS decision are clear –the agency must rebuild overfished species as quickly as possible. This means an aggressive bycatch reduction program (which would minimize economic impacts of avoiding overfished species and allow fishermen to catch quota of healthy populations while keeping catch of overfished species low) and allowing only enough fishing of the overfished species to avert a disaster for fishing communities.

Instead of complying with this directive, however, the agency has instead created a "multi-tiered" framework. The agency has described this framework as follows: "Consistent with Amendment 16-4, NMFS took a programmatic perspective for 2009 and 2010 and examined all rebuilding plans, and their impacts on communities, simultaneously." 2009-2010 FEIS at 607.

This "multi-tiered" framework is deficient in a number of regards and should not be used in the 2011-2012 specifications cycle. First, this framework impermissibly functions as a shield which is then used to try to deflect any meaningful evaluation of the agency's decisions. Consider the following FEIS statements made in response to our observation that lower OYs of certain species (e.g., darkblotched, canary) had not caused disastrous impacts in the past and so were therefore a viable option for the 2009-2010 Specifications period. "Alternative rebuilding OYs need to be considered on a case by case basis and need to consider much more than how the OY changes from one management period to the next." FEIS at 611. "This multi-tiered analytical approach is designed to appropriately address the Magnuson-Stevens Act mandate to rebuild in as short a time as possible while taking into account the status and biology of the depleted stock, the needs of fishing communities, and the interaction of the depleted stock within the marine environment." FEIS at 610. The agency's decisions for each species should be capable of evaluation and should not be shrouded in a mysterious black-box of balancing economic tradeoffs between various communities.

Second, this "multi-tiered approach" essentially results in a moving target; any attempt to pin down the soundness of the agency's OY choices leads to the response that no individual part can be evaluated. See 2009-2010 FEIS at 607 ("We cannot look at darkblotched rockfish in isolation when considering community impacts, and therefore the commenters have taken a limited perspective on the darkblotched rebuilding plan. Consistent with Amendment 16-4, NMFS took a programmatic perspective for 2009 and 2010 and examined all rebuilding plans, and their impacts on communities, simultaneously. In doing so, NMFS and the Council considered both time to rebuild and needs of communities in adopting their final preferred alternative."). With this approach the agency essentially demands (impermissibly) that all of its OY decisions be taken on faith as complying with the MSA.

Similarly, the agency uses its framework to suggest that the calculations involved in determining impacts on communities are so complex that no OY decision can be evaluated. "Under this framework, impacts to west coast fishing communities associated with rebuilding alternatives are analyzed based on each community's dependence on the groundfish fishery and the general economic resilience of that community to changes in fishing opportunities. . . . Each community is differentially affected by an individual species rebuilding plan based on that species distribution and the way that species rebuilding plan affects the fisheries that contribute to the community's economic infrastructure. This is a more realistic approach for assessing impacts on communities since different communities suffer such different impacts." 2009-2010 FEIS at 609-10.

We therefore respectfully request that the Council not use this "multi-tiered" framework in this specification cycle as it does not comply with the direction provided by the Ninth Circuit under the MSA and, moreover, appears to be an attempt to shield its decisions from evaluation.

8. List the sector allocations for each species and analyze the environmental impacts

As part of the groundfish specifications process, allocations of groundfish are made between the different groundfish gear sectors and analyzed for their environmental impacts in the DEIS. See 2009-2010 DEIS at 12 ("Alternative management measures adopted for analysis are designed to illustrate the potential efficacy and tradeoffs of management strategies and allocations considered for the next biennial management period by the Council.").

Fixed gear and trawl gear have different impacts on bycatch and habitat. According to a recent study done on sablefish, trawl gear catches orders of magnitude more bycatch than fixed gear in the sablefish fishery. Lekelia Jenkins, Gear Conversion as a Means to Reduce Bycatch and Habitat Impacts in the U.S. West Coast Sablefish Fishery (2008). Trawling also wreaks more bottom habitat destruction than fixed gear. See National Research Council, Effects of Trawling & Dredging on Seafloor Habitat (2002); Korie A. Johnson, A Review of National and International Literature on the Effects of Fishing on Benthic Habitats (2002); Eleanor M. Dorsey and Judith Pederson (Eds.), Effects of Fishing Gear on the Sea Floor of New England (1998); Peter W. Barnes and James P. Thomas (Eds.), Benthic Habitats and the Effects of Fishing (2005); Christian Nellemann, Stefan Hain, and Jackie Alder, In Dead Water, Merging of Climate Change with Pollution, Over-Harvest, and Infestations in the World's Fishing Grounds (2008).

To allow decision-makers to make a rational choice about allocating groundfish between trawl and fixed gear (and the public to provide input), the EIS should first list each groundfish species and the percentage being allocated between gears types for the proposed 2009-2010 action.

The EIS should then analyze the impacts of allocating different percentages of groundfish species between trawl and fixed gear (including pots) to overfished species' habitat and bycatch. According to the 2009-2010 DEIS, "groundfish trawlers landed 96 percent of total groundfish harvest by weight" which means that the "trawlers take the vast majority of the groundfish harvest." 2009-2010 DEIS at 414. Given the enormous adverse environmental impacts from the trawling gear, the agency should analyze alternatives to giving the vast majority of groundfish to trawl, including higher allocations to gears with lower environmental impact such as fixed gear. We suggest analyzing an alternative which increases the allocation of fish that is shared between trawl and fixed gears by 25-30% over the status quo.

Not only does NEPA require analysis of the environmental impacts of allocating the vast amount of groundfish to the gear that generally has the most bycatch and causes the most habitat destruction, but so do the MSA and FMP. "The entire resource, or a portion, may be allocated to a particular group, although the Magnuson-Stevens Act requires that allocation among user groups be fair and equitable, **reasonably calculated to promote conservation**, and determined in such a way that no group, person, or entity receives an undue excessive share of the resource. The socioeconomic framework described in

Section 6.2.3 provides criteria for direct allocation. **Allocative impacts of all proposed management measures should be analyzed and discussed in the Council's decision-making process**." Groundfish FMP § 6.3 at 73 (emphasis added).

In addition, the FMP further requires consideration of the following factors (including ones with conservation implications bolded below) "when intending to recommend direct allocation of the resource.

1. Present participation in and dependence on the fishery, including alternative fisheries.
2. Historical fishing practices in and historical dependence on the fishery.
3. The economics of the fishery.
4. Any consensus harvest sharing agreement or negotiated settlement between the affected participants in the fishery.
5. **Potential biological yield of any species or species complex affected by the allocation.**
6. **Consistency with the Magnuson-Stevens Act national standards.**
7. **Consistency with the goals and objectives of the FMP."**

Id. (emphasis added)

Analyzing the intersector allocation amendment process (FMP Amendment 21) is simply not a substitute for analyzing the intersector allocation implications of the 2009-2010 specifications. Amendment 21 is a companion amendment to Amendment 20 for the trawl individual quota program. As such, its focus will likely be on ensuring that the quota share program functions appropriately, not necessarily the effect of allocation on the resource from the 2011-2012 specification process. As an example, two of the leading alternatives in the Amendment 21 make an intersector allocation to the trawl gear and simply lump the rest of the sectors together (fixed gear, open access, recreational). See Intersector Allocation EA at 12 (Alt. 1 and Alt. 3). Thus, the environmental implications of which sectors get different allocations of fish in 2009-2010 is unlikely to be adequately analyzed. In addition, Amendment 21 focuses on a specific list of species based on their suitability for the ITQ process –the species implicated in Amendment 21 do not necessarily have complete overlap with the species at issue in the specifications process.

Conclusion

We appreciate this opportunity to comment on the proposed action. Thank you.

Sincerely,

Laura Pagano, Attorney
Karen Garrison, Oceans Program Co-Director
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BIBLIOGRAPHY

ACIA (2005) Marine Systems Arctic Climate Impact Assessment

Anderson CNK, Hsieh CH, Sandin SA, Hewitt R, Hollowed A, Beddington J, May RM, Sugihara G (2008) Why fishing magnifies fluctuations in fish abundance. Nature 452: 835-839

Barnes PW and James P. Thomas (Eds.), Benthic Habitats and the Effects of Fishing (2005).

Berkeley SA, Hixon MA, Larson RJ, Love MS (2004) Fisheries Sustainability via protection of age structure and spatial distribution of fish populations. Fisheries 29: 23-32

Dorsey EM and Judith Pederson (Eds.), Effects of Fishing Gear on the Sea Floor of New England (1998).

Faber, Stephen et al. 2006. Linking Ecology and Economics for Ecosystem Management. Bioscience 56(2).

FAO (2002) The state of world fisheries and aquaculture. Food and Agricultural Organization, Rome

IPCC (1995) Impacts, Adaptations, and Mitigation of Climate Change: Scientific-Technical Analysis. In: Moss RH (ed). Cambridge University Press, pp 878

Jenkins, L, Gear Conversion as a Means to Reduce Bycatch and Habitat Impacts in the U.S. West Coast Sablefish Fishery (2008)

Johnson KA, A Review of National and International Literature on the Effects of Fishing on Benthic Habitats (2002).

Key M, A. D. MacCall, J. Field, D. Aseltine-Neilson, K. Lynn. 2008. The 2007 Assessment of Blue Rockfish (Sebastes mystinus) in California. Southwest Fisheries Science Center. Santa Cruz, CA.

Levin, P.S., E.E. Holmes, K.R. Piner, and C.J Harvey. 2006. Shifts in a Pacific Ocean Fish Assemblage: The Potential Influence of Exploitation. Conservation Biology 20(4): 1181-90

Love MS, M. Yoklavich and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press. Berkeley, California.

Ludwig D, Hilborn R, Walters C (1993) Uncertainty, Resource Exploitation, and Conservation - Lessons from History (Reprinted from Science, Vol 260, Pg 17, 1993). Ecological Applications 3: 547-549

Murawski SA (1993) Climate-Change and Marine Fish Distributions - Forecasting from Historical Analogy. Transactions of the American Fisheries Society 122: 647-658

National Marine Fisheries Service. 2007. Summary of Bronzespotted rockfish (Sebastes gilli) conservation concerns. SW Fisheries Science Center Report, February 2007. In: Pacific Fishery Management Council Agenda Item E.2.b, Attachment 3, March 2007.

National Research Council, Effects of Trawling & Dredging on Seafloor Habitat (2002).

Nellemann C, Stefan Hain, and Jackie Alder, In Dead Water, Merging of Climate Change with Pollution, Over-Harvest, and Infestations in the World's Fishing Grounds (2008).

Office of Sustainable Fisheries, Guidelines for Economic Analysis of Fishery Management Actions, National Marine Fisheries Service (2000)

Perry AL, Low PJ, Ellis JR, Reynolds JD (2005) Climate change and distribution shifts in marine fishes. Science 308: 1912-1915
Rose GA (2005) Capelin (Mallotus villosus) distribution and climate: a sea "canary" for marine ecosystem change. Ices Journal of Marine Science 62: 1524-1530
Rosenberg, A., et. al. Setting Annual Catch Limits for U.S. Fisheries: An Expert Working Group Report. Lenfest Ocean Program. September 2007
Stenseth NC, Rouyer T (2008) Ecology - Destabilized fish stocks. Nature 452: 825-826
Sumaila UR and Elizabeth Suatoni, Fish Economics: The Benefits of Rebuilding U.S. Ocean Fish Populations (2005)
WBGU (2006) The future of the oceans - warming up, rising high, turning sour. In: Schmid J (ed). German Advisory Council on Global Change, Berlin, pp 110

APPENDIX

to comments submitted on June 8, 2009 by Natural Resources Defense Council on the Proposed Process and Schedule for Developing 2011-2012 Biennial Harvest Specifications and Management Measures

Appendix Table of Contents

This document is not included in the printed materials. It is available from the Council web site at http://www.pcouncil.org/groundfish/gffmp/gfa20/App_C_Analytical_tools.pdf

FISHERY MANAGEMENT PLAN AMENDMENT 22 (OPEN ACCESS FISHERY): REVIEW MARCH COUNCIL ACTION

Concerns were raised at the April 2009 Council meeting regarding the open access fishery preseason registration alternative adopted by the Council at its March 2009 meeting. The March 2009 decision came after a lengthy Council process initially aimed at capping or limiting access to the directed fishery sector of the open access fishery for B species groundfish (Federal groundfish not including nearshore species). There were concerns expressed by the National Marine Fisheries (NMFS) seat about the efficiency and efficacy of the alternative selected and there were concerns from the Washington Department of Fish and Wildlife seat about the clarity of motion adopted, including inclusion in the registration program of (a) target groundfishing vessels, (b) vessels incidentally catching groundfish (e.g., salmon troll vessels, pink shrimp trawl vessels) and (c) vessels fishing in or possessing B species groundfish in state waters (e.g., nearshore vessels in Oregon and California). To advance further consideration of this matter, the Council asked that NMFS meet with Council staff to put together information on relevant concerns expressed at the April 2009 Council meeting. The Council indicated it would consider this information at the June 2009 Council meeting towards a decision on whether or not to schedule a reconsideration of the March 2009 decision at some point in the future.

The final vote adopted a preseason registration process that was a slightly modified version of Alternative 2 contained in the March 2009 Preliminary Draft Environmental Assessment (EA). The motion and Council discussion at the time of action is contained in Agenda Item E.3.a, Attachment 1. The original unmodified Alternative 2 and analysis excerpts from the March 2009 Preliminary Draft Environmental Assessment are contained in Agenda Item E.3.a, Attachment 2. NMFS clarification about the March 2009 Council action is contained in Agenda Item E.3.b, NMFS Report. Relevant preliminary draft minutes from two portions of the April 2009 Council meeting dealing with this issue (the NMFS Groundfish Report and Future Council Meeting Agenda and Workload Planning) are provided in Agenda Item E.3.a, Attachment 3.

Council Action:

1. **Review final action from March 2009.**
2. **Consider noticing the possibility of rescinding or affirming the March 2009 action at a future Council meeting.**
3. **Provide guidance to staff (e.g., additional analysis, new alternatives, new control date, draft EA revisions, etc.).**

Reference Materials:

1. Agenda Item E.3.a, Attachment 1: March 2009 Draft Meeting Minutes: Council Action on Open Access License Limitation.
2. Agenda Item E.3.a., Attachment 2: EA Description and Analysis of Alternative 2.

3. Agenda Item E.3.a, Attachment 3: April 2009 Preliminary Initial Draft Meeting Minutes: Open Access Fishery Discussion.
4. Agenda Item E.3.b: NMFS Report on March 2009 Adopted Motion on Fishery Management Plan Amendment 22: Open Access License Limitation.
5. Agenda Item E.3.c, Public Comment.

Agenda Order:

a. Agenda Item Overview LB Boydstun
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Review March Council Action on Limiting the Open Access Fishery

PFMC
06/01/09

March 2009 Draft Meeting Minutes: Open Access License Limitation

G.5.a Agenda Item Overview (03/12/09; 4 pm)

Mr. LB Boydstun provided an agenda item overview which included a Powerpoint presentation, Review and Update of Open Access Fishery Preliminary Draft Environmental Assessment, Proposed Amendment 22, http://www.pcouncil.org/bb/2009/0309/G5b_SUP_EA_TEAM_PPT_0309.pdf. During the powerpoint, Mr. Kevin Ford, NMFS, joined Mr. Boydstun to answer questions. The slide show summarized (1) the license limitation alternatives, (2) the analysis of Alternative 6 (same as A-6, the Council's September 2008 adopted preliminary preferred alternative), and (3) new information regarding cumulative impacts and post window period landings.

During questions, it was clarified that the administrative process for the proposed B permit program would mimic that of the Limited Entry (A permit) program.

G.5.b Reports and Comments of Agencies and Advisory Bodies

Mr. Jones provided Agenda Item G.5.b, Supplemental GMT Report. Among other things, he noted that sablefish trip limits would not change until the fleet size was lowered to about 250 vessels and that a license limitation program would improve some aspects of the current management.

[Council adjourned for the day; returned back to Agenda Item G.5.b, on 03/13/09; 8 a.m.]

Mr. Ancona provided Agenda Item G.5.b, Supplemental GAP Report. The Council asked questions about issuing permits to previous vessel owners or fisherman and why the GAP recommended a relatively low landing threshold for a sablefish endorsement given that it made very little difference between the 100 lb or 500 lb thresholds.

Dr. McIsaac summarized Agenda Item G.5.b, GAC Report.

Ms. Vojkovich summarized Agenda Item G.5.b, Supplemental CDFG Report

Mr. Lockhart summarized Agenda Item G.5.b, Supplemental NMFS Report. In addition, Dr. Clark reported that the proposed license limitation program under Alternative 6 would cause the observer program to redesign their at-sea sampling strategy and increase overall program cost.

Mr. Steve Williams summarized Agenda Item G.5.b, Supplemental ODFW Report.

G.5.c Public Comment

Mr. Dave Bitts, PCFFA, Eureka, CA
Mr. Steve Gray, Bell Buoy Crab Co., Seaview, WA
Mr. Bill James, Port San Luis Commercial Fishing Association
Mr. Larry Collins, Crab Boat Owners Association, San Francisco, CA
Mr. Jason Salvato, fisherman, Petaluma, CA
Mr. Santi Roberts, Oceana (for NRDC), Portland, OR

Public comments ranged from taking no action to requesting a much higher standard for a sablefish endorsement (to several thousand pounds).

G.5.d Council Action: Adopt a Final Preferred Alternative for Implementation (03/13/09; 9:55 am)

Mr. Moore moved and Mr. Warrens seconded the following motion (Motion 39):

I move that the Council approve converting the Open Access Fishery to Federal Permit Management using the Council Preliminary Preferred Alternative (A-6) with the addition of sablefish and lingcod endorsements using the following criteria:

- The current owner of a vessel is eligible for a B permit if that vessel(s) was (were) used to make one or more directed B species open access fishery landings totaling ≥ 100 pounds from Federal and/or state waters off the Washington, Oregon or California coasts during the period April 9, 1998-September 13, 2006 (window period); and that at least one directed fishery landing was made during January 1 2004-September 13, 2006;
- A lingcod endorsement will be affixed to a B permit if a vessel qualifies for a B permit and landed ≥100 pounds of lingcod in any one year during the window period;
- A sablefish endorsement will be affixed to a B permit if a vessel qualifies for a B permit and landed ≥500 pounds of sablefish in any one year during the window period;
- Allow both a lingcod and a sablefish endorsement to be affixed to a B permit if the vessel qualifies for both endorsements;
- Affix species endorsements permanently to and for sole use with the original B permit and allow directed fishing for the endorsed species in addition to other B species groundfish;
- The endorsement provision is intended to preclude non-endorsed vessels from directly fishing for (targeting) endorsed species, but allow B permitted vessels without endorsements to land incidental amounts of the endorsed species under cumulative landing limits identified during the normal specifications process;
- Vessels that apply for and receive B permits, including any associated species endorsements, would be allowed to take and land B species groundfish using open access gear in amounts specified in Federal groundfish regulations;
- Vessels that do not receive a B permit and that do not possess a Limited Entry (A) permit will be allowed to take and land B species groundfish incidental to fishing for non-groundfish species in amounts specified in Federal groundfish regulations;
- Permits and associated species endorsements are transferable between vessels, including transfer during the first year;

- Allow A and B permits to be used alternately on the same vessel in the same year, but not in the same cumulative limit period. A declaration process is required as part of the A and B provision;
- Establish a process for initial issuance appeals;
- Remove C permit program provisions and provide a mechanism to account for and manage incidental catch of groundfish in these fisheries

Motion 39 was not voted on because Mr. Dan Wolford made a substitute motion.

Mr. Wolford moved and Ms. Kathy Fosmark seconded a motion (Motion 40) to adopt, with one exception, Alternative 2 (the vessel registration alternative on page 35 of Agenda Item G.5.a, Attachment 3) which establishes an annual federal license requirement for vessel owners that intend to participate in the open access groundfish fishery. The one exception would be in the last sentence of the paragraph under Alternative 2 which should read: "However, a vessel owner may apply for an open access license <u>for the following year</u> at any time during the year."

Mr. Wolford stated that there has been a lot testimony by the public that the current fishery was viable and that many long time fishermen, for one reason or another would not qualify to continue fishing under the more limiting alternatives. He noted that the fleet size reduction had been achieved; the proposed B permit program was too complex; the vessel monitoring system (VMS) requirement is effective in limiting fishery participation; a \$100 to \$200 annual registration fee would discourage frivolous vessel registrations; and a salmon vessel effort shift did not appear to be a problem in the fishery.

Mr. Wolford reviewed the seven items under the need for the proposed action of page 4 of the EA and compared his motion with the preliminary preferred alternative. His Alternative 2 with a simple registration program would be expected to have fewer vessels; would allow simple market forces rather than regulatory action to determine how communities would benefit; is as effective or more effective than the preferred alternative with regard to eliminating restrictive landing limits; assists in efficiently meeting management goals with the registration of vessels; is neutral with regard to economic viability issues and salmon effort shifts; and achieves improved management and enforcement through simple registration as effectively as the preferred alternative.

He further noted that the analyses for Alternatives 2 and 6 had very similar results and that the directed fishery was too small to justify the high cost of a limited entry program.

It was further clarified that the purpose of this alternative is to identify all vessels and vessel owners that participate in the open access fishery and to aid managers in estimating fishery impacts to target and non-target species. This alternative would not limit fishery participation and the registration would be valid for directed or incidental fishing operations in both state and Federal waters. Registration would have to occur far enough in advance of the next year to allow for processing by NMFS.

Mr. Lockhart stated he would not be supporting the substitute motion. The primary reason is because the problem with OA is that it does provide an outlet for potentially increasing and expanding effort in the fishery. We don't see a lot of people in the fishery right now, but that hasn't always been true, and we don't know what will happen in the future. The Federal

Government has a strong position in limiting capacity and matching capacity to the resource. And without capping this fishery, we cannot achieve that match. A simple registration does not do that. When we created this fishery 15 years ago, we did not anticipate that we would be here today when the LE system was designed. Everyone thought OA would be a minor thing, but it is not. There is significant effort on sablefish and possibly a growing problem with lingcod. The economic issues mentioned by Dan Wolford are a concern, but all of these fisheries are linked. Decisions in one fishery affect other fisheries. The trawl rationalization decisions, such as the Adaptive Management Program, could help to alleviate some of these economic problems in the Open Access fishery. The EFP for a Community Fishing Association could be another venue for addressing some of these economic problems identified by Dan. But the substitute motion at its core does not address the primary problem, but the original motion does.

Mr. Warrens said that he was at the table when LE was created. We did not cut deep enough at that time, and now is the time to limit this. If not now, you will be back at this table again and again. I oppose the motion.

Ms. Vojkovich said she would support this motion as the PPA. The suite of management measures we had 15 years ago are not that same as those we have now. If we give out 1000 permits under the PPA, it would not match the capacity to the resource given that California now has less than 700. The complexity of the program is far in excess of what is needed. It will have disproportional effects on California. Dan's motion takes care of part of the issue, and we could discuss sablefish as a separate item.

Mr. Moore said the need for the proposed action is stated in the EA which says the number of vessels needs to be limited to match capacity and effort to match resource availability, but the analysis for Alternative 2 says this alternative would not limit fishery participation. I will have to oppose the substitute motion.

Ms. Fosmark stated she would support the motion. What she sees going forward with a more restrictive permitting system would not allow people to come in and out of a fishery that serves as a safety net. Our aging fleet and harvesters will leave, and young fishermen want to get in. This fishery allows them to get in with cheaper vessels and gear – you can't get into a more expensive fishery because no one will loan you the money to do so. This fishery is necessary to provide opportunity for young folks to enter the fishery.

Mr. Wolford said that with regard to how many permits would be available, the analysis under Alternative 2 estimates less than 713 permits would be needed initially and less than 713 permits in the long term. The same analysis shows that Alternative 6 would use those same numbers, but the analysis shows the PPA would have in excess of a 1000 boats that would qualify. Therefore, the PPA does not limit entrants into the fishery any more than a simple registration. That excess is not needed.

Ms. Culver said that WDFW proposed an option similar to this 3 years ago to the Council, but over that time she realized she couldn't convince all Council Members to support it. One of the things that concerns her with the PPA is that 15 years ago the LE fishery was developed over 6 or 7 years. As a result, there were people identified that would not qualify for an LE permit. The Council decided an OA component would be available for people to enter annually when other fishing opportunities were not available, such as Dungeness crab and salmon troll. And for the last 15 years that's what OA was used for. The GMT said the trip limits would not change under the PPA; the landings in this fishery are directly related to the amount of sablefish that is available in the OY and OA allocation; and the trip limits would roughly be the same under the substitute motion. If we have concerns about the amount of effort in this fishery, and the quickness with which the OA allocation is obtained, and the potential bycatch in the fishery – then the Council should do a better job of managing the fishery through trip limits, and by applying the bycatch rate appropriately. The one thing she is most uncomfortable with in the PPA is creating a new LE permit that looks like a property right, even though we say it isn't. We had testimony today from people who feel like they have had a property right in the past, and giving out a permit sets that in concrete a little bit more. She stated she will support the substitute motion.

Motion 40 passed on a roll call vote with all voting members present. Mr. Moore, Mr. Warrens, Mr. Lockhart, Mr. Williams, and Mr. Ortmann voted no. Mr. Jerry Mallet abstained. The vote was 5 no, 7 yes, 1 abstention. The Chair did not vote nor abstain.

PFMC
06/01/09

Agenda Item E.3.a
Attachment 2
June 2009

EA Description and Analysis of Alternative 2[1]

2.0 Alternatives Including the Proposed Action

From EA page 30:
Nearshore rockfish, cabezon, kelp greenling and California scorpionfish (nearshore species) are removed from any federal license or permit requirement in Alternatives 2 through 6. (underline added for emphasis) This was done because these species predominately occur in state waters, and because the states manage and regulate or affect the take of those species (see **Appendix D** for information on the states' nearshore management efforts). Therefore, removal of these nearshore species avoids duplicate licensing or permitting requirements between state and federal agencies for fishermen or vessels. The remaining groundfish species include species groups that are identified in Federal regulation at 50 CFR Part 660 as shelf and slope rockfish, roundfishes, flatfishes, sharks, and other species (**Table 2-2).**

From EA page 103:
4.2 Alternative 2
This alternative is the same as the No-action Alternative, but establishes an annual licensing requirement in which vessel owners could submit a license application at any time during the year (**Table 2-3**). There would be no differentiation with regard to whether individual vessel owners intended to fish in a directed or incidental fishing mode or to combine the two modes. (underline added for emphasis). This alternative would be expected to have fishery and human impacts comparable to Alternative 1 because no change in current fishery management is proposed under this alternative.

A total of 1,103 different vessels participated in the directed open access fishery for B species groundfish during 2004-2006 window period years. The recent VMS requirement for vessels that fish in federal waters for federal groundfish will likely reduce the number of vessels that participate in the directed fishery in near term years to <713, which is the number that participated in the last year of the window period, 2006 (**Tables 4-1-1 and 4-1-2**).

1 see http://www.pcouncil.org/bb/2009/0309/G5a_ATT3_0309.pdf

April 2009 Preliminary Initial Draft Meeting Minutes: Open Access Fishery Discussion

F. Groundfish Management

F.1 National Marine Fisheries Service Report (04/05/09; 2:55 p.m.)

F.1.a Regulatory Activities

Mr. Frank Lockhart spoke about the open access decision made at the March Council meeting. After reviewing the decision and talking with his staff about that decision, this program doesn't provide as many benefits as compared to the costs to both the government and the industry. He believes perhaps with more time we could improve upon that decision and come up with something that works better for all involved. He intends on Thursday when we talk about June Council meeting agenda and workload, he will ask for an hour on the June agenda, with intent to make a motion to rescind; to undo the decision made in March and go forward from there. He realizes this is an unusual step. He thinks the decision made doesn't provide us with very much at all. He just wanted to put people on notice that he will be asking for time on the June agenda during Agenda Item G.5. this Thursday.

F.1.e Council Discussion

Ms. Culver had discussion and concerns about rescinding the open access motion passed in March. She would rather discuss alternatives that were not considered previously; perhaps staff prepares a white paper on the topic. The discussion would show how the new proposals would better meet the goals of the Council. Then the Council could decide if they would want to rescind the previous action.

Mr. Lockhart responded that it was an interesting proposal; they will certainly consider that, and the steps and order is different from what he is proposing and would like to talk to his staff and review other considerations. This is primarily a conservation concern; the capping of effort is a primary thorough concern here. In NMFS opinion, this does not cap effort and address the primary concern of NMFS.

Mr. Moore, to clarify, asked Mr. Lockhart, the point made that the Council failed the cost-benefit analysis. (nod yes?).

G.5 Future Council Meeting Agenda and Workload Planning (04/09/09; 2:35 pm)

G.5.a Agenda Item Overview

Dr. Donald McIsaac provided the agenda item overview. Mr. Merrick Burden walked the Council through Agenda Item G.5.a, Supplemental Attachment 7.

G.5.b Reports and Comments of Management Entities and Advisory Bodies

None.

G.5.c Public Comment

Ms. Dorothy Lowman, Environmental Defense, Portland, OR
Mr. Santi Roberts,
Ms. Erica Fuller,

G.5.d Council Discussion and Guidance on Future Council Meeting Agenda and Workload Planning

Mr. Lockhart spoke about his intention to rescind the decision on open access from the March meeting (which he announced earlier in the week). Mr. Lockhart said it would be unprecedented; and convinced that he should not break the precedence. There was also some public testimony about this. So he did not want to make a motion to rescind the action in June. Mr. Lockhart said NMFS still has strong conservation issues about the action in March; the March action does not accomplish or provide us that much more information. The Council still needs to submit the amendment to NMFS and based on the information that is available, he said it might be difficult for the federal government to proceed.

Ms. Culver appreciated Mr. Lockhart's comments; positive to have open discussion. Ms. Culver said there were some items included in the intent of the motion. In addition to that there was some confusion on her part relative to the actual fisheries that were covered and required to register; she thought directed fisheries for all groundfish; but found out we are looking at incidental too. She spoke about registration for state waters. Her thoughts would be if the Council could not transmit the final to NMFS, and schedule an opportunity to clarify the intention of the motion in March (similar to the trawl rationalization).

Mr. Moore on that, he is concerned that not use a clarification process to completely modify something the Council voted on; he felt the motion was fairly clear.

Mr. Steve Williams asked how long we might find out from NMFS what the decision might be, if we sent the amendment to NMFS. Mr. Lockhart said in the past it has been a few weeks to a few months.

Ms. Eileen Cooney said this is an FMP amendment and there is a statutory process (60 day comment period). So it triggers a longer process.

Dr. McIsaac asked if the Council would like to schedule some sort of clarification – verbatim description of the motion and what passed, we could do that perhaps as early as September. Mr. Lockhart stated he did not want to prejudge the package before it was submitted. Dr. McIsaac noted this should be considered workload issue for the staff to prepare full MSA recommendation documentation that NMFS felt could not be approved. Ms. Cooney stated the action might not just be a clarification as noted by Ms. Culver – if there are different interpretations, we would just be getting the information; cannot make changes.

Ms. Culver, not sure how to accomplish this, but relative to the two issues she had, she would like to have some clarification on that (as to what was adopted, who is affected, and whether it meets the objectives).

Ms. Vojkovich asked what happens if we don't like it? Dr. Hanson explained the rules of how to rescind a motion. Ms. Vojkovich, we adopted something about "deeming" where does that fit into this whole thing? <u>Mr. Lockhart suggested NMFS and Council staff meet to put together information and provide a report to the Council in June or a letter to the Council members in June as a way forward. Mr. Moore said if Mr. Lockhart is going to do that, he wants to make sure that you review the Council discussion as well. Council concurrence. (underline added for emphasis).</u>

PFMC
06/01/09

NMFS REPORT ON MARCH 2009 ADOPTED MOTION ON FISHERY MANAGEMENT PLAN AMENDMENT 22: OPEN ACCESS LICENSE LIMITATION

In March 2009 the Council took final action on Amendment 22: Open Access License Limitation. This report is provided to present the motion as it was approved.

Open Access motion adopted:

Alternative 2, with a slight modification, as listed on page 35 of agenda item G.5.a attachment 3, Preliminary Draft Environmental Assessment (EA).

- Simple registration of vessel owners that intend to participate in the open access groundfish fishery
- Paragraph 2.2 Alternative 2, move to adopt the paragraph except that the last line of the paragraph should read as follows: "However a vessel owner may apply for an open access license for the following year at any time during the year."
- Mr. Wolford assumed there should be a fee for the license, on the order of \$100-\$200 which would aid in deterring frivolous entrants.
- Mr. Wolford noted there is a Vessel Monitoring System requirement for this fishery.
-

Preliminary Draft EA from March 2009 Council Briefing Book, section 2.2 printed here includes clarifying language from the motion:

This alternative establishes an annual federal license requirement for vessel owners that intend to participate in the open access groundfish fishery. The purpose of this alternative is to identify all vessels and vessel owners that participate in the open access fishery and to aid managers in estimating fishery impacts to target and non-target species. This alternative would not limit fishery participation. To be eligible for an open access license, the vessel owner must have a valid commercial fishing license with Washington, Oregon, or California and the vessel must be currently documented by the United States Coast Guard (USCG) or state registered. As with A permits, NMFS would require that the applicant/vessel owner certify that he/she is eligible to own a U.S.-documented vessel. NMFS would issue a single open access license that would authorize the vessel to participate in both the directed and incidental components of the open access fishery. NMFS would mail open access license applications to vessel owners prior to the calendar year and would encourage submission of applications at least 30 days prior of the calendar year (and start of the open access fishery). However, a vessel owner may apply for an open access license for the following year at any time during the year.

Vote on substitute motion:

1 abstention

7 Yes

5 No

PFMC
06/01/09

Agenda Item E.3.b
Supplemental GAP Report
June 2009

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN (FMP) AMENDMENT 22 OPEN ACCESS FISHERY LIMITATION

The Groundfish Advisory Subpanel (GAP) considered Agenda Item E.3.b.

LB Boydstun gave an overview of the open access situation and the GAP offers the following comments.

A majority of the GAP supports the Council rescinding the action taken on open access at the March 2009 meeting and feel that an effort cap should be established. This reflects previous GAP statements of support for an effort limit for open access.

A minority of the GAP supports reaffirming the March 2009 open access decision, and believes business decisions have been made by the fleet based on the Council action.

The question of any gain for management from the March 2009 Council decision was discussed. It was noted that the present open access regulations require a vessel monitoring system and declarations when you intend to change your fishing strategy to target groundfish. The time and cost of establishing a separate registry should be considered if the Council retains this preferred alternative.

PFMC
06/12/09

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

http://www.pcffa.org

Please Respond to:

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27 May 2009

Dr. Don McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Briefing Book Agenda Items: E.2 FMP Amendment 22: Open Access Fishery Limitation; E.11 FMP Amendment 20 – Accumulations Limits and Divestiture; E.12 Adaptive Management Program

Dear Dr. McIsaac and members of the Pacific Fishery Management Council,

The Pacific Coast Federation of Fishermen's Associations (PCFFA) represents working men and women in the West Coast commercial fishing fleet. Among the fishermen belonging to PCFFA member organizations that we represent are many engaged in the open access groundfish fishery, as well as some in the fixed gear limited entry and trawl fisheries.

PCFFA respectfully submits these comments on three briefing book agenda items.

E.2 FMP Amendment 22: Open Access Fishery Limitation

PCFFA supports the decision that the Council made at the March 2009 meeting to implement a new registration requirement for the open access fishery. PCFFA believes that this registration requirement in addition to the current management measures such as trip and landing limits are sufficient to effectively regulate this fishery for both conservation and socioeconomic goals.

At the March 2009 meeting PCFFA objected to the Council's preferred alternative, which would have converted the open access fishery into a limited entry system, and maintains that position. Many of our member fishermen reported to us that the limited entry system would have shut them out of the fishery despite their past participation. PCFFA, in conjunction with our port and marketing associations, conducted an informal survey to gauge how many fishermen would be denied a permit under Amendment 22. Our survey results showed that Amendment 22 would have excluded more than half of the fishermen who historically participated in the fishery. In some ports the percentage of fishermen that would be excluded would have been closer to 75%. The proposed limited entry program was based on a qualifying period when most fishermen who historically participated in the fishery were precluded from doing so because of area closures (the RCA) and low landing limits.

Rockfish have historically been an important part of the fishing portfolio of these smaller hook-and-line open access boats that supply high value rockfish to the market. It has been the smaller hook-and-line boats in the open access fishery that have bore the brunt of rockfish conservation measures for over a decade – they should be entitled to enjoy the fruits of their conservation by being allowed fair access to rockfish stocks as populations rebuild and catch restrictions can be relaxed.

A registration system is sufficient to control access to the fishery in conjunction with additional management measures such as trip and landing limits.

E.11 FMP Amendment 20 – Accumulations Limits and Divestiture

PCFFA has supported and continues to support low accumulation limits in the trawl fishery. PCFFA is troubled by the accumulation limits that the Council has considered adopting. An accumulation limit of 1 percent for most species seems prudent and has been a figure widely used in other IFQ fisheries to avoid excessive consolidation and control of a particular fishery.

It bears repeating that high accumulations limits, which lead inexorably to fleet consolidation, affect adjacent fisheries and smaller ports. The Council should consider the needs of smaller ports and fishing communities when setting accumulation limits. A fleet of 40 to 60 trawl vessels for the entire coast, as predicted in the Amendment 20 EIS, would have a large impact on smaller ports and other fisheries that depend on trawl boats to help support dockside businesses and infrastructure.

In previous public comment PCFFA has advocated for using divestiture fish to fund Community Fishing Associations (CFAs). At the April 2009 meeting the Council adopted a motion to consider allowing CFAs to be "first in line" to access these fish. The question of whether or not CFAs would have to pay for these fish was deliberately not addressed. PCFFA supports the motion made by the Council in April for CFAs to be first in line to access divestiture fish. PCFFA believes that if smaller ports and fishing communities are to survive this "rationalization" process, CFAs are going to have to play a part in allowing these communities to maintain access to their resources. Funding CFAs with fish through various "pockets" of fish is imperative to their success.

E.12 FMP Amendment 20 – Adaptive Management Program

At the May GAC meeting, the GAC adopted a motion to support the "pass through" of Adaptive Management Program quota pounds to permit holders for the first two or three years of the "rationalized" fishery. The GAC recommended a reactive approach in addressing problems that will crop up in the rationalized fishery.

Given the warning contained in the EIS regarding the impacts that trawl rationalization will have on “vulnerable” fishing communities, PCFFA recommends the opposite approach of the GAC recommendation. The adaptive management program should anticipate problems and address them before they develop. PCFFA recommends using the Adaptive Management quota pounds for its original intent – to address the myriad social, economic, and conservation problems that are expected to form at the outset of the trawl rationalization program. The Adaptive Management program was originally designed to help address the transition from one management regime to the next. If the Adaptive Management Program is put on hold for two or three years, it will not be able to fulfill that function.

The experience from other IFQ fisheries has shown that problems due to management transitions need to be addressed before the implementation of a new system. The EIS, though insufficient in its analysis of likely impacts, already highlights some problems that are likely to develop. Additionally the EIS lists ports that are likely to be adversely affected by the management changes. A good starting point for the Adaptive Management Program would be to identify regions and ports that could benefit from the infusion of quota pounds in order to limit the socioeconomic impacts.

Sincerely,

W.F. “Zeke” Grader
Executive Director

Agenda Item E.4
Situation Summary
June 2009

FISHERY MANAGEMENT PLAN AMENDMENT 23 – IMPLEMENTING ANNUAL CATCH LIMIT REQUIREMENTS

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) established several new fishery management provisions pertaining to National Standard 1 (NS1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which states, "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." On January 16, 2009, the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register to implement the new MSRA requirements and amend the guidelines for NS1. The MSRA and amended NMFS guidelines introduce new fishery management concepts including overfishing levels (OFLs), annual catch limits (ACLs), annual catch targets (ACTs), and accountability measures (AMs) that are designed to better account for scientific and management uncertainty and to prevent overfishing. One important change in the final guidelines is that ACTs are no longer mandatory, rather they are included as an optional accountability tool intended for the management of fisheries without inseason monitoring and harvest controls. These important aspects of the MSRA are required to be implemented by 2011 for most species and by 2010 for those species designated as being subject to overfishing. There are no groundfish species currently subject to overfishing, so 2011 is the implementation goal.

Precautionary harvest control rules exist for the actively managed species in the fishery management plan (FMP), control rules which provide a solid foundation for the implementation of new fishery management provisions such as the OFL and the ACL, which are analogous to the current definition of acceptable biological catch (ABC) and optimum yield (OY), respectively in the FMP. However, a new definition and control rules for specifying an ABC which, under the new NS1 guidelines, factors scientific uncertainty into the specification, will likely take considerably more thought.

The Scientific and Statistical Committee (SSC) provided a conceptual framework in April for factoring scientific uncertainty in the ABC rule for stocks with a history of multiple assessments. They recommended quantifying assessment variability as a basis for evaluating the size of a scientific uncertainty buffer (i.e., the difference in yield between the OFL and the ABC) and the risk of overfishing the stock. The SSC also recommended establishing a status determination criterion for groundfish stocks that would define overfishing as exceeding the OFL. Further, the SSC outlined the following tasks they thought should be done as part of Amendment 23:

- Evaluate the efficacy of current in-season monitoring as an accountability measure, which should be documented in the FMP amendment.
- Document the history of current harvest control rules to identify precautionary adjustments currently in place.
- Review current rebuilding plans and analytical methods to ensure compliance with NS1 guidelines.
- Categorize all FMP groundfish species as "stocks in the fishery" or "ecosystem component species".

- Assign vulnerability scores to all species in the FMP. A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to fishery. These scores could potentially be used in conjunction with the meta-analytical results to tier uncertainty buffers.

A working group of NMFS scientists, termed the Vulnerability Evaluation Working Group, convened recently to develop methodologies for determining a stock's vulnerability. Their report entitled, "Use of productivity and susceptibility indices to determine the vulnerability of a stock: with example applications to six U.S. fisheries" (Agenda Item E.6.a, Attachment 1), provides a description of a proposed methodology for determining the vulnerability of a fish stock to exploitation, which may be helpful to the Council and its advisors as Amendment 23 control rules and stock evaluation methodologies are developed.

Many of the other tasks outlined by the SSC will likely occur in the 2011-12 biennial specifications process; however, some tasks, such as classifying stocks as in the fishery or as "ecosystem component" species, may be completed sooner. According to the new NS1 guidelines, ecosystem component species do not require specification of reference points (i.e., harvest specifications) but should be monitored to the extent that any new pertinent scientific information becomes available (e.g., catch trends, vulnerability, etc.) to determine changes in their status or their vulnerability to the fishery. For this classification, such species should: 1) be a non-target species or stock; 2) not be determined to be subject to overfishing, approaching overfished, or overfished; 3) not be likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and 4) not generally be retained for sale or personal use. There are a number of dwarf rockfish species that are largely unexploited and appear to meet the criteria for an ecosystem component classification (Agenda Item E.4.a, Attachment 2).

The Council decided in April to proceed with Amendment 23 to incorporate these new NS1 guidelines in the FMP. The Council endorsed the tasks outlined by the SSC and also recommended frameworking these guidelines in the FMP per SSC advice. Expeditious progress on Amendment 23 would synchronize best with the biennial specifications process which starts in November (see Agenda Item E.2). While it is unlikely Amendment 23 will be finalized by November, making as much progress as possible by then should be the goal. The task at this meeting is to begin development of frameworking alternatives for Amendment 23. The Council should consider the new NS1 guidelines and consider the comments of Council advisory bodies and the public before providing guidance on developing preliminary Amendment 23 alternatives.

Council Action:

Provide guidance on the development of preliminary Amendment 23 alternatives.

Reference Materials:

1. Agenda Item E.4.a, Attachment 1: The report of the NMFS Vulnerability Evaluation Working Group entitled, "Use of productivity and susceptibility indices to determine the vulnerability of a stock: with example applications to six U.S. fisheries".
2. Agenda Item E.4.a, Attachment 2: Table of west coast groundfish species that are candidate "ecosystem component" species.

Agenda Order:

a. Agenda Item Overview John DeVore
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Guidance on Developing Preliminary Amendment Alternatives

PFMC
06/01/09

Use of productivity and susceptibility indices to determine the vulnerability of a stock: with example applications to six U.S. fisheries.

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EXECUTIVE SUMMARY

In response to congressional action, the U.S. National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) in 2009 revised the National Standard 1 (NS1) guidelines that govern federal fisheries management in the United States. The term "vulnerability" is referenced in sections of the NS1 guidelines that deal with: 1) differentiating between "fishery" and "ecosystem components" stocks, 2) assembling and managing stock complexes, and 3) creating management control rules. NMFS created a Vulnerability Evaluation Work Group (VEWG) in January 2008 to provide a methodology for determining vulnerability. While quantitative modeling provides the most rigorous method for determining whether a stock is vulnerable to becoming overfished or is currently experiencing overfishing, insufficient data exist to perform such modeling for many of the stocks managed by NMFS. These relatively data-poor stocks highlight the need to develop a flexible semi-quantitative methodology that can be applied broadly to many fisheries and regions. The methodology developed and six example applications to U.S. fisheries are contained in this document.

The vulnerability of a stock to becoming overfished is defined in the NS1 guidelines as a function if its productivity ("the capacity of the stock to produce MSY and to recover if the population is depleted") and its susceptibility to the fishery ("the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery"). Upon review of several risk assessment methods, the Productivity and Susceptibility Assessment (PSA) was chosen as the best approach for determining the vulnerability of data-poor stocks. The PSA evaluates an array of productivity and susceptibility attributes for a stock, from which index scores for productivity and susceptibility are computed and graphically displayed. The PSA methodology described in this document scores attributes on a three-point scale (i.e., 1 = low, 2 = moderate, 3 = high). The weighted average of each factor's attribute scores is plotted in an x-y scatter plot and the vulnerability score of the stock is calculated by measuring the Euclidean distance of the datum point from the origin of the plot. Stocks that receive a low productivity score and a high susceptibility score are considered to be the most vulnerable, while stocks with a high productivity score and low susceptibility score are considered to be the least vulnerable.

The PSA methodology contains several modifications to previously published examples, including: 1) expanding the number of attributes scored from 13 to 22 to consider both direct and indirect impacts; 2) redefining the attribute scoring bins to align with life history characteristics of fish species found in U.S. waters; 3) developing an attribute weighting system that allows users to customize the analysis for a particular fishery; 4) developing a data quality index based on five tiers of data quality, ranging from best data to no data, to provide an estimate of information uncertainty; and 5) developing a protocol for addressing stocks captured by different sectors of a fishery (i.e., different gear types, different regions, etc.).

The PSA was applied to six U.S. fisheries, containing 162 stocks that exhibited varying degrees of productivity, susceptibility, and data quality. The PSA was capable of broadly distinguishing between stocks based on fishing pressure, as stocks that were known to be overfished or undergoing overfishing in the past had significantly higher vulnerability scores (P = 0.002) than other stocks, and *post* hoc analysis of four potential candidates for ecosystem component stocks had some of lowest vulnerability scores.

However, the vulnerability of non-target stocks was not significantly different from target stocks for three of the example applications (Hawaii longline-tuna sector, Hawaii longline-swordfish sector, and Atlantic shark complex), highlighting the need to carefully examine non-target stocks when determining ecosystem component stocks. Thresholds for low, moderate, and high vulnerability that could be used to distinguish ecosystem stocks will likely depend on the nature of the fishery to which the PSA is applied. It is recommended that the Councils and their associated Scientific and Statistical Committees jointly determine these thresholds to aid in their decision making process.

The degree of consistency within the productivity and susceptibility scores was determined from correlations of a particular attribute to its overall productivity or susceptibility score (after removal of the attribute being evaluated). High correlation scores were observed for the majority (i.e., 20 of 22 attributes) of the productivity and susceptibility attributes, indicating a high degree of consistency with the productivity and susceptibly attributes.

The PSA developed for this report considers missing data as an endpoint in a continuum of data quality. Data availability in the example applications was generally high for the majority of the attributes examined, averaging 88% and ranging from 30% to 100%. Data quality is a consideration in interpreting the vulnerability scores, and it is recommended that managers employ the precautionary approach when evaluating a PSA with limited or poor data. Resources for conducting a vulnerability analysis can be found at http://www.nmfs.noaa.gov/msa2007/catchlimits.htm/vulnerability.

1.0 INTRODUCTION

In 1976, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) was signed into law to implement the management of living marine resources (Public Law 109-479). The Act has since been amended several times (National Research Council 1994, Darcy and Matlock 1999), most recently through the 2006 Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA). The MSRA added, among other things, new requirements for fishery management councils to set annual catch limits (ACLs) and establish accountability measures (AMs) for each of its managed fisheries to ensure that overfishing (i.e., $F > F_{MSY}$) does not occur (Public Law 94-265).

To assist the eight regional fishery management councils in implementing the new ACL and AM requirements, the U.S. National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) revised its National Standard 1 (NS1) guidelines, which provides guidance on how conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery (see 74 FR 3178, January 16, 2009). Because the guidelines are written for a general audience, greater technical detail has often been needed to further explain how certain aspects of the MSA should be implemented (Restrepo and Powers 1999). For example, in the NS1 guidelines, the "vulnerability" of fish stocks is referenced as one of the bases for: 1) differentiating between stocks that are "in the fishery" versus those that are "ecosystem components," 2) defining stock complexes, and 3) creating a buffer between target and limit fishing mortality reference points. While the NS1 guidelines define the term "vulnerability," during the scoping period NMFS received several public comments requesting that they further describe how the vulnerability of a stock should be evaluated, especially for stocks for which biological or fishery data are limited (termed "data-poor" stocks). In response, a Vulnerability Evaluation Work Group (VEWG) was established to develop a methodology for determining the vulnerability of data-poor stocks managed under a fishery management plan (FMP). The objective of this report is to explain the methodology developed for determining vulnerability and present six example applications to U.S. fisheries. We begin by reviewing the need for assessing vulnerability for the three tasks identified above.

2.0 NEED FOR ASSESSING VULNERABILITY

2.1 Differentiating Between Fishery and Ecosystem Component Stocks

The NS1 guidelines recommend that ACLs and AMs are needed for all federally managed fisheries, unless they have been explicitly exempted by the MSRA (i.e., stocks managed according to international agreement, or a fish with a life cycle of less than 1 year). NMFS defines a "fishery" as one or more stocks that can be treated as a unit for purposes of conservation and management and can be identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and any fishing for such stocks (see MSA § 3(13)). Given the broad definition of "fishery," managers have had considerable discretion in defining the "fishery" in their FMPs (73 FR 32527, June 9, 2008). Some FMPs may include only one stock (e.g., Mid-Atlantic – Bluefish) while others include hundreds of species (e.g., Western Pacific Council – Coral Reef Ecosystem). The latter is an example of a Council including all species within their management area into the FMP in order to monitor the impacts of the fishery on other parts of the ecosystem. Because the requirements for assigning ACLs and AMs were meant to be applied to only those stocks and stock complexes considered to be "in the fishery," NMFS suggests that species added to an FMP for data collection or ecosystem considerations could be exempted from ACL and AMs requirements and classified as "ecosystem components" (see NS1 Guidelines § 600.310(d)).

In general, stocks "in the fishery" include target stocks (those that are directly pursued by commercial fisheries) and non-target stocks (fish species that are not targeted but are caught incidentally in target fisheries). Stocks may be managed as single species or in stock complexes. All stocks "in the fishery" are generally retained for sale or personal use and/or are vulnerable to overfishing, being overfished, or could become so in the future based on the best available information. As a default, NMFS declares that all stocks and stock complexes currently listed in FMPs are considered "in the fishery" and are required to have status determination criteria (SDC) and related reference points (see NS1 Guidelines § 600.310). Because ecosystem component stocks are a type of non-target stock not generally retained for sale or personal use, occasional retention of the species is not in and of itself a reason to classify the stock as "in the fishery." In addition, ecosystem component stocks must not be subject to overfishing, becoming overfished, or likely to become so in the future based on the best available information, in the absence of conservation and management measures. While these NS1 definitions are useful, they lack technical details on how to determine whether a non-targeted stock is likely to become subject to overfishing or become overfished in the future. Instead, the NS1 guidelines refer generally to this likelihood as the "vulnerability" of a stock, noting that stocks in an FMP should be monitored regularly to determine whether their vulnerability has changed.

2.2 Assembling and Managing Stock Complexes

Stocks with similar geographic distributions and life histories are sometimes grouped into stock complexes by managers. Stocks may be grouped into complexes for various reasons. For example, complexes may include stocks in a multispecies fishery in which it is difficult to harvest or target species independently (e.g., the Pacific west coast multispecies trawl fishery for the Dover sole - thornyhead - sablefish complex); stocks with insufficient data to make a status determination (e.g., undergoing overfishing, overfished, etc.); or stocks that are not reliably identified by fishermen (e.g., the blackspotted rockfish, *Sebastes melanostictus*, looks very similar to the rougheye rockfish, *S. aleutianus*).

The NS1 guidelines recommend that the vulnerability of stocks be considered when establishing or reorganizing stock complexes or when evaluating whether a particular stock should be included in an existing complex. Currently, the status of many stock complexes is monitored using indicator stock(s), which have sufficient data available to define their status determination criteria and to set an ACL (see § 600.310(d)). However, if the indicator stock is less vulnerable than other stocks in the complex, those other stocks could be undergoing overfishing or be overfished while the indicator stock is not (Shertzer and Williams 2008). Therefore, the NS1 guidelines recommend that if individual stocks within a complex have a wide range of vulnerabilities, the stock complex should either be divided into smaller complexes with similar vulnerabilities, or an indicator stock should be chosen to represent the more vulnerable stocks within the complex. If data are insufficient to take these actions, then the stock complex should be managed more conservatively.

2.3 Modifying Control Rules

Restrepo and Powers (1999) define a *control rule* as "a variable over which management has some direct control as a function of some other variable related to the stock." Within the NS1 guidelines, control rules are used to determine how fishing mortality rate (*F*) or catch (total weight or number of fish) should change as a function of spawning biomass of the stock or stock complex. The NS1 guidelines also state that the Acceptable Biological Catch (ABC) and Annual Catch Target (ACT) control rules should take into account scientific and management uncertainty, as well as other pertinent information (e.g., potential consequences of overfishing). In general, control rules are policies to help fishery managers, in consultation with fisheries scientists, establish fishing limits based on the best available scientific information. Control rules should be designed so that management actions become more conservative as biomass estimates, or other proxies, for a stock or stock complex decline and as science and management uncertainty increases (see § 600.310(f))

Within the NS1 Guidelines limit and target hierarchy (e.g., OFL ≥ ABC ≥ ACL ≥ ACT), the ABC control rule defines the buffer between the Overfishing Limit (OFL) and ABC. The OFL is the annual amount of catch that corresponds to F_{MSY} or its proxy (the fishing rate that results in maximum sustainable yield) applied to the current abundance of the stock, and is considered a maximum limit to catch. The ABC is set below the OFL to take into account the scientific uncertainty in the estimation of OFL, as well as other information that may be useful for determining the buffer (e.g., vulnerability to overfishing). Similarly, the ACT control rule is used as an AM to define the buffer between the ACL and ACT, and is intended to account for management or implementation uncertainty. A stock that is found to be particularly vulnerable to the effects of overfishing might be given a larger buffer between either the OFL and the ABC or the ACL and the ACT (but not in both control rules, so as not to "double count" and provide unduly cautious management advice). For additional information regarding the ABC and ACT control rules see § 600.310(f) and Methot et al. (*In prep*).

3.0 DETERMINING VULNERABILITY

The vulnerability of a stock to becoming overfished is defined in this report as the potential for the productivity of the stock to be diminished by direct and indirect fishing pressure. Vulnerability is expected to differ among stocks based on the life history characteristics and susceptibility to the fishery. This definition follows from Stobutzki et al. (2001b), and includes the two key elements of 1) stock productivity (a function of the stock's life-history characteristics); and 2) stock susceptibility, or the degree to which the fishery can negatively impact the stock. This definition differs from that often used in evaluation of species at risk of extinction, where the concern is the likelihood of recovering from a diminished abundance and the focus is placed upon the productivity of the stock (Musick 1999). In our case, a stock with a low level of productivity would not be considered vulnerable to fishing unless there was also some susceptibility of the stock to the fishery. The interaction between the productivity of a species and its susceptibility to the fishery has a long history in fisheries science (Beverton and Holt 1957, Adams 1980, Jennings et al. 1998, Reynolds et al. 2001, Dulvy et al. 2004).

Several risk assessment methods were reviewed to determine which approach would be flexible and broadly applicable across fisheries and regions, and was best suited for the NS1 guidelines use of the term vulnerability. The methods reviewed generally involved semi-quantitative analyses because the data necessary for fully quantitative analyses are not available for many fisheries (Dulvy et al. 2003). Previous examples of semi-quantitative risk assessments have addressed the fishery impacts on bycatch species (Jennings et al. 1999, Milton 2001, Stobutzki et al. 2001b), extinction risk (Musick 1999, Roberts and Hawkins 1999, Dulvy and Reynolds 2002, Cheung et al. 2005, Patrick and Damon-Randall 2008), and ecosystem viability (Jennings et al. 1999, Fletcher 2005, Fletcher et al. 2005, Astles et al. 2006). A modified version of the Productivity and Susceptibility Assessment (PSA) was selected as the best approach for examining the vulnerability of stocks due to its history of use in other fisheries (Milton 2001; Stobutzki et al. 2001a, 2001b; Environment Australia 2002; Gribble et al. 2004; QDPI 2004; Webb and Hobday 2004,; Braccini et al. 2006; Griffiths et al. 2006; Zhou and Griffiths 2008) and recommendations by several organizations and work groups as a reasonable approach for determining risk (Hobday et al. 2004, 2007; Smith et al. 2007; Rosenberg et al. 2007).

3.1 The Productivity and Susceptibility Analysis (PSA)

The PSA was originally developed to classify differences in bycatch sustainability in the Australian prawn fishery (Milton 2001, Stobutzki et al. 2001b) by evaluating the productivity of a stock and its susceptibility to the fishery. Stobutzki et al. (2001b) define "productivity" as the capacity of a species to recover once the population is depleted (i.e., resilience) and "susceptibility" as the likelihood or propensity of species to capture and mortality from the fishery.

In the original form of the PSA, values for the two factors productivity (p) and susceptibility (s) of a stock were determined by providing a score ranging from 1 to 3 for a standardized set of attributes related to each factor. When data were lacking, scores could be based on similar taxa or given the highest vulnerability score as a precautionary approach. The individual attribute scores were then averaged for each factor and graphically displayed on an x-y scatter plot (Figure 1). The overall vulnerability score (v) of a stock was calculated as the Euclidean distance from the origin of the x-y scatter plot (i.e., 3.0, 1.0) and the datum point (note the x-axis scale is reversed):

$$v = \sqrt{[(p-3)^2 + (s-1)^2]} \qquad [1]$$

Stocks that received a low productivity score and a high susceptibility score were considered to be the most vulnerable to overfishing, while stocks with a high productivity score and low susceptibility score were considered to be the least vulnerable.

The PSA was later modified in 2004 by the Australian Ecological Risk Assessment (AERA) team (Hobday et al. 2004), who expanded the structure of the PSA to include habitat and community components so the tool could be used to assess the vulnerability of an ecosystem. In 2007, the AERA also modified the susceptibility score to be the product rather than the average of the susceptibility attributes (Hobday et al. 2007). Revisions to the PSA were also suggested in Lenfest expert working group reports on setting annual catch limits for U.S. fisheries (Rosenberg et al. 2007) and determining the risk of over-exploitation for data-poor pelagic Atlantic sharks (Simpfendorfer et al. 2008). In the next section we review how we adapted previous applications of PSAs for this report, including descriptions of the productivity and susceptibility attributes and the methodology for defining attribute scores and assessing data quality.

4.0 THE VULNERABILITY INDEX

4.1 Identifying Productivity and Susceptibility Attributes

Originally, the Stobutzki et al. (2001b) and Milton (2001) analyses were limited to 13 attributes (7 susceptibility, 6 productivity). Using partial correlations, Stobutzki et al. (2001b) found no redundancy in the 13 attributes. Hobday et al. (2004) and Rosenberg et al. (2007) expanded to 75 the number of attributes that could be considered for scoring, none of which had been examined for redundancy.

Development of the PSA utilized in this report began with examination of the attributes developed by Hobday et al. (2004). This list of attributes was reduced to 35 after removal of attributes perceived as redundant or pertaining more to risk analyses for fishing impacts on habitat quality or overall ecosystem health. The remaining attributes were evaluated in a two-phase process. In phase one, the VEWG members provided individual scores (i.e., “yes”, “no”, or “maybe”) to determine whether each attribute was: 1) scientifically valid for calculating productivity or susceptibility of a stock, 2) useful at different scales (i.e., stocks of various sizes and spatial distributions), and 3) capable of being calculated for most fisheries (i.e., data availability). Attributes receiving a majority of “yes” scores for all three factors were retained. In phase 2, attributes receiving mixed scores, as well as new attributes that had not been previously identified, were evaluated in a group discussion. Through this process, 18 (9 productivity, 9 susceptibility) of the 35 attributes were selected and four new attributes were added, including: 1) recruitment pattern, 2) management strategy, 3) fishing rate relative to natural mortality, and 4) desirability/value of the fishery. Overall, twenty-two attributes were selected for the analysis (10 productivity, 12 susceptibility).

4.2 Defining Attribute Scores and Weights

The original analyses performed by Milton (2001) and Stobutzki et al. (2001b) defined the criteria for which a score of 1, 2, or 3 should be given to a productivity or susceptibility attribute. For instance, the attribute scoring bins for the maximum size of a species were defined by Stobutzki et al. (2001b) by dividing the length of the largest species examined in their study by 3, thereby dividing the scoring bins into equal thirds. The PSA developed for this report also scores the productivity and susceptibility attributes on a scale of 1 to 3, although an intermediate score (e.g., 1.5 or 2.5) can be used when data span two categories. Descriptions of the productivity and susceptibility attributes and explanations of the scoring criteria are given in the following two sections.

Not all of the productivity and susceptibility attributes listed in Table 1 will be equally useful for determining the vulnerability of a stock. Previous versions of the PSA utilized an attribute weighting scheme in which higher weights were applied to the more important attributes (Stobutzki et al. 2001b, Hobday et al. 2004, Rosenberg et al. 2007). We recommend a default weight of 2 for the productivity and susceptibility attributes, where attribute weights can be adjusted within a scale from 0 to 4 to customize the analysis for each fishery. However, we do not recommend adjusting the weighting among stocks within any given fishery, as inconsistent weights for individual stocks within a PSA analysis can cause problems with transparency and interpretation of the results and analysis. In determining the proper weighting of each attribute, users should consider the relevance of the attribute for describing productivity or susceptibility rather than the availability of data for that attribute (e.g., data-poor attributes should not automatically receive low weightings). In some rare cases, it is also anticipated that some attributes will receive a weighting of zero, removing them from the analysis, because the attribute has no relation to the fishery and its stocks.

The scoring criteria should ideally be based on clear rules and leave as few attributes as possible up to subjective interpretation (Lichtensten and Newman 1967, Janis 1983, Von Winterfeldt and Edwards 1986, Bell et al. 1988). However, not all of the selected attributes translate into quantitative definitions for the scoring criteria, a situation also seen by Stobutzki et al. (2002). To reduce scoring bias, all weighting and attribute scores should be determined using a collaborative process (e.g., the Delphi method – Okoli and Pawlowski 2004, Landeta 2006), rather than being scored by one or two individuals (Janis 1983, Von Winterfeldt and Edwards, 1986, Bell et al. 1988).

4.3 Productivity Attributes

"Productivity" is defined as the capacity of the stock to recover once the population is depleted (Stobutzki et al. 2001b). This largely reflects the life-history characteristics of the stock. While there is some redundancy among the productivity attributes, the inclusion of multiple life history traits allows a more comprehensive assessment of productivity. Many of these attributes are based on the Musick (1999) qualitative extinction risk assessment and the PSA of Stobutzki et al. (2001b). However, the scoring thresholds have been modified in many cases to better suit the distribution of life history characteristics observed in U.S. fish stocks (Table 2).

Information on maximum length, maximum age, age at maturity, natural mortality, and von Bertalanffy growth coefficient were available from 140+ stocks considered to be representative of U.S. fisheries (Appendix 1). For these attributes, analysis of variance (ANOVA) was used to define attribute scoring thresholds that produced significantly different bins of data. In order to ensure consistency in these attributes, the scoring thresholds from the analysis of variance were also compared to published relationships among maximum age and natural mortality (Alverson and Carney 1975, Hoenig 1983), von Bertalanffy growth coefficient (Froese and Binohlan 2000), and age at maturity (Froese and Binohlan 2000). We have defined 10 productivity attributes:

Population growth (r): This is the intrinsic rate of population growth or maximum population growth that would be expected to occur in a population under natural conditions (i.e., no fishing), and thus directly reflects stock productivity. The scoring definitions were taken from Musick (1999), who stated that r should take precedence over other productivity attributes (e.g., given a weighting of 4) as it combines many of the other attributes defined below.

Maximum age (t_{max}): Maximum age is a direct indication of the natural mortality rate (M), where low levels of M are negatively correlated with high maximum ages (Hoenig 1983). The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of U.S. fisheries (Appendix 1). The t_{max} for a majority of these fish ranges between 10 to 30 years.

Maximum size (L_{max}): Maximum size is also correlated with productivity, with large fish tending to have lower levels of productivity (Roberts and Hawkins 1999), though this relationship tends to degrade at higher taxonomic levels. The scoring definitions were based on the ANOVA applied to the observed fish stocks considered to be representative of U.S. fisheries (Appendix 1). The L_{max} for a majority of these fish ranges between 60 to 150 cm TL.

Growth coefficient (k): The von Bertalanffy growth coefficient measures how rapidly a fish reaches its maximum size, where long-lived, low-productivity stocks tend to have low values of k (Froese and Binohlan 2000). The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of U.S. fisheries was 0.15 to 0.25. This is roughly consistent with the values obtained from Froese and Binohlan's (2000) empirical relationship $k = 3/ t_{max}$ of 0.1 to 0.3, based upon tmax values of 10 and 30.

Natural mortality (M): Natural mortality rate directly reflects population productivity, as stocks with high rates of natural mortality will require high levels of production in order to maintain population levels. Several methods for estimating M rely upon the negative relationship between M and t_{max}, including Hoenig's (1983) regression based upon empirical data, the quantile method that depends upon exponential mortality rates (Hoenig 1983), and Alverson and Carney's (1975) relationship between mortality, growth, and t_{max}. The attribute scoring thresholds from the ANOVA applied to the fish stocks considered to be representative of U.S. fisheries was 0.2 to 0.4, and were roughly consistent with those produced from Hoenig's (1983) empirical regression of 0.14 to 0.4, based on t_{max} values of 10 and 30.

Fecundity: Fecundity (i.e., the number of eggs produced by a female for a given spawning event or period) varies with size and age of the spawner, so we followed Musick's (1999) recommendation that fecundity should be measured at the age of first maturity. As Musick (1999) noted, low values of fecundity imply low population productivity but high values of fecundity do not necessarily imply high population productivity; thus, this attribute may be more useful at the lower fecundity values. The scoring definitions were taken from Musick (1999), which range between fecundities of 1,000 and 100,000.

<u>Breeding strategy</u>: The breeding strategy of a stock provides an indication of the level of mortality that might be expected for the offspring in the first stages of life. To estimate offspring mortality, we used Winemiller's (1989) index of parental investment. The index ranges in score from 0 to 14 and is composed of: 1) the placement of larvae or zygotes (i.e., in nest or into water column; score ranges from 0 to 2); 2) the length of time of parental protection of zygotes or larvae (score ranges from 0 to 4); and 3) the length of gestation period or nutritional contribution (score ranges from 0 to 8). To translate Winemiller's index into our 1-3 ranking system, we examined King and McFarlane's (2003) parental investment scores for 42 North Pacific stocks. These 42 stocks covered a wide range of life-histories and habitats, including ten surface pelagic, three mid-water pelagic, three deep-water pelagic, 18 near-shore benthic, and nine offshore benthic stocks. Thirty-one percent of the stocks had a Winemiller score of zero, and 40 percent had a Winemiller score of 4 or higher, so 0 and 4 were used as the breakpoints between our ranking categories.

<u>Recruitment pattern</u>: Stocks with sporadic and infrequent recruitment success often are long-lived and thus might be expected to have lower levels of productivity (Musick 1999). This attribute is intended as a coarse index to distinguish stocks with sporadic recruitment patterns and high frequency of year class failures from those with

relatively steady recruitment. Thus, the frequency of year class success (defined as exceeding a recruitment level associated with year class failure) was used for this attribute. Because this attribute was viewed as a course index, the VEWG chose 10 percent and 75 percent as the breakpoints between our ranking categories so that scores of 1 and 3 identified relatively extreme differences in recruitment patterns.

Age at maturity (t_{mat}): Age at maturity tends to be positively related with maximum age (t_{max}), as long-lived, lower productivity stocks will have higher ages at maturity relative to short-lived stocks. The attribute scoring definitions based upon the ANOVA applied to the fish stocks considered to be representative of U.S. fisheries was 2 to 4 years. This range is lower than that observed from Froese and Binohlan's (2000) empirical relationship between Tmat and tmax, which was 3 to 9 based upon values of t_{max} of 10 and 30 However, the Froese and Binohlan (2000) used data from many fish stock around the world, which may not be representative of U.S. stocks. For the PSA, the thresholds obtained from the ANOVA applied to stocks considered representative of U.S. fisheries were used.

Mean trophic level: The position of a stock within the larger fish community can be used to infer stock productivity, with lower-trophic-level stocks generally being more productive than higher-trophic-level stocks. The trophic level of a stock can be computed as a function of the trophic levels of the organisms in its diet. For this attribute, stocks with trophic levels higher than 3.5 were categorized as low productivity stocks and stocks with trophic levels less than 2.5 were categorized as high-productivity stocks, with moderate productivity stocks falling between these bounds. These attribute threshold roughly categorize piscivores to higher trophic levels, omnivores to intermediate trophic levels, and planktivores to lower trophic levels (Pauly et al. 2000).

4.4 Susceptibility Attributes

Susceptibility is defined as the potential for a stock to be impacted by a fishery. Previous applications have focused on the catchability and mortality of stocks, and addressed other attributes such as management effectiveness and effects of fishing gear on habitat quality in subsequent analyses (Hobday et al. 2007, Hobday and Smith 2009). Our susceptibility index includes all these attributes in an effort to make the results of analysis more transparent and understandable. However, since these attributes address different aspects of susceptibility, we have differentiated the catchability and management attributes as sub-categories under the susceptibility factor.

Similar to AERA's susceptibility attributes (Hobday et al. 2007), catchability attributes provide information on the likelihood of a stock's capture by a particular fishery, given the stock's range, habitat preferences, and behavioral responses and/or morphological characteristics that may affect its susceptibility to the fishing gear deployed in that fishery. Management attributes consider how the fishery is managed: fisheries with conservative management measures in place that effectively control the catch in the fishery are less likely to have overfishing occurring. For some of these attributes, criteria are somewhat general in order to accommodate the wide range of fisheries and systems. We defined 12 susceptibility attributes:

4.4.1 Catchability

Areal overlap: This attribute pertains to the extent of geographic overlap between the known distribution of a stock and the distribution of the fishery. Greater overlap implies greater susceptibility, as some degree of geographical overlap is necessary for a fishery to impact a stock. The simplest approach is to determine, either qualitatively or quantitatively, the proportion of the spatial distribution of a given fishery that overlaps that of the stock, based on known geographical distributions of both. If data regarding spatial distributions are lacking, inferences on areal overlap may be made from knowledge of depth distributions of the fishery and the stock. For example, if only a portion of the fishing effort was known to occur in the depth range occupied by a species, this would give an upper bound estimate of areal overlap.

<u>Geographic concentration</u>: Geographical concentration is the extent to which the stock is concentrated into small areas. The rationale for including this attribute is that a stock with a relatively even distribution across its range may be less susceptible than a highly aggregated stock. For some species, a useful measure of this attribute is the minimum estimate of the proportion of area occupied by a certain percentage of the stock (Swain and Sinclair 1994), which can be computed in cases where survey data exist. First, the cumulative frequency of the survey CPUE is computed as

$$F(c) = 100\frac{\sum_{i=1}^{h}\sum_{j=1}^{n_i}\frac{A_i}{n_i}y_{ij}I(c)}{\sum_{i=1}^{h}\sum_{j=1}^{n_i}\frac{A_i}{n_i}y_{ij}} \quad \text{where} \quad I(c) = \begin{Bmatrix} 1, & if\ \ y_{ij} \le c \\ 0, & otherwise \end{Bmatrix}, \qquad [2]$$

h is the number of strata, y_{ij} is the CPUE of tow j in stratum i, and n_i and A_i are the number of tows and area, respectively, for stratum i. Equation 2 is used to compute the CPUE c_z associated with a particular percentile z of the species CPUE data. The cumulative area associated with a particular density level c is then estimated as

$$G(c) = \sum_{i=1}^{h}\sum_{j=1}^{n_i}\frac{A_i}{n_i}I(c) \quad \text{where} \quad I(c) = \begin{Bmatrix} 1, & if\ \ y_{ij} \le c \\ 0, & otherwise \end{Bmatrix}, \qquad [3]$$

and the minimum area corresponding to the 100 - z percentile is obtained by subtracting $G(c_z)$ from the total survey area A_T. For example, the area covered by 95 percent of the stock (D_{95}) is computed as

$$D_{95} = A_T - G(c_{05})\,. \qquad [4]$$

The area covered by 95 percent of the concentration is then divided by A_T to get the proportion of the survey area occupied by the stock.

For many stocks, this index gives a general index of areal coverage that relates well to geographic concentration. However, some stocks can cover a small area even though the stocks were not concentrated in a small number of locations (i.e., a “patchy” stock that is distributed over the survey area). Thus, some refinements to the index may be necessary to characterize geographic concentration in these cases.

Vertical overlap: Similar to geographical overlap, this attribute concerns the position of the stock within the water column (i.e., demersal or pelagic) relative to the fishing gear. Information on the depth at which gear is deployed (e.g., depth range of hooks for a pelagic longline fishery) and the depth preference of the species (e.g., obtained from archival tagging or other sources) can be used to estimate the degree of vertical overlap between fishing gear and a stock.

Seasonal migrations: Seasonal migrations either to or from the fishery area (i.e. spawning or feeding migrations) could affect the overlap between the stock and the fishery. This attribute also pertains to cases where the location of the fishery changes seasonally, which may be relevant for stocks captured as bycatch.

Schooling, aggregation, and other behaviors: This attribute encompasses behavioral responses of both individual fish and the stock in response to fishing.

Individual responses may include, for example, herding or gear avoidance behavior that would affect catchability. An example of a population-level response is a reduction in the area of stock distribution with reduction in population size, potentially leading to increases in catchability (MacCall 1990).

Morphology affecting capture: This attribute pertains to the ability of the fishing gear to capture fish based on their morphological characteristics (e.g., body shape, spiny versus soft rayed fins, etc.). Because gear selectivity varies with size and age, this measure should be based on the age or size classes most representative of the entire stock.

Desirability/value of the fishery: This attribute assumes that highly valued fish stocks are more susceptible to overfishing or becoming overfished by recreational or commercial fishermen due to increased effort. To identify the value of the fish, we suggest using the price per pound or annual landing value for commercial stocks (using the higher of the two values) or the retention rates for recreational fisheries (Table 3). Commercial landings and recreational retention rates can be found at:

www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html

and

www.st.nmfs.noaa.gov/st1/recreational/queries/index.html

4.4.2 Management

Management strategy: The susceptibility of a stock to overfishing may largely depend on the effectiveness of fishery management procedures used to control catch (Sethi et al. 2005, Rosenberg et al. 2007, Shertzer et al. 2008, Dankel et al. 2008, Anderson and Semmens *in press*). Stocks that are managed using catch limits for which the fishery can be closed before the catch limit is exceeded (i.e., in-season or proactive accountability measures) are considered to have a low susceptibility to overfishing. However, stocks that do not have specified catch limits or accountability measures are highly susceptible to overfishing if their abundance trends are not monitored. Stocks that are managed using catch limits and reactive accountability measures (e.g., catch levels are not determined until after the fishing season) are considered to be moderately susceptible to overfishing or becoming overfished.

Fishing mortality rate (relative to *M*): This criterion is applicable to stocks where estimates of both fishing mortality rates (*F)* and (*M*) are available. Because sustainable fisheries management typically involves conserving the reproductive potential of a stock, it is recommended that the average *F* on mature fish be used where possible as opposed to the fully selected or "peak" *F*. We base our thresholds on the conservative rule of thumb that the *M* should be an upper limit of *F* (Thompson 1993; Restrepo et al. 1998), and thus F/M should not exceed 1. For this attribute, we define intermediate F/M values as those between 0.5 and 1.0; values above 1.0 or below 0.5 are defined as high and low susceptibility, respectively.

Biomass of Spawners: Analogous to fishing mortality rate, the extent to which fishing has depleted the biomass of a stock relative to expected unfished levels offers information on realized susceptibility. One way to measure this is to compare the current stock biomass against an estimate of B_0 (the estimated biomass with no fishing). If B_0 is not available, one could compare the current stock size against the maximum observed from a time series of population size estimates (e.g., from a research survey). If a time series is used, it should be of adequate length (e.g., > 5 years). Note that the maximum observed survey estimate may not correspond to the true maximum biomass for stocks with substantial observation errors in survey biomass estimates. Additionally, stocks may decline in abundance from environmental factors not related to susceptibility to the fishery, so this should be considered in evaluating depletion estimates. Notwithstanding these issues, which can be addressed with the data quality score described below, some measure of current stock abundance was viewed as a useful attribute.

Survival after capture and release: Fish survival after capture and release varies by species, region, and gear type or even market conditions, and thus can affect the susceptibility of the stock. When data are lacking, the VEWG suggest using NMFS' National Bycatch Report (due to be published in the summer of 2009) to estimate bycatch mortality. The report provides comprehensive estimates of bycatch of fish, marine mammals, and non-marine mammal protected resources in major U.S. commercial fisheries, and should allow users to develop a proxy based on similar fisheries. Once published the report can found at: http://www.st.nmfs.noaa.gov/st4/nop/Outreach/NBR_Factsheet_Final.pdf.

Fishery impact on habitat: A fishery may have an indirect effect on a species via adverse impacts on habitat. Defining these effects is the focus of Environmental Impact Statements or Essential Fish Habitat Evaluations that have been conducted by NMFS, and this work can be used to evaluate this attribute. Thus, the impacts on habitat may be categorized with respect to whether adverse impacts on habitat are minimal, temporary, or mitigated.

4.5 Data Quality Index

The uncertainty associated with data-poor stocks can lead to errors in risk assessment (Astles et al. 2006, Peterman 1990, Scandol 2003). As a precautionary measure, ecological risk assessments have often provided higher-level risk scores when data are missing in an attempt to avoid incorrectly identifying a high-risk stock as a low-risk (Milton 2001, Stobutzki et al. 2001b, Astles et al. 2006). While this approach can be viewed as precautionary, it also confounds the issues of data quality with risk assessment. For example, under this approach a data-poor stock may receive a high-risk evaluation either from an abundance of missing data or from the risk assessment of the available data, with the result that the risk scores may be inflated (see Hobday et al. 2004). In contrast, we considered missing data within the larger context of data quality, and report the overall quality of data as a separate value.

A data quality index was developed that provides an estimate of uncertainty for individual vulnerability scores based on five tiers ranging from best data or high belief in the score to no data or little belief in the score (Table 4). The data quality score is computed for the productivity and susceptibility scores as a weighted average of the data quality scores for the individual attributes, and denotes the overall quality of the data or belief in the score rather than the actual type of data used in the analysis. For example, a data quality score of 3 (related to limited data), could be derived from data equally divided among scores of "1, best data" and "5, no data." It is important to highlight the data quality associated with each vulnerability score when plotting the data on an x-y scatter plot (Figure 2). Similar to Webb and Hobday (2004), we suggest dividing the data quality scores into three groupings (low > 3.5; moderate 2.0 to 3.5; and high < 2.0) for display purposes. We also recommend that the data quality scores be: 1) plotted as a separate graph noting how many attributes were used in the analysis (Figure 3; Appendices 1- 6) and 2) listed in a table to provide decision makers with more information on the scores, such as mean score, range, mode, variance, etc. In the case of missing data for an attribute (data quality score of 5), this attribute would not be used in the computation of the vulnerability score but would be reflected in the computation of overall data quality. Thus, a stock with missing data for many attributes would have a low overall data quality score.

Data quality scores can be used to reflect the extent to which historical data on productivity and susceptibility pertains to current conditions. Productivity and abundance of marine stocks often show low-frequency trends or "regime shifts" that reflect environmental variability (Spencer and Collie 1997, Hare and Mantua 2000), and erroneous estimates of productivity could occur if historical data that do not reflect current conditions are utilized. A lack of recent data reflecting current environmental conditions can be reflected in the data quality score. For stocks with relatively short generation times it is important to conduct the PSA analysis frequently to monitor environmental-driven changes in stock status and productivity.

4.6 Different Sectors and Gear Types

As noted earlier, the PSA was first developed to evaluate the sustainability of bycatch species in the Australian commercial prawn fishery, which consists of a single sector (i.e., trawl fishery), and subsequent applications to other fisheries have also consisted of single sectors. However, PSA scores may vary between sectors of a single fishery (e.g., gear sectors, commercial versus recreational sectors, etc.), or between multiple fisheries that harvest a single stock. For example, the susceptibility score for "survival after capture and release" may differ greatly between trawl and gill net gears. Similarly, the "degree of habitat disturbance" would vary greatly depending on the habitat type and gear used to capture a species (e.g., bottom trawl versus rod and reel). In these cases, each sector of a fishery or each fishery should have its own vulnerability evaluation performed to determine which stocks in that sector or fishery are most vulnerable. An overarching vulnerability evaluation score should be calculated for each stock listed in an FMP using a weighting system based on the sectors landings over some predetermined time frame (i.e., based on average landings).

5.0 EXAMPLE APPLICATIONS

To demonstrate the utility of the vulnerability evaluation, we evaluated six U.S. fisheries that had varying degrees of productivity, susceptibility, and data quality (see Appendices 2 – 10). These example applications show that there can be considerable variation in vulnerability within currently grouped complexes, and between sectors (see Northeast Groundfish and Pacific longline studies). Please note, however, this report should not be considered the "official" vulnerability analysis for the six fisheries we examined. The Councils and their SSC, or in the case of Highly Migratory Species NMFS scientists, who are charged with managing these fisheries should perform their own vulnerability analysis or modify ours to meet their data quality standards.

5.1 Northeast Groundfish Multi-species Fishery

Within the NMFS Northeast Region, 19 groundfish stocks are assessed as a group on a 5-year planning horizon by the Groundfish Assessment Review Meeting (GARM) committee for the New England Management Council. The GARM stocks include gadoids (i.e., Atlantic cod, haddock, red hake, etc.), several flatfish (i.e. yellowtail, witch, plaice, and winter flounders), and related demersal stocks, which are overall valued at about $75 million (NMFS 2008). Previously, the entire complex was overfished during the International Commission on of the Northwest Atlantic Fisheries (ICNAF) era (1960s to1970s) and also after extended jurisdiction in 1976. More recently this complex has been managed by the New England Fishery Management Council under the Multispecies Groundfish FMP. The fishery is currently managed with area closures, mesh-size regulations, and effort reduction procedures (days at sea), and is almost entirely prosecuted with bottom trawl gear, with small amounts of landings by gill nets and longlines. The fleet fishes mostly on Georges Bank, but also has a significant component in the Gulf of Maine and in the Southern New England region. Several stocks in the complex have recovered (e.g., Georges Bank haddock, redfish), but many are still chronically overfished (e.g. Southern New England yellowtail flounder, Georges Bank cod).

Data quality for the entire group is relatively high, with long-term time-series of catch and research vessel survey data available; however, information for windowpane flounder, ocean pout, and Atlantic halibut is not quite as good as for the other members of the group. Life history information for most of the stocks is relatively complete, many are assessed with fairly detailed analytical stock assessment models, and new research on movements, morphometrics, bycatch, and improved survey techniques is ongoing.

These stocks range from relatively low (e.g. ocean pout) to high productivity (e.g. Georges Bank haddock) in their life histories, and some are more susceptible than others to overfishing (e.g. halibut, white hake), habitat disturbances (e.g. winter flounder), and gear interactions (e.g. Gulf of Maine and Georges Bank cod). We note that the spread across GARM stocks is smaller than that in other fisheries (see below) due to their similarities in life history and targeting fishing gear. Overall, these GARM stocks clustered into two groups based on differences in productivity (Figure 4). The first cluster of stocks contains cod, haddock, and most of the flatfish etc. The second cluster contains redfish, white hake, and halibut, and is somewhat more vulnerable to overfishing because the life histories of these stocks suggest they are generally less productive.

5.2 Highly Migratory Atlantic Shark Complexes

Atlantic shark species are divided into four management groups under the current Highly Migratory Species (HMS) FMP: 1) large coastal, 2) small coastal, 3) pelagic, and 4) prohibited. The four groups were designed to facilitate management, but do not necessarily reflect the exact habitat preferences or life histories of the component species. In general, large coastal sharks are large sharks characterized by slow growth rates, low fecundity, late age at maturation, and long lifespan. These species generally utilize estuaries and nearshore waters during at least part of their life cycle, but also occur in and sometimes beyond waters of the continental shelf. Typical large coastal sharks are blacktip, sandbar, bull, tiger, and hammerhead sharks. By contrast, small coastal sharks reach a smaller size, tend to grow and mature more rapidly and have shorter lifespans, and are generally restricted to more coastal waters. Atlantic sharpnose and bonnethead sharks exemplify a "typical" small coastal shark. Pelagic sharks are large, with life history characteristics generally intermediate to those of the two other groups, which range widely in the upper reaches of the ocean and undertake extensive, sometimes transoceanic, migrations. Typical pelagic sharks are blue, shortfin mako, and thresher sharks. Prohibited species are a mixture of species once included in the other management groups and having coastal, pelagic, and coastal-pelagic habitat preferences.

They include some charismatic species, such as the white, whale, and basking sharks, and three species that have been proposed for listing under the Endangered Species Act (dusky, night, and sand tiger sharks). Prohibited species tend to be large and rare, and have life history characteristics that make them particularly vulnerable to overfishing. In some cases, however, they were included in this group to err on the side of caution because of a complete absence of biological data on the species (e.g., Caribbean sharpnose, smalltail, and Atlantic angel sharks). As a group, sharks exhibit low productivity (as compared to teleosts, for example), mainly owing to their reduced reproductive rates. We included 37 species of sharks in our analysis (Table 5).

Although shark production is relatively low compared to other marine resources, U.S. commercial and recreational shark fisheries are likely to account for more than $100 million annually, with the global shark fin trade alone being valued at close to $400 million (Clarke 2003). In addition to direct consumption and production of shark products, net benefits in the shark fishery are also derived from the existence value of sharks for non-consumptive user groups (Davis et al. 1997, Cardenas-Torres et al. 2007, Rowat and Engelhardt. 2007). While there are bottom longline and drift gillnet fisheries that target sharks in the United States, sharks are caught incidentally as bycatch in a variety of fisheries (e.g., gill net, pelagic longline and trawl fisheries), with the magnitude of this bycatch being poorly known in general. The commercial fishery is a limited access fishery with incidental retention limits, observer and reporting requirements, and a ban on finning. Sharks are also commonly caught in U.S. recreational fisheries, including private boats, charterboats, and headboats. Recreational regulations allow retention of one shark per vessel per trip, with a 4.5 ft (1.4 m) fork length minimum size requirement, and an additional allowance of one Atlantic sharpnose shark and one bonnethead shark per person per trip with no minimum size. In general, the U.S. Atlantic shark fishery is primarily a southeastern fishery extending from Virginia to Texas, although sharks are also landed in the states north of Virginia. All sharks fall under the jurisdiction of NMFS' Highly Migratory Species Division.

Both the quality and quantity of available biological and fishery data vary by species of sharks. While relatively good information is available for the most important species in the fisheries, basic biological information is lacking for the less common species. Analytical stock assessments are thus available for only a few species: sandbar and blacktip sharks (large coastal); Atlantic sharpnose, bonnethead, blacknose, and finetooth sharks (small coastal); blue and shortfin mako sharks (pelagic); and dusky sharks (prohibited).

The information used to score the productivity attributes was derived from a dedicated shark life history database maintained by NMFS (citations available upon request). The information used to score the susceptibility attributes was derived from various sources. The *area overlap* and *geographic concentration* attributes were scored using information from IUCN species distribution maps (pelagic shark species), HMS Essential Fish Habitat maps (large and small coastal sharks), ICCAT effort distribution maps (pelagic sharks), Coastal Fishery Logbook effort maps (large coastal sharks), and shrimp trawl effort distribution (small coastal sharks). For *vertical overlap*, we used mostly unpublished information from archival tags and published papers (a variety of species, mostly pelagic); for *morphology affecting capture,* we used data on size of animals caught in various scientific observer programs (U.S. pelagic longline observer program for pelagic sharks, bottom longline observer program for large coastal sharks, shrimp trawl observer program for small coastal sharks); for *survival after capture and release,* the data also came from the three observer programs referenced above. There was consistently no information for several attributes (*recruitment pattern, seasonal migrations,* and s*chooling/aggregation behavior*). Information for *F relative to M* and *SSB* was only available for those species for which stock assessments have been conducted.

The susceptibility aspect refers to the main fishery affecting each group: pelagic longline fishery for tunas and tuna-like species (pelagic sharks), bottom longline directed shark fishery (large coastal sharks), and bottom trawl shrimp fishery (small coastal sharks). Weights for each attribute were assigned by discussion and consensus between the two assessment scientists involved in the evaluation. For the productivity attributes, both scientists felt that the intrinsic rate of increase (*r*) was the most valuable quantitative measure of productivity and was assigned the highest weight of 4. *Measured fecundity* and *estimated natural mortality* were also viewed as important indicators and were assigned a weight of 3. The *recruitment* attribute, on the other hand, was assigned a weight of zero because it was felt it was not a good indicator for productivity of sharks as currently defined. For the susceptibility attributes, it was felt that the overlap between the distribution of the species and the fisheries (*areal overlap* and *vertical overlap*) and the probability of *survival after capture and release* were the most important attributes and were assigned a weight of 4. The remainder of the susceptibility attributes were given a default weighting of 2.

The productivity scores clearly separated the highly productive Atlantic sharpnose and bonnethead (small coastal) and the Caribbean sharpnose shark (prohibited, but note the low data quality) from the other species in the analysis (Table 5; Figure 5). The remaining species were grouped toward the lower end of the productivity scale, with scores ranging from 1.0 to 1.35. Within this grouping, the relatively higher productivity of species such as the tiger and nurse (large coastal) and blue (pelagic) sharks were reflected in the scoring; however, the overall scoring showed little contrast for over 50 percent of the stocks analyzed (22 of the 37 stocks had weighted productivity scores of 1.1 or less). While this level of detail may be appropriate for intertaxonomic comparisons, it would not be adequate for a PSA applied to sharks only for which the use of a continuous score, such as the intrinsic rate of increase (*r*) provides much more contrast (Cortés et al. 2008, Simpfendorfer et al. 2008). The susceptibility scores show more overall contrast than the productivity scores, with a range of 1.4 to 2.9. A number of ecologically different species have similar susceptibilities to the main fisheries, while several less common species (e.g., sixgill, sharpnose sevengill, bigeye sandtiger, and whale shark) show decreased susceptibility (but also note the lower data quality). It is interesting to note that 12 of the 14 species with the lowest susceptibility scores fall into the prohibited FMP group.

5.3 California Nearshore Groundfish Finfish Assemblage

The California nearshore finfish assemblage is a complex of 19 nearshore species, with a unique history of landings comprising a mix of heavy recreational and lucrative commercial fisheries. Most of the species in this fishery are rockfishes (family Scorpaenidae, with most of these of the genus *Sebastes*), but there are also two greenlings (family Hexagrammidae), one prickleback (family Stichaeidae), and one wrasse (family Labridae) (Table 5). The species are typically associated with nearshore rocky reef or kelp forest communities, and have a range of life histories. Most are relatively long-lived, slow-growing, and either live-bearing (*Sebastes*) or egg-guarding (cabezon, greenlings); there is also one protogynous hermaphrodite (California sheephead). By virtue of their life history characteristics and accessibility to a wide range of fishing types, most have been shown or are perceived to be vulnerable to overexploitation in the absence of effective management regimes (Gunderson et al. 2008). Although the total landings by volume tend to be small (only 224 tons landed commercially in California waters in 2006), many of the premium/live-fish fishery targets are highly lucrative, with ex-vessel values of up to $10 per pound (and net revenues of $2.2 million in 2006). Through the 1990s, as commercial landings in the major offshore fisheries sectors decreased, the live-fish fishery harvest began to represent a greater proportion of landings and revenue in California. For example, between 1989 and 1992 the nearshore, live-fish trap fishery developed in response to demand in high-end restaurants, increasing from 2 to 27 boats that landed over 52,000 lbs of live fish (Palmer-Zwahlen et al. 1993). Recreational fisheries consist largely of commercial passenger fishing vessels (CPFVs), an important activity in many coastal communities for which the economic contribution can be comparable to the landed value of the commercial catch. Private boats access, pier and jetty fishing, and spearfishing also contribute to the high recreational effort targeted at these species.

Most of the nearshore species are considered to be relatively data-limited, with relatively modest research done on their life history and little or no fishery-independent survey data available for monitoring trends in abundance. Only 5 of the 16 species managed by the Pacific Fisheries Management Council (gopher rockfish, black rockfish, blue rockfish, cabezon and California scorpionfish) have formally adopted stock assessments that included part or all of their California populations. An assessment also exists for sheephead, although the results have not been directly applied in management. An assessment for kelp greenling also exists for the Oregon population. Most of these assessments have been considered to have moderate to poor data availability, and a majority of the remaining nearshore species have even less available data for potential assessments, such that alternative means of monitoring of stock status and evaluating the vulnerability to overexploitation are key management priorities.

The average productivity and susceptibility scores for each of the 19 nearshore species are shown in Figure 6. These scores were produced using the default weighting of 2, as all attributes were viewed to be equally applicable. Susceptibility scores are similar for all species (average range between 2.0 and 2.4), with only the California scorpionfish scoring below 2. Considering the productivity axis, two primary clusters can be distinguished: one of relatively deeper-living, larger, and longer-lived rockfishes (though grass rockfish is one of the shallowest-living of the species considered), and the other mainly smaller, shorter-lived species with varying reproductive life histories. Combining the two axes, there is a loose but noticeable negative linear relationship between productivity and susceptibility. Of the species considered, brown, blue, China, copper, and quillback rockfish appear to be the most vulnerable, based on their relatively lower productivity and greater susceptibility; black, olive, and grass are also ranked as among the more vulnerable species. Interestingly, all of the most vulnerable species are

Sebastes, consistent with the perceived higher vulnerability of the slower-growing and longer-lived members of this genus relative to most other groundfish. Given that these are among the more valuable commercial targets, but are characterized by long lifespans and slow growth rates, these results are consistent with expectations (Table 5).

5.4 California Current Coastal Pelagic Species

The coastal pelagic species fisheries management plan (CPS FMP) on the U.S. West Coast includes four species of schooling pelagic fishes (Pacific sardine, northern anchovy, Pacific mackerel, and jack mackerel), market squid, and more recently two species of euphausiids declared prohibited due to their important role as forage. Euphausiids are not included in this assessment as the lack of any historical fisheries in the California Current, and the recent ban on future fisheries, gives us no ability to evaluate susceptibility. However, several additional coastal pelagic species, currently not managed under the CPS FMP, exhibit similar life history characteristics and trophic roles as the five above. Consequently, we considered Pacific herring, Pacific bonito, and Pacific saury as well. All of these species are characterized by rapid growth, relatively short lifespans, and significant short- and long-term variability in abundance, productivity, and distribution. These species also represent key energy pathways from planktonic communities to higher-trophic-level predators such as salmon, tunas, groundfish, sharks, seabirds, and marine mammals. Commercial fisheries for these stocks are typically high-volume and, despite moderate ex-vessel values, they are among the most economically significant fisheries in the California Current. Many of these species are also targeted by fisheries in both Mexico and Canada; however, there are no formal international management agreements in place for these partially shared resources.

The Pacific sardine (*Sardinops sagax*) fishery was the largest in the United States throughout the first half of the 20th century, with landings greater than 700,000 tons during its peak. Although the notorious collapse of the sardine stock in the 1950s led to several decades of low abundance and landings, the current stock biomass and fishery are again among the largest on the U.S. West Coast. The northern anchovy (*Engraulis mordax*) fishery was of considerable economic significance throughout the 1970s and early 1980s, but biomass levels have been relatively low since the early 1980s and the current fishery is negligible. Although not taxonomically related, both Pacific (*Scomber japonicus*) and jack (*Trachurus symmetricus*) mackerel are larger, have greater longevity (particularly *Trachurus*), and are higher-trophic-level components of this assemblage that have variously been important in the CPS fisheries in the California Current. The market squid (*Doryteuthis opalescens*) is a very short-lived and highly variable stock that has been a significant target of commercial fisheries for over 100 years and is frequently the largest (by volume) fishery in California waters. For the three species not in the CPS FMP, Pacific herring (*Clupea pallasii*) is a state-managed species of considerable economic importance in California and modest importance in the Pacific Northwest. Pacific bonito (*Sarda chiliensis*) is a larger piscivorous species rarely found north of Point Conception that is an occasional commercial target and a fairly important recreational target. Pacific saury (*Cololabis saira*) is a pelagic species of little commercial importance in the California Current but of considerable economic importance in the western Pacific.

These species are typical of the coastal pelagic community of upwelling ecosystems, which collectively account for as much as one-third of total global marine fish landings. The population dynamics of all of these species can be characterized as highly dynamic in space and time, with tremendous interannual and interdecadal variability in abundance, productivity and distribution. Although the mechanisms behind these fluctuations remain largely unknown, this variability is widely held to be a consequence of the dynamic nature of oceanographic features in coastal upwelling ecosystems over both interannual and interdecadal time scales (Bakun 1996, MacCall 1996, Schwartzlose et al. 1999). The current management regime for the federally managed CPS species includes threshold biomass levels because of the considerable importance of these species as forage to higher-trophic-level predators. Additionally, Pacific sardine are managed using a climate-based harvest control rule, in recognition of the significance of climate factors in driving productivity and abundance (PFMC 1998).

The productivity and vulnerability scores developed for these eight species are shown in Figure 7. All are estimated to range between moderate and high productivity (with the caveat that they routinely undergo extensive periods in which productivity declines to very low levels), with the species having the fastest growth rates and shortest lifespans (market squid, Pacific saury and northern anchovy) among the highest in their collective productivity scores. The relatively longer-lived Pacific and jack mackerel are characterized by lower productivity. The generally above-average susceptibility scores for these species are in part a consequence of relatively high susceptibility due to schooling behavior and the hyperstability of catch rates (Hilborn and Walters 1992). Higher scores for California market squid and Pacific herring reflect their current relatively high exploitation rates in fisheries that target spawning aggregations. In contrast, Pacific saury and jack mackerel are generally widespread, located in offshore waters, and effectively unexploited in the California Current, even though both stocks now may be at low levels of abundance due to climate factors.

Despite their rapid growth and relatively high natural mortality rates, high interannual and interdecadal recruitment variability tempers the higher productivity scores for all species. Such variability is significant with respect to assessing the vulnerability of these stocks to overexploitation, as the failure to recognize climate-driven changes in the productivity of coastal pelagics was a key factor behind the notorious collapse of the California sardine fishery in the 1950s and 1960s and of the largest historic fishery on the planet – Peruvian anchoveta (*Engraulis ringens*). Between 1971 and 1973, anchoveta landings fell from over 12 million tons per year to less than 2 million (Schwartzlose et al. 1999). Although this fishery also has recovered to the point where it is again the largest fishery by volume in the world's oceans, there is general agreement that coastal pelagic populations are highly vulnerable to overexploitation in the absence of effective monitoring and management systems.

5.5 Skates (Rajidae) of the Bering Sea and Aleutian Islands Management Area

The Bering Sea and Aleutian Islands (BSAI) fishery management plan contains 13 species of skate (Rajidae) that are incidentally caught by the commercial fisheries in this management area off Alaska. Although not targeted, these skate species are caught in substantial amounts by bottom trawl and longline vessels pursuing other species and are valued at $2 million (2006 NMFS commercial landing statistics). They are managed by the North Pacific Fishery Management Council as part of its "Other Species" group, which also contains sharks, squid, octopus, and sculpins (Ormseth and Matta 2007). An aggregate catch limit is established annually for this entire group.

Skates in the BSAI vary in size and other life history traits, as well as in abundance and distribution. The BSAI consists of three main regions: the eastern Bering Sea (EBS) shelf, which is quite broad; the EBS slope; and the Aleutian Islands (AI). The EBS shelf contains the vast majority of the skate biomass in the BSAI but has relatively low species diversity of skates, with the Alaska skate (*Bathyraja parmifera*) dominating the biomass. The skate communities of the EBS slope and the AI are much more diverse, and species are distributed unequally among the three areas. Because Alaska skate dominate the shelf, where fishing activity is strongest, they are the main species caught in commercial fisheries. Data quality is greatest for this species (Table 5).

Within our analysis, all attributes were weighted equally with the exception of recruitment pattern. Based on skate life histories and information available for *B. parmifera*, we concluded that skates have low recruitment variability and that year classes tend to be small but of consistent size. Because it was unclear how this pattern might affect productivity, particularly as the criteria are based on the frequency of successful year classes, we decided to reduce the weight to 1. Extensive life history data were available for only a subset of the species (*B. parmifera*, Aleutian, Bering, big, and longnose). For the remaining species, maximum size was the only attribute for which we had information. Other life history attributes for these species were assigned based on results for the better-known species, and were assigned a data quality score of 3.

During the scoring process, we identified some attributes that warranted further explanation, including breeding strategy, management strategy, areal overlap, and geographic concentration. We used Winemiller's (1989) index to estimate breeding strategy, but modified it somewhat for skates. When Winemiller mentions "parental protection of zygotes or larvae," it seems as if he has teleosts in mind and perhaps is thinking of nest-guarding behavior. For skates, there is no nest-guarding protection as such, but the spawners do produce a tough egg case that helps ward off predation for up to several years. We evaluated this as providing lengthy protection to the offspring, and gave a score of 4 for the "parental protection" portion of the index.

Regarding the attribute management strategy, all skate species received a score of 1 for this attribute, because a catch limit is set for the BSAI skate complex and catch is monitored weekly throughout the fishing season. However, because skate catch limits are managed in aggregate with a larger "Other Species" group, and identification of rarer skates can be problematic, there is more potential for inadvertent overfishing of skates than indicated by the attribute score. A data quality score of 2 was assigned to reflect this inconsistency.

We quantified *areal overlap* by examining the percentage of the stock distribution (based on survey data) that occurs within the depths of the trawl fishery. First, we examined the observed trawling effort (in minutes) by depth from the North Pacific Fishery Observer Program and noted that nearly all of the trawling effort occurs at depths less than 300 meters. Next, we quantified the proportion of the total CPUE data, per year, that exists at depths shallower than 300 meters. For each skate species in each year, we produced the cumulative distribution of CPUE as a function of depth, which gives the proportion of the sum of the CPUE data that occurs shallower than a given depth. From this distribution, we were able to identify the proportion of the CPUE data that occurred shallower than 300 meters, which we took as the maximum percentage areal overall with the fishery. Note that the actual overlap may be less because of spatial and/or temporal mismatches between the distributions of the fishery and the stock, so this is a conservative estimate of areal overlap. This technique was applied to the Aleutian Islands trawl survey and the Eastern Bering Sea slope trawl survey; the Eastern Bering Sea shelf survey occurs at depths less than 200 meters, so all CPUE from this survey would be less than 300 meters.

Lastly, we quantified *geographic concentration* as the area covered by 95 percent of the stock relative to the area covered by the survey using the method of Swain and Sinclair (1994) described in the Methods section.

Overall, all attributes received a score less than 2.0 for BSAI skates, because the species were considered highly susceptible to becoming overfished and their productivity was relatively low compared to other U.S. fish stocks. Many of the skate species were clustered close together in the PSA plot (Figure 8). This result is likely due to three factors: 1) most skates share similar life histories that tend toward low productivity; 2) BSAI skate species show similar susceptibility to trawl and longline fishing gear; and 3) similar attribute scores were assigned to many of the data-poor species. One species (longnose skate) stood out from the rest as a result of lower productivity, which in turn resulted from its larger size and longevity. Of the remaining 12 species, four (Aleutian skate, Bering skate, big skate, and butterfly skate) showed reduced susceptibility relative to the others. This resulted from differences in spatial distribution that reduced their susceptibility to fisheries. Data quality was highest for *B. parmifera* and lowest for the eight species for which life-history data were mostly unavailable. The lowest data quality score was 3: we had enough data to produce a score for each attribute. The results of this

PSA suggest that skates in the BSAI are vulnerable to fishing activity and should be carefully managed to reduce the likelihood of overfishing.

5.6 Hawaii-based Longline Fishery: A Comparison of the Tuna and Swordfish Sectors

The Hawaii-based longline fishery is a year-round pelagic fishery operating out of Hawaii that targets a range of pelagic finfish species with hook and line gear for the fresh fish market, and is comprised of approximately 125 active fishing vessels in a limited entry program (WPRFMC 2007). This is the largest commercial fishery in Hawaii in both landings (21.6 million pounds for 2006) and revenue ($54.4 million ex-vessel revenue for 2006). The Hawaii-based longline fishery began in 1917 using tuna fishing methods imported from Japan. The fishery underwent a substantial expansion from 1987 to 1993 due to the introduction of swordfish (*Xiphias gladius*) fishing methods using shallow set fishing gear (Boggs and Ito 1993). As this sector of the fishery became more heavily regulated (due primarily to interactions with sea turtles in the late 1990s) shallow set fishing effort decreased substantially with a corresponding expansion of the tuna sector of the fishery, which primarily targeted bigeye tuna (*Thunnus obesus*) with deep set gear. These two sectors of the fishery continue through present time; fishermen can either set shallow gear to target swordfish in the higher latitudes, or set deep gear to target tuna primarily in lower latitudes (Bigelow et al. 2006). Tunas are the largest component of the overall catch (59 percent for 2006), with bigeye tuna alone comprising 40 percent of the total longline landings for 2006. Billfish are the second largest component of the overall catch (22 percent for 2006), with swordfish alone composing 10 percent of the total longline landings for 2006. Both sectors are tightly regulated to reduce conflicts with recreational fishermen, to reduce protected species interactions, and to minimize risks of overfishing.

The Western Pacific Regional Fishery Management Council (WPRFMC) pelagics FMP includes 28 stocks or assemblages as pelagic management unit species (PMUS). This PSA considered 33 stocks, since two assemblages (oilfishes and pomfrets) were disaggregated to individual species (Table 5). These PMUS taxa can be aggregated into four general categories of tunas, billfishes, other bony fishes, and sharks (Table 5). A wide variety of data sources were examined to extract pertinent biological and fishery information for this PSA case study, and included published and unpublished scientific findings, webpage summaries, personal communications, and NMFS research finding from longline observer data, auction data, logbook data, and State of Hawaii commercial catch data (citations available upon request). The dual nature of the fishery necessitated that two separate PSA results be prepared – one for the shallow set swordfish fishery sector and one for the deep set tuna fishery sector. Productivity attributes were identical for the two PSA applications; however, susceptibility values can vary substantially between the sectors for the same species due to differences in the geographic fishing areas, seasonal patterns of fishing effort, vertical positioning of the fishing gear in the water column, and bycatch survival. Other gear-related issues involved in targeting of particular species are also important and are incorporated in the sector-specific susceptibility scorings.

PSA scorings for the two fishery sectors are shown in Table 5 and Figures 9 and 10. Generally, all stocks fell into the region characterized as moderate to low productivity and moderate to low susceptibility. Sharks and others were among the lower productivity stocks, while tunas and billfishes tended to be among the higher productivity stocks, when examined as broader taxonomic groupings (Table 5). Interestingly, it was observed that the productivity scores for blue, bigeye thresher, longfin mako, oceanic whitetip, silky, and the common thresher shark differed from those recorded in the Highly Migratory Atlantic Shark Complexes case study (Table 5, Appendix 2). These differences are likely related to intraspecific variations in life history patterns (Cope 2006), and the use of different weightings in the vulnerability analysis. Sharks and billfishes were among the lower susceptibility stocks, while tunas and others were among the higher susceptibility stocks. The swordfish sector exhibited an overall slightly reduced susceptibility when compared to the tuna sector, probably due to the higher level of targeting in this sector of the fishery. In fact, only five stocks had a higher susceptibility in the swordfish sector than the tuna sector (Figures 9 and 10). Therefore, ~85 percent (28 out of 33) of the stocks analyzed here had an equal or higher susceptibility in the tuna sector than the swordfish sector of the longline fishery. Further analysis is needed to fully understand the roles of spatio-temporal patterns of fishing gear deployment, gear specificity, catchability, and the biology of the individual stocks.

6.0 SYNTHESIS AND DISCUSSION

6.1 Range of Vulnerability Scores

The managed stocks evaluated in this report represent both targeted (*n* = 71; 44 percent) and non-targeted species (*n* = 91; 56 percent) that were included in FMPs to prevent overfishing and rebuild overfished stocks (see MSA §§ 303(a)(1)(A) & 303(b)(1)(A)). The stocks generally displayed vulnerability scores greater than 1.0 or, when plotted, are above the 2.0 isopleth (the distance should be measured from the origin, which in this case is 3,1; see Table 5 and Figure 2). The only exception to this observation was the Pacific saury, which received a susceptibility score of 1.91, a productivity score of 2.70 and a vulnerability score of 0.96.

Within any particular example application, the range of productivity and selectivity values can be restricted depending upon the characteristics of the species of interest. For example, the species in the Atlantic shark complex showed a wide range of susceptibility values, but 34 of the 37 species had productivity values between 1.0 and 1.5. Similarly, the 13 BSAI skate species had productivity scores between 1.0 and 1.5, and susceptibility scores between 1.5 and 2.0. In contrast, the species in the Hawaii longline fishery (both the tuna and swordfish sectors) showed an expanded range of productivity and susceptibility scores. The restricted range in some of the example applications may reflect the species chosen for these examples, and it is possible that a more expanded range would be observed if the PSA was applied to all species in a FMP. For example, BSAI skates are managed within the BSAI groundfish FMP which includes a range of life-history types, including gadids and flatfish, and the productivity and susceptibility scores for these species would likely show some contrast from those obtained for skates.

A restricted range of scores from a PSA might motivate some to modify the attribute definitions to produce greater contrast. However, it is important to recognize that the overall goal of the PSA is to estimate vulnerability relative to an overall standard appropriate for the range of federally managed species. Thus, a lack of contrast in vulnerability scores may simply reflect a limited breadth of species diversity. For example, examination of a subset of approximately 40 stocks in the West Cost Groundfish FMP indicates that none have a maximum age less than 10 years, and nearly 60% have a maximum age over 30 years (Figure 11). Similarly, over 80% of these stocks have natural mortality rates estimated to be less than 0.20, and half have a von Bertalanffy growth coefficient of less than 0.15. A similar lumping of values takes place for other attributes, including age at 50% maturity. Thus, it may be advantageous in some cases to redefine the attribute score definitions in order to increase the contrast within a given region or FMP, while recognizing that the vulnerability scores for that particular fishery no longer represent the risk of overfishing based on the original scoring criteria. Analyses that use modified attribute scoring definitions should be clearly labeled to avoid confusion with PSAs based on the scoring bins indentified in the report.

6.2 Relationship of Vulnerability to Fishing Pressure

In order to evaluate the effect of fishing pressure on vulnerability, we examined a subset (n = 50) of the example application stocks for which status determination criteria were available to determine if the stock had been overfished or undergone overfishing between the years of 2000 – 2008 (Figure 12; Appendix 11). Kruskall-Wallis tests indicated that there were significant differences in susceptibility ($P = 0.001$) and vulnerability ($P = 0.002$) scores between stocks that had been overfished or undergone overfishing in the past (i.e., New England Groundfish and Atlantic Shark Complexes) and those that had not. However, productivity scores were not found to be significantly different ($P = 0.891$). Stocks that had been overfished or undergone overfishing in the past generally had susceptibility scores greater than 2.3 and vulnerability scores greater than 1.8.

To further examine the effect of fishing pressure on PSA results, we evaluated four lightly fished non-target species in the South Atlantic-Gulf of Mexico Snapper/Grouper Bottom Longline fishery that were considered potential ecosystem component species (i.e., low vulnerability to overfishing/overfished) based on their average landings (< 5 mt/yr) and price/pound (< $1.00) (Table 5; Figure 2; Appendix 12). Three of the four non-target species received vulnerability scores less than 1.0, but the other stock (sand tilefish) received a vulnerability score of 1.1 due to its moderate productivity (2.1) and susceptibility (1.9). However, several other stocks that would not be considered ecosystem stocks had similar vulnerability scores. Though based on limited data, these *post hoc* results involving overfished and potential ecosystem component stocks indicate that although the PSA is capable of identifying low-, moderate-, and highly- vulnerable stocks, a fixed threshold for delineating between low and highly vulnerable stocks in all situations was not observed.

Determination of appropriate thresholds for low-, moderate-, and highly- vulnerable stocks will likely reflect upon the nature of each particular fishery and the management action to which it will apply. In some cases, the Council may prefer to use the results of the PSA in a qualitative manner to inform management decisions rather than as a basis for specifying rigid decision rules. When thresholds are desired, we recommend that Fishery Management Councils and their associated Science and Statistical Committees jointly determine appropriate thresholds on a fishery-by fishery basis.

6.3 Comparisons Between Target and Non-target Stocks

Comparisons of productivity and susceptibility between target and non-target stocks can be made in the Hawaii longline (tuna sector), Hawaii longline (swordfish sector), and the Atlantic shark complex (Table 5 notes which stocks were considered targets and non-targets). Kruskall-Wallis tests revealed that the productivity scores were significantly different between the target and non-target stocks in each of the two sectors of the Hawaii longline fishery ($P = 0.026$)(Figures 9 and 10, Table 6), whereas the susceptibility scores were significantly different ($P = 0.000$) in the Atlantic shark complex (Figure 5, Table 6). None of these cases showed significant differences in both axes, and no significant differences were observed in vulnerability. These results suggest that non-target stocks can be as vulnerable to overfishing as the target stocks of a fishery, and reinforce the need to carefully examine the vulnerability of non-target stocks when making management decisions.

6.4 Data Availability and Data Quality

Application of a PSA to data-poor stocks will very likely reveal missing data for one or more attributes. From our example applications, data availability was relatively high for the majority of the attributes evaluated, averaging 88% and ranging from 30 to 100% in scoring frequency (Table 7; Figure 3). However, the quality of this data was considered moderate (i.e., medium data quality scores 2 to 3), with an exception of the Northeast Multi-species Groundfish fishery (Table 5, Figure 3). The high degree of data quality for these targeted stocks reflects the relatively long time series of fishery and survey data. In general, a relationship between susceptibility and data quality is intuitive in that valuable stocks are likely the most susceptible due to targeting, and the priority placed upon the collection of data for valuable target fisheries. It is recommended that the data quality of vulnerability scores be considered in the decision-making process, and that the precautionary approach is employed if vulnerability scores were made with limited or poor data.

6.5 Degree of Consistency within Productivity and Susceptibility Scores

The degree of consistency within the productivity and susceptibility scores was determined from correlations of a particular attribute to its overall productivity or susceptibility score (after removal of the attribute being evaluated). In this analysis, susceptibility attributes related to management were separated from other susceptibility attributes. All but two of the attributes had relatively high correlation coefficients, averaging 0.43 and ranging from -0.21 to 0.80 (Table 7). The correlation coefficients for recruitment pattern (-0.21) and seasonal migration (0.06) were unusually low and could reflect the narrow range of observed recruitment patterns or seasonal migrations, as is evident from each attribute being scored 90% of time as a moderate risk. The restricted range observed for these attributes could also reflect the definition of scoring bins that were used. While these attributes were not informative for the majority of the stocks we examined here, it is anticipated that in some fisheries these attributes may prove to be more useful. As previously noted, in these cases the attribute weight can be adjusted to reflect its utility.

6.6 Correlations to Other Risk Analysis

The productivity scores obtained from our PSA analysis generally correspond to Musick’s (1999) extinction risk analysis and vulnerability analysis of Cheung et al. (2005), which is integrated into the FishBase database (www.fishbase.org). In contrast to the PSA analysis which evaluates vulnerability to overfishing, these approaches aim to evaluate the risk of extinction as a function of stock productivity, trends in abundance, and life-history characteristics. As expected, scores from Musik (1999) and Cheung et al (2005) were highly correlated with our productivity scores and not correlated with our susceptibility scores (Table 8; Figures 13 and 14). Since vulnerability scores are dependent on productivity and susceptibility scores, correlations between our PSA vulnerability score and the other risk analyses were moderate (Table 8; Figures 13 and 14).

6.7 Cluster Analysis for Determining Stock Complex Groupings

The NS1 guidelines emphasize that when stock complexes are created to manage data-poor stocks, the stocks should be sufficiently similar in geographic distribution, life history, and vulnerabilities such that the impact of management actions on the stocks within the complex is similar (see § 600.310 (d)(8)). The NS1 guidelines also state that the vulnerability of stocks should be evaluated when determining if a particular stock complex should be established or reorganized, or if a particular stock should be included in a complex. To help determine the appropriate grouping of vulnerable stocks, it is recommended that a hierarchical cluster or discriminant function analysis be conducted.

7.0 CONCLUSIONS

While there are many qualitative risk analyses currently used by fisheries scientists and managers, a PSA is a particularly useful methodology for determining vulnerability because it evaluates both the productivity of the stock and its susceptibility to the fishery. Several modifications to previously published PSAs were developed to better evaluate U.S. fisheries and incorporate the principles described in the NS1 guidelines. The output from this relatively simple and straightforward tool provides the SSC and Council members an index of how vulnerable their managed stocks are to becoming overfished. It also provides guidance to help determine the needed strength of conservation measures and the degree of precaution to apply in management measures. The vulnerability of a stock should be considered when determining: 1) which stocks are fishery and ecosystem component stocks; 2) the appropriate grouping of data-poor stocks into stock complexes; and 3) appropriate buffers in either the ABC or ACT control rules.

Our analyses indicate that the PSA is generally capable of distinguishing the vulnerability of stocks that experience differing levels of fishing pressure, although fixed thresholds separating low, medium, and high vulnerability stocks were not observed. Due to differences in data quality and the manner in which FMPs were developed, it is recommended that Fishery Management Councils and their SSCs determine thresholds between low, medium, and high vulnerability stocks on a fishery-by-fishery basis.

Similar to Shertzer and Williams (2008), our example applications showed that current stock complexes exhibit a wide range of vulnerabilities (e.g., pomfrets and sharks). Therefore, the SSCs and Councils should consider reorganizing complexes that exhibit a wide range of vulnerabilities, or at least consider choosing an indicator stock that represents the more vulnerable stock(s) within the complex. If an indicator stock is found to be less vulnerable than other members of the complex, management measures need to be more conservative so that the more vulnerable members of the complex are not at risk from the fishery (see § 600.310(d)(9)).

Lastly, it is recommended that SSC or Council members consider using information on vulnerability to adjust the buffer either between OFL and ABC, or ACL and ACT, but not both in order to avoid "double-counting" of the vulnerability information. More specific guidelines about incorporating the vulnerability of stocks into control rules are being addressed by the ABC/ACT control rule working group (see Methot et al. *in prep*).

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9.0 LITERATURE CITED

Adams, P. B. 1980. Life history patterns in marine fishes and their consequences for management. Fishery Bulletin 78: 1-12.

Alverson, D. L., and M. J. Carney. 1975. A graphic review of the growth and decay of population cohorts. ICES Journal of Marine Science 36: 133-143.

Anderson, L. G. and K. A. Semmens. (*In press*). Risk analysis in setting allowable harvests: Annual catch limits under the Magnuson Stevens Reauthorization Act. International Institute of Fisheries Economics and Trade 2008 Vietnam Proceedings. Nha Trang, Khanh Hoa, Vietnam. July 22, 2008.

Astles, K.L., M. G. Holloway, A. Steffe, M.Green, C. Ganassin, and P. J. Gibbs. 2006. An ecological method for qualitative risk assessment and its use in the management of fisheries in New South Wales, Australia. Fisheries Research 82: 290–303.

Bakun, A. 1996. Patterns in the Ocean: Ocean Processes and Marine Population Dynamics. University of California Sea Grant, San Diego, California, USA, in cooperation with Centro de Investigaciones Biol-gicas de Noroeste, La Paz, Baja California Sur, Mexico. 323 pp.

Bell, D.E., H. Raiffa, and A. Tverskey. 1988. Decision Making: Descriptive, Normative, and Prescriptive Interactions. Cambridge University Press, New York.

Beverton, R. J. H. and S. J. Holt. 1957. On the dynamics of exploited fish populations. Chapman and Hall, London, UK.

Bigelow, K., M. K. Musyl, F. Poisson, and P. Kleiber. 2006. Pelagic longline gear depth and shoaling. Fisheries Research 77: 173-183.

Boggs, C. H. and R. Ito. 1993. Hawaii's pelagic fisheries. Marine Fisheries Review 55: 69-82.

Braccini, J. M., B. M. Gillanders and T. I. Walker. 2006. Hierarchical approach to the assessment of fishing effects on non-target chondricthyans: case study of *Squalus megalops* in southeastern Australia. Canadian Journal of Fisheries and Aquatic Sciences 63: 2456-2466.

Cardenas-Torres, N., R. Enriquez-Andrade,and N. Rodriguez-Dowdell. 2007. Community-based management through ecotourism in Bahia de los Angeles, Mexico. Fisheries Research 84: 114-118.

Cheung, W. W. L., T. J. Pitcher, and D. Pauly. 2005. A fuzzy logic expert system to estimate intrinsic extinction vulnerabilities of marine fishes to fishing. Biological Conservation 124: 97–111.

Clarke, S. 2003. Quantification of the trade in shark fins. PhD thesis, Imperial College London, UK, 327 p.

Cope, J. M. 2006. Exploring intraspecific life history patterns in sharks. Fisheries Bulletin 104: 3011-320.

Cortés, E., F, Arocha, L. Beerkircher, F. Carvalho, A. Domingo, M. Heupel, H. Holtzhausen, M. Neves, M. Ribera, and C. Simpfendorfer. 2008. Ecological Risk Assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. SCRS/2008/138 Col. Vol. Sci. Pap. ICCAT.

Dankel, D. J., D. W. Skagen, and O. Ulltang. 2008. Fisheries management in practice: review of 13 commercially important fish stocks. Reviews in Fish Biology and Fisheries 18: 201-233.

Darcy, G. H. and G. C. Matlock. 1999. Application of the precautionary approach in the national standard guidelines for conservation and management of fisheries in the United States. ICES Journal of Marine Science 56: 853–859.

Davis, D., S. Banks, A. Birtles, P. Valentine, and M. Cuthill. 1997. Whale sharks in Ningaloo Marine Park: managing tourism in an Australian marine protected area. Tourism Management 18: 259-271.

Dulvy, N. K. and J. D. Reynolds. 2002. Predicting extinction vulnerability in skates. Conservation Biology 16: 440-450.

Dulvy, N. K., Y. Sadovy, and J. D. Reynolds. 2003. Extinction vulnerability in marine populations. Fish and Fisheries 4: 25-64.

Dulvy, N. K., J. R. Ellis, N. B. Goodwin, A. Grant, J. D. Reynolds, and S. Jennings. 2004. Methods of assessing extinction risk in marine fishes. Fish and Fisheries 5: 255-276.

Environment Australia. 2002. Assessment of the Western Australia Shark Bay Prawn Trawl Fishery. Environment Australia: Canberra, Australia. 25 pp.

Fletcher, W. J. 2005. The application of qualitative risk assessment methodology to prioritize issues for fisheries management. ICES Journal of Marine Science 62: 1576-1587.

Fletcher, W. J., J. Chesson, K. J. Sainsbury, T. J. Hundloe, and M. Fisher. 2005. A flexible and practical framework for reporting on ecologically sustainable development for wild capture fisheries. Fisheries Research 71: 175-183.

Froese, R. and C. Binohlan. 2000. Empirical relationships to estimate asymptotic length, length at first maturity and length at maximum yield per recruit in fishes, with a simple method to evaluate length frequency data. Journal of Fish Biology 56: 758-773.

Gribble, N. O. Whybird, L. Williams, and R. Garrett. 2004. Fishery assessment update 1989-2003: Queensland East Coast shark. Report QI 04070. Queensland Department of Primary Industries, Brisbane.

Griffiths, S. P., D. T. Brewer, D. S. Heales, D. A Milton, and I. C. Stobutzki. 2006. Validating ecological risk assessments for fisheries: assessing the impacts of turtle excluder devices on elasmobranch bycatch populations in an Australian trawl fishery. Marine and Freshwater Research 57: 395-401.

Gunderson, D. R., A. M. Parma, R. Hilborn, J. M. Cope, D. L. Fluharty, M. L. Miller, R. D. Vetter, S. S. Heppell, and H. G. Greene. 2008. The challenge of managing nearshore rocky reef resources. Fisheries 33: 172-179.

Hare, S.R. and N.J. Mantua. 2000. Empirical evidence for North Pacific regime shifts in 1977 and 1989. Progress in Oceanography 47:103-145. .

Hilborn, R., and C. J. Walters. 1992. Quantitative Fisheries Stock Assessment: Choice, Dynamics, and Uncertainty. Chapman and Hall, New York.

Hobday, A. J., A. Smith, and I. Stobutzki. 2004. Ecological risk assessment for Australian Commonwealth fisheries. Final Report Stage 1. Hazard identification and preliminary risk assessment. Report Number R01/0934, CSIRO Marine Research.

Hobday, A. J., A. Smith, H. Webb, R. Daley, S. Wayte, C. Bulman, J. Dowdney, A. Williams, M. Sporcic, J. Dambacher, M. Fuller, T. Walker. 2007. Ecological risk assessment for the effects of fishing: methodology. Report R04/1072 for the Australian Fisheries Management Authority, Canberra.

Hobday, A. J, and T. Smith. 2009. Risk-based frameworks: ERAEF. PowerPoint presentation given to the MRAG Americas Productivity and Susceptibility Analysis Working Group. Boston, MA. January 12-14. http://www.mragamericas.com/PSA_WG.php

Hoenig, J. M. 1983. Empirical use of longevity data to estimate mortality rates. Fishery Bulletin 82: 898-902.

Janis, I. 1983. Groupthink: Psychological Studies of Policy Decisions and Fiascoes. Houghton Mifflin Company, Boston.

Jennings, S., J. D. Reynolds and S. C. Mills. 1998. Life history correlates of responses to fisheries exploitation. Proceedings of the Royal Society of London – Series B Biological Sciences 265: 333-339.

Jennings, S., J. D. Reynolds, and N. V. C. Polunin. 1999. Predicting the vulnerability of tropical reef fishes to exploitation with phylogenies and life histories. Conservation Biology 13: 1466-1475.

King, J. R., and G. A. McFarlane. 2003. Marine fish life history strategies: applications to fishery management. Fisheries Management and Ecology 10: 249-264.

Landeta, J. 2006. Current validity of the Delphi method in social sciences. Technological Forecasting and Social Change 73: 467-482.

Lichtensten, S. and J. R. Newman. 1967. Empirical scaling of common verbal phrases associated with numerical probabilities. Psychonomic Science 9: 563–564.

MacCAll, A. D. 1990. Dynamic geography of marine fish populations. Washington Sea Grant, Seattle, WA. 153 pp.

MacCall A.D. 1996. Patterns of low-frequency variability in fish populations of the California Current. CalCOFI Reports 37: 100-110.

Methot, R., M. Prager, E. Brooks, P. Crone, M. Haltuch, D. Hanselman, P. Kleiber, A. MacCall, M. Pan, V. Restrepo, G. Thompson, and K. Shertzer. *In prep*. Methodologies for creating acceptable biological catch and annual catch target control rules. NOAA, National Marine Fisheries Service, Control Rule Working Group, Seattle, WA.

Milton, D. A. 2001. Assessing the susceptibility to fishing of populations of rare trawl bycatch: sea snakes caught by Australia's Northern Prawn Fishery. Biological Conservation 101: 281-290.

Musick, J. A. 1999. Criteria to define extinction risk in marine fishes. Fisheries 24: 6-14.

NMFS (National Marine Fisheries Service). 2001. Marine fisheries stock assessment improvement plan. Report of the National Marine Fisheries Service National Task Force for Improving Fish Stock Assessments. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-F/SPO-56. 69 pp.

NMFS 2008. National Marine Fisheries Service Annual Commercial Landings Statistics. http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html.

National Research Council (NRC). 1994. Improving the Management of U.S. Marine Fisheries. Committee on Fisheries, Ocean Studies Board, Commission on Geosciences, Environment, and Resources. National Academy Press, Washington, D.C. 44 pp.

Okoli, C. and S. D. Pawlowski. 2004. The Delphi method as a research tool: an example, design considerations and applications. Information and Management 42: 15-29.

Ormseth, O.A., and Matta, M.E. 2007. Bering Sea and Aleutian Islands skates. IN: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/ Aleutian Islands regions. North Pacific Fishery Management Council, Anchorage Alaska. URL: http://www.fakr.noaa.gov/npfmc/SAFE/SAFE.htm.

Pacific Fishery Management Council (PFMC). 1998. The coastal pelagic species fishery management plan. Pacific Fishery Management Council, Portland, OR.

PFMC. 2008. Pacific Coast Groundfish Fishery Management Plan as Amended through Amendment 19. Pacific Fishery Management Council, Portland, OR.

Palmer-Zwahlen, M., J. O'Brien and L. Laughlin. 1993. Live-Fish Trap Fishery in Southern California 1989-1992 and Recommendations for Management. Marine Resources Division, Department of Fish and Game, State of California.

Patrick, W. S. and K. Damon-Randall. 2008. Using a five-factored structured decision analysis to evaluate the extinction risk of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Biological Conservation 141: 2906-2911.

Pauly, D., V. Christensen, J. Dalsgaard, R. Froese, and F. Torres. 1998. Fishing down marine food webs. Science 279:860-863.

Peterman, R. M. 1990. Statistical power analysis can improve fisheries research and management. Canadian Journal of Fisheries and Aquatic Sciences 47: 2-15.

Queensland Department of Primary Industries (QDPI). 2004. Review of the sustainability of fishing effort in the Queensland East Coast Trawl Fishery. Discussion paper. Queensland Department of Primary Industries, Brisbane.

Restrepo V.R. , G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall, R. D. Methot, J. E. Powers, B. L. Taylor, P. R. Wade, and J. F. Witzig. 1998. Technical Guidance On the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS–F/SPO–31. 54 pp.

Restrepo, V. R. and J. E. Powers. 1999. Precautionary control rules in US fisheries management: specification and performance. ICES Journal of Marine Science 56: 846-852.

Reynolds, J. D., S. Jennings, and N. K. Dulvy. 2001. Life histories of fishes and population responses to exploitation. In: Reynolds, J.D., Mace, G.M., Redford, K.H., Robinson, J.G. (Eds.), Conservation of Exploited Species. Cambridge University Press, Cambridge, pp. 147–169.

Roberts, C. M. and J. P. Hawkins. 1999. Extinction risk in the sea. Trends in Ecology and Evolution 14: 241-248.

Rosenberg, A, D. Agnew, E. Babcock, A. Cooper, C. Mogensen, R. O'Boyle, J. Powers, G. Stefansson, and J. Swasey. 2007. Setting annual catch limits for U.S. fisheries: An expert working group report. MRAG Americas, Washington, D.C. 36 pp.

Rosenberg, A. A., A. Acosta, E. Babcock, J. Harrington, A. Hobday, C. B. Mogensen, R. O'Boyle, D. Rader, J. H. Swasey, R. J. Trumble, and R. C. Wakeford. 2009. Use of productivity-susceptibility analysis (PSA) in setting annual catch limits for the federal fisheries of the United State: An Expert Working Group Report. MRAG Americas, Essex, Massachusetts. 15 pp.

Rowat, D., U. and U. Engelhardt. 2007. Seycehelles: a case study of community involvement in the development of whale shark ecotourism and its socio-economic impact. Fisheries Research 84: 109-113.

Scandol, J. P. 2003. Use of cumulative sum (CUSUM) control charts of landed catch in the management of fisheries. Fisheries Research 64: 19-36.

Schwartzlose, R.A., J. Alheit, A. Bakun, T.R. Baumgartner, R. Cloete, R.J.M. Crawford, W.J. Fletcher, Y. Green-Ruiz, E. Hagen, T. Kawasaki, D. Lluch-Belda, S.E.

Lluch-Cota, A.D. MacCall, Y. Matsuura, M.O. Nevarez-Martinez, R.H. Parrish, C. Roy, R. Serra, K.V. Shust, M.N. Ward, and J.Z. Zuzunaga. 1999. Worldwide large-scale fluctuations of sardine and anchovy populations. South African Journal of Marine Science 21: 289-347.

Sethi, G., C. Costello, A. Fisher, M. Hanemann, and L. Karp. 2005. Fishery management under multiple uncertainty. Journal of Environmental Economics and Management 50: 300-318.

Shertzer, K. W. and E. H. Williams. 2008. Fish assemblages and indicator species: reef fishes off the southeastern United States. Fishery Bulletin 106: 257-269.

Shertzer, K. W., M. H. Prager, and E. H. Williams. 2008. A probability-based approach to setting annual catch levels. Fishery Bulletin 106: 225-232.

Simpfendorfer, C., E. Cortés, M. Heupel, E. Brooks, E. Babcock, J. K. Baum, R. McAuley, S. F. J. Dudley, J. D. Stevens, S. Fordham, and A. Soldo. 2008. An integrated approach to determining the risk of over-exploitation for data-poor pelagic Atlantic sharks. An Expert Working Group Report, Lenfest Ocean Program, Washington, D.C.

Smith, A. D. M., E. J. Fulton, A. J. Hobday, D. C. Smith, and P. Shoulder. 2007. Scientific tools to support the practical implementation of ecosystem-based fisheries management. ICES Journal of Marine Science 64: 633-639.

Spencer, P.D. and J.S. Collie. 1997. Patterns of population variability for marine fish stocks. Fisheries Oceanography 6:188-204.

Stobutzki, I. C., M. J. Miller, P. Jones, and J. P. Salini. 2001a. Bycatch diversity and variation in a tropical Australian penaeid fishery: the implications for monitoring. Fisheries Research 53: 283-301.

Stobutzki, I., M. Miller, and D. Brewer. 2001b. Sustainability of fishery bycatch: a process for assessing highly diverse and numerous bycatch. Environmental Conservation 28: 167-181.

Stobutzki, I. C., M. J. Miller, D. S. Heales, D. T. Brewer. 2002. Sustainability of elasmobranchs caught as bycatch in a tropical prawn (shrimp) trawl fishery. Fishery Bulletin 100: 800-821.

Swain, D.P. and Sinclair, A.F. 1994. Fish distribution and catchability: what is the appropriate measure of distribution? Canadian Journal of Fisheries and Aquatic Sciences 51: 1046-1054.

Thompson, G. G. 1993. A proposal for a threshold stock size and maximum fishing mortality rate. In S. J. Smith, J. J. Hunt, and D. Rivard [eds.] Risk evaluation and biological reference points for fisheries management, p. 303-320. Canada Special Publication of Fisheries and Aquatic Sciences 120.

VonWinterfeldt, D., and W. Edwards. 1986. Decision Analysis and Behavioral Research. Cambridge University Press, New York.

Webb, H. and Hobday, A. 2004. Draft ecological risk assessment for the effects of fishing: southwest tuna and billfish fishery (v7). In Hobday, A., A.D.M. Smith and I. Stobutzki. Ecological Risk Assessment for Australian Commonwealth Fisheries. Final Report - Stage 1. Hazard identification and preliminary risk assessment. Report to the Australian Fisheries Management Authority, Canberra, Australia

WPRFMC. 2007. Pelagic Fisheries of the Western Pacific Region 2006 Annual Report. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii. 282 p.

Winemiller, K. O. 1989. Patterns of variation in life history among South American fishes in seasonal environments. Oecologia 81: 225-241.

Zhou, S. and S. P. Griffiths. 2008. Sustainability assessments for fishing effects (SAFE): a new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. Fisheries Research 91: 56-68.

TABLES AND FIGURES

Table 1. Productivity and susceptibility attributes and rankings.

	Ranking		
Productivity Attribute	**High (3)**	**Moderate (2)**	**Low (1)**
r	>0.5	0.16-0.5	<0.16
Maximum Age	< 10 years	10 - 30 years	> 30 years
Maximum Size	< 60 cm	60 - 150 cm	> 150 cm
von Bertalanffy Growth Coefficient (k)	> 0.25	0.15-0.25	< 0.15
Estimated Natural Mortality	> 0.40	0.20 - 0.40	< 0.20
Measured Fecundity	> 10e4	10e2-10e3	< 10e2
Breeding Strategy	0	between 1 and 3	≥4
Recruitment Pattern	highly frequent recruitment success (> 75% of year classes are successful)	moderately frequent recruitment success (between 10% and 75% of year classes are successful)	infrequent recruitment success (< 10% of year classes are successful)
Age at Maturity	< 2 year	2-4 years	> 4 years
Mean Trophic Level	<2.5	between 2.5 and 3.5	>3.5

Table 1 (continued).

Susceptibility Attribute	Ranking		
	Low (1)	**Moderate (2)**	**High (3)**
Management Strategy	Targeted stocks have catch limits and proactive accountability measures; non-target stocks are closely monitored.	Targeted stocks have catch limits and reactive accountability measures	Targeted stocks do not have catch limits or accountability measures; non-target stocks are not closely monitored.
Areal Overlap	< 25% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	> 50% of stock occurs in the area fished
Geographic Concentration	stock is distributed in > 50% of its total range	stock is distributed in 25% to 50% of its total range	stock is distributed in < 25% of its total range
Vertical Overlap	< 25% of stock occurs in the depths fished	Between 25% and 50% of the stock occurs in the depths fished	> 50% of stock occurs in the depths fished
Fishing rate relative to M	<0.5	0.5 - 1.0	>1
Biomass of Spawners (SSB) or other proxies	B is > 40% of B0 (or maximum observed from time series of biomass estimates)	B is between 25% and 40% of B0 (or maximum observed from time series of biomass estimates)	B is < 25% of B0 (or maximum observed from time series of biomass estimates)
Seasonal Migrations	Seasonal migrations decrease overlap with the fishery	Seasonal migrations do not substantially affect the overlap with the fishery	Seasonal migrations increase overlap with the fishery
Schooling/Aggregation and Other Behavioral Responses	Behavioral responses decrease the catchability of the gear	Behavioral responses do not substantially affect the catchability of the gear	Behavioral responses increase the catchability of the gear [i.e., hyperstability of CPUE with schooling behavior]
Morphology Affecting Capture	Species shows low selectivity to the fishing gear.	Species shows moderate selectivity to the fishing gear.	Species shows high selectivity to the fishing gear.
Survival After Capture and Release	Probability of survival > 67%	33% < probability of survival < 67%	Probability of survival < 33%
Desirability/Value of the Fishery	stock is not highly valued or desired by the fishery (< $1/lb; < $500K/yr landed; < 33% retention)	stock is moderately valued or desired by the fishery ($1 - $2.25/lb; $500k - $10,000K/yr landed; 33-66% retention)	stock is highly valued or desired by the fishery (> $2.25/lb; > $10,000K/yr landed; > 66% retention)
Fishery Impact to EFH or Habitat in General for Non-targets	Adverse effects absent, minimal or temporary	Adverse effects more than minimal or temporary but are mitigated	Adverse effects more than minimal or temporary and are not mitigated

Table 2. Productivity attribute thresholds based on the empirical relationships between t_{max}, M, k, and t_{mat} (noted as "Modeling"), as well as a survey of stocks landed by U.S. fisheries representing all six regional management areas (N = 141; noted as "US Fisheries).

Attribute	Source	Productivity: Low	Productivity: Moderate	Productivity: High
K	Modeling	<0.10	0.10 - 0.30	>0.30
	US Fisheries	<0.15	0.15 - 0.25	>0.25
	Threshold	<0.15	0.15 - 0.25	>0.25
M (M/yr)	Modeling	< 0.14	0.14 - 0.40	>0.40
	US Fisheries	<0.20	0.20 - 0.40	>0.40
	Threshold	<0.20	0.20 - 0.40	>0.40
t_{max} (yrs)	Modeling	>30	10 - 30	<10
	US Fisheries	>30	10 - 30	<10
	Threshold	>30	10 - 30	<10
t_{mat} (yrs)	Modeling	>9	3 - 9	<3
	US Fisheries	>4	2 - 4	<2
	Threshold	>4	2 - 4	<2
L_{max} (cm)	Modeling	-	-	-
	US Fisheries	>150	60 - 150	<60
	Threshold	>150	60 - 150	<60

Table 3. The susceptibility scoring thresholds for desirability/value of a stock.

Sector	Measure	Susceptibility Score Low (1)	Moderate (2)	High (3)
Commercial	$/lb	< $1.00	$1.00 - $2.25	> $2.25
	Annual Landings (lbs)	< $500,000	$500,000 - $10,000,000	> $10,000,000
Recreational	% Retention	< 33%	34 - 66%	> 66%

Table 4. The five tiers of data quality used when evaluating the productivity and susceptibility of an individual stock.

Data Quality Score	Description	Example
1	(Best data) Information is based on collected data for the stock and area of interest that is established and substantial.	Data rich stock assessment, published literature that uses multiple methods, etc.
2	(Adequate Data) Information with limited coverage and corroboration, or for some other reason deemed not as reliable as Tier 1 data	Limited temporal or spatial data, relatively old information, etc
3	(Limited Data) Estimates with high variation and limited confidence and may be based on similar taxa or life history strategy.	Similar genus or family, etc.
4	(Very Limited Data) Expert opinion or based on general literature review from wide range of species, or outside of region	General data – not referenced
5	(No Data) No information to base score on – not included in the PSA, but included in the DQI score.	

Table 5. Data for example applications including identification numbers, common and scientific names, productivity, susceptibility and vulnerability and data quality scores. ID numbers are used to note stocks in summary x-y plots that include multiple fisheries, while group IDs are used in x-y plots for a particular fishery.

ID	Group ID	Fishery	Stock	Scientific name	Productivity	Susceptibility	Vulnerability	# of Productivity Attributes Scored	Productivity Data Qaulity	# of Susceptiblity Attributes Scored	Susceptibility Data Quality
1	1		Sixgill shark*	*Hexanchus griseus*	1.1	1.4	2.0	9	2.7	7	3.0
2	2		Sharpnose sevengill shark*	*Heptranchias perlo*	1.1	1.4	1.9	4	4.1	6	3.4
3	3		Bigeye sandtiger shark*	*Odontaspis noronhai*	1.1	1.6	2.0	9	3.0	7	3.1
4	4		Whale shark*	*Rhincodon typus*	1.3	1.7	1.9	9	3.1	6	3.2
5	5		Caribbean sharpnose shark*	*Rhizoprionodon porosus*	1.8	1.6	1.4	9	2.9	6	3.4
6	6		Angel shark*	*Squatina dumeril*	1.3	1.6	1.8	9	3.0	6	3.5
7	7		White shark*	*Carcharodon carcharias*	1.1	1.7	2.1	9	2.5	6	3.3
8	8		Basking shark*	*Cetorhinus maximus*	1.0	1.8	2.1	9	2.9	7	2.9
9	9		Sandtiger shark*	*Carcharias taurus*	1.1	1.8	2.0	9	2.0	8	2.7
10	10		Blue shark*	*Prionace glauca*	1.3	1.9	1.9	9	1.8	10	1.9
11	11		Smalltail shark*	*Carcharhinus porosus*	1.3	1.8	1.9	9	2.5	6	3.4
12	12		Nurse shark	*Ginglymostoma cirratum*	1.3	1.8	1.9	9	2.4	7	2.7
13	13		Galapagos shark*	*Carcharhinus galapagensis*	1.2	1.9	2.0	9	2.6	6	3.3
14	14		Dusky shark*	*Carcharhinus perezi*	1.0	2.1	2.2	9	2.0	9	2.1
15	15		Porbeagle*	*Lamna nasus*	1.0	2.1	2.3	9	2.0	9	2.2
16	16		Common thresher shark*	*Alopias vulpinus*	1.1	2.3	2.3	9	2.0	7	2.7
17	17		Oceanic whitetip shark*	*Carcharhinus longimanus*	1.1	2.2	2.3	9	2.3	7	2.7
18	18		Blacknose shark	*Carcharhinus acronotus*	1.3	2.3	2.2	9	2.0	9	2.1
19	19	Atlantic Shark Complexes	Lemon shark	*Negaprion brevirostris*	1.0	2.2	2.3	9	1.6	8	2.7
20	20		Shortfin mako shark*	*Isurus oxyrinchus*	1.0	2.3	2.4	9	2.0	9	2.1
21	21		Longfin mako shark*	*Isurus retroflexus*	1.1	2.3	2.3	9	2.5	7	2.8
22	22		Tiger shark	*Galeocerdo cuvier*	1.4	2.3	2.1	9	2.0	7	2.7
23	23		Smooth hammerhead shark	*Sphyrna zygaena*	1.1	2.3	2.3	9	2.6	7	2.7
24	24		Caribbean reef shark*	*Carcharhinus perezi*	1.0	2.4	2.4	8	3.0	8	2.7
25	25		Blacktip shark	*Carcharhinus limbatus*	1.2	2.4	2.3	9	2.0	10	2.0
26	26		Scalloped hammerhead shark	*Sphyrna lewini*	1.0	2.4	2.4	9	2.0	10	2.1
27	27		Sandbar shark	*Carcharhinus plumbeus*	1.0	2.4	2.4	9	2.0	10	2.0
28	28		Bigeye thresher shark*	*Alopias superciliosus*	1.1	2.4	2.4	9	2.4	7	2.7
29	29		Finetooth shark	*Carcharhinus isodon*	1.3	2.5	2.2	9	2.0	9	2.1
30	30		Night shark*	*Carcharhinus signatus*	1.1	2.5	2.4	9	2.4	7	2.7
31	31		Bignose shark*	*Carcharhinus altimus*	1.1	2.5	2.4	9	2.1	7	2.7
32	32		Bonnethead shark	*Sphyrna tiburo*	1.7	2.5	2.0	9	2.0	9	2.1
33	33		Spinner shark	*Carcharhinus brevipinna*	1.2	2.6	2.4	9	2.0	7	2.7
34	34		Bull shark	*Carcharhinus leucas*	1.1	2.6	2.4	9	2.0	7	2.7
35	35		Great hammerhead shark	*Sphyrna mokarran*	1.0	2.5	2.5	9	2.2	7	2.7
36	36		Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	1.8	2.6	2.0	9	2.0	9	2.1
37	37		Silky shark	*Carcharhinus falciformis*	1.1	2.7	2.6	9	2.0	7	2.7
38	1		Alaska skate*	*Bathyraja parmifera*	1.4	1.9	1.8	10	1.3	10	2.0
39	2		Aleutian skate*	*Bathyraja aleutica*	1.3	1.6	1.8	9	1.5	10	2.5
40	3		Commander skate*	*Bathyraja lindbergi*	1.4	1.8	1.8	9	2.9	10	2.5
41	4		Whiteblotched skate*	*Bathyraja maculata*	1.4	1.8	1.8	9	2.8	10	2.5
42	5		Whitebrow skate*	*Bathyraja minispinosa*	1.4	1.8	1.8	9	2.9	10	2.5
43	6		Roughtail skate*	*Bathyraja trachura*	1.4	1.8	1.8	9	2.7	10	2.5
44	7	BSAI Skate Complexes	Bering skate*	*Bathyraja interrupta*	1.4	1.6	1.7	9	1.6	10	2.5
45	8		Mud skate*	*Bathyraja taranetzi*	1.4	1.8	1.8	9	2.8	10	2.5
46	9		Roughshoulder skate*	*Amblyraja badia*	1.4	1.7	1.8	9	3.0	9	2.8
47	10		Big skate*	*Raja binoculata*	1.3	1.6	1.8	9	1.6	10	2.5
48	11		Longnose skate*	*Raja rhina*	1.3	1.6	1.8	9	1.5	10	2.8
49	12		Butterfly skate*	*Bathyraja mariposa*	1.4	1.6	1.7	9	2.9	10	2.5
50	13		Deepsea skate*	*Bathyraja abyssicola*	1.4	1.8	1.8	9	2.9	10	2.2

Table 5. (continued).

ID	Group ID	Fishery	Stock	Scientific name	Productivity	Susceptibility	Vulnerability	# of Productivity Attributes Scored	Productivity Data Qaulity	# of Susceptiblity Attributes Scored	Susceptibility Data Quality
51	1	CA Nearshore Groundfish	California sheephead	*Semicossyphus pulcher*	1.9	2.2	1.7	10	1.6	12	1.6
52	2		Cabezon	*Scorpaenichthys marmoratus*	2.0	2.2	1.6	10	1.7	12	1.5
53	3		Kelp greenling	*Hexigrammos decagrammus*	2.0	2.1	1.4	10	2.1	12	1.5
54	4		Rock greenling	*Hexigrammos lagocephalus*	2.0	2.1	1.5	10	2.3	12	1.9
55	5		California scorpionfish	*Scorpaena guttata*	2.0	1.8	1.3	10	2.1	12	1.5
56	6		Monkyface prickelback	*Cebidichthys violaceus*	1.8	2.0	1.6	10	2.3	12	2.0
57	7		Black rockfish	*Sebastes melanops*	1.4	2.2	2.0	10	1.9	12	1.5
58	8		Black-and-yellow rockfish	*Sebastes chrysomelas*	1.9	2.3	1.7	10	1.9	12	1.8
59	9		Blue rockfish	*Sebastes mystinus*	1.5	2.3	2.0	10	1.9	12	1.5
60	10		Brown rockfish	*Sebastes auriculatus*	1.7	2.4	1.9	10	2.2	12	1.9
61	11		Calico rockfish*	*Sebastes dallii*	1.8	2.0	1.5	10	2.4	12	1.9
62	12		China rockfish	*Sebastes nebulosus*	1.6	2.5	2.0	10	2.2	12	1.9
63	13		Copper rockfish	*Sebastes caurinus*	1.3	2.3	2.2	10	2.0	12	1.9
64	14		Gopher rockfish	*Sebastes carnatus*	2.0	2.2	1.6	10	2.4	12	1.6
65	15		Grass rockfish	*Sebastes rastrelliger*	1.6	2.2	1.8	10	2.1	12	1.9
66	16		Kelp rockfish	*Sebastes atrovirens*	1.9	2.0	1.5	10	2.2	12	1.9
67	17		Olive rockfish	*Sebastes serranoides*	1.5	2.2	2.0	10	2.1	12	1.9
68	18		Quillback rockfish	*Sebastes maliger*	1.3	2.4	2.3	10	2.0	12	1.9
69	19		Treefish rockfish	*Sebastes serriceps*	1.9	2.3	1.7	10	2.2	12	1.9
70	1	CA Current Pelagics	Pacific sardine	*Sardinops sagax*	2.5	2.1	1.2	10	2.7	11	2.3
71	2		Northern anchovy	*Engraulis mordax*	2.8	2.1	1.2	10	2.8	11	2.4
72	3		Pacific mackerel	*Scomber japonicus*	2.2	2.2	1.5	10	2.5	11	2.6
73	4		Jack mackerel	*Trachurus symmetricus*	2.1	1.9	1.3	10	2.7	11	3.1
74	5		Market squid	*Doryteuthis opalescens*	2.6	2.3	1.4	10	2.8	11	3.2
75	6		Pacific herring	*Clupea pallasii*	2.4	2.5	1.6	10	2.7	11	2.9
76	7		Pacific bonito	*Sarda chiliensis*	2.5	2.1	1.3	10	3.2	11	3.6
77	8		Pacific saury	*Cololabis saira*	2.7	1.9	1.0	10	3.5	11	3.1
78	1	NE Groundfish	Gulf of Maine cod	*Gadus morhua*	2.3	2.5	1.7	10	1.5	12	1.5
79	2		Georges Bank cod	*Gadus morhua*	2.3	2.6	1.7	10	1.5	12	1.5
80	3		Gulf of Maine haddock	*Melanogrammus aeglefinus*	2.0	2.4	1.7	10	1.5	12	1.5
81	4		Georges Bank haddock	*Melanogrammus aeglefinus*	2.0	2.5	1.8	10	1.5	12	1.5
82	5		Redfish	*Sebastes marinus*	2.5	2.3	1.4	10	1.5	12	1.5
83	6		Pollock	*Pollachius virens*	2.3	2.4	1.5	10	1.5	12	1.5
84	7		Cape Cod/Gulf of Maine yellowtail flounder	*Limanda ferruginea*	2.1	2.6	1.8	10	1.5	12	1.5
85	8		Georges Bank yellowtail flounder	*Limanda ferruginea*	2.1	2.5	1.8	10	1.5	12	1.5
86	9		Southern New England yellowtail flounder	*Limanda ferruginea*	2.1	2.6	1.8	10	1.5	12	1.5
87	10		American plaice	*Hippoglossoides platessoides*	2.2	2.3	1.5	10	1.5	12	1.5
88	11		Witch flounder	*Glyptocephalus cynoglossus*	2.2	2.5	1.7	10	1.5	12	1.5
89	12		Gulf of Maine Winter flounder	*Pseudopleuronectes americanus*	2.0	2.5	1.8	10	1.5	12	1.5
90	13		Georges Bank Winter flounder	*Pseudopleuronectes americanus*	2.0	2.5	1.8	10	1.5	12	1.5
91	14		Southern New England/Mid-Atlantic winter flounder	*Pseudopleuronectes americanus*	2.0	2.5	1.8	10	1.5	12	1.5
92	15		Gulf of Maine/Georges Bank windowpane	*Scophthalmus aquosus*	2.0	2.2	1.6	10	1.7	12	1.9
93	16		Southern New EnglandMid-Atlantic windowpane	*Scophthalmus aquosus*	2.0	2.2	1.6	10	1.7	12	1.9
94	17		Ocean pout	*Zoarces americanus*	2.5	2.3	1.4	10	1.8	12	1.9
95	18		White hake	*Urophycis tenuis*	2.5	2.4	1.5	10	1.5	12	1.5
96	19		Atlantic halibut	*Hippoglossus hippoglossus*	2.6	2.6	1.6	10	1.6	12	1.9
97	1	HA Pelagic Longline - Swordfish	Albacore	*Thunnus alalunga*	1.9	2.0	1.5	10	2.5	11	1.9
98	2		Bigeye tuna	*Thunnus obesus*	1.9	2.1	1.5	10	2.2	11	1.9
99	3		Black marlin*	*Makaira mazara*	1.8	1.8	1.5	10	2.3	9	3.4
100	4		Bullet tuna	*Auxis rochei rochei*	2.3	1.8	1.0	10	3.2	9	3.9

Table 5. (continued).

ID	Group ID	Fishery	Stock	Scientific name	Productivity	Susceptibility	Vulnerability	# of Productivity Attributes Scored	Productivity Data Qaulity	# of Susceptiblity Attributes Scored	Susceptibility Data Quality
101	5		Pacific pomfret*	*Brama japonica*	2.3	1.6	1.0	9	3.2	9	3.3
102	6		Blue shark*	*Prionace glauca*	1.5	1.7	1.7	10	2.0	11	1.9
103	7		Bigeye thresher shark*	*Alopias superciliosus*	1.4	1.7	1.8	10	3.0	9	3.1
104	8		Blue marlin*	*Makaira nigricans*	1.8	1.8	1.4	10	2.2	11	2.2
105	9		Dolphin fish (mahi mahi)*	*Coryphaena hippurus*	2.3	1.9	1.1	10	1.4	9	2.4
106	10		Brilliant pomfret*	*Eumegistus illustris*	1.7	2.1	1.7	4	4.4	9	3.8
107	11		Kawakawa*	*Euthynnus affinis*	2.3	1.7	1.0	10	2.2	9	3.8
108	12		Spotted moonfish*	*Lampris guttatus*	1.5	2.0	1.8	6	3.7	9	3.1
109	13		Longfin mako shark*	*Isurus paucus*	1.4	1.5	1.7	10	2.9	9	3.8
110	14		Salmon shark*	*Lamna ditropis*	1.2	1.9	2.0	8	3.5	9	3.4
111	15		Striped marlin*	*Tetrapturus audax*	2.0	2.0	1.4	10	1.9	10	2.2
112	16		Oilfish*	*Ruvettus pretiosus*	2.0	1.8	1.2	10	3.7	9	2.8
113	17		Northern bluefin tuna*	*Thunnus orientalis*	1.7	2.2	1.7	10	2.3	11	2.9
114	18		Roudi escolar*	*Promethichthys prometheus*	2.1	1.7	1.1	10	3.5	9	2.8
115	19	HA Pelagic Longline - Swordfish	Pelagic thresher shark*	*Alopias pelagicus*	1.5	1.5	1.6	10	2.6	9	3.8
116	20		Sailfish*	*Istiophorus platypterus*	1.9	1.8	1.3	10	2.1	9	3.4
117	21		Skipjack tuna	*Katsuwonus pelamis*	2.4	1.9	1.0	10	1.8	11	2.6
118	22		Shortfin mako shark*	*Isurus oxyrinchus*	1.4	1.5	1.6	10	2.6	9	2.8
119	23		Shortbill spearfish*	*Tetrapturus angustirostris*	2.2	1.8	1.2	10	2.8	9	2.8
120	24		Broad billed swordfish	*Xiphias gladius*	1.8	1.7	1.3	10	1.5	11	1.9
121	25		Flathead pomfret*	*Taractichthys asper*	1.7	1.5	1.3	4	4.4	9	3.8
122	26		Dagger pomfret*	*Taractichthys rubescens*	1.5	1.7	1.7	4	4.4	9	3.4
123	27		Sickle pomfret*	*Taractichthys steindachneri*	1.8	2.1	1.6	5	4.5	9	2.8
124	28		Wahoo*	*Acanthocybium solandri*	2.3	2.0	1.2	10	1.8	9	3.1
125	29		Yellowfin tuna	*Thunnus albacares*	2.3	1.9	1.2	10	1.2	11	2.2
126	30		Oceanic whitetip shark*	*Carcharhinus longimanus*	1.3	1.4	1.7	10	3.2	9	3.1
127	31		Silky shark*	*Carcharhinus falciformis*	1.3	1.5	1.7	10	3.3	9	3.4
128	32		Common thresher shark*	*Alopias vulpinus*	1.7	1.7	1.5	3	4.7	9	3.4
129	33		Escolar*	*Lepidocybium flavobrunneum*	2.0	1.8	1.3	10	3.6	9	2.8
130	1		Albacore	*Thunnus alalunga*	1.9	2.1	1.6	10	2.5	11	1.9
131	2		Bigeye tuna	*Thunnus obesus*	1.9	2.1	1.6	10	2.2	11	1.9
132	3		Black Marlin*	*Makaira mazara*	1.8	2.0	1.5	10	2.3	9	3.4
133	4		Bullet tuna	*Auxis rochei rochei*	2.3	1.8	1.0	10	3.2	9	3.9
134	5		Pacific pomfret*	*Brama japonica*	2.2	1.9	1.2	9	3.2	9	3.0
135	6		Blue Shark*	*Prionace glauca*	1.5	1.6	1.6	10	2.0	11	1.9
136	7		Bigeye thresher shark*	*Alopias superciliosus*	1.4	1.5	1.7	10	3.0	9	2.8
137	8		Blue marlin*	*Makaira nigricans*	1.8	1.9	1.5	10	2.2	11	2.2
138	9		Dolphin fish (mahi mahi)*	*Coryphaena hippurus*	2.3	1.9	1.2	10	1.4	9	2.4
139	10		Brilliant pomfret*	*Eumegistus illustris*	1.7	2.3	1.8	4	4.4	9	3.1
140	11	HA Pelagic Longline - tuna	Kawakawa*	*Euthynnus affinis*	2.3	1.7	1.0	10	2.2	9	3.8
141	12		Spotted moonfish*	*Lampris guttatus*	1.5	2.2	1.9	6	3.7	9	2.4
142	13		Longfin mako shark*	*Isurus paucus*	1.4	1.9	1.8	10	2.9	9	3.1
143	14		Salmon shark*	*Lamna ditropis*	1.2	1.7	1.9	8	3.5	9	3.4
144	15		Striped marlin*	*Tetrapturus audax*	2.0	1.8	1.3	10	1.9	10	1.9
145	16		Oilfish*	*Ruvettus pretiosus*	2.0	1.8	1.3	10	3.7	9	2.8
146	17		Northern bluefin tuna*	*Thunnus orientalis*	1.7	2.0	1.7	10	2.3	11	2.9
147	18		Roudi escolar*	*Promethichthys prometheus*	2.1	1.9	1.3	10	3.5	9	3.1
148	19		Pelagic thresher*	*Alopias pelagicus*	1.5	1.9	1.7	10	2.6	9	3.1
149	20		Sailfish*	*Istiophorus platypterus*	1.9	1.9	1.4	10	2.1	9	3.1
150	21		Skipjack tuna	*Katsuwonus pelamis*	2.4	2.0	1.2	10	1.8	11	1.9

Table 5. (continued).

ID	Group ID	Fishery	Stock	Scientific name	Productivity	Susceptibility	Vulnerability	# of Productivity Attributes Scored	Productivity Data Qaulity	# of Susceptiblity Attributes Scored	Susceptibility Data Quality
151	22	HA Pelagic Longline - tuna	Shortfinned mako shark*	*Isurus oxyrinchus*	1.4	1.9	1.8	10	2.6	9	2.8
152	23		Short bill spearfish*	*Tetrapturus angustirostris*	2.2	1.8	1.1	10	2.8	9	2.4
153	24		Broad billed swordfish*	*Xiphias gladius*	1.8	1.6	1.3	10	1.5	11	1.9
154	25		Flathead pomfret*	*Taractichthys asper*	1.7	1.6	1.4	4	4.4	9	3.1
155	26		Dagger pomfret*	*Taractichthys rubescens*	1.5	1.7	1.7	4	4.4	9	2.8
156	27		Sickle pomfret*	*Taractichthys steindachneri*	1.8	2.2	1.6	5	4.5	9	2.4
157	28		Wahoo*	*Acanthocybium solandri*	2.3	2.1	1.3	10	1.8	9	2.4
158	29		Yellowfin tuna	*Thunnus albacares*	2.3	2.0	1.2	10	1.2	11	1.9
159	30		Oceanic whitetip shark*	*Carcharhinus longimanus*	1.3	1.6	1.8	10	3.2	9	2.8
160	31		Silky shark*	*Carcharhinus falciformis*	1.3	1.7	1.8	10	3.3	9	2.8
161	32		Common thresher shark *	*Alopias vulpinus*	1.7	1.9	1.6	3	4.7	9	3.4
162	33		Escolar*	*Lepidocybium flavobrunneum*	2.0	1.8	1.3	10	3.6	9	2.9
163	1	South Atlantic and Gulf of Mexico Longline	Sand tilefish*	*Malacanthus plumieri*	2.1	1.5	1.1	10	3.4	9	3.4
164	2		Rock sea bass*	*Centropristis philadelphica*	2.7	1.7	0.7	10	3.6	9	3.6
165	3		Margate*	*Haemulon album*	2.4	1.8	1.0	10	3.3	9	3.1
166	4		Bar jack*	*Caranx ruber*	2.1	1.4	0.9	10	2.9	9	3.4

* Non-target stocks

Table 6. Non-parametric statistical analysis of targeted versus non-targeted species among productivity (VEP), susceptibility (VES), and vulnerability (VE) scores.

Fishery	Number	Kruskall-Wallis P Values		
		VEP	VES	VE
Hawaii Longline - Tuna Sector	33	0.026	0.373	0.072
Hawaii Longline - Swordfish Sector	33	0.026	0.153	0.058
Atlantic Shark Complexes	37	0.150	0.000	0.380
Combined	**103**	**0.752**	**0.000**	**0.160**

Table 7. Summary of the productivity and susceptibility scoring frequencies and correlations to its overall factor/category score. Correlations were based on stock attributes scores (1 – 3) compared to a modified categorical score for the stock, which did not included the related attribute score.

Category	Number Scored	Frequency Scored	Pearson Correlation Coefficient	P Value
Productivity				
r	128	96%	0.596	0.000
Maximum Age	126	95%	0.674	0.000
Maximum Size	128	96%	0.592	0.000
von Bertalanffy Growth Coefficient (k)	129	97%	0.656	0.000
Estimated Natural Mortality	127	95%	0.785	0.000
Measured Fecundity	126	95%	0.509	0.000
Breeding Strategy	133	100%	0.568	0.000
Recruitment Pattern	84	63%	-0.211	0.054
Age at Maturity	125	94%	0.802	0.000
Mean Trophic Level	132	99%	0.439	0.000
Susceptibility				
Management				
Management Strategy	133	100%	0.154	0.077
Fishing rate relative to M	79	59%	0.510	0.000
Biomass of Spawners (SSB) or other proxies	78	59%	0.389	0.000
Survival After Capture and Release	126	95%	0.201	0.024
Fishery Impact to EFH or Habitat in General for Non-targets	133	100%	0.286	0.001
Catchability				
Areal Overlap	123	92%	0.333	0.000
Geographic Concentration	133	100%	0.345	0.000
Vertical Overlap	133	100%	0.772	0.000
Seasonal Migrations	49	37%	0.058	0.692
Schooling/Aggregation and Other Behavioral Responses	87	65%	0.340	0.001
Morphology Affecting Capture	132	99%	0.319	0.000
Desirability/Value of the Fishery	133	100%	0.504	0.000

Table 8. Regression and correlation analysis of our vulnerability analysis compared to (A) fuzzy logic vulnerability assessment (FishBase.org source) and (B) AFS' vulnerability scores (Musick 1999).

(A)

Case Study	Number	Coefficent of Determination (R^2)			Pearson's Correlation Coefficent		
		VEP vs. FB	VES vs. FB	VE vs. FB	VEP vs. FB	VES vs. FB	VE vs. FB
Coastal Pelagics	8	0.505	0.012	0.103	-0.709	-0.110	0.313
Hawaii Longline - Tuna Sector	33	0.398	0.014	0.356	-0.631	-0.117	0.599
Hawaii Longline - Swordfish Sector	33	0.398	0.043	0.343	-0.631	-0.208	0.586
Northeast Groundfish	19	0.512	0.013	0.440	-0.716	0.114	0.665
Atlantic Shark Complexes	37	0.353	0.015	0.093	-0.594	-0.121	0.302
California Nearshore Groundfish	19	0.445	0.398	0.559	-0.667	0.631	0.742
Bering Sea/Aleutian Islands Skates	13	0.137	0.001	0.010	-0.035	0.307	0.307
All Case Studies Combined	**162**	**0.459**	**0.028**	**0.234**	**-0.674**	**-0.163**	**-0.484**

(B)

Case Study	Number	Coefficent of Determination (R^2)			Pearson's Correlation Coefficent		
		VEP vs. AFS	VES vs. AFS	VE vs. AFS	VEP vs. AFS	VES vs. AFS	VE vs. AFS
Coastal Pelagics	8	NA	NA	NA	NA	NA	NA
Hawaii Longline - Tuna Sector	33	0.815	0.145	0.682	0.903	0.319	-0.827
Hawaii Longline - Swordfish Sector	33	0.815	0.102	0.682	0.903	0.380	-0.826
Northeast Groundfish	19	0.756	0.023	0.425	-0.279	-0.220	0.103
Atlantic Shark Complexes	37	0.848	0.003	0.439	-0.040	0.120	0.105
California Nearshore Groundfish	19	0.468	0.234	0.468	0.642	-0.296	-0.568
Bering Sea/Aleutian Islands Skates	13	NA	NA	0.000	-0.072	-0.196	-0.196
All Case Studies Combined	**162**	**0.494**	**0.000**	**0.354**	**0.737**	**-0.005**	**-0.596**

Figure 1. An example of the productivity and susceptibility x-y plot. This plot has been modified slightly from Stobutzki et al. (2001b) by reversing the productivity scale to begin with 3 (high productivity) instead of 1 (low productivity).

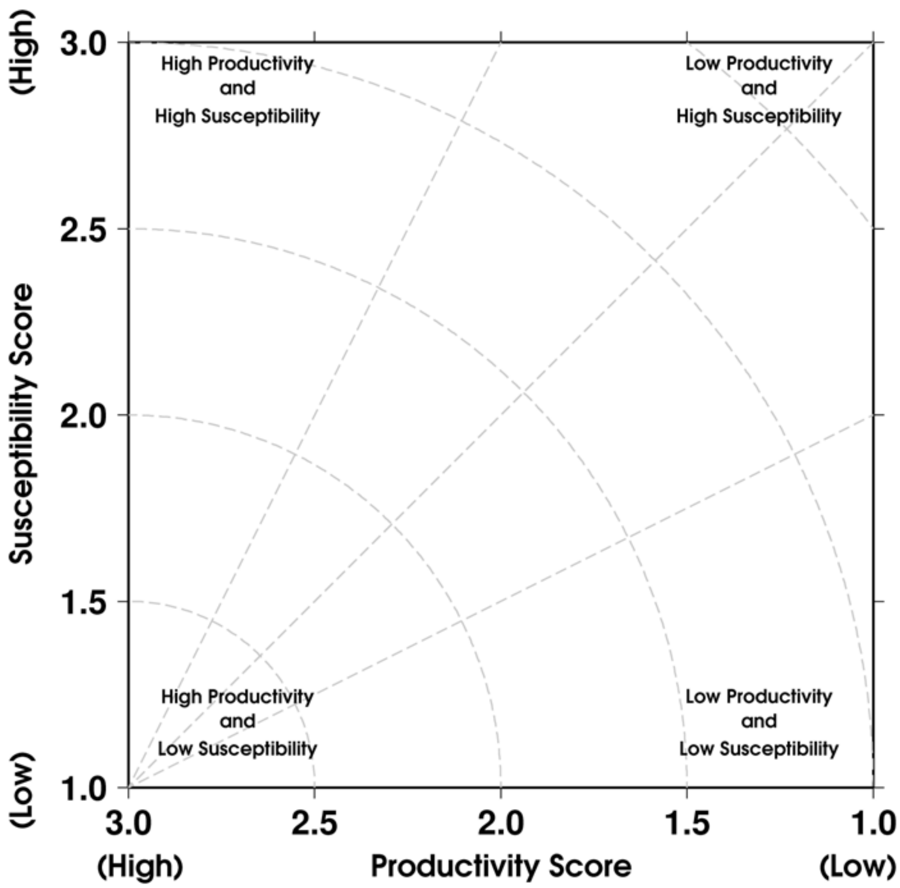


Figure 2. Overall distribution of productivity and susceptibility x-y plot for the 166 stocks evaluated in this study, as well as the associated data quality of each datum point (see Table 5 for reference IDs).

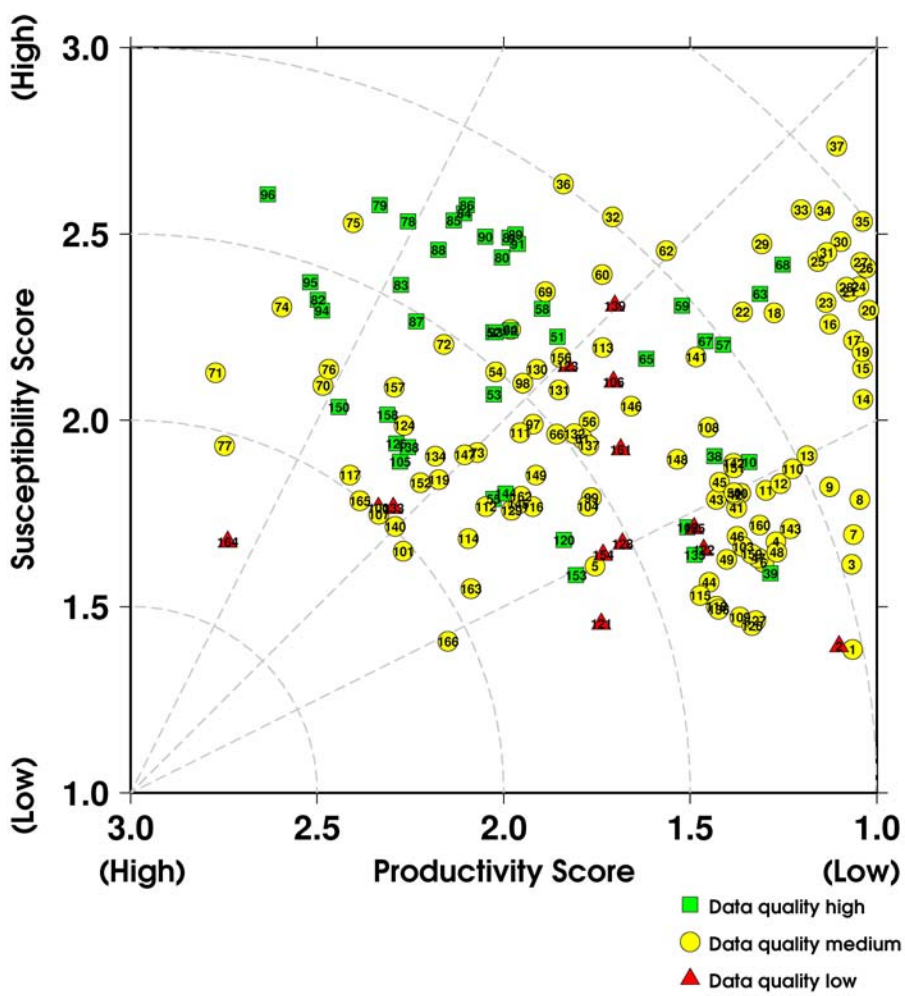


Figure 3. Overall distribution of data quality scores for the productivity and susceptibility factors, noting the number of attributes used for each stock (see Table 5 for reference IDs).

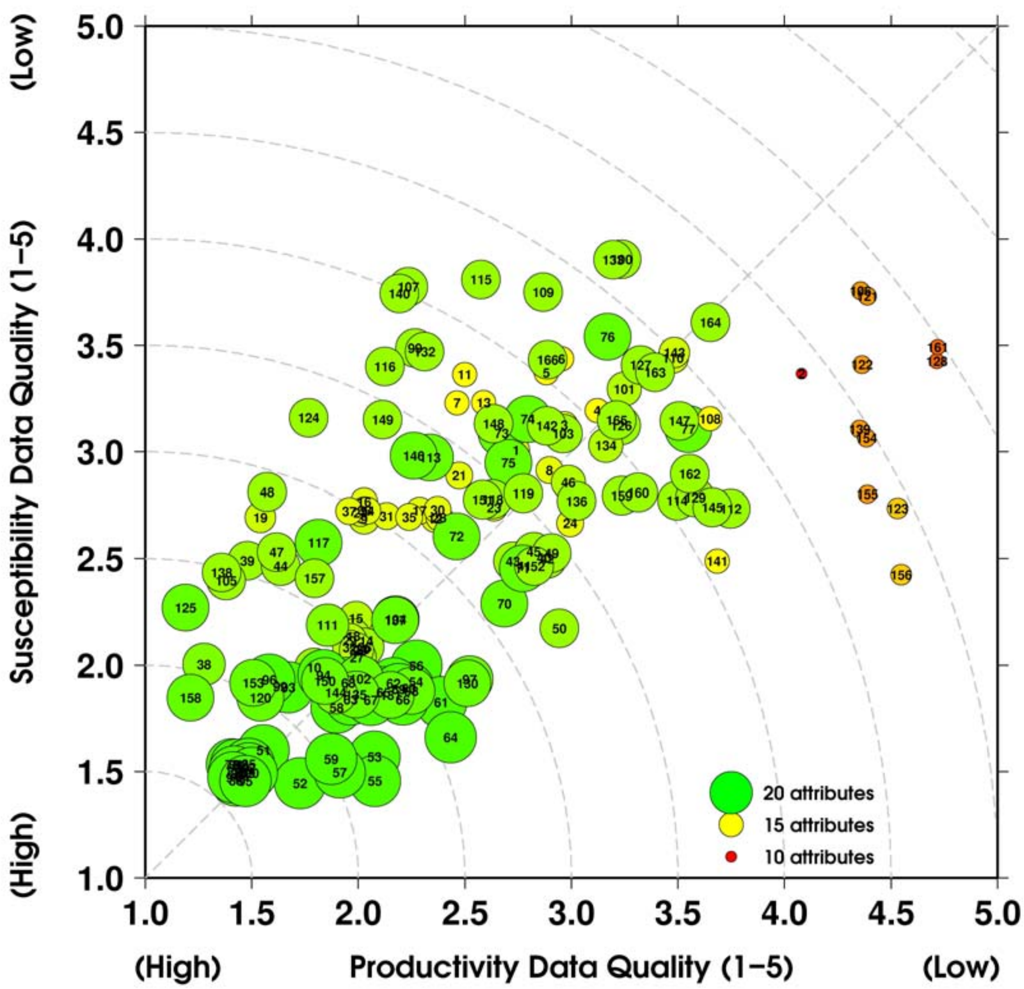


Figure 4. Northeast Groundfish Multispecies Fishery productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

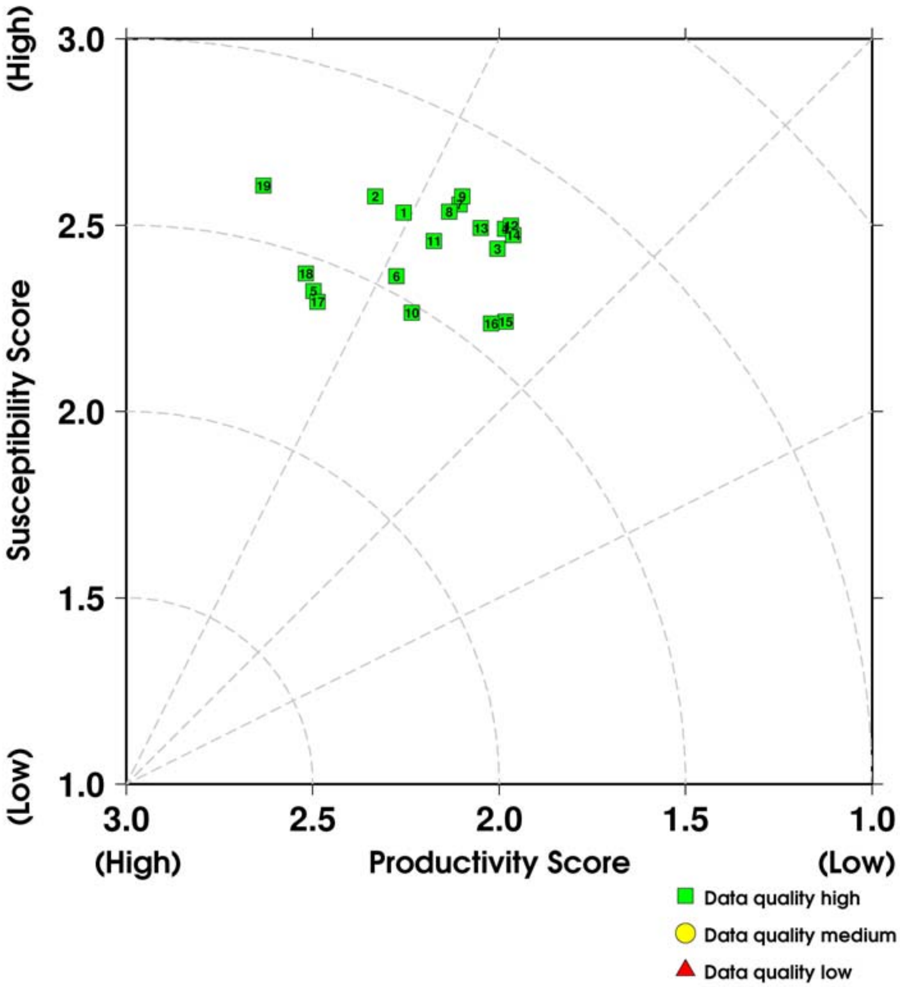


Figure 5. Highly Migratory Atlantic Shark Complex productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

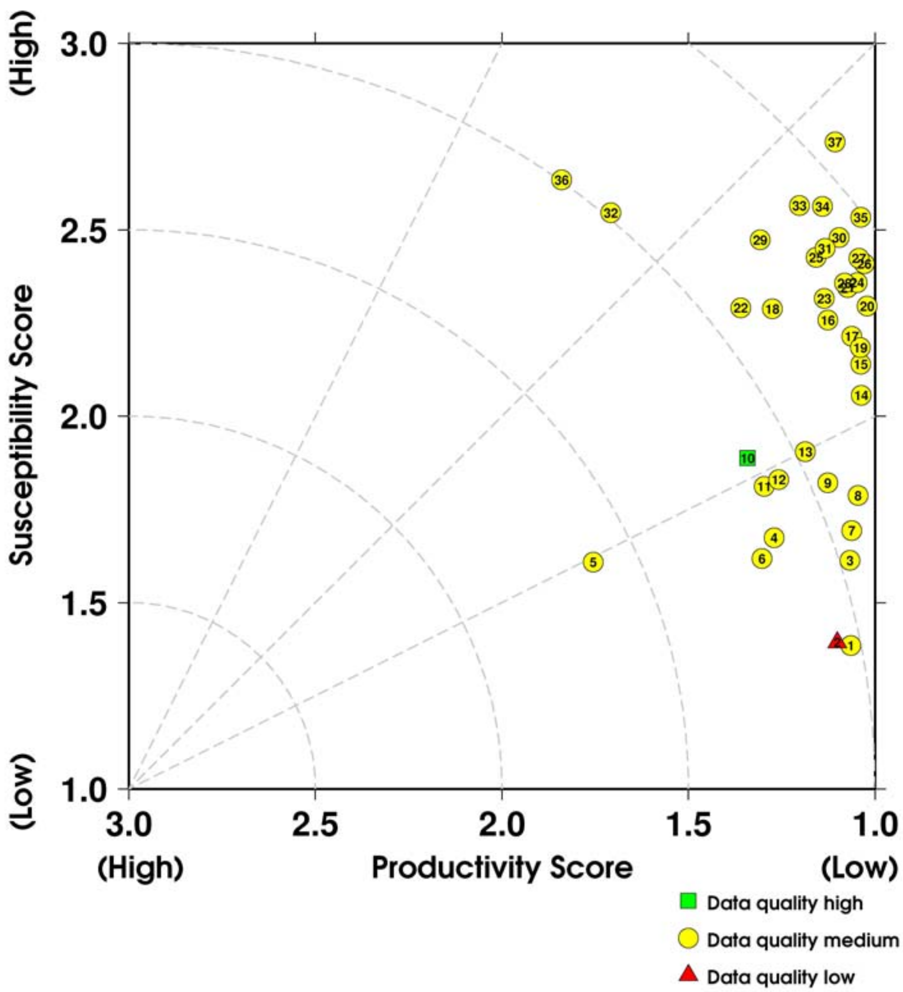


Figure 6. California Nearshore Groundfish Finfish Assemblage productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

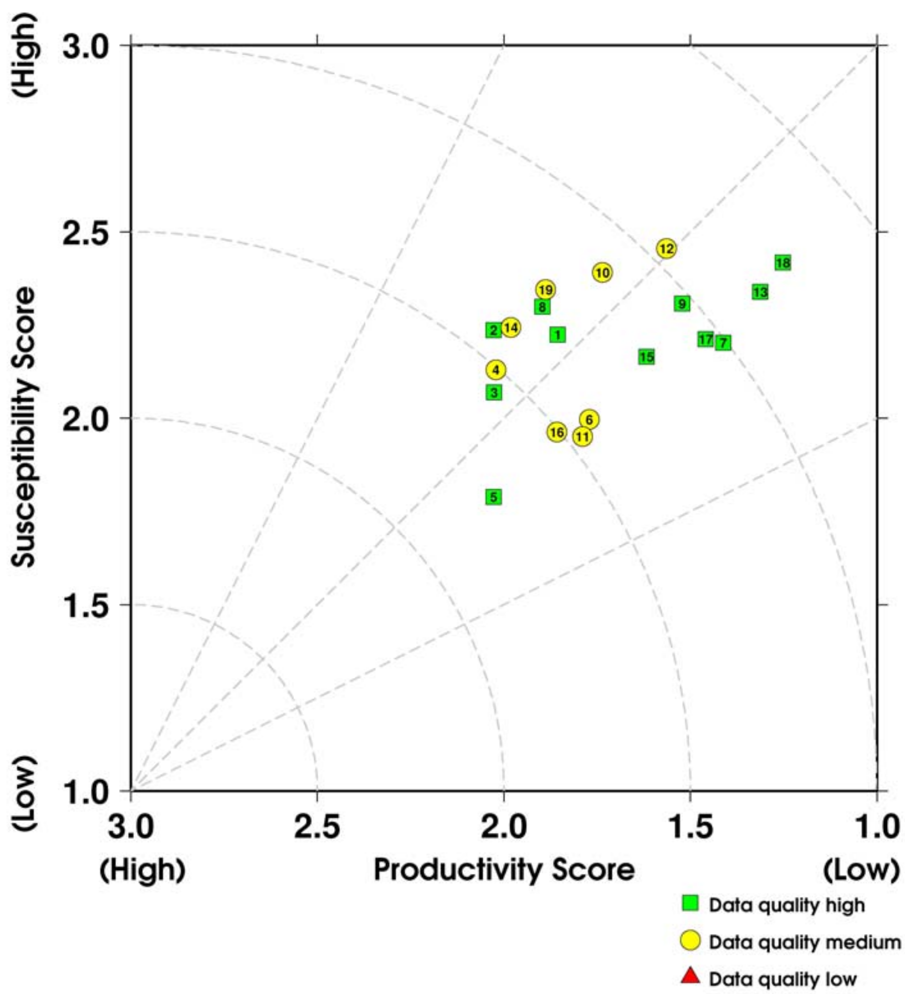


Figure 7. California Current Coastal Pelagic Species productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

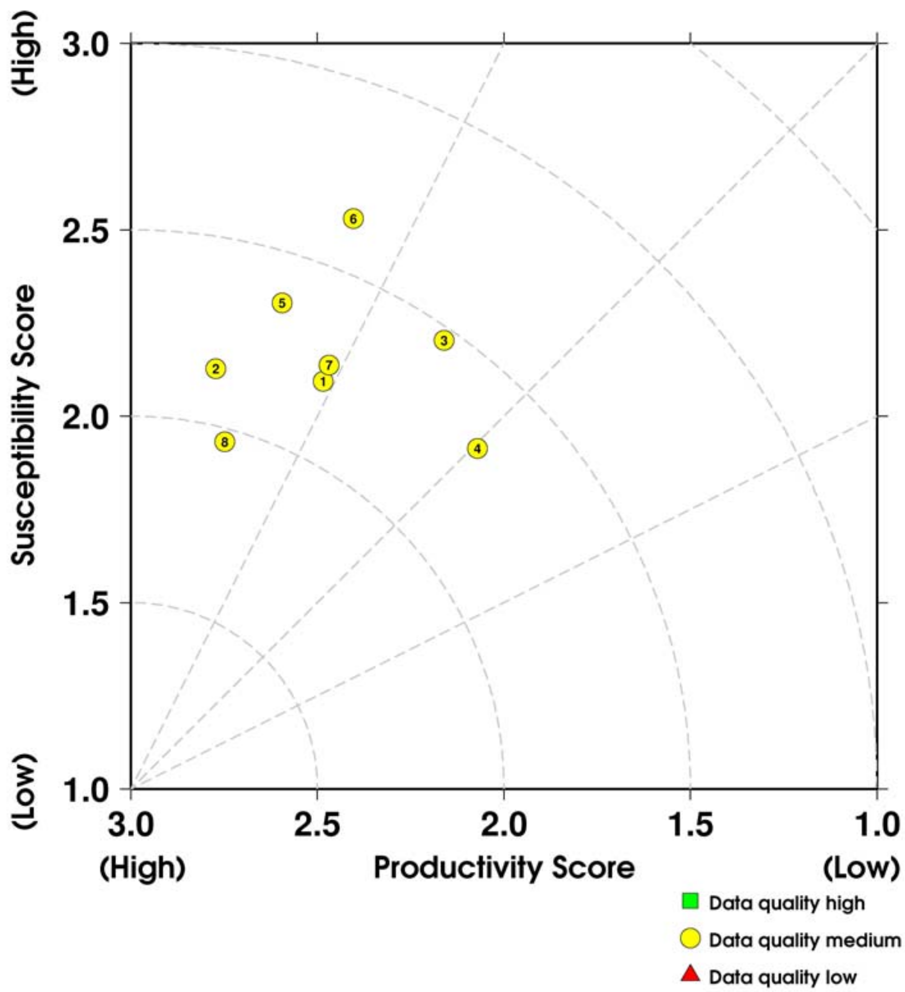


Figure 8. Skates of the Bering Sea and Aleutian Islands Management Area productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

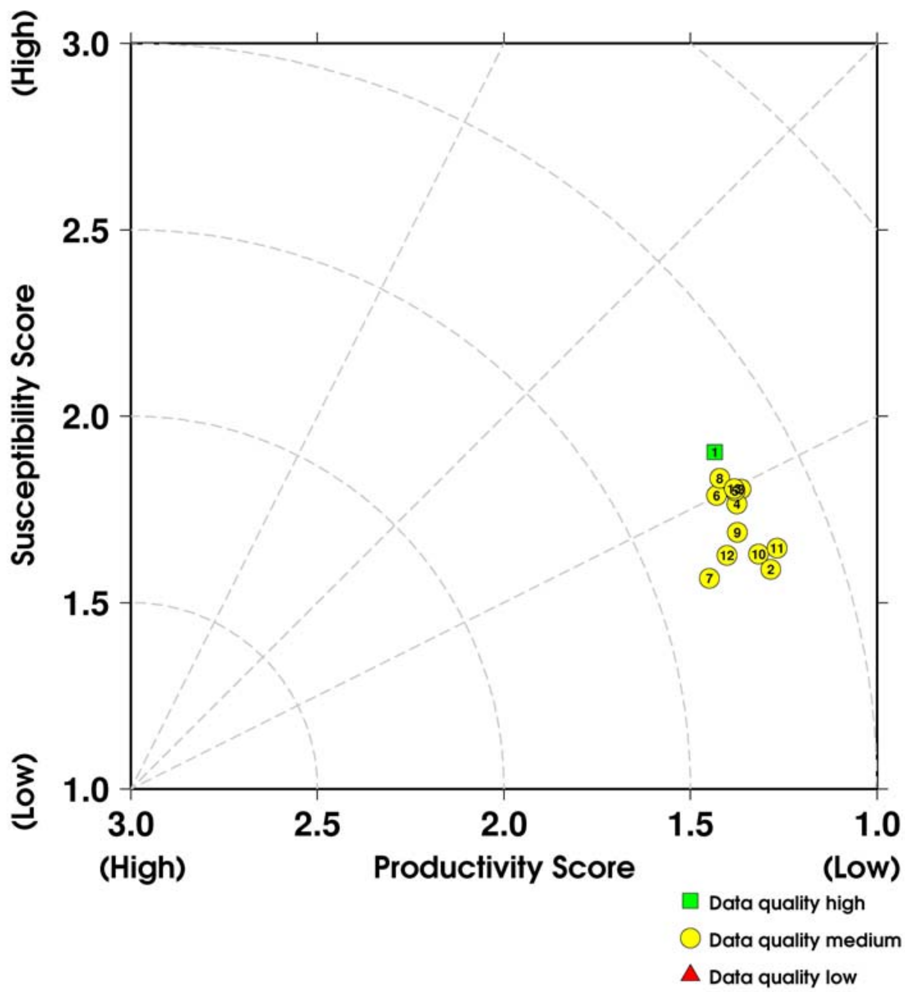


Figure 9. Hawaii-based Tuna Longline Fishery productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

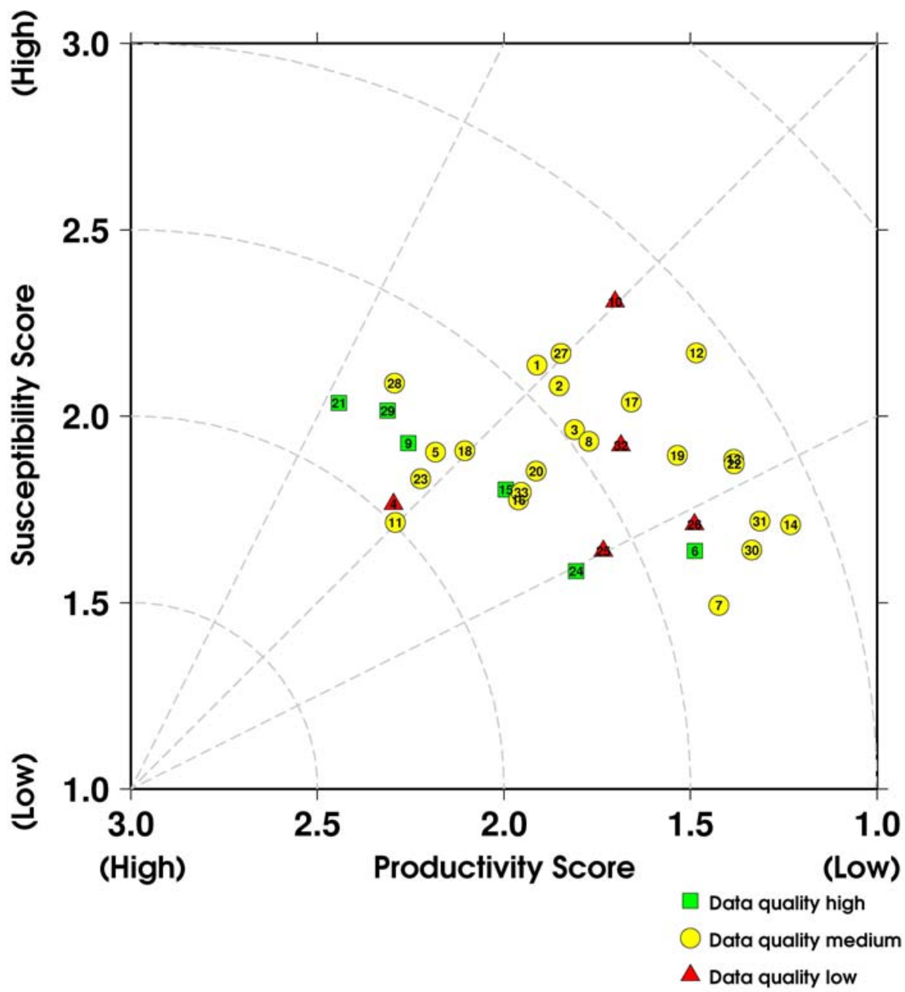


Figure 10. Hawaii-based Swordfish Longline Fishery productivity and susceptibility x-y plot (see Table 5 for reference group numbers).

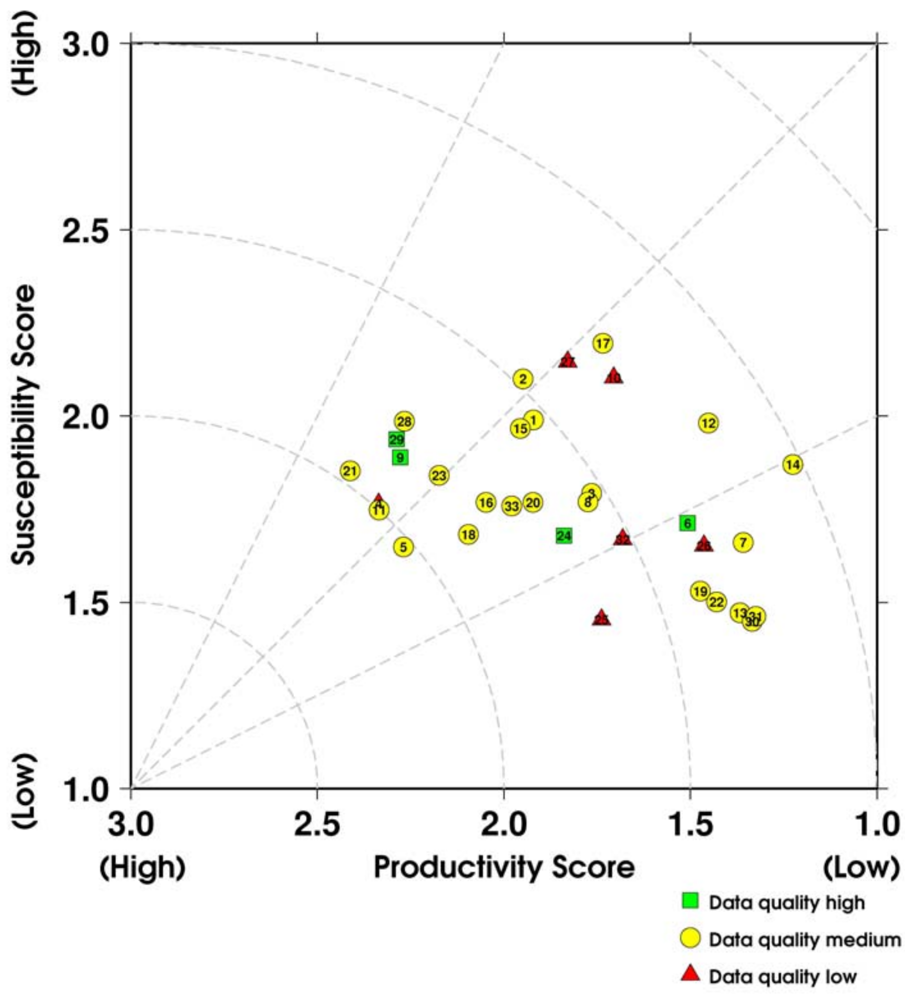


Figure 11. Differences in productivity observed in a subset of forty stocks from the West Coast Groundfish Fishery Management Plan, including nearshore (black) and shelf (grey) species.

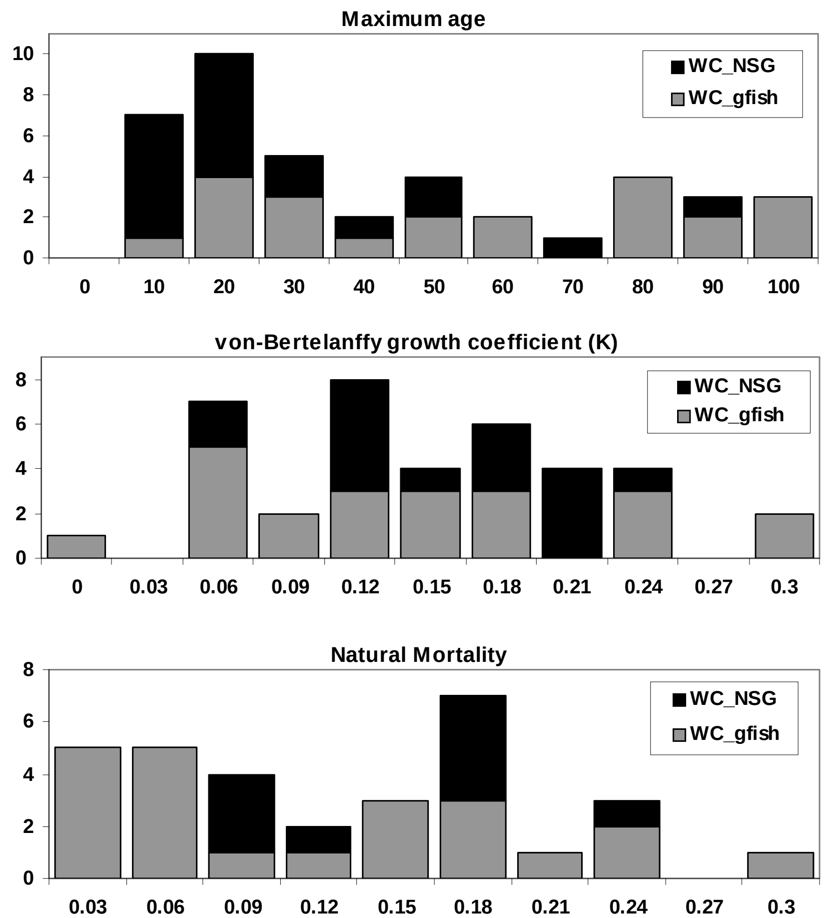


Figure 12. A subset of the stocks from the example applications (n = 50) for which the status (either overfished or undergoing overfishing) could be determined between the years of 2000 and 2008. The dashed line references the minimum vulnerability scores observed among the 162 stocks evaluated in the example applications.

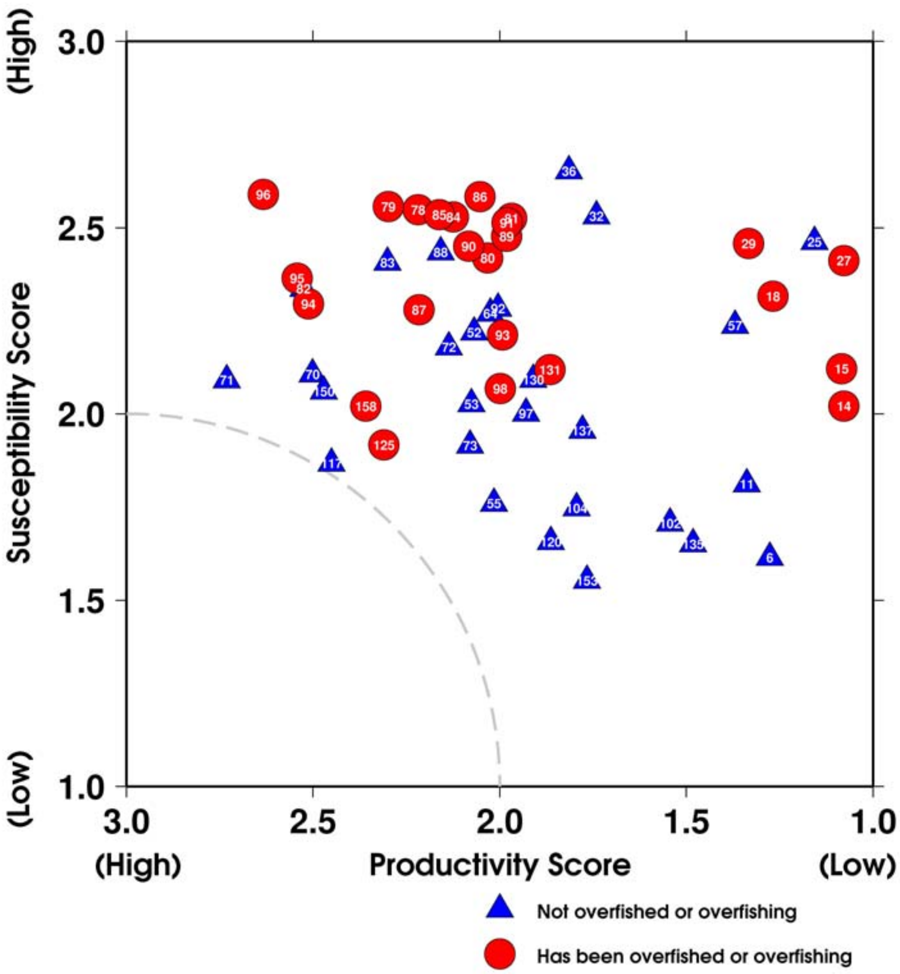
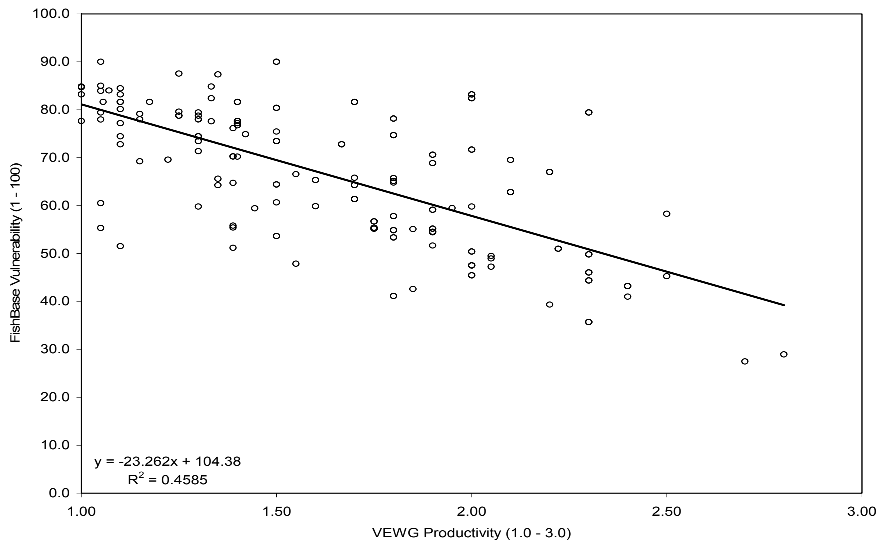
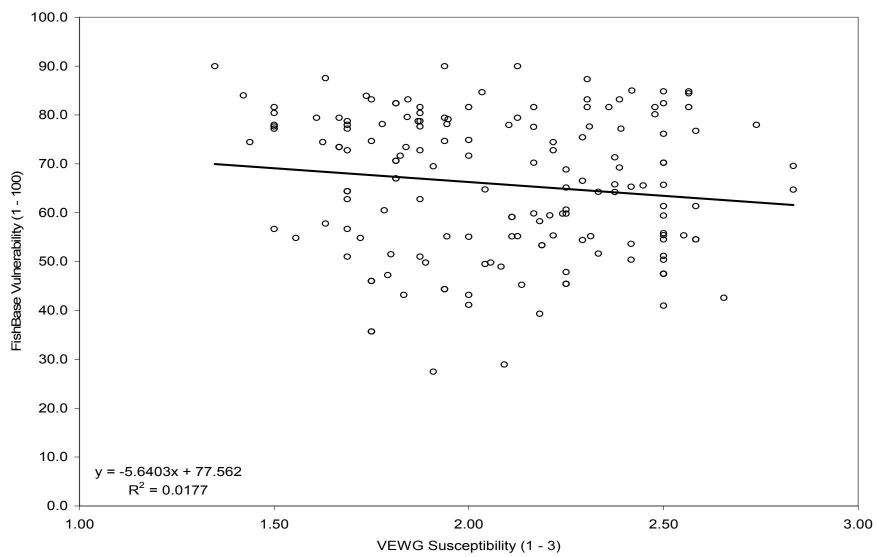


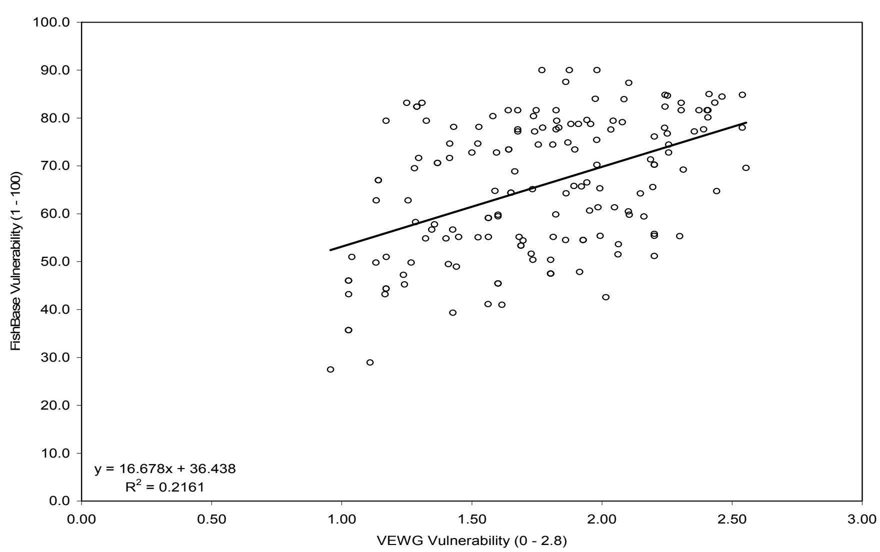
Figure 13. VEWG vulnerability (A), productivity (B), and susceptibility (C) scores compared to FishBase vulnerability (Cheung et al. 2005).



100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
FishBase Vulnerability (1 - 100)
y = -23.262x + 104.38
$R^2 = 0.4585$
1.00
1.50
2.00
2.50
3.00
VEWG Productivity (1.0 - 3.0)

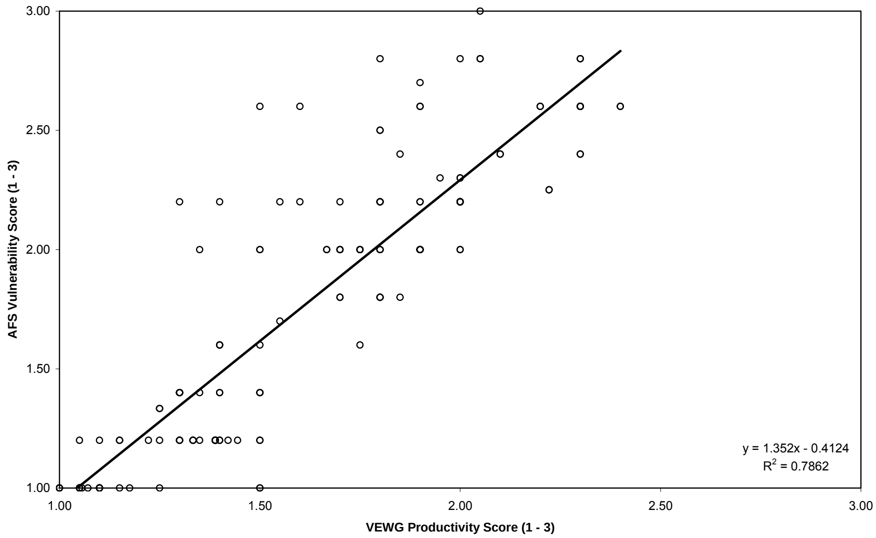


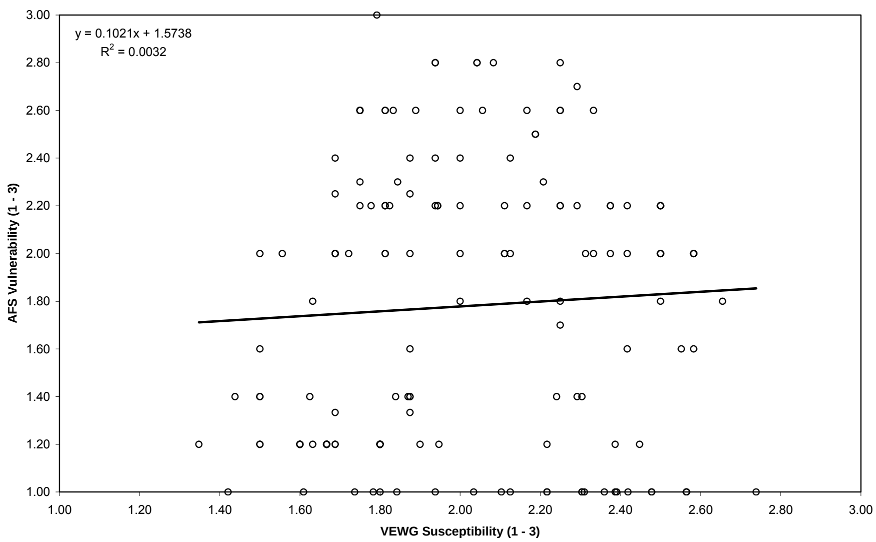
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
FishBase Vulnerability (1 - 100)
y = -5.6403x + 77.562
$R^2 = 0.0177$
1.00
1.50
2.00
2.50
3.00
VEWG Susceptibility (1 - 3)

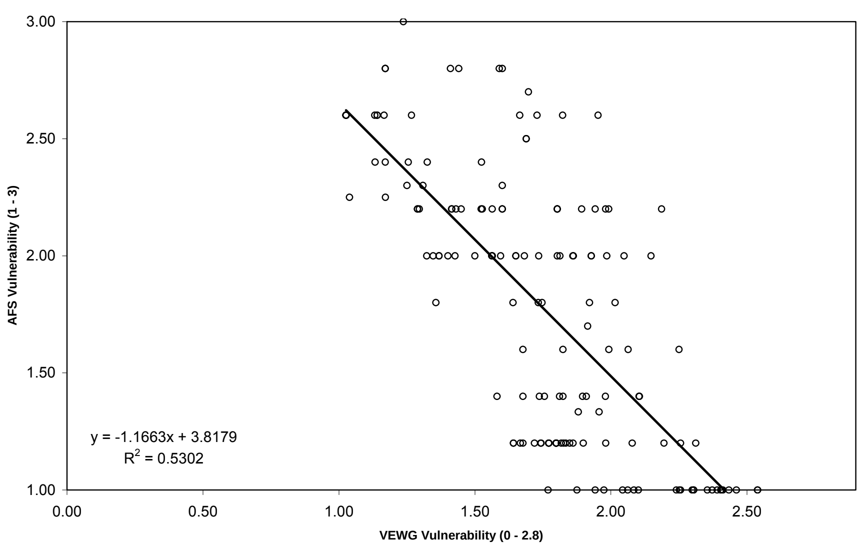


100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
FishBase Vulnerability (1 - 100)
y = 16.678x + 36.438
$R^2 = 0.2161$
0.00
0.50
1.00
1.50
2.00
2.50
3.00
VEWG Vulnerability (0 - 2.8)

Figure 14. VEWG vulnerability (A), productivity (B), and susceptibility (C) scores compared to American Fisheries Society's (AFS) vulnerability (Musick 1999).


AFS Vulnerability Score (1 - 3)
VEWG Productivity Score (1 - 3)
y = 1.352x - 0.4124
R2 = 0.7862
3.00
2.50
2.00
1.50
1.00
1.00
1.50
2.00
2.50
3.00


AFS Vulnerability (1 - 3)
VEWG Susceptibility (1 - 3)
y = 0.1021x + 1.5738
R2 = 0.0032
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
1.00
1.20
1.40
1.60
1.80
2.00
2.20
2.40
2.60
2.80
3.00


AFS Vulnerability (1 - 3)
VEWG Vulnerability (0 - 2.8)
y = -1.1663x + 3.8179
R2 = 0.5302
3.00
2.50
2.00
1.50
1.00
0.00
0.50
1.00
1.50
2.00
2.50

APPENDICES

Appendix 1. The list of marine fish stocks that were considered to be representative of U.S. fisheries, and used to help define scoring bins for the following productivity attributes: maximum age, maximum size, growth coefficient, natural mortality, and age at maturity.

Number	Family Name	Scientific Name	Common Name
1	Acanthuridae	*Acanthurus bahianus*	Ocean Surgeonfish
2	Alopiidae	*Alopias superciliosus*	Bigeye thresher shark
3	Anguillidae	*Anguilla rostrata*	American eel
4	Anoplopomatidae	*Anoplopoma fimbria*	Sablefish
5	Balistidae	*Balistes ventula*	Queen triggerfish
6	Bramidae	*Brama japonica*	Pacific Pomfret
7	Bramidae	*Eumegistus illustris*	Brillant Pomfret
8	Bramidae	*Taractes asper*	Flathead/Rough Pomfret
9	Bramidae	*Taractichthys steindachneri*	Sickle Pomfret/Monchong
10	Carangidae	*Caranx crysos*	Blue Runner
11	Carangidae	*Seriolda lalandi*	Amberjack
12	Carangidae	*Seriola zonata*	Banded rudderfish
13	Carangidae	*Trachinotus carolinus*	Florida Pompano
14	Carcharhinidae	*Prionace glauca*	Blue Shark
15	Carcharhinidae	*Carcharhinus longimanus*	Oceanic Whitetip Shark
16	Carcharhinidae	*Carcharhinus falciformis*	Silky Shark
17	Cheatodontidae	*Chaetodon ocellatus*	Spotfin Butterflyfish
18	Clupeidae	*Sardinops sagax*	Pacific Sardine
19	Clupeidae	*Clupea harengus harengus*	Atlantic Herring
20	Clupeidae	*Alosa sapidissima*	American shad
21	Clupeidae	*Alosa aestivalis*	Blueback Herring
22	Coryphaenaidea	*Coryphaena hippurus*	Mahi Mahi/Dolphin Fish
23	Cottidae	*Scorpaenichthys marmoratus*	Cabezon
24	Engraludae	*Engraulis mordax*	Northern Anchovy
25	Ephippidae	*Cheatodipterus faber*	Atlantic Spadefish
26	Gadidae	*Gadus morhua*	Atlantic Cod
27	Gadidae	*Melanogrammus aeglefinus*	Haddock
28	Gadidae	*Pollachius virens*	East Coast Pollock
29	Gadidae	*Theragra chalcogramma*	Alaska Pollock
30	Gempylidae	*Ruvettus pretiosus*	Oilfish
31	Gempylidae	*Promethichthys prometheus*	Roudi Escolar
32	Haemulidae	*Haemulon plumierii*	White Grunt
33	Haemulidae	*Anisotremus surinamensis*	Margate
34	Hexagrammidae	*Hexagrammos decagrammus*	Kelp Greenling
35	Hexagrammidae	*Hexagrammos lagocephalus*	Rock Greenling
36	Hexagrammidae	*Ophiodon elongatus*	Lingcod
37	Holocentridae	*Holocentrus rufus*	Longspine Squirrelfish
38	Istophoridae	*Makaira indica*	Black Marlin
39	Istophoridae	*Makaira nigricans*	Blue Marlin
40	Istophoridae	*Istiophorus platypterus*	Sailfish
41	Istophoridae	*Tetrapturus angustirostris*	Short Bill Spearfish
42	Labridae	*Semicossyphus pulcher*	California Sheephead
43	Labridae	*Bodianus rufus*	Spanish Hogfish
44	Lamnidae	*Isurus paucus*	Longfin Mako
45	Lamnidae	*Lamna ditropis*	Salmon Shark
46	Lamnidae	*Isurus oxyrinchus*	Shortfinned Mako
47	Lampridae	*Lampris guttatus*	Spotted Moonfish
48	Loliginidae	*Loligo opalescens*	Market quid
49	Lophiidae	*Lophius americanus*	Pacific Squid
50	Lutjanidae	*Lutjanus campechanus*	Red Snapper

Appendix 1 (continued).

Number	Family Name	Genus species	Common Name
51	Lutjanidae	*Rhomboplites aurorubens*	Vermillion Snapper
52	Lutjanidae	*Ocyurus chrysurus*	Yellowtail Snapper
53	Lutjanidae	*Lutjanus analis*	Mutton Snapper
54	Lutjanidae	*Lutjanus synagris*	Lane Snapper
55	Lutjanidae	*Lutjanus apodus*	Schoolmaster
56	Lutjanidae	*Pristipomodies filamentosus*	Opakapaka/Pink Snapper
57	Lutjanidae	*Etelis cornuscans*	Onaga/Flame Snapper
58	Lutjanidae	*Etelis carbunculus*	Ehu/Ruby Snapper
59	Lutjanidae	*Aprion virescens*	Uku/Grey Snapper
60	Malacanthidae	*Lopholatilus chamaeleonticeps*	Golden Tilefish
61	Megalopidae	*Megalops atlanticus*	Tarpon
62	Merluccidae	*Merluccius productus*	Pacific Whiting
63	Moronidae	*Morone saxatilis*	Striped Bass
64	Mugilidae	*Mugil cephalus*	Striped Mullet
65	Mullidae	*Mullodichthys martinicus*	Yellow Goatfish
66	Osmeridae	*Osmerus mordax mordax*	Rainbow Smelt
67	Phycidae	*Urophycis tenuis*	White Hake
68	Pleuronectidae	*Limanda ferruginea*	Yellowtail Flounder
69	Pleuronectidae	*Hippoglossoides platessoides*	American Plaice
70	Pleuronectidae	*Glyptocephalus cynoglossus*	Witch Flounder
71	Pleuronectidae	*Pseudopleuronectes americanus*	Winter Flounder
72	Pleuronectidae	*Scophthalmus aquosus*	Windowpane Flounder
73	Pleuronectidae	*Paralichthys dentatus*	Summer Flounder
74	Pleuronectidae	*Hippoglossus hippoglossus*	Halibut
75	Pleuronectidae	*Atheresthes stomias*	Arrowtooth Flounder
76	Pleuronectidae	*Microstomus pacificus*	Dover Sole
77	Pleuronectidae	*Eopsetta jordani*	Petrale Sole
78	Pleuronectidae	*Platichthys stellatus*	Starry Flounder
79	Polyprionidae	*Polyprion americanus*	Wreckfish
80	Pomacanthidae	*Holacanthus ciliaris*	Queen Angelfish
81	Pomacanthidae	*Pomacanthus arcuatus*	Gray Angelfish
82	Pomatomidae	*Pomatomos saltatrix*	Bluefish
83	Rachycentridae	*Rachycentron canadum*	Cobia
84	Rajiidae	*Bathyraja parmifera*	Alaska Skate
85	Rajiidae	*Bathyraja aleutica*	Aleutian Skate
86	Rajiidae	*Bathyraja interrupta*	Bering Skate
87	Rajiidae	*Raja eglanteria*	Clearnose Skate
88	Rajiidae	*Dipturus laevis*	Barndoor Skate
89	Salmonidae	*Salmo salar*	Atlantic Salmon
90	Salmonidae	*Oncorhynchus tshawytscha*	Chinook Salmon
91	Salmonidae	*Oncorhynchus keta*	Chum Salmon
92	Scaridae	*Scarus guacamaia*	Rainbow Parrotfish
93	Scaridae	*Scarus coelestinus*	Midnight Parrotfish
94	Scaridae	*Sparisoma viride*	Stoplight Parrotfish
95	Scieanidae	*Sciaenops ocellatus*	Red Drum
96	Scieanidae	*Micropogonias undulatus*	Atlantic Croaker
97	Scieanidae	*Leiostomus xanthurus*	Spot
98	Scorpaeinidae	*Scorpaena guttata*	California Scorpionfish
99	Scrombridae	*Scomber japonicus*	Pacific Mackerel
100	Scrombridae	*Trachurus symmetricus*	Jack Mackerel

Appendix 1 (continued).

Number	Family Name	Genus species	Common Name
101	Scrombridae	*Thunnus thynnus*	Northern Bluefin Tuna
102	Scrombridae	*Katsuwonus pelamis*	Skipjack Tuna
103	Scrombridae	*Acanthocybium solandri*	Wahoo
104	Scrombridae	*Thunnus albacares*	Yellowfin Tuna
105	Scrombridae	*Scomberomorus cavalla*	King Mackerel
106	Scrombridae	*Thunnus alalunga*	Albacore
107	Scrombridae	*Thunnus obesus*	Bigeye Tuna
108	Scrombridae	*Auxis rochei rochei*	Bullet Tuna
109	Scrombridae	*Euthynnus affinis*	Eastern Little/Mackerel Tuna
110	Sebastidae	*Sebastes maliger*	Quillback Rockfish
111	Sebastidae	*Sebastes caurinus*	Copper Rockfish
112	Sebastidae	Sebastes mystinus	Blue Rockfish
113	Sebastidae	*Sebastes melanops*	Black Rockfish
114	Sebastidae	*Sebastes carnatus*	Gopher Rockfish
115	Sebastidae	*Sebastes atrovirens*	Kelp Rockfish
116	Sebastidae	*Sebastes viviparus*	Redfish
117	Sebastidae	*Sebastes flavidus*	Yelloweye Rockfish
118	Sebastidae	*Sebastes paucispinis*	Bocaccio Rockfish
119	Sebastidae	*Sebastes crameri*	Darkblotched Rockfish
120	Sebastidae	*Sebastes jordani*	Shortbelly Rockfish
121	Sebastidae	*Sebastes goodei*	Chilipepper Rockfish
122	Sebastidae	*Sebastes levis*	Cowcod
123	Sebastidae	*Sebastolobus altivelis*	Longspine Thornyhead
124	Sebastidae	*Sebastes alutus*	Pacific Ocean Perch
125	Serranidae	*Centropristis striata*	Black Sea Bass
126	Serranidae	*Cephalophols cruentata*	Graysby
127	Serranidae	*Epinephelus itajara*	Jewfish
128	Serranidae	*Epinephelus striatus*	Nassau Grouper
129	Serranidae	*Epinephelus adscensionis*	Rock Hind
130	Serranidae	*Epinephelus quernus*	Hapuupuu/Hawaiian grouper
131	Serranidae	*Mycteroperca veneosa*	Yellowfin Grouper
132	Sparidae	*Stenotomus chrysops*	Scup
133	Sparidae	*Lagodon rhomboides*	Pinfish
134	Sparidae	*Diplodus holbrookii*	Spottail Pinfish
135	Sparidae	*Archosargus probatocephalus*	Sheepshead
136	Sparidae	*Pagrus pagrus*	Red Porgy/Common Seabream
137	Sparidae	*Calamus bajondao*	Jolthead Porgy
138	Stichaenidae	*Cebidichthys violaceus*	Monkyface Prickleback
139	Stromateidae	*Pepriuls triacanthus*	Butterfish
140	Xiphiidae	*Xiphias gladius*	Broad Billed Swordfish
141	Zoarcidae	*Gymnelus viridis*	Ocean Pout

Appendix 2. Scoring of the productivity attributes for the example applications.

Fishery	Stock	r	Maximum Age	Maximum Size	von Bertalanffy Growth Coefficient (k)	Estimated Natural Mortality	Measured Fecundity	Breeding Strategy	Recruitment Pattern	Age at Maturity	Mean Trophic Level
	Shortfin mako	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Blue shark	2.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Common thresher	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Porbeagle	1.0	1.5	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Oceanic whitetip	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Bigeye thresher	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Longfin mako	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Sixgill shark	1.0	1.0	1.0	1.5	1.0	1.0	1.0		1.0	1.0
	Sharpnose sevengill shark			1.5			1.0	1.0			1.0
	Sandbar shark	1.0	1.5	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Blacktip shark	1.0	2.0	1.0	1.5	1.0	1.0	1.0		1.0	1.0
	Spinner shark	1.0	2.0	1.0	1.0	1.5	1.0	1.0		1.0	1.0
	Silky shark	1.0	2.0	1.0	1.5	1.0	1.0	1.0		1.0	1.0
	Bull shark	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Tiger shark	2.0	2.0	1.0	1.5	1.0	1.0	1.0		1.0	1.0
	Nurse shark	2.0	1.0	1.0	2.0	1.0	1.0	1.0		1.0	1.0
	Lemon shark	1.0	1.5	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Scalloped hammerhead	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Atlantic Shark Complexes	Great hammerhead	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Smooth hammerhead	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Dusky shark	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Caribbean reef shark	1.0	1.5	1.0		1.0	1.0	1.0		1.0	1.0
	Night shark	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Bignose shark	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Galapagos shark	1.0	2.0	1.0	1.5	1.0	1.0	1.0		1.0	1.0
	Sandtiger shark	1.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Bigeye sandtiger shark	1.0	1.5	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	White shark	1.0	1.5	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Basking shark	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	2.0
	Whale shark	1.0	1.5	1.0	1.0	1.0	2.0	1.0		1.0	2.0
	Atlantic sharpnose shark	2.0	2.5	2.0	3.0	2.0	1.0	1.0		2.0	1.0
	Bonnethead shark	2.0	2.5	1.5	3.0	1.5	1.0	1.0		2.0	1.0
	Blacknose shark	1.0	2.0	1.0	2.0	1.0	1.0	1.0		2.0	1.0
	Finetooth shark	1.0	2.5	1.5	2.0	1.5	1.0	1.0		1.0	1.0
	Angel shark	1.0	2.0	1.5	2.0	1.5	1.0	1.0		1.0	1.0
	Smalltail shark	1.0	2.5	1.5	1.0	1.5	1.0	1.0		1.0	1.0
	Caribbean sharpnose shark	2.0	2.0	2.0	3.0	2.0	1.0	1.0		2.0	1.0
	Alaska skate	2.0	2.0	2.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0
	Aleutian skate	2.0	2.0	1.0	1.0	2.0	1.0	1.0		1.0	1.0
	Commander skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Whiteblotched skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Whitebrow skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Roughtail skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
BS/AI Skate Complex	Bering skate	2.0	2.0	2.0	1.0	2.0	1.0	1.0		1.0	1.0
	Mud skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Roughshoulder skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Big skate	2.0	2.0	1.0	1.0	2.0	1.0	1.0		1.0	1.0
	Longnose skate	2.0	2.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
	Butterfly skate	2.0	2.0	2.0	1.0	1.5	1.0	1.0		1.0	1.0
	Deepsea skate	2.0	2.0	1.0	1.0	2.0	1.0	1.0		1.0	1.0
	California sheephead	2.0	2.0	2.0	1.0	2.0	1.0	3.0	2.0	1.0	2.0
	Cabezon	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0
	Kelp greenling	2.0	2.0	3.0	2.0	2.5	2.0	1.0	1.0	2.0	2.0
	Rock greenling	2.0	2.0	3.0	2.0	2.5	2.0	1.0	1.0	2.0	2.0
	California scorpionfish	2.0	2.0	3.0	1.0	1.0	2.0	2.0	2.0	2.5	2.0
	Monkyface prickelback	2.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	1.0
	Black rockfish	1.0	1.0	2.0	1.0	1.0	1.0	1.0	2.0	1.0	2.0
	Black-and-yellow rockfish	1.0	2.0	3.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0
California Nearshore Groundfish	Blue rockfish	1.0	1.0	3.0	1.5	1.0	1.0	1.0	2.0	1.0	2.0
	Brown rockfish	1.0	1.0	2.0	2.0	2.0	1.0	1.0	2.0	2.0	1.0
	Calico rockfish	1.0	2.0	3.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0
	China rockfish	1.0	1.0	3.0	2.0	1.0	1.0	1.0	2.0	1.0	2.0
	Copper rockfish	1.0	1.0	1.0	1.5	1.0	1.0	1.0	2.0	1.0	2.0
	Gopher rockfish	1.0	2.0	3.0	2.5	2.0	1.0	1.0	2.0	2.0	2.0
	Grass rockfish	1.0	2.0	2.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0
	Kelp rockfish	1.0	2.0	3.0	3.0	2.0	1.0	1.0	2.0	1.5	2.0
	Olive rockfish	1.0	1.0	2.0	1.5	1.0	1.0	1.0	2.0	1.5	2.0
	Quillback rockfish	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	2.0
	Treefish rockfish	1.0	2.0	3.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0
	Pacific sardine	2.0	2.5	3.0	3.0	2.5	3.0	2.5	1.5	2.5	2.5
Coastal Pelagics	Northern Anchovy	2.5	3.0	3.0	3.0	3.0	3.0	3.0	2.0	3.0	2.5
	Pacific mackerel	1.5	2.0	2.5	3.0	3.0	3.0	2.5	1.0	2.0	1.5
	Jack mackerel	2.0	2.0	2.0	1.0	2.0	3.0	3.0	1.0	3.0	2.0

Appendix 2. (continued).

Fishery	Stock	r	Maximum Age	Maximum Size	von Bertalanffy Growth Coefficient (k)	Estimated Natural Mortality	Measured Fecundity	Breeding Strategy	Recruitment Pattern	Age at Maturity	Mean Trophic Level
Coastal Pelagics	Market squid	3.0	3.0	3.0	3.0	3.0	2.5	2.5	1.0	3.0	2.0
	Pacific herring	2.0	2.0	2.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0
	Pacific bonito	2.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	1.0
	Pacific saury	2.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	3.0	2.0
Hawaii Longline Fishery - Both Sectors	Albacore	2.0	2.0	2.0	2.0	2.0	3.0	1.0	2.0	2.0	1.0
	Bigeye Tuna	2.0	3.0	1.0	2.0	2.0	3.0	1.0	2.0	2.0	1.0
	Black Marlin	3.0	3.0	1.0	1.0	1.0	3.0	1.0	2.0	2.0	1.0
	Bullet Tuna	3.0	3.0	2.0	3.0	3.0	3.0	1.0	2.0	2.0	1.0
	Pacific Pomfret	3.0	3.0	2.0	2.0	3.0		1.0	2.0	3.0	1.0
	Blue Shark	2.0	2.0	1.0	2.0	2.0	1.0	1.0	2.0	1.0	1.0
	Bigeye thresher shark	2.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0
	Blue Marlin	3.0	2.0	1.0	2.0	1.0	3.0	1.0	2.0	2.0	1.0
	Dolphin Fish	3.0	3.0	1.0	3.0	3.0	3.0	1.0	2.0	3.0	1.0
	Brilliant Pomfret				2.0			1.0	2.0		2.0
	Kawakawa	3.0	3.0	2.0	3.0	3.0	3.0	1.0	2.0	2.0	1.0
	Spotted Moonfish		2.0	1.0		2.0		1.0	2.0		1.0
	Longfin Mako Shark	2.0	2.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
	Salmon Shark	2.0		1.0	1.0	1.0	1.0	1.0	2.0		1.0
	Striped Marlin	1.0	3.0	1.0	3.0	3.0	3.0	1.0	2.0	2.0	1.0
	Oilfish	3.0	2.0	1.0	3.0	3.0	3.0	1.0	2.0	1.0	1.0
	Northern Bluefin Tuna	2.0	2.0	1.0	1.0	2.0	3.0	1.0	2.0	2.0	1.0
	Roudi Escolar	3.0	2.0	3.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0
	Pelagic Thresher Shark	3.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0
	Sailfish	3.0	2.0	1.0	1.0	3.0	3.0	1.0	2.0	2.0	1.0
	Skipjack Tuna	3.0	3.0	2.0	3.0	3.0	3.0	1.0	2.0	3.0	1.0
	Shortfinned Mako Shark	2.0	2.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
	Short Bill Spearfish	3.0	3.0	1.0	3.0	3.0	3.0	1.0	2.0	2.0	1.0
	Broadbill Swordfish	2.0	2.0	1.0	3.0	2.0	3.0	1.0	2.0	1.0	1.0
	Flatheat Pomfret				2.0			1.0	2.0		2.0
	Dagger Pomfret				2.0			1.0	2.0		1.0
	Sickle Pomfret	3.0			2.0			1.0	2.0		1.0
	Wahoo	3.0	3.0	2.0	2.0	3.0	3.0	1.0	2.0	3.0	1.0
	Yellowfin Tuna	3.0	3.0	2.0	3.0	3.0	3.0	1.0	2.0	2.0	1.0
	Oceanic Whitetip Shark	2.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0
	Silky Shark	2.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0
	Common Thresher Shark	2.0						1.0	2.0		
	Escolar	3.0	2.0	2.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0
NE Groundfish	GM Cod	2.0	3.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0	3.0
	GB Cod	2.0	3.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0	3.0
	GM Haddock	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	GB Haddock	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Redfish	3.0	3.0	2.0	3.0	3.0	1.0	3.0	2.0	3.0	2.0
	Pollock	2.0	3.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0	3.0
	CC-GM Yellowtail Flounder	2.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	GB Yellowtail Flounder	2.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	SNE Yellowtail Flounder	2.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	American Plaice	2.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	3.0	2.0
	Witch Flounder	2.0	3.0	2.0	2.0	2.0	1.0	3.0	2.0	3.0	2.0
	GM Winter Flounder	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	GB Winter Flounder	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	SNE-MidA winter Flouder	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	GM-GB Windowpane	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	SNE-MA Windowpane	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	2.0
	Ocean Pout	2.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	2.5	2.0
	White Hake	3.0	3.0	3.0	2.0	2.0	1.0	3.0	2.0	3.0	3.0
	Halibut	3.0	3.0	3.0	2.0	3.0	1.0	3.0	2.0	3.0	3.0
SA/GOM Bottom Longline Fishery	Sand Tilefish	3.0	2.0	2.0	1.5	2.0	3.0	3.0	2.0	1.0	1.0
	Bar Jack	3.0	2.0	2.5	1.5	2.0	3.0	3.0	2.0	1.5	1.0
	Rock Sea Bass	3.0	3.0	3.0	3.0	3.0	2.5	3.0	2.0	2.5	2.0
	Margate	3.0	2.5	2.5	2.0	2.0	3.0	3.0	2.0	2.0	2.0

Weights
Atlantic Sharks - 4, 2, 1, 2, 3, 3, 2, 0, 2
BS/AI Skates - 2, 2, 2, 2, 2, 2, 2, 1, 2, 2
California Nearshore Groundfish - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
Coastal Pelagics - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
Hawaii Longline - Both Sectors - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
NE Groundfish - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
SA/GOM Snapper-Grouper Bottom Longline - 4, 2, 2, 2, 2, 2, 2, 2, 3, 2

Appendix 3. Scoring of the susceptibility attributes for the example applications. .

Fishery	Stock	Management Strategy	Areal Overlap	Geographic Concentration	Vertical Overlap	Fishing rate relative to M	Biomass of Spawners (SSB) or other proxies	Seasonal Migrations	Schooling-Aggregation and Other Behavioral Responses	Morphology Affecting Capture	Survival After Capture and Release	Desirability-Value of the Fishery	Fishery Impact to EFH or Habitat in General for Non-targets
	Shortfin mako	2.0	2.0	1.0	3.0	2.0	2.0			3.0	3.0	3.0	1.0
	Blue shark	2.0	2.0	1.0	3.0	1.0	1.0	2.0		3.0	1.0	3.0	1.0
	Common thresher	2.0	3.0	1.0	3.0					3.0	2.0	1.0	1.0
	Porbeagle	2.0	2.0	2.0	3.0	1.0	3.0			3.0	1.0	3.0	1.0
	Oceanic whitetip	2.0	2.0	1.0	3.0					3.0	2.0	3.0	1.0
	Bigeye thresher	1.0	3.0	2.0	3.0					3.0	2.0	3.0	1.0
	Longfin mako	1.0	3.0	1.0	3.0					3.0	2.0	3.0	1.0
	Sixgill shark	1.0	3.0	1.0	1.0					1.0	1.0	1.0	1.0
	Sharpnose sevengill shark	1.0	3.0	1.0	1.0					1.0		1.0	1.0
	Sandbar shark	1.0	3.0	1.0	3.0	2.0	2.0	3.0		3.0	3.0	3.0	1.0
	Blacktip shark	2.0	3.0	1.0	3.0	2.0	1.0	3.0		3.0	3.0	3.0	1.0
	Spinner shark	2.0	3.0	1.0	3.0					3.0	3.0	3.0	1.0
	Silky shark	2.0	3.0	3.0	3.0					3.0	3.0	3.0	1.0
	Bull shark	2.0	3.0	1.0	3.0					3.0	3.0	3.0	1.0
	Tiger shark	2.0	2.0	2.0	3.0					3.0	2.0	3.0	1.0
	Nurse shark	2.0	2.0	1.0	2.0					3.0	1.0	3.0	1.0
	Lemon shark	2.0	2.0	1.0	2.0					3.0	3.0	3.0	1.0
	Scalloped hammerhead	2.0	3.0	1.0	3.0	2.0	1.0		3.0	3.0	3.0	3.0	1.0
Atlantic Shark Complexes	Great hammerhead	2.0	3.0	1.0	3.0					3.0	3.0	3.0	1.0
	Smooth hammerhead	2.0	1.0	2.0	3.0					3.0	3.0	3.0	1.0
	Dusky shark	1.0	3.0	1.0	3.0	1.0	1.0			3.0	2.0	3.0	1.0
	Caribbean reef shark	1.0	1.0	3.0	3.0				3.0	3.0	3.0	3.0	1.0
	Night shark	1.0	3.0	1.0	3.0					3.0	3.0	3.0	1.0
	Bignose shark	1.0	3.0	1.0	3.0					3.0	3.0	3.0	1.0
	Galapagos shark	1.0	1.0	1.0	3.0					3.0		3.0	1.0
	Sandtiger shark	1.0	3.0	1.0	2.0				3.0	1.0	1.0	3.0	1.0
	Bigeye sandtiger shark	1.0	1.0	3.0	1.0					3.0	1.0	3.0	1.0
	White shark	1.0	1.0	1.0	2.0					3.0		3.0	1.0
	Basking shark	1.0	1.0	1.0	3.0					3.0	1.0	3.0	1.0
	Whale shark	1.0	1.0	1.0	3.0					1.0		3.0	1.0
	Atlantic sharpnose shark	2.0	3.0	1.0	3.0	3.0	3.0			3.0	3.0	3.0	1.0
	Bonnethead shark	2.0	3.0	1.0	3.0	2.0	3.0			3.0	3.0	3.0	1.0
	Blacknose shark	2.0	3.0	1.0	3.0	1.0	1.0			3.0	3.0	3.0	1.0
	Finetooth shark	2.0	3.0	1.0	3.0	3.0	3.0			1.0	3.0	3.0	1.0
	Angel shark	1.0	3.0	1.0	1.0				1.0			3.0	1.0
	Smalltail shark	1.0	1.0	3.0	3.0					1.0		3.0	1.0
	Caribbean sharpnose shark	1.0	1.0	1.0	3.0					1.0		3.0	1.0
	Alaska skate	1.0	1.0	3.0	1.0	3.0	3.0			1.0	2.0	1.0	3.0
	Aleutian skate	1.0	1.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Commander skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Whiteblotched skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Whitebrow skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Roughtail skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
BS/AI Skate Complex	Bering skate	1.0	1.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Mud skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Roughshoulder skate	1.0		1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Big skate	1.0	1.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Longnose skate	1.0		1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Butterfly skate	1.0	1.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0
	Deepsea skate	1.0	3.0	1.0	1.0	2.0	3.0			1.0	2.0	1.0	3.0

Appendix 3 (continued).

Fishery	Stock	Management Strategy	Areal Overlap	Geographic Concentration	Vertical Overlap	Fishing rate relative to M	Biomass of Spawners (SSB) or other proxies	Seasonal Migrations	Schooling-Aggregation and Other Behavioral Responses	Morphology Affecting Capture	Survival After Capture and Release	Desirability-Value of the Fishery	Fishery Impact to EFH or Habitat in General for Non-targets
	California sheephead	2.0	3.0	1.0	3.0	2.0	3.0	2.0	3.0	3.0	1.0	2.0	2.0
	Cabezon	1.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	1.0	2.0	2.0
	Kelp greenling	1.0	3.0	3.0	3.0	1.0	1.0	2.0	2.0	3.0	1.0	2.5	2.0
	Rock greenling	2.0	3.0	3.0	3.0	1.0	1.0	2.0	2.0	3.0	1.0	2.0	2.0
	California scorpionfish	1.0	3.0	3.0	3.0	1.0	1.0	2.0	2.0	2.0	1.0	1.5	1.0
	Monkyface prickelback	2.0	3.0	3.0	3.0	2.0	1.0	2.0	1.0	3.0	1.0	1.5	2.0
	Black rockfish	1.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.0	1.0	2.0
	Black-and-yellow rockfish	2.0	3.0	3.0	3.0	1.0	1.0	2.0	3.0	3.0	2.0	2.5	2.0
	Blue rockfish	1.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	2.5	1.0	2.0
California Nearshore Groundifsh	Brown rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.0	2.5	2.0
	Calico rockfish	2.0	3.0	3.0	3.0	1.0	1.0	2.0	2.0	1.0	3.0	1.0	2.0
	China rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.5	2.5	2.0
	Copper rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.5	2.0	2.0
	Gopher rockfish	1.0	3.0	3.0	3.0	1.0	1.0	2.0	3.0	3.0	2.0	2.5	2.0
	Grass rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	1.0	3.0	1.0	3.0	2.0
	Kelp rockfish	2.0	3.0	3.0	3.0	1.0	1.0	2.0	1.0	2.0	1.5	2.5	2.0
	Olive rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.0	1.0	2.0
	Quillback rockfish	2.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	3.0	2.5	2.0	2.0
	Treefish rockfish	2.0	3.0	3.0	3.0	1.0	1.0	2.0	3.0	3.0	2.0	3.0	2.0
	Pacific sardine	1.0		2.0	3.0	1.5	2.0	2.0	3.0	3.0	3.0	2.0	1.0
	Northern Anchovy	2.0		2.0	3.0	1.0	2.0	2.0	3.0	3.0	3.0	1.0	1.0
	Pacific mackerel	1.0		2.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0	1.0
Coastal Pelagics	Jack mackerel	2.0		2.0	2.0	1.0	1.0	2.0	3.0	3.0	3.0	1.0	1.0
	Market squid	2.0		2.0	3.0	2.5	2.0	3.0	3.0	3.0	2.0	2.0	1.0
	Pacific herring	2.0		2.0	3.0	2.5	3.0	3.0	3.0	3.0	3.0	2.0	1.0
	Pacific bonito	2.0		2.0	3.0	2.0	2.0	1.0	3.0	3.0	3.0	2.0	1.0
	Pacific saury	2.0		2.0	2.0	1.0	2.0	2.0	3.0	2.0	3.0	1.0	1.0
	Albacore	1.0	1.0	1.0	2.0	3.0	1.0		2.0	3.0	3.0	2.0	1.0
	Bigeye Tuna	1.0	1.0	1.0	2.0	3.0	2.0		2.0	3.0	3.0	3.0	1.0
	Black Marlin	1.0	1.0	1.0	2.0				2.0	2.0	3.0	1.0	1.0
	Bullet Tuna	2.0	1.0	1.0	2.0				2.0	1.0	3.0	1.0	1.0
	Pacific Pomfret	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Blue Shark	1.0	1.0	1.0	3.0	3.0	1.0		2.0	3.0	1.0	1.0	1.0
	Bigeye thresher shark	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Blue Marlin	1.0	1.0	1.0	2.0	2.0	1.0		2.0	3.0	3.0	1.0	1.0
	Dolphin Fish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	2.0	1.0
	Brilliant Pomfret	2.0	1.0	3.0	2.0				2.0	3.0	3.0	2.0	1.0
	Kawakawa	2.0	1.0	1.0	2.0				2.0	1.0	3.0	1.0	1.0
Hawaii Longline Fishery - Swordfish Sector	Spotted Moonfish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	2.0	1.0
	Longfin Mako Shark	2.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Salmon Shark	2.0	1.0	1.0	2.0				2.0	3.0	3.0	1.0	1.0
	Striped Marlin	1.0	1.0	1.0	2.0	3.0			2.0	3.0	3.0	2.0	1.0
	Oilfish	2.0	1.0	1.0	2.0				2.0	3.0	2.0	2.0	1.0
	Northern Bluefin Tuna	1.0	1.0	1.0	3.0	3.0	2.0		2.0	3.0	3.0	2.0	1.0
	Roudi Escolar	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Pelagic Thresher Shark	2.0	1.0	1.0	1.0				2.0	3.0	2.0	1.0	1.0
	Sailfish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	1.0	1.0
	Skipjack Tuna	1.0	1.0	1.0	2.0	1.0	1.0		2.0	3.0	3.0	2.0	1.0
	Shortfinned Mako Shark	2.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Short Bill Spearfish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	1.0	1.0

Appendix 3 (continued).

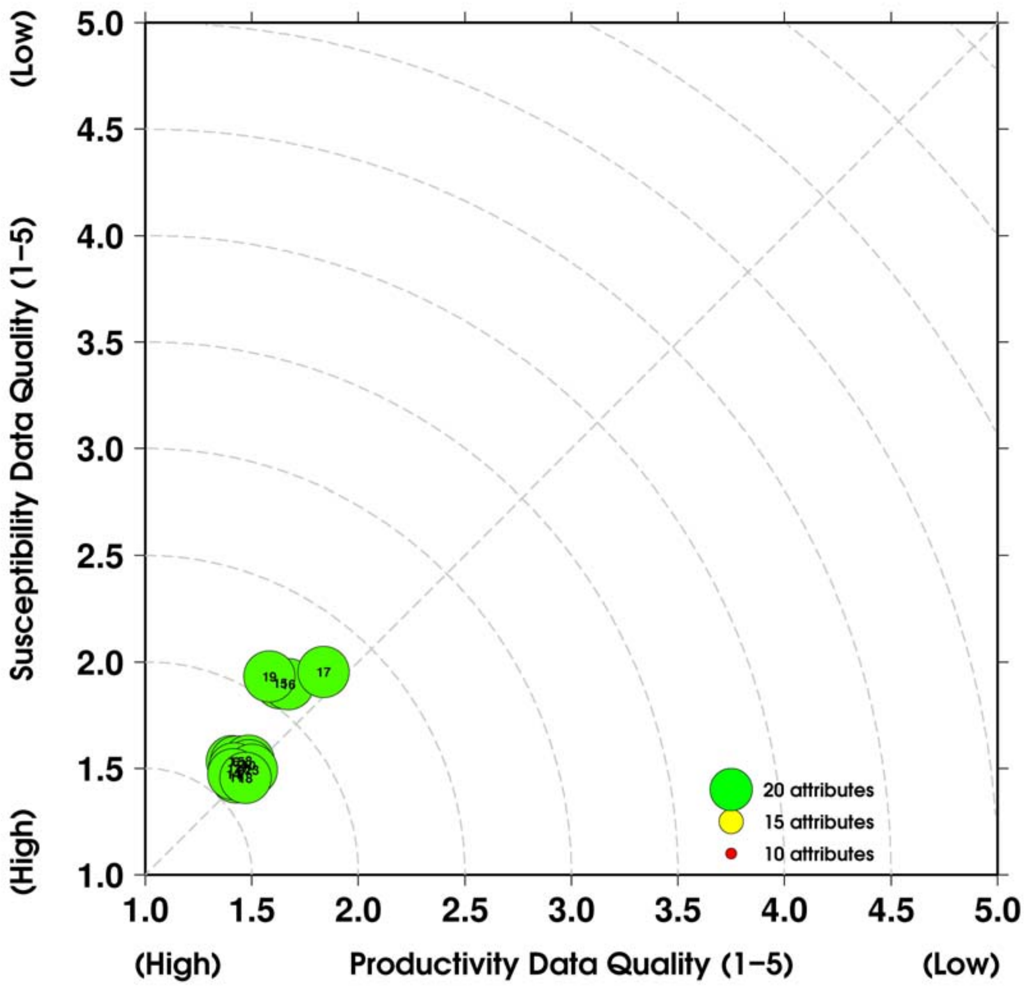
Fishery	Stock	Management Strategy	Areal Overlap	Geographic Concentration	Vertical Overlap	Fishing rate relative to M	Biomass of Spawners (SSB) or other proxies	Seasonal Migrations	Schooling-Aggregation and Other Behavioral Responses	Morphology Affecting Capture	Survival After Capture and Release	Desirability-Value of the Fishery	Fishery Impact to EFH or Habitat in General for Non-targets
Hawaii Longline Fishery - Swordfish Sector	Broadbill Swordfish	1.0	1.0	1.0	2.0	1.0	1.0		2.0	3.0	3.0	1.0	1.0
	Flatheat Pomfret	2.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Dagger Pomfret	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Sickle Pomfret	2.0	1.0	1.0	3.0				2.0	3.0	3.0	2.0	1.0
	Wahoo	1.0	1.0	1.0	2.0				2.0	3.0	3.0	2.0	1.0
	Yellowfin Tuna	1.0	1.0	1.0	2.0	2.0	1.0		2.0	3.0	3.0	2.0	1.0
	Oceanic Whitetip Shark	1.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Silky Shark	2.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Common Thresher Shark	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Escolar	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.5	1.0
Hawaii Longline Fishery - Tuna Sector	Albacore	1.0	1.0	1.0	3.0	3.0	1.0		2.0	3.0	3.0	2.0	1.0
	Bigeye Tuna	1.0	1.0	1.0	2.0	3.0	2.0		2.0	3.0	3.0	3.0	1.0
	Black Marlin	1.0	1.0	1.0	3.0				2.0	2.0	3.0	1.0	1.0
	Bullet Tuna	2.0	1.0	1.0	2.0				2.0	1.0	3.0	1.0	1.0
	Pacific Pomfret	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Blue Shark	1.0	1.0	1.0	3.0	3.0	1.0		2.0	3.0	1.0	1.0	1.0
	Bigeye thresher shark	2.0	1.0	1.0	2.0				2.0	3.0	1.0	1.0	1.0
	Blue Marlin	1.0	1.0	1.0	3.0	2.0	1.0		2.0	3.0	3.0	1.0	1.0
	Dolphin Fish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	2.0	1.0
	Brilliant Pomfret	2.0	1.0	3.0	3.0				2.0	3.0	3.0	2.0	1.0
	Kawakawa	2.0	1.0	1.0	2.0				2.0	1.0	3.0	1.0	1.0
	Spotted Moonfish	1.0	1.0	1.0	3.0				2.0	3.0	3.0	2.0	1.0
	Longfin Mako Shark	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Salmon Shark	2.0	1.0	1.0	2.0				2.0	3.0	2.0	1.0	1.0
	Striped Marlin	1.0	1.0	1.0	3.0	3.0			2.0	3.0	1.0	2.0	1.0
	Oilfish	2.0	1.0	1.0	1.0				2.0	3.0	3.0	2.0	1.0
	Northern Bluefin Tuna	1.0	1.0	1.0	2.0	3.0	2.0		2.0	3.0	3.0	2.0	1.0
	Roudi Escolar	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Pelagic Thresher Shark	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Sailfish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	1.0	1.0
	Skipjack Tuna	1.0	1.0	1.0	3.0	1.0	1.0		2.0	3.0	3.0	2.0	1.0
	Shortfinned Mako Shark	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Short Bill Spearfish	1.0	1.0	1.0	2.0				2.0	3.0	3.0	1.0	1.0
	Broadbill Swordfish	1.0	1.0	1.0	1.0	1.0	1.0		2.0	3.0	3.0	1.0	1.0
	Flatheat Pomfret	2.0	1.0	1.0	3.0				2.0	3.0	1.0	1.0	1.0
	Dagger Pomfret	2.0	1.0	1.0	3.0				2.0	3.0	1.0	1.0	1.0
	Sickle Pomfret	2.0	1.0	1.0	3.0				2.0	3.0	3.0	2.0	1.0
	Wahoo	1.0	1.0	1.0	3.0				2.0	3.0	3.0	2.0	1.0
	Yellowfin Tuna	1.0	1.0	1.0	3.0	2.0	1.0		2.0	3.0	3.0	2.0	1.0
	Oceanic Whitetip Shark	1.0	1.0	1.0	3.0				2.0	3.0	1.0	1.0	1.0
	Silky Shark	2.0	1.0	1.0	3.0				2.0	3.0	1.0	1.0	1.0
	Common Thresher Shark	2.0	1.0	1.0	3.0				2.0	3.0	2.0	1.0	1.0
	Escolar	2.0	1.0	1.0	2.0				2.0	3.0	2.5	1.5	1.0
NE Groundfish	GM Cod	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	GB Cod	2.0	3.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
	GM Haddock	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	GB Haddock	2.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
	Redfish	2.0	3.0	2.0	3.0	2.0	1.5	2.0	2.0	2.0	3.0	2.0	3.0
	Pollock	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0
	CC-GM Yellowtail Flounder	2.0	3.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0

Appendix 3 (continued).

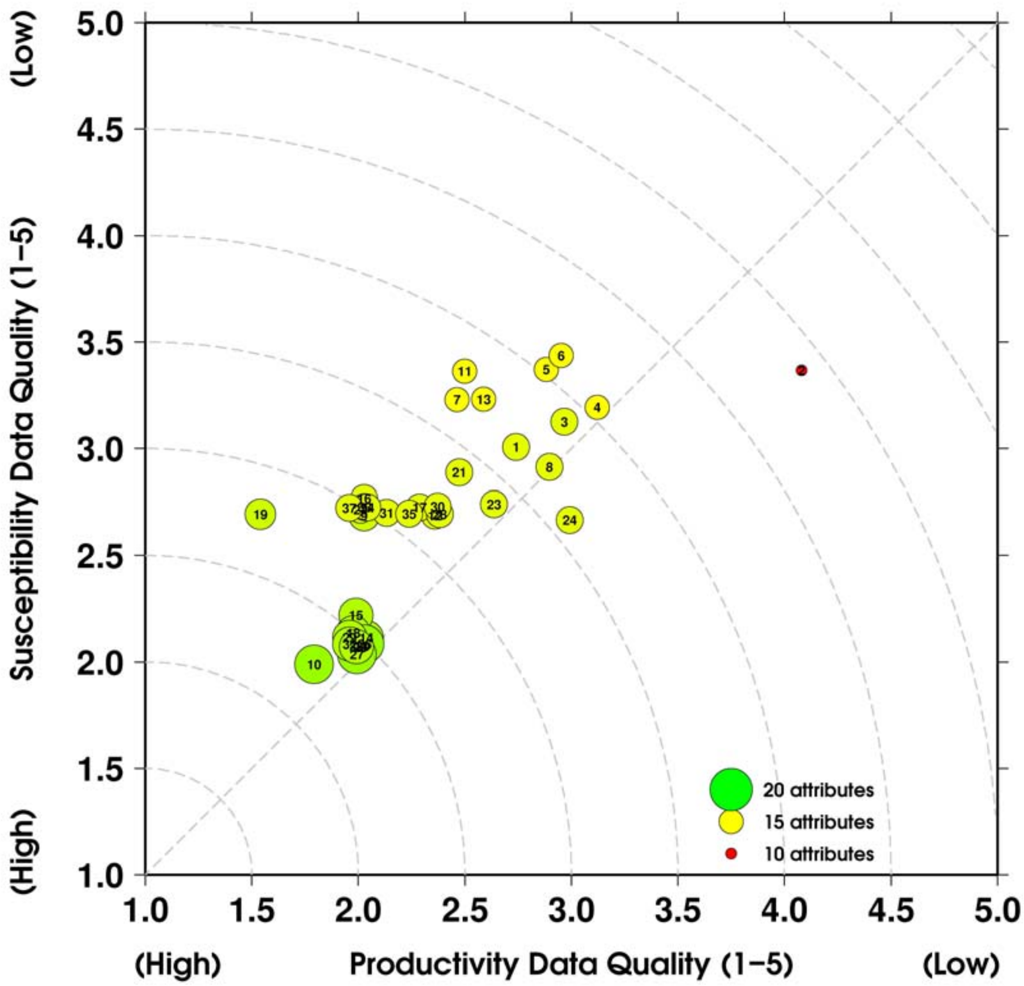
Fishery	Stock	Management Strategy	Areal Overlap	Geographic Concentration	Vertical Overlap	Fishing rate relative to M	Biomass of Spawners (SSB) or other proxies	Seasonal Migrations	Schooling-Aggregation and Other Behavioral Responses	Morphology Affecting Capture	Survival After Capture and Release	Desirability-Value of the Fishery	Fishery Impact to EFH or Habitat in General for Non-targets
NE Groundfish	GB Yellowtail Flounder	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	SNE Yellowtail Flounder	2.0	3.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
	American Plaice	2.0	3.0	2.0	3.0	2.0	1.0	2.0	2.0	2.0	3.0	2.0	3.0
	Witch Flounder	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	GM Winter Flounder	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	GB Winter Flounder	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	SNE-MidA winter Flouder	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
	GM-GB Windowpane	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	1.0	3.0
	SNE-MA Windowpane	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	1.0	3.0
	Ocean Pout	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	1.0	3.0
	White Hake	2.0	3.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0
	Halibut	2.0	3.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
SA/GOM Snapper-Grouper Bottom Longline	Sand Tilefish	3.0	1.0	1.0	1.0				2.0	2.0	2.5	1.0	1.5
	Bar Jack	3.0	1.0	1.0	1.0				2.0	1.5	2.5	1.0	1.5
	Rock Sea Bass	3.0	1.0	1.0	1.0				2.0	2.0	3.0	1.0	1.5
	Margate	3.0	1.0	1.0	2.0				2.0	2.0	3.0	1.0	1.5

Weights
Atlantic Sharks - 2, 4, 2, 4, 3, 3, 2, 2, 3, 4, 2, 2
BS/AI Skates - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
California Nearshore Groundfish - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
Coastal Pelagics - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
Hawaii Longline - Both Sectors - 1, 2, 1, 3, 1, 1, 0, 2, 1, 3, 2, 1
NE Groundfish - 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
SA/GOM Snapper-Grouper Bottom Longline - 2, 4, 2, 3, 2, 2, 1, 2, 2, 2, 2, 1

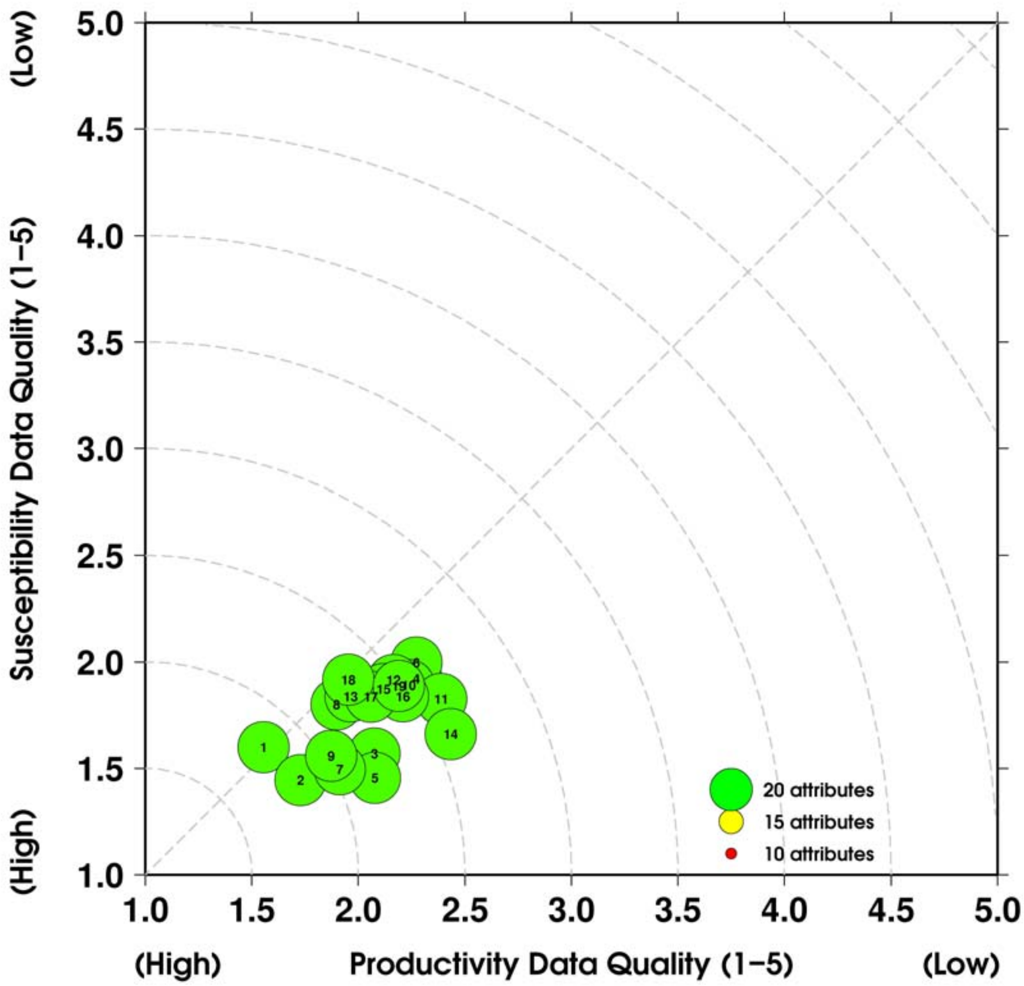
Appendix 4. Data quality plot for the Northeast Groundfish Multispecies Fishery.



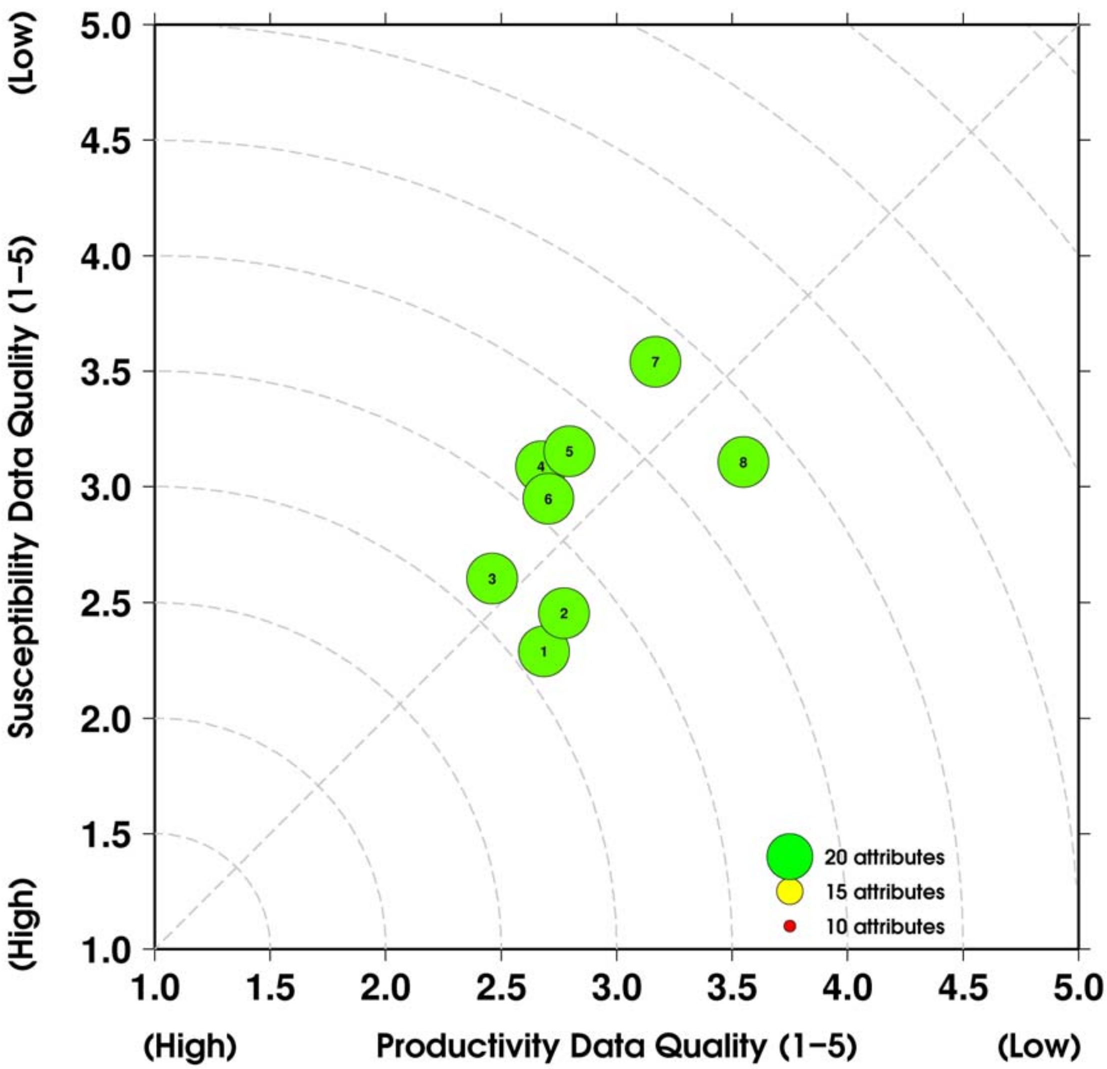
Appendix 5. Data quality plot for the Highly Migratory Atlantic Shark Complex.



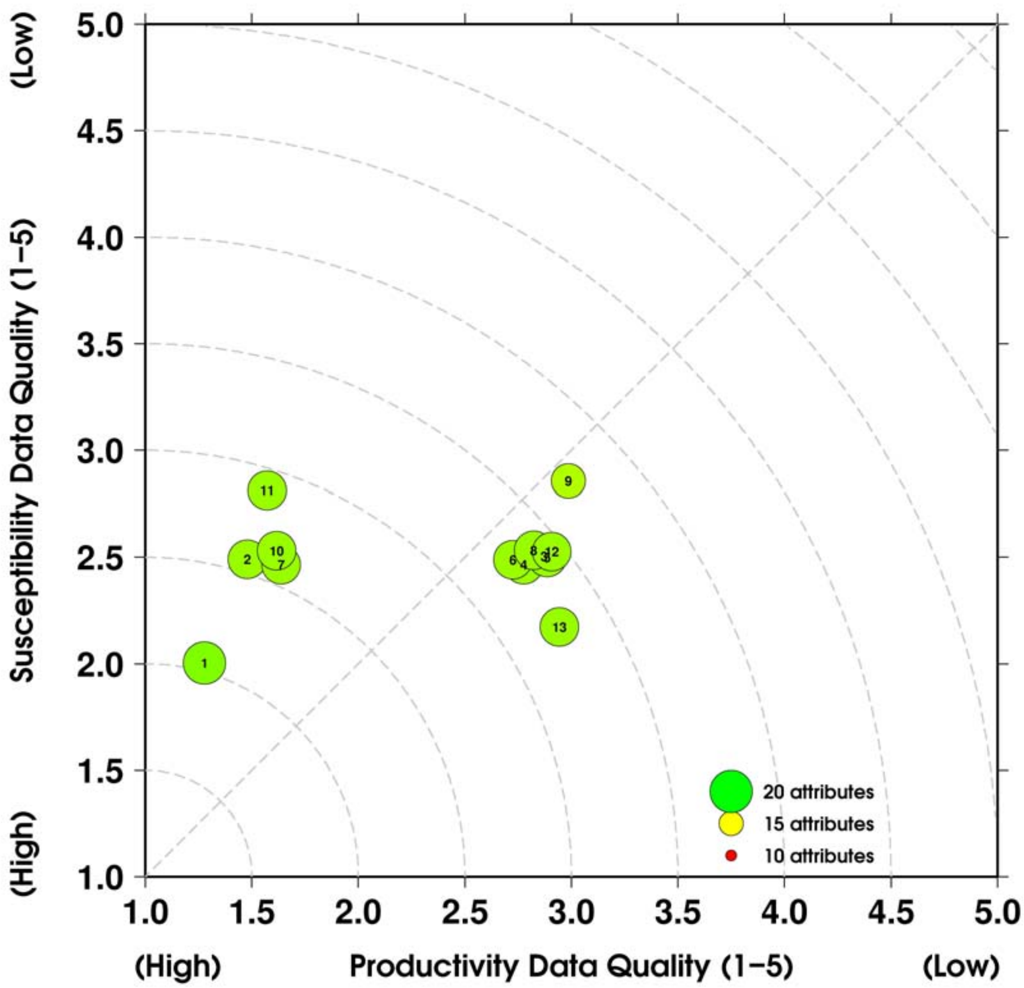
Appendix 6. Data quality plot for the California Nearshore Groundfish Finfish Assemblage.



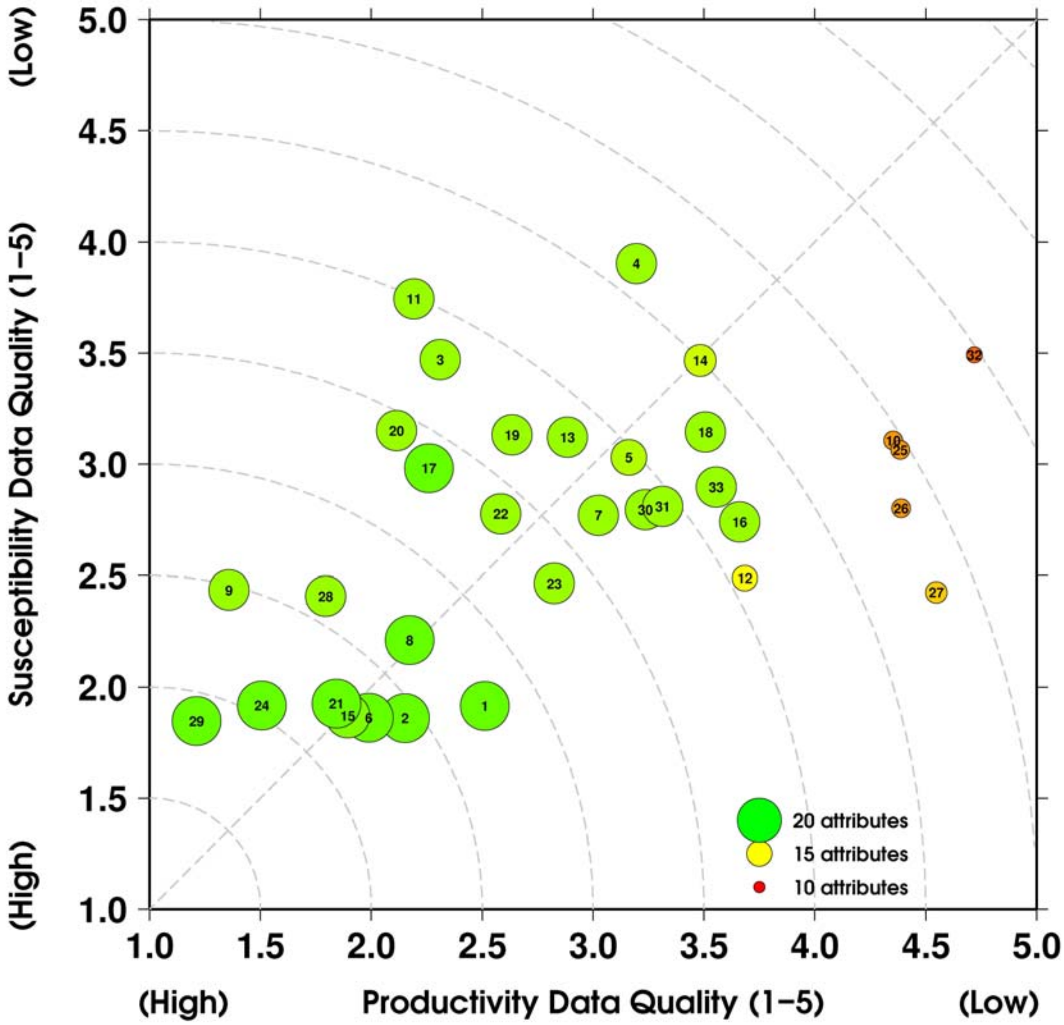
Appendix 7. Data quality plot for California Current Coastal Pelagic Species.



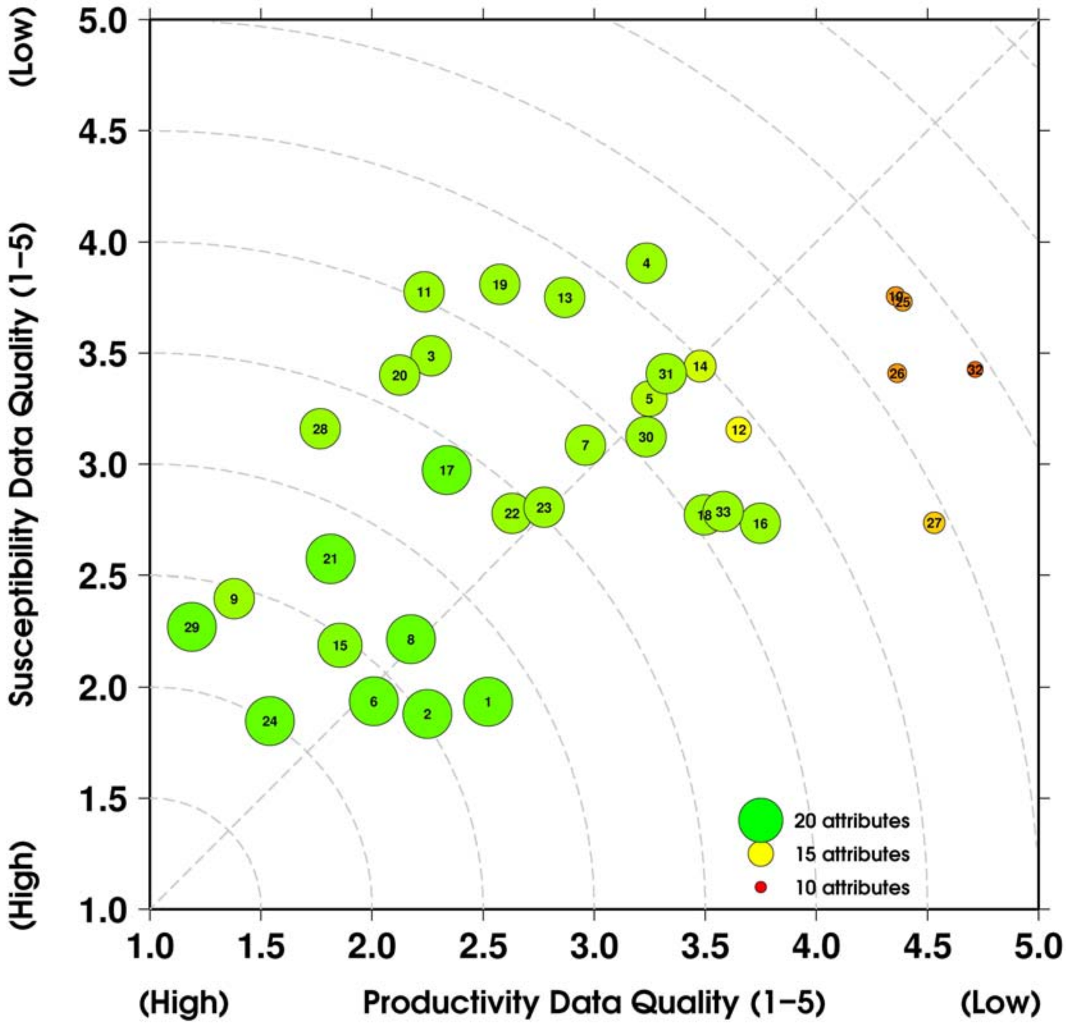
Appendix 8. Data quality plot for the Skates of the Bering Sea and Aleutian Islands Management Area.



Appendix 9. Data quality plot for the Hawaii-based Tuna Longline Fishery.



Appendix 10. Data quality plot for the Hawaii-based Swordfish Longline Fishery.



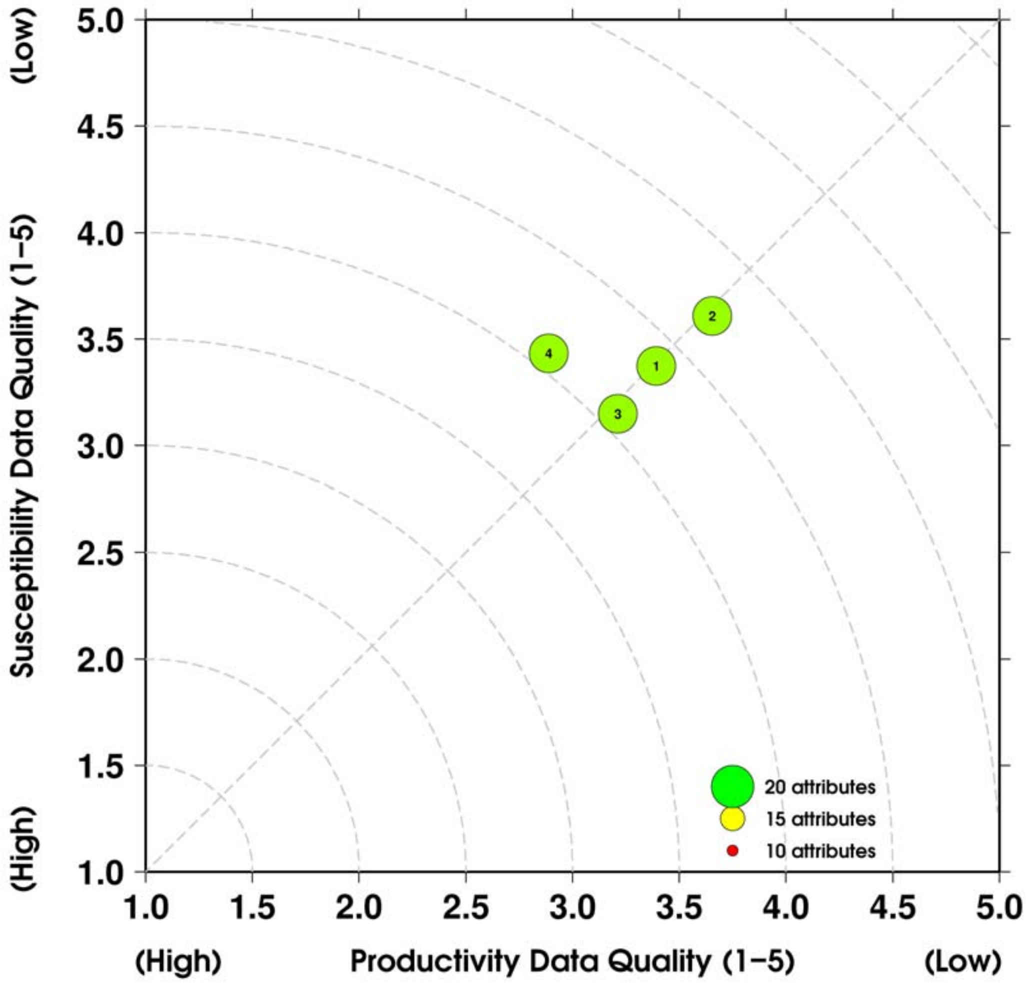
Appendix 11. A subset of the stocks from the example applications for which status determinations could be made between the years of 2000 and 2008.

ID	Fishery	Stock	Productivity	Susceptibility	Vulnerability	2000 - 2008 Stock Status	
						Overfishing	Overfished
14		Dusky shark	1.04	2.06	2.23	Y	Y
15		Porbeagle	1.04	2.14	2.27	N	Y
18		Blacknose shark	1.28	2.29	2.15	Y	Y
25	Atlantic Shark Complexes	Blacktip shark	1.16	2.43	2.33	N	N
27		Sandbar shark	1.04	2.42	2.42	Y	Y
29		Finetooth shark	1.31	2.47	2.24	Y	N
32		Bonnethead shark	1.71	2.55	2.01	N	N
36		Atlantic sharpnose shark	1.84	2.63	2.00	N	N
52		Cabezon	2.03	2.24	1.57		N
53		Kelp greenling	2.03	2.07	1.45	N	N
55	CA Nearshore Groundfish	California scorpionfish	2.03	1.79	1.25		N
57		Black rockfish	1.41	2.20	1.99	Y	N
64		Gopher rockfish	1.98	2.24	1.61		N
70		Pacific sardine	2.48	2.09	1.21	N	N
71	CA Current Pelagics	Northern anchovy	2.77	2.13	1.15	N	
72		Pacific mackerel	2.16	2.20	1.47	N	N
73		Jack mackerel	2.07	1.91	1.30	N	
78		Gulf of Maine cod	2.26	2.53	1.70	Y	Y
79		Georges Bank cod	2.33	2.58	1.71	Y	Y
80		Gulf of Maine haddock	2.01	2.44	1.75	N	Y
81		Georges Bank haddock	1.98	2.49	1.80	N	Y
82		Redfish	2.50	2.32	1.42	N	N
83		Pollock	2.28	2.36	1.54	N	N
84		Cape Cod/Gulf of Maine yellowtail flounder	2.11	2.56	1.79	Y	Y
85		Georges Bank yellowtail flounder	2.13	2.54	1.76	Y	Y
86		Southern New England yellowtail flounder	2.10	2.58	1.82	Y	Y
87	NE Groundfish	American plaice	2.23	2.26	1.48	N	Y
88		Witch flounder	2.18	2.46	1.67	N	N
89		Gulf of Maine Winter flounder	1.97	2.50	1.82	Y	N
90		Georges Bank Winter flounder	2.05	2.49	1.77	Y	N
91		Southern New England/Mid-Atlantic winter flounder	1.96	2.47	1.80	Y	Y
92		Gulf of Maine/Georges Bank windowpane	1.98	2.24	1.60	N	N
93		Southern New EnglandMid-Atlantic windowpane	2.02	2.24	1.58	N	Y
94		Ocean pout	2.49	2.29	1.39	N	Y
95		White hake	2.52	2.37	1.45	Y	Y
96		Atlantic halibut	2.63	2.61	1.65		Y
97		Albacore	1.92	1.99	1.46	N	N
98		Bigeye tuna	1.95	2.10	1.52	Y	N
102		Blue shark	1.51	1.71	1.65	N	N
104	HA Pelagic Longline - Wwordfish	Blue marlin	1.77	1.77	1.45	N	N
117		Skipjack tuna	2.41	1.85	1.04	N	N
120		Broad billed swordfish	1.84	1.68	1.35	N	N
125		Yellowfin tuna	2.29	1.94	1.18	Y	N

Appendix 11 (continued).

ID	Fishery	Stock	Productivity	Susceptibility	Vulnerability	2000 - 2008 Stock Status	
						Overfishing	Overfished
130	HA Pelagic Longline - Tuna	Albacore	1.91	2.14	1.57	N	N
131		Bigeye tuna	1.85	2.08	1.58	Y	N
135		Blue Shark	1.49	1.64	1.64	N	N
137		Blue marlin	1.77	1.93	1.54	N	N
150		Skipjack tuna	2.44	2.04	1.18	N	N
153		Broad billed swordfish	1.81	1.58	1.33	N	N
158		Yellowfin tuna	2.31	2.01	1.23	Y	N

Appendix 12. Data quality plot for the four non-target species captured in the South Atlantic/Gulf of Mexico Snapper-Grouper Bottom Longline Fishery.



West coast groundfish species that are candidate "ecosystem component" species.

Common name	Scientific name	Comments
Calico Rockfish	*Sebastes dalli*	Some are caught and discarded in southern CA rec. fisheries
Puget Sound Rockfish	*Sebastes emphaeus*	Small size; rarely caught
Shortbelly Rockfish	*Sebastes jordani*	Small size; not targeted; some trawl and line gear bycatch
Freckled Rockfish	*Sebastes lentiginosus*	Small size; some incid. rec. catch in southern CA
Dwarf-red Rockfish	*Sebastes rufinanus*	Small size; no record of west coast catch
Pygmy Rockfish	*Sebastes wilsoni*	Small size; not taken in fisheries

Agenda Item E.4.b
Supplemental SSC Report
June 2009

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 23 – IMPLEMENTING ANNUAL CATCH LIMIT REQUIREMENTS

Mr. John DeVore briefed the Scientific and Statistical Committee (SSC) on development of the Council's framework for implementing Annual Catch Limits (ACLs) under the Fishery Management Plan (FMP) Amendment 23. Dr. Jim Hastie (NWFSC) also participated in the discussion.

The SSC provided a conceptual framework in April for incorporating scientific uncertainty in the Acceptable Biological Catch (ABC) rule for stocks with assessment models. Recommendations included quantifying assessment variability as a basis for evaluating the size of a scientific buffer (i.e., the difference in yield between the Overfishing Limit [OFL] and the ABC) and the risk of overfishing a stock.

The SSC proposes to convene a subgroup meeting this summer to scope approaches to quantify scientific buffers. The SSC notes that there are many challenges to developing a consistent analytical approach to characterize scientific uncertainty due to differences in data coverage and quality for assessed species (e.g., geographic boundaries, availability of age data, different time series). The scoping exercise would explore a number of possible approaches to incorporate scientific uncertainty in the ABC control rules, using data and parameter estimates from current and past stock assessments. Council staff would assist by assembling data and parameter estimates from past stock assessments. The SSC anticipates that the scoping exercise will be useful to identify preliminary ABC control rule alternatives for assessed species for Council consideration. A strategy for incorporating scientific uncertainty can be specified for the framework, but the SSC does not expect a full analysis for assessed species to be completed by November.

The SSC also discussed concepts in the Vulnerability Evaluation Work Group report (Agenda Item E.4.a., Attachment 1) on Productivity and Susceptibility Assessments (PSAs) to determine vulnerability of a stock. Stock vulnerability categorization methods, such as the PSA, will be needed for data poor species in particular. Dr. Jim Hastie stated that the NWFSC will be compiling trend data for unassessed stocks, but the compilation will not be completed by November. The SSC proposes to review the PSA methodology before the November meeting for use in the FMP Amendment 23 preliminary alternatives on ABC control rules.

The SSC also briefly discussed management uncertainty, and considered that the inseason management procedures currently employed by the Groundfish Management Team (GMT) are performing well. If documentation of the procedures is provided, the adequacy of current methodologies can be verified.

PFMC
06/14/09

NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Northwest Region will briefly report on recent regulatory developments relevant to groundfish fisheries and issues of interest to the Pacific Fishery Management Council (Council).

NMFS Northwest Fisheries Science Center (NWFSC) will also briefly report on groundfish-related science and research activities.

Council Task:

Discussion.

Reference Materials:

1. Agenda Item E.5.a, Attachment 1: *Federal Register* Notices Published Since the Last Council Meeting.

Agenda Order:

a.	Regulatory Activities	Frank Lockhart
b.	Fisheries Science Center Activities	Elizabeth Clarke
c.	Reports and Comments of Management Entities and Advisory Bodies	
d.	Public Comment	
e.	Council Discussion	

PFMC
05/21/09

FEDERAL REGISTER NOTICES

Groundfish and Halibut Notices
March 19, 2009 through May 28, 2009

Documents available at NMFS Sustainable Fisheries Groundfish Web Site
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/index.cfm

74 FR 11681. Pacific Halibut Fisheries; Catch Sharing Plan. The Assistant Administrator for Fisheries publishes annual management measures promulgated as regulations by the International Pacific Halibut Commission (IPHC) and approved by the Secretary of State, governing the Pacific Halibut Fishery - 3/19/09

74 FR 11880. Pacific Coast Groundfish Fishery; Amendment 15; Correction. NMFS is correcting a final regulation that appeared in the Federal Register on March 10, 2009 - 3/20/09

74 FR 13420. Pacific Coast Groundfish Fishery; Application for an Exempted Fishing Permit. NMFS announces the receipt of exempted fishing permit applications, and is considering issuance of EFPs for vessels participating in the fisheries - 3/27/09

74 FR 18657. Pacific Halibut Fisheries; Catch Sharing Plan; Correction. Final rule. This action corrects the text of a final rule published on March 19, 2009, that implemented annual management measures governing the Pacific Halibut Fishery - 4/24/09

74 FR 19011. Pacific Coast Groundfish Fishery; Biennial Specifications and Management Measures; Inseason Adjustments. This final rule announces inseason changes to management measures in the commercial Pacific Coast Groundfish Fisheries - 4/27/09

74 FR 20620. Pacific Coast Groundfish Fishery. Biennial Specifications and Management Measures. This final rule establishes the 2009 fishery specifications and management measures for Pacific Whiting in the U.S. exclusive economic zone - 5/5/09

Agenda Item E.5.c
Supplemental EC Report
June 2009

ENFORCEMENT CONSULTANTS REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

At the April meeting, Mr. Phil Anderson asked for a breakdown by gear type for the Vessel Monitoring System cases that have a final disposition. That breakdown is as follows:

NW Region: 12 Total
- 8 Limited Entry Trawl
- 4 Limited Entry Fixed Gear

SW Region: 9 Total
- 2 Limited Entry Trawl
- 7 Limited Entry Fixed Gear

West Coast Totals: 21
- 10 Limited Entry Trawl
- 11 Limited Entry Fixed Gear

PFMC
06/13/09

PART I OF STOCK ASSESSMENTS FOR 2011-2012 GROUNDFISH FISHERIES

The Council process for setting groundfish harvest levels and other specifications depends on periodic assessments of the status of groundfish stocks and a report from an established assessment review body or, in the Council parlance, a Stock Assessment Review (STAR) Panel. The Scientific and Statistical Committee (SSC) reviews this information and makes a recommendation relative to the standards of 1) the best available science, and 2) soundness for use in groundfish fishery management decision-making by the Council. The Council then approves the new assessments and relevant analyses used to set groundfish harvest levels and other specifications for the following biennial management period.

New full assessments for petrale sole and splitnose rockfish were recently prepared and reviewed by a STAR Panel. The executive summaries of these assessments and the associated STAR Panel reports are provided as Agenda Item E.6.a, Attachments 1, 2, 4, and 5. The petrale sole assessment is more pessimistic than the last one done in 2005. The stock is overfished according to the proxy biomass thresholds used for groundfish. However, the STAR Panel recommends consideration for managing petrale using the biomass thresholds estimated in the assessment, which would result in the stock being in the precautionary zone. The National Marine Service has requested explicit advice from the SSC on a management strategy for petrale sole in light of the new assessment results as specified in Agenda Item E.6.a, Attachment 3. The splitnose rockfish assessment is the first one done for this stock and the result is the stock is at a healthy level of abundance. While the STAR Panel recommends the assessment for determining the status of the splitnose stock, they are urging caution in using the assessment result for setting harvest specifications.

Members of the Groundfish Subcommittee of the SSC, the Groundfish Management Team (GMT), and Groundfish Advisory Subpanel (GAP) are scheduled to review four updated assessments Thursday preceding the June Council meeting (see Ancillary Agenda A). The executive summaries of these four updated assessments are provided as Agenda Item E.6.a, Attachments 6-9 and **all the assessments in their entirety and STAR Panel reports under Council consideration at this meeting are included in the CD copy of meeting materials.**

The Council should consider the new full and updated assessments and STAR Panel reports, as well as the advice of the SSC, other advisory bodies, and the public before adopting the new stock assessments for use in 2011-2012 groundfish management.

Council Action:

Consider approving stock assessments.

Reference Materials:

1. Agenda Item E.6.a, Attachment 1: Executive Summary of "Draft Status of the U.S. Petrale Sole Resource in 2008."
2. Agenda Item E.6.a, Attachment 2: Petrale Sole STAR Panel Report.

3. Agenda Item E.6.a, Attachment 3: May 27 letter from Frank Lockhart to Don McIsaac Regarding SSC Considerations for Managing Petrale Sole.
4. Agenda Item E.6.a, Attachment 4: Executive Summary of "Status of the U.S. Splitnose Rockfish (*Sebastes diploproa*) resource in 2009."
5. Agenda Item E.6.a, Attachment 5: Splitnose Rockfish STAR Panel Report.
6. Agenda Item E.6.a, Attachment 6: Executive Summary of "Status of the U.S. Canary Rockfish Resource in 2009 (Update of the 2007 Assessment Model)."
7. Agenda Item E.6.a, Attachment 7: Executive Summary of "Updated Status of Cowcod, *Sebastes levis*, in the Southern California Bight."
8. Agenda Item E.6.a, Attachment 8: Executive Summary of "Status and Future Prospects for the Darkblotched Rockfish Resource in Waters off Washington, Oregon, and California as Updated in 2009."
9. Agenda Item E.6.a, Attachment 9: Executive Summary of "Status and Future Prospects for the Pacific Ocean Perch Resource in Waters off Washington and Oregon as Updated in 2009."

<u>Agenda Order</u>:

a.	Agenda Item Overview	John DeVore
b.	Presentation of Petrale Sole and Splitnose Rockfish Assessments	Allan Hicks, Vladlena Gertseva
c.	Scientific and Statistical Committee Report	Steve Ralston
d.	Reports and Comments of Management Entities and Advisory Bodies	
e.	Public Comment	
f.	**Council Action:** Approve Stock Assessments	

PFMC
05/29/09

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DRAFT Status of the U.S. petrale sole resource in 2008

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27 May, 2009

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Executive Summary

Stock

This assessment reports the status of the petrale sole (*Eopsetta jordani*) resource off the coast of California, Oregon, and Washington using data through 2008. While petrale sole are modeled as a single stock, the spatial aspects of the coast-wide population are addressed through geographic separation of data sources/fleets where possible and consideration of residual patterns that may be a result of inherent stock structure. There is currently no genetic evidence suggesting distinct biological stocks of petrale sole off the U.S. coast. The limited tagging data available to describe adult movement suggests that petrale sole may have some homing ability for deepwater spawning sites but also have the ability to move long distances between spawning sites and seasonally.

Catches

The earliest catches of petrale sole are reported in 1876 in California and 1884 in Oregon. Recent annual catches during 1981–2008 range between 1,244–2,854 mt (Table a, Figure a). Petrale sole are almost exclusively caught by trawl fleets. Non-trawl gears contribute less than 2% of the catches. Based on the previous 2005 assessment, subsequent OYs were reduced due to 2499 mt. From the inception of the fishery through the war years, the vast majority of catches occurred between March and October (the summer fishery), when the stock is dispersed over the continental shelf. The post-World War II period witnessed a steady decline in the amount and proportion of annual catches occurring during the summer months (March-October). Conversely, petrale catch during the winter season (November–February), when the fishery targets spawning aggregations, has exhibited a steadily increasing trend since the 1940's. Since the mid-1980s, catches during the winter months have been roughly equivalent to or exceeded catches throughout the remainder of the year (Figure a).

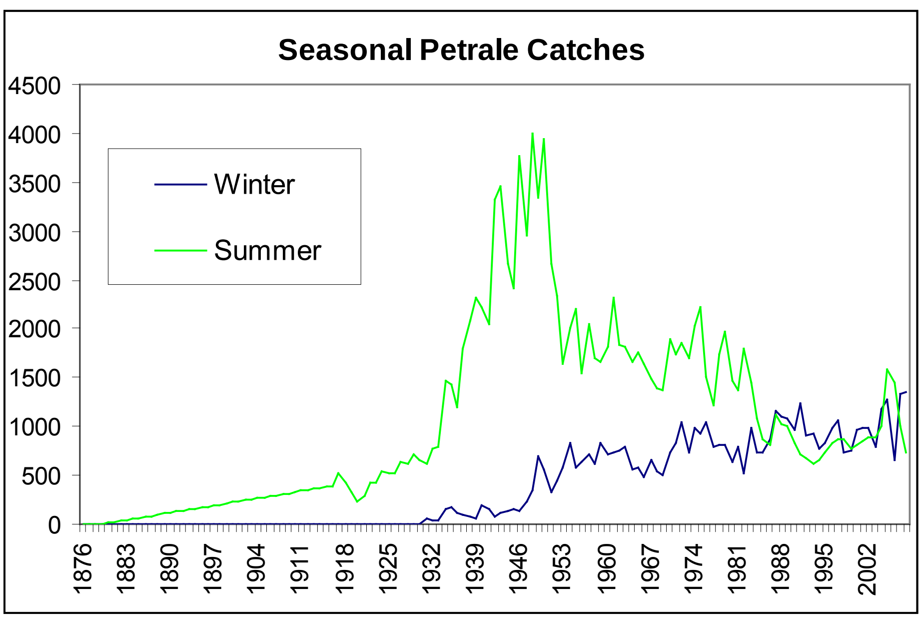

Figure a. Petrale sole catch history by season, 1876-2008.

Table a. Recent commercial fishery catches (mt) by combined summer and winter fleets.

Fishing year	Washington trawl	Oregon trawl	California trawl	Total
1999	443	517	560	1,520
2000	668	460	650	1,778
2001	675	584	579	1,838
2002	861	481	536	1,877
2003	837	408	441	1,686
2004	1,234	511	445	2,191
2005	1,319	661	874	2,854
2006	871	641	590	2,102
2007	635	732	963	2,329
2008	466	585	1,028	2,079

Data and Assessment

The previous stock assessment for petrale sole was developed during 2005 using Stock Synthesis 2. This assessment uses the Stock Synthesis 3 (SS-V3.03a-SAFE, 04/30/09) integrated length-age structured model. Due to higher wintertime catches in recent decades the assessment is based on winter (November to February) and summer (March to October) fishing seasons with the fishing year starting on November 1 and ending on October 31. The fisheries are divided into WA-Winter, WA-Summer, OR-Winter, OR-Summer, CA-Winter, and CA-Summer fisheries. The model includes catch, length- and age-frequency data from the trawl fleets described above as well as standardized CPUE indices developed by Sampson and Lee (1999) for the Oregon fleets from 1987–1997. The impact of rapidly changing regulations in the trawl fishery after these dates makes the fishery-based CPUE indices unreliable. Biological data are derived from both port and on-board observer sampling programs. The National Marine Fisheries Service (NMFS) triennial bottom trawl survey (1980, 1983, 1986, 1989, 1992, 1995, 1998, 2001, and 2004) and Northwest Fisheries Science Center (NWFSC) trawl survey (2003–2008) relative biomass indices and biological sampling provide fishery independent information on relative trend and demographics of the petrale sole stock.

The base case assessment model includes parameter uncertainty from a variety of sources, but likely underestimates the uncertainty in recent trend and current stock status. For this reason, in addition to asymptotic confidence intervals (based upon the model's analytical estimate of the variance near the converged solution), results from models that reflect alternate states of nature regarding the estimate of 2009 spawning biomass are presented as a decision table.

Stock biomass

Petrale sole were lightly exploited during the early 1900s but by the 1950s the fishery was well developed and showing clear signs of depletion and declines in catches and biomass (Figures a, b). The rate of decline in spawning biomass accelerated through the 1930s–1970s reaching minimums generally around or below 10% of the unexploited levels during the 1980s and 1990s (Figure b). The petrale sole spawning stock biomass is estimated to have increased slightly from the late 1990s, peaking in 2005, in response to above average recruitment (Table b, Figure b). However, this increasing trend has reversed since the 2005 assessment and the stock has been declining, most likely due to strong year classes having passed through the fishery (Table b). The estimated relative depletion level in 2009 is 11.6% (~95% asymptotic interval: ±4.8%, ~ 75% interval based on the range of states of nature: 9.4-13.8%), corresponding to 2937.6 mt (~95% asymptotic interval: ±832.7 mt, states of nature interval: 2407.8-3468.1 mt) of female spawning biomass in the base model (Table b). The base model indicates that the spawning biomass has been below 25% of the unfished level continuously since 1953.

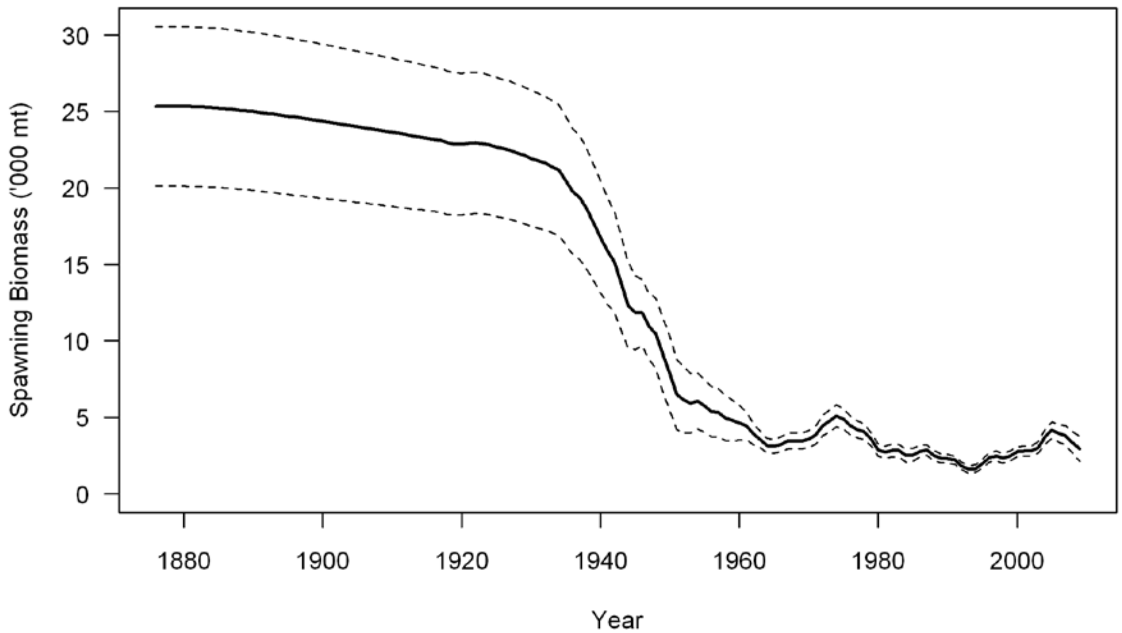

Figure b. Estimated spawning biomass time-series (1876-2009) for the base case model (solid line) with approximate asymptotic 95% confidence interval (dashed lines).

Table b. Recent trend in estimated petrale sole female spawning biomass and relative depletion.

Fishing year	Spawning biomass (mt)	~95% confidence interval	Range of states of nature	Estimated depletion	~95% confidence interval	Range of states of nature
2000	2,765.2	±329.7	2743.9-2776.9	10.9	±3.4	10.7-11.1
2001	2,810.3	±328.3	2781.5-2829.5	11.1	±3.4	10.8-11.3
2002	2,798.4	±333.6	2759.3-2827.8	11.0	±3.4	10.7-11.3
2003	3,030.0	±381.0	2969.1-3080.3	12.0	±3.8	11.5-12.3
2004	3,706.4	±463.0	3605.0-3796.5	14.6	±4.7	14.0-15.1
2005	4,160.7	±529.5	4002.0-4308.6	16.4	±5.2	15.5-17.2
2006	3,949.8	±576.0	3720.7-4169.9	15.6	±5.1	14.5-16.6
2007	3,818.0	±624.1	3507.4-4122.5	15.1	±5.1	13.6-16.4
2008	3,349.6	±704.6	2940.8-3755.2	13.2	±4.8	11.4-14.9
2009	2,937.6	±832.7	2407.8-3468.1	11.6	±4.8	9.4-13.8

Recruitment

Annual recruitment was treated as stochastic, and estimated as annual deviations from log-mean recruitment where mean recruitment is the fitted Beverton-Holt stock recruitment curve. The time-series of estimated recruitments shows a weak relationship with the decline in spawning biomass, punctuated by larger recruitments (Figure c). The four weakest recruitments since 1939 are estimated to be in 1972, 1985-1986, 1991 and 2003. The four strongest recruitments since 1939 are estimated to be in 1939-1940, 1960, 1965, and 1997-1998 (Figure c). The most recent above average recruitment event, is estimated to be in 2005, and is about 20% smaller than of the 1997–1998 recruitment event (Table c).

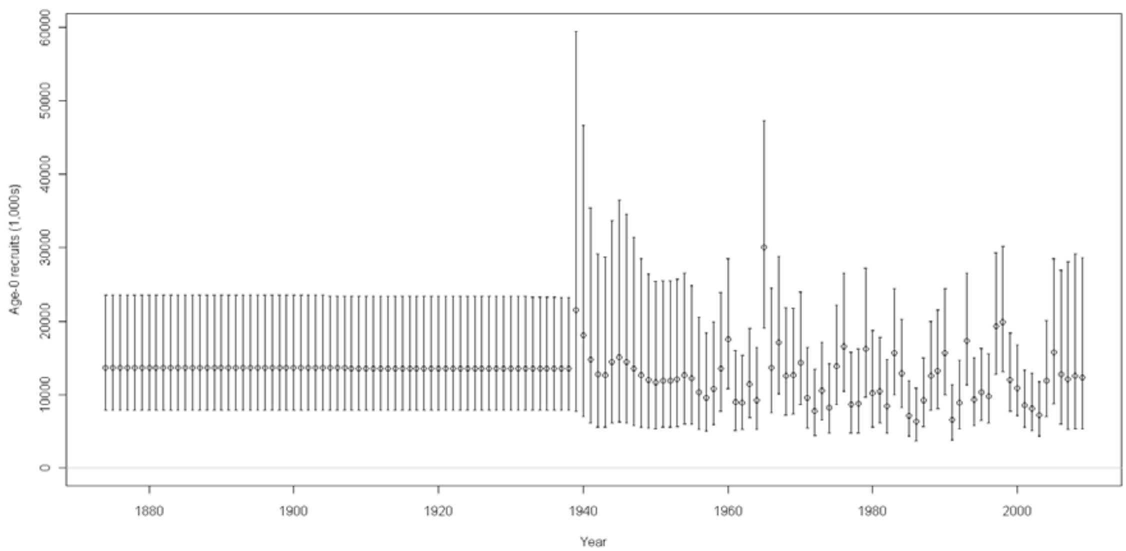

Figure c. Time series of estimated petrale sole recruitments for the base case model (round points) with approximate asymptotic 95% confidence interval (vertical bars).

Table c. Recent estimated trend in petrale sole recruitment.

Fishing year	Estimated recruitment (1000s)	~95% confidence interval	Range of states of nature
2000	10,903.2	±4,721.5	10,022.7-11,679.2
2001	8,562.7	±3,816.7	7,674-9,382.8
2002	8,161.0	±3,805.4	7,040.9-9,241.4
2003	7,164.5	±3,606.0	5,965.2-8,354.8
2004	11,897.1	±6,338.7	9,554.3-14,285.1
2005	15,770.9	±9,522.5	12,415.7-19,223.9
2006	12,740.4	±9,912.5	10,911.6-14,269.5
2007	12,048.8	±10,655.9	11,335.2-12,513
2008	12,508.7	±11,097.5	11,826.7-12,947.8
2009	10,903.2	±4,721.5	10,022.7-11,679.2

Reference Points

Unfished spawning stock biomass was estimated to be 25,334 mt in the base case model (Figure b). The target stock size ($SB_{40\%}$) is therefore 10,134 mt which gives a catch of 2060 mt (Table i, Figure b). The estimates of unfished spawning biomass, and therefore the $SB_{40\%}$ reference points were very sensitive to the assumption of stock-recruitment relationship (see section 2.9.1). Model estimates of spawning biomass at MSY and MSY yield were more robust to the assumption of stock-recruitment relationship (see section 2.9.1). Maximum sustained yield (MSY) applying recent fishery selectivity and allocations was estimated in the assessment model at 2376 mt, occuring at a spawning stock biomass of 4796 mt (SPR = 0.20) (Table i, Figures d,h,i) , which is 18.9% of the unfished level.

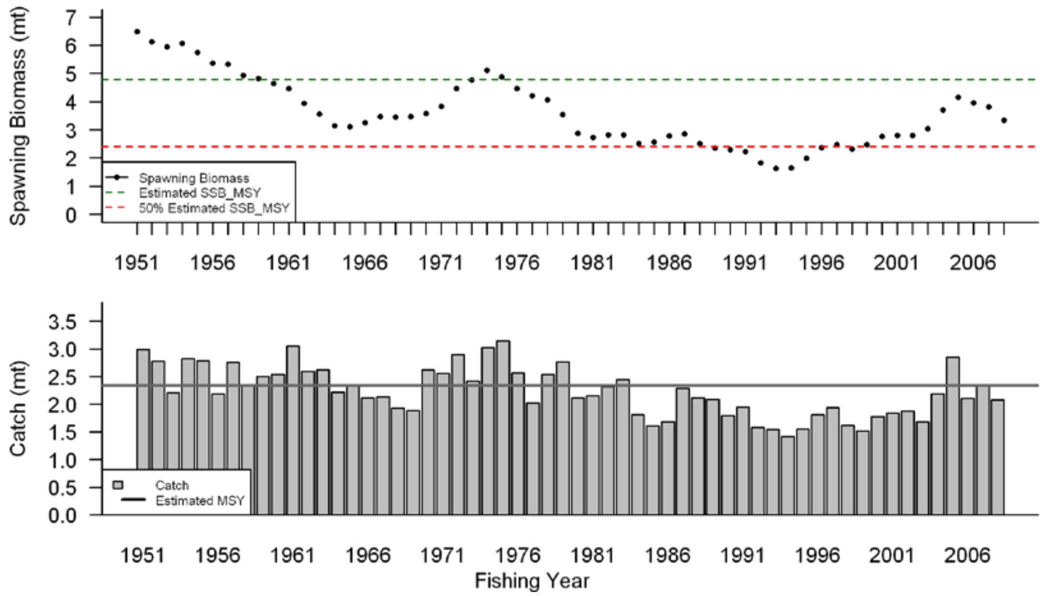

Figure d. Time series of catches startin in 1950 in comparison to the model estimated time series of spawning biomass and summary (age 3+) biomass. The solid horizontal line is the estimated MSY catch and the dashed line is the estimated spawning biomass at MSY.

Exploitation status

The abundance of petrale sole was estimated to have dropped below the $SB_{40\%}$ management target in 1949 and the overfished threshold in 1953. Beginning in 1980 the stock size was around 10–12% of unfished spawning biomass and in 1988 the stock dropped below 10% of the unfished spawning biomass (Figure e). Since 2000 the stock has increased, reaching a peak of 16.4% of unfished biomass in 2005, followed by a decreasing trend through 2009. Fishing mortality rates in excess of the current F-target for flatfish of $SPR_{40\%}$ are estimated to have begun in the late 1930s and persisted through 2008 (Table d, Figures f,g). Current F (catch/biomass of age-3 and older fish) is estimated to have been 0.29 in 2008 (Table d, Figure f).

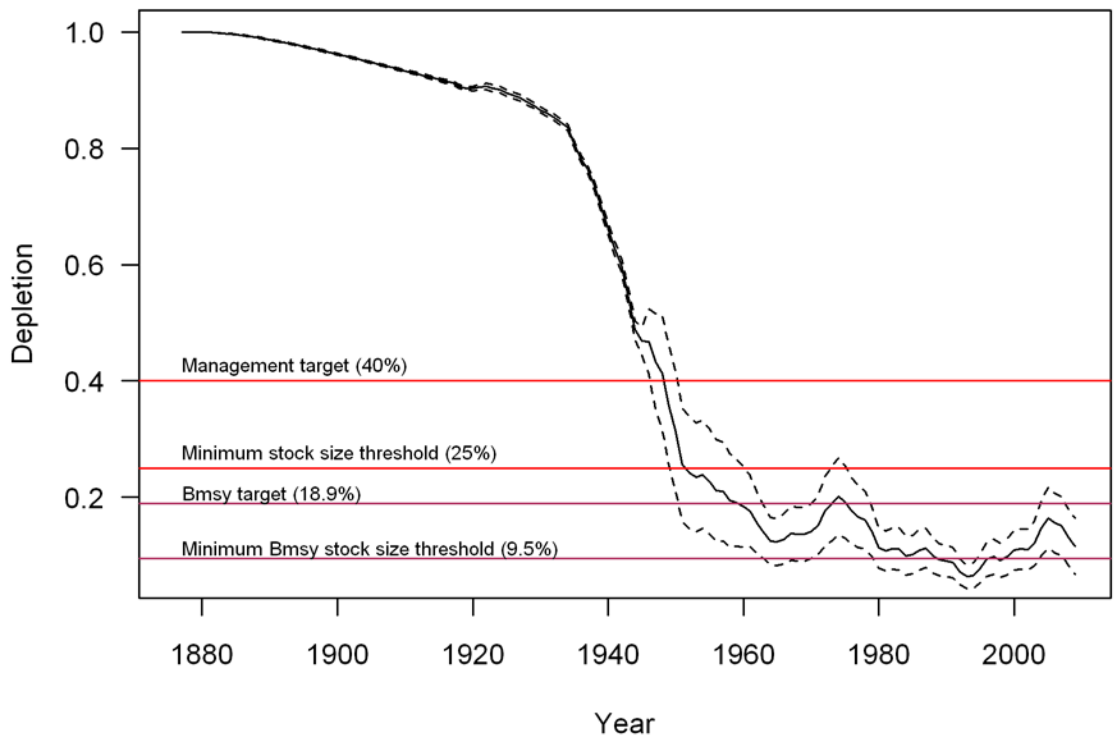

Figure e. Time series of depletion level as estimated in the base case model (round points) with approximate asymptotic 95% confidence interval (dashed lines) and alternate states of nature (light lines).

Table d. Recent trend in spawning potential ratio (1-SPR) and relative exploitation rate (catch/biomass of age-3 and older fish).

Fishing year	Estimated 1-SPR (%)	Range of states of nature	F	Range of states of nature
2000	0.86	0.86-0.86	0.28	0.28-0.27
2001	0.87	0.87-0.86	0.27	0.27-0.27
2002	0.86	0.87-0.86	0.26	0.27-0.26
2003	0.82	0.83-0.81	0.21	0.22-0.21
2004	0.83	0.84-0.83	0.25	0.26-0.24
2005	0.87	0.87-0.86	0.32	0.34-0.31
2006	0.83	0.85-0.82	0.27	0.29-0.25
2007	0.85	0.87-0.83	0.31	0.34-0.28
2008	0.85	0.87-0.83	0.29	0.34-0.26
2009	0.90	0.93-0.87	0.36	0.45-0.31

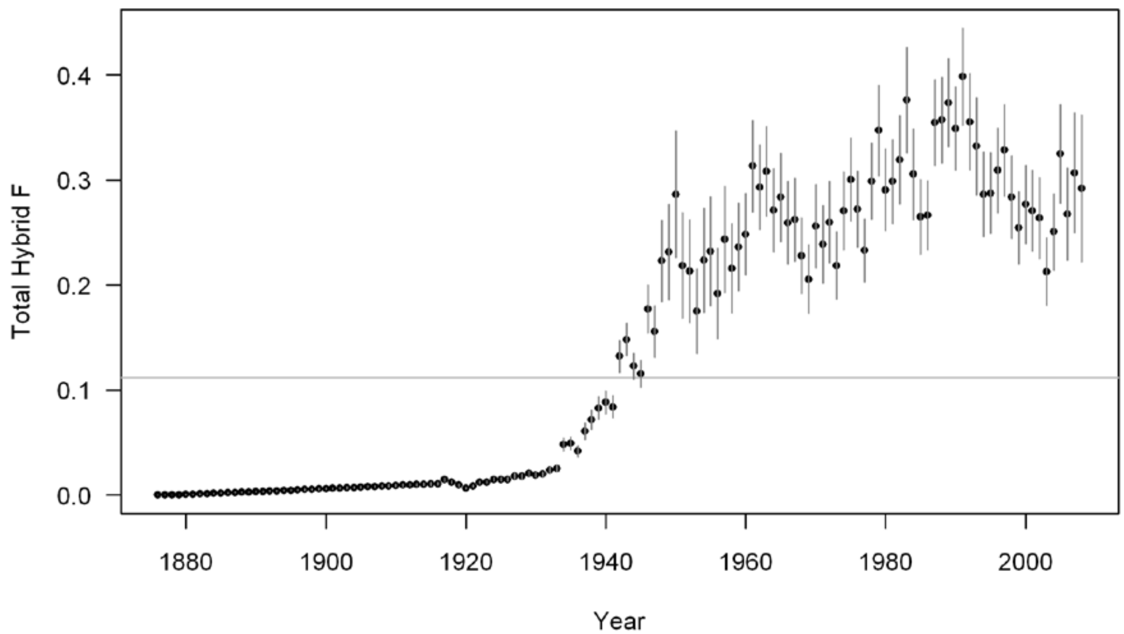

Figure f. Time series of estimated relative exploitation rate (catch/age 3 and older biomass) for the base case model (round points). Values of relative exploitation rate in excess of horizontal line are above the rate corresponding to the overfishing proxy from the base case.

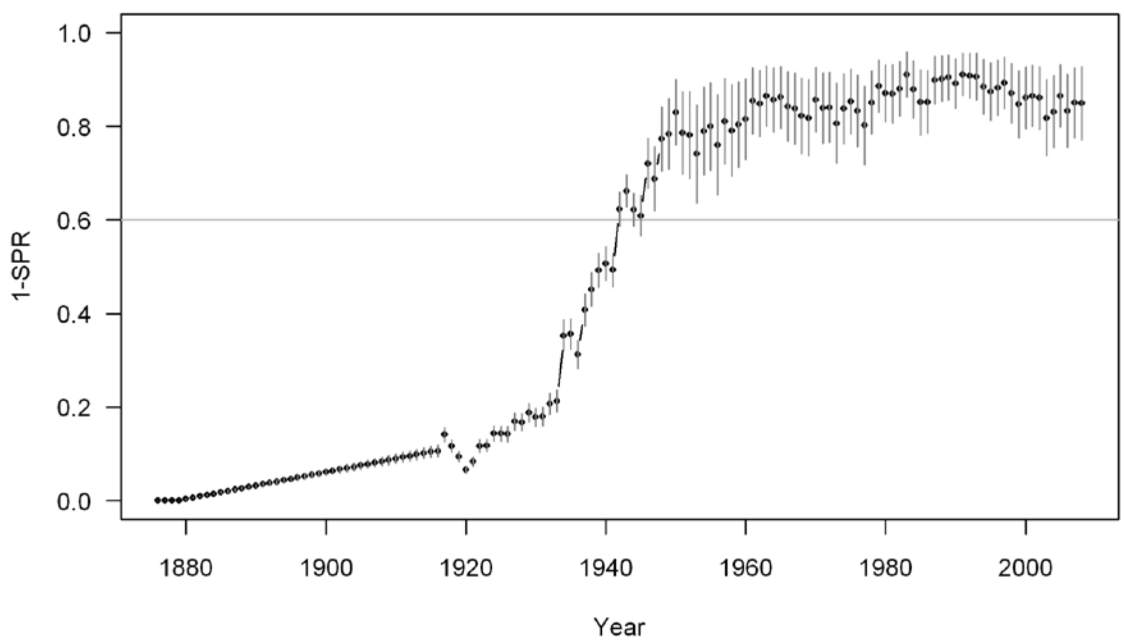

Figure g. Estimated spawning potential ratio from the base case model. One minus SPR is plotted so that higher exploitation rates occur on the upper portion of the y-axis.

Management performance

The most recent 2005 assessment of petrale sole stock assessment split the stock into two areas, the northern area that included U.S. Vancouver and Columbia INPFC areas and the southern area that included the Eureka, Monterey and Conception INPFC areas (Lai et al. 2006). In 2005 petrale sole were estimated to be at 34 and 29 percent of unfished spawning stock biomass in the northern and southern areas, respectively. Based on the 2005 stock assessment coast-wide ABCs were set at 3025 mt and 2919 mt for 2007 and 2008, respectively, with an OY of 2499 mt for both years (Table e). Recent coast-wide annual landings have not exceeded the ABC except for 2005 when the ABC was exceeded by 92 mt, 3.3%. The 2005 stock assessment estimated that petrale sole have been below the Pacific Council's minimum stock size threshold of 25 percent of unfished biomass from the mid-1970s until recently with estimated harvest rates in excess of the target fishing mortality rate of F40%. The 2005 assessment estimated the spawning stock biomass in 1998 at 12 percent of unfished stock biomass. The current assessment estimates that petrale sole have been below the $SB_{40\%}$ management target since 1949 and below the overfished threshold since 1953 (Table b, Figures e) with fishing mortality rates in excess of the current F-target for flatfish of $SPR_{40\%}$ since the late 1930s (Table d, Figure h). Using reference points based on the model estimates of Bmsy from the base case model suggests that the petrale sole fishery has been fishing at or near the management targets for a large portion of the time (Figure i). A summary of recent trends in the fishery and petrale sole population can be found in Table h.

Table e. Recent trend in estimated total petrale sole catch and commercial landings (mt) relative to management guidelines.

Fishing year	ABC (mt)	OY (mt)	Commercial Landings (mt)	Estimated[1] Total Catch (mt) for the Annual Year	Estimated Total Catch (mt) for the Fishing Year
1999	2,700	2,700	1,520	1,617	1,591
2000	2,950	2,950	1,778	1,888	1,856
2001	2,762	2,762	1,838	1,975	1,934
2002	2,762	2,762	1,877	2,066	2,024
2003	2,762	2,762	1,686	1,786	1,809
2004	2,762	2,762	2,191	2,273	2,284
2005	2,762	2,762	2,854	2,948	2,960
2006	2,762	2,762	2,102	2,173	2,183
2007	3,025	2,499	2,329	2,372	2,376
2008	2,919	2,499	2,079	2,114	2,117

[1] Total annual catches reflect the commercial landings plus the model estimated annual discard biomass (commercial landings * retained catch/total catch). The total amounts of discard may differ from those reported in the NWFSC reports on total catch for some of these years.

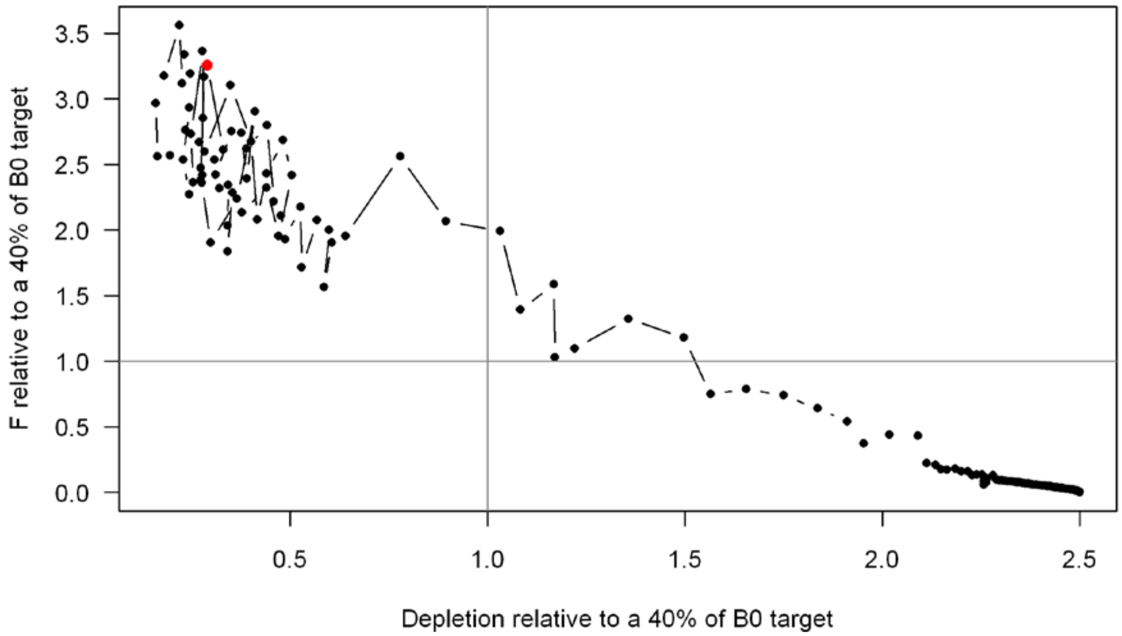

Figure h. Phase plot of estimated fishing intensity vs. relative spawning biomass for the base case model. Fishing intensity is the relative exploitation rate divided by the level corresponding to the overfishing proxy. Relative spawning biomass is annual spawning biomass relative to virgin spawning biomass divided by the 40% rebuilding target. The red point is 2009.

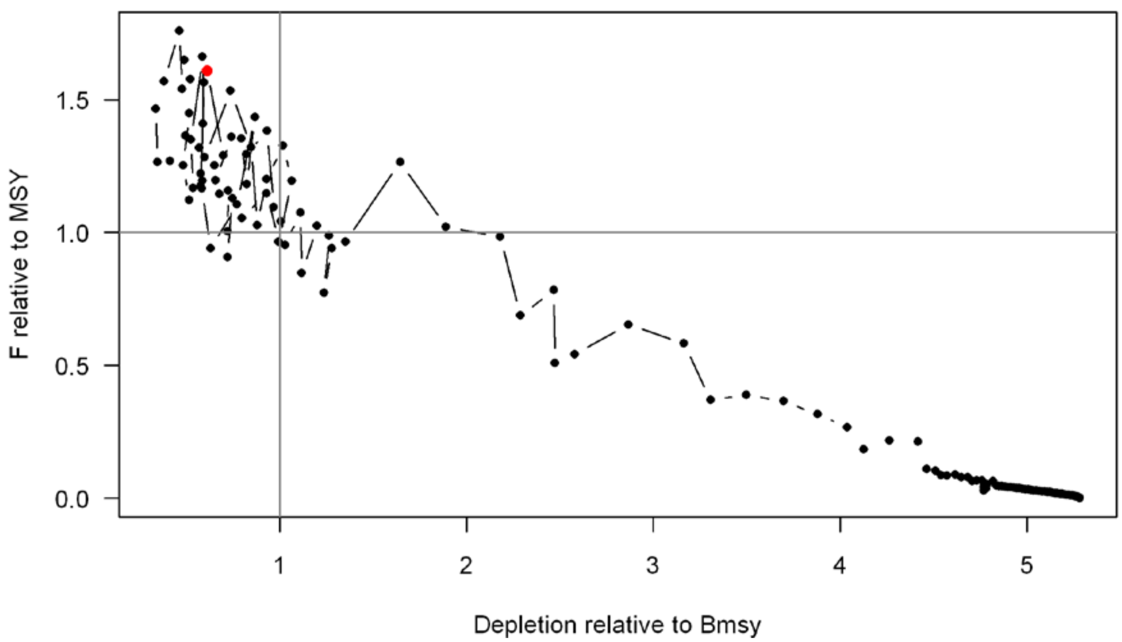

Figure i. Phase plot of estimated fishing intensity vs. relative spawning biomass for the base case model. Fishing intensity is the relative exploitation rate divided by the level corresponding to Fmsy. Relative spawning biomass is annual spawning biomass relative to the model estimate of Bmsy. The red point is 2009.

Unresolved problems and major uncertainties

Parameter uncertainty is explicitly captured in the asymptotic confidence intervals reported throughout this assessment for key parameters and management quantities. These intervals reflect the uncertainty in the model fit to the data sources included in the assessment, but do not include uncertainty associated with alternative model configurations, weighting of data sources (a combination of input sample sizes and relative weighting of likelihood components), or fixed parameters.

There are a number of major uncertainties regarding model parameters that have been explored via sensitivity analysis using both the model submitted to the STAR panel and variations which were evaluated during the STAR meeting. The most notable explorations involved the sensitivity of model estimates to the specification of the stock-recruitment relationship.

The comparability of age data within and between age-reading laboratories over time due to changes in ageing methods, a variety of ageing methods being applied to the same sample, inadequate otolith sampling, and between-laboratory variation is a major source of uncertainty. The application of the ‘combo’ age reading method for petrale, where petrale up to approximately age 10 are surface read and those otoliths thought to be greater than age 10 are broken and burned leads to a high level of variability in the age data, especially at older ages, when the ‘combo’ method is applied. Recent bomb radiocarbon analysis shows that the best ages for petrale are obtained using the break and burn method. The break and burn method should be used for ageing petrale sole.

There are problems with the Oregon commercial age data from 1981–1999. Ages from this period were aged using a combination of methods and non-randomly (i.e. one individual aged all males and another individual aged all females). While age reader information exists it is not currently in the PacFIN database, making it impossible to closely examine the impact of varying ageing methods and non-random reader design. This leads to large levels of ageing error for ages from this period of the Oregon fishery. If possible, these otoliths should be re-aged and age reader information needs to routinely be included in PacFIN.

Forecasts

The forecast of stock abundance and yield was developed using the base model. The total catch in 2009 and 2010 are set at 2433 and 2393 mt. The exploitation rate for 2011 and beyond is based upon an SPR of 40%. The 40:10 control rule reduces forecasted yields below those corresponding to $F_{40\%}$ because the stocks are estimated to be lower than the management target of $SB_{40\%}$ (Table f). The 2008 exploitation rate was used to distribute catches among the fisheries. Uncertainty in the forecasts is based upon the three states of nature agreed upon at the STAR panel. The high and low states are differentiated from the base case by the size of the 2009 spawning biomass, assuming values that were 1.25 standard deviations higher and lower, respectively, than the base case.. Manipulation of the amount of NWFSC survey biomass in 2008 was used to achieve these alternative sizes for the 2009 spawning biomass. Each forecast scenario includes random variability in future recruitment deviations (Table g). Current medium-term forecasts predict a declining trend in abundance and catch through 2011, with OY values for 2011 set at zero catch under the 40-10 harvest policy. This decline is followed by increasing abundance and catches, with the stock moving above the minimum stock size threshold of $SB_{25\%}$ in 2015. The following table shows the projection of expected petrale sole catch, spawning biomass and depletion from the base model using the 40-10 control rule (Table f).

Table f. Projection of potential petrale sole ABC, OY , spawning biomass and depletion for the base case model based on the SPR= 40% fishing mortality target used for the last plan (OY) and $F_{40\%}$ overfishing limit/target (ABC). Assuming the OYs of 2433 and 2393 mt are attained in 2009 and 2010.

Year	ABC (mt)	OY (mt)	Age 3+ biomass (mt)	Spawning biomass (mt)	Depletion
2009	2,499	2,433	7,151	2,938	11.6%
2010	2,499	2,393	6,776	2,400	9.5%
2011	535	0	6,468	2,171	8.6%
2012	802	311	8,646	3,427	13.5%
2013	1,068	680	10,680	4,712	18.6%
2014	1,301	997	12,358	5,843	23.1%
2015	1,489	1,311	13,675	6,778	26.8%
2016	1,631	1,489	14,678	7,503	29.6%
2017	1,735	1,621	15,437	8,037	31.7%
2018	1,812	1,718	16,022	8,431	33.3%
2019	1,870	1,794	16,482	8,740	34.5%
2020	1,917	1,838	16,850	8,991	35.5%

Decision table

Relative probabilities of each state of nature are based on the 2009 estimate of spawning biomass. Landings in 2009–2010 are 2,433 and 2,393 mt for all cases. Selectivity and fleet allocations are projected based on 2008 values.

Table g. Decision table of 12-year projections for alternate states of nature (columns) and management options (rows) beginning in 2011. There are two values for depletion, the first calculates depetion using the SB40% Bmsy proxy and the second calculates depletion relative to the model estimate of Bmsy. Relative probabilities of each state of nature are based on identifying low and high values from the model-estimated distribution of 2009 spawning biomass, those high and low values for 2009 were achieved through changing the size of the 2008 NWFSC survey biomass. Landings in 2009–2010 are 2433 mt

			State of nature								
			Low 2009 Spawning Biomass (-1.25 SD)			Base case			High 2009 Spawning Biomass (+1.25 SD)		
Relative probability			0.25			0.5			0.25		
			Depletion		Spawning biomass	Depletion		Spawning biomass	Depletion		Spawning biomass
Management decision	Year	Catch (mt)	SB0	Bmsy	(mt)	SB0	Bmsy	(mt)	SB0	Bmsy	(mt)
Catches Near Zero (3 mt)	2011	3	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	3	9%	50%	2,380	14%	74%	3,572	19%	100%	4,786
	2013	3	14%	75%	3,600	20%	105%	5,012	26%	134%	6,426
	2014	3	19%	104%	4,976	26%	136%	6,514	32%	168%	8,033
	2015	3	25%	134%	6,423	32%	167%	8,025	38%	200%	9,589
	2016	3	31%	164%	7,856	37%	198%	9,493	44%	231%	11,068
	2017	3	36%	192%	9,217	43%	227%	10,884	50%	260%	12,452
	2018	3	41%	219%	10,511	48%	254%	12,197	55%	286%	13,739
	2019	3	46%	245%	11,766	53%	280%	13,440	59%	311%	14,933
	2020	3	50%	271%	12,984	58%	305%	14,613	64%	334%	16,034
Half 40-10 catches from base case	2011	0	5%	50%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	156	9%	37%	2,382	14%	75%	3,574	18%	95%	4,554
	2013	340	14%	29%	3,524	19%	103%	4,932	24%	127%	6,090
	2014	499	18%	50%	4,710	25%	130%	6,239	30%	156%	7,493
	2015	656	23%	73%	5,861	29%	155%	7,451	35%	182%	8,750
	2016	745	27%	98%	6,893	34%	178%	8,520	39%	205%	9,837
	2017	810	30%	122%	7,796	37%	197%	9,460	43%	225%	10,785
	2018	859	33%	144%	8,604	41%	215%	10,297	46%	242%	11,615
	2019	897	36%	163%	9,365	44%	231%	11,060	49%	257%	12,349
	2020	919	39%	179%	10,097	46%	245%	11,763	52%	271%	13,004
40-10 catches from base case	2011	0	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	311	9%	50%	2,382	14%	75%	3,574	19%	100%	4,788
	2013	680	13%	72%	3,444	19%	101%	4,849	25%	130%	6,258
	2014	997	17%	93%	4,439	24%	124%	5,959	30%	156%	7,469
	2015	1,311	21%	110%	5,291	27%	143%	6,871	34%	176%	8,418
	2016	1,489	23%	123%	5,918	30%	158%	7,576	36%	190%	9,095
	2017	1,621	25%	133%	6,358	32%	169%	8,096	38%	200%	9,579
	2018	1,718	26%	139%	6,669	33%	177%	8,480	39%	207%	9,920
	2019	1,794	27%	144%	6,923	35%	183%	8,782	40%	212%	10,161
	2020	1,838	28%	149%	7,152	36%	188%	9,026	41%	215%	10,331

Table g continued.

			State of nature								
			Low 2009 Spawning Biomass (-1.25 SD)			Base case			High 2009 Spawning Biomass (+1.25 SD)		
Relative probability			0.25			0.5			0.25		
			Depletion		Spawning biomass	Depletion		Spawning biomass	Depletion		Spawning biomass
Management decision	Year	Catch (mt)	SB0	Bmsy	(mt)	SB0	Bmsy	(mt)	SB0	Bmsy	(mt)
Constant 500 mt	2011	500	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	500	8%	44%	2,134	13%	69%	3,314	18%	94%	4,522
	2013	500	12%	64%	3,056	18%	93%	4,455	23%	122%	5,861
	2014	500	16%	86%	4,109	22%	118%	5,639	28%	149%	7,153
	2015	500	20%	109%	5,228	27%	142%	6,833	33%	175%	8,397
	2016	500	25%	132%	6,342	32%	167%	7,997	38%	200%	9,578
	2017	500	29%	154%	7,403	36%	190%	9,104	43%	223%	10,687
	2018	500	33%	176%	8,418	40%	212%	10,157	47%	244%	11,723
	2019	500	37%	196%	9,415	44%	233%	11,165	51%	265%	12,694
	2020	500	40%	217%	10,401	48%	253%	12,129	54%	284%	13,599
Constant 1500 mt	2011	1,500	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	1,500	6%	34%	1,649	11%	58%	2,802	16%	83%	3,995
	2013	1,500	8%	41%	1,979	13%	70%	3,341	19%	99%	4,728
	2014	1,500	9%	49%	2,367	15%	81%	3,874	21%	112%	5,375
	2015	1,500	11%	58%	2,791	17%	92%	4,407	24%	125%	5,973
	2016	1,500	12%	67%	3,210	19%	103%	4,926	26%	136%	6,534
	2017	1,500	14%	75%	3,599	21%	113%	5,424	28%	147%	7,062
	2018	1,500	15%	83%	3,968	23%	123%	5,907	30%	158%	7,564
	2019	1,500	17%	91%	4,348	25%	133%	6,388	32%	168%	8,050
	2020	1,500	18%	99%	4,752	27%	143%	6,869	34%	178%	8,519
Constant 2/3 Fmsy	2011	36	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	86	9%	50%	2,375	14%	74%	3,555	19%	100%	4,781
	2013	166	14%	75%	3,576	20%	103%	4,948	25%	133%	6,400
	2014	274	19%	102%	4,905	25%	132%	6,354	32%	166%	7,960
	2015	447	24%	131%	6,261	30%	161%	7,703	38%	196%	9,421
	2016	582	29%	157%	7,517	35%	186%	8,930	43%	224%	10,721
	2017	714	34%	180%	8,629	39%	209%	10,000	47%	247%	11,856
	2018	837	37%	200%	9,602	43%	228%	10,918	51%	267%	12,825
	2019	949	41%	218%	10,473	46%	244%	11,706	54%	284%	13,641
	2020	1,020	44%	235%	11,252	49%	258%	12,376	57%	298%	14,314
Ramp down catches between 2/3 Fmsy at Bmsy and 0 catch at 50%Bmsy	2011	0	5%	29%	1,397	9%	48%	2,295	13%	67%	3,229
	2012	354	9%	50%	2,382	14%	75%	3,574	18%	93%	4,478
	2013	764	14%	75%	3,603	19%	101%	4,826	24%	123%	5,921
	2014	977	19%	100%	4,795	23%	123%	5,888	29%	152%	7,307
	2015	1,161	23%	121%	5,819	27%	142%	6,807	34%	176%	8,421
	2016	1,280	26%	139%	6,650	30%	158%	7,585	37%	194%	9,306
	2017	1,379	28%	153%	7,320	32%	171%	8,224	40%	209%	10,030
	2018	1,461	31%	164%	7,868	35%	183%	8,754	42%	221%	10,618
	2019	1,530	32%	174%	8,354	36%	192%	9,211	44%	231%	11,100
	2020	1,574	34%	184%	8,801	38%	200%	9,610	46%	240%	11,494

Research and data needs

Progress on a number of research topics and data issues would substantially improve the ability of this assessment to reliably and precisely model petrale sole population dynamics in the future:

1. The estimate of the NWFSC survey catchability in the base case model is higher than expected. This may be due to the use of the total area within each strata during the expansion of the survey data rather than the trawlable areas only. At this time there are no area estimates for trawlable and untrawlable areas. However the petrale sole population is most likely well surveyed by the trawl survey and expanding using areas that include untrawlable areas may not be appropriate.
2. In the past many assessments have derived historical catches independently. Since 2005 each of the states has undertaken comprehensive historical catch reconstructions. At the time of this assessment only a partial reconstruction was available for Washington, and no catch reconstruction was available from Oregon Department of Fish and Wildlife. Completion of the Washington and Oregon catch reconstructions would provide the best possible estimated catch series that accounts for all the catch and makes sense for flatfish as a group.
3. Due to limited data, new studies on both the maturity and fecundity relationships for petrale sole would be beneficial.
4. Increased collection of commercial fishery age data from California would help reduce uncertainty. No recent age data are available from the California fleet. However, the greatest landings by state have come from California in the most recent two years. Without age data, the ability to estimate year-class strength and the extent of variation in recruitment is compromised.
5. The comparability of ages between agencies is unknown. A common set of otoliths should be aged by each agency to be able to compile between agency age error information.
6. Where possible historicalotoliths should be re-aged using the break-and-burn method.
7. Effect of fishery regulations. The impacts of trip-limits and other management approaches, such as closed areas, on discards and fishery selectivity requires further study.
8. Studies on stock structure and movement of petrale sole, particularly with regard to the winter-summer spawning migration of petrale sole.
9. Continue and if possible increase the recent collection of length compositions for discarded petrale sole for both the winter (Nov–Feb) and summer (Mar–Oct) fisheries.

Table h. Summary of recent trends in estimated petrale sole exploitation and stock levels from the base case model; all values reported at the beginning of the fishing year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Commercial landings (mt)	1778	1838	1877	1686	2191	2854	2102	2329	2079	
Total catch (mt)	1895	1987	2088	1793	2276	2951	2176	2373	2115	
ABC (mt)	2950	2762	2762	2762	2762	2762	2762	3025	2919	2433
OY	2950	2762	2762	2762	2762	2762	2762	2499	2499	2499
1-SPR	0.86	0.87	0.86	0.82	0.83	0.87	0.83	0.85	0.85	0.9
Exploitation rate (catch/age 3+ biomass)	0.28	0.27	0.26	0.21	0.25	0.32	0.27	0.31	0.29	0.36
Age 3+ biomass (mt)	6846.92	7337.86	7912.96	8422.52	9079.6	9082.01	8132.41	7735.76	7240.22	7150.57
Spawning biomass (mt)	2,765.20	2,810.30	2,798.40	3,030.00	3,706.40	4,160.70	3,949.80	3,818.00	3,349.60	2,937.60
~95% Confidence interval	±329.7	±328.3	±333.6	±381.0	±463.0	±529.5	±576.0	±624.1	±704.6	±832.7
Range of states of nature	2743.9-2776.9	2781.5-2829.5	2759.3-2827.8	2969.1-3080.3	3605.0-3796.5	4002.0-4308.6	3720.7-4169.9	3507.4-4122.5	2940.8-3755.2	2407.8-3468.1
Recruitment	10,903.20	8,562.70	8,161.00	7,164.50	11,897.10	15,770.90	12,740.40	12,048.80	12,508.70	10,903.20
~95% Confidence interval	±4,721.5	±3,816.7	±3,805.4	±3,606.0	±6,338.7	±9,522.5	±9,912.5	±10,655.9	±11,097.5	±4,721.5
Range of states of nature	10,022.7-11,679.2	7,674-9,382.8	7,040.9-9,241.4	5,965.2-8,354.8	9,554.3-14,285.1	12,415.7-19,223.9	10,911.6-14,269.5	11,335.2-12,513	11,826.7-12,947.8	10,022.7-11,679.2
Depletion (%)	10.9	11.1	11	12	14.6	16.4	15.6	15.1	13.2	11.6
~95% Confidence interval	±3.4	±3.4	±3.4	±3.8	±4.7	±5.2	±5.1	±5.1	±4.8	±4.8
Range of states of nature	10.7-11.1	10.8-11.3	10.7-11.3	11.5-12.3	14.0-15.1	15.5-17.2	14.5-16.6	13.6-16.4	11.4-14.9	9.4-13.8

Table i. Summary of petrale sole reference points from the base case model. Values are based on 2008 fishery selectivity and allocation.

Quantity	Estimate	~95% Confidence interval
Unfished spawning stock biomass (SB_0, mt)	25,334	±5,209
Unfished 3+ biomass (mt)	39,211	±5296
Unfished recruitment (R_0, thousands)	13,604	±7,590
Reference points based on $SB_{40\%}$		
MSY Proxy Spawning Stock Biomass ($SB_{40\%}$)	10,134	±2084
SPR resulting in $SB_{40\%}$ ($SPR_{SB40\%}$)	0.408	±0.0178
Exploitation rate resulting in $SB_{40\%}$	0.112	±0.0197
Yield with $SPR_{SB40\%}$ at $SB_{40\%}$ (mt)	2,060	±162
Reference points based on SPR proxy for MSY		
Spawning Stock Biomass at SPR (SB_{SPR})(mt)	9,928	±2,476
$SPR_{MSY\text{-}proxy}$	0.4	NA
Exploitation rate corresponding to SPR	0.115	±0.0263
Yield with $SPR_{MSY\text{-}proxy}$ at SB_{SPR} (mt)	2,080	±203
Reference points based on estimated MSY values		
Spawning Stock Biomass at MSY (SB_{MSY}) (mt)	4,796	±582
SPR_{MSY}	0.200	±0.07
Exploitation Rate corresponding to SPR_{MSY}	0.23	±0.03
MSY (mt)	2,376	±86

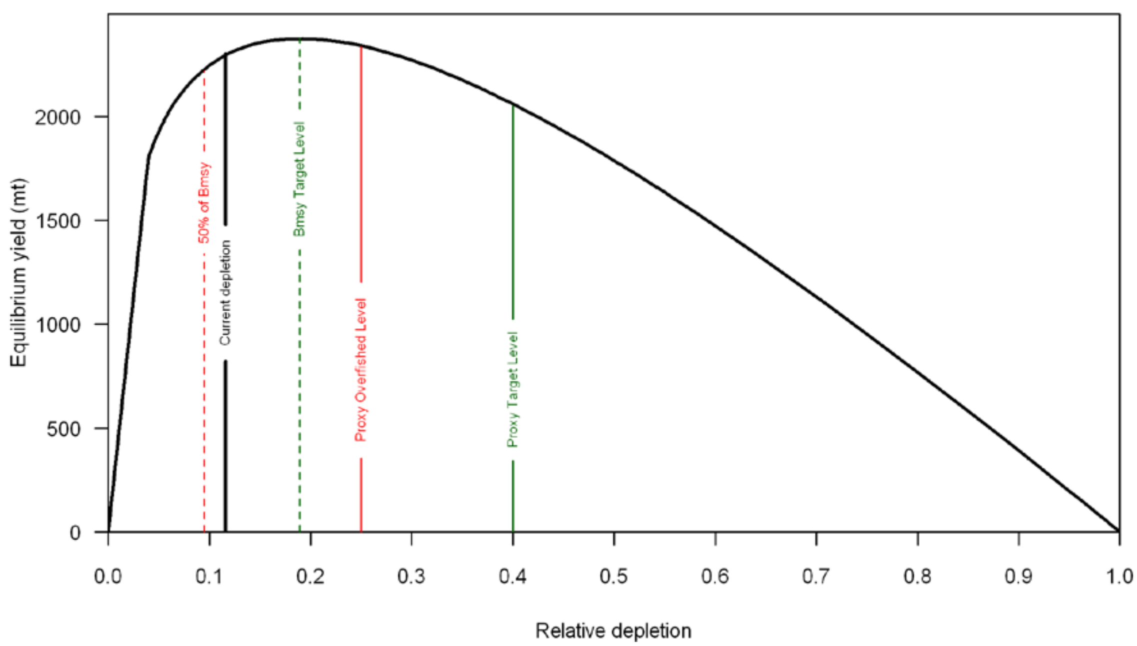

Figure j. Equilibrium yield curve (derived from reference point values reported in table i) for the base case model. Values are based on 2008 fishery selectivity and allocation. The depletion is relative to unfished spawning biomass

PETRALE SOLE

STAR Panel Report

May 4-8, 2009
Northwest Fisheries Science Center
Hatfield Marine Science Center
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Overview

A draft assessment of the coastwide petrale sole (*Eopsetta jordani*) off the U.S. west coast was reviewed by the STAR panel during May 4-8, 2009. This assessment used the Stock Synthesis platform version 3.03a and incorporated a variety of data sources into the candidate base model. Data from commercial trawl fisheries included landings, discards, and age and length composition data. Abundance indices used in the model were a standardized CPUE index of the Oregon trawl fleets from 1987-1997 from Sampson and Lee (1999), the triennial shelf trawl survey (1980-2004), and the NWFSC shelf/slope trawl survey (2003-08). Biological information collected from both trawl surveys was also included.

Petrale sole was last assessed in 2005. Significant differences in data sources and model configuration between the 2005 and current assessment include:

- A coastwide model instead of separate north and south assessments in 2005;
- Reconstructed historical catches from California and Washington;
- An updated ageing error matrix;
- Incorporation of the NWFSC shelf/slope survey;
- Direct inclusion of discard information from Pikitch et al. (1988) and from the West Coast Groundfish Observer Program.

Multiple model runs were conducted and reviewed to examine model assumptions and structure, and to identify uncertainties in the assessment. The panel noticed that the estimates of B_0 and 2009 biomass are very sensitive to the assumption of the stock recruitment relationship and the 2008 NWFSC survey data. While the current stock status with reference to B_0 is notably different among model runs, the B_{MSY} estimate remains consistent. The panel is concerned that the 25% B_0 minimum stock size threshold (MSST or overfished threshold) proxy is highly uncertain because both B_0 and $B_{CURRENT}$ are highly uncertain in this assessment. Therefore, the panel recommends that reference points based on MSY are investigated as an alternative MSST. . The Panel notes that catches since 1951 have been fluctuating around MSY. The spawning biomass has largely been in the precautionary zone since about 1958 with the exception of a few years above B_{MSY} in the mid-1970s, and a series of years below B_{MSY} between the late 1980s to mid-late 1990s.

The STAR panel concluded that the petrale sole assessment was based on the best available data, and that this new assessment constitutes the best available information on petrale sole off the U.S. west coast. The STAR panel thanks the STAT team for their willingness to respond to panel requests and their dedication in finding possible solutions to difficult assessment problems.

Analyses requested by the STAR panel

1. **Split the triennial survey due to changes in starting date.**
   Rationale: The difference in the timing of the surveys, approximately one month later since 1995, is expected to result in a change in catchability of petrale sole because of its seasonal onshore-offshore migrations.

Response: Splitting the survey improved the fit marginally and the resulting catchability coefficients (q) were 0.51 for the early time series of the survey and 0.71 for the later time series of the survey. The selectivity curves for the NWFSC shelf/slope survey also changed marginally.

2. **Plot the biomass trends from the 1999, 2005 and current assessments to compare the differences.**
Rationale: This is a standard request to put the results of the current assessment in the context of previous ones. This was seen as particularly important for petrale sole given the changed perception in stock status.
Response: The biomass trajectories in the 1999, 2005 and the current assessments for 1980 to 2000 period are very similar and the confidence intervals for B_0 estimates in the 2005 and current assessments overlap. The 1999 and 2005 assessments suggested that biomass was increasing at the time of each assessment; while the current assessment indicates that biomass peaked in 2005 and has been decreasing since. The ratio of $B_{current}$ to B_0 (depletion) was higher in the 1999 assessment because the estimate of B_0 was smaller, largely due to the fact that historical catches back to 1976 were incorporated in the 1999 assessment and historical catches back to 1876 were incorporated in the 2005 and current assessments. The estimated 2005 depletion from the 2005 assessment is within the confidence interval of the estimated 2005 depletion from the current assessment.

3. **Remove all data related to 2008 NWFSC shelf/slope survey.**
Rationale: The objective of this request was to evaluate the influence of the 2008 NWFSC survey data.
Response: Removing the 2008 NWFSC survey data significantly increased the estimate of current biomass, decreased the estimated recruitment strength of the 2005 year class, and increased the recruitment strength of the three previous year classes from lower than average to average recruitment by losing the signal for the 2005 year class. The estimated current depletion changed from 0.14 to 0.24 due to a higher estimated 2008 biomass.

4. **Use a Ricker stock and recruitment relationship.**
Rationale: The Beverton-Holt stock recruitment curve is the standard choice for most assessments but there is no specific evidence to support this model over others for petrale sole. This species is an ambush predator and it could be hypothesised that the habitat available for young petrale sole to settle could become limited at high adult stock size. There is a high potential for density dependence, though no direct evidence for it. This request is to test and evaluate the influence of the assumed stock-recruitment relationship.
Response: Assuming a Ricker relationship provides a very similar fit to the Beverton-Holt assumption for the 1954 to 2008 time period, but the B_0 estimate is substantially lower. Because of the lower B_0, the ratio of $B_{current}$ to B_0 was higher. MSY estimates were very consistent under both stock-recruitment assumptions.

5. **Start assessment in 1939 and estimate initial F/depletion.**
   Rationale: Catch estimates prior to 1939 are more uncertain than those since. Size information is scarce before the 1960s and reliable fishery-independent abundance estimates start in 1980. Also, 1939 was the earliest reliable estimate for catches in Washington.
   Response: Three ways of doing this were explored: 1) start with an equilibrium catch and estimate initial equilibrium Fs; 2) start with an equilibrium age structure and estimate a multiplier on initial recruitment; and 3) start at a virgin, equilibrium state. All 3 options showed similar trends. The panel concluded that the current biomass trends were similar and MSY estimates were robust across these assumptions. Because the starting year did not make a difference in the results, the panel decided to initiate the assessment in 1876 when the first historical catches of petrale sole were documented.

6. **Allow selectivity functions to deviate without assuming blocks.**
   Rationale: The panel wanted to evaluate patterns and / or trends in fishery selectivity over time rather than using blocks.
   Response: Allowing smooth changes in fishery selectivities using annual blocks seemed to chase recruitments. The panel initially thought that time blocks on fishery selectivities were not necessary, but, under a no-time block structure, patterns in residuals appeared worse and the Hessian matrix did not invert. The panel finally decided on ten-year blocks starting in 1973. Results from a five-year blocking structure starting in 1973 were more variable and less parsimonious.

7. **Profiling on the length at minimum age.**
   Rationale: The panel wanted to test the influence of size at minimum age and investigate the effects of external estimates of growth.
   Response: The model-estimated length at minimum age seemed to explain the data better. Externally-estimated L_{MIN} resulted in a larger B_0 estimate and a lower current depletion of 4%. The model fit was degraded and the data did not support externally estimated parameters.

8. **Plot summer fishery CPUE and NWFSC survey biomass on same graph.**
   Rationale: The panel requested this plot to make it easier to directly compare these indices.
   Response: When plotted on the same graph and scales, the correspondence was seen to be very similar in recent years, especially for the Washington portion of the catch. There was a slight time shift in the peak values for Oregon and California fisheries CPUE compared with the survey. The panel concluded that future exploration of the Summer CPUE series as an index of abundance may be warranted.

9. **Provide the actual catch values for the big tows in NWFSC survey.**
   Rationale: The panel wanted to get an appreciation for the magnitude of petrale sole tows during the survey.
   Response: The STAT presented the top ten tows in the surveys, which ranged from 76 to 747 kg resulting in density estimates of 4 357 to 53 085 kg/km^2.

10. **Provide the data informing the length at maturity relationship.**
Rationale: The panel wanted to get an appreciation for how well the maturity model from Hannah et. al (2002)[1] fitted the macroscopic and microscopic observations of maturity.
Response: The panel was satisfied that the data supported the length at maturity relationship used in the model.

11. **Provide the historical Washington catch data used to interpolate historical catches during the 1930-1950 period.**
Rationale: The reconstruction of historical Washington catch estimates is one of the reasons for the difference between the 2009 and the 2005 assessments. The panel wanted to see if different interpolations could have been possible.
Response: The data were presented and the panel concluded that sensible catch interpolations had been done.

12. **Plot the catch series used in the 2005 and current assessments.**
Rationale: The panel requested these plots for direct comparison of catch histories used in these assessments.
Response: The panel could not evaluate the catch data directly; however, it was concluded that the new catch series should be used.

13. **Check the maximum length in surveys and compare with the maximum length in the winter fishery.**
Rationale: The commercial length frequencies seemed to show more larger fish than captured in trawl surveys and this could have implications for estimated fishery selectivities.
Response: A plot of the proportions at lengths greater than 50 cm showed that the maximum lengths in the surveys and winter fisheries were similar.

14. **Reduce effective sample sizes for survey data.**
Rationale: The panel wanted to see the effect of giving less weight to survey data.
Response: Reducing the effective sample sizes of survey data by half did not significantly affect selectivities nor other results.

15. **Provide the estimated growth parameters from other studies or assessments.**
Rationale: The panel was concerned that estimated growth parameters in the model and fishery selectivities could potentially be confounded, i.e. it could be growth rather than selectivity that varied over time..
Response: Estimated growth parameters from other studies were provided and were similar to those estimated in the model. The panel therefore concluded that there was no reason to assume alternative growth functions from other studies.

[1] Hannah, R.W., S.J. Parker and E.L. Fruth. 2002, Length and age at maturity of female petrale sole (Eopsetta jordani) determined from samples collected prior to spawning aggregation. U.S. Fish. Bull. 100:711-719.

16. **Explore the areal expansion used to expand survey results to estimate biomass.**
    Rationale: The panel was concerned that the areal expansion may have included areas where petrale sole are not found.
    Response: The habitat areas used by petrale were not available. The petrale sole densities are therefore expanded to the entire area surveyed which may contain habitats that are not suitable for petrale sole.

17. **Plot recruitment deviations in log space without error bars since 1939 for the base model and under requested sensitivity runs (i.e., no time blocking of fishery selectivities and start the fishery in 1939).**
    Rationale: The panel wanted to see how the various runs compared to understand the sensitivity of recruitment estimates to assumptions regarding time-varying fishery selectivity and the historical catch prior to 1939.
    Response: This graph was provided for all requested runs and showed a similar pattern of recruitment deviations, especially from 1970 to present.

Description of base model and alternative models used to bracket uncertainty.

The final base model uses data from the beginning of the fishery in 1876. The model estimates separate selectivity curves for 1876 to 1972, 1973-1982, 1983-1992 and 2003-2008, splits the triennial survey in 1995 into two series and assumes a Beverton-Holt stock recruitment relationship. A sensitivity run assuming a Ricker stock-recruitment relationship showed very similar trends in biomass estimates from the early 1950s to 2008, but a substantially smaller B_0. This resulted in a higher ratio of $B_{current}$ to B_0. A second sensitivity run excluded the 2008 NWFSC survey data, which resulted in a markedly higher biomass estimate for 2008 and, consequently, a higher $B_{current}$ to B_0 ratio. A final sensitivity run assigned half the effective sample size to the survey length composition data, which resulted in no significant change to the base model results.

Comments on the technical merits

The current assessment and the 2005 assessment provide similar biomass and depletion trajectories, with overlapping confidence intervals and similar estimates during the 1980-2000 periods. The 2005 assessment suggested that biomass was generally increasing through 2005 while the current assessment indicates that the stock has been declining since the peak biomass in 2005. While the 2005 assessment indicated that the stock was not overfished in 2005 and that overfishing was not occurring it did show that the stock had been below the minimum stock size threshold (MSST) for much of the previous three decades and had only increased above the MSST during the previous 1-3 years. Both the current and 2005 assessments agree that that stock declined below the B40% reference point during the 1950s to an all time minimum stock size during the early 1990s, followed by increases in the stock up to 2005.

The petrale assessment was thorough, with no major flaws, and well investigated with all requested sensitivity runs provided. The document was clear and well written.

Explanation of areas of disagreement regarding STAR panel recommendations:

A. Among STAR panel members (including concerns raised by GAP and GMT representatives); and

There were no areas of disagreement among STAR panel members, though concerns were raised regarding the estimated *q* value for the NWFSC shelf/slope survey. The panel regards the *q* value as a scaling factor and noted that biomass was expanded to the whole survey area in the depths petrale occur while it is unlikely the whole area represents petrale habitat. Potential differences in growth between the northern and southern substocks may need further exploration given that the 2005 assessment estimated higher growth rates for the southern substock than for the northern substock. However, there are no recent age data available from California fisheries to better explore these potential differences.

B. Between the STAR panel and STAT team:

There were no areas of disagreement between the STAR panel and the STAT

Unresolved problems and major uncertainties

The choice of an assumed stock-recruitment relationship is uncertain in the petrale sole assessment. While there are theoretical reasons to expect a Ricker stock-recruitment relationship, there is insufficient evidence to choose between Ricker and Beverton-and-Holt, and the panel defaulted to the more commonly used B&H relationship. Choosing a Ricker relationship, however, would result in a lower B_0 estimate and thus higher $B_{CURRENT}$ to B_0. The difference in perception is smaller if MSY – based reference points are used.

The q estimated for the NWFSC shelf/slope is approximately 6 times higher than that for the AFSC triennial surveys. Higher catch rates were observed in the NWFSC survey when compared to the Triennial survey, and even though some of the difference can be explained by gear design and the NWFSC survey ability to move around rocks, further investigation is needed

The model is sensitive to the 2008 survey data and removing the 2008 survey data results in a markedly higher 2009 biomass estimate.

While the STAT addressed aging errors, uncertainties in age-composition remain important.

Management, data, or fishery issues raised by the GMT or GAP representatives

The history of key management changes was provided and was useful in ground-truthing historical catch reconstructions and time-blocking fishery selectivities. The details regarding development of the fishery were provided and important events were identified.

Prioritized recommendations for future research and data collection.

- The comprehensive catch reconstructions currently underway in Washington and Oregon need to be completed. The mixing of U.S. and Canadian catches is of particular concern for the Washington fleet. The break-and-burn aging technique is recommended for determining petrale ages because it was estimated to be less biased than surface-read ages through a bomb radiocarbon age validation study.

- The current assessment platform (SS3) is structurally complex, making it difficult to understand how individual data elements are affecting outcomes. The panel recommends investigating simpler, less structured models, including statistical catch/length models, to compare and contrast results as data and assumptions are changed.
- Expand the stock assessment area to include Canadian waters to cover the entire biological range of petrale sole.
- The abundance vs. survey depth plot suggests that the highest summer densities of petrale sole are inshore of the survey area. Expanding the survey area inshore or implementing a new nearshore survey is recommended.
- A winter shelf/slope survey would be particularly valuable for a stock like petrale with seasonal onshore-offshore migrations.
- A management strategy evaluation is recommended for petrale sole because the estimates of B_0 and $B_{current}$ are sensitive to the assumed stock-recruitment relationship, making these reference points more uncertain, while B_{MSY} estimates are consistent among all the model run results. The usefulness of the Summer CPUE series as an index of abundance should be evaluated.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sustainable Fisheries Division F/NWR2
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115-0070

Agenda Item E.6.a
Attachment 3
June 2009

MAY 27 2009

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Dr. McIsaac:

Following a National Marine Fisheries Service (NMFS) review of the current petrale stock assessment where we discussed it with the Northwest Fisheries Science Center, NMFS believes a review and follow up report related to this stock assessment would aid the Council in its final adoption of this assessment and the petrale specifications. Specifically, NMFS believes a review by the SSC of the following issues is warranted:

- The new assessment shows that the estimated B_{MSY} is a better fit than the proxy that was previously used.
    - NMFS would like the SSC to discuss the difference between these estimations and any issues with moving forward using the estimated B_{MSY} rather than the B_{MSY} proxy as used in the past assessments.
- NMFS would like to know what the SSC's general policy is regarding use of an estimated B_{MSY} versus the use of proxies for rockfish. What are the reasons for using the estimated B_{MSY} in this case and not in other stock assessments? This issue could be examined holistically across all rockfish species.

Given the time constraints associated with the June, 2009 Pacific Fishery Management Council meeting, attention to these matters might be best served through meetings of a subgroup of the SSC that deals with groundfish over the summer, with a report to be submitted to the Council at the September meeting.

NMFS looks forward to continuing its work with the Council and its advisory bodies.

Sincerely,

Kevin C. Duffy for

Frank Lockhart
Assistant Regional Administrator.

DRAFT

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Status of the U.S. splitnose rockfish (*Sebastes diploproa*) resource in 2009.

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May 28, 2009

Table of Contents:

EXECUTIVE SUMMARY

Stock

Splitnose rockfish (*Sebastes diploproa*) are distributed from the northern Gulf of Alaska (Prince William Sound) to central Baja California. This assessment reports the status of the splitnose rockfish resource off the continental coast of the United States from the U.S.-Canadian border in the north to the U.S.-Mexican border in the south. Within the assessment area the resource is treated as a single stock due to the lack of biological and genetic data supporting the presence of multiple stocks. Nevertheless, management decisions on a coast-wide population need to account for effort concentration, since abundance is higher in some areas such as off central California.

Catches

Splitnose rockfish have not been a target of commercial fisheries, but have been taken incidentally. Off Washington and Oregon, it was historically bycaught in the Pacific ocean perch fishery. Since the adoption of the formal rebuilding plan for Pacific ocean perch, splitnose rockfish have been caught primarily in fisheries for mixed slope rockfish or other deepwater targets. Because of their small size, splitnose rockfish have a limited market and are often discarded. Over the last twenty years, discard rates ranged between 27% and 80% of the total catch.

Splitnose rockfish are not consistently sorted to species, and landings are estimated from applying port sampling species compositions to mixed rockfish landings. Trawl landings on average comprise 90% of annual catches, with 80% of fish landed in California. Only 10% of splitnose rockfish on average are caught by non-trawl commercial fisheries. The vast majority of non-trawl landings are caught by net gear, and only a small portion is caught by hook-and-line in the sablefish fishery. This species is rarely taken in the recreational fishery.

The landed catch of splitnose rockfish was reconstructed back to 1900 from variety of published sources and databases. The fishery removals were divided among three fisheries - domestic trawl, foreign trawl and domestic non-trawl. Landings peaked in the 1960s, when foreign trawl fleets operated in U.S. waters, and reached 5313 mt in 1967. The highest catch by domestic fleets was in 1998, when 1526 mt of splitnose rockfish was landed. For the last ten years landings were relatively low and ranged between 65 and 274 mt.

Table ES-1. Recent landings (mt) of splitnose rockfish in domestic trawl (by state) and non-trawl fisheries.

Year	Trawl CA	Trawl OR	Trawl WA	Non Trawl	Total (mt)
1999	231	35	1	1	267
2000	101	23	2	6	132
2001	99	9	1	2	110
2002	57	4	1	3	65
2003	151	4	1	1	157
2004	170	11	1	0	182
2005	86	10	0	1	97
2006	269	4	0	1	274
2007	61	7	1	0	69
2008	61	3	2	0	67

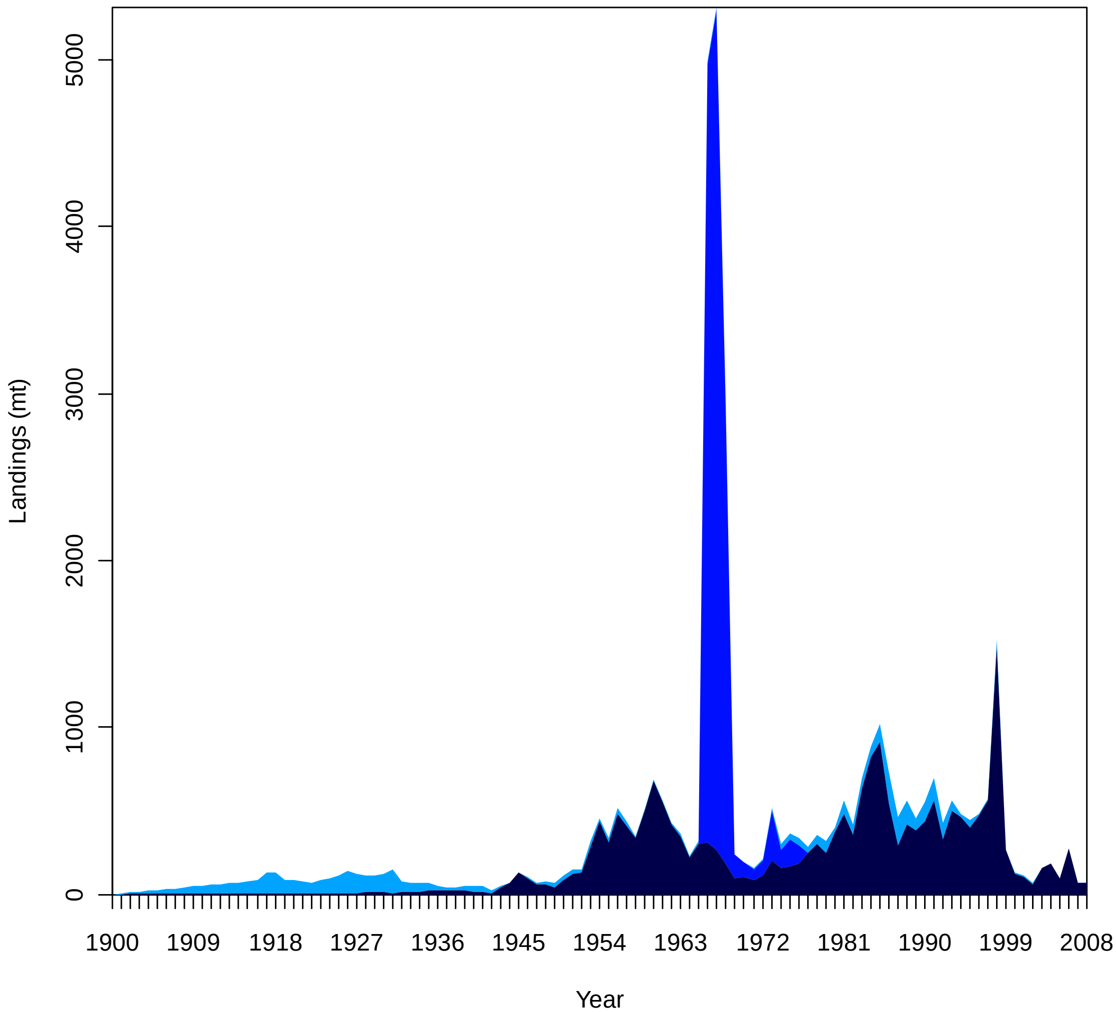

Figure ES-1. Reconstructed historical landings (mt) for splitnose rockfish by domestic trawl (dark blue), foreign trawl (mid blue) and non-trawl (light blue) fisheries.

Data and Assessment

This is the first full assessment for splitnose rockfish on the U.S. West Coast. Preliminary assessment of the splitnose rockfish status was conducted in 1994, when the available data about the species were compiled. However, since the data were sparse and no evident trends in biomass or mean size were detected, the results were inconclusive. In 1996, the status of the remaining rockfish species in the *Sebastes* complex was assessed, and species-specific Allowable Biological Catch (ABC) for splitnose rockfish was calculated.

In this assessment, the Stock Synthesis modeling program (version 3.02E) was used to conduct the analysis and estimate management quantities. The assessment is based on a two-sex model. The modeling period begins in 1900, assuming an unfished equilibrium state of the stock in 1899. The model includes three fisheries (domestic trawl, foreign trawl and domestic non-trawl) that operate within the entire area of assessment. Fishery-dependent data used in the assessment include landings by domestic trawl (1916-2008), foreign trawl (1966-1976) and non-trawl (1916-2008) fisheries; length frequency distributions for domestic trawl (1978-2008) and non-trawl (1983-1998, 2002) fleets; domestic trawl discards and discard length frequency distributions from Pikitch's study (1987) and the West Coast Groundfish Observer Program (2002-2007). Fishery-independent data include survey abundance estimates (1983-2008) from four National Marine Fisheries Service (NMFS) surveys conducted on the continental shelf and slope, length frequency distributions (1983-2008) from three of the four NMFS surveys and age compositions (2003-2008) from one of the surveys.

Stock spawning output

The splitnose rockfish assessment model uses a non-proportional egg-to-weight relationship, and the spawning output is reported in millions of eggs. The unexploited level of spawning stock output for splitnose rockfish is estimated to be 12853 million eggs. At the beginning of 2009, the spawning stock output is estimated to be 8426 million eggs, which represents 65.55% of the unfished spawning output.

Splitnose rockfish were relatively lightly exploited until 1940s, when the trawl fishery for the rockfish first became important. With the development of the Pacific ocean perch fishery (a species with which splitnose rockfish co-occur), spawning output of splitnose rockfish began to decline. A sharp drop in the 1960s was associated with large harvests of Pacific ocean perch by foreign trawl fleets operating in the current U.S. EEZ. Another drop occurred in 1998 when the increased availability of splitnose rockfish led to high removals off California. Since 1999, the splitnose spawning output was estimated to have been increasing in response to below-average removals and above-average recruitment during the last decade.

Table ES-2. Recent trend in estimated splitnose rockfish spawning output (million eggs) and depletion level.

Year	Estimated spawning output (million eggs)	95% confidence interval	Estimated depletion
1998	4913	2681-7145	38%
1999	4602	2363-6841	36%
2000	4651	2372-6931	36%
2001	4763	2430-7096	37%
2002	4910	2508-7312	38%
2003	5125	2627-7623	40%
2004	5404	2770-8038	42%
2005	5807	2975-8639	45%
2006	6365	3273-9457	50%
2007	6972	3574-10370	54%
2008	7690	3960-11420	60%
2009	8426	4357-12495	66%

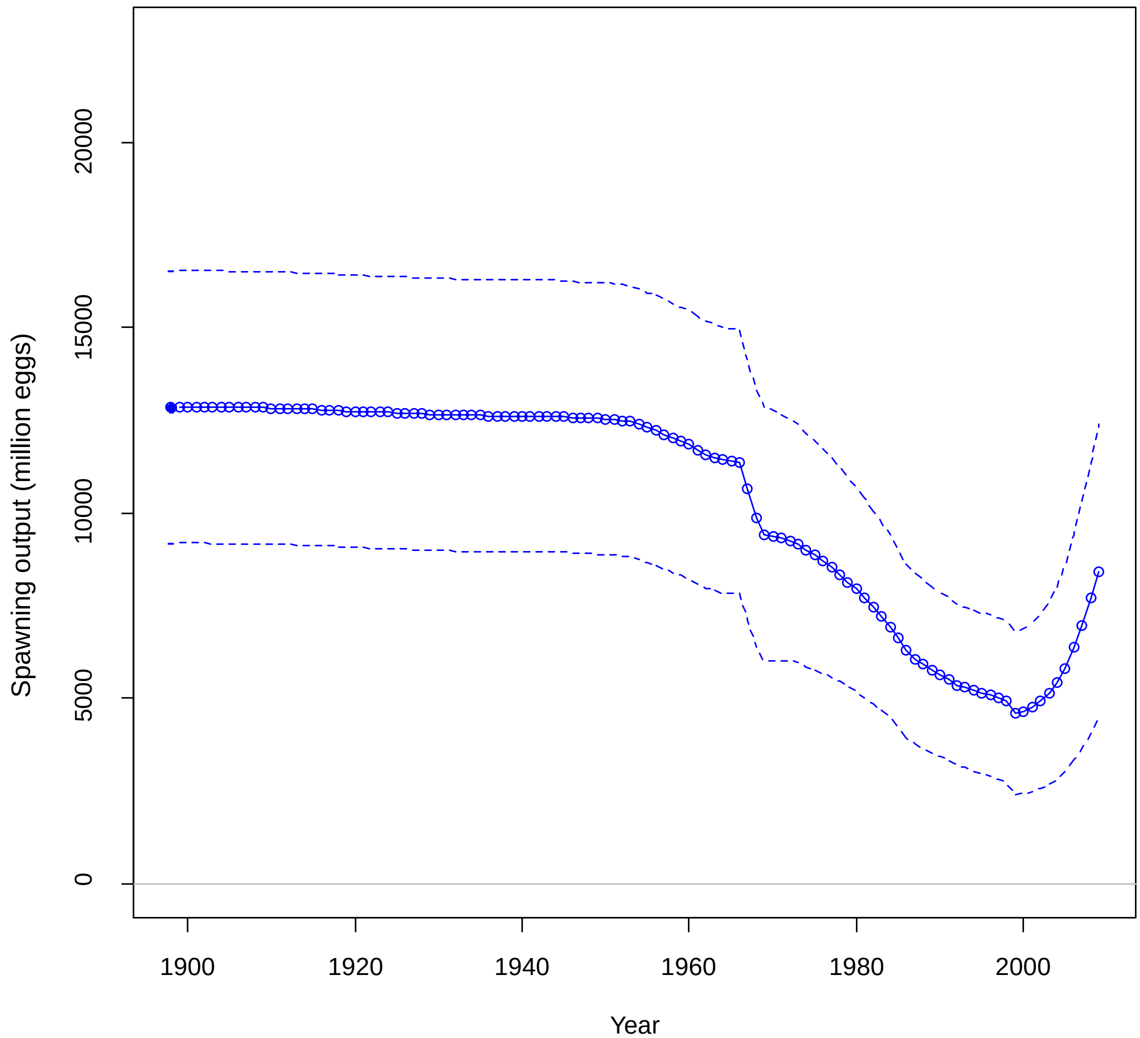

Figure ES-2. Time-series of estimated spawning output (million eggs) with 95% confidence interval.

Recruitment

In the assessment, the Beverton-Holt model was used to describe the stock-recruitment relationship. The level of virgin recruitment was estimated in order to assess the magnitude of the initial stock size. Recruitment deviations were estimated for each year between 1960 and 2006, which is the period best informed by the data based on evaluation of the variance of the recruitment deviations. Prior to 1960 and after 2006, recruits were taken deterministically from the stock-recruit curve. The standard deviation of log recruitment, used to define offset of the stock recruitment curve when recruitment deviations were estimated, was iteratively fit within the model and then fixed at the resulting level of 1. Steepness of the stock-recruitment curve was fixed at a value of 0.58, as estimated by meta-analysis for unassessed rockfish.

The model estimated above-average recruitments in the most recent years beginning 1999, which along with low catches during the last decade determine a population increase in recent and early forecast years. Uncertainty in recent recruitment was used to define alternative states of nature and develop the decision table.

Table ES-3. Recent trend in estimated recruitment for splitnose rockfish.

Year	Estimated recruitment (1000s)	95% confidence interval
1998	23415	7040-39790
1999	61334	28740-93929
2000	35490	13997-56983
2001	44964	20993-68934
2002	35911	16312-55510
2003	22393	8682-36103
2004	21045	6964-35125
2005	40017	14419-65614
2006	52323	11360-93286
2007	78227	0-186159
2008	12441	0-37683
2009	12741	0-38585

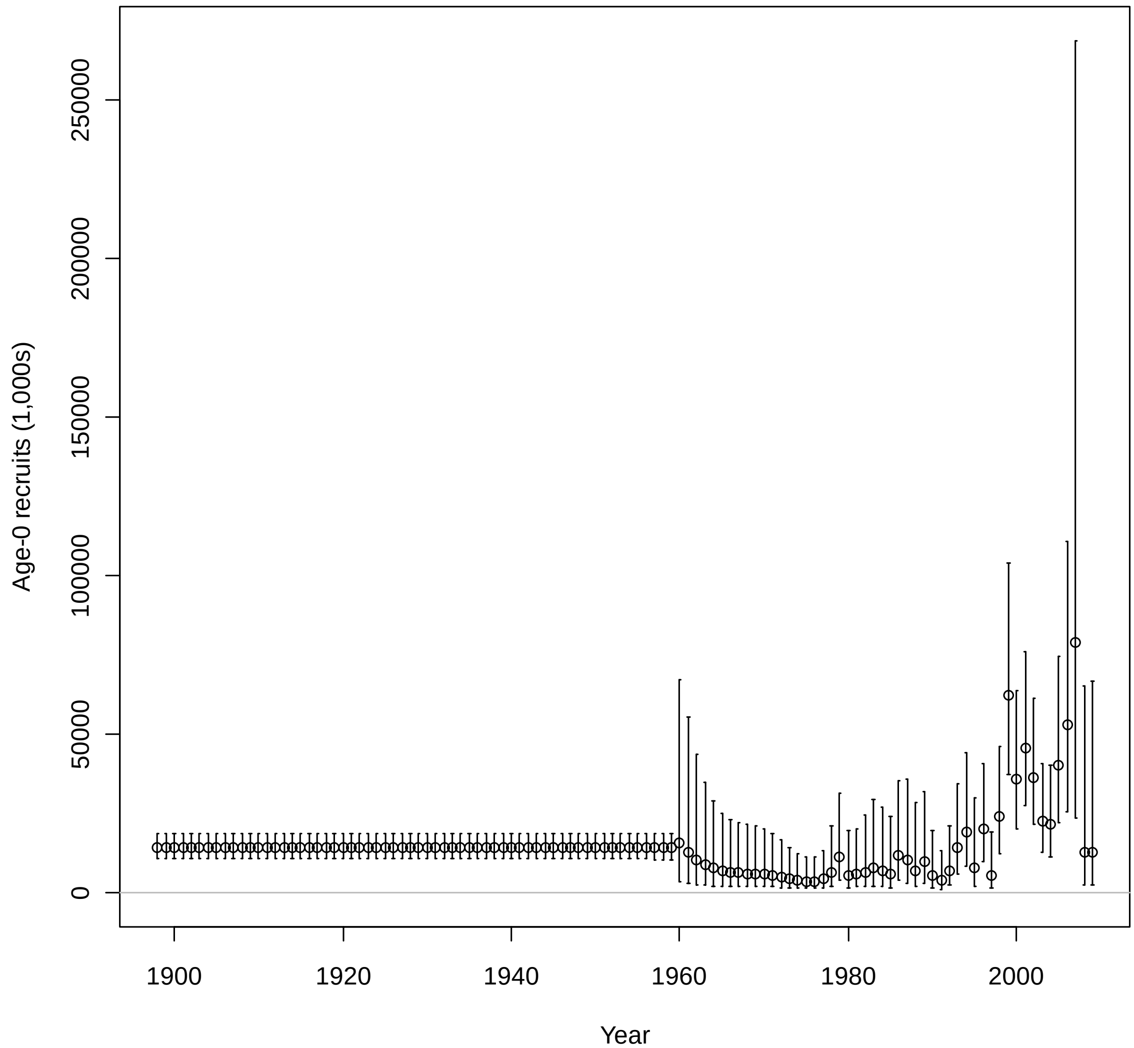

Figure ES-3. Time-series of estimated recruitment with 95% confidence interval.

Reference Points

Unfished spawning stock output for splitnose rockfish was estimated to be 12853 million eggs (95% confidence interval: 9105-16601 million eggs). The management target for splitnose rockfish is defined as 40% of the unfished spawning output ($SB_{40\%}$), which is estimated by the model to be 5141 million eggs (95% confidence interval: 3642-6641 million eggs). The stock is declared overfished if the current spawning output is estimated to be below 25% of unfished level. The MSY-proxy harvest rate for splitnose rockfish is SPR=F50%, which corresponds to an exploitation rate of 0.033. This harvest rate provides an equilibrium yield of 1236 mt at $SB_{40\%}$ (95% confidence interval: 883-1589 mt). The model estimate of maximum sustainable yield (MSY) is 1268 mt (95% confidence interval: 906-1630 mt). The estimated spawning stock output at MSY is 4121 million eggs (95% confidence interval: 2900-5342 million eggs). The exploitation rate corresponding to the estimated SPR_{MSY} of F44% is 0.039.

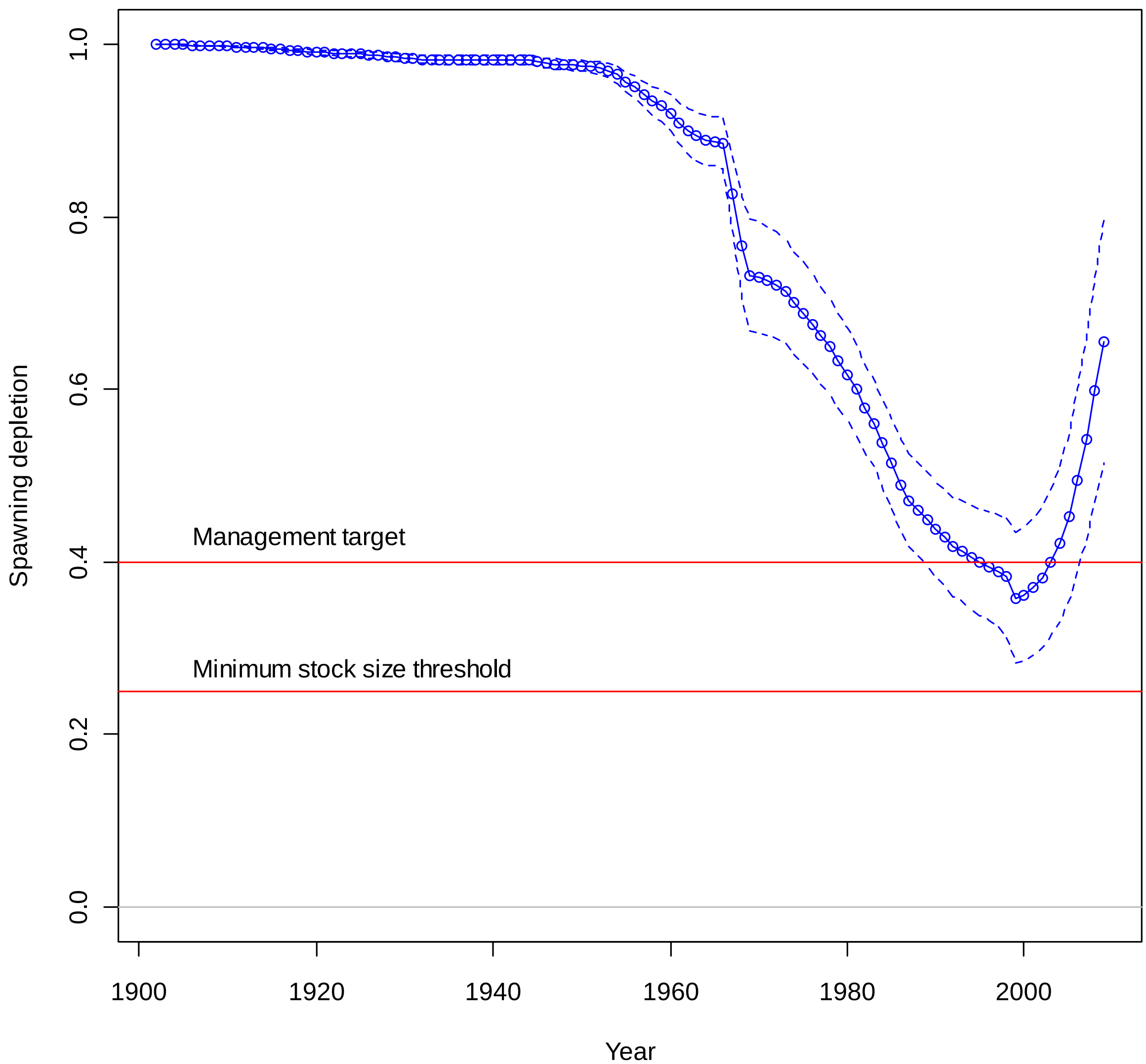

Figure ES-4.Time-series of estimated spawning depletion with 95% confidence interval

Exploitation Status

The assessment shows that the stock of splitnose rockfish in the U.S. West Coast is currently at 66% of its unexploited level and, therefore, not overfished. Historically, the abundance of splitnose rockfish was estimated to have dropped below the $SB_{40\%}$ management target in 1995, after experiencing sharp reductions from the large catches by foreign fishery in mid-1960s and increasing domestic catches in 1980s. However, the spawning stock has been increasing since the early 2000s, and stayed above the $SB_{40\%}$ management target since 2003. The assessment identifies two historical periods in which exploitation rates exceeded the current F_{MSY} proxy harvest rate: during the foreign fishery peak in the mid 1960s, and in 1998.

Table ES-4. Recent trends in estimated spawning potential ratio (SPR) and exploitation rate for splitnose rockfish.

Year	SPR (%)	Exploitation rate
1998	28.25%	0.0910
1999	70.77%	0.0077
2000	83.66%	0.0033
2001	86.02%	0.0027
2002	91.56%	0.0015
2003	81.58%	0.0043
2004	79.74%	0.0053
2005	88.68%	0.0027
2006	74.14%	0.0090
2007	92.69%	0.0019
2008	93.45%	0.0018

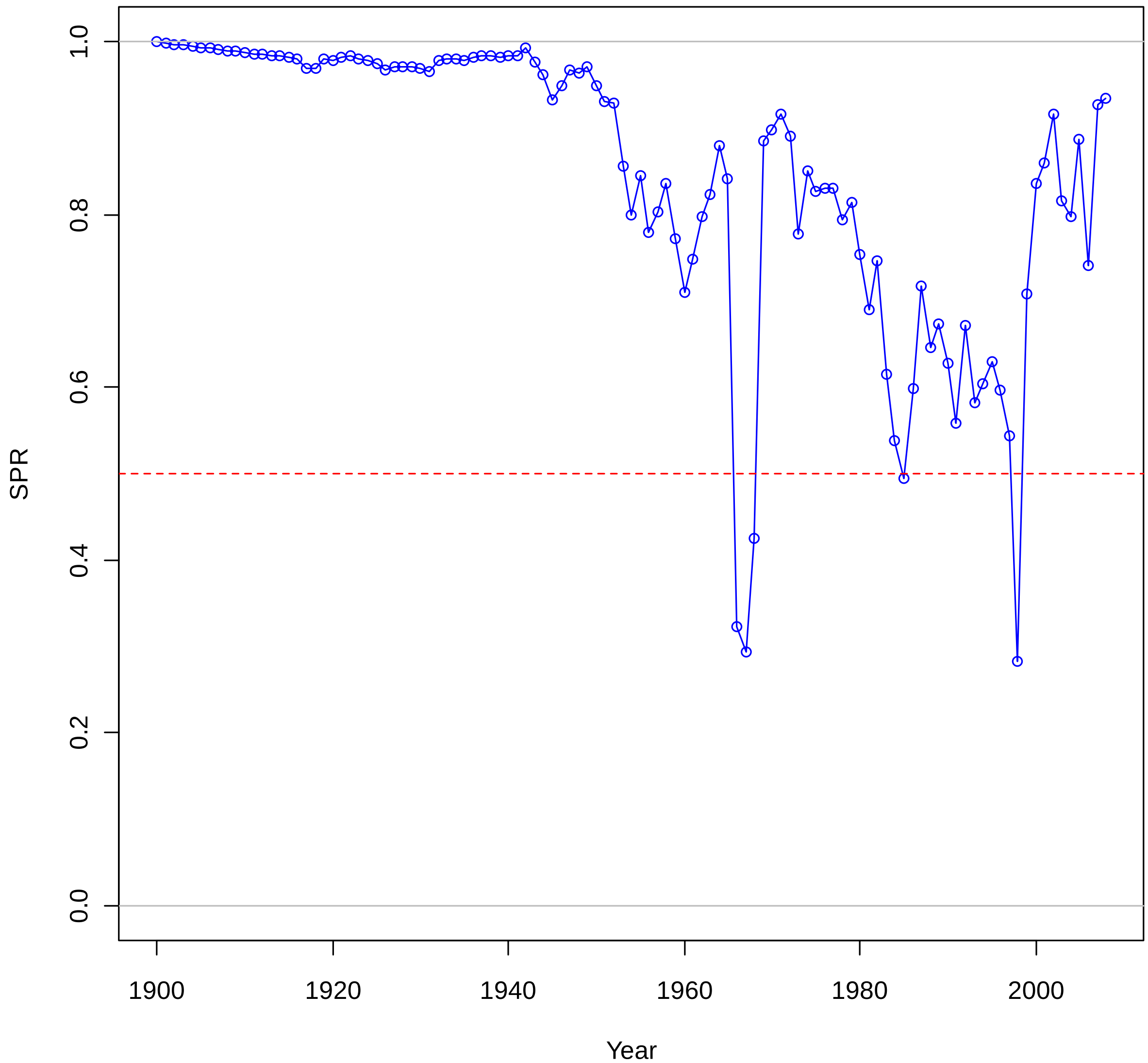

Figure ES-5. Time-series of estimated spawning potential ratio (SPR) with SPR target of 0.5. Values below target reflect harvest that exceeded current overfishing proxy.

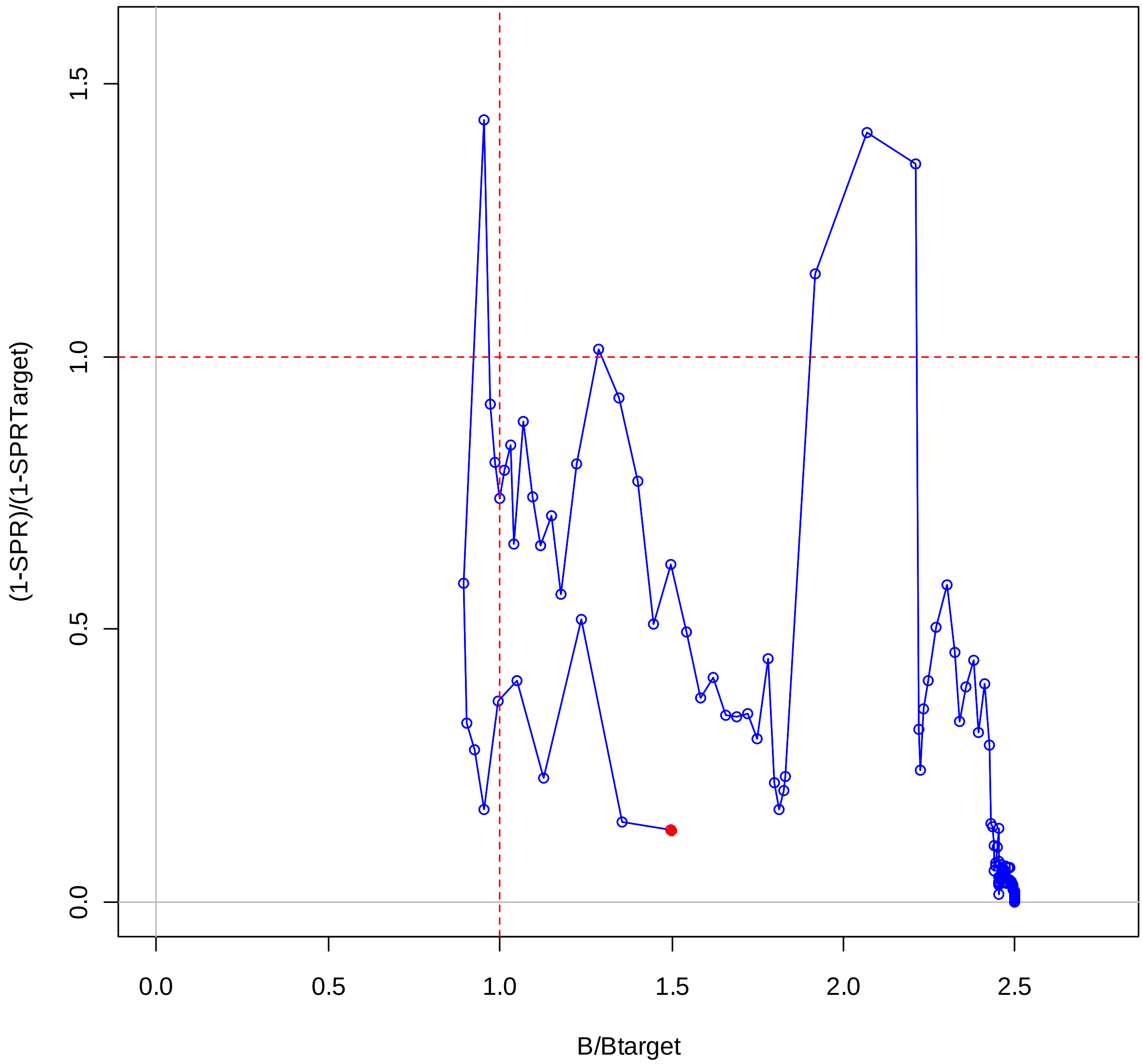

Figure ES-6. Estimated spawning potential ratio relative to its target of 0.5 versus estimated spawning output relative to its target of $SB_{40\%}$. Red dot indicates the point that corresponds to 2009.

Management

Splitnose rockfish were historically managed within the *Sebastes* complex. In 1994, the *Sebastes* complex was divided into southern (Conception, Monterey and Eureka INPFC areas) and northern (Columbia and US Vancouver INPFC areas) management areas, and harvest guidelines were established for the complex in each area. In 1999, after unusually high splitnose rockfish catches in 1998 that were mostly landed in California, splitnose rockfish for the first time were individually separated from the *Sebastes* complex in the southern area. Individual Allowable Biological Catch (ABC) and Optimum Yield (OY) for splitnose rockfish in that area have been specified along with splitnose-specific trip limits.

In 1999, the general *Sebastes* complex was divided into near-shore, shelf, and slope assemblages, and the dividing line between the northern and southern management units was shifted southward to $40^{o}10'$ N. latitude, near Cape Mendocino. In the northern area, splitnose has been managed under trip limits for minor slope rockfish since 1999. For 2000, harvest specifications for splitnose rockfish were set for the Conception and Monterey INPFC areas only, and 48 metric tons for the Eureka area were added to the northern minor rockfish ABC. Also, a precautionary adjustment of the OY (reduced from the ABC by 25%) was specified to account for a less rigorous assessment. In 2000, the ABC and OY for splitnose rockfish south of $40^{o}10'$ N. latitude were reduced based on the revised F_{MSY} harvest rate policy. For the last 10 years, the coast-wide landings and total catch of splitnose rockfish were relatively low, and the limits established for the area south of $40^{o}10'$ N. latitude have not been exceeded.

Table ES-5. Management guidelines, recent trends in landings and estimated total catch for splitnose rockfish.

	South of 40°10' N latitude		North of 40°10' N latitude		Coaswide	
Year	**ABC**	**Total Catch OY**	**ABC**	**Total Catch OY**	**Landings**	**Total catch**
1998	NA	NA	NA	NA	1526	2780
1999	868	868	NA	NA	267	500
2000	820	615	NA	NA	132	245
2001	615	461	NA	NA	110	211
2002	615	461	NA	NA	65	125
2003	615	461	NA	NA	158	320
2004	615	461	NA	NA	182	383
2005	615	461	NA	NA	97	210
2006	615	461	NA	NA	274	610
2007	615	461	NA	NA	68	154
2008	615	461	NA	NA	66	149

Uncertainty

Uncertainty in the model was explored though asymptotic variance estimates and sensitivity analyses. Asymptotic confidence intervals were estimated within the model and reported throughout the assessment for key model parameters and management quantities. Sensitivity analysis allowed evaluation of the responsiveness of model outputs to changes in model assumptions. A variety of sensitivity runs were performed in regards to omission and inclusion of data sources, increase and decrease in reconstructed historical catches, timing of recruitment deviations, assumptions regarding selectivity parameters (asymptotic versus dome-shaped), female fecundity (proportional versus non-proportional female egg-weight relationship), and others. The uncertainty regarding natural mortality and stock-recruitment curve steepness was explored through likelihood profile analysis.

Decision table

Three states of nature were defined based on the alternative assumptions regarding recent recruitments for years between 2000 and 2006. The middle scenario uses the recent recruitment deviations estimated by the base model. The “low” and “high” recruitment scenarios were generated by fixing recruitment deviations between 2000 and 2006 at the limits of the 95% confidence interval (at the low limit for the low scenario; at the high limit for the high scenario) of the expected deviations for each year. Recruitment deviations between 1960 and 1999 were fixed at the base model expectations in both scenarios.

Research and data needs

In this assessment, several critical assumptions were made based on limited supporting data and research. There are several research and data needs which, if satisfied could improve the assessment. These research and data needs include:

1) Genetic studies of splitnose rockfish stock structure in the Northeast Pacific ocean;
2) Comprehensive historical reconstruction of splitnose rockfish catches in Oregon and Washington;
3) Age-determination and age-validation studies to develop a consistent set of aging criteria for the species that could help reduce the differences among agers;
4) Histological studies of splitnose rockfish maturity to reliably estimate and reduce uncertainty in female maturity parameters;
5) Studies of the spatial dynamics of splitnose rockfish to better understand their distribution and explain increased availability of the species off California in 1998;
6) Further exploration of climate-growth relationships for splitnose rockfish and incorporation of this relationship into the stock assessment model.

It is also very important to continue to monitor discard in order to improve the accuracy of total catch estimates.

Table ES-6. Decision table of 12-year projections for alternative states of nature defined based on the alternative scenarios for recent recruitment deviations (2000-2006), with low and high scenarios corresponding to the high and low limits of the 95% confidence interval around the base model recruitment deviations for the same period.

			Low recent recruitments		Base Case		High recent recruitments	
Forecast	Year	Total removals (mt)	Spawning output (million eggs)	Depletion	Spawning output (million eggs)	Depletion	Spawning output (million eggs)	Depletion
	2009	2,780	7,432	62%	8,426	66%	8,177	66%
	2010	2,780	7,601	64%	8,825	69%	8,785	71%
	2011	2,780	7,754	65%	9,261	72%	9,503	76%
	2012	2,780	7,906	66%	9,750	76%	10,342	83%
1998 removals	2013	2,780	8,062	67%	10,275	80%	11,256	91%
	2014	2,780	8,190	68%	10,765	84%	12,124	98%
	2015	2,780	8,263	69%	11,154	87%	12,845	103%
	2016	2,780	8,268	69%	11,416	89%	13,376	108%
	2017	2,780	8,208	69%	11,552	90%	13,719	110%
	2018	2,780	8,094	68%	11,581	90%	13,898	112%
	2019	2,780	7,936	66%	11,520	90%	13,941	112%
	2020	2,780	7,745	65%	11,391	89%	13,875	112%
	2009	291	7,432	62%	8,426	66%	8,177	66%
	2010	291	7,935	66%	9,153	71%	9,107	73%
	2011	291	8,436	71%	9,929	77%	10,159	82%
	2012	291	8,943	75%	10,768	84%	11,344	91%
Average removals	2013	291	9,461	79%	11,653	91%	12,615	101%
of the last 10 years	2014	291	9,956	83%	12,509	97%	13,848	111%
	2015	291	10,396	87%	13,268	103%	14,940	120%
	2016	291	10,766	90%	13,897	108%	15,842	127%
	2017	291	11,065	93%	14,395	112%	16,551	133%
	2018	291	11,300	94%	14,775	115%	17,086	137%
	2019	291	11,480	96%	15,054	117%	17,472	141%
	2020	291	11,615	97%	15,250	119%	17,734	143%
	2009	145	7,432	62%	8,426	66%	8,177	66%
	2010	145	7,955	67%	9,172	71%	9,126	73%
	2011	145	8,475	71%	9,968	78%	10,198	82%
	2012	145	9,004	75%	10,827	84%	11,403	92%
50%	2013	145	9,543	80%	11,733	91%	12,694	102%
of average removals	2014	145	10,060	84%	12,611	98%	13,949	112%
of the last 10 years	2015	145	10,522	88%	13,392	104%	15,063	121%
	2016	145	10,913	91%	14,043	109%	15,986	129%
	2017	145	11,233	94%	14,562	113%	16,717	134%
	2018	145	11,488	96%	14,963	116%	17,273	139%
	2019	145	11,688	98%	15,262	119%	17,679	142%
	2020	145	11,842	99%	15,476	120%	17,961	144%

Table ES-7. Summary of recent trends in estimated splitnose rockfish exploitation and stock level from the assessment model.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Landings (mt)	132	110	65	158	182	97	274	68	66
Estimated Discards (mt)	113	101	60	162	201	113	336	86	83
Estimated Total Catch (mt)	245	211	125	320	383	210	610	154	149
ABC (mt) south of 40°10' N lat	820	615	615	615	615	615	615	615	615
OY * (if different from ABC) (mt) south of 40°10' N lat	615	461	461	461	461	461	461	461	461
ABC (mt) north of 40°10' N lat									
OY * (if different from ABC) (mt) north of 40°10' N lat									
SPR	83.66%	86.02%	91.56%	81.58%	79.74%	88.68%	74.14%	92.69%	93.45%
Exploitation Rate (total catch/summary biomass)	0.0033	0.0027	0.0015	0.0043	0.0053	0.0027	0.0090	0.0019	0.0018
Summary Age 4+ Biomass (B) (mt)	75191	76985	81215	73570	72152	79014	67815	82064	82640
Spawning Stock Output (*SB*) (million eggs)	4651	4763	4910	5125	5404	5807	6365	6972	7690
Uncertainty in Spawning Stock Output estimate	2372-6931	2430-7096	2508-7312	2627-7623	2770-8038	2975-8639	3273-9457	3574-10370	3960-11420
Recruitment at age 0	35490	44964	35911	22393	21045	40017	52323	78227	12441
Uncertainty in Recruitment estimate	13997-56983	20993-68934	16312-55510	8682-36103	6964-35125	14419-65614	11360-93286	0-186159	0-37683
Depletion (SB/SB0)	36.19%	37.06%	38.20%	39.87%	42.04%	45.18%	49.52%	54.24%	59.83%
Uncertainty in Depletion estimate									46.68%-72.98%

Table ES-8. Summary of splitnose rockfish reference points from the assessment model.

	Point estimate	95% confidence interval
Unfished Spawning Stock Output (SB_0) (million eggs)	12853	9105-16601
Unfished Summary Age 4+ Biomass (B_0) (mt)	87588	NA
Unfished Recruitment (R_0) at age 0	13953	9874-18031
Reference points based on $SB_{40\%}$		
MSY Proxy Spawning Stock Output ($SB_{40\%}$) (million eggs)	5141	3642-6641
SPR resulting in $SB_{40\%}$ ($SPR_{SB40\%}$)	50.86%	50.86%-50.86%
Exploitation rate resulting in $SB_{40\%}$	3.18%	NA
Yield with $SPR_{SB40\%}$ at $SB_{40\%}$ (mt)	1236	883-1589
Reference points based on SPR proxy for MSY		
Spawning Stock Output at SPR (SB_{SPR}) (million eggs)	5006	3546-6466
$SPR_{MSY\text{-}proxy}$	50%	
Exploitation rate corresponding to SPR	3.28%	NA
Yield with $SPR_{MSY\text{-}proxy}$ at SB_{SPR} (mt)	1244	888-1599
Reference points based on estimated MSY values		
Spawning Stock Output at MSY (SB_{MSY}) (million eggs)	4121	2900-5342
SPR_{MSY}	44.36%	43.90%-44.83%
Exploitation Rate corresponding to SPR_{MSY}	3.98%	NA
MSY (mt)	1268	906-1630

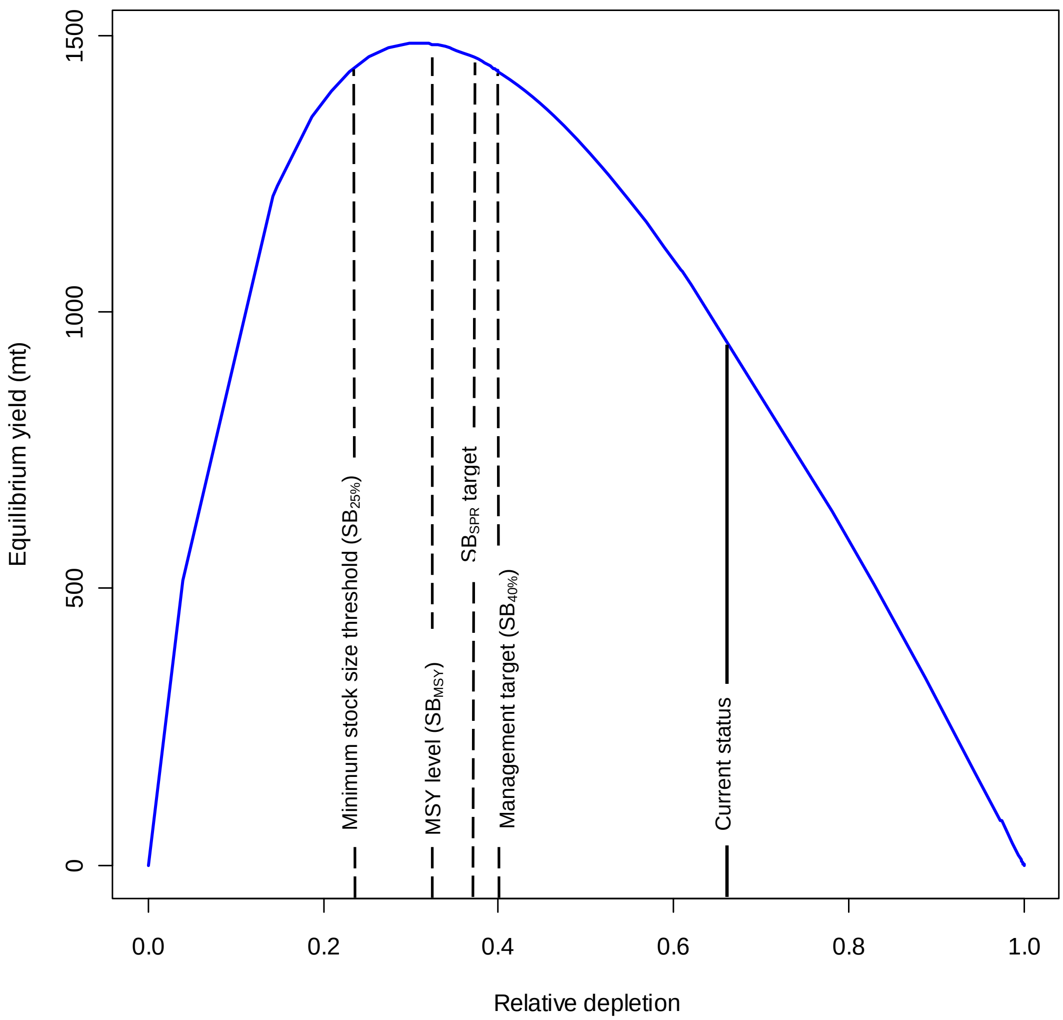

Figure ES-7. Equilibrium yield curve for splitnose rockfish from the assessment model (based on Table ES-8).

SPLITNOSE ROCKFISH

STAR Panel Report

May 4-8, 2009
Northwest Fisheries Science Center
Hatfield Marine Science Center
2032 SE Oregon State University Drive,
Newport, OR 97365

Reviewers:
Robin Cook, Center for Independent Experts
Xi He, Southwest Fisheries Science Center
Jean-Jacques Maguire, Center for Independent Experts
Theresa Tsou (Chair), Scientific and Statistical Committee (SSC) representative

Advisors:
John DeVore, Pacific Fishery Management Council (PFMC) representative
Dan Erickson, Groundfish Management Team (GMT) representative
Brad Pettinger, Groundfish Advisory Subpanel (GAP) representative

STAT Team Members present:
Vladlena Gertseva, Northwest Fisheries Science Center
Jason Cope, Northwest Fisheries Science Center

Overview

A draft assessment of splitnose rockfish (*Sebastes diploproa*) off the U.S. west coast was reviewed by the STAR panel during May 4-8, 2009. This assessment is the first full assessment for the species, which assumed a single coastwide stock given no distributional breaks or genetic information suggesting more than one stock. This assessment used Stock Synthesis platform version 3.02e and incorporated a variety of data sources into the candidate base model. Data from commercial fisheries included landings, discards, and biological information. Abundance indices used in the model were the Alaska Fisheries Science Center (AFSC) shelf (triennial) survey (1977-2004), the AFSC slope survey (1997, 1999-2001), the NWFSC shelf-slope survey (2003-2008), and the NWFSC slope survey (1999-2002). Biological information from three of the four trawl surveys was also included.

The STAT team presented assessment results based on the model in the draft document distributed for review and from an improved model. The differences were through tuning and limiting the survey index to those years where the latitude and depths relative to splitnose distribution were well covered. Also the 1977 and 1980 survey data were removed because the length compositions in those years were implausibly large and the surveys were not well sampled in those years.

The Panel reviewed the revised assessment and requested a number of runs as outlined below. In performing these runs a question arose about the use of 'tuning', i.e., iteratively re-weighing of the recruitment variability parameter (σ_R) and effective sample sizes during the analysis. Tuning the model runs has a substantial effect on the results. In general, the results of the tuned runs are much more similar to each other than those of the non-tuned versions. The effect is to reduce R_0 compared to the base run with a fairly flat trend in spawning output in the period from 1900 to the 1960s. While tuning has the effect of producing similar trends in spawning output, it also tends to result in larger differences in scale between the various runs. In summary, the runs requested suggest that the model is heavily influenced by the recruitment assumptions in the analysis, and the effect of tuning.

Considerable progress has been achieved in evaluating the population dynamics of splitnose rockfish and all model formulations tested indicate that splitnose rockfish is not overfished and that overfishing is not occurring. The results of the assessment suggest that the current fisheries management measures result in catches that appear to be sustainable, but it would not be prudent to allow catches to increase markedly above the long term average until the next stock assessment, with a few more years of data, substantiate the yield reference points calculated in the current assessment.

The STAR panel concluded that the splitnose rockfish assessment was based on the best available data, and that this new assessment constitutes the best available information on splitnose rockfish off the U.S. west coast. The STAR panel thanks the STAT team for their willingness to respond to panel requests and their dedication in finding possible solutions to difficult assessment problems.

Analyses requested by the STAR Panel

The STAT team ran all the following requests in both non-tuned and tuned mode. The effects of tuning were summarized above.

1. **Provide a run with the time series of domestic landed catches reversed from the beginning of the time series to 1977.**
Reason: There is uncertainty in the historical catches resulting from reconstructing historical records. This uncertainty applies mainly to the data prior to 1978, given there is sparse data informing catches in this period. This means that the estimated stock trends in the early part of the time series may be influenced by errors in the estimated catches. The run was requested to evaluate the sensitivity of the assessment, especially in early years, to possible uncertainty in the catch data.
Response: Compared to the initial base run, inverting the catch series has relatively little effect and shows a similar long term decline in spawning output, though the rate of decline to the 1970s is somewhat higher as might be expected due to the higher catches in early years. The run illustrates the fact that B_0 is heavily influenced by the estimate of R_0 which is determined to a large degree by model assumptions, rather than the data.

2. **Provide a run beginning catch in 1960.**
Reason: Prior to 1960 there is very little data available apart from reconstructed catches. Running the assessment from 1960 using the average catch of pre-1960 years as the initial catch provides an opportunity to assess the extent to which early data affect the results in the more recent period.
Response: There was very little change to the assessment compared to the initial base run.

3. **Provide a run where recruitment deviations are estimated only from 1960 onwards.**
Reason: In the initial base model recruitment deviations were calculated for the whole period of the assessment. There is no information in the data prior to 1960 on year class strength and it may be unrealistic to try to estimate deviations with only catch data. Therefore, the panel requested a run where recruitment deviations are estimated beginning in 1960 and bias correction beginning in 1980.
Response**:** Spawning output in the early period up to 1960 was substantially reduced in the revised run mainly as a result of higher estimates of σ_R and much lower estimates of R_0. Unlike the base run where spawning output shows a sustained reduction during the period up to the 1950s, this run shows an almost flat trend. The reduced value of R_0 appears to be a result of the influence of σ_R which is lower in this run. There appears to be an inconsistency between the input value of σ_R and the estimated root mean square error (RMSE) from the model which is larger. It did not prove possible to set an input value of σ_R that caused the model to estimate a lower RMSE, unless the effective sample sizes were also tuned; this is a reason to be cautious about the reliability of the model output.

4. **Provide a run where recruitment deviations are estimated only from 1960 onwards and steepness is estimated within the model.**

Reason: This run was requested for similar reasons justifying request #3 and to see if the model-estimated value of steepness is consistent with the assumed input value. The panel requested a run where recruitment deviations are estimated beginning in 1960 and bias correction beginning in 1980.
Response: This run gave a similar result to the previous run. Steepness was estimated to be 0.71 compared with the value used in the base model of 0.58 (based on a meta-analysis). This run assumed a lower σ_R to allow the model to estimate steepness.

5. **Provide a run using a Ricker stock-recruitment function.**
   Reason: The recruitment estimated in the base run is lower in the early period when spawning stock size is high compared to the recent period when recruitment is estimated higher although stock size is lower. This appears to be inconsistent with the assumed Beverton-Holt relationship used in the model; a Ricker curve may be able to reconcile this trend in the recruitment series. The panel again requested that recruitment deviations are estimated beginning in 1960 and bias correction beginning in 1980.
   Response: Replacing the Beverton-Holt function with a Ricker function did not change the trend in recruitment and gave the same general trend in spawning output seen in the base model with, if anything, a higher value of R_0. There was no evidence to suggest the Ricker model offered a preferable assumption for the analysis.

6. **Provide a run with the foreign catch halved.**
   Reason: There is a very high catch by foreign fleets estimated for the mid-1960s which in turn is based on catch reconstruction where there is uncertainty about the species composition of the catches. The large estimated catch in this period may have a large influence on the assessment.
   Response: Halving the foreign catch did not have a large effect on the trend in estimated spawning output.

7. **Provide length frequency data plots:**
   Reason: Length frequency plots were requested to see if modes could be identified that track year classes.
   Response: Data suggested some identifiable year classes on the left tail of the length frequency distributions.

Description of base model and alternative models used to bracket uncertainty.

- The base model assumed a Beverton-Holt stock recruitment relationship.
- Recruitment deviations were estimated beginning in 1960 ending in 2006.
- Bias adjustment was started in 1980 and stopped in 2002.
- Tuned effective sample sizes and recruitment variation (σ_R).
- Use ± 2 S.D. of the 2000-2006 recruitment deviations to bracket the main axis of uncertainty in the decision table.

Comments on technical merits

The assessment was thorough and well investigated. Although sensitive to certain assumptions on model structure (tuning of σ_R and sample sizes, and the timing of bias adjustment), stock trends demonstrated low sensitivity to a broad range of data use and specifications. The MSY estimates (or proxies) appear high compared with the history of the fishery, thus allowable catch markedly higher than long-term average catch is not recommended. Further work in exploring model behavior is recommended before the assessment can be considered a stable basis for providing management advice.

Areas of disagreement

There were no areas of disagreement among STAR panel members or between the STAR panel and the STAT with regard to technical issues.

Unresolved problems and major uncertainties

Recent recruitment is estimated to be much higher than in early years even though stock size has reduced compared to the start of the time series.

Tuning has a large effect on the initial conditions of the assessment and there does not appear to be a clear consensus about the most appropriate choice of when to tune and when not to tune. It was agreed to tune σ_R so that the input σ_R value would be greater than the rmse of the estimated recruitments, because the data are never perfectly informative about the recruitment deviations. In this assessment, tuning on σ_R alone results in implausibly high stock size estimates. The problem can only be resolved by tuning on effective sample size as well. This illustrates the sensitivity of the assessment to the choice of model configuration.

Management or data issues raised by the GMT or GAP

None.

Research and data recommendations

- There is a need to improve age determination and collect more age data. Splitnose rockfish is a long-lived species and grows fast reaching L_{inf} at young age. This makes it difficult to identify recruitment signals using length compositions.
- Otoliths from the 1980 domestic trawl fishery should be re-aged to help clarify stock structure for the 1960-1970s time period.
- Historical catch data require further work to arrive at improved estimates. Though the panel was not able to review the reconstruction of historical catches, a constant fraction approach is not desirable. A thorough review of historical species composition in catch is needed.
- The current assessment model has a complex structure but there are not enough data with a long time series to support it. Investigating more parsimonious modeling approaches is recommended for comparing and contrasting purposes.

Agenda Item E.6.a
Attachment 6
June 2009

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Status of the U.S. canary rockfish resource in 2009
(Update of 2007 assessment model)

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27 May, 2009

Table of Contents

Executive Summary

Stock

This updated assessment reports the status of the canary rockfish (*Sebastes pinniger*) resource off the coast of the United States from southern California to the U.S.-Canadian border using data through 2008. As in 2007, the resource is modeled as a single stock.

Catches

The historical period (< 1981) of the catch history for canary rockfish has been substantially revised for this updated assessment. Historical reconstruction estimates from efforts by CDFG and NOAA scientists were made available and replaced existing estimates which dated back to the 2005 and earlier assessments. These older estimates assumed a constant percentage of canary rockfish in the total California landings, whereas the improved estimates now available allowed for changes in this percentage over time and fishing areas accounting for shifts in the fishery and the lower occurrence of canary in Southern California waters. The net result of this revision was a 24% reduction in the total estimated canary catch from 1916-2006 with most of this reduction occurring prior to 1968.

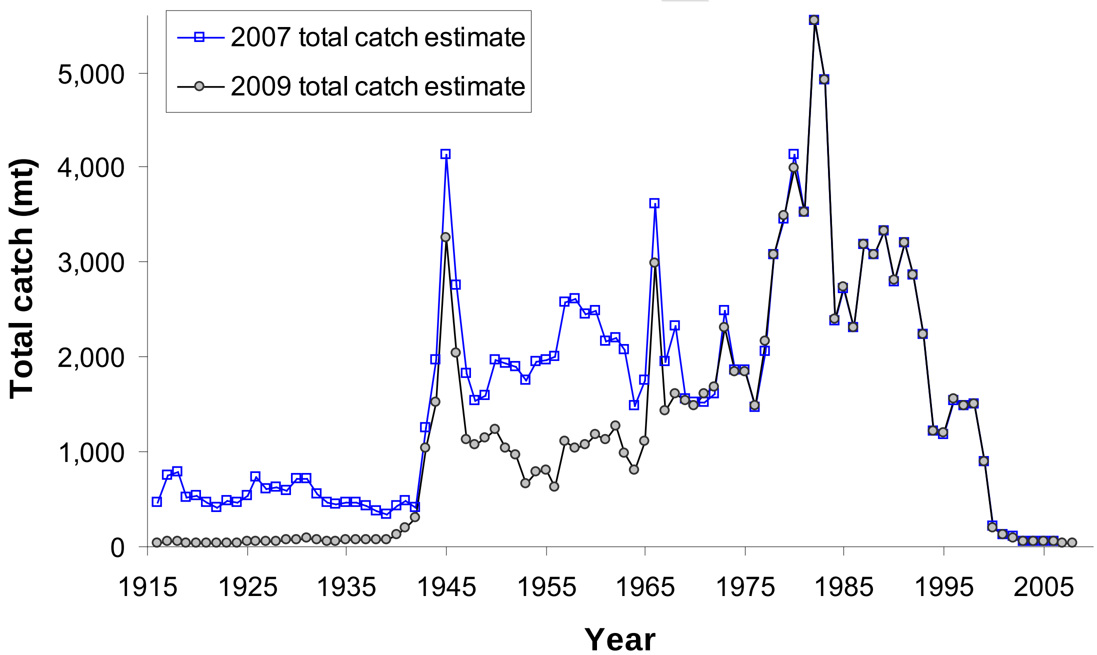


Figure a. Comparison of the 2007 and recently revised canary rockfish catch history, 1916-2008.

Recent canary rockfish catches were revised based on current total mortality estimates (2002-2007) and the GMT scorecard (2008). Where only aggregated catches were available, these were pro-rated to modeled fleets as was done in the 2007 assessment.

Table a. Recent canary rockfish catches (mt).

Year	Commercial trawl	Commercial non-trawl	At-sea whiting bycatch	Recreational	Research
1999	632.47	160.72	5.63	99.89	0.00
2000	12.63	18.29	2.35	95.52	0.00
2001	10.87	17.57	4.05	46.71	1.61
2002	16.13	5.26	5.24	17.34	0.13
2003	4.73	3.50	0.93	30.21	1.08
2004	2.24	9.35	5.22	16.35	2.24
2005	6.06	2.99	1.44	10.31	4.54
2006	6.53	3.55	1.09	22.01	7.78
2007	7.80	4.28	2.00	14.44	2.50
2008	8.47	6.20	5.96	12.50	2.90

Data and Assessment

This updated assessment used the newest version of Stock Synthesis available (3.03a, released 30 April 2009). Change in assessment results from 2007 due to Synthesis updates was negligible. The model data sources are unchanged, including updated catch, length- and age-frequency data from 11 fishing fleets. Biological data is derived from both port and on-board observer sampling programs. The National Marine Fisheries Service (NMFS) Northwest Fisheries Science Center (NWFSC) trawl survey relative biomass indices and biological sampling provide updated fishery independent information on relative trend and demographics of the canary stock. The Southwest Fisheries Science Center (SWFSC)/NWFSC/Pacific Whiting Conservation Cooperative (PWCC) coast-wide pre-recruit survey provides an updated source of recent recruitment strength information. The use of time varying selectivity (for commercial fisheries) and catchability (Triennial survey) is unchanged from the 2007 assessment.

As in 2007, the base case assessment model includes parameter uncertainty from a variety of sources, but underestimates the considerable uncertainty in recent trend and current stock status. For this reason, in addition to asymptotic confidence intervals (based upon the model's analytical estimate of the variance near the converged solution), two alternate states of nature regarding stock productivity (via the steepness parameter of the stock-recruitment relationship) are presented. The base case model (steepness = 0.51) is considered to be twice as likely as the two alternate states (steepness = 0.35, 0.72) based on the results of a 2007 meta-analysis of west coast rockfish (M. Dorn, personal communication). In order to best capture this source of uncertainty, all three states of nature will again be used as probability-weighted input to the rebuilding analysis.

Stock biomass

Updating all data sources through 2008 and including revised estimates of recent catch (1981-2008) could be considered the simplest form for an updated assessment. These new data resulted in a slightly more pessimistic view of the recent stock recovery trajectory, just inside the lower 95% confidence interval from the 2007 assessment. This downward revision of recent spawning biomass was not attributable to a single data source, but appears to be incrementally informed by each updated series.

Addition of the fully revised catch history reduced the scale of the entire time-series estimate of spawning biomass by an average of 14% (19% in the first 10 years of the series and 47% in the last 10). The central portion of the time-series estimates remained largely unchanged (~1960-1990).

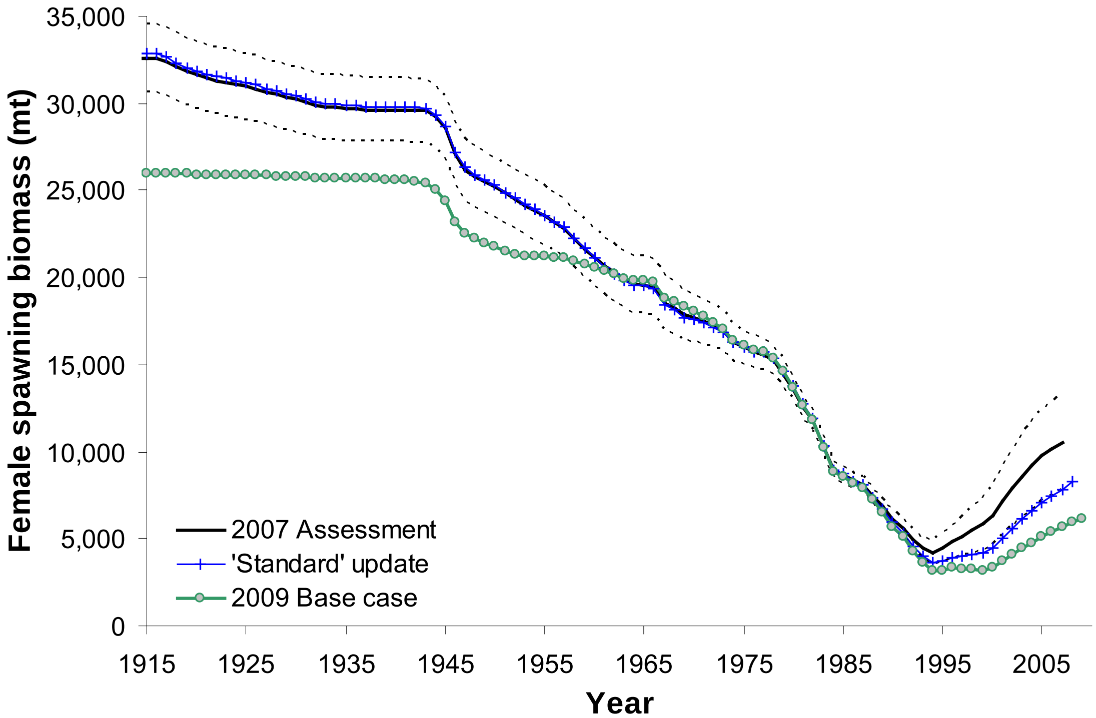


Figure b. Estimated spawning biomass time-series (1916-2009) for the 2007 assessment base case model (solid line) with approximate asymptotic 95% confidence interval (dashed lines), results of 'standard' update of recent data and catches (crosses), and 2009 base case model (round symbols).

Based on the revised catch series, canary rockfish were very lightly exploited until the early 1940's, when catches increased and a decline in biomass began. The spawning biomass experienced an accelerated rate of decline during the late 1970s, and finally reached a minimum (12% of unexploited, slightly below the estimate of 13% from the 2007 assessment) in the mid-1990s. The canary rockfish spawning stock biomass is estimated to have been gradually increasing since that time, in response to reductions in harvest and above average recruitment in the preceding decade. However, this trend is very uncertain. The estimated relative depletion level in 2007 is 21.7% (below the estimate of 32.4% from the 2007 assessment) and 23.7% in 2009 (~95% asymptotic interval: 16-28%, ~75% interval based on the range of states of nature: 9-40%), corresponding to 6,170 mt (5,642 in 2007, 54% of the 2007 estimate of 10,544 mt). The base model asymptotic interval for 2009 spawning biomass remains broad: 4,385-7,955 mt, and the states of nature interval: 2,459-10,244.

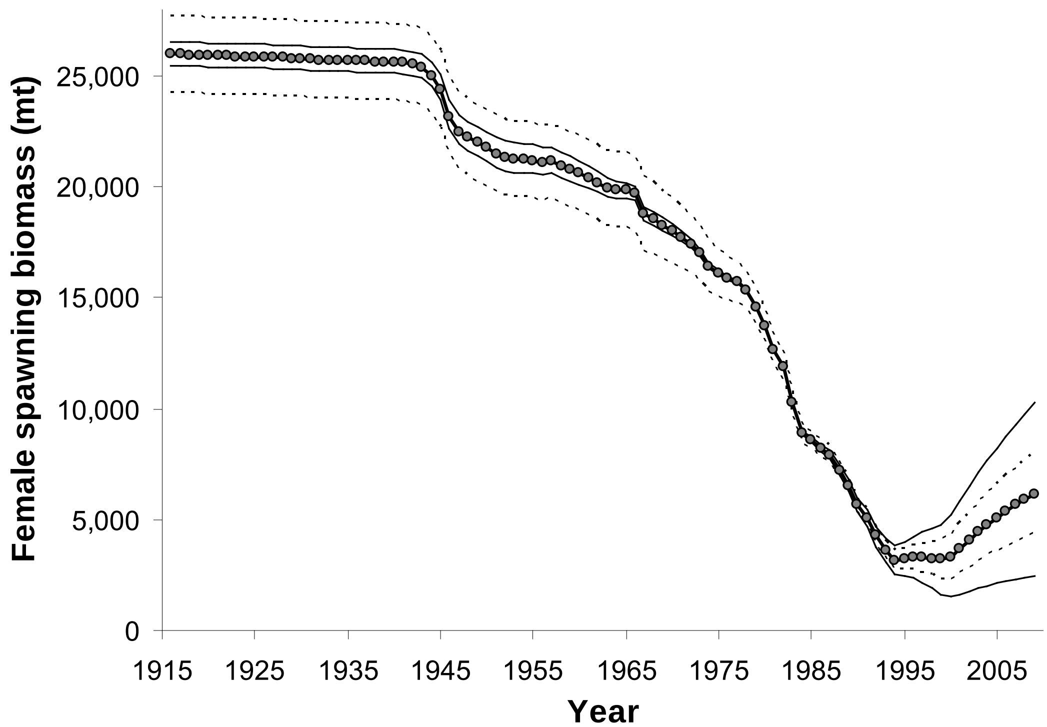


Figure c. Estimated spawning biomass time-series (1916-2009) for the base case model (round points) with approximate asymptotic 95% confidence interval (dashed lines) and alternate states of nature (light lines).

Table b. Recent trend in estimated canary rockfish spawning biomass and relative depletion level.

Year	Spawning biomass (mt)	~95% confidence interval	Range of states of nature	Estimated depletion	~95% confidence interval	Range of states of nature
2000	3,316	2,331-4,302	1,507-5,182	12.8%	9.2-16.4%	5.7-20.3%
2001	3,699	2,592-4,805	1,639-5,835	14.2%	10.2-18.3%	6.2-22.9%
2002	4,080	2,856-5,304	1,774-6,485	15.7%	11.2-20.2%	6.7-25.4%
2003	4,440	3,108-5,772	1,899-7,107	17.1%	12.2-21.9%	7.1-27.9%
2004	4,781	3,353-6,210	2,023-7,696	18.4%	13.2-23.6%	7.6-30.2%
2005	5,091	3,577-6,604	2,131-8,240	19.6%	14.1-25.1%	8.0-32.3%
2006	5,372	3,783-6,960	2,222-8,748	20.7%	14.9-26.4%	8.4-34.3%
2007	5,642	3,984-7,301	2,305-9,247	21.7%	15.7-27.7%	8.7-36.3%
2008	5,912	4,187-7,636	2,386-9,751	22.7%	16.5-29.0%	9.0-38.2%
2009	6,170	4,385-7,955	2,459-10,244	23.7%	17.3-30.2%	9.3-40.2%

Recruitment

The degree to which canary rockfish recruitment declined over the last 50 years is closely related to the level of productivity (stock-recruit steepness) modeled for the stock. High steepness values imply little relationship between spawning stock and recruitment, while low steepness values cause a strong positive correlation. After a period of above average recruitments, recent year-class strengths (1997-2008) have generally been low, with only 4 of the 12 years (1999, 2001, 2006, and 2007) producing large estimated recruitments (the 2009 recruitment is based only on the stock-recruit function). Because of the limited number of years they have been observed, the strengths of the 2006-2007 year classes are subject to greater uncertainty than other strong recruitment events in the last 30 years. As the larger recruitments from the late 1980s and early 1990s move through the population in future projections, the effects of recent poor recruitment may tend to slow the rate of recovery.

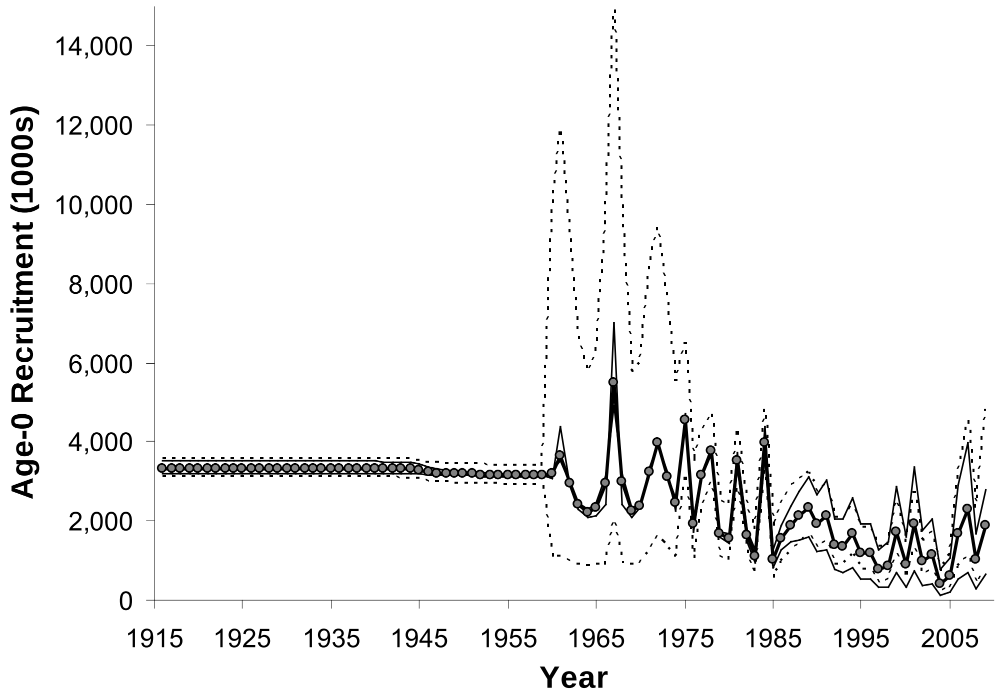


Figure d. Time series of estimated canary rockfish recruitments for the base case model (round points) with approximate asymptotic 95% confidence interval (dashed lines) and alternate states of nature (light lines).

Table c. Recent estimated trend in canary rockfish recruitment (1000s age-0).

Year	Estimated recruitment (1000s)	~95% confidence interval	Range of states of nature
2000	904	559-1,460	335-1,025
2001	1,936	1,361-2,754	735-2,491
2002	1,004	661-1,524	359-1,220
2003	1,148	761-1,733	400-1,416
2004	422	245-725	137-452
2005	594	306-1,156	185-556
2006	1,679	872-3,231	546-1,539
2007	2,276	1,143-4,530	715-2,004
2008	1,012	441-2,319	301-737
2009	1,886	734-4,848	636-1,104

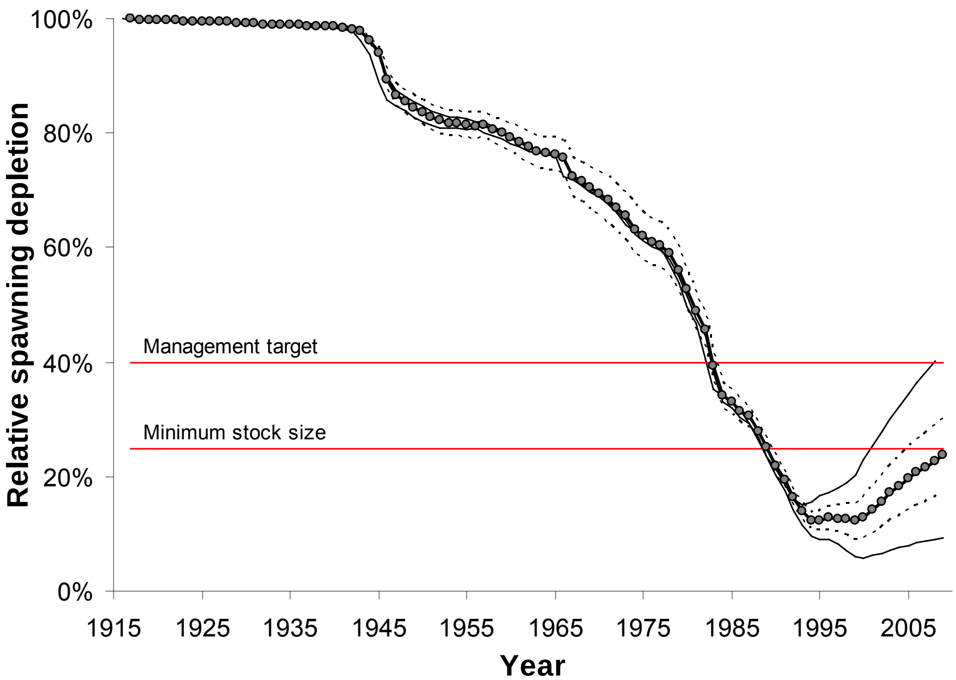


Figure e. Time series of depletion level as estimated in the base case model (round points) with approximate asymptotic 95% confidence interval (dashed lines) and alternate states of nature (light lines).

Reference points

Unfished spawning stock biomass was estimated to be 25,993 mt (down from the 2007 estimate of 32,561 mt) in the base case model. The target stock size ($SB_{40\%}$) is therefore 10,397 mt and the overfished threshold ($SB_{25\%}$) is 6,498 mt. Maximum sustained yield (MSY) applying current fishery selectivity and allocations (a 'bycatch-only' scenario) was estimated in the assessment model to occur at a spawning stock biomass of 9,928 mt and produce an MSY catch of 937 mt (down from 1,169 mt estimated in the 2007 assessment). This sustainable yield is achieved at an SPR of 53.0%, nearly identical to the estimate from the 2007 assessment (52.9%). This is nearly identical to the yield, 936 mt, generated by the SPR (54.4%) that stabilizes the stock at the $SB_{40\%}$ target. The fishing mortality target/overfishing level (SPR = 50.0%) generates a yield of 931 mt at a stock size of 8,909 mt. When selectivity and allocation from a 'target-fishery' in the mid 1990s (1994-1998) was applied, the MSY yield increased to 960 mt from a slightly larger stock size (9,949 mt), but nearly the same rate of exploitation (SPR = 53.0%). This is due to higher relative selection of older and larger fish when the fishery was targeting instead of avoiding canary rockfish. These yields are somewhat lower than those from the 2007 assessment.

Exploitation status

The abundance of canary rockfish was estimated to have dropped below the $SB_{40\%}$ management target in 1983 and the overfished threshold in 1990. In hindsight, the spawning stock biomass passed through the target and threshold levels at a time when the annual catch was averaging more than twice the current estimate of the MSY. The stock remains slightly below the overfished threshold (unlike the 2007 estimate), although the spawning stock biomass still appears to have been increasing since 1999. The degree of increase is very sensitive to the value for steepness (state of nature), and is projected to slow as recent (and largely below average) recruitments begin to contribute to the spawning biomass. Fishing mortality rates in excess of the current F-target for rockfish of $SPR_{50\%}$ are estimated to have begun in the late 1970s and persisted through 1999. Recent management actions appear to have curtailed the rate of removal such that overfishing has not occurred since 1999, and recent SPR values are in excess of 70% (> 90% since 2003). Relative exploitation rates (catch/biomass of age-5 and older fish) are estimated to have been less than 1% since 2001. These patterns are largely insensitive to the three states of nature.

Table d. Recent trend in spawning potential ratio (SPR) and relative exploitation rate (catch/biomass of age-5 and older fish).

Year	Estimated SPR (%)	Range of states of nature	Relative exploitation rate	Range of states of nature
1999	31.2%	14.5-42.7%	0.0928	0.1855-0.0613
2000	73.0%	50.8-81.6%	0.0204	0.0453-0.0130
2001	81.6%	63.8-87.9%	0.0127	0.0289-0.0080
2002	86.7%	72.8-91.3%	0.0088	0.0205-0.0055
2003	91.1%	80.3-94.4%	0.0051	0.0121-0.0032
2004	93.0%	84.3-95.6%	0.0040	0.0096-0.0025
2005	92.6%	83.4-95.3%	0.0046	0.0111-0.0028
2006	92.2%	81.9-95.2%	0.0044	0.0109-0.0027
2007	94.5%	86.7-96.7%	0.0031	0.0076-0.0019
2008	95.0%	87.9-97.0%	0.0027	0.0067-0.0016

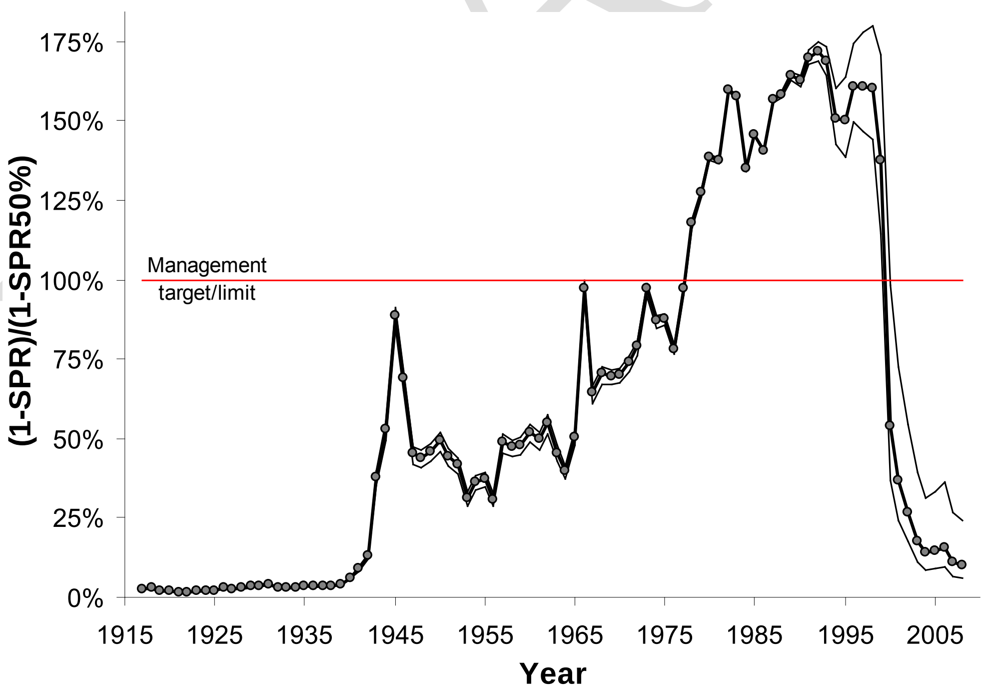


Figure f. Time series of relative spawning potential ratio ($1\text{-}SPR/1\text{-}SPR_{Target=0.5}$) for the base case model (round points) and alternate states of nature (light lines). Values of relative SPR above 100% reflect harvests in excess of the current overfishing proxy.

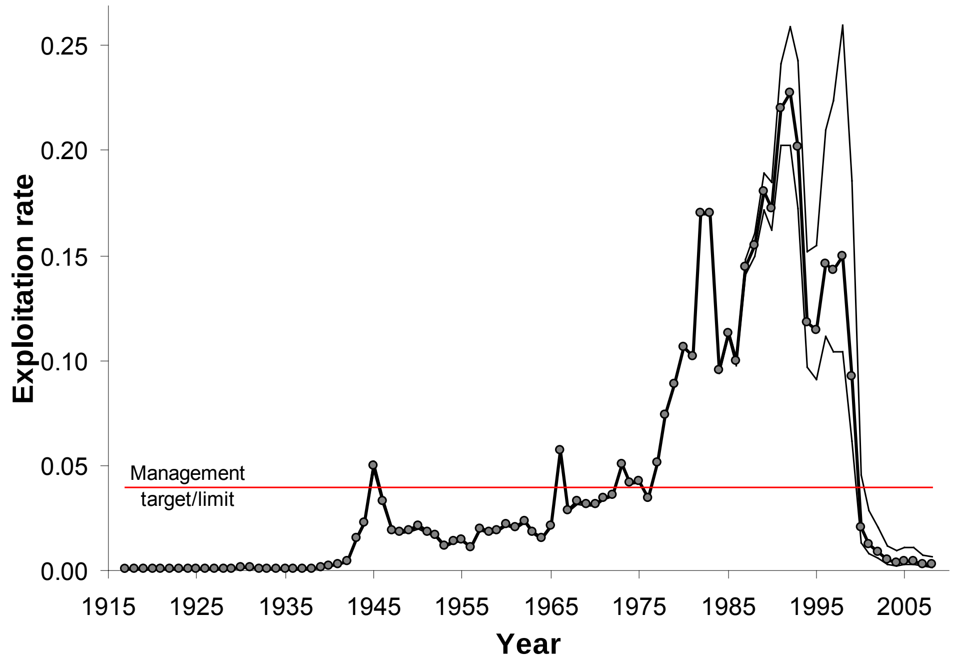


Figure g. Time series of estimated exploitation rate (catch/age 5 and older biomass) for the base case model (round points) and alternate states of nature (light lines). Horizontal line indicates the overfishing limit/target ($F_{50\%}$) from the base case.

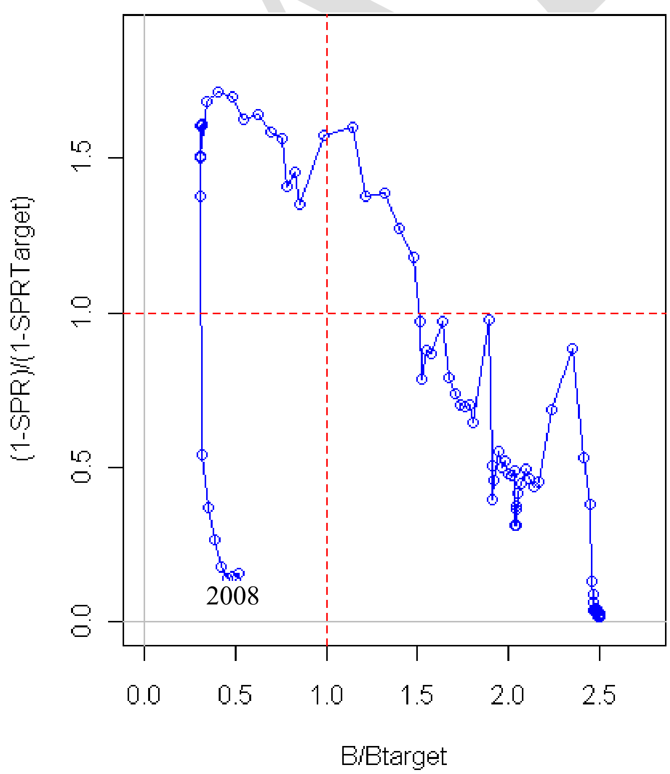


Figure h. Estimated relative spawning potential ratio relative to the proxy target/limit of 50% vs. estimated spawning biomass relative to the proxy 40% level from the base case model. Higher biomass occurs on the right side of the x-axis, higher exploitation rates occur on the upper side of the y-axis.

Management performance

Following the 1999 declaration that the canary rockfish stock was overfished, the canary OY was reduced by over 70% in 2000 and by the same margin again over the next three years. Managers employed several tools in an effort to constrain catches to these dramatically lower targets. These included: reductions in trip/bag limits for canary and co-occurring species, the institution of spatial closures, and new gear restrictions intended to reduce trawling in rocky shelf habitats and the coincident catch of rockfish in shelf flatfish trawls. In recent years, the total mortality has been slightly above the OY (higher in retrospect based on current methods used for total mortality estimates), but well below the ABC. Since the overfished determination in 1999, the total 9-year catch (749 mt) has been only 14% above the sum of the OYs for 2000-2006. This level of removals represents only 34% of the sum of the ABCs for that period. The total 2008 catch (40.5 mt) is <1% of the peak catch that occurred in the early 1980s.

Table e. Recent trend in estimated total canary rockfish catch and commercial landings (mt) relative to management guidelines.

Year	ABC (mt)	OY (mt)	Commercial landings (mt)[1]	Total Catch (mt)
1999	1,045[2]	857[2]	666.3	898.7
2000	287	200	55.7	199.9
2001	228	93	42.6	133.0
2002	228	93	47.8	98.1
2003	272	44	8.6	59.9
2004	256	47.3	10.7	50.3
2005	270	46.8	12.0	60.4
2006	279	47	7.3	62.0
2007	172	44	12.1	44.7
2008	179	44	9.4	40.5

[1]Excludes all at-sea whiting, recreational and research catches.
[2]Includes the Columbia and Vancouver INPFC areas only.

Unresolved problems and major uncertainties

As in the 2007 assessment, parameter uncertainty is explicitly captured in the asymptotic confidence intervals reported throughout this assessment for key parameters and management quantities. These intervals reflect the uncertainty in the model fit to the data sources included in the assessment, but do not include uncertainty associated with alternative model configurations, weighting of data sources (a combination of input sample sizes and relative weighting of likelihood components), or fixed parameters. Specifically, there appears to be conflicting information between the length- and age-frequency data regarding the degree of stock decline, making the model results sensitive to the relative weighting of each. This issue was not revisited as part of the update. The relationship between the degree of domed shape in the selectivity curves and the increase in female natural mortality with age remains a source of uncertainty that is included in model results, as it has been in previous assessments for canary rockfish. Uncertainty in the steepness parameter of the stock-recruitment relationship is significant and will likely persist in future assessments; this uncertainty is included in the assessment and rebuilding projections through explicit consideration of the three states of nature. Given the change in this update caused by the revised historical California catch estimates, future assessments are likely to be sensitive to additional revised estimates from ongoing efforts in Oregon and Washington should they prove appreciably different from the time-series used here.

Forecasts

The forecast reported here will be replaced by the rebuilding analysis to be completed in September-October 2009 following SSC review of the stock assessment. In the interim, the total catch in 2009 and 2010 is set equal to the OY (105 mt). The exploitation rate for 2011 and beyond is based upon an SPR of 92.2%, which approximates the harvest level in the current rebuilding plan. As in 2007, uncertainty in the rebuilding forecast will be based upon the three states of nature for steepness and random variability in future recruitment deviations for each rebuilding simulation. Current medium-term forecasts predict slow increases in abundance and available catch, with OY values for 2011 and 2012 lower than those predicted from the 2007 assessment. The following table shows the projection of expected canary rockfish catch, spawning biomass and depletion.

Table f. Projection of potential canary rockfish ABC, OY, spawning biomass and depletion for the base case model based on the SPR = 0.922 fishing mortality target used for the last rebuilding plan (OY) and $F_{50\%}$ overfishing limit/target (ABC). Assuming the OY of 105 mt is achieved exactly in 2009 and 2010.

Year	ABC[1] (mt)	OY[1] (mt)	Age 5+ biomass (mt)	Spawning biomass (mt)	Depletion
2009	*981*	*105*	15,483	6,170	23.7%
2010	*980*	*105*	15,687	6,379	24.5%
2011	627	69	16,129	6,548	25.2%
2012	661	73	16,825	6,694	25.8%
2013	690	76	17,229	6,828	26.3%
2014	718	79	17,862	6,975	26.8%
2015	749	83	18,554	7,152	27.5%
2016	780	86	19,300	7,365	28.3%
2017	812	90	20,094	7,616	29.3%
2018	843	93	20,925	7,904	30.4%
2019	874	96	21,783	8,224	31.6%
2020	905	100	22,658	8,567	33.0%

[1]ABC/OY values for 2009 and 2010 have already been adopted, and are not based on the results of this update.

Decision table

The format of this decision table is unchanged from the 2007 assessment. Because canary rockfish is currently managed under a rebuilding plan, this decision table is only intended to better compare and contrast the base case with uncertainty among states of nature. The results of the rebuilding plan will integrate these three states of nature as well as projected recruitment variability. Further, various alternate probabilities of rebuilding by target and limit time-periods as well as fishing mortality rates will be evaluated in the rebuilding analysis. Relative probabilities of each state of nature are based on a meta-analysis for steepness of west coast rockfish (M. Dorn, AFSC, personal communication). Landings in 2009-2010 are 105 mt for all cases. Selectivity and fleet allocations are projected at the average 2006-2008 values.

Table g. Decision table of 12-year projections for alternate states of nature (columns) and management options (rows) beginning in 2011. Relative probabilities of each state of nature are based on a 2007 meta-analysis for steepness of west coast rockfish (M. Dorn, AFSC, personal communication). Landings in 2009-2010 are 105 mt for all cases. Selectivity and fleet allocations are projected at the average 2006-2008 values.

			State of nature					
			Low steepness (0.35)		Base case (steepness = 0.51)		High steepness (0.72)	
Relative probability			0.25		0.5		0.25	
Management decision	Year	Catch (mt)	Depletion	Spawning biomass (mt)	Depletion	Spawning biomass (mt)	Depletion	Spawning biomass (mt)
Rebuilding SPR 92.2% catches from low steepness state of nature	2011	25	9.4%	2,509	25.2%	6,548	43.3%	11,052
	2012	26	9.5%	2,535	25.8%	6,711	44.7%	11,397
	2013	27	9.6%	2,553	26.4%	6,862	46.0%	11,722
	2014	28	9.7%	2,572	27.0%	7,029	47.3%	12,068
	2015	29	9.8%	2,600	27.8%	7,228	48.8%	12,453
	2016	30	9.9%	2,639	28.7%	7,464	50.5%	12,876
	2017	31	10.1%	2,693	29.8%	7,741	52.3%	13,331
	2018	32	10.4%	2,761	31.0%	8,055	54.2%	13,813
	2019	33	10.7%	2,843	32.3%	8,403	56.1%	14,312
	2020	34	11.0%	2,934	33.8%	8,776	58.1%	14,820
Rebuilding SPR 92.2% catches from base case	2011	69	9.4%	2,509	25.2%	6,548	43.3%	11,052
	2012	73	9.5%	2,519	25.8%	6,694	44.6%	11,381
	2013	76	9.5%	2,519	26.3%	6,828	45.8%	11,688
	2014	79	9.5%	2,519	26.8%	6,975	47.1%	12,013
	2015	83	9.5%	2,525	27.5%	7,152	48.5%	12,376
	2016	86	9.6%	2,542	28.3%	7,365	50.1%	12,774
	2017	90	9.7%	2,571	29.3%	7,616	51.8%	13,205
	2018	93	9.8%	2,614	30.4%	7,904	53.6%	13,659
	2019	96	10.0%	2,668	31.6%	8,224	55.4%	14,131
	2020	100	10.3%	2,731	33.0%	8,567	57.3%	14,610
Rebuilding SPR 92.2% catches from high steepness state of nature	2011	118	9.4%	2,509	25.2%	6,548	43.3%	11,052
	2012	124	9.4%	2,500	25.7%	6,676	44.6%	11,362
	2013	129	9.3%	2,481	26.1%	6,790	45.7%	11,649
	2014	133	9.3%	2,460	26.6%	6,915	46.9%	11,952
	2015	137	9.2%	2,444	27.2%	7,069	48.2%	12,291
	2016	142	9.2%	2,437	27.9%	7,257	49.7%	12,665
	2017	146	9.2%	2,442	28.8%	7,483	51.3%	13,070
	2018	151	9.3%	2,460	29.8%	7,746	52.9%	13,498
	2019	155	9.4%	2,489	30.9%	8,039	54.7%	13,944
	2020	159	9.5%	2,526	32.1%	8,356	56.5%	14,397
Status quo (catch = 105 mt)	2011	105	9.4%	2,509	25.2%	6,548	43.3%	11,052
	2012	105	9.4%	2,507	25.7%	6,683	44.6%	11,369
	2013	105	9.4%	2,496	26.2%	6,806	45.7%	11,665
	2014	105	9.4%	2,485	26.7%	6,941	47.0%	11,978
	2015	105	9.3%	2,480	27.3%	7,106	48.3%	12,329
	2016	105	9.3%	2,485	28.1%	7,306	49.9%	12,715
	2017	105	9.4%	2,503	29.0%	7,546	51.5%	13,134
	2018	105	9.5%	2,536	30.1%	7,824	53.2%	13,578
	2019	105	9.7%	2,582	31.3%	8,135	55.1%	14,041
	2020	105	9.9%	2,637	32.6%	8,471	56.9%	14,514

Research and data needs

Progress on a number of research topics would substantially improve the ability of this assessment to reliably and precisely model canary rockfish population dynamics in the future and provide better monitoring of progress toward rebuilding:

1. Expanded Assessment Region: Given the high occurrence of canary rockfish close to the US-Canada border, a joint US-Canada assessment should be considered in the future.
2. Many assessments (including this one) have derived historical catch by applying various ratios to the total rockfish catch prior to the period when most species were delineated. Based on the sensitivity of this update to the revised catch history for California, a comprehensive historical catch reconstruction for all rockfish species is needed for Washington and Oregon as well.
3. Habitat relationships: The historical and current relationship between canary rockfish distribution and habitat features should be investigated to provide more precise estimates of abundance from the surveys, and to guide survey augmentations that could better track rebuilding through targeted application of newly developed survey technologies. Such studies could also assist determining the possibility of dome-shaped selectivity, aid in evaluation of spatial structure and the use of fleets to capture geographically-based patterns in stock characteristics.
4. Meta-population model: The spatial patterns show patchiness in the occurrence of large vs. small canary; reduced occurrence of large/old canary south of San Francisco; and concentrations of canary rockfish near the US-Canada border. The feasibility of a meta-population model that has linked regional sub-populations should be explored as a more accurate characterization of the coast-wide population's structure. Tagging of other direct information on adult movement will be essential to this effort.
5. Increased computational power and/or efficiency is required to move toward fully Bayesian approaches that may better integrate over both parameter and model uncertainty.
6. Additional exploration of surface ages from the late 1970s and inclusion into or comparison with the assessment model, or re-aging of the otoliths could improve the information regarding that time period when the stock underwent the most dramatic decline. Auxiliary biological data collected by ODFW from recreational catches and hook-and-line projects may also increase the performance of the assessment model in accurately estimating recent trends and stock size.
7. Due to inconsistencies between studies and scarcity of appropriate data, new data are needed on both the maturity and fecundity relationships for canary rockfish.
8. Re-evaluation of the pre-recruit index as a predictor of recent year class strength should be ongoing as future assessments generate a longer series of well-estimated recent recruitments to compare with the coast-wide survey index.
9. Meta-analysis or other summary of the degree of recruitment variability and the relative steepness for other rockfish and groundfish stocks should be ongoing, as this information is likely to be very important for model results (as it is here) in the foreseeable future.

Rebuilding projections

The rebuilding projections will be presented in a separate document after the assessment has been reviewed in June 2009.

Table h. Summary of recent trends in estimated canary rockfish exploitation and stock levels from the base case model; all values reported at the beginning of the year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Commercial landings (mt)[1]	55.7	42.6	47.8	8.6	10.7	12	7.3	12.1	9.4	NA
Total catch (mt)	199.9	133	98.1	59.9	50.3	60.4	62	44.7	40.5	NA
ABC (mt)	287	228	228	272	256	270	279	172	179	981
OY	200	93	93	44	47.3	46.8	47.0	44	44	105
SPR	73.0%	81.6%	86.7%	91.1%	93.0%	92.6%	92.2%	94.5%	95.0%	NA
Exploitation rate (catch/age 5+ biomass)	0.0204	0.0127	0.0088	0.0051	0.004	0.0046	0.0044	0.0031	0.0027	NA
Age 5+ biomass (mt)	9,783	10,502	11,114	11,698	12,513	13,106	13,945	14,542	15,145	15,483
Spawning biomass (mt)	3,316	3,699	4,080	4,440	4,781	5,091	5,372	5,642	5,912	6,170
~95% Confidence interval	2,331-4,302	2,592-4,805	2,856-5,304	3,108-5,772	3,353-6,210	3,577-6,604	3,783-6,960	3,984-7,301	4,187-7,636	4,385-7,955
Range of states of nature	1,507-5,182	1,639-5,835	1,774-6,485	1,899-7,107	2,023-7,696	2,131-8,240	2,222-8,748	2,305-9,247	2,386-9,751	2,459-10,244
Recruitment (1000s)	904	1,936	1,004	1,148	422	594	1,679	2,276	1,012	1,886
~95% Confidence interval	559-1,460	1,361-2,754	661-1,524	761-1,733	245-725	306-1,156	872-3,231	1,143-4,530	441-2,319	734-4,848
Range of states of nature	335-1,025	735-2,491	359-1,220	400-1,416	137-452	185-556	546-1,539	715-2,004	301-737	636-1,104
Depletion	12.8%	14.2%	15.7%	17.1%	18.4%	19.6%	20.7%	21.7%	22.7%	23.7%
~95% Confidence interval	9.2-16.4%	10.2-18.3%	11.2-20.2%	12.2-21.9%	13.2-23.6%	14.1-25.1%	14.9-26.4%	15.7-27.7%	16.5-29.0%	17.3-30.2%
Range of states of nature	5.7-20.3%	6.2-22.9%	6.7-25.4%	7.1-27.9%	7.6-30.2%	8.0-32.3%	8.4-34.3%	8.7-36.3%	9.0-38.2%	9.3-40.2%

[1]Excludes all at-sea whiting, recreational and research catches.

Table i. Summary of canary rockfish reference points from the base case model. Values are based on 1994-1998 fishery selectivity and allocation to reflect the performance of recent targeted fishing rather than the current bycatch-only environment.

Quantity	Estimate	~95% Confidence interval	Range of states of nature
Unfished spawning stock biomass (SB_0, mt)	25,993	24,266-27,719	25,500-26,575
Unfished 5+ biomass (mt)	68,539	64,536-72,542	66,349-71,606
Unfished recruitment (R_0, thousands)	3,335	3,101-3,570	3,203-3,529
Reference points based on $SB_{40\%}$			
MSY Proxy Spawning Stock Biomass ($SB_{40\%}$)	10,397	9,706-11,088	10,200-10,630
SPR resulting in $SB_{40\%}$ ($SPR_{SB40\%}$)	54.4%	NA	45.8-67.9%
Exploitation rate resulting in $SB_{40\%}$	0.0353	NA	0.0213-0.0469
Yield with $SPR_{SB40\%}$ at $SB_{40\%}$ (mt)	959	882-1,036	599-1,248
Reference points based on SPR proxy for MSY			
Spawning Stock Biomass at SPR (SB_{SPR})(mt)	8,909		1,772-11,377
$SPR_{MSY\text{-}proxy}$	0.5	NA	NA
Exploitation rate corresponding to SPR	0.0409	NA	0.0406-0.0409
Yield with $SPR_{MSY\text{-}proxy}$ at SB_{SPR} (mt)	954	877-1,030	191-1,209
Reference points based on estimated MSY values			
Spawning Stock Biomass at MSY (SB_{MSY}) (mt)	9,949	9,315-10,582	8,105-11,629
SPR_{MSY}	53.0%	52.8-53.2%	38.4%-69.9%
Exploitation Rate corresponding to SPR_{MSY}	0.0369	0.0352-0.0387	0.0196-0.0596
MSY (mt)	960	883-1,037	602-1,278

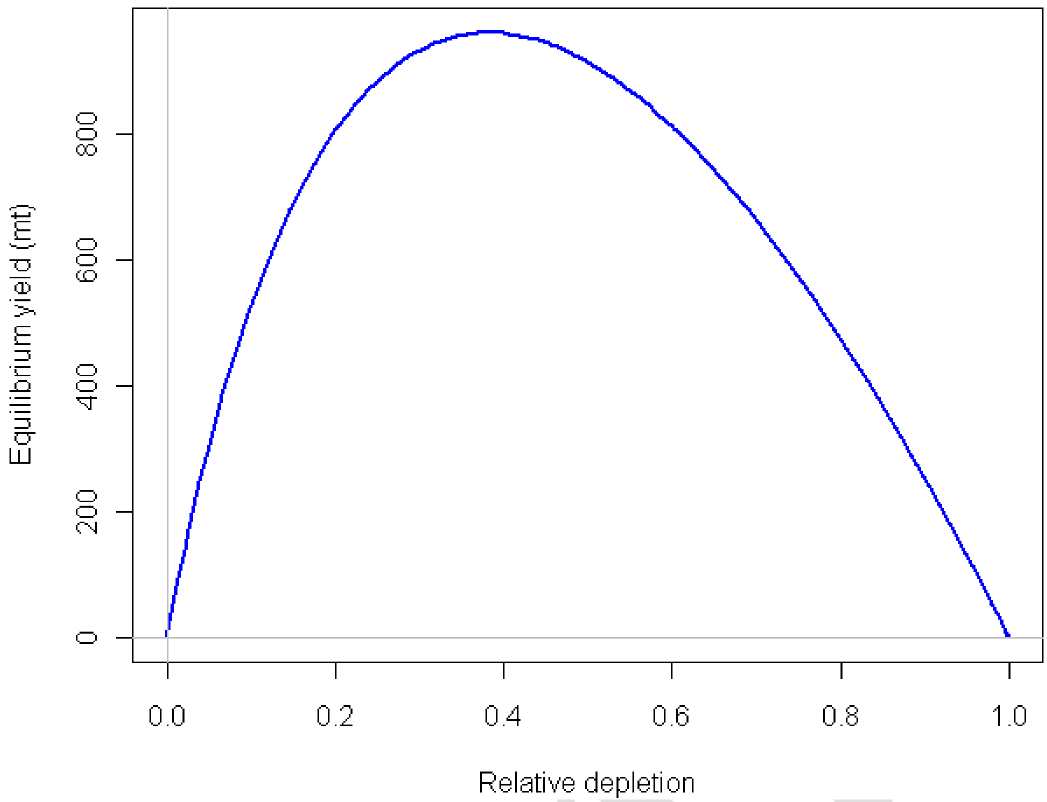
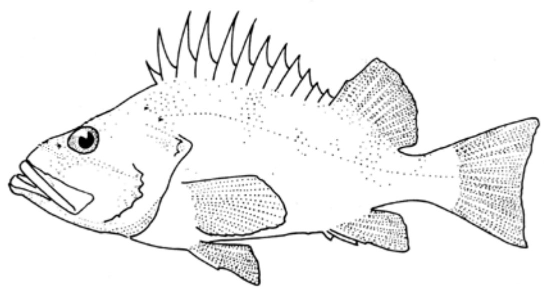


Figure i. Equilibrium yield curve for the base case model. Values are based on 1994-1998 fishery selectivity and allocation to reflect the performance of a targeted fishery.

Agenda Item E.6.a
Attachment 7
June 2009

Updated status of cowcod, *Sebastes levis*, in the Southern California Bight



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June 2009

Cowcod drawing adapted from Fish Bulletin No. 157 (California Department of Fish and Game, 1972)

Executive Summary

Stock: This assessment describes the status of cowcod (*Sebastes levis*) in the Southern California Bight (SCB), defined as U.S. waters off California and south of Point Conception (34°27' north latitude). The assumption of an isolated stock is untested, and no information is available regarding stock structure or dispersal across the assumed stock boundaries.

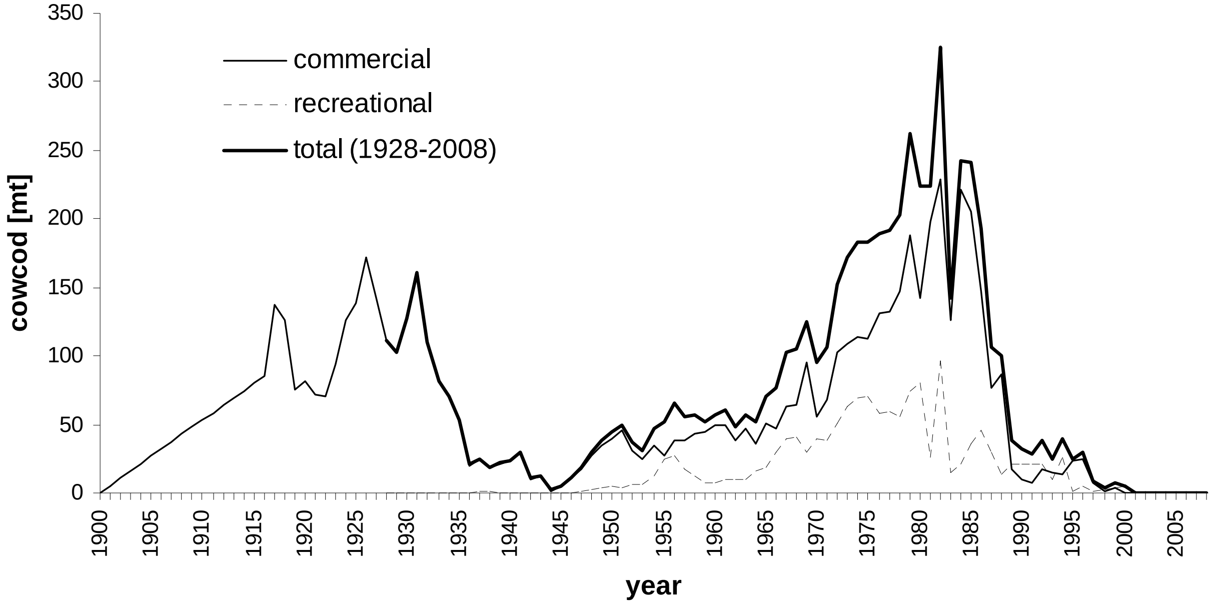
Catch: Commercial landings of cowcod from 1969-2008 were obtained from the CALCOM database (CALCOM, 2009). Recreational landings were obtained from the RecFIN database (www.recfin.org) for the period 1981-2008. Retention of cowcod has been prohibited since January 2001. Due to uncertainty in total mortality since no-retention regulations took effect, recreational and commercial mortalities have been fixed at 0.25 metric tons per year, per fishery (Table ES1).

Dick et al. (2007) estimated historical commercial landings of cowcod in Southern California (1900-1968). Estimated catches from a recent commercial catch reconstruction effort (Ralston et al., in review) are slightly larger than those reported by Dick et al., but represent landings in the Conception INPFC area rather than south of Point Conception. For this reason, we retain the commercial landings reconstruction from the previous assessment. Historical recreational landings were estimated by Butler et al. (1999) for the period 1951-1979. An alternative reconstruction of recreational landings (Ralston et al., in review) for the years 1928-1980 produced slightly lower estimates, but included 1970s species composition data from a CDF&G recreational observer program. We present model results based on both recreational time series (see main text), and incorporate the reconstructed recreational landings from Ralston et al. in the base model.

Table ES1: Recent estimated catches of cowcod (mt) in the Southern California Bight.

Year	Commercial	Recreational	Total
1999	3.47	3.77	7.24
2000	0.45	4.49	4.94
2001	*0.25*	*0.25*	*0.5*
2002	*0.25*	*0.25*	*0.5*
2003	*0.25*	*0.25*	*0.5*
2004	*0.25*	*0.25*	*0.5*
2005	*0.25*	*0.25*	*0.5*
2006	*0.25*	*0.25*	*0.5*
2007	*0.25*	*0.25*	*0.5*
2008	*0.25*	*0.25*	*0.5*

Figure ES1: Estimated cowcod catch, 1900-2008



Data and assessment: The last assessment of cowcod was completed in 2007 (Dick et al., 2007). The current assessment is based on an identical age-structured model with three estimated parameters: virgin recruitment (R_0), catchability for a logbook index from the Commercial Passenger Fishing Vessel (CPFV) fleet, and catchability for a biomass estimate from a submersible line-transect survey (Yoklavich et al., 2007). Recruitment is assumed to follow a Beverton-Holt type relationship with steepness (h) fixed at 0.6. Natural mortality (M) is fixed at 0.055 yr^{-1}. The model was created using Stock Synthesis 2 (version 2.00c, 3/26/07).

All commercial gear types are modeled as a single fishery, with selectivity for the combined commercial fleet set equal to the female maturity schedule. Recreational landings are also modeled as a single fishery. Length data from a CDF&G observer study were used to estimate a selectivity curve that is shared by the combined recreational fishery and Commercial Passenger Fishing Vessel (CPFV) logbook index.

Abundance indices include a time series of relative abundance derived from CPFV logbook data (details in Dick et al., 2007). The CPFV logbook index ends in 2000 due to the adoption of no-retention regulations in 2001. An estimate of cowcod biomass in 2002 from a submersible line-transect survey inside the Cowcod Conservation Areas (Yoklavich et al., 2007) is modeled as a relative abundance index with a Gaussian prior probability distribution on the logarithm of catchability (details in Piner et al., 2005).

Uncertainty in the base model was characterized by evaluating alternative values of steepness (0.4 and 0.8) and examining the effect of removing the CPFV logbook index. Removing the CPFV index reduces the model to a deterministic trajectory, solving for the value of unfished recruitment that allows the model to exactly match the adjusted 2002 biomass estimate.

Unresolved problems and major uncertainties

The CPFV index ends in 2000, and no data in the model inform trends in biomass since the 2002 submersible survey. Indications of stock increases since 2002 are inferred from the model but have not been confirmed by observations. Replication of the non-lethal submersible survey, inside and outside the Cowcod Conservation Areas (CCA), could provide information on rebuilding progress without impacting affected fisheries.

The CPFV logbook index is a long-term (1963-2000) time series of relative abundance which shows declining catch rates over time in the SCB. It is estimated from logbook records of catch and effort that are aggregated by year, month, and CDFG block. This level of aggregation makes it difficult to determine the amount of effective effort for cowcod. The biomass trajectory from the population model is unable to match the rate of decline exhibited by this index, i.e. a 'hyperdepletion' pattern exists. The STAT recommends further analysis of this data set in future full assessments of cowcod.

The base model fixes steepness at 0.6 based on the expectation of a prior distribution from a meta-analysis of rockfish steepness parameters. Attempts to quantify uncertainty in this parameter, given the current model structure, suggest that the current value may overestimate productivity of the stock (see Uncertainty Analysis in main text). Recruitments are estimated directly from the stock-recruitment relationship, although considerable interannual variation in recruitment is a common characteristic of rockfish species.

The base model underestimates our uncertainty about the status of the stock. Several model assumptions (e.g. fixed steepness and natural mortality, recruitments drawn from the stock-recruitment curve, catches known without error) generate results that are unrealistically precise. The last full assessment identified the steepness parameter and the CPFV logbook index as two dominant sources of uncertainty in the model. Other sources of uncertainty such as natural mortality, historical catch, gear selectivity, and recruitment variability are almost certainly important as well, but difficult to estimate with the available data.

Historical commercial landings are based on species composition data from relevant ports and gear types, using the earliest data for which we have actual samples (1980s). However, the percentage of cowcod in total rockfish landings in years prior to the 1980s is not well understood, and this percentage is assumed to be constant over the historical period.

The biomass estimate from the 2002 visual survey is expanded to represent the biomass in the entire SCB via an estimated catchability coefficient with an informative prior distribution. This data point and the CPFV survey provide conflicting information about the status of the stock in 2002. The influence of the visual survey on model results is largely determined by the assumed precision of the prior on the catchability coefficient. To avoid this issue, future visual surveys should be expanded to include areas outside the Cowcod Conservation Areas.

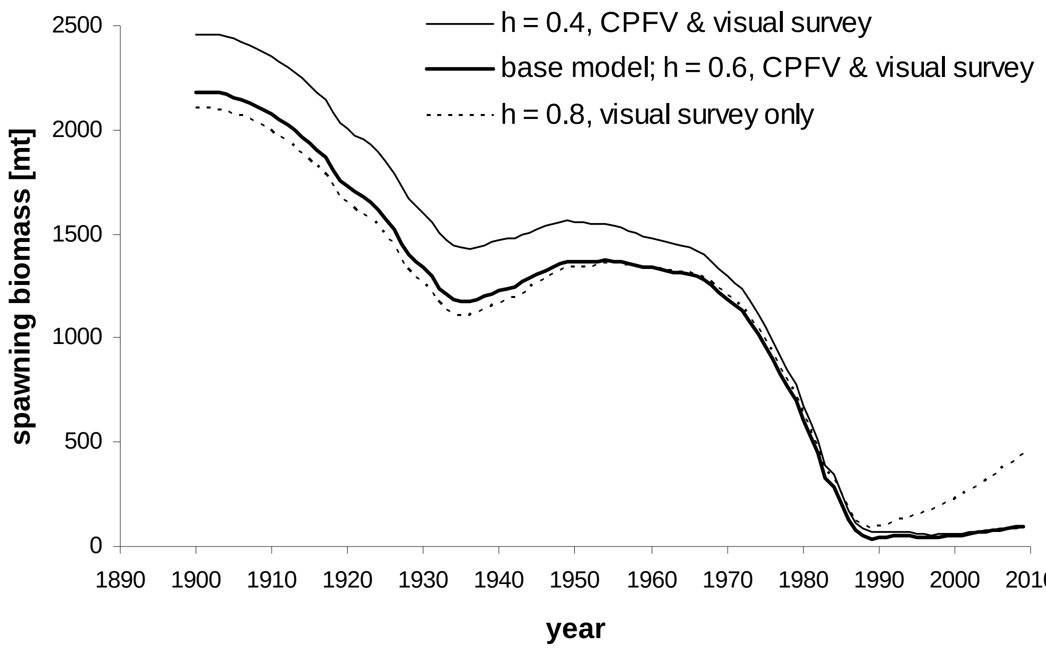
Reference points: For *Sebastes*, the PFMC currently uses $F_{50\%}$ as a proxy for the fishing mortality rate that achieves maximum sustainable yield (F_{MSY}). Estimated spawning biomass (SB) in 2009 is between 3.8% and 21.0% of the unfished level (Table ES2). The poor precision of this estimate is due to 1) a lack of data to inform estimates of stock productivity, and 2) conflicting information from fishery-dependent and fishery–independent data. The most optimistic model presented here, which assumes a high-productivity stock (h = 0.8) and ignores declines suggested by CPFV catch rates, suggests that female spawning biomass has been below 25% since 1980 (Fig. ES2). Retention of cowcod is prohibited and bycatch is thought to be minimal, so it is unlikely that overfishing is currently an issue.

Table ES2: Base model (h = 0.6) reference points and alternative low- and high-productivity models

	Model Description			
	h = 0.4	**h = 0.6**	**h = 0.8**	
Reference Point	**CPFV Logbook + Visual Survey**	**CPFV Logbook + Visual Survey**	**Visual Survey**	**units**
Unfished summary (age-1+) biomass	5233	4643	4469	metric tons
Unfished female spawning biomass (SB_0)	2461	2183	2101	metric tons
Unfished recruitment (R_0)	109	96	93	1000s of fish
40% of SB_0 (proxy for SB_{MSY})	984	873	841	metric tons
Exploitation rate at $F_{50\%}$ (proxy for F_{MSY})	2.7%	2.7%	2.7%	percent
Spawning biomass in 2009 (SB_{2009})	93	98	441	metric tons
SB_{2009} / SB_0	3.8%	4.5%	21.0%	percent

Spawning stock biomass: Estimates of female spawning stock biomass in 2009 are highly uncertain. The current models suggest that spawning biomass has declined from an unfished biomass of 2101-2461mt to 93-441 mt in 2009 (Fig. ES2, Table ES2).

Figure ES2: Time series of female spawning biomass for cowcod



Relative depletion: Estimates of relative depletion in 2009 range from 3.8% to 21% (Fig. ES3). Indications of recent stock increases (Table ES3) are inferred from the model but have not been confirmed by observations.

Figure ES3: Time series of relative depletion for cowcod (female spawning biomass in 2009 as a percentage of unfished female spawning biomass).

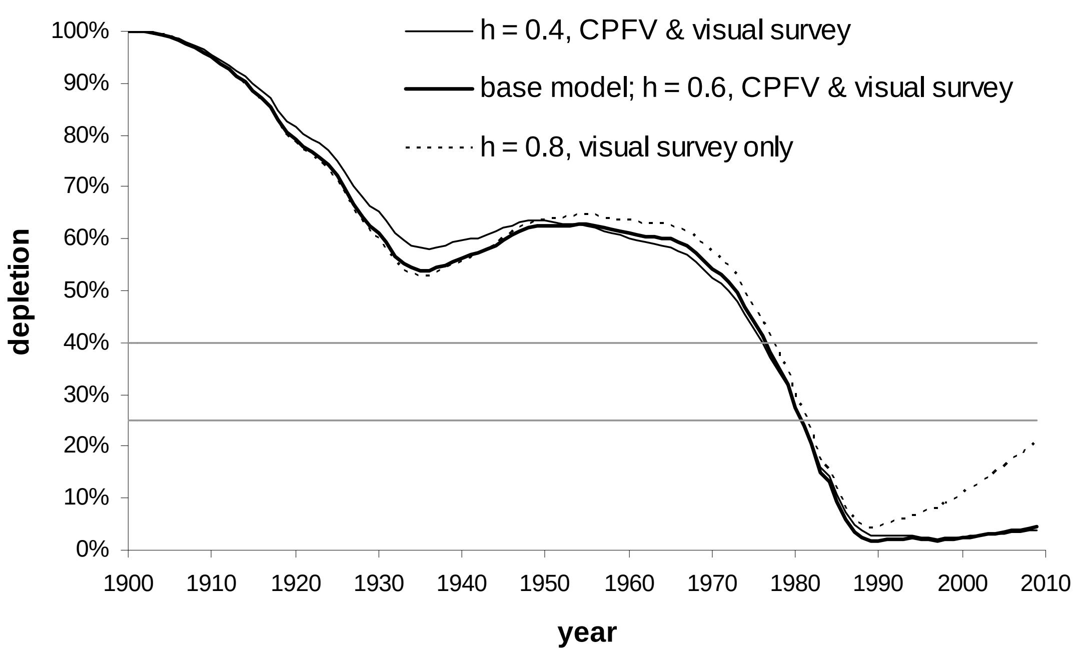


Table ES3: Recent trends in cowcod biomass and depletion

	h = 0.4, CPFV index & visual survey			h = 0.6, CPFV index & visual survey			h = 0.8, visual survey only		
year	Age 1+ biomass [mt]	SB [mt]	SB/SB_0	Age 1+ biomass [mt]	SB [mt]	SB/SB_0	Age 1+ biomass [mt]	SB [mt]	SB/SB_0
2000	146	62	2.5%	132	51	2.3%	579	226	10.8%
2001	150	65	2.6%	139	55	2.5%	623	246	11.7%
2002	158	69	2.8%	150	60	2.7%	672	268	12.8%
2003	166	73	3.0%	161	65	3.0%	723	291	13.8%
2004	173	77	3.1%	172	71	3.2%	775	314	14.9%
2005	180	80	3.3%	184	76	3.5%	829	338	16.1%
2006	187	84	3.4%	195	81	3.7%	884	363	17.3%
2007	194	87	3.5%	208	87	4.0%	941	388	18.5%
2008	201	90	3.7%	220	92	4.2%	999	414	19.7%
2009	208	93	3.8%	233	98	4.5%	1058	441	21.0%

Recruitment: Predicted recruitments were taken directly from the assumed stock-recruitment relationship, estimating only virgin recruitment. The base model suggests that recruitment declined rapidly from about 1970-1990, followed by an increasing trend (Fig. ES4, Table ES4).

Figure ES4: Time series of estimated recruitment for cowcod

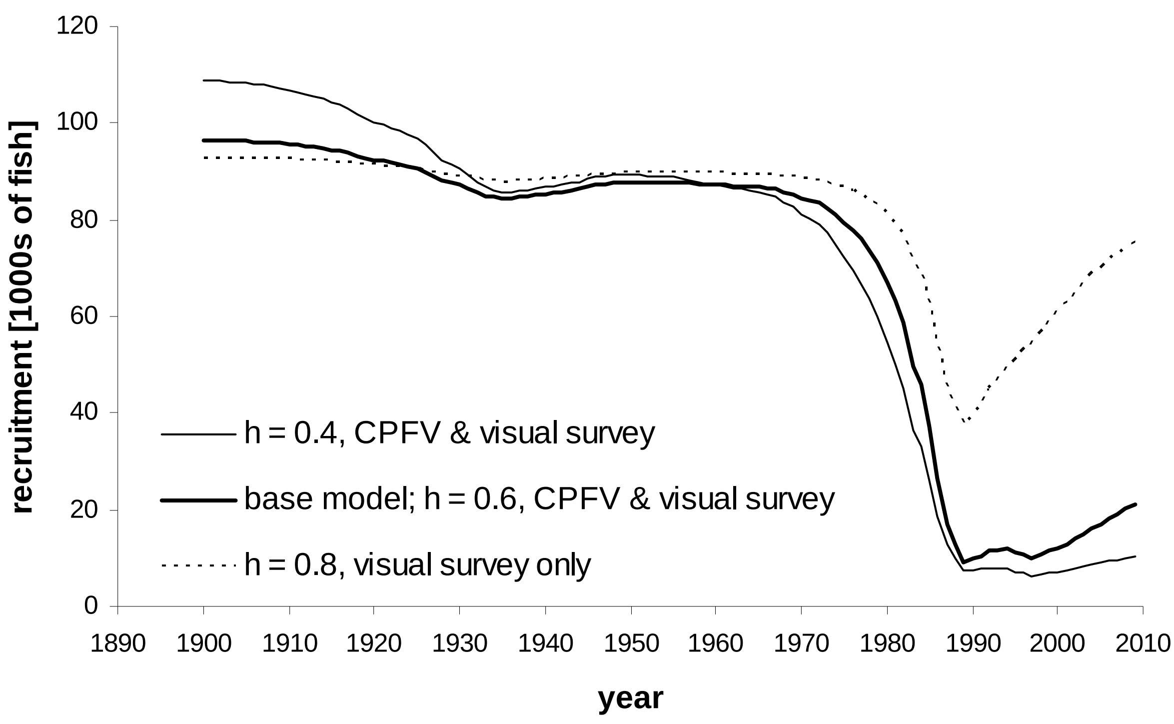


Table ES4: Estimated recruitments from the base model stock-recruitment curve.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Recruitment (1000s)	12.1	12.9	14.0	15.0	16.1	17.1	18.2	19.2	20.2	21.1

Exploitation status: We summarize the history of exploitation according to the base model with two phase diagrams. Figure ES5 shows total exploitation rate (catch / age 1+ biomass) relative to the exploitation rate at $F_{50\%}$, plotted against spawning biomass relative to target spawning biomass ($SB_{40\%}$). Figure ES6 replaces exploitation rate with the complement of the spawning potential ratio (1-SPR). SPR is the ratio of equilibrium spawning output per recruit under fished conditions to spawning output per recruit in the virgin population.

Figure ES5: Phase diagram of cowcod exploitation history (relative exploitation rate)

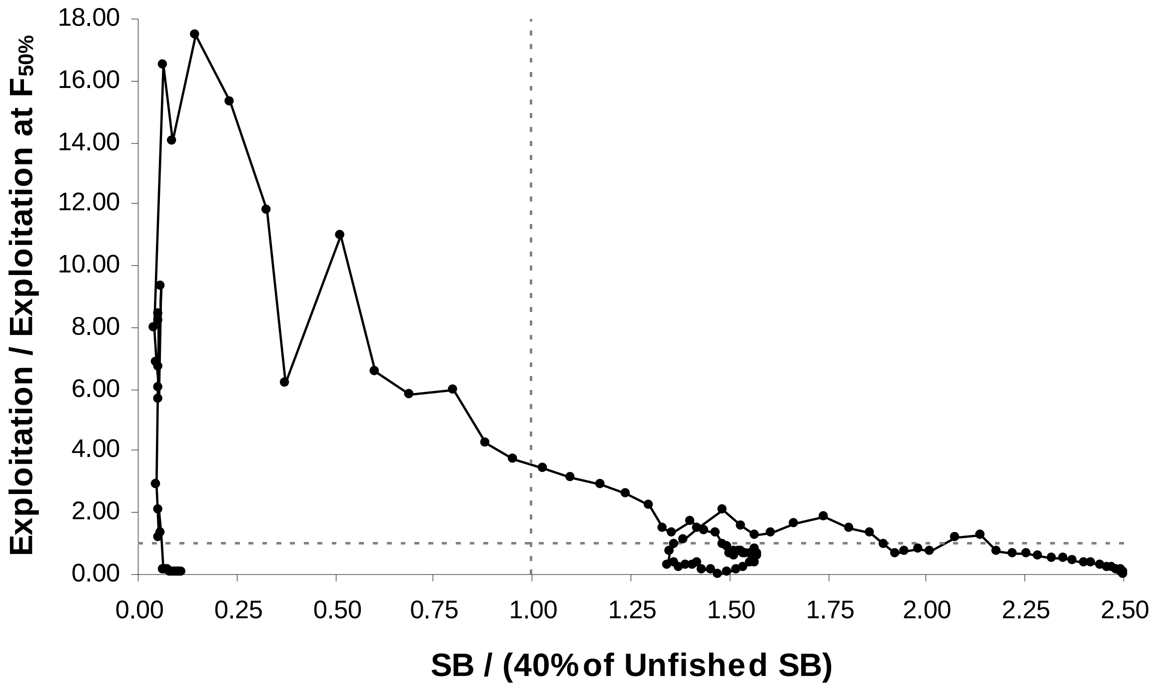
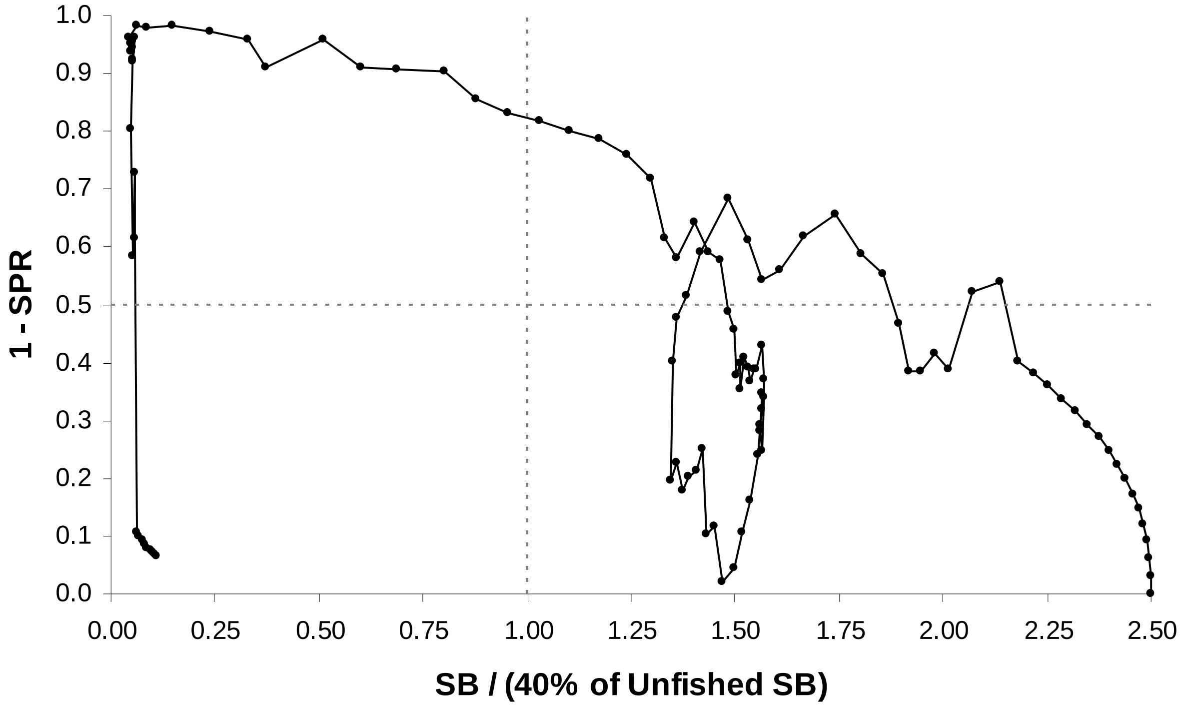


Figure ES6: Phase diagram of cowcod exploitation history (1-SPR)



Management performance: The CCAs are effective at minimizing fishing mortality over offshore rocky habitat in the SCB. However, evaluation management performance for cowcod is difficult for several reasons. Retention of cowcod is prohibited; requiring estimation of bycatch to assess total mortality. Few cowcod have been observed in the SCB by the West Coast Groundfish Observation Program (WCGOP), and estimates of commercial discard are highly uncertain. Recreational discard rates have not been thoroughly assessed. Recreational observer data are available for the CPFV fleets, but little is known about discard from private boats.

A portion of the recreational rockfish catch has not been identified to species (the “rockfish genus” category in RecFIN), and is not included in current estimates of total mortality for rockfish species. Cowcod are a small component of rockfish catch in recent years but given the low OYs even a small fraction of cowcod in the total unidentified catch may influence management decisions. The PFMC has tasked the RecFIN committees, state, NMFS, and Council staff to evaluate this issue and report to the Council at the September 2009 meeting (PFMC, 2009).

Although current total mortality estimates are highly uncertain, the available catch estimates and mortality reports suggest that landings in the SCB have not exceeded the OY limits in recent years (Table ES5). Piner et al. (2005) and Butler et al. (1999) describe the history of management measures related to cowcod in greater detail.

Table ES5: Recent management performance

Year	Commercial (CalCOM)	Recreational (RecFIN)	Total Mortality Report	Assumed Total Mortality: Commercial	Assumed Total Mortality: Recreational	ABC[a]	OY[a]
1999	3.47	3.77	--	3.47	3.77	[b]	[b]
2000	0.45	4.49	--	0.45	4.49	5	<5
2001	--	--	--	0.25	0.25	5	2.4
2002	0.03	0.49	0.02	0.25	0.25	5	2.4
2003	--	--	0.00	0.25	0.25	5	2.4
2004	--	0.45	0.54	0.25	0.25	5	2.4
2005	0.04	0.15	0.25	0.25	0.25	5	2.1
2006	--	0.07	0.10	0.25	0.25	5	2.1
2007	0.06	0.11	0.21	0.25	0.25	17	4
2008	--	0.19	--	0.25	0.25	17	4

[a] ABCs and OYs are for the Conception area only

[b] cowcod managed under "other rockfish"

Forecasts and Decision Tables

Principal results from the cowcod rebuilding analysis will be included in the SAFE version of this assessment.

Table ES6: Summary of recent trends in cowcod exploitation and stock levels from the base case model.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Assumed total mortality (mt)	4.94	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	NA
ABC[a] (mt)	5	5	5	5	5	5	5	17	17	13
OY[a] (mt)	<5	2.4	2.4	2.4	2.4	2.1	2.1	4	4	4
SPR	38.6%	89.3%	90.1%	90.8%	91.4%	91.9%	92.4%	92.8%	93.2%	NA
Exploitation rate (catch / 1+ biomass)*100%	3.73%	0.36%	0.33%	0.31%	0.29%	0.27%	0.26%	0.24%	0.23%	NA
Age 1+ biomass	132.0	138.7	149.7	160.8	172.1	183.7	195.5	207.6	220.0	232.9
Spawning biomass (mt)	51.1	54.6	59.9	65.2	70.5	75.9	81.3	86.7	92.1	97.6
Recruitment (1000s)	12.1	12.9	14.0	15.0	16.1	17.1	18.2	19.2	20.2	21.1
Depletion	2.3%	2.5%	2.7%	3.0%	3.2%	3.5%	3.7%	4.0%	4.2%	4.5%

[a] ABC and OY for 2009 is for Conception and Monterey areas; other ABCs and OYs are for the Conception area only

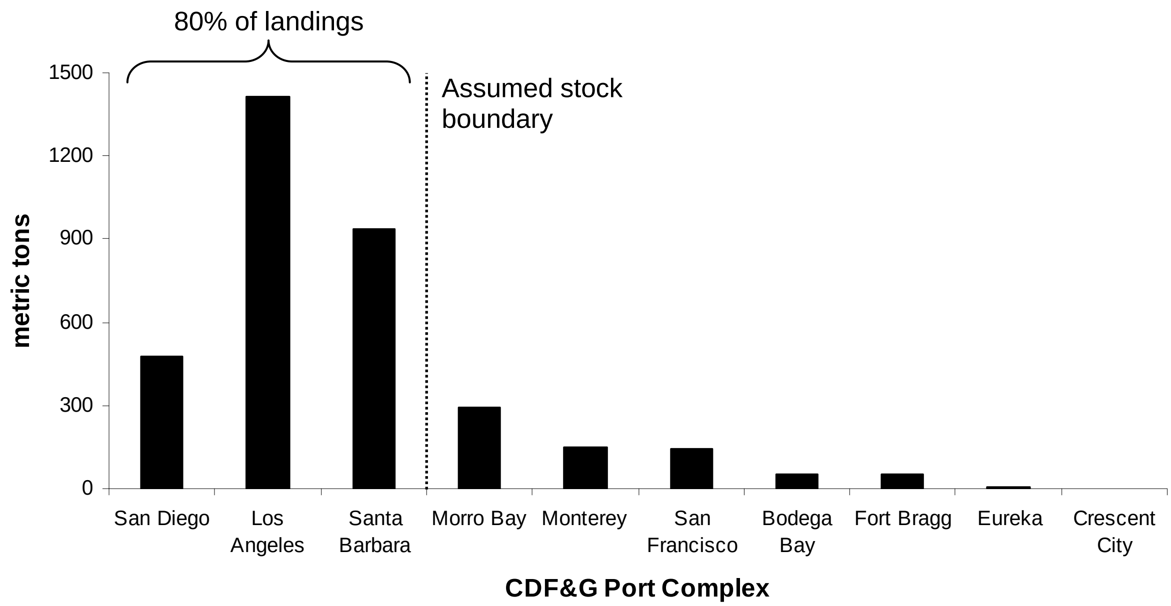
Research and data needs

The cowcod assessment is a data-poor assessment. Current progress toward rebuilding is not based on data, but rather model assumptions. Promising topics for future research include, but are not limited to:

- Development of an informative index to inform progress toward recovery
- Biological sampling to improve our understanding of life-history characteristics (length at age, maturity, fecundity, etc.)
- Improved monitoring of commercial and recreational catch and discard.
- Further refinement of methods used to estimate CPFV logbook index; future STAT teams should explore trip-specific catch composition data (1980-present) to refine estimates of effective effort for cowcod (e.g. Stephens and MacCall, 2004), and explore spatial differences in CPUE trends
- Exploration of alternative model structures and methods to quantify uncertainty
- Replication of non-lethal surveys to monitor rebuilding progress, with extended sampling inside and outside the CCAs
- Evaluation of the assumed selectivity curve for commercial gears; commercial selectivity currently matches the female maturity curve
- Examination of alternative indices, including those previously dropped from the assessment (CalCOFI, sanitation surveys, etc.), to identify potential signs of stock recovery or pulses in recruitment.

Regional management: The current model assumes that cowcod in the Southern California Bight are isolated from cowcod north of Point Conception and south of the U.S.-Mexico border. This assumption remains untested. Cowcod landings in California (1969-2005) primarily occur within the current stock boundaries (Figure ES7). The magnitude of Mexican catches is unknown.

Figure ES7: Cowcod Landings by California Port Complex, 1969-2005



Agenda Item E.6.a
Attachment 8
June 2009

DRAFT
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Status and Future Prospects for the Darkblotched Rockfish Resource in Waters off Washington, Oregon, and California as Updated in 2009

by

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May 27, 2009

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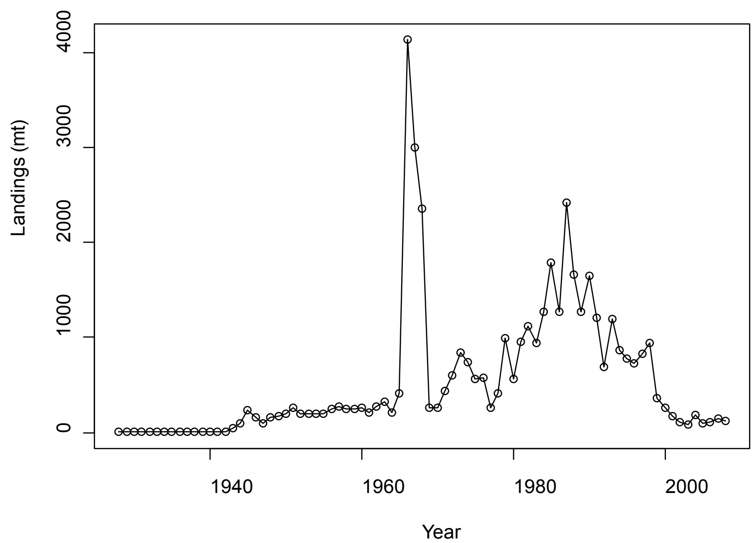
Status and Future Prospects for the Darkblotched Rockfish Resource in Waters off Washington, Oregon, and California as Updated in 2009

This assessment applies to the darkblotched rockfish (*Sebastes crameri*) resource in the combined US Vancouver, Columbia, Eureka and Monterey INPFC areas. The largest landings (removals between 2,300 and 4,200 metric tons (mt)) of darkblotched were taken from 1966-1968, primarily by foreign vessels. From 1969 to 1981, the fishery proceeded with more moderate landings of between 200 and 1000 mt per year, with the foreign fishery ending in 1977. A second peak in landings occurred between 1982 and 1993, with landings exceeding 1,100 mt in 10 of 12 years, reaching over 2,400 mt in 1987. Management measures reduced landings to below 950 mt since 1994, below 400 mt since 1999, and below 200 mt in recent years.

Landings history from 1928-2006



Landings estimates for the past 10 years

Year	*Landings(mt)*
1999	*362*
2000	*262*
2001	*173*
2002	*113*
2003	*80*
2004	*189*
2005	*98*
2006	*109*
2007	*145*
2008	*117*

This assessment used the SS model, version 3.03a. New data and updates to the data used in the previous assessment were used in this new assessment. They are as follows:

Landings data for 1983-2006 were checked, and new landings data were added for 2007 and 2008. Fishery length compositions for 1983-2006 were updated, with new 2007 and 2008 length compositions added. New pairs of discard estimates and discard length compositions for 2006 and 2007 were both added. The 1999-2008 NWFSC Slope and the 2003-2008 NWFSC Survey GLMM-based biomass indices and CV's were recalculated and used. All the length compositions for the NWFSC Slope and NWFSC Survey were updated and used. The "super years" from the AFSC Slope Survey continue to be excluded, as is the 1977 Triennial Shelf Survey. The fishery conditional age-at-length data were updated, using otoliths from 1991, 1998, and 2003-2008. The NWFSC slope and shelf conditional age-at-length from 2003-2008 were updated. Lastly, the AFSC Slope Survey conditional age-at-length from 2001 and the fishery discard otoliths from 2004 and 2005 remain unchanged.

A number of sources of uncertainty were explicitly included in this assessment. For example, allowance was made for uncertainty in natural mortality and the parameters of the stock-recruitment relationship.

There were also other sources of uncertainty that were not included in the current model, including the degree of connection between the stocks of darkblotched rockfish off British Columbia and those in PFMC waters; the effect of the PDO, ENSO and other climatic variables on recruitment, growth and survival of darkblotched rockfish; and gender-based differences in survival.

The reference case, on which this update is based, was selected by extensive model testing with an attempt to balance the sources of uncertainty.

Summary of past 10 years

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
ABC	256	256	302-349	187	205	240	269	294	456	487	437
OY			130	168	172	240	269	200	290	330	285
Landings(mt)	362	262	173	113	80	189	98	109	145	117	
*Discards(mt)**	10	152	101	66	47	63	31	91	119	96	
*Catch (mt)**	372	414	274	179	127	252	129	200	264	213	
F	0.086	0.091	0.056	0.033	0.021	0.035	0.015	0.021	0.025	0.020	
Expl. Rate	0.068	0.072	0.044	0.025	0.016	0.028	0.013	0.018	0.023	0.018	
1+ Biomass	5,462	5,776	6,280	7,109	8,122	9,161	10,018	10,935	11,672	12,180	12,579
Sp. Output	3,279	3,131	3,050	3,197	3,510	3,928	4,384	5,132	6,048	6,951	7,782
Sp. Out. sd	323	333	350	383	428	483	553	650	774	903	1021
Sp. Out. cv	0.10	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13
Recruits(10^3)	5,757	6,519	967	949	2,298	2,758	2,424	532	45	1,969	
Rec. sd	742	833	178	155	330	417	409	134	23	1582	
Rec. cv	0.13	0.13	0.18	0.16	0.14	0.15	0.17	0.25	0.51	0.80	
Depletion	0.115	0.110	0.107	0.113	0.124	0.138	0.154	0.181	0.213	0.245	0.274
Depl. sd	0.010	0.010	0.011	0.012	0.014	0.015	0.018	0.021	0.025	0.029	0.032
Depl. cv	0.086	0.094	0.102	0.107	0.109	0.110	0.113	0.114	0.115	0.117	0.118

* Discard is a model estimate, and catch is landings plus the model based discard.

The point estimate for the depletion of the spawning output at the start of 2009 is 19.6%. The ABC (using the F50% MSY proxy) and OY (from the rebuilding plan) for 2009 in the above table reflect current management based on the 2007 assessment. Under the current model the OFL (Over Fishing Limit or ABC) for 2009 is lower at 342 mt. For West Coast rockfish, a stock is considered overfished when it is below 25% of virgin spawning biomass, and recovered when it reaches 40% of virgin spawning biomass. Overfishing is considered to be occurring when catch exceeds the ABC specified for a particular year. Based on this assessment, darkblotched rockfish on the West Coast remain below the overfished threshold, but the spawning output appears to have increased steadily over the past 7 or 8 years (which is essentially the same period in which a formal rebuilding plan has been in place). Since 2003, overfishing is estimated to have occurred once, with estimated catch exceeding the ABC by 12 mt (5%) in 2004. However, due to the uncertainty in actual discard, overfishing may or may not have occurred in that year.

With the stock extending northwards into Canadian waters, management and assessment of stock status might be improved through greater cooperation with British Columbia.

Major quantities from assessment

	Value	*sd*	*cv*
$SpOut_0$ (10^8 eggs)	28,394	626	0.022
B_0 (mt)(1+ Biomass)	32,303	730	0.023
R_0 (10^3 fish)	2,982	73	0.024
$SpOut_{msy}$ (10^8 eggs)	11,358	250	0.022
F_{msy}	0.041		
Basis for above	$F_{50\%SPR}$		
Exploitation rate at MSY	0.037		
MSY	575		

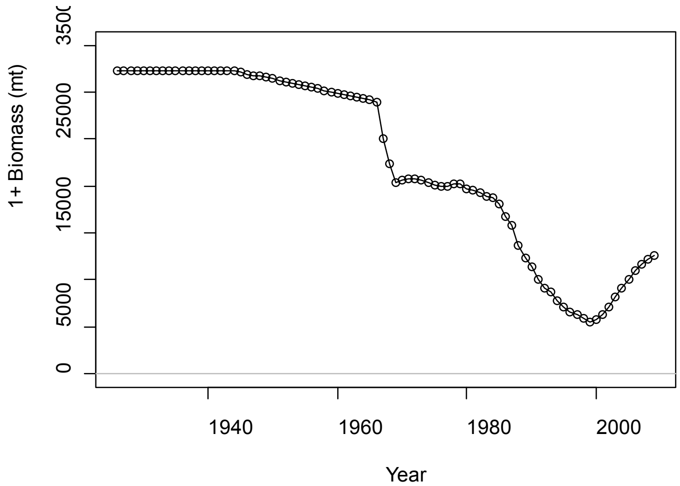
Reference points

	F_{msy}=F_{spr} (0.5)	**F_{msy} = F_{Btarg}(B_{40})**	**Calculated F_{msy}**
SPR	**0.5**	**0.5**	**0.421**
F	**0.041**	**0.041**	**0.054**
Exploitation Rate	**0.037**	**0.037**	**0.051**
MSY (mt)	**575**	**575**	**597**
Sp. Out. $_{msy}$	**11,358**	**11,358**	**8,663**
B/B_0 (Sp. Out.)	**0.40**	**0.40**	**0.305**
Age 1+ Biomass	**15,532**	**15,532**	**11,708**

*Note that when steepness (h) = 0.6, the reference F_{spr} = 0.5 will result in an equilibrium biomass of B_{40}; therefore, the first two columns in the above table are identical (since when h = 0.6 and biomass = B_{40}, expected recruitment = $0.8R_0$)

The point estimates of summary (age 1+) biomass show an upward trend over the past ten years, nearly doubling during that time.

1+ Biomass Levels from 1928 to 2009

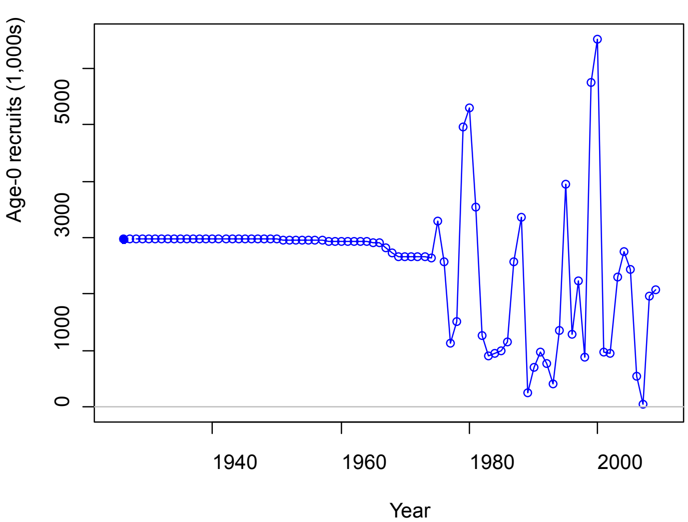


Biomass estimates for the past 10 years

Year	*Total 1+ biomass(mt)*
2000	*5,462*
2001	*5,776*
2002	*6,280*
2003	*7,109*
2004	*8,122*
2005	*9,161*
2006	*10,018*
2007	*10,935*
2008	*11,672*
2009	*12,180*

The first year for which recruitment appears to be reliably estimated is 1975. The recruitment pattern for darkblotched rockfish is similar to that of many rockfish species, with highly variable recruitment from year to year. With a few exceptions, the 1980's and 1990's provided rather poor year-classes compared with average historical recruitment levels, although the 1999 and 2000 year-classes appear to be two of the four largest year-classes since 1975. The most recent year of 2008 shows recruitment closer to those seen in 2003-2005 after very low recruitment in 2006 and 2007. These low estimates appear to reflect the low 2008 shelf survey index.

Recruitment estimates (1928-2008)



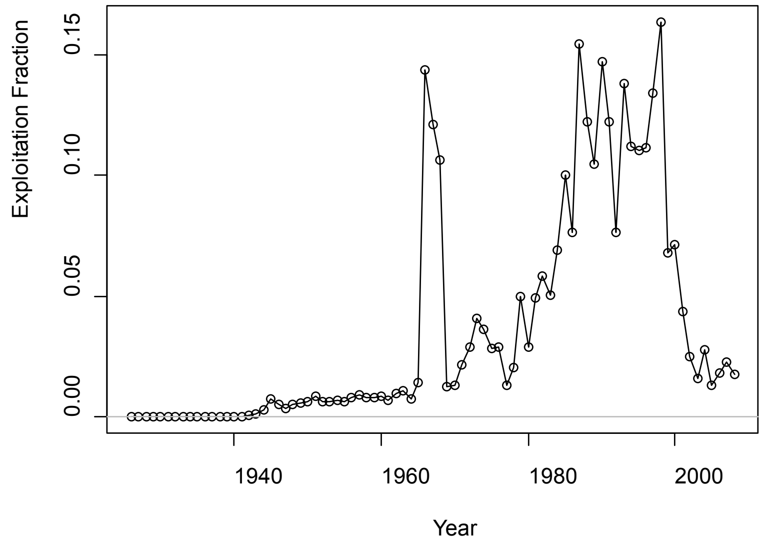
Recruitment estimates for the past 10 years (Thousands of age-0 recruits)

Year	*Recruitment*
1999	*5,757*
2000	*6,519*
2001	*967*
2002	*949*
2003	*2,298*
2004	*2,758*
2005	*2,424*
2006	*532*
2007	*45*
2008	*1,969*

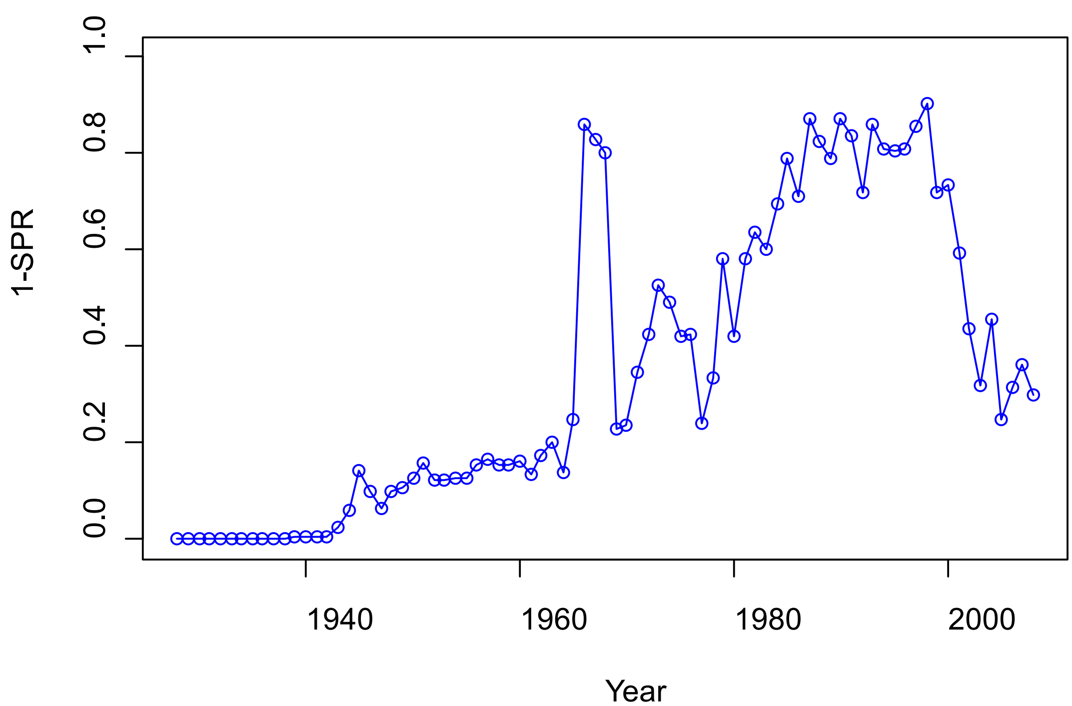
The exploitation rate (percent of biomass taken) on fully-selected animals peaked near 15% in the mid-1960's when foreign fishing was intensive. The exploitation rate dropped by the late 1960's, but increased slowly and steadily from the late 1970's to 1987 at 15% and stayed high until 1998 with the continuing decline in exploitable biomass. Over the past 10 years the exploitation rate has fallen from over 6% (with a peak of 7% in 2000) to 2%.

Explotation Fraction (1928-2008)

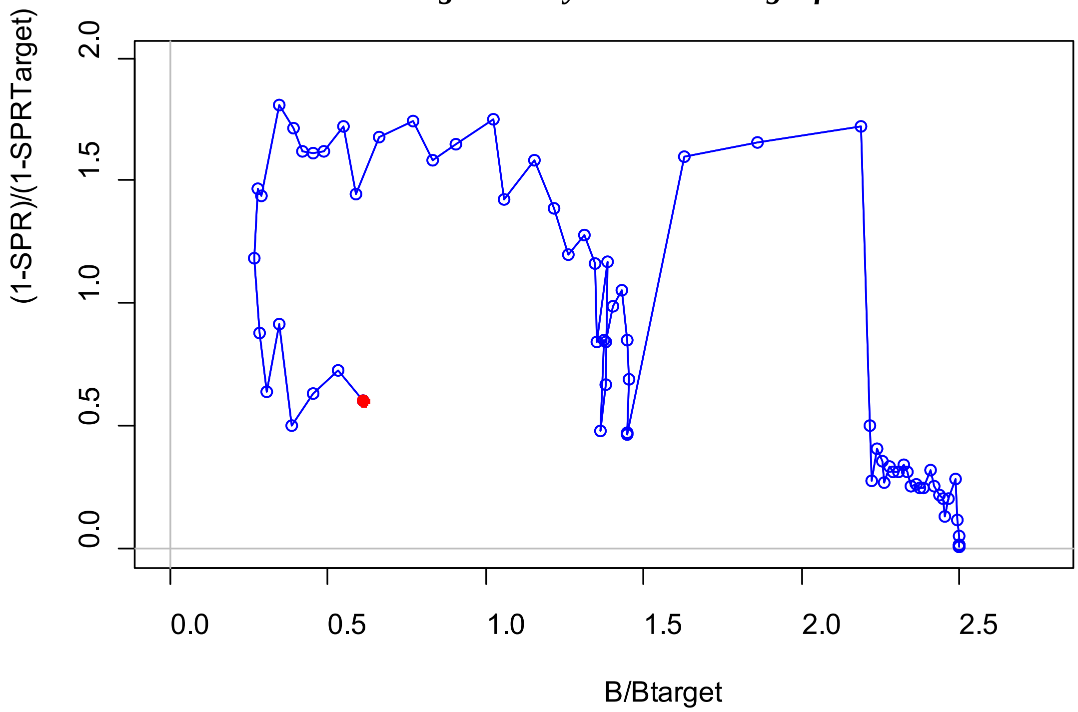
Explotation Fraction the past 10 years



One minus SPR for 1928-2008



Relative Fishing Intensity versus B/Btarget for 1928-2008



Percent of B_0 for 1928 to 2009 for the new model (circles) and 1928 to 2007 for the 2007 model (squares).

The major axes of uncertainty are steepness and natural mortality. The decision table below uses natural mortality (M) as the major axis of uncertainty. The three landings series are based upon 2008 fishing mortality rate (F_{2008}; “Low Landings”), 40:10 rule catches (with 2009 and 2010 landings to meet catch OYs; “Medium Landings”), and 2005 rebuilding plan SPR (0.50) = ABC, with 2009-10 OYs; “High Landings”). Discard, and thus total catch, is estimated within the model.

			LOW STATE M = 0.05			MEDIUM STATE M = 0.07			HIGH STATE M = 0.09		
	Year	Landings	Catch	Sp. Out.	Depl.	Catch	Sp. Out.	Depl.	Catch	Sp. Out.	Depl.
	2009	105	191	2,763	9.5%	190	7,782	27.4%	189	16,769	55.1%
	2010	115	209	2,982	10.3%	208	8,523	30.0%	207	18,221	59.9%
	2011	122	221	3,155	10.9%	220	9,179	32.3%	219	19,485	64.1%
	2012	125	228	3,276	11.3%	226	9,734	34.3%	225	20,533	67.5%
Low Landings	2013	126	231	3,333	11.5%	229	10,133	35.7%	228	21,243	69.8%
	2014	128	234	3,331	11.5%	232	10,370	36.5%	231	21,591	71.0%
	2015	130	239	3,301	11.4%	236	10,510	37.0%	235	21,706	71.4%
	2016	133	244	3,271	11.3%	241	10,627	37.4%	240	21,730	71.4%
	2017	136	250	3,254	11.2%	247	10,756	37.9%	246	21,743	71.5%
	2018	139	256	3,253	11.2%	253	10,911	38.4%	252	21,774	71.6%
	2009	157	287	2,763	9.5%	285	7,782	27.4%	284	16,769	55.1%
	2010	161	293	2,911	10.0%	291	8,453	29.8%	290	18,151	59.7%
	2011	252	458	3,013	10.4%	455	9,039	31.8%	454	19,348	63.6%
	2012	251	459	2,934	10.1%	455	9398	33.1%	453	20,204	66.4%
Medium Landings	2013	248	454	2,777	9.6%	449	9,590	33.8%	448	20,715	68.1%
	2014	245	451	2,563	8.8%	445	9,622	33.9%	443	20,869	68.6%
	2015	244	449	2,333	8.0%	443	9,570	33.7%	441	20,804	68.4%
	2016	244	450	2,116	7.3%	444	9,506	33.5%	441	20,664	67.9%
	2017	245	453	1,921	6.6%	446	9,468	33.3%	444	20,527	67.5%
	2018	248	458	1,746	6.0%	450	9,464	33.3%	448	20,421	67.1
	2009	157	287	2,763	9.5%	285	7,782	27.4%	284	16769	55.1%
	2010	161	293	2,911	10.0%	291	8,453	29.8%	290	18151	59.7%
	2011	275	501	3,013	10.4%	497	9,039	31.8%	496	19348	63.6%
	2012	269	491	2,900	10.0%	487	9,364	33.0%	485	20170	66.3%
High Landings	2013	263	481	2,713	9.3%	476	9,527	33.6%	474	20653	67.9%
	2014	259	476	2,474	8.5%	470	9,534	33.6%	467	20784	68.3%
	2015	257	475	2,221	7.6%	468	9,460	33.3%	465	20698	68.0%
	2016	258	476	1,983	6.8%	469	9,375	33.0%	466	20538	67.5%
	2017	259	479	1,767	6.1%	471	9,316	32.8%	469	20382	67.0%
	2018	261	483	1,573	5.4%	475	9,292	32.7%	473	20258	66.6%

Future research needs include:

Inclusion of the recently revised historical rockfish landings.

Investigation into the best available methods and data for constructing and using conditional age at length compositions from data taken across space and time within years.

A thorough investigation of historical darkblotched rockfish mortality in the shrimp fishery.

Mapping of “trawlable” and “untrawlable” habitat and construction of a prior on survey q.

Agenda Item E.6.a
Attachment 9
June 2009

DRAFT
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Status and Future Prospects for the Pacific Ocean Perch Resource in Waters off Washington and Oregon as Assessed in 2009

by

Owen S. Hamel

May 27, 2009

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U. S. Department of Commerce
National Oceanic and Atmospheric Administration
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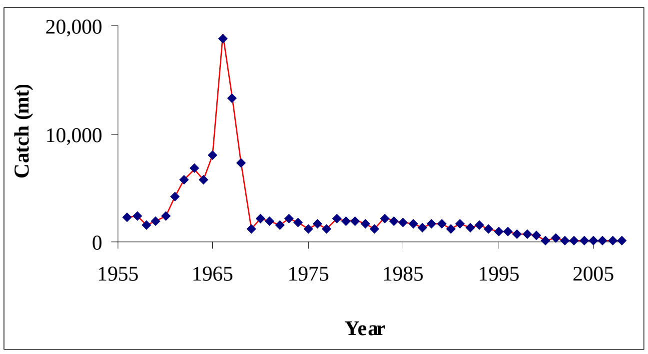
Status and Future Prospects for the Pacific Ocean Perch Resource in Waters off Washington and Oregon as Assessed in 2009

This assessment update applies to the Pacific ocean perch (*Sebastes alutus*) (POP) species of rockfish for the combined US Vancouver and Columbia INPFC areas. Catches are characterized by large removals of between 5,000 and 20,000 mt during the mid-1960's, primarily by foreign vessels. The fishery proceeded with more moderate removals of between 1,100 and 2,200 metric tons per year from 1969 through 1994, with the foreign fishery ending in 1977. Management measures further reduced landings to below 900 metric tons by 1995, with subsequent landings falling steadily until reaching between 60 and 150 metric tons per year from 2002 through 2008. Total catch, including discard, has been estimated to be between 80 and 180 metric tons since 2002.

Catch history from 1956-2006



Catch estimates for past 10 years including discard

Year	*Catch*
1999	*593*
2000	*171*
2001	*307*
2002	*178*
2003	*145*
2004	*150*
2005	*81*
2006	*82*
2007	*156*
2008	*106*

This assessment is an update and uses the same model as in the 2003, 2005 and 2007 assessments, a forward projection age-structured model (Hamel 2007, Hamel 2005, Hamel et al. 2003).

New data and changes to the data used in the previous assessment are as follows. Catch data for 2002-2006 were updated using total mortality estimates from the observer program. New catch data were added for 2007 and 2008. The 2007 and 2008 NWFSC slope survey indices were added. Fishery age compositions from 2004-2006 were updated, with new 2008 age compositions added. 2007 length compositions were used in place of age compositions on account of substantial issues with the quality of age assignments for that year of data. The 2001-2006 NWFSC slope survey age compositions were recalculated, and the 2008 compositions added. Due to the ageing issues mentioned above, the 2007 NWFSC slope survey length compositions were used in place of age compositions.

A number of sources of uncertainty are explicitly included in this assessment. For example, allowance is made for uncertainty in natural mortality, the parameters of the stock-recruitment relationship, and the survey catchability coefficients. However, sensitivity analyses based upon alternative model structures / data set choices in the 2003 and 2005 assessments suggest that the overall uncertainty may be greater than that predicted by a single model specification. There are also other sources of uncertainty that are not included in the current model. These include the degree of connection between the stocks of Pacific ocean perch off British Columbia and those in PFMC waters; the effect of the PDO, ENSO and other climatic variables on recruitment, growth and survival of Pacific ocean perch; gender differences in growth and survival; a possible non-linear relationship between individual spawner biomass and effective spawning output and a more complicated relationship between age and maturity.

A reference case was selected which adequately captures the range for those sources of uncertainty considered in the model. Bayesian posterior distributions based on the reference case were estimated for key management and rebuilding variables. These distributions best reflect the uncertainty in this analysis, and are suitable for probabilistic decision making.

Retrospective of past 10 years

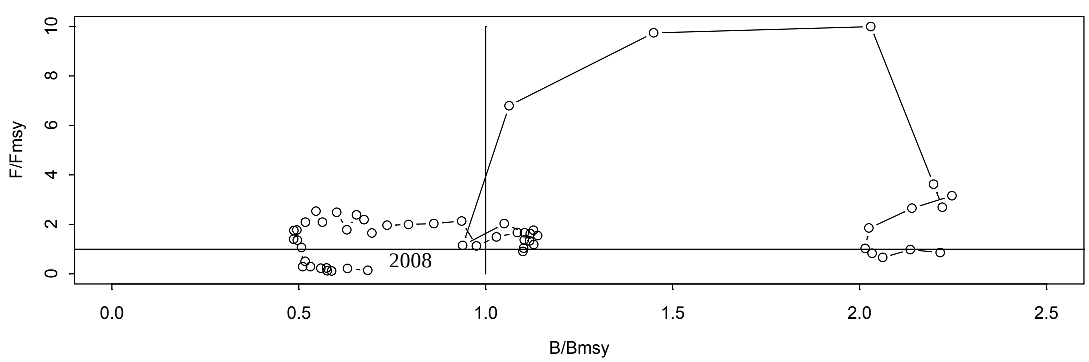
Year	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
Total Catch	593	171	307	178	145	150	81	82	*156*	106	
Discards	95	27	49	28	18	27	16	10	22	17	
Landings	498	144	258	150	127	123	65	72	134	89	
ABC	695	713	1541	640	689	980	966	934	900	911	1160
OY	595	270	303	350	377	444	447	447	150	150	189
F	0.048	0.013	0.023	0.013	0.010	0.010	0.005	0.005	0.009	0.006	
Expl. Rate	0.032	0.009	0.016	0.009	0.007	0.007	0.004	0.004	0.007	0.005	
3+ Biomass	18,481	18,366	18,710	19,926	20,908	21,593	22,104	22,563	23,128	23,492	23,844
Biom. sd	2,590	2,627	2,675	2,889	3,061	3,188	3,295	3,390	3,530	3,661	3,817
Biom. cv	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16
Sp Biomass	7,669	7,711	7,811	8,025	8,448	8,676	8,708	8,884	9,528	10,342	10,794
Sp Bio. sd	1,078	1,107	1,116	1,152	1,211	1,244	1,251	1,277	1,385	1,543	1,644
Sp Bio. cv	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15
Recruitment	0.45	0.73	1.45	7.71	3.62	1.21	0.71	0.72	2.15	1.62	
Rec. sd	0.27	0.35	0.58	1.98	1.29	0.66	0.52	0.57	2.91	1.46	
Rec. cv	0.61	0.48	0.40	0.26	0.36	0.54	0.73	0.79	1.36	0.90	
Depletion	0.203	0.204	0.207	0.212	0.224	0.230	0.231	0.235	0.252	0.274	0.286
Depl. sd											0.054
Depl. cv											0.189

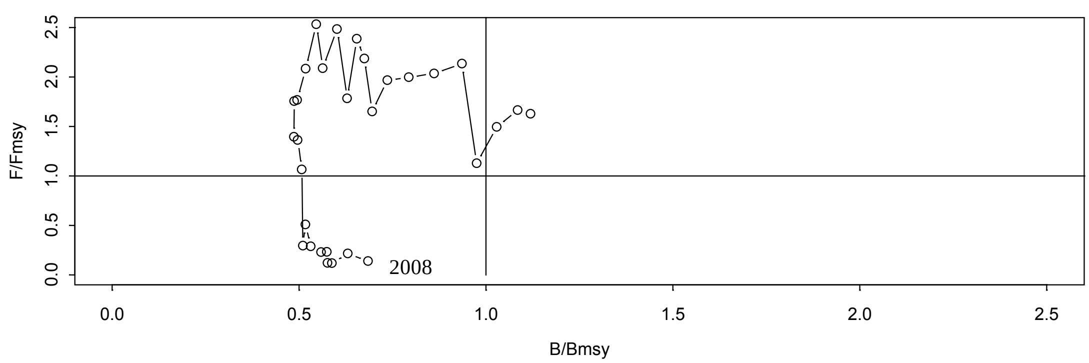
The point estimate (maximum of the posterior density function, MPD) for the depletion of the spawning biomass at the start of 2009 is 28.6%. The ABC for 2009 based on the MPD point estimate is 811 mt. The OY for 2009 based upon the 40-10 rule is 703 mt (The ABC and OY for 2009 in the above table are based on current management and the 2007 assessment). For West Coast rockfish, a stock is considered overfished when it is below 25% of virgin spawning biomass, and recovered when it reaches 40% of virgin spawning biomass. Overfishing for POP is considered to be occurring when F is above Fmsy = 0.0406 according to the current assessment base model. Based on this assessment, POP on the West Coast are recovering, and overfishing is not occurring.

POP are essentially managed on a regional basis, as they occur almost exclusively off of Oregon and Washington for the West Coast. Management and assessment of stock status might be improved through greater cooperation with British Columbia, as the stock extends northward into Canadian waters.

Major quantities from assessment

	Value	*sd*	*cv*
SB_0	37,780	5,030	0.13
B_0	75,760	6,254	0.09
R_0	5.05	0.99	0.20
SBmsy	15,112	2,535	0.17
Fmsy	0.0406	0.0151	0.37
Basis for above	F at equilibrium 40% biomass with S-R curve		
Exploitation rate at MSY	0.0310	0.0104	0.33
MSY	1,124	346	0.31

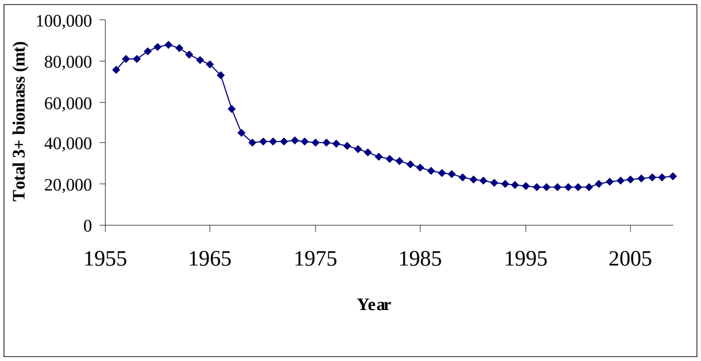




F/Fmsy versus B/Bmsy for all years of catch data and the last 30 years

The point estimates of summary (age 3+) biomass show an upward trend over the past ten years, increasing by about 30% in that time.

3+ Biomass Levels from 1956 to 2007



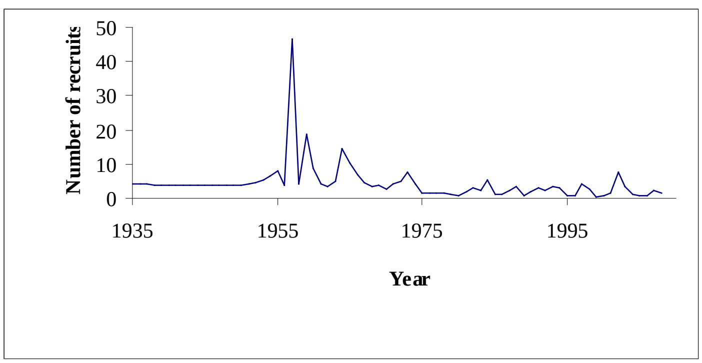
Biomass estimates for the past 10 years

Year	*Total 3+ biomass(mt)*
2000	18,366
2001	18,710
2002	19,926
2003	20,908
2004	21,593
2005	22,104
2006	22,563
2007	23,128
2008	23,492
2009	23,844

The recruitment pattern for POP is similar to that of many rockfish species. Recent decades have provided rather poor year-classes compared with the 1950s and 1960s, although the 1999 year class (the 2002 recruitment year) appears to be larger than has occurred since the 1960's, and the 2000 year class appears to be relatively large as well, however this may be due to some small amount of overall bias in ageing with age.

The first year for which there are age-composition data to support an estimate of recruitment is 1956, which also happens to be the first year for which catch data are available. The estimates of recruitment for the years prior to 1956 are close to the equilibrium estimate from the stock-recruitment relationship. The first few years with recruitment estimates that are informed by data are, however, still highly uncertain. The extremely large recruitment for 1957 may therefore partly reflect slightly higher average recruitment over the years 1935-56. Only by the early to mid-1960s are the estimates of recruitment reliable. Recent (1999-2008 in the table below) estimates of recruitment are highly variable by year, and lower on average than those for 1960-74, though higher on average than those for 1975-1994. The estimate of recruitment for 2008 is based on very limited information.

Recruitment estimates (1935-2008)

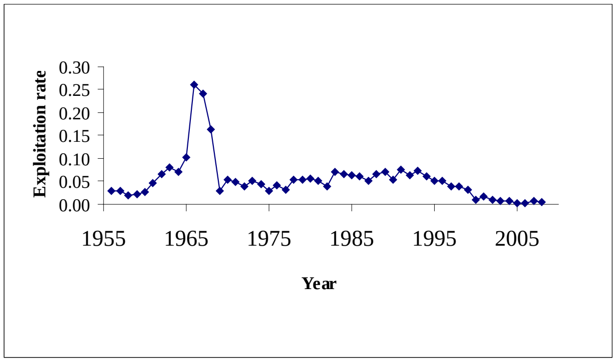


Recruitment estimates for the past 10 years (millions of age-3 recruits)

Year	*Recruitment*
1999	0.45
2000	0.73
2001	1.45
2002	7.71
2003	3.62
2004	1.21
2005	0.71
2006	0.72
2007	2.15
2008	1.62

The exploitation rate (percent of biomass taken) on fully-selected animals peaked near 25% in the mid-1960's when foreign fishing was intensive. The exploitation rate dropped by the late 1960's, but increased slowly and steadily from 1975 to the early 1990's, due to decreasing exploitable biomass. Over the past 10 years the exploitation rate has fallen from over 3% to well under 1%.

Exploitation rate estimates (1956-2008)



Exploitation estimates for the past 10 years

Year	*Exploitation rate*
1999	0.032
2000	0.009
2001	0.016
2002	0.009
2003	0.007
2004	0.007
2005	0.004
2006	0.004
2007	0.007
2008	0.005

Near term projections show a slow monotonic increase in exploitable biomass. These were calculated with a new module within the assessment model using fishing morality rates (F* - when average selectivity across ages is 1, rather than maximum selectivity being 1) of 0.01 and 0.02 (or F = 0.0137 and 0.0275), . This module projects recruitment from the estimated spawner recruit curve.

Catch, Spawning Biomass and Depletion MPD projections with F* = 0.01 and 0.02

	F*=0.01			F*=0.02		
Year	Catch	Sp. Bio.	Depletion	Catch	Sp. Bio.	Depletion
2009	266	10794	0.286	530	10794	0.286
2010	274	10828	0.287	538	10695	0.283
2011	278	10735	0.284	538	10473	0.277
2012	278	10698	0.283	533	10311	0.273
2013	277	10743	0.284	525	10238	0.271
2014	279	10870	0.288	523	10255	0.271
2015	283	11107	0.294	526	10388	0.275
2016	290	11395	0.302	533	10576	0.280
2017	297	11709	0.310	543	10795	0.286
2018	305	12037	0.319	555	11026	0.292
2019	314	12366	0.327	567	11256	0.298
2020	322	12685	0.336	578	11475	0.304

To create three different possible states of nature for the two fishing morality rates, we took the medians of the lowest 25%, the middle 50% and the highest 25% for each quantity and year from the 2400 saved model runs from the MCMC analysis. These projections are based upon the estimated spawner recruit curve and current spawning biomass and age composition estimates. A more thorough analysis will be done for the rebuilding analysis, upon which management actions will be based, which will likely result in different projections than those seen here.

Catch, Spawning Biomass and Depletion MCMC projections with F* = 0.01

	Catch (mt)			Spawning biomass			Depletion		
	0-25%	25-75%	75-100%	0-25%	25-75%	75-100%	0-25%	25-75%	75-100%
2009	240	284	341	9816	11695	14040	0.263	0.332	0.415
2010	246	294	353	9869	11755	14101	0.264	0.334	0.419
2011	250	301	362	9788	11677	14080	0.261	0.332	0.417
2012	252	304	368	9791	11698	14135	0.262	0.333	0.419
2013	255	307	372	9830	11822	14388	0.264	0.337	0.426
2014	256	309	379	9922	12022	14787	0.267	0.343	0.437
2015	259	314	385	10114	12295	15127	0.273	0.352	0.447
2016	264	321	394	10381	12617	15527	0.279	0.361	0.458
2017	270	329	403	10641	12979	15934	0.286	0.371	0.469
2018	277	338	414	10903	13330	16372	0.294	0.381	0.481
2019	284	347	426	11193	13657	16806	0.301	0.391	0.491
2020	290	355	437	11442	13988	17216	0.308	0.401	0.504

Catch, Spawning Biomass and Depletion MCMC projections with F* = 0.02

	Catch (mt)			Spawning biomass			Depletion		
	0-25%	25-75%	75-100%	0-25%	25-75%	75-100%	0-25%	25-75%	75-100%
2009	477	564	677	9816	11695	14040	0.263	0.332	0.415
2010	484	577	694	9750	11615	13929	0.261	0.330	0.414
2011	485	582	702	9551	11402	13747	0.255	0.325	0.407
2012	483	582	705	9441	11277	13636	0.253	0.321	0.404
2013	482	581	706	9373	11275	13739	0.252	0.322	0.407
2014	480	580	711	9358	11365	13972	0.252	0.324	0.412
2015	481	583	716	9448	11527	14189	0.255	0.330	0.418
2016	486	591	727	9642	11726	14468	0.259	0.335	0.426
2017	494	602	738	9806	11980	14752	0.264	0.342	0.433
2018	502	613	753	9984	12213	15056	0.269	0.350	0.440
2019	512	625	768	10177	12439	15348	0.274	0.357	0.448
2020	519	637	784	10326	12660	15627	0.279	0.363	0.457

Research and data needs for future assessments include information on the relationship of individual female age and biomass to maturity, fecundity and survival of offspring; information on the accuracy of POP ageing; information on the relative density of POP in trawlable and untrawlable areas and differences in age and/or length compositions between those areas; and information on the status of the British Columbia stock of POP and its relationship to that off of Oregon and Washington.

Agenda Item E.6.b
Supplemental Petrale PowerPoint Presentation
June 2009

Draft status of the U.S. petrale sole resource in 2008

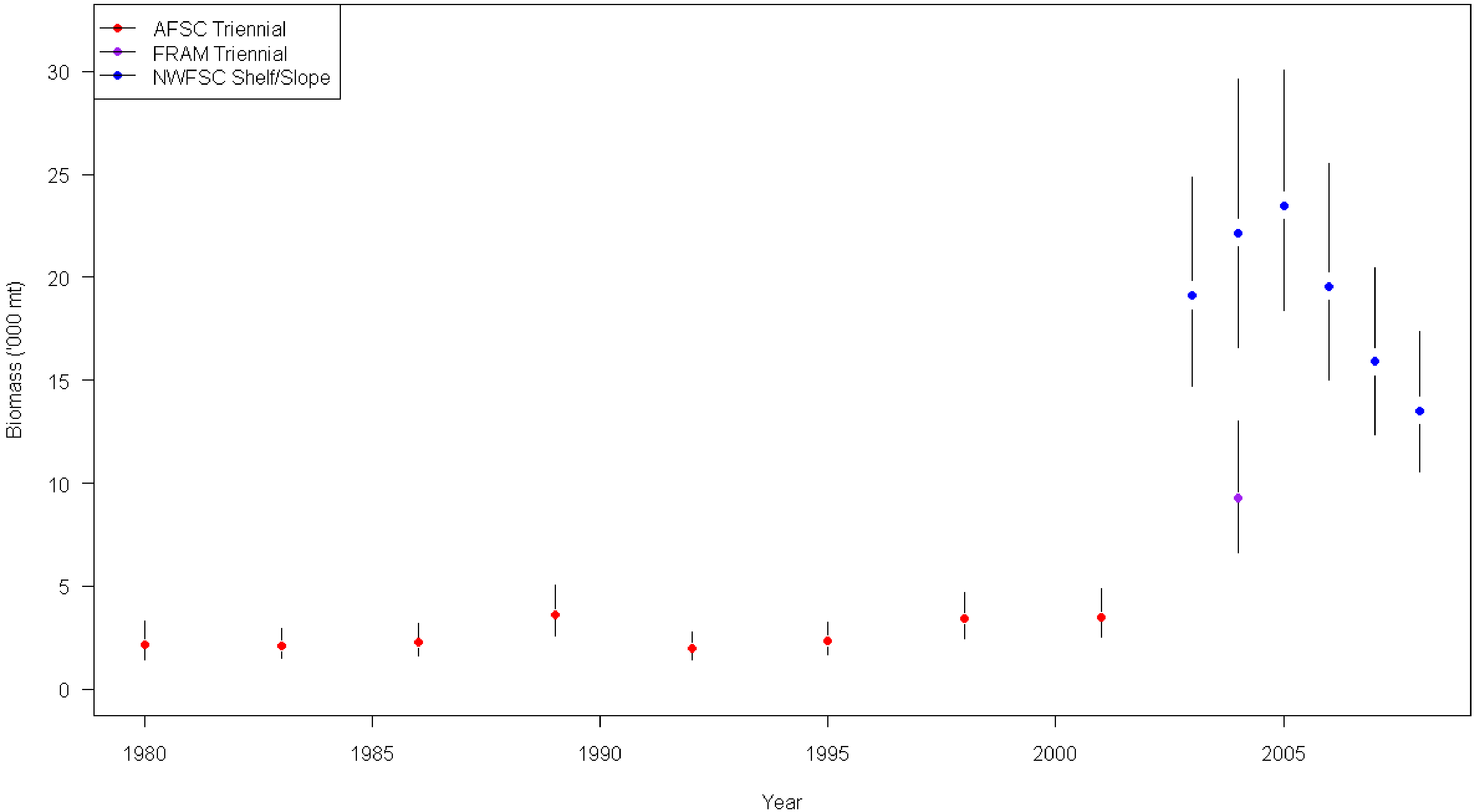
Melissa Haltuch
Allan Hicks

June 2009

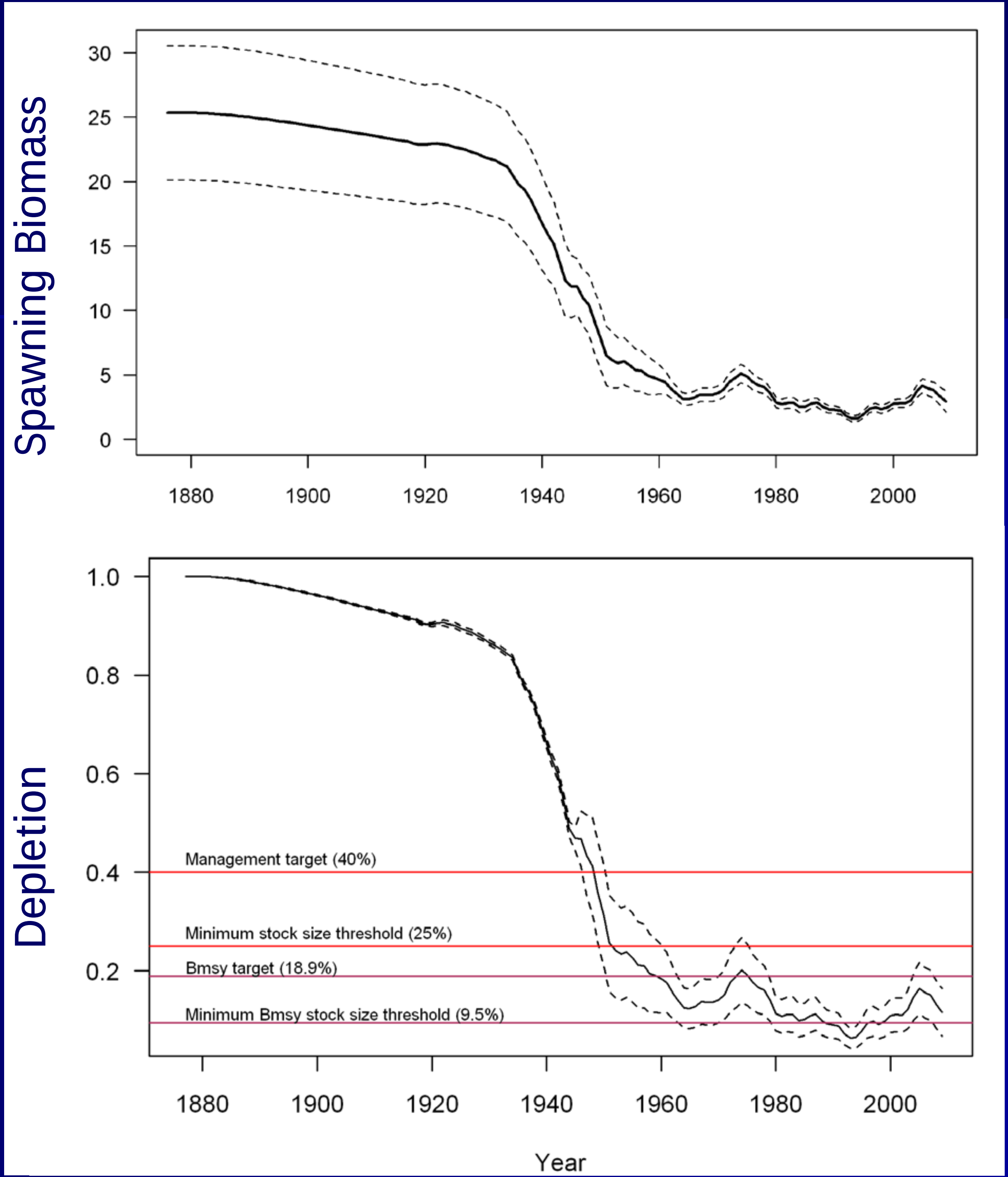
Changes from 2005 Model

- Coast-wide model
- All age data used with new analysis of ageing bias and imprecision
- NWFSC survey index, age, and length data used
- Pikitch and WCGOP discard data used
- Updated catch history
- Recruitment and natural mortality parameters estimated

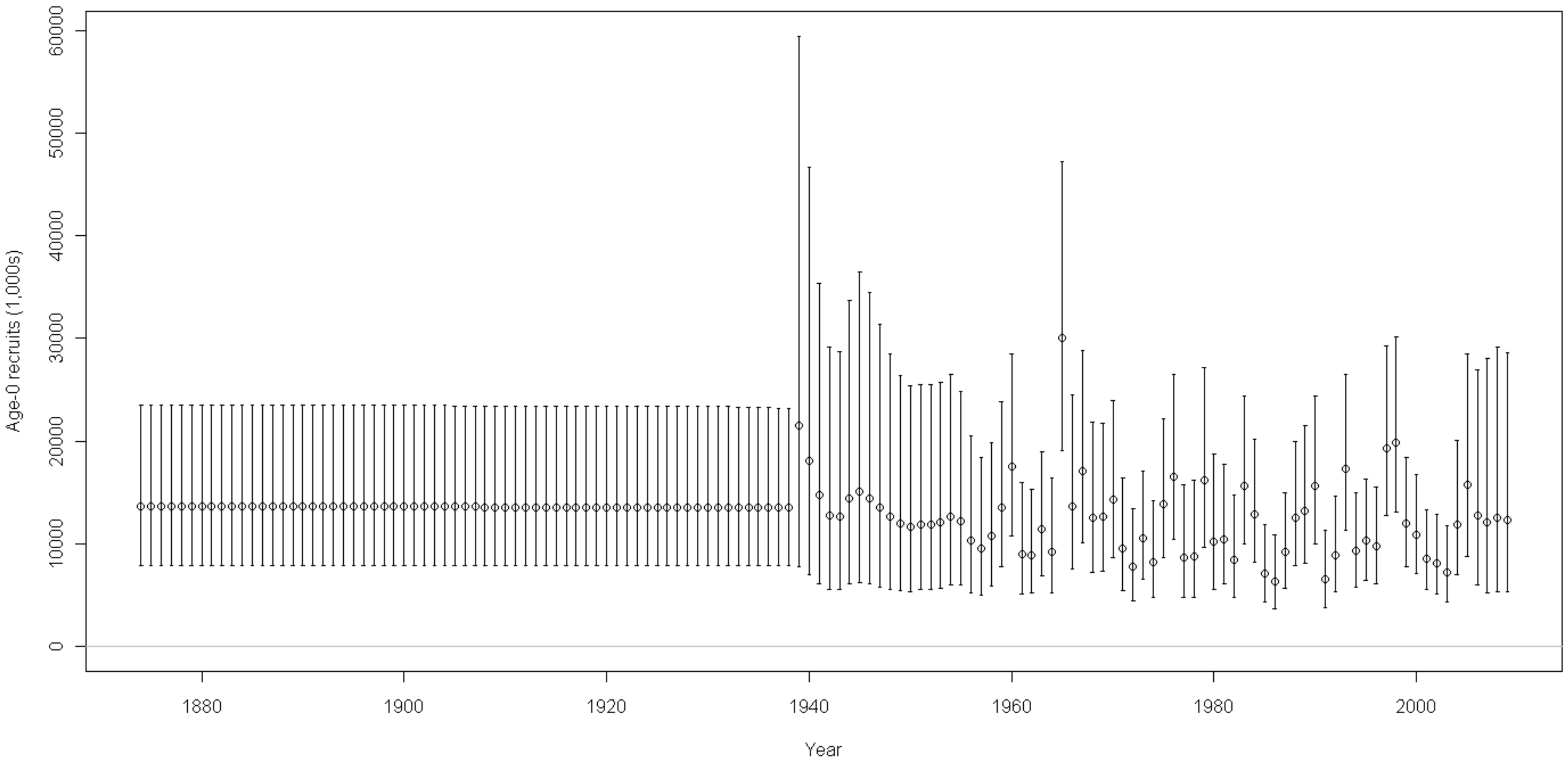
Survey Biomass Estimates



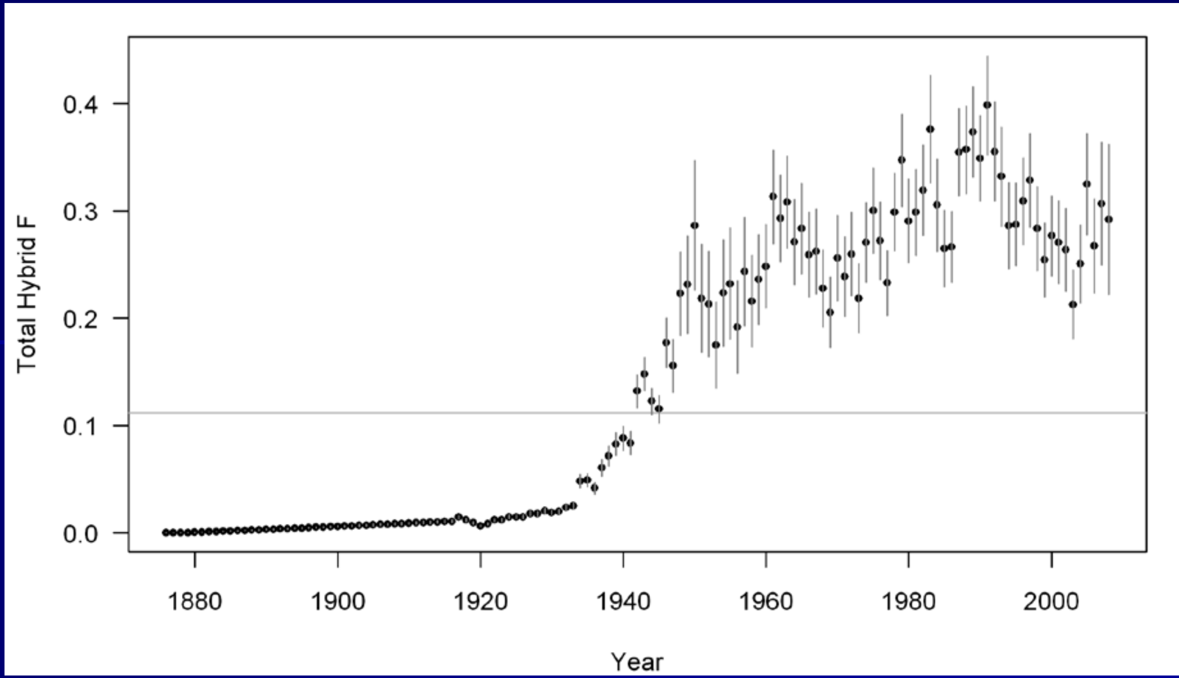
Biomass trajectory



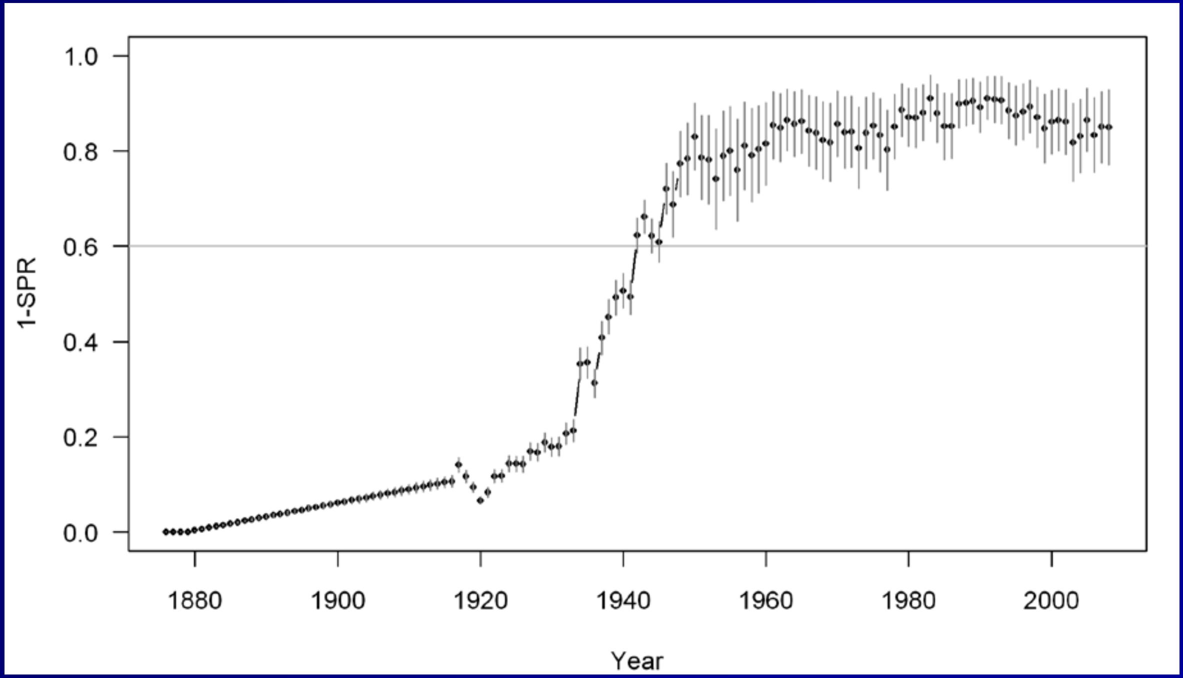
Recruitment deviations



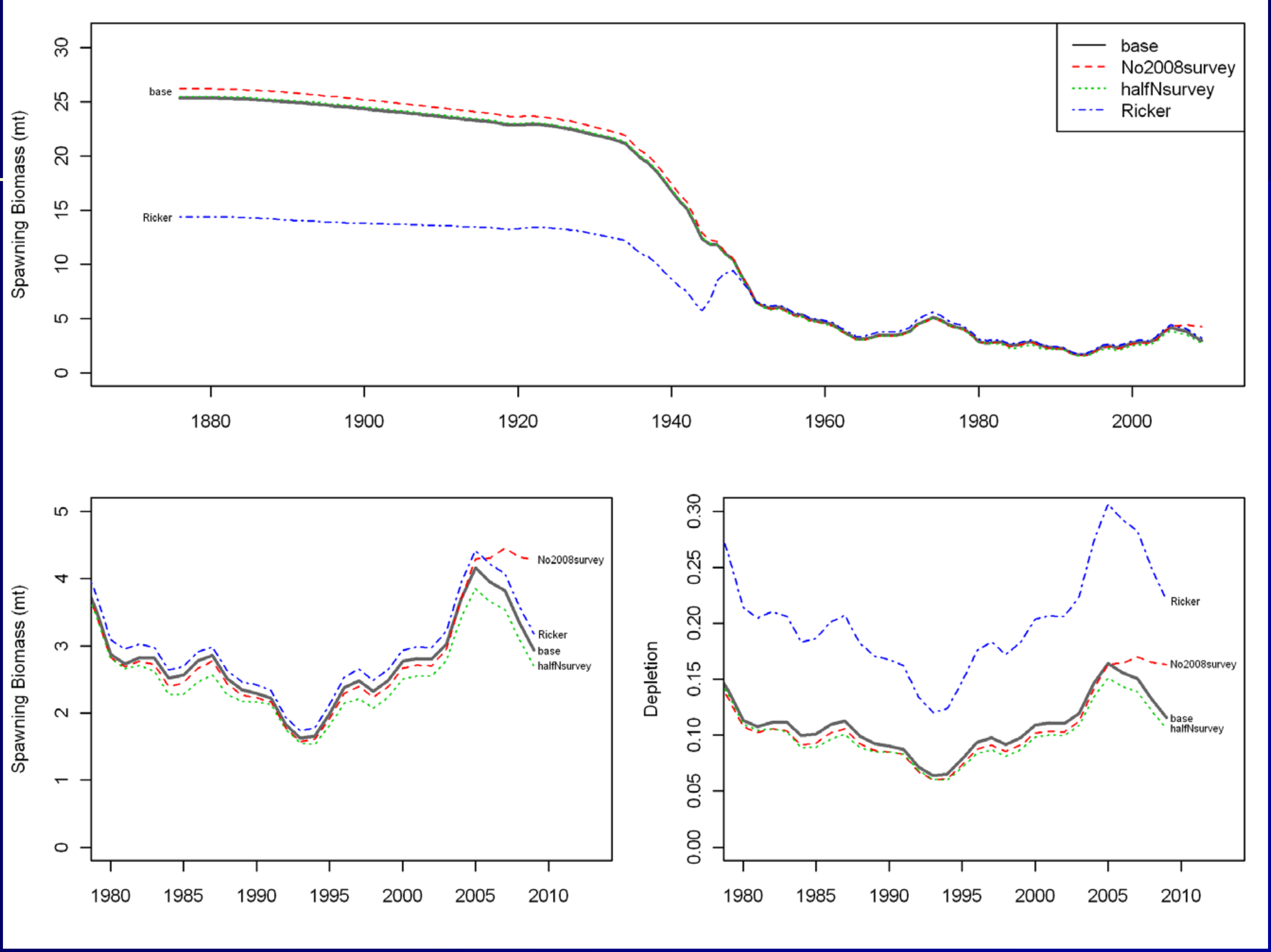
Fishing Mortality



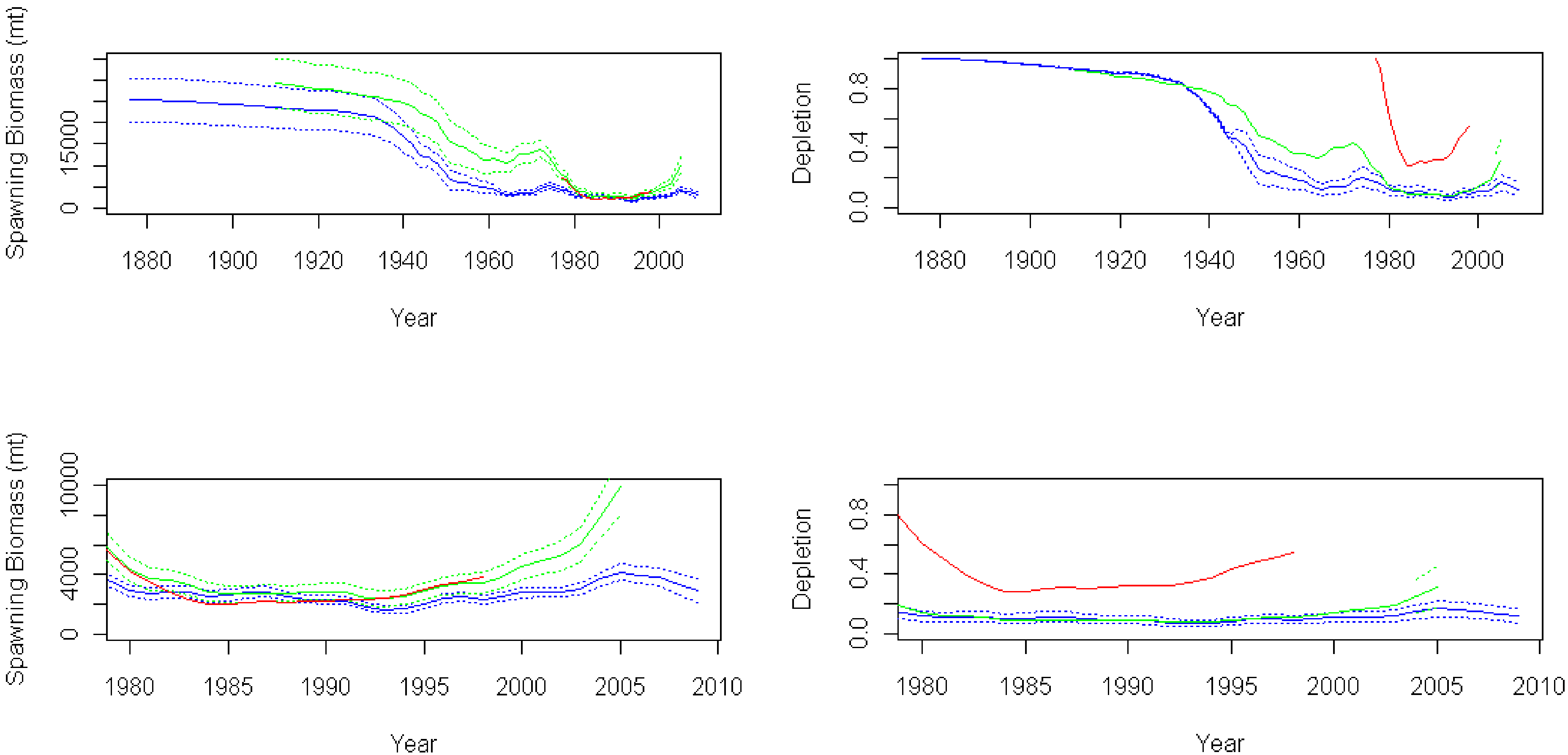
Spawning Potential Ratio



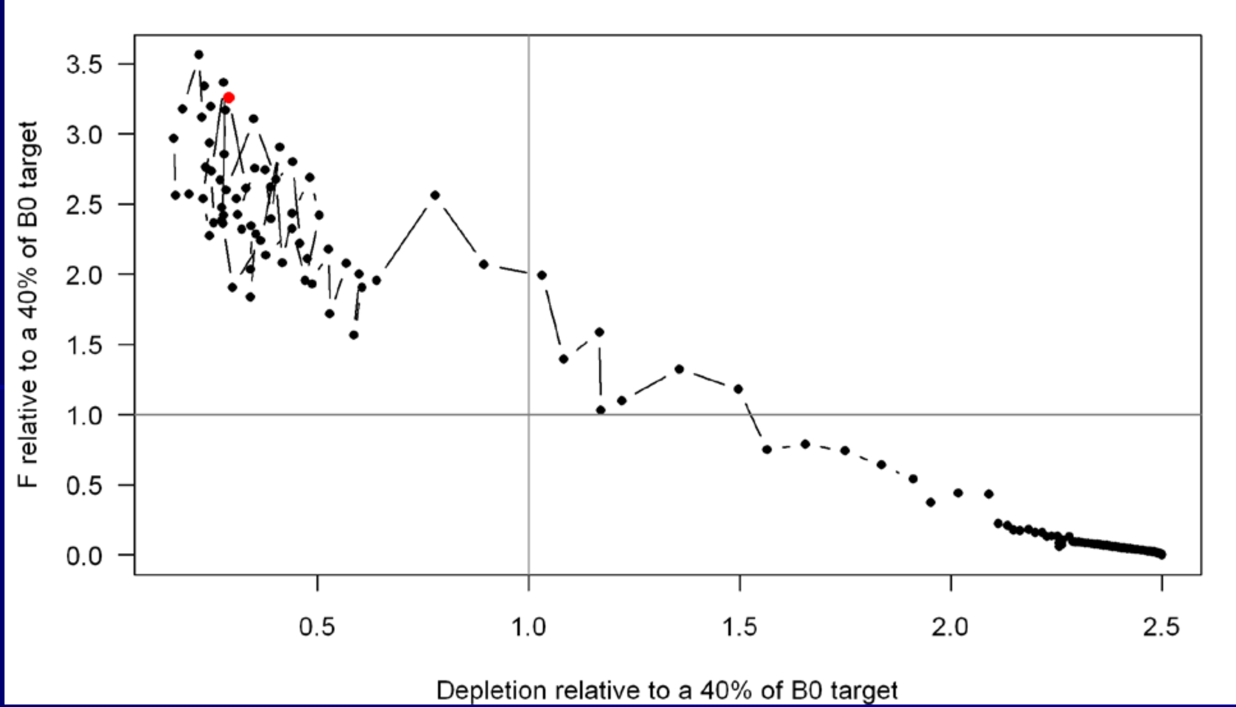
Model Sensitivity Plots

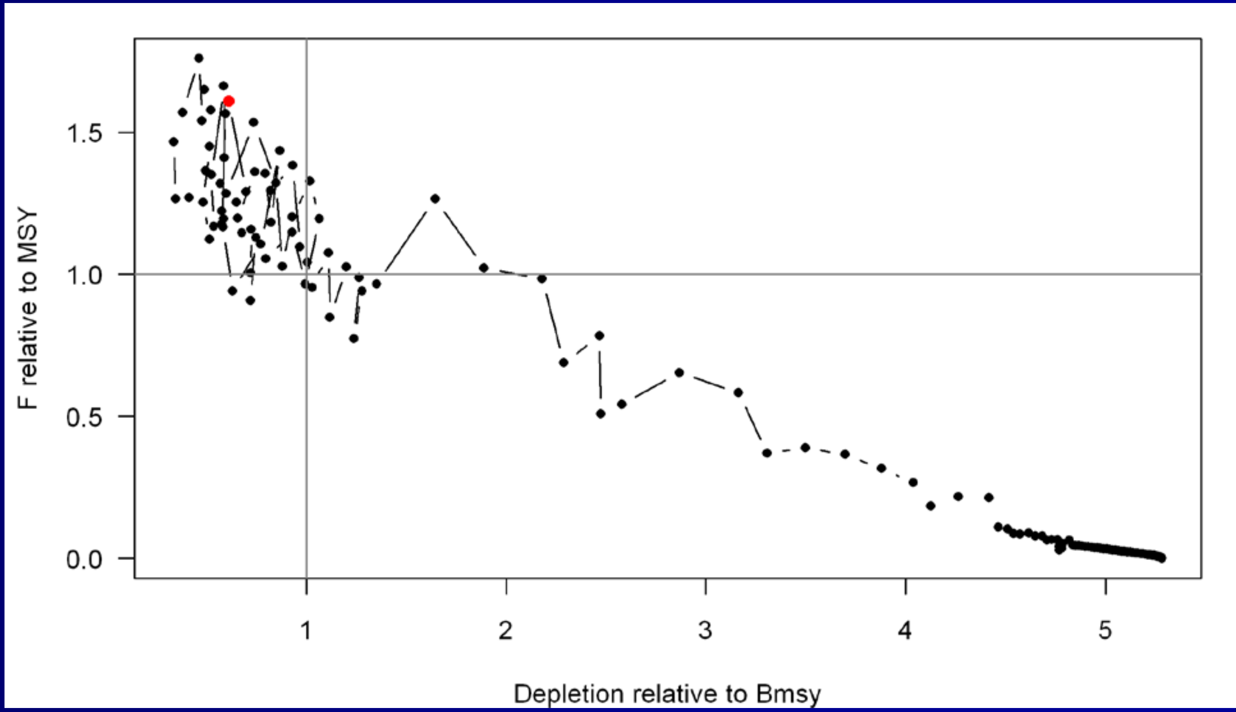


Comparison between 2009 (blue), 2005 (green) and 1999 (red) assessments

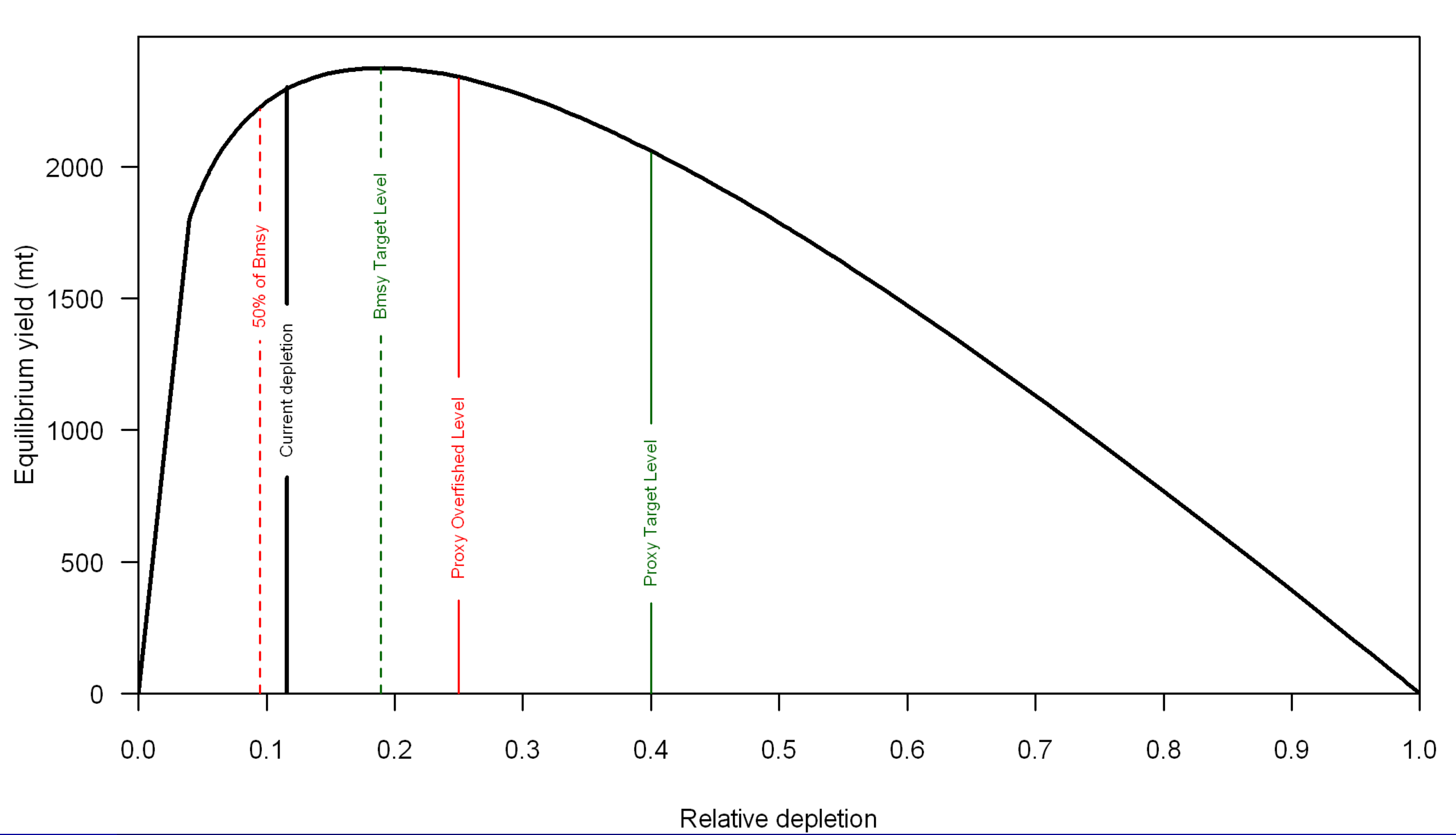


Management performance

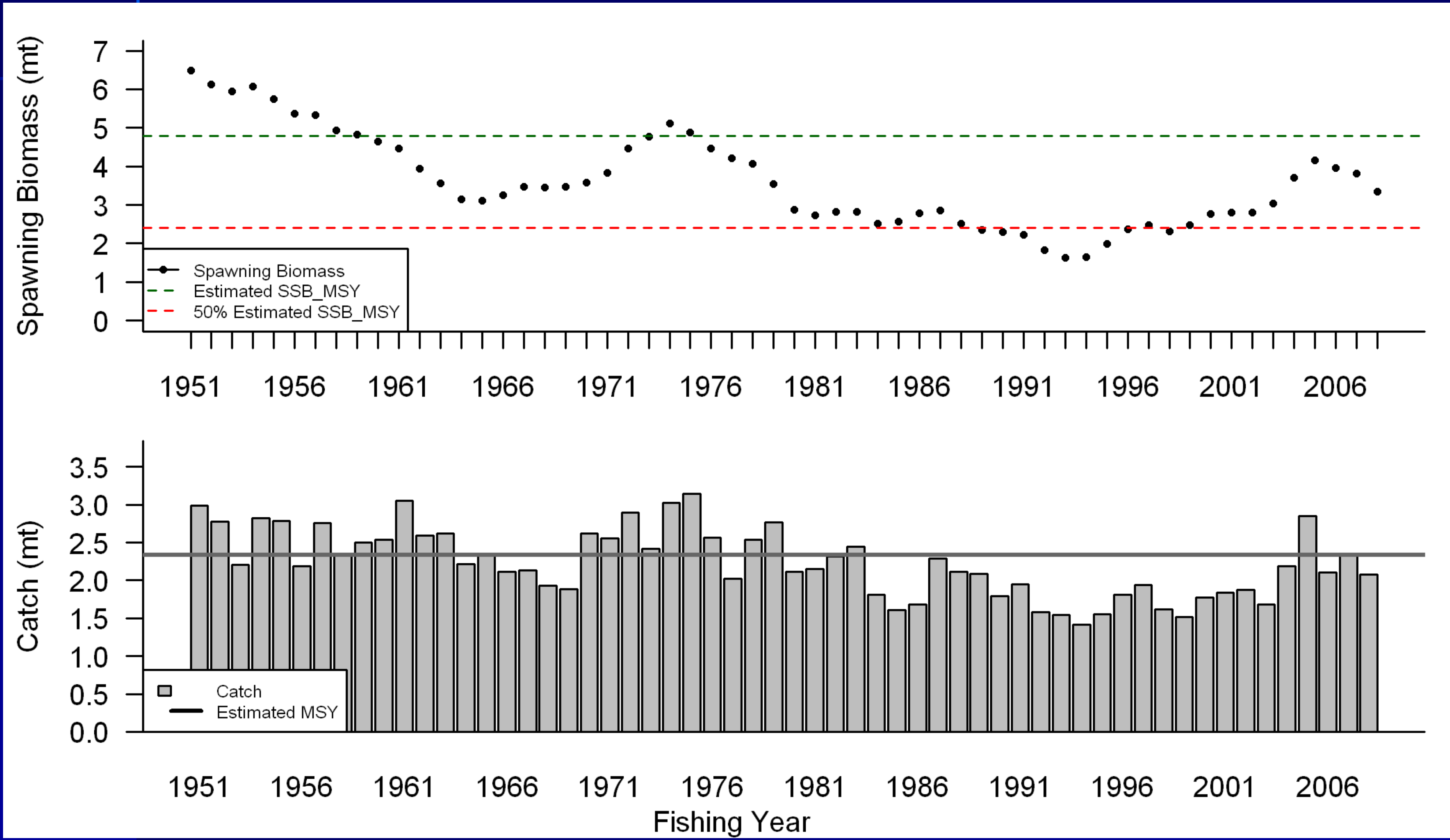




Equilibrium Yield Curve



Long term spawning biomass and catch in comparison to MSY based reference points



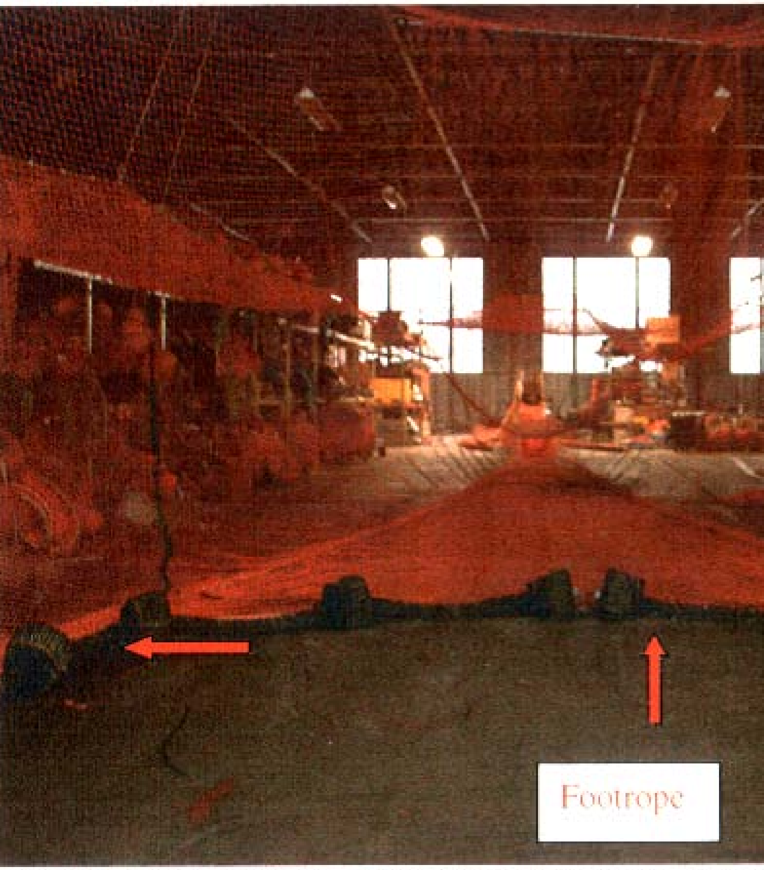
Base model projection using 40-10 control rule

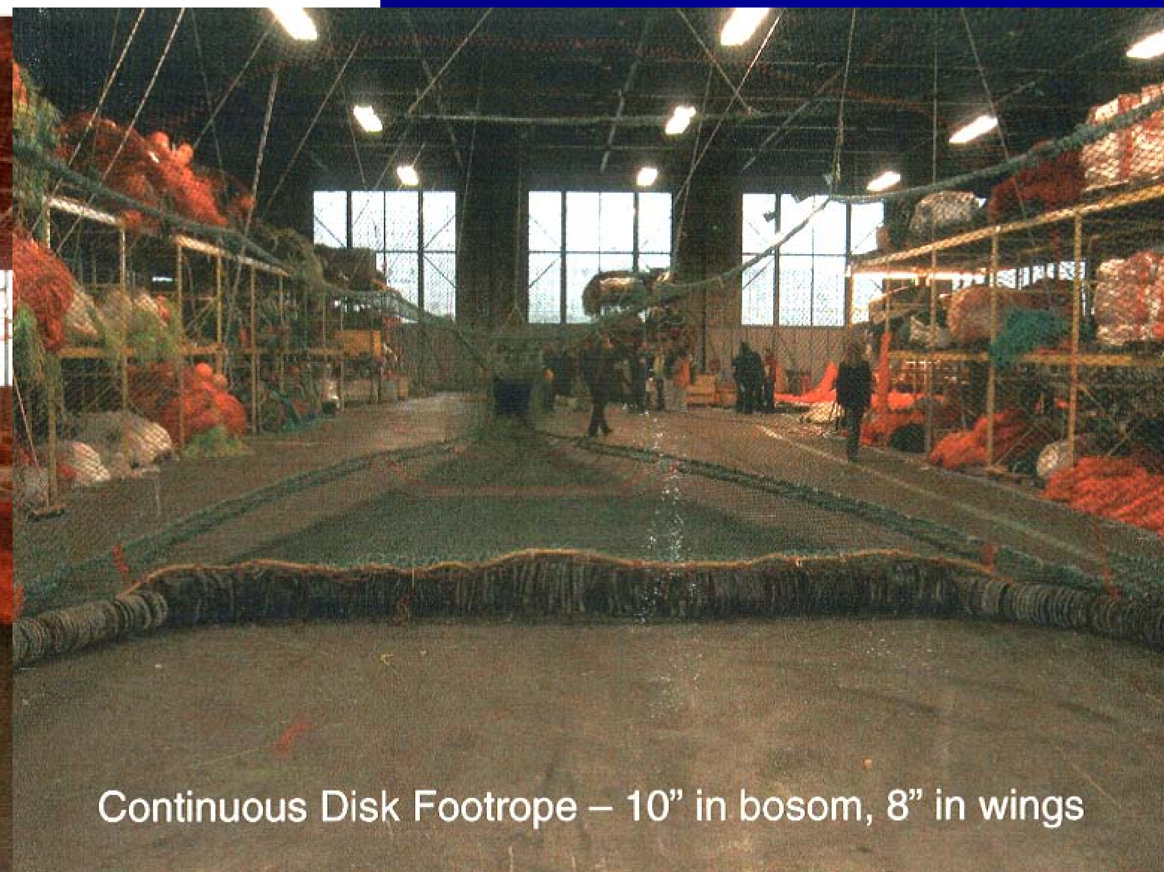
	No current modification			Modify 2010 catch			Modify 2009 & 2010 catches		
Year	OY (mt)	Depl B0	Depl Bmsy	OY (mt)	Depl B0	Depl Bmsy	OY (mt)	Depl B0	Depl Bmsy
2009	2,433	12%	61%	2,433	12%	61%	2,000	12%	61%
2010	2,393	10%	52%	1,200	10%	52%	1,200	11%	57%
2011	0	9%	48%	147	12%	63%	226	13%	68%
2012	311	14%	75%	529	17%	90%	597	18%	95%
2013	680	19%	101%	870	22%	115%	926	23%	119%
2014	997	24%	124%	1,153	26%	136%	1,196	26%	139%
2015	1,211	27%	143%	1,375	29%	152%	1,453	29%	155%
2016	1,489	30%	158%	1,540	31%	165%	1,599	32%	167%
2017	1,621	32%	169%	1,661	33%	174%	1,707	33%	176%
2018	1,718	33%	177%	1,751	34%	181%	1,788	35%	183%
2019	1,794	35%	183%	1,821	35%	187%	1,851	36%	188%
2020	1,838	36%	188%	1,876	36%	191%	1,888	36%	192%

Triennial

NWFSC

Alaska Fisheries Science Center's
Trawl Used for the 1977-2004 West Coast Triennial Survey
89/121 PolyNor' Eastern Trawl



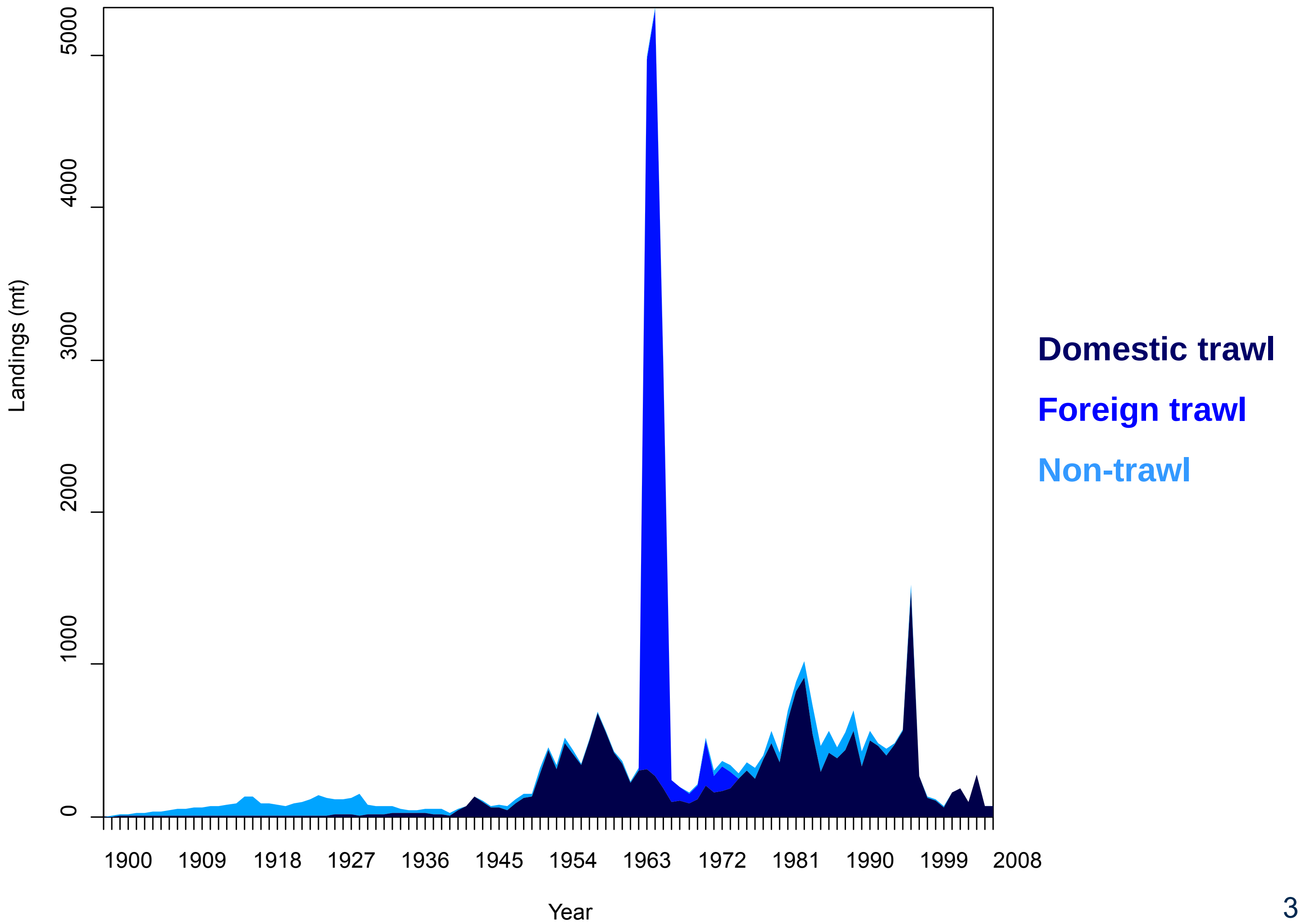


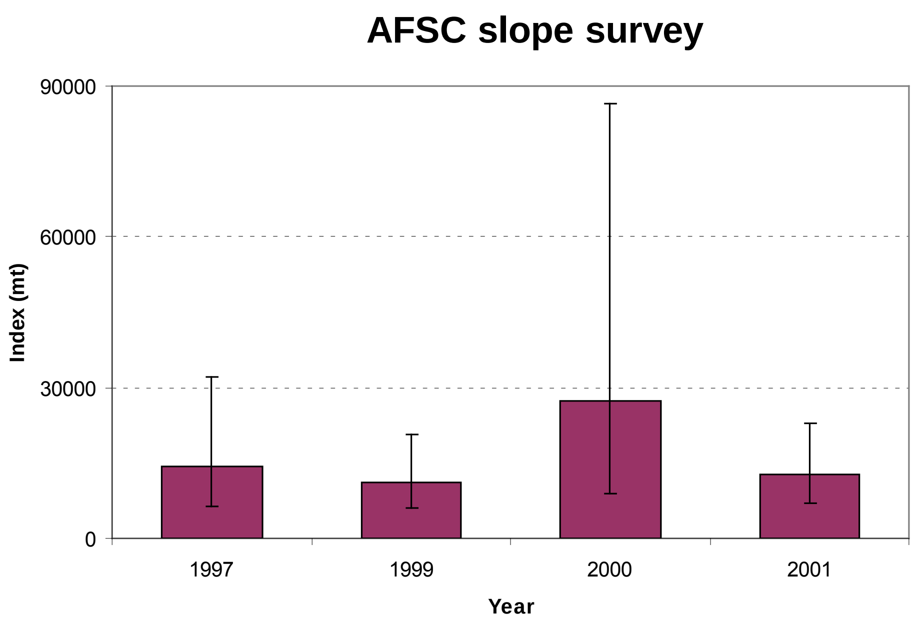
igure 1. Front opening of the PolyNor' Eastern. Note: Footrope difference, high
Rise opening, and steep taper to

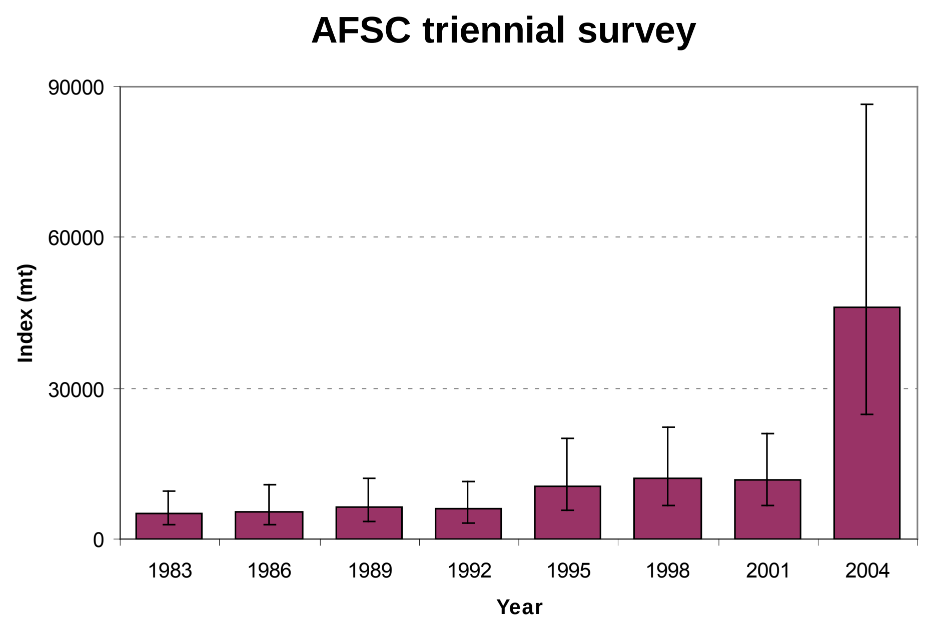
Agenda Item E.6.b
Supplemental Splitnose Rockfish PowerPoint Presentation
June 2009

Splitnose rockfish
(Sebastes diploproa)

Splitnose rockfish landings




AFSC slope survey
90000
60000
30000
0
Index (mt)
1997
1999
2000
2001
Year


AFSC triennial survey
90000
60000
30000
0
Index (mt)
1983
1986
1989
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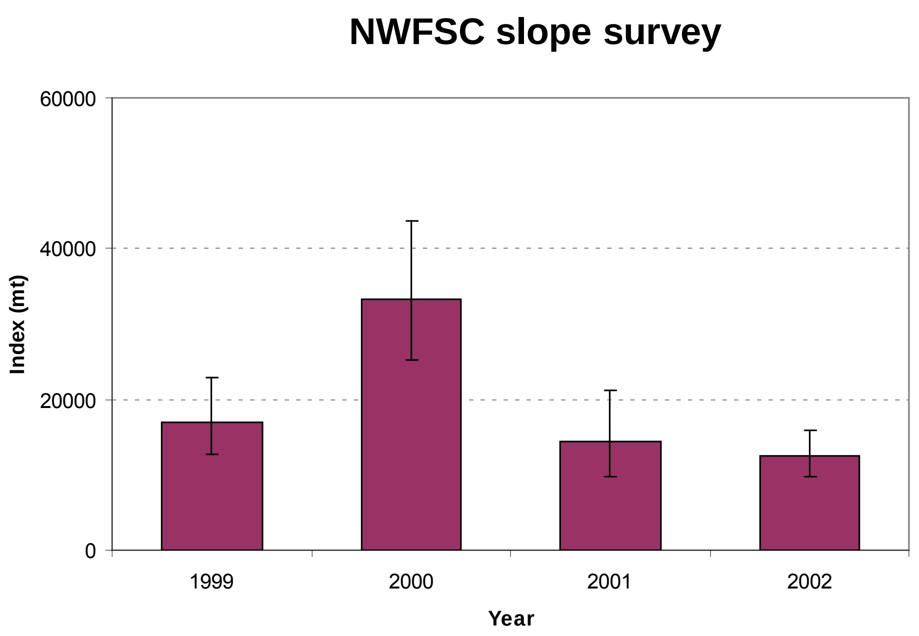
2004
Year


NWFSC slope survey
60000
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1999
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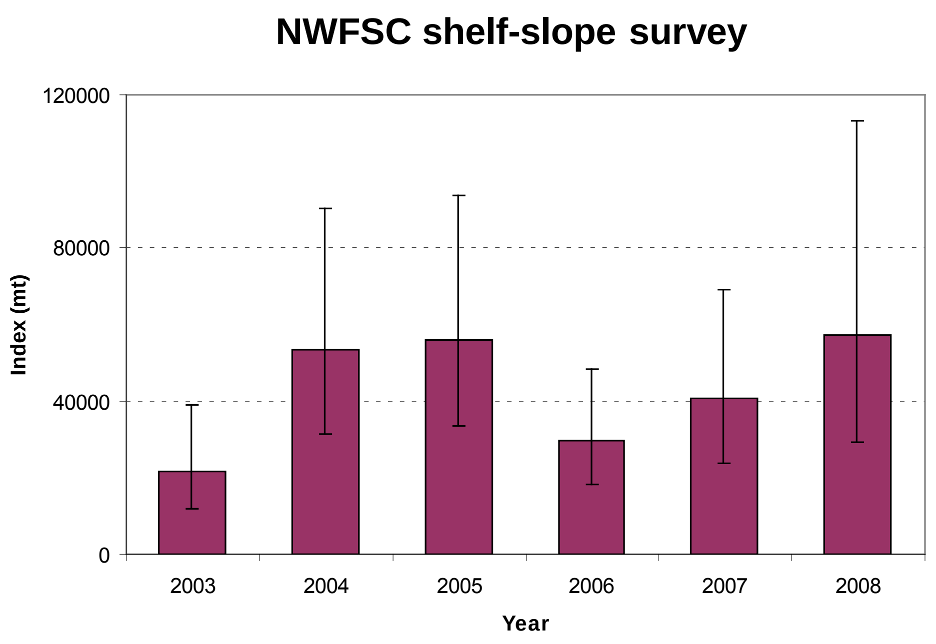
NWFSC shelf-slope survey
120000
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Index (mt)
2003
2004
2005
2006
2007
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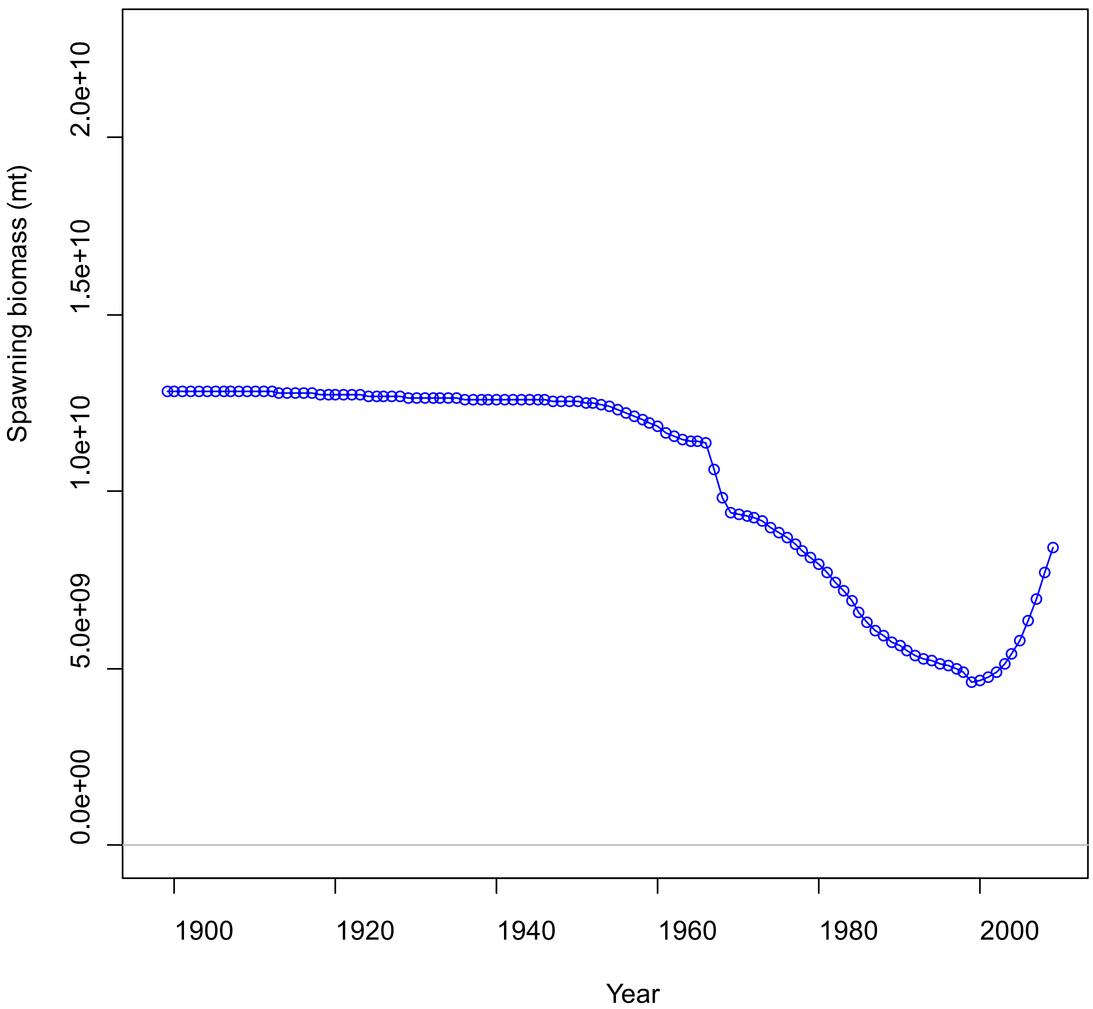
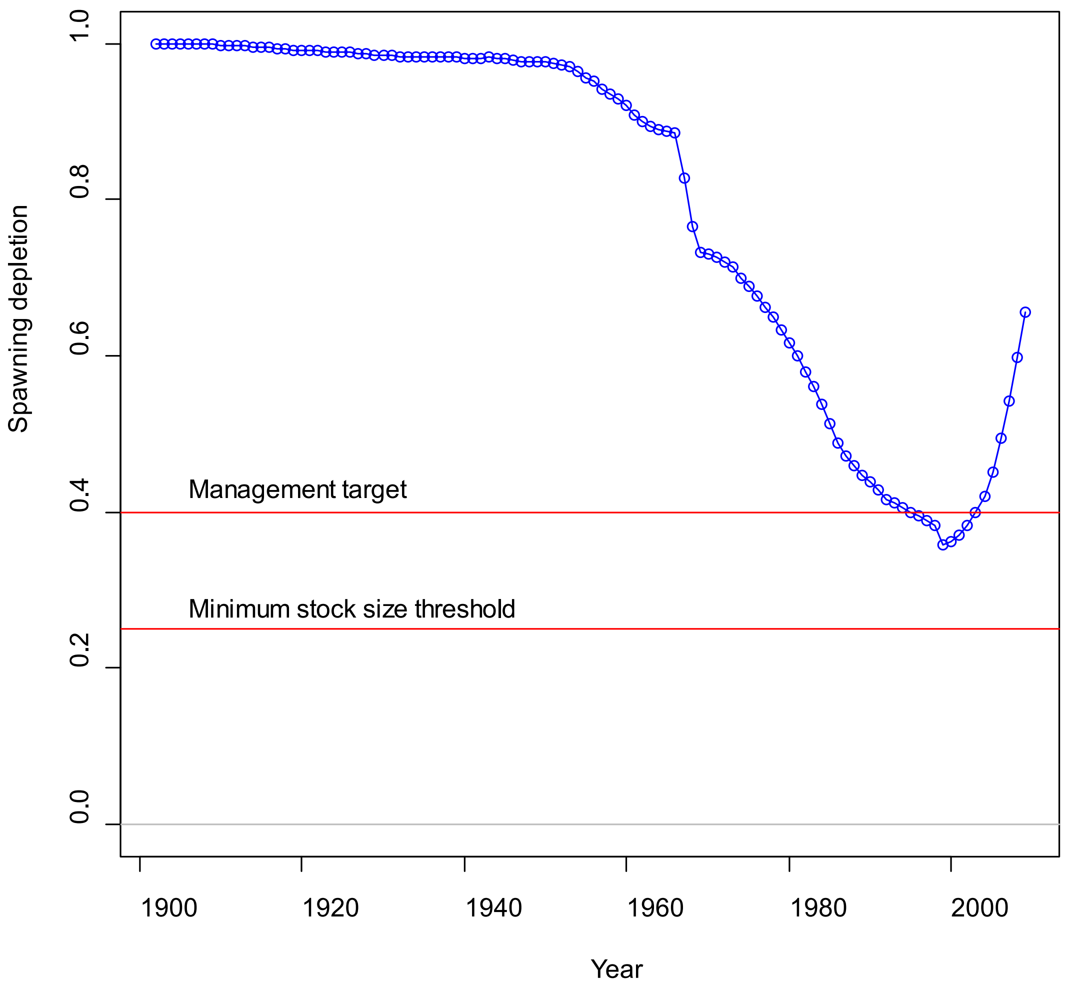
Year

NOAA FISHERIES SERVICE

~95% Asymptotic confidence interva

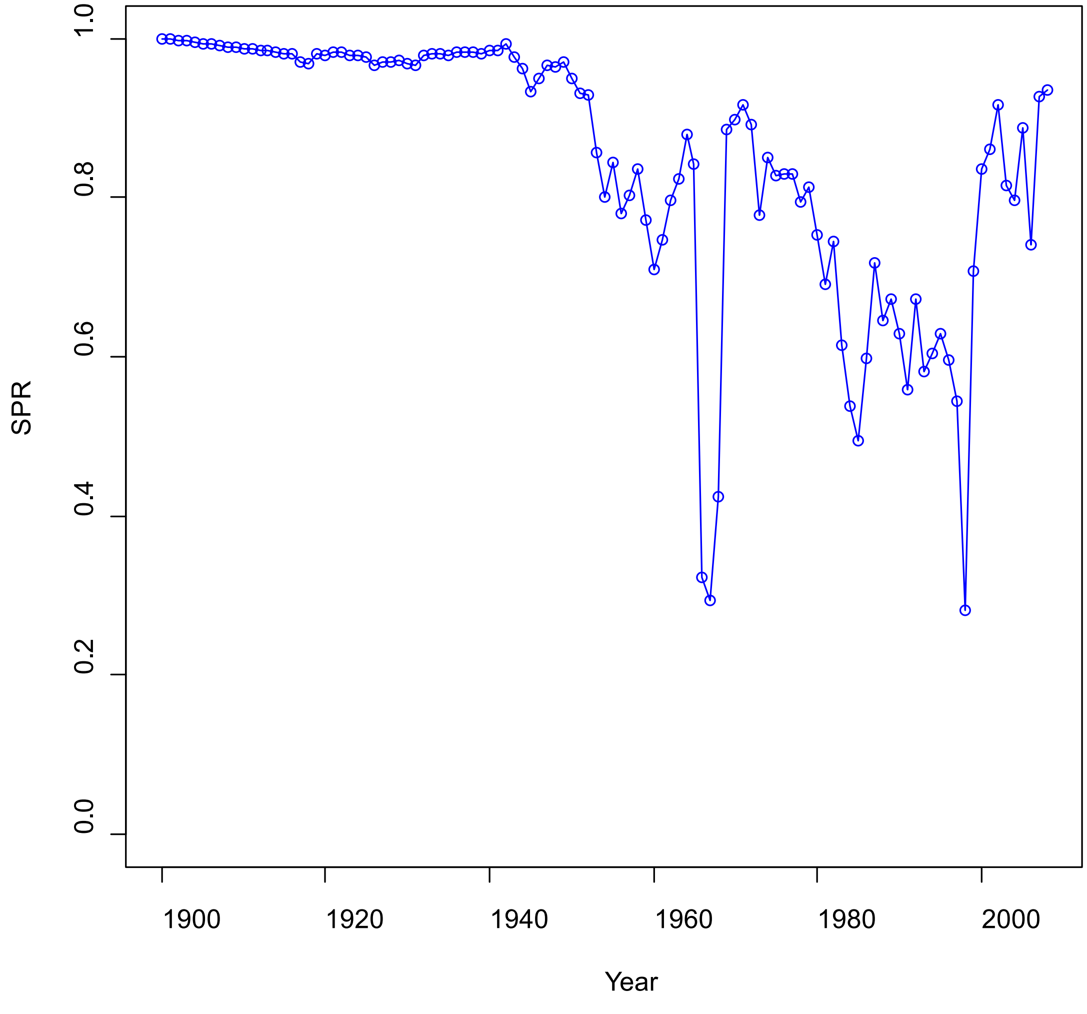


Spawning depletion



NOAA FISHERIES SERVICE

Spawning Potential Ratio (SPR)



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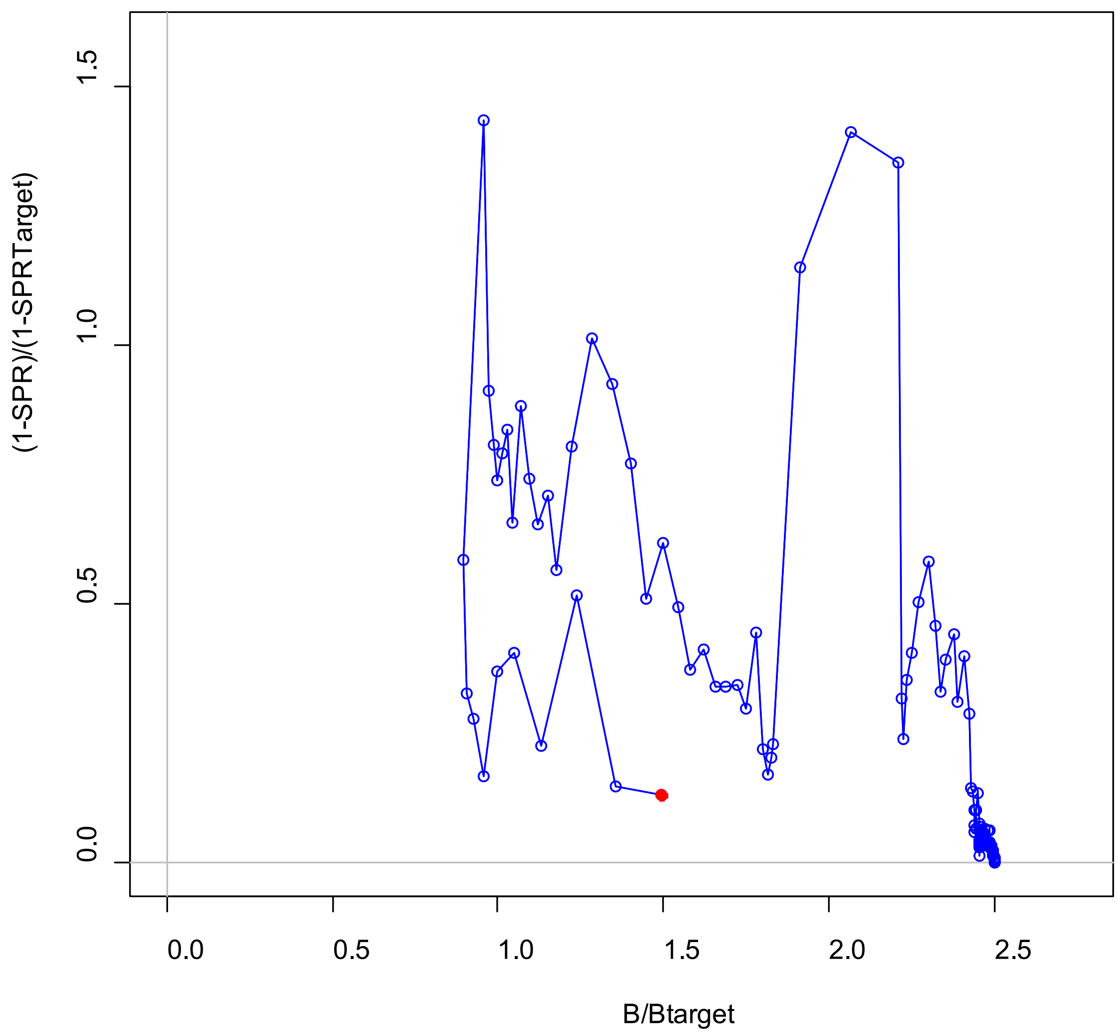

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON STOCK ASSESSMENTS FOR 2011-2012 GROUNDFISH FISHERIES

FULL STOCK ASSESSMENTS

Petrale Sole

Dr. Melissa Haltuch presented the petrale sole assessment to the Scientific and Statistical Committee (SSC). Mr. Allan Hicks was also present to respond to questions. Dr. Theresa Tsou summarized the report of the Stock Assessment and Review (STAR) Panel review of the petrale sole assessment, held in Newport, Oregon, May 4-8, 2009.

The previous petrale sole assessment was conducted in 2005. The Stock Assessment team (STAT) successfully addressed many of the issues that were raised during STAR Panel review of the 2005 assessment. The most significant change was that a single coast-wide model was used, rather than independent assessments of northern and southern components of the stock. Other changes included incorporation of discard data in the model, addressing problems with petrale sole age data and ageing error information, and estimation of different natural mortality rates for the females and the males.

Despite these changes, the new assessment estimates of stock size and trend are highly consistent with the previous assessment. The most notable exception is that the previous assessment showed a strong increase in stock size in the last years of the assessment The current assessment now shows a recent decline in stock size that is driven by four consecutive years of decline in the Northwest Fisheries Science Center (NWFSC) survey index since 2005. Stock size is estimated to be at a depletion level of 11.6 percent in 2009.

Assessment results indicate that according to Council's proxy reference points, fishing mortality on petrale sole has continually exceeded the target of $F_{40\%}$ since the 1940s, and that the stock has been below the $B_{25\%}$ overfished threshold since about 1953. These results are to a large degree driven by two basic pieces of information: 1) the high landings of petrale sole during the 1940s and 1950s, and 2) age and size composition data that are consistent with a high exploitation rate (e.g., the recent age composition data show that very few old fish are present in the population). Sensitivity analyses with different modeling assumptions consistently showed this pattern, suggesting that it is a relatively robust result of the assessment.

While the petrale sole assessment appeared to be technically sound and thoroughly reviewed by the STAR panel, the SSC was concerned that certain assessment results were so extreme that the overall plausibility of the assessment was called into question. Attention focused primarily on the estimated catchability of the NWFSC survey, the estimate of stock-recruit steepness (0.95), and confounding of estimated model parameters.

The petrale sole assessment used two indices of abundance, the Alaska Fisheries Science Center (AFSC) triennial survey from 1980 to 2004, and NWFSC survey from 2003 to 2008. The estimated catchability of the AFSC survey was 0.52 and 0.72 for early and late periods, while the estimated catchability of the NWFSC survey was 3.07. A catchability of 1.0 would imply that the survey net captured all the fish in front of the net, and that fish density is the same in trawlable and untrawlable areas. A catchability greater than 1.0 could be a result of two general processes: herding of fish into the net, and lower densities of fish in untrawlable areas. Although it is reasonable to expect that these factors may be important for petrale sole, it is difficult to reconcile a catchability of 3.07 with likely magnitude of these factors inferred from studies of flatfish herding by research trawls in other areas, and initial estimates of trawlable and untrawlable areas off the west coast. Higher catchability of the NWFSC survey compared to the AFSC triennial survey is to be expected, given differences in survey design, survey procedures, and net configuration. Additional information on specifications of the NWFSC trawl net, such as the arrangement of discs on the trawl sweeps, may help to address this issue.

Although flatfish are, in general, productive stocks, the model-derived estimate of steepness for petrale sole (0.95) is at the 99th percentile of the distribution of steepness based on a meta-analysis of Pleuronectids stocks (the family of right-eyed flatfish), indicating that the estimate of steepness for petrale sole is very high compared to other flatfish. The SSC recommends that the STAT consider including a prior for steepness in the assessment model based on the meta-analysis of steepness for Pleuronectids. This would have the effect of constraining steepness so that it is within the range for other flatfish. Information presented to the SSC suggests that adding a prior for steepness would also have the effect of reducing the estimate of NWFSC survey catchablity, though the amount of reduction is unclear.

The STAT and STAR Panel recommended that the model estimate of B_{MSY} be used for status determination. The SSC does not consider that a strong enough case has been made that the estimate of B_{MSY} is sufficiently reliable to be used for fisheries management. The STAT team reported that changes in fisheries selectivity blocking adopted during the STAR Panel lead to an increase in steepness, which would have a large influence on the estimate of B_{MSY}.

The SSC requests additional information to evaluate the reliability of the model estimate of B_{MSY}. Specifically, the SSC requests an analysis to evaluate whether changes in fishery selectivity have an influence on the estimate of B_{MSY}. The SSC also requests further evaluation of the uncertainty in the estimate of B_{MSY}, and will provide a list of specific analyses to the STAT. The requested analyses and model changes are relatively limited in scope, so the SSC does not recommend addressing these issues during the mop-up panel meeting. Instead, the SSC recommends that these analysis and model changes be reviewed by the SSC Groundfish Subcommittee at a short meeting during August. This meeting would also provide an opportunity for the Groundfish Subcommittee to develop criteria for evaluating whether species-specific B_{MSY} and F_{MSY} estimates should be used for status determination and applying the ABC and optimum yield (OY) control rules, rather than current proxies. The Groundfish Subcommittee may also consider whether a single proxy could be used for west coast flatfish stocks, since other assessed flatfish show the high productivity characteristics of petrale sole.

Splitnose Rockfish

Dr. Vladlena V. Gertseva presented the assessment of splitnose rockfish to the SSC. Dr. Jason Cope was present to respond to questions. Dr. Theresa Tsou summarized the report of the STAR Panel review of the splitnose rockfish assessment, held in Newport Oregon, May 4-8, 2009.

This was the first full assessment of splitnose rockfish; a preliminary assessment of the splitnose rockfish status was conducted in 1994. Splitnose rockfish have not been a target of commercial fisheries; rather they have been taken incidentally as bycatch in fisheries for Pacific ocean perch, mixed slope rockfish and other deepwater targets.

Splitnose rockfish were relatively lightly exploited until the 1940s, when the trawl fishery for rockfish first became important. Biomass and spawning output began to decline gradually then dropped rapidly for 3 years in the 1960s due to take by foreign trawl fleets. A more gradual decline then continued until 1998, and biomass has increased since then.

The current estimated status exhibits no cause for concern. Spawning depletion is currently at 66 percent of its unexploited level, hence this stock is not overfished or in the precautionary zone. It dropped below the 40 percent threshold for the 8 years prior to 2003. Values of spawning biomass per recruit (SPR) have been greater than 50 percent since 1999.

The STAR Panel registered some concern that tuning of σ_R during the estimation, while it produced similar trends in spawning output, also resulted in larger differences in scale between the various runs. They concluded that the model is heavily influenced by the recruitment assumptions in the analysis and the effects of tuning. They were confident that the assessment had demonstrated the population was not overfished and that overfishing was not occurring, but cautioned against allowing catch to increase until the next assessment could identify yield reference points better.

Drs. Gertseva and Cope noted there are existing otoliths from several hundred fish taken off California between 1981 and 1985, which could be aged for the next assessment, and would likely improve the confidence in the assessment. Reliable age data are particularly important for this species since length distributions are uninformative because they reach maximum size relatively more quickly than other species.

The SSC endorses the use of the splitnose rockfish assessment for status and management in the Council process, but agrees with comments by the STAR Panel that caution be used in the use of results in management actions such as setting annual catch limits (ACLs).

UPDATED STOCK ASSESSMENTS

According to the terms of reference for stock assessment reviews (TOR), updates are appropriate in situations where a "model" has already been critically examined and the objective is to simply incorporate the most recent data. To qualify, a stock assessment must carry forward its fundamental structure from a model that was previously reviewed and endorsed by a STAR Panel. Any new information being incorporated into the assessment should be presented in enough detail that the review panel can determine whether the update satisfactorily meets the Council's requirement to use the best available scientific information. The SSC's review focused on two crucial questions: (1) did the assessment comply with the TORs for stock assessment updates and (2) are new input data and model results sufficiently consistent with previous data and results that the updated assessment can form the basis of Council decision-making. Generally, if either of these criteria were not met, a full stock assessment (rather than an update) would be recommended.

While an update assessment is clear in concept, in practice there are often special issues that make it difficult to determine whether an assessment qualifies as an update. For the update assessments reviewed by the SSC, several such issues needed to be considered, e.g. when "new" data were added to early years in the assessment. Despite these considerations, it was generally clear that all of this year's update assessments were acceptable as updates.

The SSC acknowledges the efforts of the STATs in preparing complete and timely assessment documents, and for the summary presentations made at this meeting. Without these high-quality documents, informative presentations, and general cooperativeness, the SSC could not have completed its work in the available time.

Canary Rockfish

Canary rockfish is a North American transboundary rockfish species distributed from central California to Alaska. The species is patchily distributed and difficult to sample well using bottom trawl gear. From the mid-1940s until it was declared overfished (1999), the average annual harvest was 2,500 t. Since 1999, harvest has been greatly reduced with annual catches only in the range 172-287 t.

Canary rockfish was last assessed in 2007. At that time, the depletion percentage (SSB_{2007}/SSB_0) was estimated to be 32.4 percent with 95 percent confidence bounds of 24-41 percent. The stock was under a Council rebuilding plan with recent year and projection estimates of spawning stock biomass (SSB) indicating an upward trend.

As per the *Terms of Reference for Groundfish Stock Assessments (TOR)*, fishery and survey data were updated to include the years since the last assessment. Data updates for earlier years were also made. Most of these were minor with the exception of the use of a revised historical California catch time series (1916-80). The SSC concurred with the STAT that (i) the revised catches reflected the best available data, and (ii) incorporation of the revised catches was consistent with the update assessment TOR in that the process for catch estimation had not changed (rather additional raw data became available after the last assessment).

The Stock Synthesis model, Version 3 (SS3) was used for this assessment update, whereas Version 2 (SS2) was used for the last assessment. However, the SS3 assessment model formulation was essentially the same as that used for the SS2 model used in 2007. Further, the STAT carried out comparative runs (SS2 vs. SS3) using data from the last assessment. The results were nearly identical.

The update assessment results indicate that the current depletion percentage (SSB_{2009}/SSB_0) is 23.7 percent with 95 percent confidence bounds of 9-40 percent. Stock projections show a slight increase in 2010 (24.5 percent). The STAT noted and the SSC concurs that there is a high degree of uncertainty in the parameter estimates – especially steepness. Under the range of alternatives examined by the STAT, recent-year depletion percentage is highly dependent on steepness – hence the broad confidence interval on depletion level.

Given that canary rockfish are already under a Council rebuilding plan, the management implications of the updated assessment are not qualitatively different from those of the 2007 assessment. The principal difference lies in the estimate of SSB_0. While the overall SSB trends (over the past 50 years) are not greatly different, the updated assessment estimated a smaller SSB_0 with concomitantly lower depletion percentage in recent years.

The canary rockfish updated assessment meets the TOR for an assessment update. It represents the "best available science," and can serve as the basis for Council management decisions.

Another update assessment is recommended for the next assessment cycle (i.e. in 2011). In conjunction with the 2011 update, the STAT should conduct sensitivity analysis to (i) examine the effects of incorporating Canadian catch (and perhaps survey data) into the assessment; and (ii) further investigate estimates of steepness since they appear to be quite influential on depletion percentage estimates. Neither of these lines of investigation would affect the base case but may demonstrate the need for a full assessment in 2013.

Darkblotched Rockfish

Darkblotched rockfish is a long-lived (60-105 years) member of the slope rockfish assemblage. There were large removals by foreign fisheries during 1966-68, followed by moderate landings of 200-1000 t per year thereafter. The species was first fully assessed in 2000, and declared overfished as a result of that assessment.

In the previous stock assessment in 2007, darkblotched rockfish was estimated to be gradually rebuilding from a low of 10 percent of unfished stock size in 2000. The stock was estimated at 22 percent of unfished stock in 2007.

As per the *Terms of Reference for Groundfish Stock Assessments (TOR)*, fishery and survey data were updated to include the years since the last assessment. Minor updates for earlier years were also made. In contrast to the updates of cowcod and canary rockfish, the revised historical California landings were not used in the darkblotched rockfish update assessment. The SSC was concerned about this lack of consistency between updates and requested that the STAT: 1) compare the time series of total landings used in the assessment with total landings when the revised historical California landings are incorporated; and 2) provide a comparison model runs with and without the revised California landings. Total landings increased, but the percentage change in the aggregate removals was much lower than for either cowcod or canary. Comparison of model runs with and without the revised historical California landing indicated that that change in estimated stock trend and current status was miniscule (~0.1 percent). Nevertheless, for consistency with other updates, the SSC recommends that this change be incorporated in the final draft of the update.

The SS3 was used for this assessment update, whereas SS2 was used for the last assessment. However, the SS3 assessment model formulation was essentially the same as that used for the SS2 model used in 2007.

The fishing mortality rate on darkblotched rockfish has been greatly reduced, and darkblotched rockfish appear to be rebuilding gradually at close to previous rebuilding projections. In this update assessment, stock status in 2007 was estimated to be 21 percent of the unfished stock size, which is consistent with the previous assessment (22 percent). The estimate for the depletion percentage of the spawning output at the start of 2009 is 27 percent, indicating that the stock has increased by a factor of 2.7 since 2000. However, recent survey trends are noisy and relatively flat. The estimated increase in stock size is driven primarily by the assumption that darkblotched productivity is analogous to that of other similar species, and not on survey and fishery data indicating an upward trend.

The darkblotched rockfish updated assessment meets the TOR for an assessment update. It represents the "best available science," and can serve as the basis for Council management decisions.

Another update assessment is recommended for the next assessment cycle (i.e. in 2011). When the next full assessment is conducted, the SSC suggests that the following items be addressed.

The AFSC slope survey was strongly domed-shaped, while the NWFSC slope survey was estimated to be asymptotic. There appeared to be no obvious reason for such a large difference in selectivity for two surveys with similar nets and depths of operation. The SSC recommends that the next full assessment for darkblotched rockfish consider whether estimated selectivity patterns are consistent with known differences and similarities between the different surveys used in the assessment.

Additional ageing work should be carried out. Older darkblotched rockfish collections should be re-aged and ageing error for the full age range should be re-evaluated.

Darkblotched rockfish habitat preferences should be quantified. Information from the STAT indicated that adult darkblotched rockfish association with rock ledges may affect the ability of survey to monitor this component of the population.

<u>Pacific Ocean Perch</u>

Pacific Ocean perch (POP) were harvested almost entirely by U.S. and Canadian vessels in the Columbia and Vancouver International North Pacific Fishery Commission (INPFC) areas prior to 1965. Large factory trawlers from the Soviet Union and Japan began fishing for POP in the Vancouver area and in the Columbia area in 1965 and 1966, respectively. Intense fishing pressure by these foreign fleets occurred from 1966 to 1975. Catches from all fleets peaked in 1966-67. Passage of the MSA in 1976 ended foreign fishing within 200 miles of the U.S. coast. NMFS formally declared POP overfished in March 1999.

In the previous stock assessment in 2007, POP was estimated to be gradually rebuilding. The estimate of depletion percentage in 2007 was 27.5 percent.

As per the *Terms of Reference for Groundfish Stock Assessments (TOR)*, fishery, survey, and observer data were updated to include the years since the last assessment. Minor updates to the data from earlier years were also made.

The last full assessment was conducted in 2003. The 2005, 2007, and this assessments were updates using the same forward projection, age-structured model as used in 2003.

Results of the updated assessment indicate that the stock continues to rebuild albeit slowly. The updated estimates of the depletion percentage are 25.2 percent, 27.4 percent, and 28.6 percent in

2007, 2008, and 2009, respectively. Exploitation rates remain at a low level. There were no significant changes in the view of stock status between the 2007 and 2009 assessment updates.

The POP updated assessment meets the TOR for an assessment update. It represents the "best available science," and can serve as the basis for Council management decisions.

A full assessment is recommended for 2011 to incorporate reconstructed historical catches from Washington and Oregon; and to explore use of the NWFSC shelf survey index, a different survey selectivity function, and different time blocking for fishery selectivities. A full assessment would also allow consideration of the Stock Synthesis modeling platform.

Key research recommendations for the next assessment are:

1. Research on the relationship of individual female age and weight to maturity, fecundity and survival of offspring.
2. Research on the relative density of POP in trawlable and untrawlable areas and differences in age and/or length compositions between those areas.
3. Research on the relative status of the British Columbia stock of POP and sensitivity of including Canadian catch in the U.S. assessment.
4. Consider expanding the assessment area south.
5. Historical catch reconstruction mainly in WA and OR.
6. Potential use of the NWFSC shelf survey index.
7. Age the Washington Department of Fish and Wildlife samples from the 1980s.

<u>Cowcod</u>

The cowcod is a long-lived, large, heavily overfished species with a large conservation zone in the Southern California Bight (SCB). The species extends to the north, but is concentrated in SCB. In 1999, the first assessment of cowcod indicated that the stock was overfished.

The 2007 assessment estimated the depletion percentage at 3.8 percent for the base model bounded by 3.4 percent (low state of nature) and 16.3 percent (high state of nature). The trend in spawning biomass was increasing slowly mainly due to assumed low catch.

No new data sources were available for this update assessment. Catch reconstructions were done for both the commercial (1900-1968) and recreational fleets (1928-1980). However, the commercial reconstructions while slightly larger than those used in the assessment, were also for a larger area than the SCB, and therefore not directly comparable. The reconstructed recreational catches were lower than those used in the 2007 assessment and were adopted for the current update. There were no changes to the assessment model in this update.

The 2009 update assessment estimated the depletion percentage at 4.5 percent for the base model bounded by 3.8 percent (low state of nature) and 21.0 percent (high state of nature). The stock continues to display a slow upward trend but given that no new data are available, this result is little more than a stock projection. Cowcod remain on a multi-decadal rebuilding timeline.

There is little change in the view of stock status as a result of the 2009 update assessment. However, the change in historical recreational catches did lower the estimate of B_0 and partly gave rise to the increase in the 2009 estimate of depletion percentage.

The cowcod updated assessment meets the TOR for an assessment update. It represents the "best available science," and can serve as the basis for Council management decisions.

The next time an assessment is conducted, it should be a full assessment. However, this need not be in 2011. Rather a simple check of the catch information to see if it is still in the current range should suffice. If needed, standard stock projection software can be used to update depletion percentages. There will be no new information in the indices currently used in the assessment to warrant the effort of an update assessment.

The next full assessment, when conducted, should include an evaluation of Mexican catch data and the catch north of Pt Conception; an evaluation of the time series excluded in the 2007 full assessment (and therefore this update); and a re-evaluation of commercial passenger fishing vessel (CPFV) logbook data used to create the index of abundance. Enhanced biological sampling should also be carried out to improve estimates of the population vital rates.

PFMC
06/14/09

Agenda Item E.6.d
Supplemental GMT Report
June 2009

GROUNDFISH MANAGEMENT TEAM REPORT ON PART 1 OF STOCK ASSESSMENTS FOR 2011-2012 GROUNDFISH FISHERIES

The Groundfish Management Team (GMT) notes that there may be some differences between results of petrale sole assessment when it may be adopted in September, compared to the current base case model. However, the Scientific and Statistical Committee's concerns will likely be addressed prior to final adoption and are unlikely to substantially change the results of the final assessment compared to the current base case model. However, these issues may be best clarified for the Council by the SSC. With the likelihood of a more pessimistic assessment, the GMT is looking at beginning a "Points of Concern" process for petrale sole as outlined in the Groundfish Fishery Management Plan (FMP).

Section 6.2.2 of the Groundfish FMP establishes a "Points of Concern Framework" to address resource conservation issues. This process is designed to assist in determining when a focused review on a particular species may be warranted. Under this framework the GMT (or another advisory body) is responsible for identifying whether a point of concern exists and this identification may occur at the first meeting of a two meeting process. The GMT would evaluate existing information and bring recommendations to the Council at the second meeting. At the second meeting, the Council may then evaluate the GMT's recommendations for addressing a "point of concern" and forward their own recommendations to the National Marine Fisheries Service Regional Administrator.

During Agenda Item E.7, Supplemental GMT Report on Inseason Considerations, the GMT may identify a point of concern for petrale sole based on the results of the preliminary 2009 stock assessment.

PFMC
6/14/09

Agenda Item E.7
Situation Summary
June 2009

CONSIDERATION OF INSEASON ADJUSTMENTS

Management measures for the 2009 groundfish season were set by the Council with the understanding these measures would likely need to be adjusted throughout the biennial period to attain, but not exceed, the optimum yields (OYs). This agenda item will consider inseason adjustments to ongoing 2009 fisheries.

As part of this agenda item, the Council may discuss more precautionary approaches to managing petrale sole within the current biennium. The most recent stock assessment for petrale sole is relatively more pessimistic than the previous assessment and discussions have alluded to the possibility that this assessment may trigger a "red light" action should it be adopted. The Groundfish Fishery Management Plan (FMP) calls for more precautionary approaches in the second year of a biennium should it be found that management targets are not adequately conservative to meet rebuilding plan goals for *overfished species*. For reference, the FMP language on this matter is included as attachment 1.

The Groundfish Management Team (GMT) and the Groundfish Advisory Subpanel (GAP) will meet prior to this agenda item to discuss and recommend inseason adjustments to 2009 groundfish fisheries. After hearing this advisory body advice and public comments, the Council will consider preliminary or final inseason adjustments. Agenda Item E.9 is scheduled for Tuesday, June 16, should further analysis or clarification be needed.

Council Task:

1. **Adopt initial or final inseason adjustments.**
2. **Consider revised management measures for petrale sole, if appropriate.**

Reference Materials:

1. Agenda Item E.7.a, Attachment 1: Fishery Management Plan language on inseason adjustments to ABCs and OYs.
2. Agenda Item E.7.c, Public Comment.

Agenda Order:

a. Agenda Item Overview — Merrick Burden
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Preliminary or Final Recommendations for Adjustments to 2009 Groundfish Fisheries

PFMC
05/28/09

5.5.1 Inseason Adjustments to ABCs

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.

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 incorrect harvest specification at the earliest possible date.

Agenda Item E.7.b
Supplemental GAP Report
June 2009

GROUNDFISH ADVISORY SUBPANEL (GAP) REPORT ON CONSIDERATION OF INSEASON ADJUSTMENTS

The GAP reviewed several requests for inseason adjustments to current groundfish cumulative limits. The GAP has presented these requests to the GMT for further consideration.

Limited Entry Trawl

Chilipepper South of 40° 10' N. Latitude

At the April Council meeting a request for consideration of an increase in the chilipepper cumulative limit was made at the GAP. Because of uncertainties and lack of current landing information the GMT recommended, and the GAP concurred that it would be better to wait until the June Council meeting.

As presented at the April meeting, the trawl fleet is consistently encountering increasing numbers of chilipepper while targeting other species, in particular flatfish shoreward of the RCA. The current limit of 5,000 lbs cumulative is forcing vessels to discard an equal amount. The small footrope requirement shoreward of the RCA has kept vessels off of hard bottom where bocaccio and canary are more commonly found.

That and the use of the select trawl have reduced the bocaccio and canary incidental catch. The bulk of the chilipepper are found while fishing for flatfish over mud bottom.
Chilipepper is still encountered seaward of the RCA though not in the same degree.

The GAP supports the GMT's comments on chilipepper and would suggest a 12,000 lb cumulative two month limit both shoreward and seaward of the RCA. This change would afford management to see to what extent, if any, fishing behavior would change at these higher limits.

Petrale

The Gap recommends the council take action to prevent petrale sole from becoming overfished if an assessment indicating that status is approved. It is also recommended to spread reductions over as many periods as possible, recognizing that a two meeting process is required to reduce limits due to assumed lower OY's in future years.

Trip Limits

The GAP supports option #2 contained in the GMT statement.

The GAP also supports a request to increase dover sole limits north of 40° 10' N Lat. and shoreward of the RCA from 45,000 to 60,000 lb/ 2 months. This has not been analyzed by the GMT as it is a late request.

Limited entry fixed gear

Sablefish DTL Limits North of 36°N. Lat.

The GAP would encourage the Council to move the line from 125 to 100 fm. The GAP was informed that the Limited Entry DTL fishery has only been realizing about 50% of its assigned OY based on numbers recorded in the Federal Register.

The GMT informed the GAP that the score card for the yelloweye take from this fishery assumes a 100 percent harvest of this sablefish allocation. Therefore the GAP would like consideration of higher trip limits both weekly and bimonthly so the L.E. DTL fishery can harvest their assigned OY. Currently the bimonthly limit is 5500.

California Scorpionfish Limits South of 40°10' N Lat.

The GAP supports the GMT recommendation to consider increasing the California scorpionfish (sculpin) trip limits to at least 1,200 lb/ 2 months.

Open Access Fishery

Sablefish North of 36° N Lat.

An increase in the daily-trip limit (DTL) limits for the open access sablefish fishery north of 36° N. latitude was requested at the April council meeting given a lack of projected landings at that time. The Council increased the cumulative limit from 2,100 to 2,400 lbs per two month period. However, current tracking still projects the fishery falling short of the 587 mt sablefish quota for the year. The GMT is currently projecting a 93 mt shortfall for the year under the current DTL limits.

There is nothing to suggest that the DTL effort will increase any more than it did in 2008. Vessels not fishing salmon and choosing to fish in the DTL sablefish fishery have already made the financial commitment and participated in the 2008 season. Also there will be some commercial salmon activity in Oregon and Washington this year, thereby reducing some DTL effort in those areas. Further anecdotal comments have indicated the lack of available sablefish so far.

The GAP therefore recommends a further modest increase of the cumulative limit from 2,400 lbs to 2,750 lbs per two months beginning on July 1, 2009 through the end of the year. The GMT projects the open access DTL fishery would still under-harvest their sablefish allocation by about 74mt.

Black rockfish limits between 42° N Lat. 40° 10' N. Lat.

The Gap supports an increase of black rockfish limits in the open access fishery from 6000 lb/2 months to 7000 lb/2 months of which no more than 1200 lb may be species other than black rockfish.

PFMC
06/15/09

Agenda Item E.7.b
Supplemental GMT Report
June 2009

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON
CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) considered the most recent information from the stock assessment review process, the West Coast Groundfish Observer Program, the status of ongoing fisheries, and requests from industry representatives and offers the following considerations and recommendations.

Potential Petrale Point of Concern

The draft assessment and Stock Assessment Review (STAR) Panel review of petrale sole - indicate that the stock status is worse off than previously believed. In fact, the base case model projects that the stock will drop below any minimum stock size threshold contemplated by the groundfish fishery management plan (FMP) at the start of 2011 if the full 2009-10 petrale optimum yields (OYs) are achieved. For this reason, the GMT anticipated that the Council might want to consider reducing petrale catches in 2009 and 2010.

The SSC's recommendation to not adopt the stock assessment at this meeting in favor of more sensitivity analysis and reconsideration at the September meeting changes the circumstances somewhat. If the SSC had recommended adoption of the assessment at this meeting, and the Council thought it prudent to make reductions to the 2009 catch, trip limit changes could have been in place by period 4, or more likely, period 5.[1] Waiting until September would delay the possibility of reductions until period 6. The GMT trawl model estimates that a complete closure of the period 6 petrale fishery could reduce the 2009 annual catch by around 400 mt.

To get some sense of the impact that 2009-10 catch reductions might have on stock status in 2011, we requested two additional base case model runs from the stock assessment authors (Table 1). Scenario I projects stock status in 2011 assuming full achievement of the 2009-10 OYs.[2] Scenario II then projects stock status in 2011 assuming zero reductions to catch in 2009 combined with a ~50 percent reduction in 2010. Scenario III looks at the same ~50 percent reduction in 2010 but with an additional 400 mt reduction to 2009 catches. These scenarios are, again, based on the base case model. Projections could of course change as a result of the SSC's review.

[1] Trip limit reductions must be in place at the start of a bimonthly period. The Region informed us that reductions for period 4, which starts on July 1, would be difficult because of the few business days remaining in June.
[2] *See* Table g in Agenda Item E.6.a, Attachment 1

Table 1. Base case model projections of 2011 petrale stock abundance under three 2009-10 catch scenarios.

	2009/2010 Catch Scenarios (mt)		
2011 abundance	***I***. (2,433/2,433)	***II***. (2,433/1,200)	***III***. (2,000/1,200)
% of $B_{unfished}$	9%	12%	13%
% of B_{MSY}	48%	63%	68%

At this time, we bring two points to the Council's attention. First, there is the possibility that the SSC's additional consideration of the assessment will not substantially change the perception of stock status. The Council may thus still want to prepare for the possibility of recommending catch reductions at the upcoming September meeting. Second, we understand that this type of action might require additional analysis and Council consideration beyond what is needed for routine adjustments to inseason trip limits. Routine inseason adjustments are intended to prevent catches from exceeding established OYs. Reductions to petrale catches based on this stock assessment, in contrast, would be aimed at lowering catches below current OYs.

We therefore recommend that the Council seek clarification from National Marine Fisheries Service (NMFS) and NOAA General Council on the requirements necessary to make such a change (e.g. by identifying a point of concern). It appears that the Council will not have a settled assessment of petrale stock status until at least September. Yet, if it turns out that a two-meeting processes would be necessary, waiting to initiate that process in September would foreclose taking action by period 6.

<u>Research</u>

The GMT received an update from Oregon Department of Fish and Wildlife (ODFW) at this meeting on their expected research impacts for the year. They originally anticipated 0.9 mt of yelloweye rockfish to conduct an enhanced rockfish survey project in conjunction with the International Pacific Halibut Commission (IPHC) survey. Limited project funding prompted ODFW to reduce this estimate by 0.4 mt in the scorecard in March 2009, decreasing the total yelloweye impacts of research from 2.8 to 2.4 mt. Due to a total lack of funding, ODFW will be unable to conduct any research projects that may impact yelloweye rockfish during 2009. Hence, the estimate is reduced another 0.5 mt, decreasing our total estimated yelloweye impacts (research) from 2.4 mt to 1.9 mt.

<u>Recreational Fisheries</u>

New Inseason Tools

A new set of recreational fishery tables containing catch estimates for both target and depleted species, angler effort, and other inseason information have been developed in conjunction with Pacific States Marine Fisheries Commission (PSMFC) RecFIN staff. This information will allow fisheries managers, anglers, and other interested members of the public to track recreational fisheries throughout the season. These tables will be posted and available on the RecFIN website in the coming weeks.

Scorecard Estimates

The GMT notes that during the specifications and management measures setting process, the Council chose to use the respective proportions from the 2005 harvest guidelines by sector to determine the harvest guidelines (HGs) for 2009-2010 given the 105 mt OY. This was done with the understanding that the values used in the scorecard could be revisited or revised inseason. Table 2 lists the difference between the preseason projections for each state and the HG currently listed in the scorecard. These projections are not updated inseason since the majority of the recreational catch is still accruing (i.e. the recreational seasons only recently opened in California and there is a lag between field data collection and estimation of impacts used in catch tracking). Given the large residual catch expected to be available given the preseason projected impacts and the increase in the recreational harvest guidelines, the Council may consider making some fraction of the residual available to other fisheries to allow targeting of species constrained by canary rockfish while maintaining an ample buffer for unanticipated recreational fishery impacts.

Table 2. Difference between 2009-2010 recreational canary harvest guidelines (mt) from the scorecard and projected impacts from the 2009-2010 Regulatory Specifications EIS.

State	2009 Harvest Guideline Specified in Federal Regulation*	2009 Projected Impacts from 2009-2010 Spex EIS	Difference
WA	4.9	1.2	3.7
OR	16	2.3	13.7
CA	22.9	7.8	15.1
Total			32.5

* Value represented in the scorecard, which is based on Council Preferred Alternative from 2009-2010 SPEX EIS. Sharing was based on the 2005 catch sharing agreement.

Commercial Fisheries

Limited Entry Non-Tribal Whiting Trawl Fishery

The GMT received a request for clarification on the new process for automatic actions regarding bycatch limits in the non-tribal whiting fishery that were implemented in the 2009-2010 specifications and management measures. It is the GMT's understanding, based on the Council decision in June 2008 and the groundfish regulations at 50 CFR 660.373 (a)(ii), that the N MFS Northwest Region (NMFS NWR) may make remaining bycatch limits from a closed whiting sector available to other whiting sectors based on the pro rata distribution that was used to initially allocate both whiting and bycatch species. The Council could consider making a request to the NWR that the Regional Administrator redistribute the remaining bycatch from the mothership sector, which closed on June 1, based on a pro-rata distribution as defined in the regulations.

Limited Entry Non-Whiting Trawl Fishery

Petrale and Sablefish

Available information indicates that absent an inseason adjustment at some time during the year, the catch of petrale sole will exceed the OY. The primary reason for this higher than anticipated catch level appears to have been the three month winter petrale fishery put in place this year.

Available information indicates that at the end of April, approximately 1,150 mt of petrale had been caught, compared to predictions that were slightly above 800 mt. On the other hand, information indicates that the catch of several other target species may come in below the OY – DTS species in particular. Of these species, requests were made to consider increases in sablefish and shortspine thornyhead trip limits, while requests were specifically made not to increase Dover sole, citing market issues. The following tables show trip limits and RCAs scheduled for this year, along with projected impacts should no inseason action be taken. Following the first three tables are three proposals for inseason adjustments. These proposed adjustments are explained in more detail below.

Status Quo Impacts and Trip Limits

Table 3. Status quo cumulative limits.

		RCA Boundaries									
Subarea	Period	INLINE	OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
North 40 10	1			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
Large	2			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
Footrope	3	see attached table		22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	4			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	5			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	6			18,000	22,000	17,000	110,000	110,000	40,000	150,000	1,500
North 40 10	1			5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
Small	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
Footrope	3	see attached table		7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	5			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	6			5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
38 - 40 10	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
S 38	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000

Table 4. Status quo RCA schedule north of 40°10’ N. lat.

	Jan - Feb	Mar - Apr		May - Jun	Jul - Aug	Sep - Oct	Nov - Dec
North of 48 10	0 - 200*		0 - 200	0 - 150	0 - 150	0 - 200	0 - 200*
48 10 to 45 46	75 - 200*		75 - 200	75 - 150	75 - 150	75 - 200	75 - 200*
45 46 to 40 10				75 - 200	75 - 200		

Table 5. Projected LE non-whiting trawl catch under status quo.

		North	South	Total	OY/HG/ allocation
Rebuilding Species	Canary	12.3	4.3	16.6	
	POP	103.2	0.8	104.0	
	Darkbltch	201.7	34.8	236.5	
	Widow	11.1	9.2	20.3	
	Bocaccio	-	13.1	13.1	
	Yelloweye	0.4	-	0.4	
	Cowcod	-	1.4	1.4	
Target Species	Sablefish	2,515.5	488.4	3,003.9	3,280
	Longspine	721.6	284.8	1,006.4	2,231
	Shortspine	1,046.2	255.2	1,301.5	1,608
	Dover	11,416.4	1,857.3	13,273.7	16,500
	Arrowtooth	3,699.8	175.5	3,875.3	11,267
	Petrale	2,099.7	393.9	2,493.6	2,433
	Other Flat	1,728.8	643.2	2,371.9	4,884
	Slope Rock	97.2	181.4	278.6	1160N/626S

Option 1: Adjust Sablefish and Petrale Limits. Move Shoreward Boundary in the North to 100 fm

The first option proposes increases in sablefish limits in the north for both small and large footrope and a reduction of petrale limits in the north in period 6. Vessels to the south do not see changes in trip limits for two reasons: the higher than expected petrale catch early in the year can be attributed to activity in the north, and sablefish opportunities in the north are far less in the summer months than for vessels in the south. In addition to the proposed trip limit changes, the shoreward portion of the RCA in the north is moved from 75fm to 100fm in period 4. Industry has stated that this period is when sablefish are accessible to vessels fishing shoreward of the RCA, but to a large degree they are only available if a 100 fm line is in place.

Shortspine thornyhead is not increased in this proposal because of the relative degree of uncertainty associated with catch projections under currently scheduled limits. Currently scheduled trip limits are substantially higher than the average trip limit size in place for this species over the past several years, and anecdotal evidence suggests that interest in this species may be growing. Therefore, in order to help ensure that opportunities for DTS species will exist later in the year, trip limits are not increased under this proposal. However, an increase may be available at a subsequent meeting if available information indicates such an increase would be appropriate.

Table 6. Cumulative limits under option 1.

Subarea	Period	RCA Boundaries INLINE	RCA Boundaries OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
North 40 10 Large Footrope	1	see attached table		18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	2			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	3			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	4			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	5			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	6			20,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
North 40 10 Small Footrope	1	see attached table		5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	3			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	5			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	6			11,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
38 - 40 10	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
S 38	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000

Table 7. RCA schedule north of 40°10' N. lat. under option 1.

	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec
North of 48 10	0 - 200*	0 - 200	0 - 150	0 - 150	0 - 200	0 - 200*
48 10 to 45 46	75 - 200*	75 - 200	75 - 150	100 - 150	75 - 200	75 - 200*
45 46 to 40 10			75 - 200	100 - 200	75 - 200	

Table 8. Projected LE non-whiting trawl catch under option 1.

		North	South	Total	OY/HG/ allocation
Rebuilding Species	Canary	16.3	4.3	20.6	
	POP	105.3	0.8	106.1	
	Darkbltch	202.7	34.8	237.4	
	Widow	11.5	9.2	20.8	
	Bocaccio	-	13.1	13.1	
	Yelloweye	0.4	-	0.4	
	Cowcod	-	1.4	1.4	
Target Species	Sablefish	2,767.2	488.4	3,255.6	3,280
	Longspine	721.7	284.8	1,006.4	2,231
	Shortspine	1,053.7	255.2	1,309.0	1,608
	Dover	11,573.4	1,857.3	13,430.7	16,500
	Arrowtooth	3,824.3	175.5	3,999.8	11,267
	Petrale	2,025.0	393.9	2,418.8	2,433
	Other Flat	1,736.2	643.2	2,379.3	4,884
	Slope Rock	97.2	181.4	278.6	1160N/626S

Option 2: Same as Option 1, but Open Shoreward Area North of Cape Alava

Option 2 is the same as option 1, but opens the area shoreward of the trawl RCA north of Cape Alava (North of 48° 10') beginning July 1. This is done based on a suggestion that more yelloweye may be available to ongoing fisheries as a result of cancelled research projects.

Table 9. Cumulative limits under option 2.

		RCA Boundaries									
Subarea	Period	INLINE	OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
North 40 10 Large Footrope	1	see attached table		18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	2			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	3			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	4			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	5			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	6			20,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
North 40 10 Small Footrope	1	see attached table		5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	3			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	5			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	6			11,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
38 - 40 10	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
S 38	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	6	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000

Table 10. RCA schedule north of 40°10' N. lat. under option 2.

	Jan - Feb	Mar - Apr		May - Jun	Jul - Aug	Sep - Oct	Nov - Dec
North of 48 10	0 - 200*		0 - 200	0 - 150	100 - 150	75 - 200	75 - 200*
48 10 to 45 46	75 - 200*		75 - 200	75 - 150	100 - 150	75 - 200	75 - 200*
45 46 to 40 10				75 - 200	100 - 200	75 - 200	

Table 11. Projected LE non-whiting trawl catch under option 2.

		North	South	Total	OY/HG/ allocation
	Canary	17.3	4.3	21.6	
Rebuilding	POP	105.2	0.8	106.1	
Species	Darkbltch	202.5	34.8	237.3	
	Widow	11.5	9.2	20.7	
	Bocaccio	3.0	13.1	16.1	
	Yelloweye	0.6	-	0.6	
	Cowcod	-	1.4	1.4	
	Sablefish	2,764.6	488.4	3,253.0	3,280
Target	Longspine	721.7	284.8	1,006.4	2,231
Species	Shortspine	1,053.3	255.2	1,308.5	1,608
	Dover	11,571.5	1,857.3	13,428.8	16,500
	Arrowtooth	3,825.2	175.5	4,000.7	11,267
	Petrale	2,022.3	393.9	2,416.2	2,433
	Other Flat	1,727.5	643.2	2,370.7	4,884
	Slope Rock	97.2	181.4	278.6	1160N/626S

Option 3 same Limits as Options 1and 2 but no RCA change

Table 12. Cumulative limits under option 3.

		RCA Boundaries									
Subarea	Period	INLINE	OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
	1	see attached table		18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
North 40 10	2			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
Large Footrope	3			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	4			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	5			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	6			20,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	1	see attached table		5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
North 40 10	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
Small Footrope	3			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	5			11,000	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	6			11,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
38 - 40 10	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	21,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	21,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	6	100	150	21,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
S 38	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	21,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	21,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	6	100	150	21,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000

Table 13. RCA schedule north of 40°10’ N. lat. under option 3.

<table>
<tr><th></th><th>Jan - Feb</th><th colspan="2">Mar - Apr</th><th>May - Jun</th><th>Jul - Aug</th><th>Sep - Oct</th><th>Nov - Dec</th></tr>
<tr><td>North of 48 10</td><td colspan="2">0 - 200*</td><td>0 - 200</td><td>0 - 150</td><td>0 - 150</td><td>0 - 200</td><td>0 - 200*</td></tr>
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Table 14. Projected LE non-whiting trawl catch under option 3.

		North	South	Total	OY/HG/ allocation
Rebuilding Species	Canary	12.4	4.3	16.7	
	POP	103.1	0.8	104.0	
	Darkbltch	201.3	34.9	236.2	
	Widow	11.1	9.3	20.4	
	Bocaccio	1.5	13.1	14.5	
	Yelloweye	0.4	-	0.4	
	Cowcod	-	1.4	1.4	
Target Species	Sablefish	2,722.3	502.2	3,224.4	3,280
	Longspine	721.6	284.8	1,006.4	2,231
	Shortspine	1,046.2	255.2	1,301.5	1,608
	Dover	11,416.4	1,857.3	13,273.7	16,500
	Arrowtooth	3,699.8	175.5	3,875.3	11,267
	Petrale	2,016.2	393.9	2,410.1	2,433
	Other Flat	1,728.8	643.2	2,371.9	4,884
	Slope Rock	97.2	181.4	278.6	1160N/626S

Finally, the GMT notes that if canary estimates in the scorecard for the recreational fishery are not revised to make some of the residual referenced previously available for other fisheries, options 1 and 2 would both result in total estimates of canary impact exceeding the OY.

<u>Chilipepper South of 40° 10’ N. lat.</u>

The GMT received a request to increase chilipepper limits south of 40° 10’ N. lat. to reduce discards of incidental catch. In 2006 and 2007, the Council established a 12,000 lb/2 month limit for chilipepper rockfish south of 40° 10’ N. lat. (which was an increase) during select periods for vessels using large footrope trawl gear. While it is somewhat difficult to see whether changes in effort occurred as a result of a 12,000 lb limit, existing information seems to indicate that fishing patterns were not substantially different after the implementation of the 12,000 lb chilipepper limit. Moderate increases to the shoreward limits were included as part of the 2009-2010 management measures, but the effect of these trip limits was not known until recently. Discussions with industry and West Coast Groundfish Observers Program (WCGOP) data both indicate a continuing high discard rate, and anecdotal information suggests that incidental encounters with chilipepper have been increasing.

Previous discussions of chilipepper opportunities have raised concerns over the potential impact on overfished species – bocaccio in particular, but also widow, and (to some degree) cowcod and canary. If a chilipepper trip limit change does not induce targeting, then current estimates of overfished species impacts are appropriate. If changes to cumulative limits do induce some targeting opportunity, then the issue is one of risk. In particular, what is the potential for that targeting opportunity to result in additional impacts on overfished species? Several pieces of information exist for informing this issue. Plots of cowcod and bocaccio bycatch events indicate that much of the observed bycatch of these species have taken place around the Monterey canyon area. However, fish ticket data indicates that the number of trawl vessels operating in that area has declined in recent years. Vessels fishing out of Monterey and Moss Landing frequent the Monterey canyon area and the number of vessels delivering to these ports has declined over the 2003 to 2007 time period, meaning effort in areas where bocaccio and cowcod are relatively common has declined.

Table 15. Effort measured as number of trawl vessels for years 2003-2008 by port in areas of highest bocaccio and cowcod interaction.

	Count of Trawl Vessels by Year and Port					
	2003	2004	2005	2006	2007	2008
FORT BRAGG	14	11	10	9	8	7
MONTEREY	5	2	2	3	2	2
MORRO BAY	10	10	9	5	7	2
MOSS LANDING	16	15	16	11	2	
PRINCETON / HALF MOON BAY	11	12	11	15	10	9

In addition to this information, adult chilipepper tend to be associated with different types of habitat than adult bocaccio and cowcod, meaning that effort focused on chilipepper will tend to occur in areas not preferred by adult cowcod and bocaccio. However, it is important to note that sub-adult cowcod are caught in the trawl fishery. Recent information indicates that a substantial portion of the cowcod catch is comprised of sub-adults, and these sub-adults frequent low relief substrate habitat that is susceptible to trawl gear.

In summary, information suggests that a 12,000 lb chilipepper trip limit is unlikely to change fishing behavior, and therefore is unlikely to increase the bycatch of overfished species. However, should a 12,000 lb trip limit induce changes in fishing behavior, the risk of cowcod and bocaccio catch events appears to be fairly minimal as effort has declined in areas where these species is relatively abundant.

Minor Slope Rockfish

A request was made to the GMT in March and April to analyze an increase in deep water opportunities (i.e. slope rockfish limits, including darkblotched). The Council considered our analysis and chose not to make increases in either March or April. Based those discussions the GMT thought it prudent to wait until we had more inseason fishery data to see how both target and overfished species catches were progressing in June. As existing information indicates darkblotched impacts are higher than previously projected, but still within the OY, the GMT is not recommending increases to minor slope rockfish limits at this time.

Non-trawl RCA North of 40° 10' N. lat.

Oregon industry representatives requested examination of a change to the seaward RCA boundary along that portion of the coast from the Columbia/Eureka line, 43° N. lat., to Cascade Head (i.e., move the line in from 125 fm to 100 fm). Based on impact modeling for the Limited Entry and OA fixed-gear fisheries, this would result in an estimated increase of 0.3 mt of yelloweye. It should be noted though that the model cannot quantify differences for part of the year, so presumably changes to the line inseason would result in smaller increases in total mortality than the model is projecting. The GMT did not recommend these changes in March due to overfished species concerns, particularly yelloweye; however the Council may wish to consider changes to this portion of the RCA at this meeting given revised overfished species impact estimates (see Attachment 1).

Limited Entry Fixed Gear

<u>Sablefish DTL Limits North of 36° N. lat.</u>

The GMT received requests to examine increasing limits for sablefish in the daily trip limit (DTL) fishery. Participation in this fishery historically fluctuates based on participation in other opportunities rather than changes to trip limits. This presents a challenge in predicting the relative effect of inseason modification of trip limits on effort, and therefore, sablefish catch. The GMT notes that inseason action was taken in April to provide for modest increases to daily, weekly, and bimonthly limits. The effect of these May 1 changes on effort and landings is unknown at this time. Despite the lack of information at this time relative to the effects of that adjustment, the Council may wish to consider another moderate increase to the bimonthly cumulative limit from 5,500 lbs/2months to 6,000 lbs/2months for periods 4 and 5 (July-October) as recent catch levels have been near or below 50 percent of the LE FG DTL allocation and existing catch estimates are approximately 20 percent higher than at this time last year. The GMT cautions however that if inseason information in September shows the fishery projected to exceed their allocation, a closure might not be in place until November 1, after the majority of catch has already been taken.

Open Access Fishery

Sablefish Fishery North of 36° N. lat.

The GMT also received requests to examine an increase in limits for sablefish in the DTL fishery. While the Open Access fishery is expected to fall short of the allocation without any inseason adjustments, a precautionary approach has typically been taken when considering inseason adjustments to this fishery. Because access to this fishery is not limited, large swings in effort have been observed in the fishery with relatively modest changes in regulations. Such increases in effort have led to much higher rates of catch and, at times, have led to an early closure of the fishery. The GMT does not recommend increasing the daily limit as effort increases appear most closely associated with changes in this limit. Catch estimates through May, combined with modeling projections through the end of the year, indicate that the Council could increase to the weekly and bimonthly limit to 950 lbs and 2,750 lbs respectively beginning July 1 through the end of the year. The GMT's OA sablefish model estimates that the fishery will still fall several tons short of the allocation. However, it is important to consider the difficulty in predicting effort in this fishery and the fact that inseason adjustments can be made later if appropriate.

California Scorpionfish Limits South of 40° 10' N. lat.

The Council received public comment requesting an increase in California scorpionfish (sculpin) trip limits to at least 1,000 lb per month and removal of the two month seasonal closure in period 2 (March-April) (Agenda Item E.7.c., Public Comment). Removing the closure in Period 2 was not analyzed during the 2009-2010 specifications and management measures cycle so the effects of this removal are unknown; therefore removing the closure is not available as an inseason action.

California scorpionfish is a healthy stock which primarily occurs and is fished south of Point Conception (34° 27' N. lat.), and is currently underutilized, with less than 25 percent of the harvest guideline being attained each year since 2003. It is also covered under California's nearshore permit and is mainly taken with other California state managed species. Since this fishery primarily occurs in shallower depths, o impacts to overfished groundfish species are expected. Therefore the GMT recommends consideration of increasing the trip limits from 600-800 lb/2 months to 1,200 lb/2 months through the end of the year.

Black Rockfish Limits between 42° N. lat. and 40°10' N. lat.

The GMT received a request to increase black rockfish limits in the open access fishery in California, between 42° N. lat. and 40°10' N. lat. An increase in black rockfish trip limits could potentially result in increased take of other nearshore species, including blue rockfish. As of 2009, blue rockfish are managed under a statewide harvest guideline in California. Current trip limits for minor nearshore rockfish in this area are 6,000 lb/2months of which no more than 1,200 lb may be species other than black or blue rockfish. The GMT discussed the possibility of restructuring the trip limit to allow access to the healthy black rockfish stock while restricting blue rockfish harvest to stay within its harvest guideline. The proposed modified trip limit is 7,000 lb /2months of which no more than 1,200 lb may be species other than black rockfish. Under this restructured trip limit, blue rockfish would be managed under the 1,200 lb/2 month sub limit.

Restructuring this trip limit could potentially result in increased discarding of blue rockfish due to the lower trip limit. WCGOP data indicate that black rockfish are generally harvested shallower than blue rockfish. Based on this data, one could infer that these two species are not entirely comingled and could be targeted separately. Industry also indicated blue rockfish occur further offshore than blacks and implementing the 20 fm depth restriction has restricted access to productive blue rockfish fishing grounds. The GMT also notes that under the current trip limit structure, individuals could potentially harvest a maximum of 6,000 lb/2 months, yet PacFIN data indicate the majority of individuals currently harvest 200 lb or less of blue rockfish per 2 months. We will continue to monitor landings relative to trip limit attainment for evidence of increased discarding. The GMT therefore recommends the Council consider modifying the minor nearshore trip limit to 7,000 lb /2months of which no more than 1,200 lb may be species other than black rockfish.

GMT Recommendations:

1. Begin a two-meeting process for identifying a point of concern for petrale sole.
2. Consider reducing scorecard values for canary in recreational fisheries to provide some residual amount for Recommendations 3 and 5.
3. Consider adjustments to petrale and sablefish cumulative limits and RCA boundaries for the non-whiting LE trawl fishery.
4. Consider increasing the limited entry trawl chilipepper cumulative limit to 12,000 lb/2 months both shoreward and seaward of the RCA in areas south of 40°10' for the remainder of the year.
5. Consider changing the seaward non-trawl RCA between the Columbia/Eureka line and Cascade Head from 125 fm to 100 fm for the rest of the year.
6. Consider increasing the bimonthly limit for the LE sablefish DTL fishery north of 36° to 6,000 lb/2 months from July-October.
7. Consider an increase in the OA sablefish DTL weekly and bimonthly limits to 950 lbs and 2,750 lbs respectively beginning July 1 through the end of the year.
8. Consider increasing California scorpionfish trip limits to 1,200 lb/2 months through the end of the year.
9. Consider modifying the minor nearshore rockfish cumulative limit between 42° N. lat. and 40°10' N. lat. to 7,000 lb/2months of which no more than 1,200 lb may be species other than black rockfish.

PFMC
06/15/09

Attachment 1

Projected mortality impacts (mt) of overfished groundfish species updated with most recent research estimates and fishery projections through June.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**13.1**	**16.6**	**1.4**	**236.5**	**104.0**	**20.3**	**0.4**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		4.3		6.0	0.5	60.0	0.0
At-sea whiting cat-proc a/		6.1		8.5	0.5	85.0	0.0
Shoreside whiting a/		7.6		10.5	0.1	105.0	0.0
Tribal whiting		1.4		0.0	0.7	3.7	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Fixed Gear Sablefish	**0.2**	**2.8**	0.0	**4.2**	**0.5**	**0.1**	**0.9**
Fixed Gear Nearshore	0.3	3.3	0.0	0.0	0.0	0.3	1.2
Fixed Gear Other	5.0	0.0	0.0	9.0	0.0	0.7	0.0
Open Access: Incidental Groundfish	2.0	0.9	0.0	0.0	0.0	4.0	0.3
Recreational Groundfish c/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	5.7	**1.9**
TOTAL	103.6	102.7	2.0	278.0	112.0	337.5	15.3
2009 OY d/	288	105	4.0	285	189	522	17
Difference	184.4	2.3	2.0	7.0	77.0	184.5	1.7
Percent of OY	36.0%	97.8%	50.0%	97.5%	59.3%	64.7%	90.0%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors.

b/ South of 40°10' N. lat.

c/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.

d/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

Agenda Item E.7.c
Public Comment
June 2009

5-26-09

Dear Fish and Game Commission,

My name is Dan McCafferty, I am a Commercial Fisherman. I am 47 years old. I started fishing when I was 16, I have made my whole life around boats and fish. Needless to say it's been a challenge. But rewarding, rewarding in the sense that I have been able to be on the water and try and utilize my experience as a fisherman to make a living I have a wife and we work hard together. In the last few years there have been a lot of changes in the fishery that I have been engaged in. I use set lines and target the Sculpin species in Southern California, also I catch California Halibut using rod and reel. I sell the fish live to restaurants that I have developed through much hard work.
Speaking of hard work, I know that you have your hands full with the responsibility of managing so many different animals and fish and the laws that govern them, let alone the people who wish to use these resources. Hats off to you.

The purpose of my letter is to let you know of the situation that I am in a result of all the monthly quotas and to ask that you consider helping me.

Since the implementation of the quotas on Sculpin stocks, I have not been able to catch enough fish to cover fishing or living expenses adequately. With the way the economy is, it is very tough to make the ends meet, as I m sure that you are very well aware

I am requesting that there be an in season adjustment to the amount of Sculpin we are allocated. I think that there are several valid reasons for doing so, namely because of the abundance of the fish, also the economy and the rising expense of fuel and other essential life expenses. Rent, insurance car payments ect. Let alone the upkeep of a fishing boat and all the licenses and equipment that are required to use it., like the added expense of the VMS unit. To a big time fisherman these expenses are a lot. Just imagine what it means for a small time guy like me.

I have restaurants that are running out of the fish I sell them, therefore they are looking for other sources, causing the chance of me losing the business altogether. This has happened already. I am at an unfair disadvantage to my competitors, namely fish that is shipped in from out of state.

Another good reason that it makes sense for an in season quota adjustment is that there are only a few guys left trying to target Sculpin commercially, even though it has been historically caught as a Commercial fish since the records go back, to 1916. We are not making a dent in the biomass, not the way we fish for them. It's been very hard to deal with these quotas since the mainstay of my business is selling live Sculpin and to have it reduced to an amount that is totally insufficient. I myself am not trying to make a "Killing" just a living. It makes sense to me to allow us to catch at least 1000 lb per month. And to remove the two month closure in February/ March, this would give us enough to supply our markets that we developed, help the economy and to help keep us from ending out on the street. I truly think this is fair, considering that the Sport Sector has a 12 month season on Sculpin, and historically doesn't have the catch history with Sculpin as does the commercial sector.

Regarding the Closure in February/ March on Sculpin, this closure makes it nearly impossible for me to take care of responsibilities during tax season and also the renewal of Fish and Game licenses and keep food on the table. I ask of you please consider my requests and do what you can do to help me and the others who have been using the Sculpin of Southern California to maintain a living.
Thank you

Sincerely, Dan McCafferty

Port Orford Ocean Resource Team
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Port Orford, OR 97465
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info@oceanresourceteam.org
http://oceanresourceteam.org

June 3, 2009

Mr. Donald K. Hansen
Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Chairman Hansen:

The Port Orford Ocean Resource Team appreciates the modest increase in daily trip limits for blackcod for the fixed gear LE fleet, yet we do not feel that we will attain the OY allocation in 2009. We would like to request the Council review in-season catch data and consider increasing the amount again. We recently became aware of the amount of DTL LE harvest being left on the table and the following information provided in the federal register characterizes our dilemma:

Table 1. Blackcod daily trip limit allocation and actual harvest.

Year	Allocation	Harvested	Percent not Utilized
2006	356 mt	106 mt	70%
2007	276 mt	116 mt	58%
2008	276 mt	150 mt	46%

We are aware that bycatch of yelloweye rockfish is of major concern yet we do not have fine scale detail observer data summaries to judge impacts near Port Orford. Based on informal discussions with observers and fishermen, we feel that the bycatch rates of overfished species including yelloweye rockfish to be very low in our area. We would like the Council to consider increasing the size of the LE fixed gear sablefish (daily) trip limit during its annual specifications process so as to allow more of the OY to be taken, especially in areas where bycatch rates of overfished species are low. Thank you!

Sincerely,

Leesa Cobb

Leesa Cobb
Executive Director
Port Orford Ocean Resource Team

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June 10, 2009

Mr. Donald K. Hansen
Chair, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda Item E.7. Consideration of Inseason Adjustments – Petrale Sole

Dear Chairman Hansen and Council Members:

Oceana is greatly concerned by the findings of the recent U.S. petrale sole stock assessment, which determined the petrale sole population is at 11.6% of unfished biomass (Agenda Item E.6.a Attachment 1, June 2009). This biomass estimate places this population deep within the overfished category. This stock assessment represents a twenty percent decrease from the findings of the last assessment completed in 2005. Moreover, the stock assessment forecast predicts this population will continue to decline unless conservation and management actions are taken to curb the directed petrale sole fishery and control petrale sole bycatch. We therefore respectfully request that the Council take immediate actions to close the directed fishery for the remainder of 2009, control bycatch in any other fisheries and implement appropriate area closures so that this population can rebuild to healthy, productive and sustainable levels.

The Pacific Fishery Management Council and National Marine Fisheries Service have the moral and legal responsibility to prevent overfishing and rebuild overfished stocks as quickly as possible. The Magnuson Stevens Fishery Conservation and Management Act requires that "[c]onservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry" 16 U.S.C. § 1851(a)(1). In the case of petrale sole, where the stock is now clearly overfished, conservation and management measures must be taken to rebuild the stock as quickly as possible.

Given the scientific information before the Council, it would be ill advised to delay action until 2011 when the Allowable Biological Catch will be set at zero under the 40:10 harvest control rule. Taking immediate action is imperative for the long-term sustainability of the petrale sole population and its role in a healthy ocean ecosystem. We look forward to working with you on this important matter.

Sincerely,

Ben Enticknap
Pacific Project Manager

Agenda Item E.8
Situation Summary
June 2009

PRELIMINARY REVIEW OF EXEMPTED FISHING PERMITS (EFPs) FOR 2010

Exempted fishing permits (EFPs) provide a process for testing innovative fishing gears and strategies to substantiate methods for prosecuting sustainable and risk-averse fishing opportunities. Applications for EFPs proposed for 2010 are provided as Agenda Item E.8.a, Attachments 1, 2, 4, 5, 7, and 8.

The first proposed EFP is designed to test a trolled longline strategy to selectively harvest abundant chilipepper rockfish off central California (Attachment 1). The second proposed EFP, sponsored by The Nature Conservancy, Environmental Defense, California Department of Fish and Game, and others, seeks to test hook-and-line and trap gears in central California using limited entry trawl permits purchased by The Nature Conservancy (Attachment 2). Additionally, a report on the implementation of this EFP in 2008 is provided as Attachment 3. The third EFP, sponsored by the Oregon Chapter of the Recreational Fishing Alliance, seeks to test floated, long leader gear to selectively harvest yellowtail rockfish within the Rockfish Conservation Area (RCA) in waters off Oregon (Attachment 4). The fourth EFP, sponsored by the Recreational Fishing Alliance and the Golden Gate Fishermen's Association, seeks to test the use of recreational hook-and-line gear to catch underutilized chilipepper rockfish, yellowtail rockfish, and slope rockfish on Commercial Party Fishing Vessels (CPFVs) within and seaward of the non-trawl RCA in waters off California north of Pt. Conception (Attachment 5). A report on the implementation of this EFP in 2008 is provided as Attachment 6. The fifth EFP, sponsored by the San Francisco Fishermen's Cooperative, seeks to harvest chilipepper rockfish and other healthy shelf rockfish in a specific area within the non-trawl RCA off San Francisco (Attachment 7). The sixth EFP is one sponsored by the Oregon Department of Fish and Wildlife and seeks to collect biological data from yelloweye rockfish encountered in the Oregon sport charter fishery (Attachment 8).

Under this agenda item, the Council will review these EFP applications, consider public and advisory body comments, and consider moving the 2010 EFP applications forward for public review. Any recommended modifications to these EFP applications will be communicated to the EFP sponsors and the public. The Council is scheduled to decide their final recommendations for 2010 EFPs at the November meeting in Costa Mesa, California.

Council Action:

Consider EFP applications for 2010 and provide preliminary recommendations for public review.

Reference Materials:

1. Agenda Item E.8.a, Attachment 1: Application for an Exempted Fishing Permit sponsored by Steve Fosmark entitled, "Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (*Sebastes goodei*)."

2. Agenda Item E.8.a, Attachment 2: Application for Issuance of an Exempted Fishing Permit (EFP) to Fish Trawl Permits with Longline, Trap, Pot, and Hook-and-line Gear in a Community Based Fishing Association off the Central California Coast.
3. Agenda Item E.8.a, Attachment 3: Testing a Community-based Fishing Association: Report on Implementation of the 2008 Morro Bay/Port San Luis Exempted Fishing Permit.
4. Agenda Item E.8.a, Attachment 4: Application for an Exempted Fishing Permit sponsored by the Recreational Fishing Alliance Entitled, "Oregon Recreational Yellowtail Rockfish EFP."
5. Agenda Item E.8.a, Attachment 5: Application for an Exempted Fishing Permit sponsored by the Recreational Fishing Alliance and the Golden Gate Fishermen's Association Entitled, "Recreational Rockfish Catch Composition Seaward of the Rockfish Conservation Area."
6. Agenda Item E.8.a, Attachment 6: Report on Implementation of the 2008 Exempted Fishing Permit Activities ("Recreational Rockfish Catch Composition Seaward of the Rockfish Conservation Area") Sponsored by the Recreational Fishing Alliance and the Golden Gate Fishermen's Association.
7. Agenda Item E.8.a, Attachment 7: Application for an Exempted Fishing Permit sponsored by the San Francisco Fishermen's Cooperative Entitled, "Evaluation of Modified Vertical Hook and Line Gear to Avoid Depressed Rockfish Species While Fishing in Certain Parts of the Rockfish Conservation Area (RCA)."
8. Agenda Item E.8.a, Attachment 8: Application for an Exempted Fishing Permit sponsored by the Oregon Department of Fish and Wildlife Entitled, "Application to the Pacific Fishery Management Council for an Exempted Fishing Permit to Collect Biological Information from Yelloweye Rockfish Encountered in the Oregon Sport Charter Fishery."

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Preliminary Recommendations for EFPs

PFMC
05/29/09

FV SEEADLER
Steve Fosmark
3059 Sherman Road, Pebble Beach, CA 93953
Phone: 831-373-5238, Fax 831-373-0123

Mr. Don Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland Oregon 97220-1384

Dear Mr. Hansen and Members of the Council,

Thank you for considering my chilipepper EFP and for working with me. I would like to request a change in the 12 month term for the EFP. Currently January is the 12 month start date.

However, observer training starts in March and it is very late for me to fish a February through April EFP. Additionally my grant request was denied for this year to help pay for observer training. However, I am fortunate to have a qualified volunteer offer to help and be trained for next year in March.

The EFP could still be fished in April and if continued through the following year from February through April there may be sufficient information for analysis. I will again be submitting an application next year for consideration for the EFP in 2011 and am hoping to expedite approval through NMFS pending a Council recommendation to do this EFP in 2011. Catch data and changes to caps would apply and any necessary changes made when EFPs are reviewed.

I am willing to make whatever changes are needed to make the fishery work. Thank you for your consideration as I was unable to execute the EFP last year.

Sincerely,

Steve Fosmark

EXEMPTED FISHING PERMIT – CHILIPEPPER ROCKFISH

Request for an exempted fishing permit (EFP).

Project Title: Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (*Sebastes goodei*).

Date of Application: March 6, 2009

Applicant:	Steven Fosmark PO Box 1338 Pebble Beach, CA 93953 Phone: 831-601-4074 Email: fvseeadler@aol.com	Analysis:	NMFS Santa Cruz Laboratory 110 Shaffer Rd. Santa Cruz, CA 95060 Phone: (831) 420-3931 Fax: (831) 420-3980

Purpose and Goals

Chilipepper rockfish stocks on the west coast are considered healthy. However, because of weak stock management, the OY for this species cannot be taken. In 2006, chilipepper landings were 39.7 mt (http://www.psmfc.org/pacfin/data/r001.p06) of a 2000 mt OY. Area closures to protect overfished rockfish species have effectively closed access to this resource.

The long-term objective of this project is to describe and evaluate the effectiveness of a species-selective longline technique, which if proven effective, will allow commercial fishermen access to chilipepper rockfish, a relatively abundant species of rockfish. This fishery is constrained by the current rockfish area closures (Rockfish Conservation Areas, RCA), implemented to protect overfished rockfish species. Despite the depressed condition of some west coast groundfish stocks, there are other stocks that remain healthy. These healthier stocks could safely sustain increased harvest levels if they could be fished more cleanly and without bycatch of more depleted stocks. If stronger stocks could be targeted without increasing fishing mortality on depressed stocks, the California commercial fishing fleet would have alternative fishing opportunities that would provide some economic relief to the industry while providing the public with a highly desirable product.

The objective of the research for which we are requesting an EFP would be to establish the performance characteristics of the gear and to rigorously document the catch and bycatch when deployed in areas where chilipepper are abundant and bycatch species are not, under commercial fishing conditions. The objectives would be: 1) to test the trolled gear and fishing strategy with vertical lines and artificial flies, and 2) determine Groundfish Fishing Areas that are abundant with chilipepper rockfish, and that correspond to low densities of overfished species. The second objective may better help to answer the question of how EFP results can potentially be translated into future fleet-wide fishing opportunities.

The location, gear characteristics (number of hooks, length of mainline, etc.), species composition, size distribution, and sex ratio (of chilipepper) of each set of gear will be recorded by onboard observers. In addition, a camera may be used at the discretion of the operator.

The EFP that we are requesting would allow up to three (3) vessels. Each would be allowed to fish inside the current RCA using otherwise legal open access fixed gear. Full retention applies to rockfish species (as defined in Federal regulations), and retention of non-rockfish species will be governed by applicable open access limits, and may be released once documented by an observer.

This EFP for chilipeppers is a mid-water project and will also be using a test line with a couple of hooks called prospecting as to avoid bocaccio. Line will be an off the bottom longline with corks attached close to line, consisting of drop line, main line, and wire attached to a reel, (Diagram below). The gear will consist of a maximum of 500-750 hooks per set. Gear consists of open access troll fly and vertical hook and line gear that is set and fished in a unique way such that the hooks sink to near, but not hard on bottom. Prior to setting the gear, a test set will be made with vertical gear in which the gear is set vertically. This will be with no hooks closer than 3 fm of the bottom, based on acoustic soundings, to ensure that the target species is present and to minimize the chance of encountering any overfished rockfish species.

Once the test set establishes the presence of chilipepper rockfish, the gear will be deployed as follows: The vessel moves slowly ahead as the gear is deployed. The gear remains attached to the vessel at all times. Artificial "flies" are used in lieu of bait for efficiency and are preferred by chilipepper. The mainline consists of 200-800 lb. test monofilament, and may be spooled on a hydraulic drum. One end, with buoy and weight attached in such a way that the gear does not touch the bottom is sent overboard as the boat moves slowly ahead, and the remaining gear is deployed. The weighted buoy line length is adjusted to avoid bottom contact to reduce the likelihood of bycatch and prevent the hooks from hanging up on bottom. Hooks are spaced approximately 18-30" apart on 12" monofilament gangions (approximately 60 lb test). Hooks are tied with artificial flies, and no bait is used. This gear is reported by the fisherman to selectively catch chilipepper rockfish when properly deployed (Steve Fosmark, Moss Landing, CA, F/V SeeAdler, Phone: 831-373-5238; cell phones: 831-601-4074; or Boat 831-601-7934 email: FVSeeAdler@aol.com).

The research would be conducted off central California (36 to 37.50 degrees), at depths of approximately 80-120 fm (chilipepper rockfish tend to get smaller in size and schools are thinner in shallow depths), in areas with canyon edges and walls, smooth hard bottom, with no rocks (example: canyon south of Año Nuevo). This depth range is currently within the non-trawl RCA established to protect overfished rockfish species.

To ensure that this experimental fishery has a minimal impact on overfished rockfish species, the Council recommended aggregate catch limits on the fishery for overfished species as follow:

Widow rockfish: 0.700 mt
Bocaccio: 3.300 mt
Canary: 0.027 mt (*20 fish*)
Cowcod: 0.015 mt *(3 fish)*
Yelloweye: 0.005 mt *(3 fish*)
Darkblotched: 0.400 mt
POP: none

The widow cap may be changed depending on the outcome of the STAR panel if it is no longer overfished or if the GMT advises a change in the EFP widow rockfish limit.

Under the terms of this EFP, each vessel will carry an observer with the cost of observer coverage borne by the EFP participants. All species will be retained. Catch of species other than the above are expected to be uncommon although some yellowtail and perhaps other rockfish may be encountered in small numbers. Attaining any of the above aggregate catch limits will terminate the EFP for all vessels.

We anticipate that fishing as described in this EFP will not be constrained by these caps.

Chilipepper rockfish caught under this EFP will be retained and sold by the permitted vessel.

We request that NMFS issue this EFP for one year, or 12 calendar months starting after April.

This EFP will incorporate a standardized data collection and reporting format as determined by the NMFS Northwest Fisheries Science Center. All vessels participating in this EFP fishery will be required to carry an observer. The observer will record all fish caught and ensure that aggregate bycatch limits are not exceeded. Vessel captains will keep records of catch by species by set for all sets under this EFP. It is possible that the catch and bycatch will change seasonally,

The applicant and the scientist will be responsible for data analysis. Data analysis will consist of statistical analysis of catch and bycatch of all species by set, trip, and month. Catch rates will be expressed as catch per hook, per set, per day, and per trip. Value of the catch will be recorded following sale. The final report will provide an estimate of fishing effort and total catch; absolute and relative species composition summarized by set, trip, and month; size composition of catch and bycatch; and sex ratio and stage of maturity for chilipepper.

Vessels participating in this EFP fishery will be chosen on their ability to accommodate an observer, their willingness to maintain detailed catch data and their willingness to participate during months when fish are available to this fishery.

Areas to be selected for high-density target species will be between 37.35 degrees (Pedro Point) and 36 degrees (Point Lopez).

Equipment needed

Hydraulic type powered reels, and stern roller, powered puller, 1000 feet of conveyor belting or wide carpet runner, fly-hooks, line, wire, snaps, swivels, small buoys, one large buoy, one 3 to 5 pound weight, one 20 to 30 pound weight, fish finder, fathometer or sonar.

Description

500 to 750 hooks are needed for three or four sets in the morning and afternoon; 1,000 hooks would be the best if sets are limited by less available time.

Determine depth

At 90 fm deep, use 85-89 fm terminal drop line buoyed to sustain depth with a 3-5 pound weight at the end a long line is attached. When long line is 1,000 feet use 750 leaders on swivels with attached fly hooks. Swivels are slipped onto line held in place by stops. Small floats are attached to long line between several leaders when deployed. Floats have short lines and snaps to be snapped onto the long line. Long line is attached at the other end to a drop wire at 1 fm above a 20-30 pound weight. Drop wire always is attached to the front reel on the boat.

Time to fish is short. During the day chilipepper come off the bottom and once they are mid-water one cannot catch them by this method. Therefore the morning and evening are the best times.

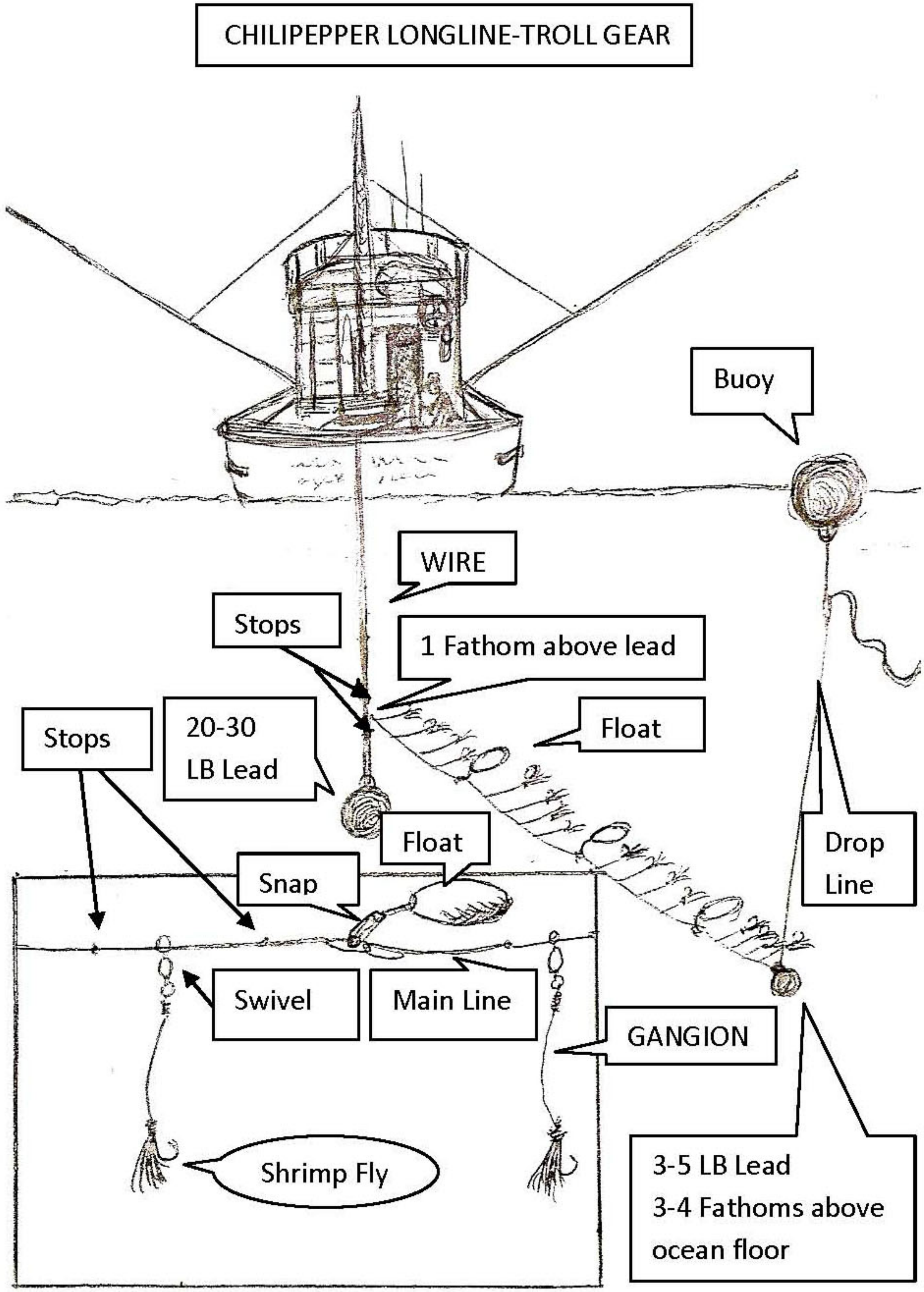
Line is approximately 1,000 feet long and the weight is 3 fm from the bottom to provide control. When the line reacts to bites, take the boat out of gear and the line will sag between floats and fish will climb the line to the floats as they do with vertical gear on up and as line is pulled, line rises to the surface. Boat must then be going ahead while pulling to keep the fish on. The terminal drop line remains at 85 fathoms. As the boat moves forward the drop line moves close to the end of the boat tight and fish continue to climb the line. As the line is towed in, fish stay in area of line where school is thicker, (pull through spot of fish). Line is pulled on board until it becomes vertical to the vessel.

Suggested Deployment

Reel to reel gear can be used to deploy a line over a conveyor belt into the water. Whichever reel has coiled belt is always free wheeled. Forward reel coils conveyor belt for storage only. Back power reel uncoils gear over the conveyor belt and deploys it to a stern roller as forward reel is in power to coil belt. Conveyor belt is coiled from the back reel to the forward reel and line spools by its own weight over the stern roller into the water.

Suggested Retrieval

Pull wire to surface with a separate power puller. Snap longline onto back reel. Pull line with powered back reel by rolling line onto conveyor belt. Belt is spooling from over the forward reel. Belt is pulled under and over the back reel. Longline is pulled over stern roller to back reel while conveyor belt is moving with it. As line comes over the stern roller, remove fish. Line is <u>never</u> coiled onto the forward reel. The line comes from the water over the stern roller, and is coiled onto the back reel. Belt acts as a protection from entanglement for hook and line separation. Another technique is to pull by hand with two people puling, one person removing fish, and one person storing gear.


CHILIPEPPER LONGLINE-TROLL GEAR
Buoy
WIRE
Stops
1 Fathom above lead
Stops
20-30
LB Lead
Float
Float
Snap
Drop
Line
Swivel
Main Line
GANGION
Shrimp Fly
3-5 LB Lead
3-4 Fathoms above
ocean floor

Application for Issuance of an Exempted Fishing Permit (EFP) to Fish Trawl Permits with Longline, Trap, Pot, and Hook-and-line gear in a Community Based Fishing Association off the Central California Coast

May 27, 2009

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

We request approval by the Pacific Fishery Management Council (PFMC) for an EFP to allow The Nature Conservancy (TNC) to continue work under the EFP approved by the Council in November 2007 and in September 2008, to employ up to six Limited Entry Trawl "A" permits using longline, trap, pot, and hook-and-line gear by leasing those permits to no more than six fishermen. Further, as was done in 2008, we request permission to use these permits under shared aggregate catch limits for target and bycatch species that are not subject to existing trawl trip limits, but would be subject to a harvest plan that includes measures to manage the pace of the EFP fishery. These exemptions to the rules governing Limited Entry Trawl permits are necessary to conduct the CBFA experiment. We are not proposing any changes in the EFP project design, but for ease of reference, we have incorporated the same description of the project from the 2009 application.

This second year of the Exempted Fishing Permit (EFP) will allow us to continue to test the proposition that establishing a cooperatively managed, community based fishing association that employs trawl licenses to use longline, trap, pot, and hook-and-line gear off the Central California coast, under shared aggregate catch limits for target and bycatch species, can provide several important benefits. Under the EFP, the applicants will test whether granting the option of switching from trawl gear to fixed gear types can be manageable and, perhaps, desirable within the larger groundfish fishery management structure. The EFP will also test whether forming relationships among fishermen under a cooperative structure with shared catch limits and several unique elements would mitigate the impact of trawl effort reduction or removal on associated communities and fishermen in these areas.

The applicants propose that reduced bycatch of overfished species and the higher value of target species caught by converting some trawl effort to longline, trap, pot, and hook-and-line gear will improve both the environmental and economic performance of the local groundfish fishery. Further, establishing a community based co-management entity may improve monitoring and compliance in the fishery, and benefit the community by ensuring access to the resource. Because the six trawl permits based in Morro Bay were purchased by The Nature Conservancy (TNC), and trawling effort has not been replaced in the area – with the exception of one trawler who is working on a project in cooperation with TNC - the permits could be re-deployed without severe impacts on other fishermen or other fishing ports.

Community based co-management has been identified as a tool for enhancing management and economic benefits in fisheries. The trawl fishery of the Central Coast of California provides a unique opportunity to test this idea in a real-world situation with features not found in current cooperatively-managed fisheries. These features include:

1. Multi-species fishery with several severely depressed stocks and constraining overfished species catch limits;
2. Single owner of multiple permits who can facilitate formation of a cooperative fishing arrangement;
3. Approved, economically viable, more selective alternative gear technologies available; and,
4. Possible future rationalization that is likely to include gear switching opportunities and may include other provisions that would affect and enable communities' ability to establish this type of fishing enterprise.

To conduct this test, TNC will be leasing up to six of its Limited Entry Trawl "A" permits, under the exemptions and requirements described in this proposal, to no more than six fishermen to fish using longline, trap, pot, and hook-and-line gear under shared aggregate catch limits for target species and bycatch. TNC will be the entity responsible for developing the lease arrangements under which fishermen will participate in this EFP and for enforcing the terms of their use, and for ensuring that implementation of this EFP is accountable to state and federal regulatory and reporting requirements.

Further, TNC is working with fishermen participating in the EFP and the Morro Bay Commercial Fishermen's Organization, the Port San Luis Commercial Fishermen's Association, the City of Morro Bay, the Port San Luis Harbor District, the Department of Fish and Game, and Environmental Defense Fund to develop the terms of the arrangement under which these fishermen will operate on a cooperative basis pursuant to the terms of the EFP. This arrangement will be referred to throughout this proposal as a "community based fishing association" or CBFA. The conditions for this arrangement will be established in the terms and conditions of the lease agreements and reinforced by the terms and conditions of the EFP.

2.1 Background on this EFP and 2010 Activities

This project builds on the foundation laid in the 2008 and soon to be launched 2009 EFP. Extending the project to a third year of operation under an EFP in 2010 will support the Council's groundfish management goals, maximize the usefulness of the lessons learned, further cement relationships between environmental groups and the commercial fishing industry and provide insight into how the community fishing association created through the EFP will continue through, and beyond, coming management changes in the fishery. In addition, extension to a third year will allow us to respond to lessons learned from an electronic monitoring test conducted in partnership with NOAA's West Coast Groundfish Observer Program (WCGOP) in 2008 and more fully develop monitoring systems which may be informative to implementation of the trawl rationalization program. Finally, the extension would provide sufficient data and experience for the partners in this effort to decide if and how to formalize a community based fishing entity and cooperative fishing in this area into a permanent fishing enterprise that could hold fishing privileges and oversee cooperative conservation and management activities. Further, it would allow the project and the demonstration fishery to continue to operate and provide benefit to the Morro Bay/Port San Luis area until the IFQ program is implemented and a permanent arrangement is established.

The Council approved the 2009 EFP in September 2008, NMFS will issue the 2009 EFP in May and fishing will begin as soon as possible. We have identified eligible and willing participants (including the return of all three 2008 participants), hired NOAA-trained observers, and made progress on developing the guidelines and harvest plan that will guide implementation and other key milestones. Building on 2008 efforts, we are working to develop incentives to encourage and test more diversified target strategies this year. In addition, TNC worked with WCGOP in 2008 to use the EFP as a platform to test the feasibility of using electronic monitoring (EM) as a component of meeting full accountability requirements. While overall compliance with the EM requirements was outstanding last year, the project revealed some opportunities for improvement. WCGOP does not plan to deploy EM on the EFP in 2009, but we are revising our data collection protocols in 2009 and conducting additional analysis of data collected in 2008 in response to feedback from WCGOP. We would like to field test these protocols and implement a more rigorous EM project in 2010. .

2.2 Disposition of species to be harvested under the EFP

All rockfish will be retained and species caught within the limits authorized for the EFP may be retained and sold by the vessel, except that canary rockfish, yelloweye rockfish, and cowcod may not be sold.

3 Justification for Issuance of the EFP, including potential impacts of issuing the EFP.

There are three main points that justify the issuance of this EFP through 2010:

1. It will further the goals and objectives of the Pacific Coast Groundfish Fishery Management Plan.
2. It will provide information regarding the mechanics of trawl IFQ process by providing experience with gear switching, community-based management, and improving monitoring efforts – all of which are or could be important elements of the trawl IFQ program.
3. It will test ways to reduce the impacts on small fishing communities from the trawl IFQ program.

Furthering the Goals of the Pacific Coast Groundfish Fishery Management Plan: This EFP is designed to test the ability of a community based fishing association that uses gear-switching and shared aggregate catch limits to better achieve Pacific Coast Groundfish Fishery Management Plan (PCGFMP) goals and objectives. The goals of the PCGFMP are to prevent overfishing and rebuild overfished stocks, prevent habitat loss, maximize the value of the groundfish resource, and to provide opportunities to utilize abundant stocks to the extent possible within the constraints of overfished species rebuilding requirements. However, the current management system provides few positive incentives or opportunities for fishermen to change the way they do business to meet the PCGFMP rebuilding or habitat protection objectives. In addition, regulatory obstructions exist to fishermen being allowed the flexibility to manage their fishing operations in a way that would enhance the value of their catch while reducing their costs. By permitting the use of trawl permits with fixed gear (which will likely offer some improvements in habitat impacts and selectivity), with shared aggregate catch limits, under collective decision-making on pooled access to the resource, this EFP will test the efficacy of a community based fishing association and gear switching as mechanisms for better aligning management and fishing incentives.

Informing Trawl Rationalization: This EFP will approximate some of the conditions that could follow implementation of an IFQ program for the West Coast trawl fishery. Fishermen will likely be confronted with highly constrained limits on target species and bycatch of overfished species, as well as additional regulatory costs (i.e. monitoring). Fishermen may choose a number of strategies to maximize the value of their catch while staying within constraints, including switching gears (currently an option in the proposed alternatives) and pooling effort through a community based entity or other such arrangement as provided for in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). This entity could be charged with making decisions regarding deployment of fishing effort within constraints established by the Council, for determining distribution of limited human observer coverage across this fishery, and for developing strategies and incentives to achieve harvest targets while remaining below aggregate catch limits for overfished/rebuilding species. Managing quota under an IFQ program collectively may provide additional conservation and economic benefits, but it will be important that provisions in the IFQ regulations are developed so that these types of arrangements are allowed so that communities like these have the opportunity to retain their traditional groundfish industries.

The trawl IFQ options currently under review call for 100% observer coverage. This EFP will similarly utilize 100% observer coverage and will provide practical and valuable information on how a community would employ and manage observers. Observer coverage is very costly and this new requirement under the IFQ program – if the cost is shifted to the industry – could be prohibitive. While full accountability is necessary and desirable under the IFQ program, it may be worthwhile to think creatively about how to meet this need. In 2008, EM systems were deployed on all participating vessels and, based on what was learned, changes have been made in monitoring and recordkeeping protocols in 2009. It is the proponents' intent to field test these protocols with EM again in 2010. By acting in a coordinated manner, fishermen may be able to reduce costs while still providing required information to managers. Furthermore, the EFP will illuminate the challenges of monitoring and managing a community based fishing association in the context of the larger west coast groundfish fishery. The EFP will also provide information on costs of management under a rationalized fishery.

In addition, the EFP will provide practical experience in developing a working relationship between the community based fishing association, the PFMC, and NOAA Fisheries. Through lease agreements, The Nature Conservancy – acting for and in collaboration with the community based fishing association - will hold participants to constraints specified in the EFP, and ensure compliance with the regulatory and reporting requirements established by the PFMC the regulatory and reporting processes established by the PFMC, the State of California, and NOAA Fisheries. This will provide insights as to how community based organizations in the future might be used to assist managers in getting timely information about the fishery including members' compliance with regulatory requirements.

Reducing Impacts on Fishing Communities: Evidence suggests that cooperative, community based fishing associations offer an opportunity to strengthen fisheries on the West Coast. Regulations to rebuild stocks and protect habitat promote fisheries sustainability and address the consequences of overcapacity, but at a very high economic and social price to fishing communities. Public perceptions about trawl fishing practices, market dislocations, increasing costs and diminishing harvest opportunities, as well as buyouts to reduce capacity have taken their toll on communities that rely on the groundfish trawl fleet. On a large scale, rationalization of the trawl fleet is likely a net benefit, but its effects on a community scale are less clear. Community fishing associations could provide an opportunity for fishermen to coordinate their efforts, pool resources, and make collective investments in fishery infrastructure, in order to optimize the value of the resource, meet rebuilding and habitat conservation requirements, and preserve fishing heritage. This part of the experiment is consistent with PCGFMP objectives to provide for the sustained participation of fishing communities, and minimize adverse economic impacts.

The use of shared aggregate catch limits for target species and bycatch proposed by this EFP will allow the community based fishing association to take steps that are likely to improve the opportunity offered to fishermen and the community, including through the following means:

1. Enhancing harvest efficiency– by coordinating on harvest, members can reduce costs of harvest by sharing information, eliminating redundant effort, and reducing the incentive to stuff capital.
2. Commanding increased price – switching to longline, trap, pot, or hook-and-line gear is likely to deliver a higher quality or preferred product that may command a higher price.
3. Pooling risk – by sharing an aggregate catch limit for bycatch, the group is able to spread compliance risk across members and minimize effort associated with individual fishing operations, including the race to fish. This could enable more targeted harvesting, and has the potential to raise revenues and reduce costs.

While community based fishing associations that operate under shared caps and facilitate gear switching will likely prove to be a valuable approach in many places around the country, practical experience is extremely limited.

4 Statement of whether the proposed EFP has broader significance than the applicant's individual goals.

While cooperative management has been used successfully in fisheries throughout the world, there is less knowledge about how such an approach could work on the West Coast, in a constrained multispecies fishery, within the management options created by new provisions of the MSFCMA which allow the establishment of community based entities as part of Limited Access Privilege Programs, such as IFQ programs. This EFP will provide managers with insights into how a fishing association could work to achieve PFMC/NOAA Fisheries' strategic goals for groundfish and FMP objectives; information that will be useful in development of regulations or guidelines governing establishment of CFAs or other community based approaches pursuant to language in the MSFCMA (Sec. 303A(c)(4)).

Management measures related to rationalization, such as the trawl IFQ program, will require enhanced monitoring, because such programs emphasize individual accountability to catch limits. This EFP will explore how to structure cost-effective and responsive monitoring system - from the perspective of both fishermen and fishery managers.

5 Expected total duration of the EFP

This EFP will be valid for at least one year, and will allow the continuation of a demonstration project initiated under an EFP in 2008 and continued in 2009. This demonstration project is intended to lay the groundwork for a permanent fishing enterprise that could hold fishing privileges and oversee cooperative conservation and management activities.

6 Number of vessels covered under the EFP

This EFP will use six Limited Entry Trawl "A" permits held by The Nature Conservancy and will include no more than six fishery participants and will employ no more than six vessels.

7 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; this description should include harvest estimates of overfished species

This proposal requests an Exempted Fishing Permit be issued to The Nature Conservancy to grant permission to lease up to six Limited Entry Trawl "A" permits to fishermen for use with longline, trap, pot, and hook-and-line gear. Further, we request permission to use these permits under a shared aggregate catch limit and, rather than be subject to existing trawl trip limits, be subject to measures established by the fishing association to pace fishing effort throughout the year. (See section 12)

Under this EFP, TNC will lease up to six permits to a specified set of participants in the fishing association who will have the opportunity to fish up to specified aggregate catch limits of target species and bycatch species. If the fishing association is on track to exceed its bycatch cap prior to reaching its target species cap, then fishing under the EFP will end (prior to its reaching the target species aggregate catch limits).

7.1 Target species caps

For the 2008 EFP, the following species were identified, through an examination of catch histories of the six permits that are the subject of this proposal, Morro Bay ex-vessel revenue data, and interviews with Central Coast fishermen, to have been historically harvested under the six trawl permits used for this experiment and to be accessible in commercially viable amounts using gear specified in this proposal. There is one exception to this last statement – flatfish are included here in greatly reduced amounts compared to trawl landings and it is unlikely that these caps will be reached during the course of this EFP.

For the requested 2010 EFP, we propose that the list of species for which aggregate catch limits are requested remain the same as was approved by the PFMC in 2008 and 2009. With regard to the aggregate catch limits proposed for each species, we would develop proposed amounts for 2010 following a similar rationale to that used for establishing the 2009 levels.

<table>
<tr><th>Species:</th><th>Aggregate Catch Limit approved for EFP in 2009:</th><th>Aggregate Catch Limit requested for EFP in 2010:</th></tr>
<tr><td>Sablefish</td><td>165 mt</td><td rowspan="13">Request for target species aggregate catch limits would follow a similar rationale to that used for establishing the 2008 levels and will be subject to GMT deliberations and Council decisions regarding 2010 management measures.</td></tr>
<tr><td>Southern Slope Rockfish</td><td>50 mt</td></tr>
<tr><td>Blackgill Rockfish</td><td>20 mt</td></tr>
<tr><td>Longspine thornyhead</td><td>60 mt</td></tr>
<tr><td>Shortspine thornyhead</td><td>60 mt</td></tr>
<tr><td>Lingcod</td><td>15 mt</td></tr>
<tr><td>Other:</td><td></td></tr>
<tr><td>Chilipepper rockfish</td><td>20 mt</td></tr>
<tr><td>Splitnose Rockfish</td><td>1000 lbs</td></tr>
<tr><td>Flatfish:</td><td></td></tr>
<tr><td>Dover sole</td><td>10 mt</td></tr>
<tr><td>Petrale sole</td><td>10 mt</td></tr>
<tr><td>Other flatfish</td><td>10 mt</td></tr>
</table>

The aggregate catch limit requested for sablefish was based on the catch history of the six permits purchased by The Nature Conservancy in 2006, which provides a good starting point because this trawl capacity was removed very recently from the Conception Area and has not been replaced. From 1994 to 2004, Morro Bay trawl landings represented on average 46% of Conception Area landings of sablefish. Together, when TNC permits were active, they accounted for approximately 30% of Conception Area landings for sablefish. Average total Conception Area landings of sablefish between 1998 and 2006 were 168 metric tons. The proposed aggregate catch limit is derived by taking 30% of the average or 50 metric tons. The 2010 requested catch limit will follow a similar rationale.

Aggregate catch limits for species other than sablefish will be based on estimates of catch history, potential catch deemed necessary by the applicants to effectively prosecute the EFP, interest from fishermen likely to participate in catching these species, and the need to minimize adverse impacts on other fishermen and areas.

7.2 Overfished Species caps

In 2008, bycatch aggregate catch limits were recommended by the California Department of Fish and Game and further refined by the PFMC based on the overfished species scorecard. Recognizing the complex issues related to allocating overfished species, we propose to work with the PFMC to develop appropriate hardcaps for overfished species in 2010 based on additional information on stock status, GMT deliberations, and the development of the 2010 scorecard. The 2009 EFP aggregate catch limits may serve as a starting point for that process:

Species:	**Aggregate Catch Limit approved for EFP in 2009:**	**Aggregate Catch Limit requested for EFP in 2010:**
Canary Rockfish	50 lbs	*Request for hardcaps for overfished species would be based on 2008 levels, stock status, GMT recommendations, and the 2010 scorecard.*
Yelloweye Rockfish	150 lbs	
Widow Rockfish	2 mt	
Darkblotched Rockfish	1000 lbs	
Pacific Ocean Perch	300 lbs	
Cowcod	440 lbs	
Bocaccio	5 mt	

All caps will be apportioned to individual vessels within the fishing association to achieve the goals of the EFP.

8 Infrastructure to monitor, process data, and administer the EFP.

The Nature Conservancy will be the entity to which the EFP, if approved, is issued and the entity principally responsible for managing implementation of this EFP.

8.1 The Nature Conservancy will manage all fishing leases and will be responsible for enforcing the terms that govern their use. This will include working with fishermen to establish lease terms that reflect the purposes and goals of this EFP. TNC will be responsible for ensuring accountability to relevant State and Federal regulatory and legal requirements.

8.2 Data collection, analysis, and reporting will be managed by a dedicated project manager under contract to The Nature Conservancy and who works closely with a local community based fishery association committee (“the Committee”) that is comprised of representatives of the sponsors of this proposal and the participants in this EFP.

8.3 The project manager's responsibilities include but are not limited to the following tasks:

- Facilitating communication among EFP participants;
- Ensuring that no vessel is allowed to fish without an observer and that observer work guidelines are complied with;
- Monitoring and enforcing compliance of vessels with the terms and conditions of the EFP;
- Collecting and compiling socioeconomic and other fishery data; and,
- Preparing, in cooperation with the Committee and others, as appropriate, reports to the PFMC on progress under this EFP.

8.4 At-sea monitoring will be done by NOAA-trained observers under contract between TNC and the Pacific States Marine Fisheries Commission with costs covered jointly by project sponsors.

8.5 Data collection and processing for the research questions presented in the proposal will be managed as follows:

- Information regarding the operation of the community based fishing association will be compiled by the project manager working in close coordination with the participants and the Committee.
- Economic data will be collected by the project manager and analyzed by an economist under contract to The Nature Conservancy for this purpose.

8.6 A Committee has been formed that will serve as the board of the proposed community based fishing association. This Committee includes representatives from the Morro Bay Commercial Fishermen's Organization, the Port San Luis Commercial Fisherman's Association, the City of Morro Bay, the Port San Luis Harbor District, The Nature Conservancy, and Environmental Defense Fund. The Committee's responsibilities include:

- Implementing a process to choose participants including, developing the application, distributing it to likely participants, screening for eligibility, and – in the event more than six eligible fishermen indicate interest – the Committee will convene an impartial selection panel to make the final recommendation regarding selection;
- Overseeing development of the EFP harvest plan with participating fishermen;
- Overseeing the budget;
- Overseeing the project manager; and,
- Ensuring compliance with all EFP reporting requirements.

9 Mechanism to ensure that the harvest limits for targeted and overfished species are not exceeded and are accurately accounted for.

All participating vessels will be required to land fish in Morro Bay or Port San Luis**.** Harvest limits for each vessel will be established by the fishing association through the harvest plan. Catch information will be monitored using observer data collected at-sea, as observers will be present on every fishing trip. Catches of rockfish will also be monitored though a dockside census of retained rockfish. All participants will enter into data sharing agreements as a condition of the lease agreement to facilitate access to fishery information and will be required to submit copies of catch information to the project manager within 48 hours after each fishing trip taken under this EFP.

Total landings and discard of all species will be accounted for by the project manager who will provide regular reports. For in-season monitoring relative to catch limits, data on catches will be collected on a by-permit basis and cumulatively for the EFP from observer data and tracked relative to aggregate catch limits, and reported every two weeks to NOAA Fisheries. The project manager will move to more frequent tracking as the EFP approaches its catch limits. All fishing will cease prior to attaining the aggregate catch limits associated with this EFP. Any unintentional overages will be reported to NMFS as quickly as possible.

Although this proposal requests an exemption from trip limits, the purposes for establishing trip limits including pacing and maintaining the fishery throughout the year, reducing discards, and protecting overfished species, are extremely important. Before fishing may commence, the fishing association will develop specific guidelines in a harvest plan that describes how fishing under the EFP will achieve these purposes.

10 Description of the proposed data collection and analysis methodology

10.1 In what ways can a community-based fishing association help to meet management objectives while simultaneously improving the economics of the fishery and the fishing community?

The Central Coast represents a unique set of circumstances for developing a cooperative fishing association, referred to in this project as a CBFA focused on both economic optimization and improved management performance. Historically, the majority of Morro Bay and Port San Luis fisheries' access to the groundfish resource has been through their trawl fleet. While other forms of fishing activity take place in these communities, trawlers from these areas have been responsible, for example, for up to a quarter of the sablefish harvest in the Conception Area.

Changing economics, increasing costs of doing business, and regulations have driven many fishermen who trawled to seek other options – many of them choosing to sell their permits and find other ways to earn their livings. These individual decisions have taken their toll on these communities as well. Within the prospect of rationalization of the trawl sector and individual quotas, looms the possibility that remaining access will soon move permanently to the north and access for central coast communities to the resource off their shores will be lost.

Provisions in the reauthorization of the MSFCMA provide for the creation of community-based entities as a way for fishing communities to cooperate and maintain access to the resource under a quota share program. This project provides a practical opportunity to develop a fishing association that can improve the conservation performance of the fishery (particularly with regard to bycatch of depleted species), provide economic opportunity for fishermen, improve accountability to managers, and enhance community stability and other benefits from the fishery.

Following the 2008 EFP, the process of establishing a CBFA, selecting members, developing performance benchmarks and harvest plans, and its operation during the fishing year was documented in the form of a first year report to the PFMC and NMFS. For the 2010 EFP, we will document the third year of operation of the community based fishing association, focusing on refinements in governance, data collection and management, monitoring, harvest planning, and organization that will emerge from this experience.

10.2 How does the economic performance of the fishery change under gear switching and cooperative local management?

Fishing under the 2010 EFP will produce more economic information and will be able to provide additional information on the contributions of the community based fishing association to the well-being of the community and the viability of the enterprise. More information is critical to understanding whether we are able to meet our community goals as we will have worked through many of the inevitable challenges associated with starting an enterprise like this, as artifacts introduced by start-up challenges will be less of a confounding variable in the interpretation of performance data.

Through this project, we will provide information on changes in fishing behavior, revenue, marketing opportunities, distribution channels, product value, and costs of monitoring. In addition, as in 2009 we will gather information and report on the socioeconomic consequences at the community level and other relevant information.

11 Description of how vessels will be chosen to participate in the EFP

TNC will be responsible for developing the lease agreements under which the six Limited Entry Trawl "A" Permits that are the subject of this EFP will be fished and will be responsible for enforcing the terms of their use, including, but not limited to, monitoring and observer requirements, data collection and information sharing, participation in the fishing association and compliance with association guidelines regarding implementation of the fishery, distribution of target and bycatch species, and mechanisms to pace the fishery throughout the year. Failure to comply with lease conditions and agree upon association guidelines will result in revocation of permission to fish under the EFP.

The selection process will be run by the Committee described in section 8.5. Eligible applicants are those that meet the following criteria, developed jointly by the applicants:

- Meets PFMC eligibility requirements for participating in an EFP fishery as described in Council Operating Procedure No. 19.
- Experience using specified gear, with preference given to those with experience fishing in the geographic area of study.
- Willingness and ability to land in Morro Bay or Port San Luis.
- Access to a suitable vessel that meets Coast Guard safety requirements and can carry an observer.

Interested fishermen in the Central Coast area will be given the opportunity to complete an application to aid in determining their eligibility. A final participant selection process to narrow down participants will include an impartial selection committee convened and overseen by the Committee.

12 For each vessel, the approximate time and places fishing will take place, and the type, size and amount of gear to be used

Under this EFP, no more than six vessels will use longline, trap, pot, and hook-and-line gear and will have the opportunity to fish between the date the 2010 EFP is issued and December 2010. Fishing will be constrained to the area between 36º00’ North latitude (Point Lopez) and 34º27’ North latitude (Point Conception) and in waters outside of the seaward boundary of the Rockfish Conservation Areas (deeper than 150 fathoms).

All fishing by EFP vessels will be done in compliance with state and federal regulations, with the exception of the exemptions granted by this EFP.

Vessels will be required to land fish in Morro Bay or Port San Luis.

Participants in the fishing association and the Committee will work cooperatively to develop a harvest plan for the fishing association that describes how fishing under the EFP will proceed. This plan will describe the requirements for participation in the EFP and the penalties for failure to comply. In addition to specifically describing the structure of the association, the specific goals and purposes – as described in this EFP, and the group’s decision-making process, roles and responsibilities and communication requirements.

13 Signature of applicant (on behalf of all applicants)

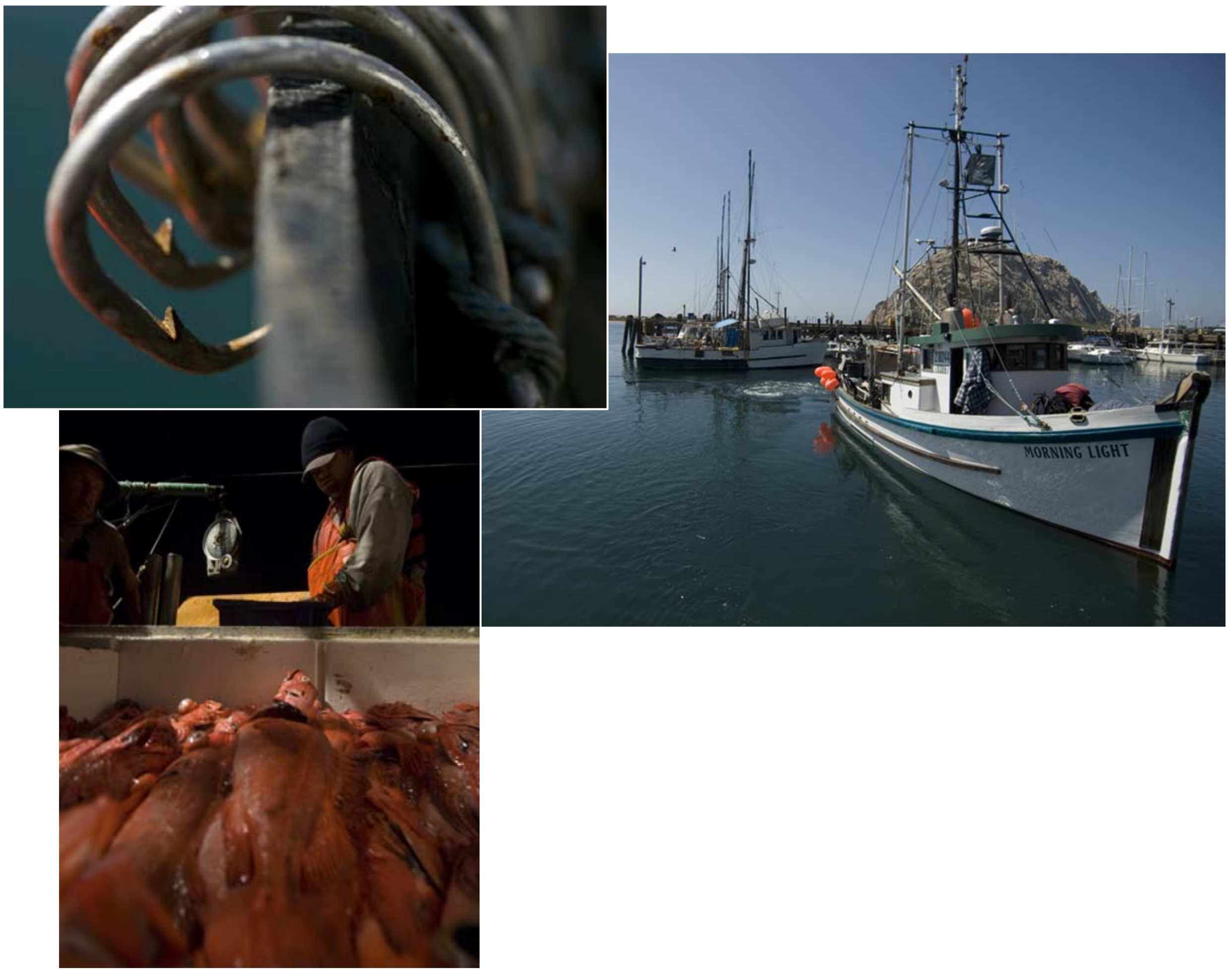
Margaret Spring, Director
California Coastal and Marine Program
The Nature Conservancy

Agenda Item E.8.a
Attachment 3
June 2009

Testing a Community-based Fishing Association: Report on Implementation of the 2008 Morro Bay/Port San Luis Exempted Fishing Permit

Presented to the Pacific Fishery Management Council and NOAA Fisheries

April 4, 2009



Prepared by staff of The Nature Conservancy, in cooperation with the City of Morro Bay, Port San Luis Harbor District, Morro Bay Commercial Fishermen's Organization, Port San Luis Commercial Fishermen's Association, Environmental Defense Fund, California Department of Fish and Game, Bill Blue, Roger Cullen, and David Rose.

Acknowledgements:

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Any questions regarding this report or the Central Coast Groundfish Project may be directed to Michael Bell (805-441-1460, mbell@tnc.org) or Erika Feller (415-281-0453, efeller@tnc.org) of The Nature Conservancy.

Cover photos by Bridget Besaw, 2008.

Testing a Community Based Fishing Association

Report on implementation of the 2008 Morro Bay/Port San Luis Exempted Fishing Permit

Table Contents

1 Introduction

This Exempted Fishing Permit (EFP) tested whether a cooperatively managed, community based fishing association (CBFA) could meet harvest objectives and conservation standards (defined as shared aggregate catch limits for target and overfished species) while improving economic output. The CBFA fished commercial groundfish trawl permits with longline, trap, pot, and hook-and-line gear off the Central California coast.   This project simulated conditions that would follow implementation of an individual fishing quota system in the groundfish trawl fishery, and provides guidance on how vulnerable fishing communities to take best advantage of that system to secure access to the resource (e.g., by adopting strategies and mechanisms for securing and sharing fishing opportunity). The major specific objectives were:

- Determine how a local cooperative management structure that manages fishing privileges could mitigate the impacts of reduced or lost trawl effort on community fisheries that have traditionally participated in the west coast groundfish fishery.
- Test the efficacy of a gear-switching policy (under consideration as part of the Council's groundfish trawl rationalization program) that authorizes switching from trawl gear to non-trawl gear in achieving Council management goals.
- Determine whether cooperative strategies for harvesting the available fish could result in improved revenues and a diverse portfolio of landings.
- Test the efficacy of lower cost cooperative strategies for ensuring full accountability for catches by sharing observers and carrying electronic monitoring equipment?
- Measure the costs associated with community-based fishery management.
- Encourage fishermen to change how they fish in response to information – as well as in response to incentives or regulations – in order to better meet fishery objectives.

More information on the purposes and goals of this project are included in the 2009 EFP application in the briefing book for the September 2008 meeting of the Pacific Fisheries Management Council (PFMC)[1].

The National Marine Fisheries Service (NMFS) issued the 2008 EFP to The Nature Conservancy (TNC) on July 23, 2008, and fishing under the EFP commenced two weeks later on August 6, 2008. The three participating fishermen took a total of 29 trips between August 6, 2008, and November 23, 2008. This first year of the EFP was not a full year of fishing, but provides some preliminary information to address the questions. In the first year of the EFP, the applicants created most of the protocols, systems and infrastructure that should enable a quicker and smooth start of the project in its second year (2009 EFP). This report describes year one project accomplishments and identifies areas for improvement for year two.

By most measures, the Community Based Fishery Management Association approach was highly successful.   Accomplishments include:

- Development of multi-partner informal (i.e., unincorporated) Community Based Fishing Association;

[1] The 2009 proposal may be found at: http://www.pcouncil.org/bb/2008/0908/I6a_ATT2_0908.pdf

- EFP issued, limited entry permit transfers, license agreements completed, and deliverables specified in cooperation with NMFS;
- EFP fishermen participant selection process designed and implemented;
- National Oceanic and Atmospheric Administration (NOAA)-trained observers hired through Pacific States Marine Fisheries Commission (PSMFC).
- EFP data collection protocols and database developed;
- Electronic monitoring (EM) study design and planning in collaboration with NOAA Northwest Fisheries Science Center and Archipelago Marine Research Ltd. (AMR) and implemented;
- Harvest plan developed with EFP fishermen participants;
- Twenty-nine fishing trips completed with 100% human observer coverage with 69,259 pounds of fish caught;
- 100% compliance with target species catch limits;
- Slowed rate of sablefish catch and increased catch of non-sablefish (rockfish and thornyhead) species through collaborative, adaptive in-season management;
- Zero bycatch of 6 out of 7 depleted species; 26.5 lbs of darkblotched rockfish caught out of 1,000 lb limit; and
- Generated $120,000 revenue.

Below are priority items for attention in the second year of the project:

- Develop protocol to improve procedures for sharing observers among fishermen to ensure continued equitable access to coverage;
- Continued refinement of the participant selection and notification process to ensure prospective participants have complete information about the project and to build local acceptance of the CBFA approach;
- Experiment with incentives to improve catch rates of non-sablefish species;
- Develop systems for sharing spatial catch data in real-time with EFP fishery participants to provide fishermen with tools to efficiently catch desired species and avoid depleted species and sensitive habitats;
- Improve data collection procedures and quality assurance for all EFP fishery data to ensure the accuracy of monitoring; and,
- Develop business strategy that would provide for the long term economic viability of the Community Based Fishing Association.

Major costs of the project were staff time, a project management contract, and observer coverage. Nominal income from the permit lease rate helped to offset the costs, which were largely covered by private fundraising. Fishermen participants in the EFP found it to be a good economic opportunity; however, without the help of a significant amount of outside capital to cover costs, this EFP project would not have been possible. Given that it seemed unrealistic to make an association financially self-sustainable in 2008, this challenge was not a priority for participants or project managers in 2008. While it is unlikely that a fishing association will become financial self-sustaining in 2009, greater attention will be given to how the association would generate sufficient returns to fund itself. In 2009, operations will be covered by a grant from the State of California.

2 Accomplishments

2.1 Development of Community Based Fishing Association

The formation of the partnership behind the CBFA was the first major milestone achieved in carrying out this EFP project. The Morro Bay – Port San Luis Community Based Fishing Association (CBFA) brings together three interest groups: local fishing communities, fishing industry participants, and conservation organizations. CBFA members[2] came together to work on a common objective – development of a new fishery enterprise that will protect traditional local access to the groundfish resource and transition the local fishery to more sustainable practices that result in higher value seafood.

2.2 Securing Approvals

On behalf of its partners, The Nature Conservancy (TNC) completed and submitted its final application for the EFP to the NMFS on February 14, 2008. The Federal Register process was completed on May 8, 2008 and the final EFP was issued on July 23, 2008. The terms and conditions of this EFP are included in **Appendix A**.

Once the EFP was approved and ready to be issued, TNC's limited entry trawl permits were transferred onto participating vessels. EFPs were issued by NMFS to TNC and participating fishermen. The terms and conditions of the EFP specified the responsibilities for both TNC and participating fishermen, and required a TNC permit be assigned to the vessel for the EFP to

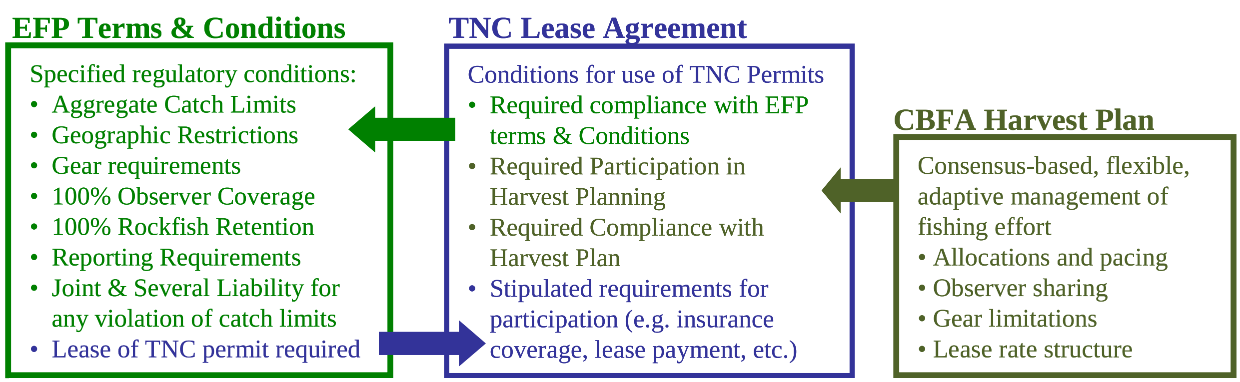

Figure 1 – CBFA permit and leasing arrangement in the 2008 EFP. Arrows indicate areas of connection between the three agreements. This type of legal arrangement allowed the CBFA to flexibly manage harvest operations under an adaptable harvest plan without costly or time consuming changes to the lease or EFP terms. Joint responsibility for catch limits and a shared responsibility for harvest planning encouraged participants to work cooperatively.

authorize fishing. TNC entered into license agreements with participating fishermen which required their compliance with EFP terms and conditions – and required the fisherman hold a valid EFP, as well as participate in and abide by CBFA harvest planning as a condition of the lease. Participating EFP fishermen agreed not to participate in other federal groundfish fisheries, including open access or under another federal limited entry permit. The relationship between the EFP terms & conditions, the lease agreement and the harvest plan is described in Figure 1.

2.3 EFP Project Organization

Implementation of the EFP in 2008 was overseen by the community based fishing association (CBFA) – made up of the sponsors of the EFP proposal. The CBFA oversaw all aspects of EFP implementation. TNC took principal responsibility for directing implementation of this project and entered into a contract with PSMFC for observers to meet the monitoring requirements of the EFP. TNC also retained a project manager under contract to manage the day-to-day needs of the EFP fishing operations. The project manager was responsible for assigning observer coverage, collecting fishery data, managing the project database, and assisting in the preparation of bi-weekly catch reports.

Development of the harvest plan (described in section 2.5) was led by a team that included the participating fishermen as well as members of the CBFA. The EFP fishermen participated in five separate EFP planning meetings as well as numerous informal conversations with TNC staff. The participants invested considerable amounts of time and work in planning monitoring, enforcement, and harvest systems that were essential to the implementation of the EFP project – the costs of participation are discussed in section 4.3.

2.4 Fishermen Selection

Participants were identified through a competitive selection process which was funded by a grant for CBFA activities from the Central Coast Joint Cable Fishery Liaison Committee to the Morro Bay Commercial Fishermen's Organization. The process was managed by a local consulting firm, Lisa Wise Consulting, Inc. An application package (**Appendix B**) describing the details of the EFP project and the selection requirements was widely distributed to fishermen who fish primarily out of Morro Bay and Port San Luis. Application materials were distributed by the Morro Bay Commercial Fishermen's Organization and the Port San Luis Commercial Fishermen's Association (CBFA member organizations). Managers of the selection process attended pre-scheduled meetings of the commercial fishing organizations in Morro Bay and Port San Luis and held separate, public meetings in Morro Bay and Port San Luis to make the selection process as public and accessible as possible. Any fisherman interested, eligible, and willing to abide by the rules of the EFP was invited to complete an application and submit it by

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[2] The members of the Community Based Fishing Association are the City of Morro Bay, the Port San Luis Harbor District, the Morro Bay Commercial Fishermen's Organization, the Port San Luis Commercial Fishermen's Association, The Nature Conservancy, and Environmental Defense Fund.

either mailing it or delivering it to the harbor office in either port. An independent selection panel was convened to review the materials submitted by 20 applicants. The independent selection panel consisted of three community leaders with no commercial fishing affiliations and was tasked with making EFP participant selection recommendations to TNC.

Initially, the CBFA stated that its intention was to select six fishermen with two to four alternates. However, because the permitting process took longer than expected and as the application package was prepared and distributed, it became apparent that the fishing opportunity available under the EFP was less than initially anticipated. The CBFA decided to reduce the number of participants in the first year of the project.

TNC used recommendations from the independent selection panel and its own applicant interviews to make final selection decisions. Four applicants were invited to participate in the 2008 EFP. All applicants were notified of the outcome of the CBFA decision in writing. These four fishermen were identified to NMFS for confidential review by the Office of Law Enforcement (OLE). OLE provided no information to TNC, only verified for NMFS, prior to issuance of the EFP, that the applicants had no violations that would preclude their participation in the project. Ultimately, three fishermen were confirmed to participate because one of the four selected decided not to fish under the EFP due to conflicts associated with other fishing business.

2.5 Monitoring the Exempted Fishing Permit

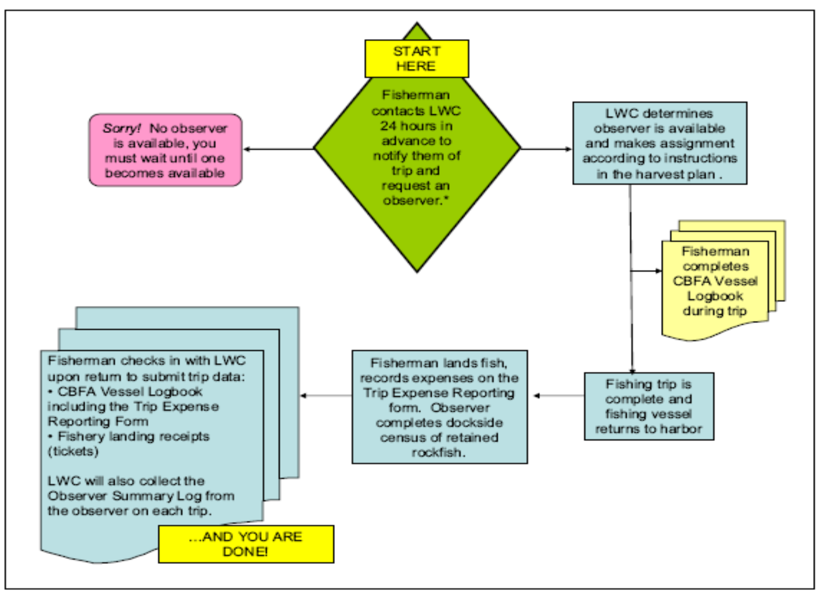


Figure 2 - Flowchart for EFP fishermen describing monitoring requirements for the EFP. This flowchart was included in the EFP logbook.

In the EFP, each fishing trip was monitored with several different and overlapping methods:

- The EFP required 100% human observer coverage and each EFP fishing trip was accompanied by a human observer. Raw, at-sea observer data was collected at the dock and quality-controlled data was provided to TNC by the West Coast Groundfish Observer Program (WCGOP) approximately two months after raw data were collected by observers under contract to TNC;
- Each fisherman was required to complete an EFP project-specific logbook (refer to **Appendix C**) for each trip documenting gear type and amount used, harvest strategy, species

landed and discarded (#s of fish), and fishing trip costs. Logbook pages were collected from fishermen after each trip, copied and returned to the fishermen for their records;

- Copies of all fish landing receipts were collected following each EFP trip;
- Each participating vessel was outfitted with an electronic monitoring (EM) system by Archipelago Marine Research (AMR);
- As required by the terms and conditions of the EFP and federal regulations, fishermen were required to verify the functioning of their Vessel Monitoring System prior to each fishing trip; and,
- Observers completed a short report at the end of each trip to verify compliance with the EFP requirement to retain all rockfish, without exception.

All data collected from the logbook, fish tickets, and observer data were entered into a spatial geodatabase so that project managers could easily track what fish were landed and where it was caught. All data collected from fishermen under this project are treated as confidential business information.

To meet the EFP requirement for 100% human observer coverage, TNC hired two observers under contract with the PSMFC. The observers were trained by WCGOP in March 2008 and reported to Morro Bay in April 2008. There was a substantial, 4-month delay between the arrival of the observers in Morro Bay and the start of fishing under the EFP. In order to give the observers experience, they were asked to participate in providing observer coverage for another TNC project in which a Morro Bay fisherman is using one of TNC's limited entry trawl permits and vessel is trawling under federal and state regulations and laws while subject to gear and geographic restrictions in a private Conservation Fishing Agreement. Each EFP trip made between August and November 2008 had observer coverage. While these observers were exclusively dedicated to this EFP, they followed all WCGOP observer protocols with the exception that they were also asked to complete a trip summary and a census of all retained rockfish at the end of each fishing trip.

The costs of human observer coverage are substantial and the EFP partners and NOAA, Northwest Fisheries Science Center are using this EFP project to test the efficacy of employing electronic monitoring systems to fully account for catch, with potentially lower costs. A similar system has been implemented in the groundfish fixed gear fishery in British Columbia. The electronic monitoring equipment incorporated cameras installed on each vessel that recorded fishing activity to monitor the number of individual fish caught by species. EM systems were installed on each participating vessel by AMR during the week of August 11 and removed as each fisherman ended his participation in the project. One of the observers was trained to download data from the EM systems and was responsible for forwarding it to AMR's office in Victoria, B.C. Copies of the EFP logbooks were provided to AMR for comparison with EM data. The CBFA is interested in continuing the EM effort in the 2009 EFP project.

2.6 Harvest Plan

A harvest plan was prepared to guide fishing in a manner consistent with the terms and conditions of the EFP. The harvest plan was developed by the participating fishermen, TNC, project managers and then approved by the CBFA. The harvest plan was intended to be managed adaptively as circumstances require. Lease terms between TNC and participating fishermen required that the lessees both participate in developing and adaptively managing the harvest plan and that they abide by its constraints.

2.6.1 Target Species Management

The primary challenge for fishing under the EFP is to catch a diverse mix of species, those traditionally landed through trawling, using fixed-gear, while avoiding catch of overfished species. Not all trawl-caught species can be accessed using fixed gear, particularly flatfish species. However, if this community (or any other community) is to successfully utilize future groundfish quota share with non-trawl harvest techniques it will be important to develop harvest strategies that access the diverse number of abundant species typically caught using trawl gear while avoiding depleted species. To address this challenge, the goals for the harvest plan were:

- Maximize learning of the feasibility and cost effectiveness of harvesting a number of traditionally trawl caught species with alternative fixed-fishing gears and techniques;
- Minimize catch of depleted species and overall by-catch rates

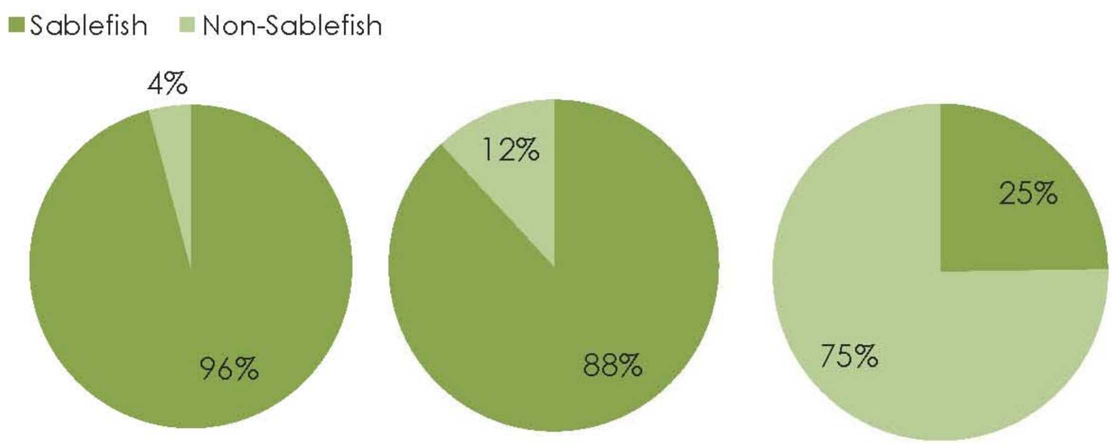
Efforts to pace the EFP were focused on sablefish because this species is easily caught in fairly high numbers using fixed gear and was deemed likely to be the first aggregate catch limit to be met. Refer to Table 1 for a summary of 2008 EFP species landings and their associated aggregate catch limits.

Table 1 - 2008 EFP Landings and Aggregate Catch Limits

Species	2008 EFP Landings		Total Landed + Observer Summary Data (mt)	Remaining Aggregate Catch Limit	Aggregate Catch Limit for EFP (mt)
	lbs	mt			
Sablefish (all sizes)	62,281	28.25	28.87	1.13	30
Southern Slope Rockfish	6,223	2.83	2.85	47.15	50
Blackgill Rockfish	6,077	2.76	2.78	17.22	20
Longspine thornyhead	1	0.00	0.00	60.00	60
Shortspine thornyhead	716	0.32	0.33	59.67	60
Lingcod	0	0.00	0.00	15.00	15
Chilipepper rockfish	0	0.00	0.00	20.00	20
Spiny dogfish	0	0.00	0.15	9.85	10
Splitnose Rockfish	11	0.00	0.01	0.44	0.45
Dover Sole	12	0.01	0.05	9.95	10
Petrale Sole	14	0.01	0.01	9.99	10
Other Flatfish	1	0.00	0.00	10.00	10
Totals	**69,259**	**31.42**	**32.26**	**243.19**	**275.45**

In the first iteration of the harvest plan, the EFP team and the CBFA established the following harvest guidelines:

- Limit fishing to vertical hook & line and horizontal longline gear and do not allow use of traps or pots;
- Pace harvest to 10 metric tons of sablefish per month with the intention that sablefish catch limit would last three months;
- Allocate two metric tons of sablefish per month to each fisherman;
- Establish a sablefish reserve of four metric tons to be distributed after fishermen landed individual allocation of two metric tons. Initially, two metric tons of sablefish was slated for a reserve each month when there were four fishermen at the start of EFP, but was revised to four metric tons with only three fishermen.
- No carry over (month to month) of allocations; and,
- Set a 20% lease rate on sablefish landings and no charge on other, non-sablefish species.



Aug 6 – 21, 2008. Sablefish and non-sablefish catch composition of the first six fishing trips with no gear restrictions.

Aug. 22 – Nov. 16, 2008. Sablefish and non-sablefish catch composition for 21 fishing trips with a 3,000 hook limit on horizontal gear and a 2:1 hook (H:V) ratio.

Nov. 17 – 27, 2008. Sablefish and non-sablefish catch composition of the last two trips when only vertical gear was used.

Figure 3 – Changes in EFP catch composition related to modifications of the harvest plan.

From August 6, 2008, to August 16, 2008, fishermen conducted six fishing trips under this version of the harvest plan and it became evident that each fisherman was maximizing the catch of sablefish, rather than diversifying towards the harvest of other, non-sablefish species. For this reason, the CBFA held a meeting with the fishermen on August 21, 2008, to discuss alternatives to catch and land non-sablefish species. At this meeting the group agreed to institute changes to the harvest plan and incorporate the following:

- Continue to limit fishing to hook & line gear and no traps or pots;
- Allocate seven metric tons of the remaining sablefish catch limit to each fisherman, while retaining 2 metric tons as a “safety” reserve to ensure the project stayed within the aggregate catch limit;
- Set a hook deployment ratio requirement of one vertical hook set for every two horizontal hooks to increase catches of species other than sablefish (monitored over course of 2008 EFP); and,
- Set gear requirement of no more than 3,000 horizontal hooks set per trip with no limit on vertical hooks.

After the harvest plan was adjusted, the general pace of fishing slowed, competition between fishermen became less and a greater effort was made by the fishermen to target non-sablefish species. Figure 3 shows species landings composition before and after hook limits and ratios were established.

The harvest plan also outlined the lease rate for each permit license agreement between TNC and participating fishermen. The lease rate should provide incentives to direct fishing efforts towards desirable and potentially underutilized target species. In 2008, the lease rate was 20% of ex-vessel value (EVV) derived only from sablefish landings with no lease rate on any other targeted and landed species. This is intended to create a financial incentive to maximize landings of non-sablefish species, such as blackgill rockfish and thornyheads. The lease rate was not modified in 2008 because of the small number of fishing trips, but changing the lease rate could be a way to provide an incentive to catch more or less of certain species. The lease rate can be adjusted as part of the harvest plan. All revenue to TNC resulting from the license agreements was allocated back to implementing and managing the EFP project.

In assessing the high landing rate of sablefish in the first year of the EFP, it is important to note some of the historical context of the local groundfish fishery. For the past three decades, trawl vessels caught the vast majority of local groundfish landings. The presence of a large trawl fleet created gear conflicts on the water that prohibited the exploration or establishment of non trawl groundfish fishing operations. The only other significant local groundfish fishing effort was a small fleet that recently began trapping for sablefish under Open Access. The trap fishery peaked in 2007 (due to high trip limits and the inactivity of the local trawl fleet). We believe the historical lack of development of a diverse local fixed gear fishery coupled with recent years of high sablefish trapping activity had resulted in local fishermen (including EFP participants) overestimating the importance and value of sablefish landings to the exclusion of other groundfish species.

For these reasons, it was encouraging to observe the increase in landings of non sablefish species as the project progressed as well as growing optimism among the EFP fishermen about the potential for non sablefish species to contribute to their fishing revenue.

2.6.2 Depleted Species Management

Table 2 shows the totals of overfished species caught compared to their associated aggregate catch limits during the 2008 EFP. A total of 26.5 pounds of overfished species, darkblotched rockfish, was caught during the 2008 EFP. The aggregate catch limit for this species was 1,000 pounds.

The participating fishermen agreed to collaborate on a mapping effort to identify areas in which depleted species are likely to be caught as well as to assess the EFP fishing grounds to identify those areas with the greatest potential to catch target species, with a focus on non-sablefish species. This tool could help fishermen reduce their chances of catching depleted species and reduce by-catch. TNC is providing Geographic Information System (GIS) support to create a mapping product that will overlay the best available habitat, depth, and substrate information with specific fishing trip data (catch, discards, locations, etc.) from the EFP. This information will be shared with the team in order to inform future fishing efforts by the EFP participants.

Table 2 -2008 EFP Depleted species catches and aggregate catch limits (in pounds). (Source: Observer data)

Overfished Species	EFP Landings	Aggregate Catch Limit
Canary Rockfish	0	50
Yelloweye Rockfish	0	150
Widow	0	4,409
Darkblotched	26.5	1,000
Pacific Ocean Perch	0	300
Cowcod	0	300
Bocaccio	0	11,023
Total	**26.5**	**17,232**

2.7 Compliance

One of the measures of the efficacy of a community fishing association is its ability to ensure its members comply with fishery management regulations and the rules of the association. By tracking its members' activities, an association can address illegal or inappropriate activity quickly and implement its own sanctions under the terms of the membership agreement (i.e., the lease agreement) or aid OLE or the state in enforcement activity. Under the terms and conditions of the EFP, participating fishermen and TNC share responsibility for abiding by aggregate catch limits, creating a strong shared incentive to ensure compliance with these limits. Catches were reported to NMFS every other week by TNC, acting on behalf of the association. If formalized, the community based fishing association could assist in bearing some of the agency's management and tracking burden and, potentially, offer more accurate and timely reporting of catches.

Participants in the EFP were required to comply with harvest caps for their fishery – both for the group and individually, by-catch limits, geographic restrictions, full retention of rockfish, and human observer coverage required for every trip taken under the EFP. All of the restrictions were specified in the terms and conditions of the EFP that each fisherman received prior to the start of fishing efforts. In addition, participating fishermen were required to participate in the iterative development of the harvest plan. As described in Figure 1, the terms of the lease agreement required compliance with all EFP terms and conditions, as well as with the harvest plan specifications offering some flexibility in adaptively managing the harvest plan and changing how fishing was regulated without requiring a contract amendment each time a change was made.

In general, all fishing was conducted in compliance with the EFP terms and conditions, the lease agreements and the harvest plan. The only exception resulted from a lack of clear understanding about the requirement for full retention of rockfish. Several predated rockfish (11 aurora rockfish and 1 blackgill rockfish) were caught by one EFP participant and, as they were in non-marketable condition, were discarded at sea. The situation was brought to the attention of the project manager in his review of trip data. TNC staff and the project manager clarified with the fisherman that all rockfish must be retained, regardless of condition (marketable or non-marketable) and notified NMFS of the event in case an enforcement action was warranted. The fisherman fully complied with 100% rockfish retention requirements as specified in the EFP terms and conditions on all subsequent trips.

3 Costs and Revenues

While the EFP was a good short term opportunity for individual participants, more work is needed to make it financially viable in the long-term and to provide sustainable benefits to the community. All participants needed to earn money from fishing activities under the EFP but all tended to view participation as an investment in future fishing activity in Morro Bay.

3.1 Management Costs

Major costs of this project were TNC staff time, a project management contract, and observer coverage. Monitoring and observer coverage costs were artificially high in 2008 and will continue to be high in 2009 with the requirement for 100% human observer coverage. The total cost of the observer contract was approximately $120,000, which was nearly the total ex-vessel revenue of landings of the 2008 EFP, and substantially more than the portion paid to TNC for lease of the permits. The cost of observer coverage during the period that fishing took place (August through November 2008) was $52,776 for two observers in August, September, and October and one observer in November. The observer cost per trip during that period was $1820. An agreement was reached to work with NOAA and AMR to test the use of cameras in monitoring the fishery. However, whether this is a viable alternative for a community fishing association will depend on the PFMC and NMFS decisions about the best methods to monitor the fishery.

TNC has donated staff time and hired a consulting firm to provide project management and monitoring services. The combined value of this staff time and the project management contract were approximately $275,000. TNC contributed the cost of securing regulatory approvals, design and printing of materials including logbooks, postage, travel, and other related operational costs, which have not been quantified. In addition, a grant from the Sustainable Fisheries Group made it possible to purchase additional fishing gear for the EFP. Given the short-term nature of an EFP it was unrealistic to expect fishermen to purchase additional gear. The grant was used to purchase both vertical and horizontal longlines and associated fishing gear (buoys, radar reflectors, anchors, lines, etc.). A grant from the Central Coast Joint Cable Fishery Liaison

Committee to the Morro Bay Commercial Fishermen's Organization funded the participant selection process which cost approximately $5,000 for materials and staff time.

3.2 Impacts on Shoreside Infrastructure and Processing

One of the purposes of this project is to find ways to stabilize landings in a fishing community for the benefit of all sectors of the fishery – including processors, receivers, and support services. Because of the relatively small amount of fish harvested under this project – just over 69,000 pounds in three months – it was difficult for fish receivers and processors to separate the effect of these additional landings from the total landings generated by all permit leaseback efforts underway in Morro Bay. In addition to three EFP fishermen, a fourth permit and vessel was leased for trawling with a number of conservation restrictions. Altogether, between the various efforts – one trawl and three fixed gear fishing operations - more than 435,000 pounds of fish were landed. The principal markets for fish caught were in San Luis Obispo County, with approximately half transported to Southern California/Los Angeles. The combination of landings from both projects are estimated to have contributed to an increase of up to $4 million in gross sales, 10-12 additional employment positions (14 including part-time positions), and an increase in hours per week for some part-time workers.

Local government officials report that the basis for Morro Bay's appeal as a tourist destination is related to its character as a fishing port and they believe that supporting the fishery is important to other sectors of the local economy. We have seen that fish harvested through the EFP has been sold in local restaurants – where the quality and freshness as well as the "local story" are used in marketing. More importantly, blackgill rockfish is being marketed by its true name rather than as the more common and generic "Pacific snapper" and with the name of the fisherman who caught it. It was reported that customers were willing to pay slightly more for locally caught fish.

3.3 Revenues

Total exvessel revenues under the EFP were $121,583, or an average of $41,194 gross per participating fishermen. Of total exvessel revenues, $30,863 was paid to TNC as a 20% lease rate charged only on sablefish, and $6,079 was paid to the NMFS under the federal vessel buyback tax, reducing average earnings per fisherman to $28,306 gross (3.4 describes the high start up and overhead costs for participating EFP fishermen). Money earned from the permit lease rate by TNC was used to offset the overall management costs, which were otherwise largely covered by private fundraising. Participants in the EFP found it to be a good economic opportunity for each individual, but there was not much thought given by participants or project managers to how an association would be financially self-sustainable in 2008. While it is highly unlikely that a fishing association will become financially self-sustaining in 2009, attention must be given to how the association would generate sufficient returns to support its operation.

3.4 Costs of Participation

According to the fishermen who participated in the EFP, there was nothing extraordinary about per trip costs for each fishing trip under the EFP compared to other fixed gear groundfish fishing opportunities.

All participants would have otherwise fished under the open access designation. It may be interesting to consider the costs of participation in the EFP in comparison to the cost to participate in the limited entry fixed gear fishery – permits are expensive and rarely available for purchase – in comparing these costs of participation to the likely circumstances post-rationalization.

The costs of participation unique to participating in the EFP are described below. These may be comparable to the burdens that might be on fishermen working with a formal CBFA.

3.4.1 Time investment in participation

A condition of the lease agreement was that all fishermen must participate in and abide by the terms of the CBFA harvest plan. Work on the harvest plan actually began well before fishing commenced (in anticipation of a hoped-for early start to the project. The first EFP planning meeting took place on April 15, 2008. Dates of additional planning meetings were April 15, May 14, May 28, July 23 and August 21, 2008. These were only formal meetings and do not include numerous information discussions among participants, project managers and the CBFA over the course of the project.

In addition, participants were required to make their vessels available for evaluation for electronic monitoring and observer inspection. Later they scheduled time – approximately 6-8 hours - with AMR technicians to have electronic monitoring systems installed and later removed from their vessels.

3.4.2 Forgone fishing opportunity

While the EFP was in some ways a better fishing opportunity that other available groundfish opportunities in the Morro Bay/Port San Luis Area, at least one participant also fishes in the Dungeness crab fishery out of San Francisco. His responsibilities to the EFP fishery in Morro Bay resulted in four missed fishing trips in the crab fishery and approximately $35,000 lost revenue as a result.

3.4.3 Insurance costs

Insurance costs turned out to be one of the most significant costs of participation. According to participating fishermen, many of per trip costs (e.g., crew share, fuel, bait, etc.) for EFP fishing trips are much the same as they would be for other fixed gear groundfish fishing opportunities. The notable exception to this observation was the cost of insurance. Because of the risks inherent in fishing and potential exposure to liability for TNC and other participants in the project, the lease agreement required licensees maintain commercial general liability insurance for all of their activities and those of their employees in owning and/or operating the vessel, applying to personal injury, bodily injury, and property damage, and including broad form contractual liability coverage, with a combined single limit of liability of not less than $500,000. They were also required to carry workers compensation coverage as required by law. Insurance costs amounted to an additional $500-$900 per month for some participants in the project.

It should be noted that, because of other cooperative research related activities with academic institutions (which have similar requirements) some participants already carried the required insurance. However, it was startling to learn that in instances where the fishing opportunity is limited – insurance is a cost that many fishermen are willing to forego.

3.4.4 Costs of a hook-and-line and longline only fishing opportunity

Fishing under the EFP was done entirely with horizontal longline and vertical hook-and-line gear. Although the terms of the EFP allowed the use of trap gear, the partners decided not to allow trap fishing under the harvest plan as it was deemed too likely to catch only sablefish, which was contrary to the goals of the association to promote a more diversified harvest. While using hook-and-line gear is advantageous because it allows fishermen to target a more diverse array of species, it is also more costly to use. It costs around $5 per pot to bait a trap and that is mainly the cost of the bait; labor cost and skill and time required for the task is relatively low. To bait a tub of 250 – 300 hooks costs around $25 (or $0.10/hook) and requires a skilled person one and a quarter to two hours.

4 Areas for Improvement

4.1 Participant Selection

Identifying a group of fishermen that could work together cooperatively and were willing to share information and abide by group decisions was a critical element of this project. The project sponsors appreciate the contributions of all participants in the 2008 EFP, and to all of those interested enough to apply for the opportunity to participate.

Despite the project sponsors' best efforts, there was some resulting resentment over who was and was not selected to participate. In addition, more clear information is needed for fishermen about the requirements of participation in the EFP.

4.2 Sharing Observer Coverage

A formalized community fishing association could provide the means for several fishermen to share the costs of observer coverage. An observer can cost $60,000 - $80,000 per year and can be available to cover from 12 to 20 sea-days each month. To ensure coverage, an individual fisherman could be required to pay for more sea days than he is likely to use, particularly if the groundfish fishery is only one of several fisheries in which he or she participates. On the other hand, several fishermen in an association could join together to share costs and more fully utilize an observer's time. To use observers most efficiently, a group of fishermen would hire observers to cover their sea-days – likely a fewer number of observers than there are fishermen. If all trips must be covered, then a system must exist to ensure that every fisherman has fair access to observers to cover his or her trips.

Under the 2008 EFP, two observers were hired to provide coverage for all 29 fishing trips taken by three EFP participants during a three month period. In the event there were overlapping requests for observers, the participating fishermen communicated and cooperated amongst themselves for observer resources. Setting aside the months the observers were idle because of permitting delays, the two observers could each have covered up to 36 fishing trips in the time period that fishing took place. Continuing and strengthening a clear and fair protocol for efficiently sharing observers is a priority for the 2009 EFP.

4.3 Provide a Suite of Tools for Better Managing Species Mix

The EFP project also evaluated the benefits to community fisheries of converting a trawl fishing capacity to other gear types – specifically increasing the use of fixed gear.

Trawlers are able to employ a wide variety of targeting strategies and catch a diverse mix of species. On the other hand, much of the fixed gear fishery – under the open access category – in Morro Bay and Port San Luis has targeted sablefish and some rockfish. For the EFP to be more successful, the fixed gear fishery needs to target a diverse mix of species. For the purpose of this project, the sponsors identified those trawl-caught species that best lent themselves to a fixed gear fishing opportunity. Those are sablefish, shortspine thornyhead, longspine thornyhead, and Southern slope rockfish - particularly blackgill rockfish, bank rockfish and lingcod.[3]

Table 3 shows the total landings by weight and by species (including size class where appropriate) under the 2008 EFP. As discussed in section 2.5 on harvest planning, two measures for encouraging effort on non-sablefish species were accepted and incorporated into the harvest plan. The two measures included a 20% lease rate for sablefish landings (other species landings were free of any lease charge) and a requirement for a 2:1 ratio of horizontal hook and line effort to vertical hook and line. Solely charging a 20% lease rate was not effective in encouraging participants to focus on non-sablefish species, but because of the short duration of the project this year there was little opportunity to experiment with different or tiered lease rates and fishing techniques to target non-sablefish. Requiring a specified amount of vertical effort to target non-sablefish species, however, successfully resulted in an increase in non-sablefish landings (Refer

[3] The project sponsors recognize that flatfish are an important component of the fishery economy and, ultimately, a community fishing association will likely manage a combination of fixed and mobile gear to target groundfish. However, as an EFP is not necessary to experiment with trawl fishing using a trawl permit, those efforts are ongoing as separate projects from the work that is reported here.

to Figure 2). Substantially more rockfish and less sablefish were caught using vertical gear than with horizontal gear. However, there may also be opportunities to influence fishing locations as well as what gear is used in order to increase landings of marketable non-sablefish species.

Also of concern is the catch composition of sablefish – nearly 60% of sablefish landed and sold was categorized on landing receipts as small or extra-small ($1.70 and $1.40 per pound, respectively). Large and extra large fish brought up to $2.25 per pound.

With the opportunity of the extended timeframe of the 2009 EFP, a plan will be developed to test different strategies to diversify landings by incentivizing and encouraging more effort away from sablefish and onto under-utilized species such as thornyheads, blackgill rockfish and other rockfish species for which there is an aggregate catch limit. The goal is to encourage more trips targeting these non-sablefish species by using experimental techniques and variations to both horizontal and vertical fishing gear. TNC and project managers will work with fishermen and the CBFA on the above stated objectives as well as to test different lease rate incentives for non-sablefish landings. Under the terms of the license agreements the following can be implemented:

Table 3 - Total pounds caught by species and size class during the 2008 EFP.

Species	Total Pounds
Sablefish Small	27,574
Sablefish Medium	13,421
Sablefish Large	9,668
Sablefish Extra-Small	6,194
Blackgill Rockfish	4,880
Shortspine Thornyhead	665
Red-banded Rockfish	20
Aurora Rockfish	16
Widow Rockfish	14
Petrale Sole Large	7
Splitnose Rockfish	7
Bank Rockfish	4
Rex Sole	1
Longspine Thornyhead	1
Dark-blotch Rockfish	1
TOTAL	62,473

- Modifications to overall and species-specific lease rates;
- Develop financial incentives for experimentation, such as a negative lease rate on non-sablefish species that could offset what a fisherman would otherwise pay on sablefish landings;
- Establish new incentives or requirements regarding fishing gear. A requirement regarding vertical versus horizontal gear sets and limiting the size of horizontal sets were effective in 2008. These could be complemented by further restrictions or incentives; and,
- Identify where desirable species are caught and share data among participants or establish geographic requirements on fishing operations.

4.4 Develop systems for sharing data in real time with EFP fishery participants

One of the important goals of this project is to encourage fishermen to change how they fish in response to information – as well as in response to incentives or regulations – in order to better meet fishery objectives. Project sponsors anticipate using mapping tools to share information on productive spots for desirable species, areas with high likelihood of encountering depleted species or sensitive habitats to avoid.

There are practical challenges to providing this type of information to all participants in real time. The data used are confidential and not commonly shared among fishermen or with a third party. It is impractical and expensive to produce, print, and distribute daily these charts to fishermen at the dock. Yet, email or internet-based systems were not commonly used in 2008. In 2009, there is a need to develop an easily accessible shared data system, available on a secured basis to protect proprietary fishery information, to provide this information in real-time, to train all participants in its use, and to hold participants responsible for the information and its use.

4.5 Improve quality assurance for EFP fishery data

All data collected in the 2008 EFP were reviewed for quality assurance purposes and entered into a database for analysis and reporting. All databases require attention to assure the quality of the data, and this project is no exception. Quality assurance has been a relatively straightforward process, but time consuming this year because of the short window of time in which fishing has occurred. However, in 2009 it is anticipated the EFP will be issued in time for fishing to begin early in the year with up to six fishermen. This will allow for more routine quality assurance checks of the database so that errors and issues can be addressed in a timely manner. Planned changes for 2009 include redesign of the vessel logbooks and observer data sheets in order to simplify the collection of accurate data from all fishing trips and redesign of the project database to make data more immediately accessible online by all project participants.

4.6 Clarify compliance requirements and penalties

All lease agreements and EFPs include provisions for penalties for noncompliance, but they are not specific and leave room for interpretation. While compliance with the EFP and lease terms in 2008 was excellent, a more clear and established set of compliance measures and penalties – developed with National Marine Fisheries Service input and support – would be valuable.

5 Conclusion

As limited as the EFP project was in 2008, the project sponsors generally view the effort as a success. The EFP demonstrated that fishermen can work cooperatively with a nontraditional partner to develop a harvest plan and manage a local fishery successfully within the context of a community based fishing association; fishermen can share observers and carry EM systems; fishermen can share fishing opportunities to enable profitable trips for others; and achieve fishery objectives such as a diversified catch. The work has generated much public attention – within the fishing community and beyond – and we are encouraged that local acceptance of this approach is increasing. There is some clear evidence of some of the benefits that a community fishing association approach can bring.

Communities are important stakeholders in the IFQ program. The trawl rationalization goals and objectives identify the need to increase individual economic stability and minimize impacts on communities. Inarguably an individual's economic stability and quality of life depends on the stability of the community that he or she is part of. Multiple fishermen delivering to a port are necessary to sustain the shoreside infrastructure and local processors, who in turn provide services and a market for the fish caught. Jobs in the fishery and related business are important to local coastal economies. Many community leaders are concerned that if access to the resource leaves their port, all of the related economic activity will follow. Evidence to justify this concern has been seen repeatedly all around the U.S. and is well-documented in the analysis supporting development of the trawl rationalization program for the west coast groundfish trawl fishery.

However, while local government leaders are concerned about and supportive of the fishing businesses in their communities, direct involvement in management of that business is something they have neither the capacity nor the authority to take on. Creating an entity that can represent and act on behalf of the community to sustain the industry and the resource is a logical way to address this need. The CBFA used in this project – with its management committee made up of local community and industry leaders – has been an excellent way for these leaders to be involved in an enterprise that seeks to sustain the fishery for their community.

Project sponsors envision a new, permanent community fishing association that will utilize a portfolio of groundfish harvest methods – that includes but is not limited to the fixed gear techniques used in this project. A key function of CFA's will be to improve long term economic performance of the fishery with harvest approaches that best meet market demand for seafood. Harvest method decisions will also be made in the context of local infrastructure capacity and resource protection measures. Although this EFP is limited to fixed gear harvest techniques, The Nature Conservancy has worked with project sponsors to also launch a local trawl operation. In the first year of fishing for both this trawl operation and the EFP, important experience and information was gained on how different harvest methods can be utilized to benefit the local fishery.

A community fishing association is a new approach to co-management that may benefit <u>fishery managers</u>. The CBFA was able to monitor fishing operations very closely and respond nearly instantly to make changes in how fishing was carried out to address the multiple goals of the project. Similarly, in the single instance where a rule was broken, project managers were able to respond very quickly to work with the fisherman to correct the problem. Although compliance with the 2008 EFP terms and conditions was excellent and no sanctions were necessary, the possibility of the CBFA being vested with the responsibility to act under the terms of a private agreement may simplify or augment the agency's enforcement responsibility. The CBFA could identify the problem and the appropriate remedy and notify the agency of the action. The agency could then determine whether further enforcement action is needed. If the terms and conditions of the CBFA charter (or EFP) required full compliance in enforcement activities then a strong incentive is created for the organization to take responsibility and hold each member accountable.

In addition to sharing responsibility (and liability) for compliance with fishery regulations, another benefit of a community fishing association is the ability to allow fishermen to pool risks and share costs. During the 2008 EFP, one participant found himself with an insufficient amount of one species of fish to make a final trip financially viable. At a CBFA meeting, he presented his need to the other participants, who agreed to share a portion of their allocation with him in return for a portion of the revenue from his trip. This example deals with target species as we had few depleted species interactions in this project – but the situation is comparable to one in which a participant finds he has insufficient depleted species allocation to make a trip.

In this first year of this project, fishermen from only one of the two communities participated, but the impact in that community, Morro Bay, was significant. The black cod landed under the EFP was an important addition to the local economy and the market indicated a high demand for the limited amount of species other than black cod that were produced under the EFP. It is anticipated that landings of non sablefish species will increase in 2009 due to increased fishermen's incentives and a good price to the fisherman with the market remaining strong. This will not only increase revenues to local participants in EFP, but enable buyers such as Morro Bay Fish Co. and Central Coast Seafood to stabilize and even expand their operations. The EFP has created additional ice and fuel sales, important to the City in its attempts to support infrastructure services, which have been in steep decline. It is anticipated that, with the inclusion of Port San Luis fishers in the second year of the project, that the economic benefits to both local communities will only grow with time.

If the EFP model can demonstrate a strong market for previously underutilized (by hook and line) but plentiful species with reasonable economic factors to the fishermen, it is possible that other fishermen will adapt the methods. This will help to anchor new direct and indirect economic benefits to the community so long as regulatory access to these stocks is maintained.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

PACIFIC COAST GROUNDFISH FISHERY
EXEMPTED FISHING PERMIT (EFP)
AUTHORITY: Title 50, Code of Federal Regulations
Sections 600.745 and 660.406, and part 660

TO TEST WHETHER THE ESTABLISHMENT OF A COMMUNITY BASED FISHING ASSOCIATION EMPLOYING COMMERCIAL FISHERS USING FIXED GEAR OFF THE CENTRAL CALIFORNIA COAST FOR SHARED SPECIES CAPS WILL PROVIDE COMMUNITY AND ECONOMIC BENEFITS

PERMIT NO.: 08-TNC-01

The Administrator of the Northwest Region of the National Marine Fisheries Service (NMFS), acting on behalf of the Secretary of Commerce, hereby permits **The Nature Conservancy (TNC)** to implement the above project which involves the exempted harvest of Pacific Coast groundfish over which the United States exercises fishery management authority under the Magnuson- Stevens Fishery Conservation and Management Act, 16 United States Code 1801 et seq. (Magnuson-Stevens Act), and implementing groundfish regulations at 50 CFR Part 660 and section 600.745, and under salmon regulations at 50 CFR 660.406. The exempted fishing must be conducted in accordance with the provisions of the Magnuson-Stevens Act and 50 CFR Parts 600 and 660, except as provided in the attached terms and conditions incorporated herein.

This permit allows for participation in an exempted fishing project to test whether the establishment of a community based fishing association employing commercial fishers using fixed gear off the central California coast for shared species caps will provide community and economic benefits. This permit is valid when signed by both the Regional Administrator and the authorized representative of TNC (hereinafter referred to as the "EFP holder") on the later of the two signature dates.

Frank Lockhart 7/23/08
Signature Date Signed
For D. Robert Lohn, Regional Administrator
Northwest Region
National Marine Fisheries Service

Margaret Spring 8/1/08
Signature Date Signed
EFP Holder (Authorized Representative of TNC)

Margaret Spring
Print EFP Holder Name

By signing this document, the EFP holder agrees that the TNC officers and staff understand and will comply with the intent and terms and conditions of this permit.

The Nature Conservancy
Attn: Michael Bell
201 Mission Street
San Francisco, CA 94105

EXEMPTED FISHING PERMIT

TO TEST WHETHER THE ESTABLISHMENT OF A COMMUNITY BASED FISHING ASSOCIATION EMPLOYING COMMERCIAL FISHERS USING FIXED GEAR OFF THE CENTRAL CALIFORNIA COAST FOR SHARED SPECIES CATCH LIMITS WILL PROVIDE COMMUNITY AND ECONOMIC BENEFITS

TERMS AND CONDITIONS

A. PURPOSE.

The purpose of this exempted fishing permit (EFP) is to test whether establishing a cooperatively managed, community based fishing association that employs commercial trawl permits to use fixed gear to fish off the Central California coast, under shared catch limits for target and bycatch species, can provide important economic and environmental performance benefits. The research objectives are as follows:

1. Demonstrate the effectiveness of community-based fishing association – TNC will document and report on the process used to develop and implement the community based fishing association (CBFA). Such information may be useful in developing regulations for regional fishing associations and trawl rationalization.

2. Evaluate the social and economic performance of the fishery under gear switching effort and cooperative local management – The Nature Conservancy (TNC) will collect economic information about the EFP fishery (revenue and cost). All participants will maintain and provide this information to TNC.

B. BACKGROUND.

In recent years, TNC purchased several limited entry trawl permits (LEPs) from fishermen that operated trawl vessels along the central California Coast. Under current federal regulations, bottom trawl LEPs cannot be converted to LEPs for harvesting groundfish with other gear types, such as hook and line and pot gears. This issue was identified by TNC when they purchased bottom trawl permits, and they have been exploring ways to mitigate the negative economic effects of the bottom trawl LEP purchases, while exploring a shift to other harvest mechanisms. The commercial fishery operating out of Morro Bay, CA and Port San Luis, CA has been much reduced in recent years, causing economic hardship on these fishing ports and the reduction of commercial fishing infrastructure, including processors and ice dealers.

In addition, the Pacific Fishery Management Council (Council) has begun development of a trawl rationalization and individual fishing quota (IFQ) program. As the Council moves forward with planning and analysis, it will need practical information on how rationalized fisheries would operate in the Pacific Coast groundfish fishery. Fishing under this EFP is expected to provide valuable information on how to structure a more cost-effective monitoring system that emphasizes individual accountability in a rationalized fishery and also on the costs of managing a rationalized fishery.

TNC will work with central California Coast fishery participants to form a community based fishing association that would cooperatively manage fishing operations to maintain harvests within a total catch amount for target and incidental species, rather than under the cumulative trip limit structure in current Pacific Coast groundfish regulations. The collaborators with TNC include: City of Morro Bay Harbor Department; Port San Luis Commercial Fishermen's Association; Port San Luis Harbor District; California Department of Fish and Game; Morro Bay Commercial Fishermen's Organization, Inc.; and Environmental Defense Fund.

This EFP will allow TNC to temporarily convert bottom trawl LEPs into longline, trap, pot, and hook and line gear LEPs. Also, TNC and designated vessels will land some groundfish species in excess of trip limits so that they may structure their fishing operation to better meet the needs of the community based fishing association. Without an EFP, these activities are otherwise prohibited by Federal regulations and TNC would not be able to test the usefulness of a community based fishing association and gear switching mechanisms to mitigate the impact of trawl effort reduction on communities and promote conservation of fishing resources. Data collected during this project are expected to have a broader significance to the management of the Pacific Coast groundfish fishery by providing insight into the challenges and successes of managing a community based fishing association under a rationalized fishery, as well as informing fishery monitoring provisions that would need to accompany an IFQ program for which individual accountability is a key component.

For purposes of this project, NMFS will issue an EFP to TNC which provides terms and conditions which specify how it will carry out and oversee the project described above. Additionally, NMFS will issue EFPs to each of the vessels selected by TNC to participate in the project and they will be bound by these terms and conditions while fishing as part of the TNC project. Finally, TNC will register these same vessels under individual EFPs with NMFS to their trawl endorsed LEPs. References to TNC limited entry permits below are specifically those that will be registered to vessels participating under an EFP with NMFS. In recognition of the differing roles of TNC and the participating vessels in this project, the terms and conditions provided below have been organized such to address the specific requirements for both TNC and participating vessels. If there is no reference to TNC or vessel for any one term and condition, that term and condition applies equally to both entities.

C. SCOPE.

1. The EFPs issued to both TNC and to vessels participating in the TNC project apply to all fishing activities in the Pacific Coast groundfish fishery during the effective dates of these EFPs.

2. The EFPs exempt both TNC and the vessels registered to TNC LEPs as part of this project from all Pacific Coast groundfish regulations in 50 CFR Part 660 that apply to trawl endorsed limited entry permits, unless otherwise stated in the terms and conditions, during the effective dates of these EFPs.

3. This EFP requires both TNC and the vessels participating in the TNC project to follow Pacific Coast groundfish regulations that apply to limited entry fixed gear, unless otherwise stated in the terms and conditions, during the effective dates of these EFPs.

D. DEFINITIONS.

1. Authorized Fishing Trip: An authorized fishing trip is a fishing trip taken by a vessel during the project period in support of the above research objectives and is simultaneously registered to a TNC LEP and that vessel's EFP.

2. Vessel Exempted Fishing Permit ("vessel EFP"): A vessel EFP is the EFP issued to the individual vessel participating in The Nature Conservancy's EFP (D.3.) project as described in Section B which specifies the terms and conditions to which individual vessel owners must adhere. The vessel EFP is only valid for a vessel that is also registered to an LEP owned by TNC. No more than 6 vessel EFPs will be issued at any given time.

3. TNC Exempted Fishing Permit ("TNC EFP"): The TNC EFP is the EFP issued to The Nature Conservancy, describing the terms and conditions to which TNC and participating vessels (i.e., those holding a "vessel EFP") must adhere in carrying out the project described in Section B.

E. PERMIT CONDITIONS.

1. **Vessel**: This Vessel EFP is valid only for the /vessel registered to it. All qualified fishing trips by the registered vessel taking and retaining groundfish must be conducted in accordance with this EFP.

   TNC: TNC shall require that all qualified fishing trips by the registered vessel taking and retaining groundfish must be conducted in accordance with this EFP. TNC will register a vessel participating in the TNC EFP project to a trawl endorsed Pacific Coast Groundfish limited entry permit owned by TNC.

2. **Vessel**: The vessel registered to a vessel EFP must also be registered to a trawl endorsed Pacific Coast Groundfish Limited Entry Permit owned by TNC in order to participate in the EFP project. If the vessel registered to a vessel EFP is not registered to a TNC limited entry permit, the EFP is invalid.

   TNC: If a vessel owner terminates its EFP with NMFS, TNC will submit to NMFS a transfer form removing the permit holder and vessel from the limited entry permit.

3. **Vessel**: A vessel EFP is not transferrable to another vessel or vessel owner.

   TNC: The TNC EFP is not transferrable to another entity. TNC limited entry permits used for this project may be transferred to more than one vessel during the exempted fishing project period. The TNC limited entry permits registered EFP vessels may not be registered to any other vessel at the same time. After the initial registration of a vessel to any TNC limited entry permits and a vessel EFP, subsequent transfers will be effective at the beginning of the next cumulative limit period, as currently prescribed at 50 CFR 335(e)(2).

F. EFFECTIVE DATES.

1. **Vessel:** The vessel EFP is effective when signed by the NMFS Regional Administrator and the vessel EFP holder (i.e., the vessel owner or authorized representative of vessel owner) and when the vessel is simultaneously registered to Pacific Coast Groundfish limited entry permit owned by TNC. If the vessel EFP is signed by the NMFS Regional Administrator and the vessel EFP holder on different dates, the effective date is the later of the two signature dates.

TNC: The TNC EFP is effective when signed by the NMFS Regional Administrator and the EFP holder. If the EFP is signed by the NMFS Regional Administrator and TNC authorized representative on different dates, the effective date is the later of the two signature dates.

2. **Vessel**: The vessel EFP is valid while the vessel is participating in the 2008 Pacific Coast Groundfish Limited Entry fishery, and expires on December 31, 2008 at 11:59 pm PST, unless cancelled at an earlier date by one of the following actions:

a. At the request of the vessel owner, in which case the vessel must return to port, remove and return the vessel EFP by mail to NMFS. Concurrently, the vessel EFP holder will immediately inform TNC that it is terminating its participation under the EFP and return the limited entry permit to TNC.

b. When the NMFS NWR Regional Administrator determines it is necessary to issue an amended TNC EFP or vessel EFP containing additional or revised restrictions, in which case termination of this EFP occurs upon NMFS receipt of a signed amended EFP, or seven days after the NMFS mailing date of the amended permit to the EFP holder, whichever occurs first.

c. When any of the catch limits are projected to be reached for the target or depleted species described in G.1 or G.2 below, NMFS may cancel the vessel EFPs.

TNC: The EFP is valid for the 2008 Pacific Coast Groundfish limited entry fishery and expires on December 31, 2008 at 11: 59 pm PST, unless cancelled at an earlier date by one of the following actions:

a. If the owner of the vessel participating in EFP project elects to terminate their vessel EFP, TNC will submit a transfer request to NMFS that either places the permit in unidentified status or will transfer it to another vessel.

b. If TNC decides to terminate their EFP with NMFS, it will submit a letter to NMFS stating that they have elected to terminate the EFP and return their EFP.

c. When the NMFS NWR Regional Administrator determines it is necessary to issue amended EFP containing additional or revised restrictions, in which case cancellation of this EFP occurs upon NMFS receipt of a signed amended permit, or seven days after the NMFS mailing date of the amended permit, whichever occurs first.

d. When any of the catch limits are projected to be reached for the target or depleted species described in G.1. and G.2 below, NMFS may cancel the TNC EFP.

G. EXEMPTIONS AND FISHING RESTRICTIONS.

1. Species to be harvested:

Vessel: The rockfish species listed below may be caught by the vessel registered to the EFP. These rockfish species must not be discarded and will count against the aggregate catch limit amounts for each of the species given below.

ROCKFISH AGGREGATE CATCH LIMITS:

Southern slope rockfish	50 mt
(except that no more than 20mt may be blackgill rockfish)	
Longspine thornyhead	60 mt
Shortspine thornyhead	60 mt
Chilipepper rockfish	20 mt
Splitnose rockfish	1000 lbs

The non-rockfish species may be caught by the vessel registered to the EFP. The flatfish species include: Dover sole, petrale sole, English sole, rex sole and sandabs. These non-rockfish species may be discarded but any discarded species counts against the catch limit amounts given below.

NON-ROCKFISH SPECIES AGGREGATE CATCH LIMITS:

Dover sole	10 mt
Petrale sole	10 mt
Other flatfish	10 mt
Sablefish	30 mt
Lingcod	15 mt

If the aggregate catch of rockfish or non-rockfish species by the vessels registered to the vessel EFP are such that TNC projects the aggregate catch limits to be achieved or exceeded, all vessels registered to a vessel EFP must cease fishing. Any vessel that catches species other than those listed above must harvest such species in the amounts and frequencies allowed for the open access fishery. The vessels registered to this EFP will comply with the harvest plan developed by TNC that directs fishing activities for species listed above and must cease fishing when directed by TNC and/or NMFS.

Vessels registered to the EFP may catch (retain and discards) spiny dogfish in amounts that comply with the spiny dogfish open access trip limits. If the aggregate catch of spiny dogfish by EFP vessels is projected to reach or exceed 10 mt, vessels will cease fishing until NMFS, in consultation with TNC, provides further direction on future fishing activities involving spiny dogfish. All retained and discarded dogfish will count against the 10 mt limit.

The aggregate catch limit for sablefish available to EFP vessels is 30 mt. When the aggregate catch limit for sablefish is projected to reach or exceed 30 mt, all vessels registered to the EFP will cease fishing. This catch limit for sablefish will be available as of the effective date of the EFP.

TNC: The rockfish and non-rockfish species and the associated aggregate catch limit amounts for the TNC EFP are the same as those referenced above for participating EFP vessels. TNC must prepare a harvest plan that limits fishing activities such that the above catch limit amounts for rockfish and non rockfish species are not collectively exceeded by participating vessels. TNC must require EFP vessels registered to TNC limited entry permits to adhere to such plan. If the aggregate catch of vessels under their EFPs for rockfish or non-rockfish species results in the catch limits are projected to be reached or exceeded, TNC must direct all vessels registered to a TNC limited entry permit to cease fishing immediately and notify NMFS immediately. Any vessel registered to a TNC LEP that catches species other than those listed above in G.1, will harvest such species in amounts and frequencies allowed for in the open access fishery.

TNC will track and monitor the catch (including discards) of spiny dogfish by vessels registered to TNC limited entry permits. TNC will require that these vessels abide by the open access trip limits for spiny dogfish. If the aggregate catch of spiny dogfish by the vessels registered to TNC limited entry permits reaches or exceeds 10 metric tons (mt), it will immediately notify NMFS and consult on an appropriate course of action. TNC will direct that vessels cease fishing under the EFP until such time that NMFS and TNC agree to an appropriate course of action regarding future catch of dogfish. NMFS may revise the EFP to reduce impacts on dogfish.

TNC will track and monitor the aggregate catch limit for sablefish of 30 mt. When the aggregate catch limit for sablefish is projected to reach or exceed 30 mt, TNC will notify the vessels registered to TNC limited entry permits to cease fishing and immediately notify NMFS. This aggregate catch limit for sablefish will be available as of the effective date of the EFP.

2. Depleted species:

Vessel: Vessel EFP holders must adhere to EFP terms and conditions and the TNC harvest plan in an effort to avoid incidental catches of the depleted species listed below. Vessel registered to this EFP shall retain all depleted species and must not discard any of the species listed below. Aggregate catch of overfished species under this EFP are limited to the following amounts:

Canary rockfish	50 lbs
Yelloweye rockfish	150 lbs
Widow rockfish	2 mt
Darkblotched rockfish	1000 lbs
Pacific Ocean perch	300 lbs
Cowcod	300 lbs
Bocaccio	5 mt

The vessel registered to the EFP must cease all fishing activity when it is informed by TNC or NMFS that one or more of these catch limits is projected to be reached or exceeded.

If the aggregate catch of Darkblotched rockfish by the vessels registered to this EFP is projected to be reached or exceeds 1,000 pounds, TNC must notify NMFS and consult on an appropriate course of action. At the same time, TNC must direct that EFP vessels to cease fishing immediately. NMFS, in consultation with TNC will decide on an appropriate course of action regarding any future catch of Darkblotched rockfish. NMFS may revise the terms and conditions of vessel EFP to include provisions to further protect Darkblotched rockfish.

TNC: TNC will track and monitor the amount of catch by vessels registered to TNC limited entry permits for the depleted species listed above in order to avoid exceeding the catch limits. TNC will require that vessels registered to TNC limited entry permits conduct fishing activities in such a manner so that participants will not exceed the established catch limits given above for depleted species. If a particular catch limit for a depleted species is projected to be reached or exceeded TNC must notify each participating vessel immediately to cease fishing and notify NMFS immediately. TNC may require vessels to reduce fishing effort or direct that fishing occur in areas to minimize incidental catch of depleted species.

If the aggregate catch of Darkblotched rockfish by the vessels registered to TNC limited entry permits is projected to reach or exceed 1,000 pounds, TNC must notify NMFS immediately and consult with NMFS on an appropriate course of action. At the same time, TNC must immediately direct that vessels cease fishing under the EFP until NMFS decides on an appropriate course of action regarding future catch of Darkblotched rockfish. NMFS may revise the terms and conditions of the EFP to include provisions to further protect Darkblotched rockfish.

3. Exemptions: In combination with the exemptions and requirements stated above, both the TNC EFP and vessels registered to EFPs, NMFS authorizes for limited purposes the following activities which would otherwise be prohibited:

a. Trip Limits: Vessels registered to a trawl endorsed TNC limited entry permit are allowed to land amounts of groundfish in excess of the limited entry trip limit and frequency and cumulative limit specifications for species subject to a total catch limit specified below in G.1 and G.2, while the EFP is valid unless otherwise noted in the terms and conditions.

b. Permit Gear Endorsement: Vessels registered to a trawl endorsed TNC limited entry permit are allowed to use other non-trawl fishing gears (see G.5) while the EFP is valid. TNC may further restrict vessels registered to their limited entry permits to use certain non-trawl fishing gears as they deem appropriate.

c. Permit Size Endorsement: Vessels registered to a trawl endorsed TNC LEPs are allowed to be greater than 5 feet of the size endorsement of the LEP or more the 5 feet below the size endorsement given on the limited entry permit while their EFP is valid. The limited entry permit will retain its original size endorsement (that given prior to the effective date of the EFP) after the EFP activities are concluded.

d. Permit Transfers: TNC may register more than one vessel to each of its limited entry permits during effective period of their EFP for purposes of carrying out the exempted fishing activities. The above term does not imply or mean that multiple vessels may be registered to a single limited entry permit at one time. TNC may register a vessel to a limited entry permit after the beginning of the May-June cumulative limit period for purposes of initiating the TNC project at the earliest possible time.

4. Location of fishing and landings:

Vessel: All fishing under a vessel EFP must take place south of 36° North latitude (Point Lopez) and north of 34°10' North Latitude (Point Conception). All fish retained under this EFP must be landed in Morro Bay, CA or Port San Luis, CA. Split offloads are prohibited by the state of California; therefore the entire delivery will be offloaded at a single port.

TNC: TNC must require participating vessels registered to TNC limited entry permits conduct all fishing south of 36° North latitude (Port Lopez) and north of 34°10' North Latitude (Point Conception). Further, TNC must require that participating vessels land all fish retained in Morro Bay, CA or Port San Luis, CA. Split offloads are prohibited by the state of California, therefore, TNC must require that the entire delivery of any vessel registered to their limited entry permit will be offloaded at a single port. TNC will terminate lease agreements for the LEPs if a vessel does not comply with this provision.

5. Gear:

Vessel: Vessels registered to the EFP will fish using types of fixed gears or nontrawl gear described at 50 CFR 660.302 and subject to the restrictions for limited entry fixed gear in 50 CFR 660.382(b). TNC may require vessels registered to TNC LEPs and a vessel EFP to use only certain fixed or nontrawl gears.

TNC: TNC must require vessels registered to TNC limited entry permits to fish using either fixed gear or nontrawl gear as described at 50 CFR 660.302 and subject to the restrictions for limited entry fixed gear in 50 CFR 660.382(b). TNC may require vessels registered to TNC LEPs and a vessel EFP to use only certain fixed or nontrawl gears.

6. Retention/Discard Requirements:

Vessel: The vessel EFP holder will be required to retain on board all rockfish caught while fishing under a vessel EFP. Such species will not be discarded. All other harvestable species may be discarded but such discards must be recorded by an observer and count towards the catch limits given in G.1 all depleted species listed in G.2 must be retained on board and not discarded. All prohibited species as defined at 60 CFR 660.370(e), must be discarded at-sea and such discards must be recorded by the observer. The vessel operator and crew will cooperate with the observer to account for all species retained or discarded.

TNC: TNC will require that any vessel registered to a TNC LEP to retain on board all rockfish species caught while fishing under the EFP project. TNC will require that observers record all discards of non rockfish species including any species not listed in G.1. TNC will terminate the registration of any vessel to their limited entry permit if it does not adhere to the retention/discard requirements. Further, any owner of a vessel registered to a TNC limited entry permit will be required to discard at-sea any prohibited species as defined at 60 CFR 660.370(e) and will require that observers record all discards of prohibited species.

7. Participation in Open Access or Limited Entry Fisheries:

Vessel: In general, if NMFS or a vessel EFP holder cancels this EFP, the vessel registered to this EFP shall not fish in either the open access groundfish fishery or a groundfish limited entry permit fishery prior to the beginning of the next cumulative limit period. However, upon request by a vessel EFP holder, NMFS may at its own discretion authorize a vessel to fish in the current cumulative limit period if such fishing is not inconsistent with the EFP goals or other legal requirements. Further, any vessel registered to this EFP shall not simultaneously participate in the open access groundfish fishery. Any vessel while registered to a vessel EFP may not be registered to any Pacific Coast Groundfish limited entry permit other than that owned by TNC. After ending their participation in the EFP project and removing their vessel from registration on the TNC LEP and EFP, the vessel owner may reregister his/her vessel to a Pacific Coast Groundfish limited entry permit owned by the vessel owner. The registration of the vessel to his/her limited entry permit will be effective at the beginning of the next cumulative limit period or the beginning a subsequent cumulative limited period in 2008.

TNC: TNC will require that any vessel registered to a TNC limited entry permit shall not be registered to another limited entry permit (not owned by TNC) while participating in the TNC EFP project or participate simultaneously in the open access fishery while registered to the limited entry permit.

8. Trip limits:

Vessel: The vessel registered to this EFP will not be subject to the trip limits for non-whiting groundfish for the species given in G.1 and G.2 However, the vessel registered to this EFP is limited by the current Open Access trip limit amounts and frequencies for any target species not named in G.1

TNC: Any vessel registered to a TNC LEP is not subject to the trip limits for non-whiting groundfish for the species given in G.1 and G.2 However, any vessel registered to a TNC LEP is limited by the current trip limit amounts and frequencies for any harvestable species not named in G.1

9. Other: NMFS Northwest Regional Administrator may place additional limits on either the TNC EFP or any vessel EFP. If such restrictions are necessary, the Regional

Administrator will issue an amended permit containing the additional restrictions on groundfish regulations as determined necessary by NMFS. NMFS will notify TNC in advance such action.

H. MONITORING REQUIREMENTS.

1. At-sea observations

Vessel: Any vessel making an authorized fishing trip must carry a NMFS trained observer. The vessel operator and crew must cooperate fully with the observer to carry out his/her monitoring and reporting responsibilities.

TNC: TNC will assign to vessels making a fishing trip under this EFP a NMFS trained observer. TNC will require observers to monitor and record catch data, including species composition of all retained and discarded catch as well as biological data such as fish length, sex, and weight for every fishing trip taken under this EFP and to provide such data to TNC in timely fashion.

2. Landings reports

Vessel: The vessel EFP holder is required to provide to TNC all fish tickets and vessel logbook information within 48 hours following each authorized EFP fishing trip.

TNC: TNC is required to obtain a completed tally sheet and logbook from the observer for the vessel registered to the EFP within 48 hours following each authorized fishing trip. TNC will collect the vessel logbook completed by an operator of a vessel registered to the EFP within 48 hours following each authorized fishing trip. TNC is required to provide bi-weekly reports of total landings (by weight and species) to NMFS for both target and depleted species. At the time that TNC finds that 90% of the listed target or depleted species catch limits provided for in G. 1 and G.2 are reached, TNC must provide NMFS with weekly reports detailing total landings by species. If any target or depleted species catch limits are projected to be exceeded, TNC must notify all EFP holders to cease fishing immediately and must immediately notify NMFS. Failure to provide or to obtain such information in the time prescribed may be the basis of cancellation of this EFP.

3. Public Release of Information.

TNC and Vessel: The fishing activities carried out under the EFP which are otherwise prohibited, are for the purpose of collecting catch information. Both TNC and vessel EFP holder agree to the public release of aggregated information obtained as a result of activities conducted under this permit.

4. Vessel Monitoring Systems (VMS)

TNC and Vessel: Any authorized fishing trip taken by a vessel registered to the EFP and registered to a TNC limited entry permit must comply with all of the Vessel Monitoring System requirements given at 50 CFR 660.312. Failure to comply with VMS regulations may be the basis for NMFS to cancel the EFP. The TNC will require all vessels registered to a TNC limited entry permit and undertaking an authorized fishing trip to comply with all VMS requirements.

I. REPORTING REQUIREMENTS.

Vessel: It is unlawful to fail to report catches as required while fishing pursuant to an exempted fishing permit. Failure to maintain the required documents may result in a vessel's inability to obtain an EFP permit in the future, may be grounds for revocation, suspension, or modification of this EFP as well as civil or criminal penalties under the Magnuson-Stevens Act with respect to all persons and vessels conducting activities under the EFP (See section K.) Any vessel registered to this EFP will provide to TNC all information in a timely fashion as required by TNC to meet their reporting requirements. The vessel EFP does not relieve any person from any other state or federal reporting requirements.

TNC: TNC is required to provide the following written reports to NMFS: Interim Report due no later than October 18, 2008 and a Final Report due by March 15, 2009. These reports will include information as outlined in TNC's EFP application. TNC will provide full disclosure of observer data, cost and revenue information, information about the formation, activities, and management of the regional fishing association and electronic monitoring data associated with fishing under the EFP to NMFS. Failure to provide NMFS with the above reports may be the basis of terminating the EFP and may be the basis for disapproval of future EFP applications.

J. CLOSURES.

Vessel: If any of the catch limits for harvestable species given in G.1 or any of the catch limits for depleted species given in G.2 is projected to be reached or exceeded the vessel registered to a vessel EFP must cease fishing immediately.

TNC: If any of the catch limits for harvestable species given in G.1 or any of the catch limits for depleted species given in G.2 is projected to be reached or exceeded, TNC must instruct all participating vessels to cease fishing immediately.

K. SANCTIONS.

Failure of the vessel owner, operator, EFP holder, or any person to comply with the terms and conditions of this permit, a notice issued under 50 CFR Part 660 any other applicable provision of 50 CFR Parts 600 and 660, the Magnuson-Stevens Act, or any other regulations promulgated thereunder, may be grounds for revocation, suspension, or modification of this permit as well as civil or criminal penalties under the Magnuson-Stevens Act with respect to all persons and vessels conducting activities under the EFP (50 CFR 600.745(b)(8)).

All owners and operators (EFP Holders) of the individual vessels and TNC participating in this exempted fishing project are jointly and severally liable for exceeding the aggregate catch limits specified in this EFP.

L. WAIVER.

The EFP holder on his/her own behalf, and on behalf of all persons conducting activities authorized by the permit under his/her direction, waives any and all claims against the United States or the State, and its agents and employees, for any liability whatsoever for personal injury, death, or damage to property directly or indirectly due to activities under this permit.

DESCRIPTION OF SELECTION OF PARTICIPATING FISHERMEN

The Exempted Fishing Permit (EFP) project will allow a partnership of fishermen and The Nature Conservancy (TNC) to work together with the local community-based fishing association (CBFA) to coordinate the fishing of 6 Federal groundfish trawl permits purchased by TNC. This opportunity will require the use of hook-and-line, longline, and/or trap gear under pooled catch limits. By this, the CBFA hopes find ways to help strengthen stewardship of marine resources, encourage collaborations that will protect local access to groundfish, identify and address conservation needs and improve monitoring and data collection. This EFP project is designed to provide Federal fishery managers with practical experience and data that could inform decisions relevant to future management of the limited entry groundfish trawl fishery.

Gear-switching and community-based fishing associations could help reduce the unintended consequences of coast-wide management measures to small, remote fishing communities that have long relied on access to groundfish. In this project, the CBFA and local fishing community has the opportunity to test how gear switching and local management may be used to build a more environmentally sustainable and economically viable groundfish industry in Morro Bay and Port San Luis.

In this project, the CBFA intends to enlist the participation of 6 fishermen and 2-4 alternates. The project is a collaborative effort to build a more reliable, local groundfish industry as opposed to providing 1 year fishing opportunity. It is imperative that the participating fishermen hold EFP objectives as high a priority as securing revenue from their fishing efforts.

Below is list of the pooled target and overfished species hard caps for this EFP, which must be shared among the six participants. Hitting the hardcap for any one species will end fishing for all species. One of the key CBFA objectives is to maximize catch and value of all target species while avoiding catches of overfished species. Developing and adapting a harvest plan over the year to achieve that objective will be one of the key challenges for the partners and participants and the CBFA.

Target Species	Hard cap for EFP
Sablefish	50 metric tons (20 mt before July 1)
Southern Slope Rockfish	90 metric tons
Blackgill Rockfish	20 metric tons
Longspine thornyhead	60 metric tons
Shortspine thornyhead	60 metric tons
Lingcod	15 metric tons
Other:	
Chilipepper rockfish	20 metric tons
Spiny dogfish	10 metric tons
Splitnose Rockfish	1000 pounds
Flatfish: [1]	
Dover sole	10 metric tons
Petrale sole	10 metric tons
Other flatfish	10 metric tons

Overfished Species	Hard cap for EFP
Canary Rockfish	50 pounds
Yelloweye	150 pounds
Widow	2 metric tons
Darkblotched	1,000 pounds
Pacific Ocean Perch	300 pounds
Cowcod	300 pounds
Bocaccio	5 metric tons

[1] Fishermen have expressed interest in this EFP who would like to test the use of traps in catching flatfish.

What are the restrictions for the EFP?

- Fishing must occur deeper than 150 ftms, north of Pt. Conception, south of Pt. Lopez
- All fishing trips will include a human observer (funded by CBFA).
- If asked, fishermen must agree to carry electronic monitoring equipment (funded by CBFA).
- 100% retention of rockfish is required and prohibited species must be surrendered.
- All fishing will be with hook-and-line, longline, and/or trap gear, however, the CBFA expects a reliance on hook-and-line over trap fishing gear.
- Participants fishing under the EFP may not fish for groundfish under open access or another LE permit during the same 2-month cumulative limit period. Participation in other, non-groundfish fisheries will be unaffected.
- Harvest limits and allocations under the hardcaps will be established by the CBFA through the harvest plan and all participants must abide by these limits.

How will participation in the EFP work?

- Fishermen will enter into permit license agreement with TNC and will be issued an EFP from NMFS – both will be required for participation in the project.
- License revenue will be allocated to cost of EFP project.
- CBFA estimates a revenue sharing of approx. 75% to fishermen, 25% to the CBFA. **Note**: final revenue-sharing may vary depending on participating fishermen's input and species harvested.
- Fishermen will be involved in final revenue sharing and lease structure decisions
- Fishermen are expected to participate in regular CBFA meetings and contribute to the development and adaptation of the harvest plan and other local management measures to achieve CBFA objectives.
- Fishermen will be expected to provide trip-level data including copies of fish tickets, logbooks, survey, economic data and other factors which will allow the CBFA and TNC to assess the performance of the fishery as well as self-reporting of daily effort, expenditures, expectations, location-specific harvest, etc.
- Acknowledgment that exceeding hard caps for overfished species will make or break the experiment, particularly 50 pounds of Canary Rockfish and 150 pounds of Yelloweye.

EFP Fishermen Participant Selection Criteria

The following criteria will be used by the selection committee to evaluate and choose six fishermen and alternates (2-4) from the group of fishermen who submit applications.

Required Criteria for Participation in this EFP

- Agrees to comply with restrictions and obligations listed above
- Experience using specified gear and the geographic area of study.
- Willingness and ability to land in Morro Bay or Port San Luis.
- Holds a valid California commercial fishing license
- Access to a vessel that has 1) enough space and weight capacity to carry an observer (in addition to crew, gear and catch), 2) a Commercial Fishing Vessel Safety Examination decal and carries current required safety equipment that is required for the decal and 3) maintains safe conditions including adherence to all USCG and other applicable rules, regulations or statutes pertaining to safe operations of the vessel.

- Willingness and ability to accommodate electronic monitoring equipment, that includes dry interior space for the EM control box, sufficient electrical supply (110V AC or 12V DC), a 1/4" National Pipe Thread female port (identical to what is required for mounting a pressure gauge) for the EM transducer, willingness to install the EM equipment and provide for its proper operation, and to make any modifications to provide these conditions and to accommodate for the wiring system.
- No violations of past EFP provisions, no violations of fishing regulations which the applicant was fined more than $1000 for a criminal penalty or $5,000 for a civil penalty, or violations including falsification of fish receiving tickets.

Required Criteria for Participation in the CBFA as an EFP Fisherman

- Desire to land species other than sablefish
- Willingness and demonstrated ability to work in cooperation with other participating fishermen and CBFA in efforts to meet EFP project objectives.
- Good reputation regarding fishing ability and ability to work with others.
- Comfortable with ambiguity of EFP project.
- Willingness to compromise in order to benefit project results.
- Willingness to place equal importance on all EFP project objectives as well as individual financial benefit.
- Commitment to stewardship of marine resources by promoting innovation in fishing business models, techniques, cooperative structures, etc.
- Strong time commitment willing to fish the EFP
- Significant experience fishing in local waters
- Sound references

Selection Committee

A committee of at least three people will be chosen to review the applications, evaluate each applicant according to their responses and provide those evaluations on a confidential basis, to The Nature Conservancy in a final package. Selection committee candidates will be identified and selected by their good standing in the community and leadership role in their particular field. The selection committee members will be chosen by the CBFA. Every reasonable effort will be made to ensure that selection committee members have no close personal, financial or familial relationships with any of the applicants, TNC, Environmental Defense, or any individual members of the CBFA partners, or a direct financial interest in the groundfish industry in Morro Bay and Port San Luis. Selection committee members will be debriefed by the CBFA on the history of the project, goals, objectives and priorities.

February 15, 2008

Regarding EFP Fishing Opportunities

Thank You for Your Interest in EFP Fishing Opportunities,

In this package, please find a Description of Selection of Participating Fishermen and an EFP Selection Application.

- Please review the **Description of Selection of Participating Fishermen**. This document is intended to answer questions regarding the EFP fishing opportunity.

- Please answer all of the questions on the **EFP Selection Application** to the best of your ability and return the completed application **by February 29** to:

  Henry Pontarelli, Lisa Wise Consulting (LWC)
  1302 Bayview Heights Drive
  Los Osos, CA 93402

Completed applications will be submitted to a selection committee for evaluation. This committee will consist of at least three people that have no personal, financial or familial relationship with the Community Based Fishing Association (CBFA) or its partners, or the local fishing industry. Selection committee members will possess a good standing in the community, a leadership role in their field and be debriefed regarding the project. Applications and evaluations will then be passed to The Nature Conservancy for final review. **Applications and evaluations will be handled in the strictest confidence**.

OVERVIEW: In November of 2007, the Pacific Fisheries Marine Council (PFMC) recommended approval of an exempted fishing permit (EFP) to seven sponsors representing the Morro Bay and Port San Luis commercial fisheries. The EFP allows six Federal groundfish trawl permits purchased by The Nature Conservancy (TNC) to be fished using hook-hand-line, longline and/or trap gear under pooled catch limits.

The project is being coordinated and administered by the Community Based Fishing Association (CBFA) that is made up of representatives from the Morro Bay Commercial Fishermen's Organization (MBCFO), Port San Luis Commercial Fisherman's Association (PSLCFA), the City of Morro Bay (City), Port San Luis Harbor District (District), TNC, and Environmental Defense (ED).

The CBFA hopes to enlist the participation of six qualified fishermen and up to four alternates. Lisa Wise Consulting (LWC) has been hired to facilitate a fair, unbiased selection process for the CBFA and TNC to choose the most qualified participants from a group of fishermen that submit EFP Selection Applications (enclosed). The work is being funded by a Central Coast Joint Cable Fishery Liaison Committee grant.

An important criteria is each fishermen's willingness and ability to work together to achieve consensus. A goal of this program is that participating fishermen play an increasingly greater role in the harvest plan, revenue-sharing decisions and build on the EFP opportunity.

Minimum required criteria include:

- Experience using hook and line, longline, and/or trap gear.
- Willingness and ability to land in Morro Bay and Port San Luis.
- Must hold a valid California commercial fishing license.
- Willingness and ability to accommodate an observer, which includes access to a vessel with valid registration that has a valid Commercial Fishing Vessel Safety Examination decal, carries current safety equipment that is required for the decal, and adheres to all U.S. Coast Guard and other rules pertaining to safe vessel operations.
- Willingness to share information on landings, economic expenditures and performance.
- Vessel must meet requirements for installation of electronic monitoring system.
- No violations of past EFP provisions, no violation of fishing regulations which the applicant was fined more than $1,000 for a criminal penalty or $5,000 for a civil penalty, or falsification of fish receiving tickets.

Again, please complete the **EFP Selection Application** to the best of your ability and return it to: Henry, Lisa Wise Consulting, 1302 Bayview Heights drive, Los Osos, CA 93402

Thank You,
Community-Based Fishing Association (CBFA)

EFP Selection Application

Name ______________________________

Address ______________________________

____

Phone ______________________________

Current employment

What is your current employment? ______________________________

Do you intend on retaining present employment should you receive an EFP? Yes No

Eligibility

Do you meet the required eligibility as described in Description of Selection of Participating Fishermen, included in this package? Yes No

Are you in violation of past EFP provisions, fishing regulations in which you were fined more than $1000 for a criminal penalty or $5,000 for a civil penalty, or violations including falsification of fish receiving tickets? Yes No

Do you presently own your vessel? Yes No

Does your vessel meet Coast Guard safety requirements? Yes No

Does your vessel meet requirements for installation of an Electronic Monitoring System or are you willing to modify it to meet those requirements? Yes No

Fishing Experience

Total years in fishing industry (actively fishing) ____________

Total years fishing within local Morro Bay/Port San Luis waters ____________

On average, percent of the year typically having fished in local waters: (e.g. 10% - 100%) ____________

Describe your experience with hook and line

length of time used ____________

percent of time used compared to total gear use ____________

species targeted ______________________________

Primary landing area over the past ten years ____________

Species predominantly pursued over the past ten years ______________________________

If you were granted an EFP, how much time would you be able to give to the experiment, including time spent fishing and CBFA regular meetings? (check one)
_____ 10%
_____ 25%
_____ 50%
_____ 75%
_____ 100%

Self-Rating

Should you be granted an EFP, how willing would you be to engage in close and ongoing interaction and decision-making with TNC and CBFA?
____ Not at all
____ Somewhat willing
____ Mostly willing
____ Very willing
____ Depends on ________________________

Should you be granted an EFP, how willing would you be to provide trip-level data through TNC administered survey and/or self-reporting of: daily effort, expenditures, expectations, and location-specific harvest?
____ Not at all
____ Somewhat willing
____ Mostly willing
____ Very willing
____ Depends on _________________________

Written Responses

In a paragraph, please answer the following questions:

In what ways do the EFP project objectives match your own objectives? In what ways do they conflict?

____
____
____
____
____
____
____
____

What suggestions can you make to enhance communication between the CBFA and fellow fishermen?

Describe one example from your experience fishing of your own ability to adapt quickly.

References

Please list three people who would recommend you as an EFP fisherman.

Name of Person Recommending You	In what capacity do you know this person?	Contact Information / Phone Number

Sign ______________________________ **Date** ____________________

Please return the completed application to:
Henry Pontarelli, Lisa Wise Consulting, 1302 Bayview Heights Drive, Los Osos, CA 93402

CBFA Vessel Logbook Instructions – Morro Bay/Port San Luis EFP

The following applies for each fishing trip conducted under the Morro Bay/Port San Luis Exempted Fishing Permit.

- Record all information requested for every set even if no marketable fish were caught.
- Use standard PacFin codes (included) or full species names for species caught and discarded on the logbook sheets. Do not invent your own codes.
- PRINT clearly and legibly.
- Use a new logbook page for each trip. One trip may use several logbook pages.
- Please complete BOTH SIDES of the logbook page for each trip. Instructions for the trip expense report are included on each trip expense page.

Vessel Name: Record the name of the fishing vessel as it is listed on the Exempted Fishing Permit for the vessel.

Trip Dates: Record the date the vessel leaves the harbor to begin fishing and then the date the vessel landsits catch.

Trip ID# (YYMMDD_VesselID#): The Trip ID# is a unique number that is generated for each fishing trip. This unique trip ID# will consist of the date the vessel leaves the harbor (first line for trip date) followed by the vessel's ID#. An example is for July 30, 2008 with a vessel number of 42516 is: 080730_42516

Set: The definition of a set is broken down into both horizontal and vertical hook and line and pot/trap gear.

> <u>Horizontal Gear</u> – A set is defined as a string of gear, regardless of the number of hooks, tied together to fish as one complete horizontal line on or near the bottom. A typical horizontal set will include an anchor and associated radar buoy at each end of the string of hooks.
>
> <u>Vertical Gear</u> – A set is defined as string of hooks, regardless of the number hooks, tied together to fish as one vertical line off the bottom in the water column. A typical vertical set will include one anchor and radar buoy per string of hooks.
>
> <u>Pot/Trap Gear</u> – A set is defined as one or more pots or traps tethered together on a single string of gear. Multiple pots/traps are attached and are set and retrieved together.

Start/End: The rows titled Start/End will correspond to the columns: Date, Time, Latitude and Longitude of the respective set.

Date (mm/dd): Record the date each set is placed in the water to fish and the date the set is retrieved. An example is for July 30, 2008: 07/30.

Time, 24 hour: Record the time in 24-hour format each set is deployed and then retrieved.

Latitude/Longitude: Record the geographic location of each set using latitude and longitude. Location should be recorded to the hundredth of a minute. An example would look like: latitude 35 degrees and 20.60 minutes and longitude 121 degrees and 59.33 minutes.

Depth of catch (fm) at retrieval: Record, in fathoms, the depth of the set being fished at the time it is being retrieved by the vessel.

Gear Type: Record the gear type for each set. See Categories to the right.

 # Hooks or Pots: Record the number hooks per horizontal or vertical set. If traps or pots are used, record the number that are tied together to form the string.

Target Strategy: Using the PacFin codes or full species names, describe the species or complex targeted with the set that is deployed.

List Species by PacFin Code: Using the PacFin codes or full species names, list the species that are retained (R) and/or discarded (D) from each set by estimating the weight in pounds.

<u>The Other Discards Section is for discards of species for which no individuals are retained on that trip.</u>

Species/Description: Using the PacFin codes or full species names, describe the species that are discarded and no individuals are retained from each set.

Quantity: Record the cumulative weight in pounds of each species from above (Species/Description) that are discarded from each set.

Set # when caught: Provide the set # (from far left column of log) during which the discard was caught.

Catch Categories and Target Strategies – PACFIN Codes

Catch Category	Code
Albacore Tuna	ALBC
Arrowtooth Flounder	ARTH
Aurora Rockfish	ARRA
Bank Rockfish	BANK
Big Skate	BSKT
Blackgill Rockfish	BLGL
Boccacio Rockfish	BCAC
Bronzespotted Rockfish	BRNZ
Butter Sole	BSOL
Cabezon	CBZN
California Halibut	CHLB
California Skate	CSKT
Canary Rockfish	CNRY
Chilipepper Rockfish	CLPR
Cowcod Rockfish	CWCD
Crab Other	OCRB
Curlfin Sole	CSOL
kblotched Rockfish	DBRK
Dover Sole	DOVR
Dungeness Crab	DCRB
English Sole	EGLS
Flag Rockfish	FLAG
Flatfish Other	OFLT
Flathead Sole	FSOL
Greenblotched Rockfish	GBLC
Greenspotted Rockfish	GSPT
Greenstriped Rockfish	GSRK
Grenadier Unspecified	GRDR
Halfbanded Rockfish	HBRK
Kelp Greenling	KLPG
Large Rockfish (OR)	LGRK
Lingcod	LCOD
Longspine Thornyhead	LSPN
Mackerel Unspecified	UMCK
Marine Mammal	ZMRM
Miscellaneous	ZMIS
Nearshore Rockfish N	NSHR
Nearshore Rockfish S	SSHR
Ocean Whitefish	OWFS
Octopus Unspecified	OCTP
Pacific Angel Shark Pacific Cod	ASRK PCOD
Pacific Halibut	PHLB
Pacific Mackerel	PMCK
Pacific Ocean Perch	POP
Pacific Whiting	PWHT
Petrale Sole	PTRL
Pollock	PLCK
Redbanded Rockfish	RDBD
Redstripe Rockfish	REDS

Catch Category	Code
Rex Sole	REX
Rock Greenling	RCKG
Rock Sole	RSOL
Rockfish Unspecified	URCK
Rockfish WA or CA	ROCK
Rosy Rockfish	ROSY
Rougheye Rockfish	REYE
Sablefish	SABL
Sablefish - low value	LVSABL
Salmon Unspecified	SAMN
Sand Sole	SSOL
Sanddabs Unspecified	SDAB
Seabird	XBRD
Shark Other	OSRK
Sharpchin Rockfish	SHRP
Sheepshead	SHPD
Shelf Rockfish N	NSLF
Shelf Rockfish S	SSLF
Shortbelly Rockfish	SBLY
Shortraker Rockfish	RKR
Shortspine Thornyhead	SSPN
Shortspine Thornyhead - low value	LVSSPN
Shrimp and Prawns	SRMP
Skates and Rays	SKAT
Slope Rockfish N	NSLP
Slope Rockfish S	SSLP
Small Rockfish (OR)	SMRK
Soupfin Shark	SSRK
Soupfin Shark	SSRK
Spiny Dogfish	DSRK
Splitnose Rockfish	SNOS
Splitnose Rockfish	SNOS
Squarespot Rockfish	SQRS
Starry Flounder	STRY
Starry Rockfish	STAR
Tanner Crab	TCRB
Thornyhead Unspecified	THDS
Tiger Rockfish	TIGR
Turbots	TRBT
Vermilion Rockfish	VRML
White Croaker	WCRK
White Seabass	WBAS
White Sturgeon	WSTG
Widow Rockfish	WDOW
Wolf-eel	WEEL

Target Strategy	Code
Bottom Rockfish Shelf	BRSH
Bottom Rockfish Slope	BRSL
Dover/Thornyheads/Sablefish	DTS
Deepwater Dover	DWD
Miscellaneous	MSC2
Nearshore Mix	NSM
Unknown	UNKN

Gear Type Categories include:

H-Horizontal Hook and Line

V-Vertical Hook and Line

T-Traps or Pots.

Aggregate Catch Limits for the Morro Bay/Port San Luis EFP

Sablefish .... 30 mt
Slope rockfish (south of 40º10' N. latitude) 50 mt (except that no more than 20mt of that may be blackgill rockfish)
Longspine thornyhead 60 mt
Shortspine thornyhead 60 mt
Lingcod .... 15 mt
Chilipepper rockfish 20 mt
Splitnose rockfish 1000 lbs
Spiny dogfish .... 10 mt
Dover sole .... 10 mt
Petrale sole .... 10 mt
Other flatfish 10 mt...

Depleted Species Aggregate Catch Limits

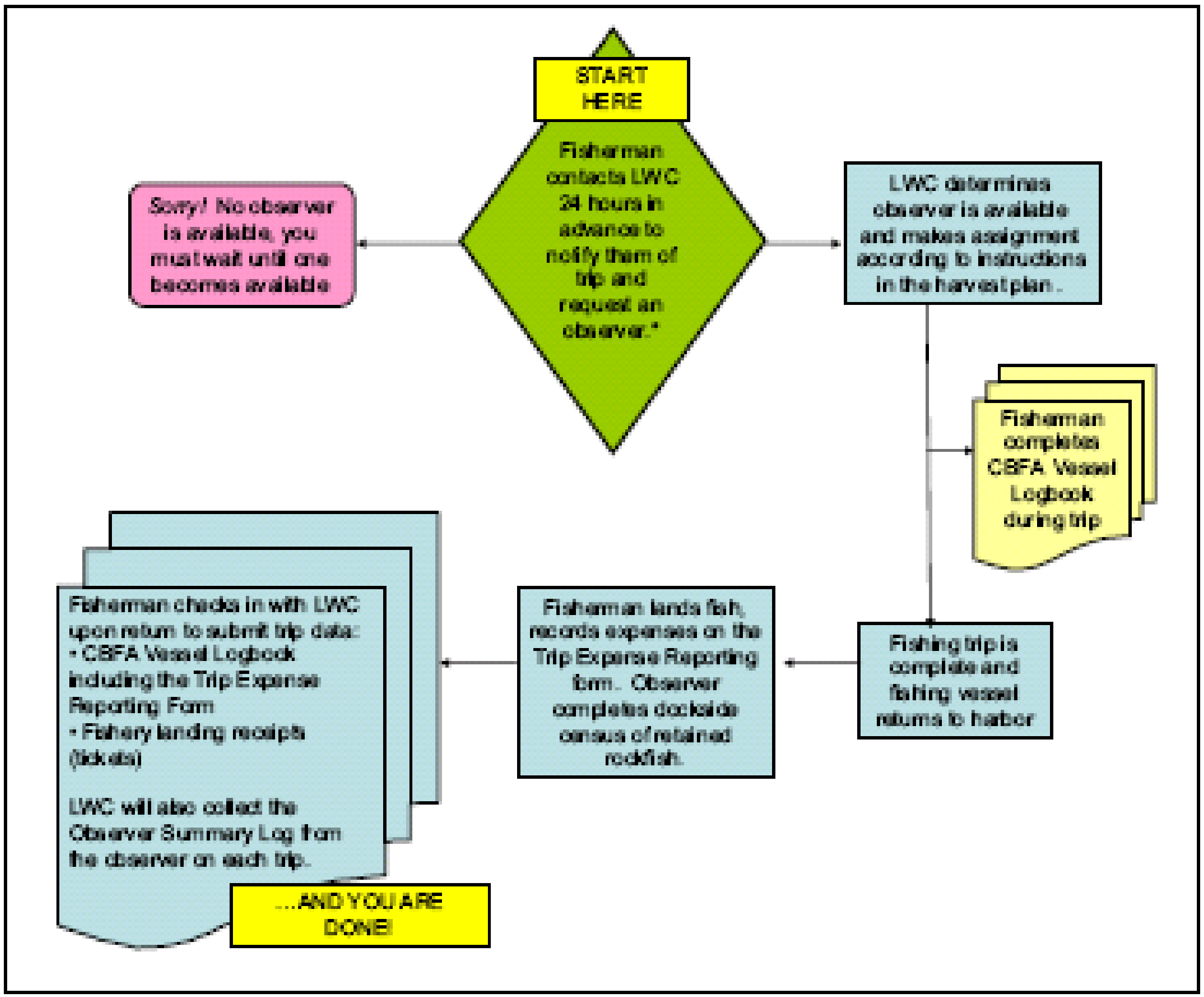
Canary rockfish** .... 50 lbs
Yelloweye rockfish** .... 150 lbs
Widow rockfish .... 2 mt
Darkblotched rockfish .... 1000 lbs
Pacific Ocean perch............................... 300 lbs
Cowcod** .... 300 lbs
Bocaccio .... 5 mt

**May NOT be sold.

Note that achieving **any** one of the target limits listed here will trigger shutdown of fishing under the EFP. Under the terms of the EFP, all participants share responsibility for any incidence of exceeding an aggregate catch limit.

Each fisherman is responsible for knowing where catches are in relation to the hard caps. Be sure to get this information before you go to sea.

In the event that your trip causes an overage for any species, contact Dwayne Oberhoff immediately at (805) 440-6137.



- To schedule an observer for a fishing trip, please contact Dwayne Oberhoff at 805-440-6137.
- At that time, please be sure that you receive an update on status of catches under the EFP. All <u>EFP participants share responsibility for any overages.</u>
- Upon return to port and landing of fish, please contact Dwayne to turn in trip documentation:
  - CBFA Vessel Logbook and Expense Reporting Form
  - Fishery landing receipts.
- Please note that access to your vessel may be necessary from time to time to install or remove EM equipment or to retrieve EM data.

<u>IMPORTANT NOTICE</u>

- **In the event an overage occurs at sea, stop fishing IMMEDIATELY and return to port. Notify Dwayne Oberhoff at the number listed above as soon as you are in cell phone range.**
- **In the event an overage is identified upon landing, notify Dwayne Oberhoff immediately.**

All participants are expected to cooperate fully in any enforcement activity.

* Note that the terms and conditions of the Exempted Fishing Permit and federal regulations require fishermen to verify the functioning of their Vessel Monitoring System at least 24 hours, and no more than 96 hours prior to each fishing trip.

CBFA VESSEL LOGBOOK - Morro Bay/Port San Luis EFP

Vessel Name:_______________________ Trip Dates (MM/DD/YYYY): ______________ to ________________ Trip ID# (YYMMDD_Vessel ID#):______________________________

Note: the Trip ID is the date of the start of the fishing trip, followed by the vessel ID number. (Sample trip ID: 080728_672937)

				Latitude		Longitude						List Species by PacFin code											Other Discards		
Set #		Date (mm/dd)	Time 24-hour	degrees	minutes	degrees	minutes	Depth of catch (fm) at retrieval	Gear Type	# Hooks or Pots	Target Strategy												Species/Description	Quantity	Set # when caught
	Start											R													
	End											D													
	Start											R													
	End											D													
	Start											R													
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CBFA Trip Expense Reporting Form - Morro Bay/Port San Luis EFP

Item		**# Units (if applicable)**		**Item Cost ($)**
General Costs:		Quantity	Units	
	Fuel		gallons	
	Ice		lbs or tons (specify)	
	Bait hooks (Bait + Baiting service)		# hooks	
	Groceries			
Crew costs:				
	Crew Insurance		# crew	
	Crew Share		% of revenue	
Lease Payment to TNC (based on lease rates/species)				
Other:				
Other:				
Other:				
Other:				
		Gear Used:	☐ Own	☐ TNC

Comments:

Per species lease rates may be changed over the course of the project, please write in current lease rates as provided by Dwayne here.

Species	**Lease Rates:**
Sablefish	
Shortspine Thornyhead	
Longspine Thornyhead	
Blackgill Rockfish	
Slope rockfish (other than blackgill)	
Lingcod	
Spiny Dogfish	
Dover Sole	
Petrale Sole	
Other flatfish	

Instructions: The expenses reported on this form should correspond with the trip reported on the other side - one logbook page per trip.

This form will be used to track all per trip costs associated with fishing under the Morro Bay/Port San Luis Exempted Fishing Permit and will be used to prepare reports on the economic viability of this project required by NMFS.

It will also be used for calculating cost recovery claims. In the event you are making a claim to recover costs, receipts for all expenses must be provided before a claim will be paid.

Please report all costs associated with each trip. Common cost categories are already listed (e.g., fuel, ice, groceries), please use blank spaces provided (marked “Other”) to note other costs to provide a complete report of costs incurred on each trip. If an unanticipated cost was incurred for a particular trip, please note the circumstances in the "Comments" section.

If you have any questions or to turn in a trip log, please contact Dwayne Oberhoff at (805) 440-6137.

Please note that all trip logs must be submitted within 48 hours of the completion of each fishing trip.

The Nature Conservancy
201 Mission Street, 4th Floor
San Francisco, CA 94105

Oregon Recreational Yellowtail Rockfish EFP

Application

A. Date of application

May 27, 2009

B. Applicants

Southern Oregon Sport Fishermen
Contact: Wayne Butler
P.O. Box 674
Bandon, OR 97411
(541) 347-9126

Recreational Fishing Alliance, Oregon Chapter
Oregon Anglers
Contact:
John Holloway
6823 SW Burlingame Ave.
Portland, OR 97219
(503) 452-7919

C. Statement of purpose and goals

This is an application for a renewal with minor changes to an existing EFP. The existing is either running or in the late stages of permitting. This EFP will test the possibility of conducting a recreational fishery targeting an underutilized species using special gear. This gear will be designed to avoid and/or minimize impacts on species of concern. Full retention of all rockfish species will be required.

D. Justification for EFP

In the next few years recreational fishing depth and area closures are to become the most constraining in history. This is due primarily to one species, yelloweye rockfish. These closures apply to the entire water column for most groundfish FMP species. Yelloweye reside near the bottom in select habitats. Midwater species exist in relative abundance, yet are inaccessible. It is believed that special gear can be developed which can provide access to midwater species without causing any additional impacts to yelloweye rockfish. Bottom habitat is all that needs protection from hooking impacts. This could provide increased opportunity for recreational fisheries and relieve fishing pressure on nearshore species. Increased opportunity is something that has been lacking for many years of incremental constraints on all fisheries. This EFP will allow legal retention of prohibited species for comprehensive utilization of limited data sources.

E. Broader significance and fleetwide applicability

Recreational midwater specific gear can be used by anglers to access underutilized fish stocks without undue complication for enforcement. Only a longer leader and a float differentiate this gear from standard practice.

F. Duration of EFP

One year with a possible renewal application in June of 2010 if necessary.

G. Number of vessels covered under this EFP.

There will be a total of 10 recreational charter vessels covered. They are as follows:

1. Capt. Ken Butler, *Prowler,* Bandon, OR (541) 347-3508
2. Capt. Jon Brown, *Kerri-Lin,* Garibaldi, OR (503) 355-2439
3. Capt. Darrel Harper, *Umatilla II,* Newport, OR (541) 867-4470
4. Capt. Lars Robison, *Sampson,* Depoe Bay, OR (541) 765-2545
5. Capt. Mick Buell, *Norwester,* Garibaldi, OR (503) 322-0007
6. Capt. Wayne Butler, *Mis-Chief*, Bandon, OR (541) 347-9126
7. Capt. Joe Ockenfels, *Siggi-G,* Garibaldi, OR (503) 322-3285
8. Capt. Mike Sorenson, *Miss Raven,* Newport, OR (541) 867-4470
9. Capt. Bob Bales, *D&D,* Garibaldi, OR (503) 322-0007
10. Capt. Bill Whitmer, *Shamrock,* Charleston, OR (541) 888-9021

Alternate Vessel

Capt. Bill Whitmer, *Betty Kay,* Charleston, OR (541) 888-9021

H. Description of species and amounts.

Target species are yellowtail rockfish. Expected encounters of overfished species include widow, canary, and yelloweye rockfish. A bag limit of 15 rockfish will be used and this quantity is the base for impact estimates.

There will be 10 vessels and 12 anglers average per trip. There will be 30 trips. This will result in 360 angler-days.

Total estimated impacts (caps):

Widow = 3.0 mt	(ref.)3,529 fish x 0.85 kg(ODFW 1993-1999)
Canary = 2.6 mt	1620 fish x 1.58 kg
Yelloweye = 0.2 mt	90 fish x 2.18 kg

The above impacts by weight will be the total caps for this EFP. A reference catch rate by average number of fish per angler per trip will be monitored for the duration of this project.

Overfished species maximum catch rate:

Widow rockfish 10 per angler
Canary rockfish 4.5 per angler
Yelloweye rockfish 0.25 per angler

I. Monitoring

At-sea on board observers will be used on all trips. These observers will be PSFMC certified groundfish observers. They will be provided through ODFW sampling and observer programs.

J. Data collection and analysis methodology

Monitoring and data.

Direction of observer coverage will be under Mr. Don Bodenmiller ODFW Marine Resources Program. ODFW will monitor, through observers, catch rates and progress toward project caps. Data will be recorded at a "drift" level. Drift level recording will make statistical comparison with existing ODFW long leader research easier. All overfished species will be "lengthed and sexed." Observers will gather species needed for biological analysis. Individual trips will not proceed if observer coverage is unavailable. Observer bookings must be made in advance of anticipated trips. If the bycatch caps are reached the project will be terminated. If the bycatch rate (section H) is being exceeded the project will be suspended until needed changes allowed within this EFP can be determined and implemented. Timely observer communication regarding ongoing catch rates will be a top priority.

Analysis.

Direction of data collection and analysis will be under Mr. Bob Hannah ODFW Marine Resources Program. Bycatch rates resulting from prosecution of this EFP will be compared to similar data from fisheries, fisheries projection models, and ODFW long leader research. This can be done geographically and/or using nonparametric statistical testing. The success criteria would be for the bycatch rates for overfished species to be significantly less than the nearshore fishery.

K. Criteria for vessel selection

Vessels have been chosen based on the individual owner/ captain history of successful participation with prior fishery management monitoring and special projects and no known fishery violations.

L. Time, place and gear.

Time

Fishing will take place between late spring and early fall. This is the normal weather friendly window and also in between the possible all depth recreational seasons.

Location

Fishing will be conducted offshore of Oregon between 42° 00.00' N lat. and 46° 18.00' N lat. Where possible, trips will be evenly distributed between the ports. Some port bias may be necessary due to availability of participating resources.

Depth

The project will be conducted in any area seaward of 40 fathoms.

Gear.

The gear to be used will be designed to locate hooking gear in a midwater location to avoid bottom dwelling species. The proposed gear for this fishery will employ the use of a long leader between sinker and hooks. The purpose will be to elevate the hooking gear above the bottom a sufficient distance to avoid and or minimize contact with species of concern. Leader lengths of 30, 40 and 60 feet may be tested. A starting point will be a leader of 30 feet. A change of length will only be made if incidental impacts are high or access to target species is low without high incidental impacts. A float will be affixed to the upper end of the leader. The purpose of this float is to prevent hooking gear from descending below the upper level of the leader. The float must have sufficient buoyancy to support all hooking gear and line above equivalent to leader length. Current tests show that a buoyancy of 2.25 ounces would be sufficient. Floats must be constructed of solid material. They can be either wood or closed cell high density foam. No hollow floats allowed. Maximum number of hooks is to conform to current regulation (3). Small plastic worms and flies will be used. Weighted hooks, bait and large lures will be prohibited.

(note): The leader length is for reference purposes only. The determinant shall be the distance between the sinker and the lowest hook. It is this dimension that will be the rule.

M. Signatures

Wayne Butler

John Holloway

To:
Bob Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115-0070
(206) 526-6150
bob.lohn@noaa.gov

cc: Frank Lockhart
frank.lockhart@noaa.gov

cc: Gretchen Arentzen
gretchen.arentzen@noaa.gov
(206) 526-6147

Subject: RFA/GGFA Exempted Fishery Permit Proposal for 2010
Title: Recreational Rockfish Catch Composition Seaward of the Rockfish Conservation Area
Date: Wednesday, May 27, 2009
Applicants:

Recreational Fishing Alliance
Contact: Jim Martin, West Coast Regional Director
P.O. Box 2420, Fort Bragg, CA 95437
(707) 357-3422

Golden Gate Fishermen's Association
Contact: Roger Thomas, President
P.O. Box 40
Sausalito CA 94966
(415) 760-9362

Justification: Since the implementation of the Rockfish Conservation Area as a bycatch reduction measure to protect overfished species such as canary rockfish, over 90% of the EEZ has been closed to recreational rockfishing. This proposal would exempt a specific number of CPFV vessels in north-central California to fish seaward of the RCA for underutilized species such as chilipepper. Note: this is a request for renewal of the EFP the Council approved for 2008. NMFS delivered the finalized permits for 2008 on August 15th, 2008. We have yet to conduct any trips under the 2009 permits, but expect to begin soon. Therefore we have no report for the Council on the progress of the current (2009) year's EFP. We are submitting a separate report on trips conducted in 2008.

Potential impacts: There is some historical data for recreational catches of rockfish on the slope, but no recent data is available. Impacts on canary rockfish, yelloweye rockfish and cowcod should be very low.

Purpose and goal of the experiment: To use selective recreational fishing gear, hook and line, to access underutilized species such as chilipepper rockfish and groundfish. While this study will test different hook and line gear to discover ways to avoid overfished species, this experiment is primarily an area-based study. The data provided from this series of trips on CPFV vessels would provide management guidance to open a new market for fishing trips on the charter fleet in northern and central California (from Point Conception to the 40-10 line). Experimenting with different types of terminal tackle results in a more selective fishery. Anglers will retain all legal fish. This EFP would be limited to the CPFV fleet to control effort, and to provide observer coverage, but the data gathered could result in a new fishery for the entire recreational fishing fleet.

Broader Significance: the data collected should prove that a recreational fishery can be conducted for abundant and underutilized species such as chilipepper rockfish without impacts to overfished species. If successful, management can shift some of the recreational effort away from inshore species and areas where interaction with canary rockfish are common.

Duration of the EFP: One year (2010). This is a extension of our previous request for the recreational EFP the Council originally approved in 2007.

Number of vessels: Approximately 10 Charter Passenger Fishing Vessels (CPFVs).

Participants in the EFP:
Capt. Randy Thornton, *Telstar*, Noyo Harbor, Fort Bragg (707) 964-8770
Capt. Bob Ingles, *Queen of Hearts*, Half Moon Bay (650) 728-3377
Capt. Dennis Baxter, *New Captain Pete*, Half Moon Bay (650) 726-6224
Capt. Steve Moore, *Pacific Horizon* Morro Bay (805) 595-4104
Capt. Tom Mattusch, *Hulicat*, Half Moon Bay (650) 726-2926

Funding: This EFP will be self-funding with individual anglers paying for an offshore rockfish trip. Grant funding is available for data analysis and observer coverage. The RFA's 501c3 account, the Fisheries Conservation Trust, received a grant for $5,000 from the Mendocino County Fish & Game Commission for the data analysis for this project, and additional funds from local groups are available if needed.

Description of Target species: Chilipepper rockfish and other species of groundfish. This species can be targeted in midwater and is vastly underutilized (1000+ mt under OY).

Harvest Control: Under current regulations, anglers are limited to two hooks per line, with a bag limit of ten rockfish and groundfish as defined by Title 14, Section 1.91. We are requesting to use up to five hooks. For a load of 15 anglers, a vessel would retain 150 fish per trip, with full observer coverage at-sea. CPFV logbooks will record species landed. While recent catch data is unavailable for the recreational fishery in deep water, a review of mortality impacts from the commercial sablefish fishery indicate zero bycatch of cowcod, zero bycatch of widow rockfish, and a total projected bycatch of canary rockfish for 2007 in the combined fixed gear (sablefish and non-sablefish) of 1.1 metric tons. In November 2007, the Pacific Fishery Management Council approved the following bycatch caps for this EFP:

Bocaccio	Canary	Cowcod	Darkblotched	Widow	Yelloweye
2.7 mt	0.2 mt	50 lbs	0.1 mt (150 lbs)	3 mt	50 lbs

Additionally, we request the Council approve a cap of 3 mt for slope rockfish (in aggregate) for 2010.

Enforcement: We propose to retain all rockfish as part of each angler's bag limit of ten fish. This EFP will require an exemption from sub-bag limits (on bocaccio, for example) and size limits. The EFP's bycatch caps provide total catch limits for the entire EFP. Each angler would be provided a letter reflecting the date of the trip, the vessel participating, and the angler's name, reflecting their participation under the terms of the EFP. If questioned by a warden, the angler can show this document to the warden to indicate his or her participation in the EFP. A sample draft letter:

This letter certifies that on ______________ (today's date), __________________________ (name of angler), under CDFG recreational fishing license # ______________________ participated in a Federal Exempted Fishing Permit ______________________ (vessels EFP ID number) titled "Recreational Rockfish Catch Composition EFP."

This EFP is limited by cumulative bycatch caps and exempts the angler from sub-bag limits on bocaccio and other species, and is exempt under federal rules from seasonal closures on groundfish, certain terminal gear restrictions and prohibitions on retention of overfished species.

This letter is to inform state and federal enforcement personnel that the EFP has been approved by the Pacific Fisheries Management Council and the National Marine Fisheries Service.

Enforcement personnel can verify the angler's participation in the EFP by contacting the CPFV Captain:
(name of vessel)
(Contact info)
.

Proposed Data Collection and Analysis Methodology: Data collection will be consistent with the existing CRFS data collection and analysis system. Expansion of the data modeling can provide an estimate of potential catches for both private boaters and the CPFV fleet, should the Council decide at a future time it would consider providing more fishing opportunity to the entire recreational sector. Onboard observers will count and identify the fish, with 100% retention to guarantee accurate identification and age class data. Type of terminal tackle (weights, lures, hook sizes) would be recorded for comparison purposes and bycatch reduction data. Vessels will record other information such as location, depth and water temperatures. By fishing different depth strata throughout an entire year, variations by depth and month can be identified. The goal of the data collection format and data analysis will be to gather enough information to project the outcomes for an expansion of the fishery throughout the recreational sector.

Participation: Commercial Passenger Fishing Vessels with a clean logbook reporting record will be chosen from various ports such as Bodega Bay, Half Moon Bay, San Francisco Bay Area and Fort Bragg where the slope is reachable on a day trip.

Time, Place and Amount of Gear Used: This EFP would be conducted during fair weather days during the entire year of 2010, with anglers limited to one rod apiece, two hooks per line, with a 10 pound weight limit. All fishing would occur seaward of the non-trawl Rockfish Conservation Area between Pt. Conception and the 40-10 management line.

The gear to be used will be designed to locate hooking gear in a midwater location to avoid bottom dwelling species. The proposed gear for this fishery would employ the use of a long leader between sinker and hooks. The purpose would be to elevate the hooking gear above the bottom a sufficient distance to avoid and or minimize contact with species of concern. Leader lengths of 15, 30 and 40 feet may be tested. A float will be affixed to the upper end of the leader. The purpose of this float is to prevent hooking gear from descending below the upper level of the leader. The float must have sufficient buoyancy to support all hooking gear and line above equivalent to leader length. Current tests show that a buoyancy of 2.25 ounces would be sufficient. Floats must be constructed of solid material. They can be either wood or closed cell high density foam. No hollow floats allowed. Maximum number of hooks is to conform to current regulation (2 hooks in California). Small plastic worms and flies will be used. Weighted hooks, bait and large lures will be prohibited.

Science Advisor:
Doyle Hanan, PhD
Hanan & Associates

POB 8914
Rancho Santa Fe CA 92067
(858) 832-1159

Data Collection and Review: Data will be collected by on-board observers, hired through the Pacific States Marine Fisheries Commission (PSMFC), and submitted to the data analyst for quality checks following each observed trip. Data quality checks will include checking all forms for completeness, appropriate species composition (observers will be expected to document each new species encountered to confirm species identification; documentation will be consistent with NMFS observer programs' protocols for species identification form submission), proper ordering of observed sets and anglers, proper data coding, and other logical checks that may be made by the analyst. All attempts will be made to overcome shortcomings in data collection through consultation with the observer. Feedback will be given after every submission to ensure complete and accurate data collection on subsequent trips. Catch of any overfished species for which the Council has recommended bycatch caps will initiate immediate notification of NMFS of that event.

Data Entry: Original hardcopies will be retained by the data analyst with copies sent to Connie Ryan of the California Department of Fish & Game for departmental records, and to PSMFC for data entry. PSMFC will conduct subsequent data quality checks required for entry of data and other checks built into their entry system. Their computer will check species ranges, reasonable lengths/weights and various cross checks on the forms for totals, anglers, limits etc. Entry will be complete no later than six business days following receipt of forms by PSMFC. Files will then be sent to the data analyst with each individual caught (including all data elements linked to that individual) as well as separate files of catch data aggregated by set.

Data Analysis and Reporting: On a monthly basis, the data analyst will stratify and report catch for the overall fishery and for each management region included in the EFP (Northern, North Central, Monterey South-Central and Morro Bay South-Central). Monthly reports will be compiled and submitted to NMFS within two weeks following the end of each calendar month and will include catch statistics for the most recent month and year to date totals. Catch will additionally be separated for analysis by disposition (retained vs. individuals that would normally be discarded) with separate CPUE (CPAD and/or CPAH) calculations made for each species of each disposition. Catch will be further stratified by terminal tackle, depth, specific lat/long locations and any other variables determined to provide significant differences through Ward's multivariate cluster analysis of catch rates for individual species. Species encountered will also be plotted against number of trips to produce a simple discovery curve for the EFP.

Expansion estimates will be reported twice for the EFP, once with data collected prior to traditional rockfish season openings and again following conclusion of the EFP period (year end or caps met) in the final report evaluating the EFP. Initial expansion estimates will consider only the effects of opening the fishery during winter months in which anticipated effort will not offset effort from the traditional fishery. Estimates of participation will be calculated using surveys of EFP trip participants and of anglers in the study area intercepted by the samplers. To supplement these tools, upon the openings of rockfish seasons, detailed survey forms will be distributed to recreational anglers found to be targeting rockfish during angler intercept surveys. These surveys will provide detailed information on the current understanding of the fishery (effort and catch statistics, distances traveled, species composition and length frequencies of various species) to give the survey participant an accurate picture of the fishery. Participants will then be asked to estimate the numbers of trips they would expect to make during the season closed for traditional rockfishing (as above) as well as how many nearshore directed trips they would expect to be offset by participation in a deepwater chilipepper fishery. The levels of response will be combined with rockfish catch and effort data from the history of CRFS (since January 2004) to determine expansion factors for collected data.

Final reporting will summarize the catch totals for the duration of the EFP with data stratification as indicated for the monthly reports. Final reporting on this EFP will include the expanded estimates for the complete opening of this fishery to the recreational community as well as alternative expansions such as opening the fishery coincident with the traditional rockfish seasons, expansion only to the CPFV fleet, and any other expansions potentially indicated by the data (specific management/geographic regions, depths, terminal tackle configurations, etc.) to provide the Pacific Fisheries Management Council with a range of options for permitting of the fishery.

Signature of Applicant:

Jim Martin

Jim Martin, RFA

Roger Thomas

Roger Thomas, GGFA

Agenda Item E.8.a
Attachment 6
June 2009

To:
Bob Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115-0070
(206) 526-6150
bob.lohn@noaa.gov

cc: Frank Lockhart
frank.lockhart@noaa.gov

cc: Gretchen Arentzen
gretchen.arentzen@noaa.gov
(206) 526-6147

Subject: RFA/GGFA Exempted Fishery Permit Report for 2008 Trips
Title: Recreational Rockfish Catch Composition Seaward of the Rockfish Conservation Area
Date: Wednesday, May 27, 2009
Applicants:

Recreational Fishing Alliance
Contact: Jim Martin, West Coast Regional Director
P.O. Box 2420, Fort Bragg, CA 95437
(707) 357-3422

Golden Gate Fishermen's Association
Contact: Roger Thomas, President
P.O. Box 40
Sausalito CA 94966
(415) 760-9362

Dear Bob, Frank and Gretchen,

This letter is intended to fulfill the requirement of our Chilipepper rockfish EFP to report on our progress since the agency's approval in August of 2008.

We have conducted three EFP trips in 2008, two aboard the Queen of Hearts out of Half Moon Bay and one on the *Telstar* out of Fort Bragg.

The first trip was conducted on the *Telstar* and produced no fish, one Humboldt squid, and no bycatch. The anglers aboard had a good attitude and understood that this was an experimental trip. However, with no landings of the target species it was difficult for the Telstar's captain, Randy Thornton, to attract interest in more EFP trips. He did discover the Humboldt squid in the area we were fishing and had a number of successful trips later that year and into 2009.

Bob Ingles was more successful and landed a few chilipepper on his first trip. Here is a picture of one of the successful anglers with his fish:

We would like to request a permit for the 2009-2010 season that runs from April through April. Chilipepper move into the deeper water over the winter months, and we feel we will be more successful in attracting anglers if there is a better chance of catching fish.

We received the permit in August of 2008 and before we really got started the permit expired in December.

We've had a hard time marketing the trips when they cost more than the average rockfish trip due to the observer costs. After the initial enthusiasm and the novelty of the trips wears off, unless we can deliver a satisfying fishing experience it will be very difficult to gather meaningful data for future management action. Moving the EFP to an April 2008 to April 2010 timeframe would allow us to fish throughout the winter months when we feel we will be more successful.

On the positive side, we've experience zero bycatch on the trips. The gear we are using was easier to use than we had anticipated. There were minimal tangles, and I had no problem reaching the bottom with 50-pound test braided line and a twelve ounce weight. The floats we used worked as expected.

We request that the Council consider some modifications to the EFP, including the ability to fish outside of 100 fathoms, and allowing the EFP to run a full calendar year. We would like to get more trips under our belt and prove out the idea that we will have no bycatch on these trips.

Thanks for the opportunity to work with your staff on this EFP. Contact me with any questions you might have.

Sincerely,

Jim Martin

Summary Table

Total Anglers	Trips	Chilipepper	Humboldt Squid
45	3	17	3

EXEMPTED FISHING PERMIT--SHELF ROCKFISH

Request for an exempted fishing permit (EFP)

Project Title: Evaluation of modified vertical hook and line gear to avoid depressed rockfish species while fishing in certain parts of the Rockfish Conservation Area (RCA).

Date of Application: May 27, 2009

Applicant: San Francisco Fishermen's Cooperative
535 Ramsell St.
San Francisco, CA 94132

Phone: (415) 585-5711
Email: lcollins@sfcrabboat.com

Scientist:
Lisa Etherington PH.D
Research Coordinator
Cordell Bank National
Marine Sanctuary

Phone: (415) 663-1443
Email:lisa.etherington@
noaa.gov

Purpose and Goals

Background:
The fishing grounds which have been historically accessible to the members of the San Francisco Fishermen's Cooperative are geographically identified as "shelf', and because of this, the gear traditionally used by the members isn't useful for catching fish on the "slope" (depths greater than 100 fathoms). The creation of the non-trawl rockfish conservation area (RCA) over the shelf (between 30 and 150 fathoms) has pushed fishermen outside their traditional fishing grounds into deeper waters where fishing is no longer feasible with their current gear. When the RCAs were created to protect depressed rockfish stocks, the use of entire gear types were prohibited from certain areas. Even though the gear itself is not innovative, changing the way that gear is deployed can make a large difference in the species that are targeted and landed and can greatly reduce or eliminate bycatch of species of concern. If the proposed modified vertical hook and line fishing technique is successful, this exempted fishery permit (EFP) would allow commercial fishermen to access historical fishing grounds targeting healthy rockfish stocks and would promote ecologically and economically sustainable fisheries in Central California.

The objective of the research for Exempted Fishery Permit is:
1. To determine if fishing technique and species-selective vertical hook-and-line gear is effective in avoiding species of concern and whether this gear type is compatible with goals of the RCAs and could allow fishing that would target healthy rockfish stocks within this area;
2. To determine areas within traditional fishing grounds that have the lowest by-catch densities of species of concern in the portion of the RCA chosen for the study; and
3. To determine if current observer coverage is warranted. Does this study demonstrate that this fishery has little by-catch?

Methods:
The proposed fishing activities and research under the exempted fishing permit would involve fishing within the current rockfish conservation areas (RCA) within the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries between latitudes 37°40' N and 38°05' N, at depths between 30 and 100 fathoms. Staff from Cordell Bank National Marine Sanctuary will provide information from submersible observations and modeling results to identify shallow reef areas with high densities of hydrocoral. Sampling will be conducted to minimize impacts to this habitat. The sampling area currently lies completely within the non-trawl RCA and also includes the Cordell Bank RCA. Fishing under the EFP would involve using vertical hook and line gear attached to the vessel as the vessel drifts (see figure). The vertical lines would be weighted, but the weights would be kept well off the bottom and the hooks would not make contact with the bottom. There will be either 4 fathoms or 8 fathoms of "breakaway" between the bottom hook and the weight. An enforcement officer would be able to see that this was the case by asking the fisherman to bring his line to the surface. The fish are brought to the surface after the "drift" is complete. This gear can use fishing pole, jigging machine or hydraulic gurdy to land the fish. This fishing gear type is traditional and will utilize existing gear and equipment; however, the manner in which the gear is deployed would be altered to target waters farther off the bottom, where by-catch of overfished species would be minimized.

The San Francisco Fisherman's Cooperative has a proposal before the Ocean Protection Council (OPC) for funding to help pursue this EFP (see attached) and to form a Community Fishing Association. Outlined in this proposal are methods to develop a comprehensive research plan that would involve consultation with science and technical advisors and compliance with Pacific Fishery Management Council and NOAA Fisheries rules. The research plan will include a spatial fishing design to ensure adequate coverage across different habitat types. It will also develop methods for standardized data collection and statistical analysis of catch data.

The EFP that we are requesting would allow up to 10 boats (or another appropriate number as determined by the council). Each boat would be limited to a bi-monthly landing as established for 2009. To ensure that this experimental fishery has a minimal impact on depressed rockfish species, we will use GMT-determined caps on the fishery for the following:

Widow rockfish: *GMT <u>determined</u>* [1,440 lb *<u>(0.7 mt)</u>* annual cap calculated as a maximum 3% by weight of expected chilipepper take]

Bocaccio: *GMT <u>determined</u>* [7,200 lb *<u>(3.3 mt)</u>* annual cap calculated as a maximum 15% by weight of expected chilipepper take]

Canary: *GMT <u>determined</u>* [*20 <u>fish</u>* annual cap]

Cowcod: *GMT <u>determined</u>* annual cap [*at least 3 fish*]

Yelloweye: *GMT <u>determined</u>* annual cap [*at least 3 fish*]

Darkblotched: *GMT <u>determined</u>* [*<u>50 lb</u>* bimonthly per vessel cap, *<u>0.4mt</u>* annual cap for all vessels]

All rockfish species caught under this EFP will be retained and sold. We anticipate that fishing as described in this EFP will not be constrained by these caps. We would consider vessel-based caps.

Under the proposed EFP, each boat would fish 100 hooks, 50 on the bow and 50 on the stern. Drifts will consist of either fishing long-bottom vertical lines (bottom-most hook 4 fathoms from bottom weight) or short-bottom vertical lines (bottom-most hook 8 fathoms from bottom weight). To equalize each boat's opportunity to harvest fish, the ability of each boat to fish with both long-bottom and short-bottom ganions will be incorporated into the sampling plan.

This EFP will incorporate a standardized data collection and reporting format. Under the terms of this EFP, there will be 100% observer coverage. For each drift, the observer will record data on the drift location (start and end), depth, gear characteristics, number of hooks, height of bottom hook above weight, and size and species of each fish landed. This will further the second objective which is to explore areas within the RCA that are relatively free of by-catch species (or Groundfish Fishing Areas).

The observer will ensure that by-catch caps are not exceeded. Captains will keep records of catch by drift for all drifts under this EFP. As it is possible that the catch and bycatch will change seasonally, we expect participants to fish year round, in each month that the fishery is permitted.

The applicant and the scientist will be responsible for data analysis. Statistical analyses will be conducted of catch and bycatch of all species by drift, day, trip and month. Catch rates will be expressed as catch per hook, per drift, per day, and per trip. Value of the catch will be recorded following sale of the catch. The final report will provide an estimate of fishing effort (both spatially and temporally) and total catch.

In order to establish a baseline (unless NMFS or CDF&G believes it is unnecessary) each boat will plan 16 drifts in each day of fishing and on one of the drifts (established randomly at the dock, e.g. drift number 7) the boat will fish traditionally (i.e. hooks all the way to the bottom weight.) This would help determine whether the avoidance of certain species is because of the gear or because of the area.

Boats participating in this EFP fishery will be chosen on their ability to accommodate an observer and their willingness to maintain detailed accurate catch data. All trips will be dedicated to the project. The duration of this EFP is for 3 years with changes based on the first year's data employed in year two and the same for year three. Since no trained observers are available in January, the EFP year should start in June.

Equipment needed:
Each boat will deploy two 50 hook lines. This will require:

1. Hooks
2. Shrimp flies
3. Swivels
4. Monofilament
5. Breakaway line
6. 10 pound weight

Total cost approximately $100 per line.

FIG. 1 DIAGRAM

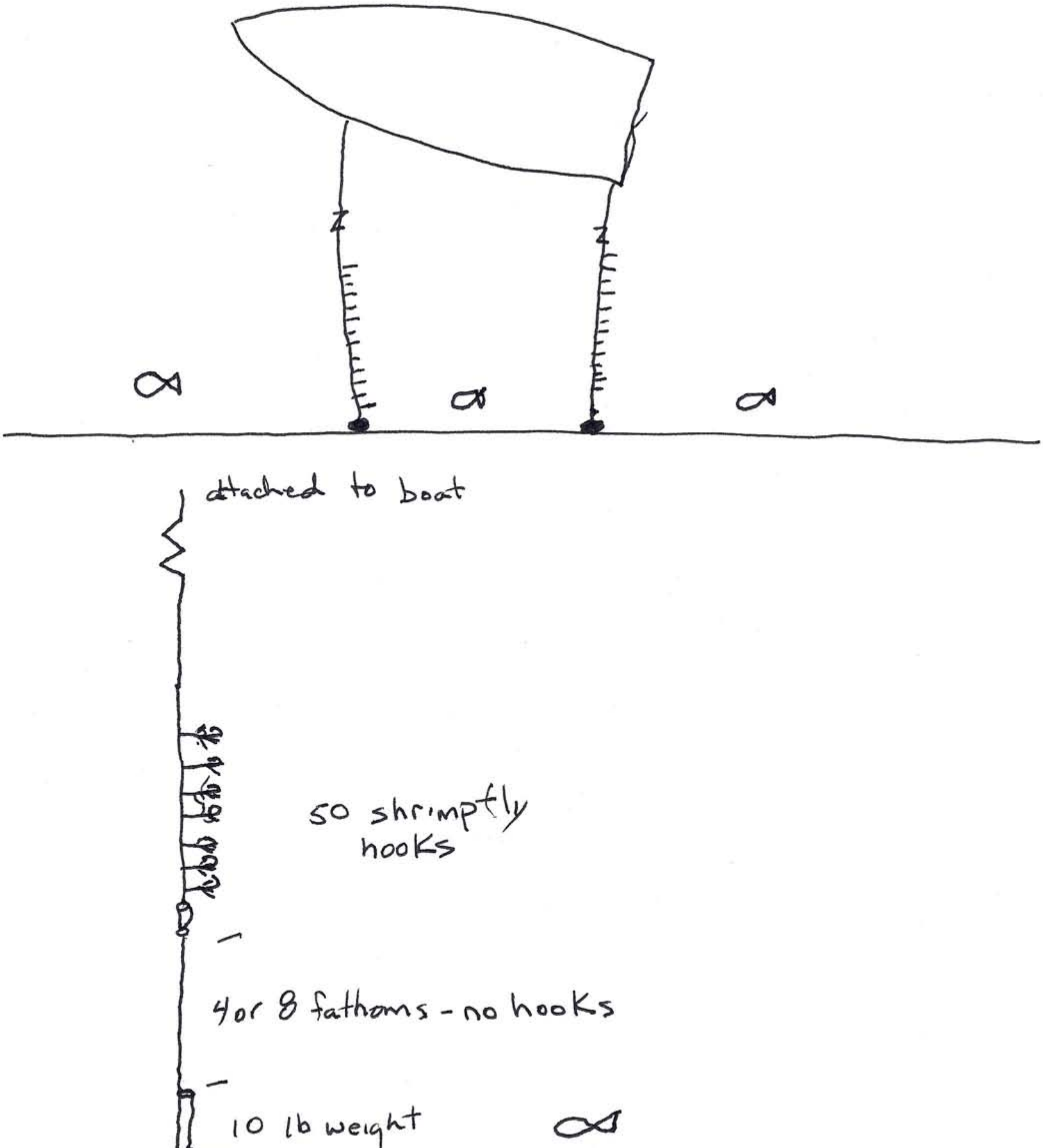
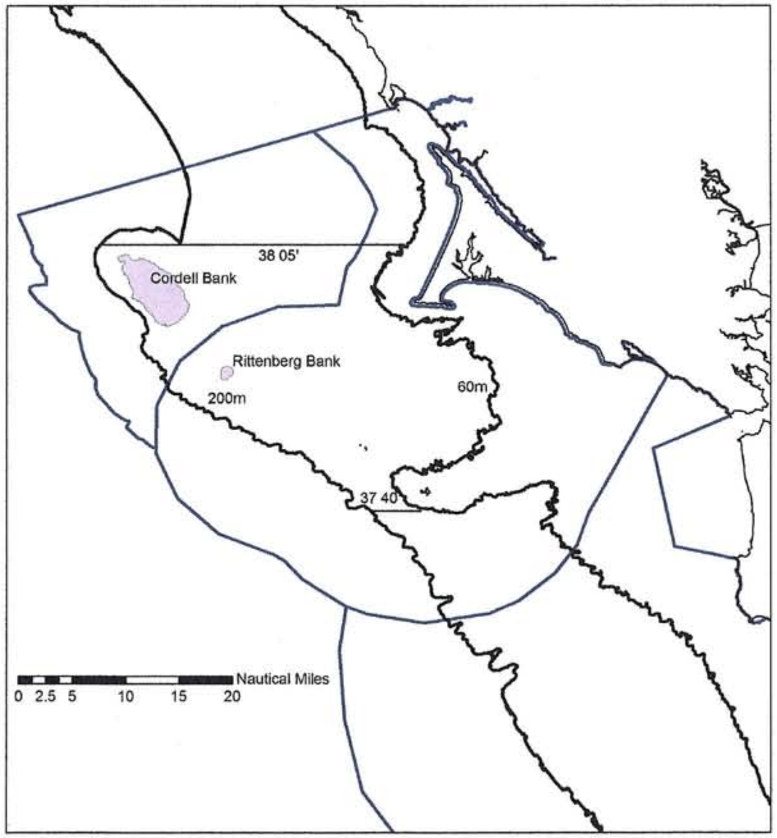


FIG. 2 AREA OF EFP



Application to the Pacific Fishery Management Council for an Exempted Fishing Permit to collect biological information from yelloweye rockfish encountered in the Oregon sport charter fishery.

Date of Application
6/18/2009

Applicants
Oregon Department of Fish and Wildlife
Marine Resources Program
2040 SE Marine Science Drive
Newport, OR 97365

Contact: Troy Buell
541-867-0300 x225

Contact: Kelly Ames
541-867-0300 x291

Statement of purpose and goals
The purpose of this EFP is to improve the quantitative assessment of U.S. west coast yelloweye rockfish stocks by collecting biological information such as length, weight, age, sex, and maturity from yelloweye rockfish encountered in Oregon's recreational groundfish fishery. This will be achieved by allowing a select group of Oregon charter vessels to retain a limited number of yelloweye rockfish while conducting groundfish trips under the current regulatory structure. The retained yelloweye rockfish will be surrendered to an ODFW biologist at the point of landing for biological sampling. Yelloweye rockfish will be donated to food share programs after data collection whenever possible.

If the project is successful, data collections maybe expanded to include samples from the commercial nearshore fishery.

Justification for EFP
Bycatch of overfished yelloweye rockfish currently constrains utilization of healthy groundfish stocks in many U.S. west coast fisheries, including recreational, commercial fixed gear, and shelf trawl fisheries. As yelloweye rockfish catch limits are projected to decrease over the next several years to meet rebuilding goals, additional constraints in these and other fisheries are anticipated. Retention of yelloweye rockfish has been prohibited in most fisheries since 2004, which has extremely limited the catch-at-age data available for this important species. Considering the lack of any fishery independent survey that is adequate for indexing the abundance or describing the age distribution of this species, it may be very difficult to detect stock rebuilding if and when it does occur. Novel methods of data collection are needed to address the wholesale lack of recent data informing age structured stock assessments of yelloweye rockfish. While we recognize that the data collected under this EFP will represent only part of the geographic and depth

range of the species, we will attempt to design this project to adequately describe the age distribution of yelloweye rockfish encountered in Oregon's recreational groundfish fishery. Consultations with NMFS stock assessment scientists familiar with yelloweye rockfish indicated that even limited catch-at-age data may be valuable for detecting population trends considering the current lack of data.

Broader significance and fleetwide applicability

Fleetwide application may be unnecessary if precise and unbiased information can be obtained using a select group of vessels. However, this data collection method could be expanded to other States and fishing fleets if the information proves valuable in assessing the status of yelloweye rockfish.

Number of vessels covered under this EFP

No more than 15 vessels would be invited to participate under this EFP in the first year. This number of vessels was selected to allow participation of 2-3 vessels in each major recreational fishing port or port group on the Oregon coast, with the goal of providing geographic coverage of the major recreational groundfish fishing grounds inside of the 40 fathom regulatory closure.

Description of species and amounts

Vessels fishing under this EFP will target black rockfish and lingcod, and are likely to have incidental catches of blue, canary, china, copper, quillback, yellowtail, vermilion, and other nearshore rockfishes, cabezon, and kelp greenling. Catch per angler statistics from Oregon charter vessel observer data indicate 125-150 trips will be needed to achieve the sampling goal of 100 yelloweye. Since vessels fishing under this EFP will be subject to all concurrent regulations except for the prohibition of retention of yelloweye rockfish, catches of all other species will be estimated by standard creel surveys and counted against the appropriate state or federal harvest caps. Projected catches of these species are provided for reference (Table 1). Because yelloweye rockfish landed under this EFP would presumably have been encountered and released in the absence of the EFP, we estimate the EFP impacts to yelloweye rockfish as the additional mortality resulting from retaining (100% mortality rate) rather than releasing (64% mortality rate) the fish and use this as the overfished species bycatch cap.

Table 1. Estimated catch and increased mortality over status quo by species for 150 EFP trips.

Species	Est. catch (mt)	Est. increased mortality (mt)
Black rockfish	8.30	0.00
Blue rockfish	1.03	0.00
Cabezon	0.57	0.00
Canary rockfish	0.27	0.00
China rockfish	0.11	0.00
Copper rockfish	0.15	0.00
Kelp Greenling	0.13	0.00
Lingcod	3.45	0.00
Quillback rockfish	0.18	0.00
Vermilion rockfish	0.30	0.00

Species	Est. catch (mt)	Est. increased mortality (mt)
Widow rockfish	0.02	0.00
Yelloweye rockfish	**0.18**	**0.06**
Yellowtail rockfish	0.56	0.00

Duration, location, and gear

Duration

The EFP will take place between April 1 and September 30, 2010. This time frame includes the vast majority of recreational fishing activity, and is commensurate with the implementation of the annual recreational groundfish fishery closure in waters deeper than 40 fathoms. If the approach is found to be successful for the purpose of informing assessments of the status of yelloweye rockfish, we would likely seek renewal until such time as retention is allowed in the fishery and catch-at-age data can be obtained through standard creel surveys.

Location

The EFP will take place in ocean waters off the coast of Oregon out to the 40 fathom regulatory closure line.

Gear

No modification of fishing gear is contemplated under this EFP. Captains and crew will be instructed to use the same gear as they would for any other similar fishing trip.

Criteria for vessel selection

Vessels will be hand picked by applicants, focusing on vessels and captains with a history of cooperation with existing sampling programs, substantial historical participation in the sport groundfish fishery, and no groundfish prohibited species related violations within the past 5 years. Vessels will be selected to provide the greatest geographic coverage possible by selecting 2 or 3 vessels from each major recreational fishing port or port group on the Oregon coast. If more than the desired number of vessels from a single port qualifies under these criteria, applicants will use their personal knowledge of the fleet and operators to make vessel selections most likely to result in a successful project.

Monitoring

Vessels fishing under this EFP will be observed at the point of landing by an ODFW sampler dedicated to this project. Vessels will notify the sampler of their estimated time and location of landing when they have yelloweye rockfish on-board, and the sampler will make every effort to arrive at that location prior to the vessel. Upon arrival of the vessel, all yelloweye rockfish will be immediately surrendered in a whole and intact condition to the sampler. In the event that the sampler cannot arrive at the point of landing prior to the vessel, the EFP will require that all yelloweye rockfish be held on-board the vessel until such time as the fish can be surrendered directly to appropriate ODFW or Oregon State Police (OSP) personnel. If yelloweye rockfish are removed from an EFP vessel without ODFW or OSP personnel present, the responsible party will be considered in violation of the EFP and subject to all applicable laws governing prohibited species catches. Catch of all other species will be accounted for under ODFW's standard catch accounting programs.

Data collection and analysis
Biological data such as length, weight, age, sex, and maturity status will be collected by the dedicated ODFW sampler after transporting specimens to the Newport lab. For each retained yelloweye rockfish, captains of participating vessels will provide a unique mark and record the depth and area of capture. Initial data analysis will be conducted by applicants and will consist of point estimates with 95% CI of the proportion of recreational catch in each age class using an area and/or depth weighted approach, and an assessment of how well the selected vessels represent the spatial and temporal characteristics of the recreational fleet as a whole. Final analysis and evaluation of the project will occur in the context of the next yelloweye rockfish stock assessment and should include participation and feedback from the stock assessment team. The project will be considered successful if the stock assessment team finds the data useful in their analysis of stock status.

Report preparation
An initial report authored by the applicants will be drafted following the completion of sampling during the 2010 fishing season. This report will focus on the success of the EFP in meeting the goal of collecting biological samples from 100 yelloweye rockfish from Oregon's sport groundfish fishery, and provide summary statistics including sample sizes for all data types, age and size distribution of the sample, and estimated age and size distribution of yelloweye rockfish encountered in the sport groundfish fishery. We expect the initial report could be completed by the June, 2011 Council meeting. A secondary reporting mechanism will be the first yelloweye stock assessment following the EFP, in which we expect the utility of this data for assessing stock status to be reported.

Signatures

Kelly Ames

Troy Buell Kelly Ames

GROUNDFISH ADVISORY SUBPANEL REPORT ON PRELIMINARY REVIEW OF EXEMPTED FISHING PERMITS (EFPS) FOR 2010

The Groundfish Advisory Subpanel (GAP) reviewed six requests for exempted fishing permits (EFPs). Two of the EFPs are new and four are continuations of previous EFPs. At this time the GAP recommends that all six EFPs go forward, but wishes to offer the following comments on each proposal.

1. Fosmark Chilipepper selective gear

This request is a continuation of the 2008 EFP. There are two differences in this application from the original. Mr. Fosmark would like to change the period of the EFP from January through December to April through April in order to enable him to operate the EFP more fully taking into account timing of permit issuance and fish presence. It is the GAP's understanding that EFPs can be issued for a one year period that does not necessarily have to be a calendar year.

The second change has to do with the required observer coverage. Mr. Fosmark has engaged a volunteer who he would like trained as an observer for his EFP. The GAP is concerned about real and perceived bias for volunteer observers, and is also concerned about the precedent that this could set. Unpaid observers may erode the credibility of the EFP process. For this reason the GAP would decline this part of the request while moving the balance of this proposal forward for consideration.

2. The Nature Conservancy

This is a request to extend an EFP for a third year of operation. Within the GAP a majority felt that this EFP could continue to provide valuable information regarding both the structure and functioning of a community fishing association (CFA) including reducing monitoring costs through pooling of observers and electronic monitoring, while others felt that the EFP has gone beyond the learning and information stage and is now merely a request for continued fishing operations. There was interest in having The Nature Conservancy put electronic monitoring on their trawl vessel to study the validity of that as a potential viable option for the trawl individual fishing quota (IFQ) program.

3. Oregon Recreational Yellowtail Rockfish

This EFP is a continuation of a previous EFP that was approved. However, due to the delay in National Marine Fisheries Service (NMFS) permitting and other unavoidable circumstances, the EFP was not able to be fully conducted during the time frame specified. A second year of this EFP will be starting shortly after this meeting. The proponents would like to consider this request for a third year of operations as a placeholder in the event that conclusive results are not reached through the balance of this calendar year. The GAP feels there is significant interest among the Oregon recreational group to move this request forward. In addition, the GAP notes that one of the goals of the EFP is to feed into the management context so it is likely that 2 or more years of data will be needed.

4. Recreational Rockfish Seaward of the RCA

This request is a continuation of the previous Recreational Fishing Alliance EFP with a few changes. The original purpose of this EFP was to establish a commercial passenger fishing vessel (CPFV) Slope rockfish fishery seaward of the rockfish conservation area (RCA) with emphasis on chilipepper rockfish using restricted hook and line gear to minimize bycatch of overfished species. Due to permitting delays and the lack of winter customers, very little opportunity was available to do this experiment.
This year one change to the EFP has been proposed. The applicants request that the period of the EFP would run from April 2009 to April 2010. They believe that more customers may be available during the winter months. As noted above, the GAP believes this change in timeline is in compliance with EFP rules.

The GAP highlighted that there has been a lack of interest in this EFP as it now stands. One reason for this may be the requirement to use only 2 hooks. The applicants request up to 5 hooks to allow full utilization of the 10 fish bag limit. The GAP notes that at present there is some inconsistency in the request for 5 hooks and that the applicants should clarify that in the application package. The applicants also request the ability to retain all fish caught since they are fully observed. The GAP did not see any concerns with that part of the request.

5. San Francisco Fishermen's Cooperative

This is a new request to fish vertical hook and line gear within the RCA and the Cordell Bank sub area RCA. The request is to use up to 10 boats over a 3 year time span.
One of the purposes of the EFP would be to determine the possibility of creating or modifying fisheries to fit within management guidelines. Some on the GAP were concerned that this is too many boats over too long of a time span for an EFP. The assumptions to be tested in the EFP could be verified in short order and the number of boats and duration of the EFP were thought by some to be excessive.

Serious concern was also raised that establishing a baseline as proposed would yield so many overfished species that it would shut down the EFP almost before it started. Finally the GAP noted that Cordell Bank is a canary hotspot and that the EFP might work better if it was amended to fish only south of 37°50' N. latitude.

The GAP would support going forward at this time to allow some revision of the proposal that would meet the concerns expressed.

6. Oregon Department of Fish and Wildlife

This is a new proposal sponsored by the Oregon Department of Fish and Wildlife for an EFP to collect biological information on yelloweye rockfish in the Oregon recreational fishery.

Although this would mean additional yelloweye to be accounted for in the scorecard, the GAP feels research of this overfished species is necessary and could be helpful in the continued rebuilding of the species. Prohibited retention of yelloweye has made it difficult to obtain the catch-at-age data sampling needed for updated science and assessments. This EFP would cover the Oregon coast out to 40 fathoms and would run from April through September 2010. The GAP recommends moving this EFP forward for consideration.

Some California GAP members wondered whether they could create a similar EFP to get updated scientific information on cowcod.

General comments

While the GAP recommends moving all six EFPs forward for further review at this time, we wish to offer the following general comments. Since all of the EFPs contain various caps for non-targeted overfished species, how these add up in the scorecard and affect primary target fisheries is a major consideration. For this reason EFPs for specific research should be given priority over experimental fisheries.

The GAP would hope that if an EFP is approved that they would start on the appropriate date and reach timely conclusions so that others have the opportunity to bring forth new requests. The limited amount of bycatch species that make EFPs necessary could preclude new proposals.

PFMC
06/14/09

GROUNDFISH MANAGEMENT TEAM REPORT ON PRELIMINARY REVIEW OF EXEMPTED FISHING PERMITS (EFPS) FOR 2010

The Groundfish Management Team (GMT) reviewed the technical merit of the six exempted fishing permit (EFP) applications relative to the evaluation criteria in the Council Operating Procedure (COP) on EFPs.

The GMT only reviewed the technical merits of the EFPs and notes that the Council will likely need to make their final decision based partially on the availability of overfished species relative to the 2010 harvest specifications. A table of requested impacts by species and EFP is included for reference; however no species specific discussion on appropriate EFP bycatch limits is included under this agenda item (Table 1).

Four of the proposed EFP applications (Agenda Item E.8.a, Attachements 1, 2, 4, & 5) are to renew EFPs that were approved in September 2008. The applications in attachments 2 and 4 are, for the most part, fundamentally unchanged from what was adopted in September 2008. The applications in attachments 1 and 5 request their EFPs be effective from April 1 to March 30, rather than a calendar year. The GMT discussed the mis-match between the proposed EFP time frame and the standard calendar year for groundfish management and tracking overfished species optimum yields (OYs). The GMT did not feel that altering the start date of these proposals would be a major issue because if a species cap had to be changed based on changes in OYs, it would not fundamentally alter their proposals. The GMT suggests that the applicants could provide an interim report to the Council at the November meeting, at which time any changes to the overfished species caps could be made based upon preliminary adoption of preferred overfished species OYs.

With the additional interim report for EFPs that transcend calendar years, and for the reasons outlined in previous GMT statements (June 2008, Agenda Item F.3.c, Supplemental GMT Statement; September 2008, Agenda Item I.6.c, Supplemental GMT Statement), t**he GMT finds technical merit in the renewal applications (1, 2, 4, & 5) and recommends that the Council forward them for public comment.**

There are two new applications for 2010. One of the new EFP applications (Agenda Item E.8.a., Attachments 7) is intended to increase access to underutilized rockfish species in the commercial shelf fixed-gear fishery. The second (Agenda Item E.8.a., Attachment 8) is intended to collect data on yelloweye rockfish encountered in the Oregon recreational charter fishery. Technical merits for these applications are discussed in more detail below.

San Francisco Bay Fisherman's Cooperative Shelf Rockfish EFP, Larry Collins (Agenda Item E.8.a, Attachment 7). This application proposes to target shelf rockfish stocks in the commercial fishery using modified vertical hook and line gear while fishing inside the RCA near the Cordell Banks off California.

A primary requirement of EFPs is the evaluation of fishing gear or management measures that can be transferred into regulation and applied fleetwide. EFPs that rely upon operator experience, skill or ability that cannot be harnessed through a regulation fail to meet this requirement, since the resulting bycatch rates may differ from those estimated in the EFP. Thus, the GMT recommended that the long leader gear employed in this proposal incorporate a means of keeping the scope of line deployed from allowing gear to contact the bottom by adding a float above the top hook.

The GMT also suggests that the applicants refine the EFP to include: (1) a very detailed description of the fishing technique or new gear type that, if successful, could be transferred into regulation and applied fleetwide; (2) a detailed description of the data analysis and who will perform it; (3) a detailed description of the sample design to ensure random and statistically valid data; and (4) a list of proposed target species and caps. **The GMT finds technical merit in this application and recommends the Council forward it for public comment,** with the understanding that the aforementioned recommendations should be integrated into the proposal prior to final action at the November Council Meeting.

Oregon Department of Fish and Wildlife Yelloweye Rockfish Data Collection EFP, Troy Buell (Agenda Item E.8.a., Attachment 8). This application proposes to allow select recreational charter vessels to retain incidentally caught nearshore yelloweye rockfish for biological samples to be used by future stock assessments on otherwise legal fishing trips. Basic life history information such as sex-specific age, maturity and length data, is valuable to stock assessment authors, especially for species such as yelloweye rockfish, for which little data is available to inform the stock assessment.

This EFP is somewhat atypical of those that the Council has considered in recent years; however the purpose is consistent with EFP regulations that define them as a mechanism to allow collection of limited experimental data via a mechanism that would otherwise be prohibited. ODFW was also advised by NOAA General Council and the NWR staff that this project should operate under an EFP since there will not be scientific staff on board the vessels during trips landing yelloweye rockfish.

Under the Council Operating Procedures "EFP proposals must contain a mechanism, such as at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted." Most EFPs test gear that is not currently legal, require trip limits in excess of current limits, or fish in closed areas. Under these circumstances, the GMT has recommended and the Council has required 100 percent at-sea observers to ensure compliance with EFP terms and conditions. This EFP is different from the other previously permitted EFPs because the only exemption needed is to allow retention of a prohibited species. In other words, the EFP applicants have no incentive to show that the gear or area has lower impacts on overfished species. Rather the EFP is designed to collect information from impacts that are already occurring by allowing an exemption to Federal Regulations.

This EFP will occur in otherwise legal fishing grounds, during the legal fishing season, using legal fishing gear and current bag limits. In this EFP, a dedicated dockside observer will be the mechanism used to ensure harvest limits and bycatch caps are not exceeded. All yelloweye rockfish caught and retained by vessels participating under this EFP will be transferred directly to the dockside observer while in port. **Therefore, the GMT finds technical merit in this application and recommends the Council forward it for public comment.**

GMT Recommendations:

1. **The GMT acknowledges the technical merit of the 6 EFP applications and recommends adopting them for review with the revisions addressed above.**

Table 1. Proposed Impacts on Overfished Species by Applications for 2010 EFPs, in Metric Tons

MT of proposed impacts	bocaccio	canary	cowcod	darkbl	POP	widow	yelloweye
Fosmark-- commercial chilipepper	3.300	0.027	0.015	0.400		0.700	0.005
TNC-community fishing assoc.	5.000	0.023	0.200	0.454	0.136	2.000	0.068
RFAOR-recreational yellowtail		2.600				3.000	0.200
Martin-recreational chilipepper	2.700	0.200	0.023	0.100		3.000	0.023
Collins- commercial shelf rockfish	3.300	0.014	0.005	0.400		0.700	0.005
ODFW-yelloweye data							0.060
Total all EFP's	**14.300**	**2.864**	**0.242**	**1.354**	**0.136**	**9.400**	**0.361**

PFMC
06/15/09

Agenda Item E.9
Situation Summary
June 2009

FINAL CONSIDERATION OF INSEASON ADJUSTMENTS – IF NEEDED

Consideration of inseason adjustments to 2009 groundfish fisheries may be a two-step process at this meeting. The Council will meet on Monday, June 15, 2009, and consider advisory body advice and public comment on inseason adjustments under Agenda Item E.7. If the Council elects to make final inseason adjustments under Agenda Item E.7, then this agenda item may be cancelled, or the Council may wish to clarify and/or confirm these decisions. If the Council tasks advisory bodies with further analysis under Agenda Item E.7, then the Council task under this agenda item is to consider advisory body advice and public comment on the status of 2009 groundfish fisheries and adopt final inseason adjustments as necessary.

Council Action:

Consider information on the status of ongoing 2009 fisheries and adopt inseason adjustments as necessary.

Reference Materials: None.

Agenda Order:

a. Agenda Item Overview — Merrick Burden
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt or Confirm Final Adjustments to 2009 Groundfish Fisheries

PFMC
05/28/09

Agenda Item E.9.b
Supplemental GAP Report
June 2009

GROUNDFISH ADVISORY SUBPANEL REPORT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) reviewed the Groundfish Management Team's (GMT) inseason adjustment recommendations and generally agrees with the GMT. The GAP is concerned about the outlook for petrale sole and the precautionary inseason adjustments considered to keep the stock above an overfished threshold in 2011. While these inseason adjustments are disruptive to the limited entry trawl fishery, the GAP agrees the threat of driving the stock to an overfished condition could be more disruptive for a longer period of time. The GAP acknowledges that the petrale sole assessment is still not final and potential inseason adjustments for period 6 this year and for the entire fishing season in 2010 will be revisited in September. However, period 5 inseason adjustments need to be considered at this meeting. The GAP simply wants to point out that lower cumulative landing limits in period 5 this year that would accommodate incidental bycatch could be considered to allow more flexibility for deciding period 6 in 2009 and 2010 management measures.

PFMC
06/16/09

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) considered the Council guidance under Agenda Item E.7, and offers the following considerations and recommendations.

LE Trawl Non-Whiting Fishery
The following table (Table 1) lists the impacts from the petrale sole reductions, sablefish and Dover sole increases, and modified Rockfish Conservation Area (RCA) line preliminarily adopted under the initial inseason action (E.7.).

Table 1. Impacts from Preliminarily Adopted Trawl Measures for 2009

		North	South	Total	OY/HG/ allocation
	Canary	18.3	4.3	22.6	
Rebuilding Species	POP	105.4	0.8	106.2	
	Darkbltch	202.7	34.8	237.5	
	Widow	11.5	9.2	20.8	
	Bocaccio	-	13.1	13.1	
	Yelloweye	0.6	-	0.6	
	Cowcod	-	1.4	1.4	
	Sablefish	2,764.6	488.4	3,253.0	3,280
Target Species	Longspine	721.7	284.8	1,006.4	2,231
	Shortspine	1,053.3	255.2	1,308.5	1,608
	Dover	11,895.1	1,857.3	13,752.4	16,500
	Arrowtooth	3,825.2	175.5	4,000.7	11,267
	Petrale	2,022.3	393.9	2,416.2	2,433
	Other Flat	1,727.5	643.2	2,370.7	4,884
	Slope Rock	97.2	181.4	278.6	1160N/626S

Petrale Adjustments for the Point of Concern

In light of the draft petrale sole assessment which indicates that the stock status is worse off than previously believed, the Council requested that the GMT look at making reductions in petrale sole catch in both the end of 2009 and for 2010 to reduce the likelihood that the stock would be overfished at the start of 2011.

In addition to the three scenarios presented in our previous inseason statement, the GMT requested another run from the stock assessment authors to explore the impact of period 5 and period 6 catch reductions. Scenario IV, which is unchanged from our first inseason statement, involves a 433 mt cut to the 2009 catch. Achieving this catch savings would require reductions to catch in both period 5 and period 6. A new run, Scenario III, is based on a 233 mt cut (i.e. only reducing limits in period 6), and is provided for comparison (Table 2).

Table 2. Base case model projections of 2011 petrale stock abundance under four 2009-10 catch scenarios.

	2009/2010 Catch Scenarios (mt)			
2011 abundance	***I.*** (2,433/2,393)	***II.*** (2,433/1,200)	***III.*** (2,200/1,200)	***IV.*** (2,000/1,200)
% of $B_{unfished}$	9%	12%	12%	13%
% of B_{MSY}	48%	63%	66%	68%

2009

The GMT looked at potential savings by period (Table 2) in light of the inseason adjustment contemplated to stay within the OY and the request to examine what changes are needed to reduce catch in 2009 to approximately 400 mt below the OY. The trip limits associated with these reductions are listed in Table 4 and the associated impacts in Table 6.

Table 3. 2009 cumulative catch by month by petrale action (takes into account Council's preliminary inseason actions, except petrale adjustments, under E.7).

	Cumulative Catch by Period				
	PD 1 and 2	PD 3	PD 4	PD 5	PD 6
No Change in 5 or 6	1,100	1,393	1,780	2,023	2,500
Reduce period 5	1,100	1,393	1,780	1,926	2,402
Reduce period 5 and 6	1,100	1,393	1,780	1,926	1,986

Table 4. 2009 cumulative limit adjustments to reduce petrale ~400 mt below OY (commensurate with Scenario IV).

		RCA Boundaries									
Subarea	Period	INLINE	OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
North 40 10 Large& sm Footrope	1	see attached table		18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	2			18,000	22,000	17,000	110,000	110,000	25,000	150,000	1,500
	3			22,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	4			24,000	22,000	17,000	110,000	110,000	30,000	150,000	1,500
	5			24,000	22,000	17,000	110,000	110,000	5,000	150,000	1,500
	6			20,000	22,000	17,000	110,000	110,000	2,000	150,000	1,500
North 40 10 SFFT	1	see attached table		5,000	3,000	3,000	40,000	90,000	16,000	90,000	1,500
	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	3			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			11,000	5,000	3,000	60,000	90,000	18,000	90,000	1,500
	5			11,000	5,000	3,000	60,000	90,000	5,000	90,000	1,500
	6			11,000	3,000	3,000	60,000	90,000	2,000	90,000	1,500
38 - 40 10	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	5,000	10,000	10,000
	6	100	200	20,000	22,000	17,000	110,000	110,000	2,000	10,000	15,000
S 38	1	100	150	20,000	22,000	17,000	110,000	110,000	50,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	30,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	5,000	10,000	55,000
	6	100	200	20,000	22,000	17,000	110,000	110,000	2,000	10,000	55,000

Table 5. RCA schedule resulting from preliminary June inseason action.

2009 RCAs							
	Jan - Feb	Mar - Apr		May - Jun	Jul - Aug	Sep - Oct	Nov - Dec
North of 48 10	0 - 200*		0 - 200	0 - 150	0 - 150	0 - 200	0 - 200
48 10 to 45 46	75 - 200*		75 - 200	75 - 150	100 - 150	75 - 200	75 - 200
45 46 to 40 10				75 - 200	100 - 200	75 - 200	

Table 6. Rebuilding and target species impacts associated with a 400 mt reduction in petrale catch in 2009.

		North	South	Total	OY/HG/ allocation
Rebuilding Species	Canary	18.1	4.0	22.1	
	POP	94.2	0.8	95.0	
	Darkbltch	170.7	32.0	202.8	
	Widow	10.2	9.2	19.4	
	Bocaccio		12.6	12.6	
	Yelloweye	0.6	0.0	0.6	
	Cowcod	0.0	1.3	1.3	
Target Species	Sablefish	2,759.3	486.8	3,246.1	3,280
	Longspine	721.7	284.8	1,006.5	2,231
	Shortspine	1,046.2	255.0	1,301.2	1,608
	Dover	11,862.6	1,854.1	13,716.7	16,500
	Arrowtooth	3,800.6	175.4	3,976.0	11,267
	Petrale	1,676.7	309.6	1,986.2	2,433
	Other Flat	1,711.2	642.4	2,353.6	4,884
	Slope Rock	96.1	177.6	273.7	1160N/626S

2010

The GMT further modeled cumulative limits (given currently scheduled RCA boundaries) designed to result in approximately 1,200 mt of catch in 2010 and the associated impacts (Tables 7 and 8). The impacts associated with those changes are also provided (Table 9).

Table 7. Cumulative limits designed to reduce petrale to ~1,200 mt of total catch in 2010.

		RCA Boundaries									
Subarea	Period	INLINE	OUTLINE	Sable	Longsp	Shortsp	Dover	Otr Flat	Petrale	Arrowtth	Slope Rk
North 40 10 Large &sm Footrope	1	see attached table		18,000	22,000	17,000	110,000	110,000	1,000	150,000	1,500
	2			18,000	22,000	17,000	110,000	110,000	18,000	150,000	1,500
	3			22,000	22,000	17,000	110,000	110,000	18,000	150,000	1,500
	4			24,000	22,000	17,000	110,000	110,000	18,000	150,000	1,500
	5			24,000	22,000	17,000	110,000	110,000	18,000	150,000	1,500
	6			20,000	22,000	17,000	110,000	110,000	1,000	150,000	1,500
North 40 10 SFFT	1	see attached table		5,000	3,000	3,000	40,000	90,000	1,000	90,000	1,500
	2			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	3			7,500	5,000	3,000	45,000	90,000	18,000	90,000	1,500
	4			11,000	5,000	3,000	60,000	90,000	18,000	90,000	1,500
	5			11,000	5,000	3,000	60,000	90,000	18,000	90,000	1,500
	6			11,000	3,000	3,000	60,000	90,000	1,000	90,000	1,500
38 - 40 10	1	100	200	20,000	22,000	17,000	110,000	110,000	1,000	10,000	15,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	15,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	15,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	10,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	10,000
	6	100	200	20,000	22,000	17,000	110,000	110,000	1,000	10,000	15,000
S 38	1	100	200	20,000	22,000	17,000	110,000	110,000	1,000	10,000	55,000
	2	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	55,000
	3	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	55,000
	4	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	55,000
	5	100	150	20,000	22,000	17,000	110,000	110,000	18,000	10,000	55,000
	6	100	200	20,000	22,000	17,000	110,000	110,000	1,000	10,000	55,000

Table 8. Current RCA schedule for 2010

2010 RCAs						
	Jan - Feb	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov - Dec
North of 48 10	0 - 200	0 - 200	0 - 150	0 - 150	0 - 200	0 - 200
48 10 to 45 46	75 - 200	75 - 200	75 - 150	100 - 150	75 - 200	75 - 200
45 46 to 40 10			75 - 200	100 - 200	75 - 200	

Table 9. Rebuilding and target species impacts associated with an estimated 1200 mt total catch of petrale in 2010.

		North	South	Total	OY/HG/ allocation
Rebuilding Species	Canary	18.1	4.0	22.1	
	POP	76.5	0.8	77.3	
	Darkbltch	118.4	28.1	146.5	
	Widow	8.1	9.2	17.3	
	Bocaccio	-	12.7	12.7	
	Yelloweye	0.6	-	0.6	
	Cowcod	-	1.4	1.4	
Target Species	Sablefish	2,752.1	485.1	3,237.2	3,280
	Longspine	721.0	284.7	1,005.6	2,231
	Shortspine	1,033.5	254.4	1,287.9	1,608
	Dover	11,839.3	1,848.7	13,688.0	16,500
	Arrowtooth	3,671.9	146.6	3,818.5	11,267
	Petrale	1,004.9	173.5	1,178.3	2,433
	Other Flat	1,674.4	638.5	2,312.9	4,884
	Slope Rock	94.2	169.3	263.5	1160N/626S

Canary Rockfish

Finally, based on the preliminary actions under E.7 the total impacts to canary rockfish are 3.7 mt over the OY in the scorecard (Attachment 1). The GMT notes that even with petrale catch reductions in periods 5 and 6 as contemplated, the overage is 3.3 mt (Attachment 2). The Council may want to consider reducing the scorecard estimates from the recreational sector by an amount slightly greater than this to balance impacts while still providing for prosecution of ongoing fishery seasons. Alternatively, the Council could reconsider some of the actions taken under the preliminary inseason item to reduce canary impacts.

GMT Recommendations:

1. Reduce petrale sole trip limits in both period 5 and 6 to achieve a harvest approximately 400 mt below the OY (see Table 4).
2. Consider adjusting canary estimates in the scorecard to balance impacts from inseason adjustments and fisheries and modeling updates.

PFMC
06/16/09

Attachment 1

Projected mortality impacts (mt) of overfished groundfish species updated with most recent research estimates and fishery projections through June and preliminary inseason action.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**13.1**	**22.6**	**1.4**	**237.5**	**106.2**	**20.8**	**0.6**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		4.3		6.0	0.5	60.0	0.0
At-sea whiting cat-proc a/		6.1		8.5	0.5	85.0	0.0
Shoreside whiting a/		7.6		10.5	0.1	105.0	0.0
Tribal whiting		1.4		0.0	0.7	3.7	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Fixed Gear Sablefish	0.2	2.8	0.0	4.2	0.5	0.1	0.9
Fixed Gear Nearshore	0.3	3.3	0.0	0.0	0.0	0.3	1.2
Fixed Gear Other	5.0	0.0	0.0	9.0	0.0	0.7	0.0
Open Access: Incidental Groundfish	2.0	0.9	0.0	0.0	0.0	4.0	0.3
Recreational Groundfish c/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	5.7	**1.9**
TOTAL	103.6	108.7	2.0	279.0	114.2	338.0	15.5
2009 OY d/	288	105	4.0	285	189	522	17
Difference	184.4	-3.7	2.0	6.0	74.8	184.0	1.5
Percent of OY	36.0%	103.5%	50.0%	97.9%	60.4%	64.8%	91.2%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors.

b/ South of 40°10' N. lat.

c/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.

d/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

Attachment 2

Projected mortality impacts (mt) of overfished groundfish species updated with most recent research estimates and fishery projections through June and reductions to petrale sole of about 400 mt in 2009.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**12.6**	**22.1**	**1.3**	**202.8**	**95.0**	**19.4**	**0.6**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		4.3		6.0	0.5	60.0	0.0
At-sea whiting cat-proc a/		6.1		8.5	0.5	85.0	0.0
Shoreside whiting a/		7.6		10.5	0.1	105.0	0.0
Tribal whiting		1.4		0.0	0.7	3.7	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Fixed Gear Sablefish	0.2	2.8	0.0	4.2	0.5	0.1	0.9
Fixed Gear Nearshore	0.3	3.3	0.0	0.0	0.0	0.3	1.2
Fixed Gear Other	5.0	0.0	0.0	9.0	0.0	0.7	0.0
Open Access: Incidental Groundfish	2.0	0.9	0.0	0.0	0.0	4.0	0.3
Recreational Groundfish c/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	5.7	**1.9**
TOTAL	103.1	108.2	1.9	244.3	103.0	336.6	15.5
2009 OY d/	288	105	4.0	285	189	522	17
Difference	184.9	-3.2	2.1	40.7	86.0	185.4	1.5
Percent of OY	35.8%	103.0%	47.5%	85.7%	54.5%	64.5%	91.2%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data sources.					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors.

b/ South of 40°10' N. lat.

c/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.

d/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

FISHERY MANAGEMENT PLAN (FMP) AMENDMENTS 20 AND 21– TRAWL RATIONALIZATION AND INTERSECTOR ALLOCATION—REGULATORY OVERVIEW AND FINAL ACTION ON MISCELLANEOUS OUTSTANDING ISSUES AND FMP LANGUAGE

Development of a trawl rationalization system has proceeded along two tracks. Under Amendment 20, the details of the management system have been developed, specifically individual fishing quotas (IFQ) for the shoreside sector and co-ops for the at-sea whiting sectors. Under Amendment 21, most of the allocations needed to support the trawl rationalization program have been developed.

The Council took final action on Amendment 20 in November 2008 and since that time has been working on related trailing actions and emerging issues and clarifications. All trailing actions are scheduled to be completed at this meeting. The Council took final action on Amendment 21 in April 2009. A calendar for finalizing the submission of recommendations for both Amendment 20 and 21 is provided (Agenda Item E.10.a, Attachment 1).

With respect to Amendment 20, the Council recommended program, as it stood after the April Council meeting, is provided as Agenda Item E.10, Attachment 2. At this meeting the Council will do the following:

- Respond to National Marine Fisheries Service (NMFS) questions and comments (Agenda Item E.10.b, NMFS NWR Report).
- Address outstanding issues (Agenda Item E.10.a, Attachment 4).
- Finalize trailing actions on:
    - accumulation limits, including action on divestiture (Agenda Item E.11), and
    - a quota pound set aside for adaptive management (Agenda Item E.12).
- Adopt Fishery Management Plan (FMP) amendment language that corresponds to its final recommendations (Agenda Item E.10, Attachment 3).

During this process, the Council also considered the development of provisions on community fishing associations (CFAs) but decided to address that issue in a trailing amendment that will not go forward with the main package. The Council will determine when to next address CFAs when it does workload planning under Agenda Item G.5.

With respect to Amendment 21, the Council recommendations are provided as Agenda Item E.10, Attachment 5. Corresponding Fishery Management Plan (FMP) amendment language will be provided for Council approval at the same time regulations are presented during the deeming process. The initial allocation of quota shares (QS) for the shoreside sector requires a one-time division of the shoreside nonwhiting species between the whiting and nonwhiting sectors. (Once the allocation is made, all resulting QS/quota pounds will be fully tradable between vessels targeting whiting and those targeting nonwhiting species.) The percentage splits necessary to support initial allocation were adopted for most species as part of the Council's intersector allocation action (Amendment 21). In order to complete the shoreside whiting/nonwhiting allocation, additional divisions are needed for the following management units, which will be developed during the 2011-2012 biennial specifications process:

- Canary
- Bocaccio
- Cowcod
- Yelloweye
- Minor shelf rockfish north
- Minor shelf rockfish south
- Other Fish
- Longnose Skate

Completion of the implementation of the IFQ program will be reliant on the results from that process. No action is required from the Council on these allocations at this meeting. There is however, a consistency issue related to an implication for the Amendment 21 action on halibut for the Amendment 20 halibut individual bycatch quota program. This is covered in E.10.a, Attachment 4 and in a NMFS Report from the Northwest Fisheries Science Center (Agenda Item E.10.b, NMFS NWFSC Report).

At its May 7-9 meeting, the Groundfish Allocation Committee (GAC) reviewed the FMP amendment language and most of the outstanding issues. These recommendations are provided in Agenda Item E.10.b, GAC Report.

Council Task:

1. **Respond to NMFS questions and comments.**
2. **Take final action on outstanding issues.**
3. **Approve FMP amendment language for Amendment 20.**

Reference Materials:

1. Agenda Item E.10.a, Attachment 1, Calendar of Activities for Groundfish Fishery Management Plan (FMP) Amendments 20 and 21.
2. Agenda Item E.10.a, Attachment 2, Pacific Council Recommendations For Groundfish Trawl Rationalization, Updated With Trailing Actions Through April 2009.
3. Agenda Item E.10.a, Attachment 3, Staff Recommendation on Amending the Groundfish FMP to Incorporate the Trawl Rationalization Program.
4. Agenda Item E.10.a, Attachment 4, Miscellaneous Remaining Issues.
5. Agenda Item E.10.a, Attachment 5, Intersector Allocation (Amendment 21) Description of Final Council Action, April 2009.
6. Agenda Item E.10.b, NMFS NWR Report on Miscellaneous Clarifications for Amendment 20: Trawl Rationalization.
7. Agenda Item E.10.b, NMFS NWFSC Report, Letter from Northwest Fisheries Science Center on Monitoring Halibut Mortality, May 26, 2009.
8. Agenda Item E.10.b, GAC Report on Trawl Rationalization.

Agenda Order:

a. Agenda Item Overview Jim Seger, Kit Dahl, John DeVore
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Final Preferred Alternative for Outstanding Issues and Amendment 20 FMP Language.

PFMC
05/29/09

CALENDAR OF ACTIVITIES FOR GROUNDFISH FISHERY MANAGEMENT PLAN (FMP) AMENDMENTS 20 AND 21

	Trawl Rationalization - Amendment 20		Intersector Allocation - Amendment 21	
Calendar of Events	**Council Actions**	**MSA, NEPA, Secretarial Approval, and Implementation**	**Council Actions**	**MSA, NEPA, Secretarial Approval, and Implementation**
2009 ***June 11-18 Council Meeting***	• **Final Council Action on** o Overfished species and halibut IBQ accumulation limits o Divestiture Motion o Adaptive Management Program o FMP Language o Set calendar for consideration of Community Fishing Associations (CFAs) o Miscellaneous Clarifications	• NMFS questions to Council in preparation for drafting regulations. • Council provides clarifications		
Summer/Fall	• Draft EIS Finalized	• NMFS drafts regulations	• Draft EIS Finalized	• NMFS drafts regulations
Sept 10-17 Council Meeting	• Council's first review of draft regulations (deeming)		• Council review of draft regulations (deeming) and FMP language	
October		• NMFS completes draft regulatory language.	• DEIS Submitted to EPA and Amendment package submitted to NMFS	

	Trawl Rationalization - Amendment 20		Intersector Allocation - Amendment 21	
Calendar of Events	Council Actions	MSA, NEPA, Secretarial Approval, and Implementation	Council Actions	MSA, NEPA, Secretarial Approval, and Implementation
Oct 29 - Nov 5 Council Meeting	• If necessary, Council's final review of draft regulations (deeming) • Biennial Specifications Options Include Shoreside Whiting and Nonwhiting Allocations for Species not Covered in A-21			
November/December	• DEIS Submitted to EPA and Amendment package submitted to NMFS			
2010	• Council consideration of trailing amendment on CFAs.	• Secretarial Approval Process		• Secretarial Approval Process
June 12-17 Council Meeting	• Final Council recommendations for allocation of species not covered in A-21.			
2011		• Implementation January 1, 2011[1]		• Implementation concurrent with implementation of A-20.

[1] IFQ required to make landings. Program regulations will be approved and the application and initial QS issuance process will occur in 2010.

PACIFIC COUNCIL RECOMMENDATIONS FOR GROUNDFISH TRAWL RATIONALIZATION, UPDATED WITH TRAILING ACTIONS THROUGH APRIL 2009

1.0 Overview of Recommendations by Sector

The Pacific Fishery Management Council's (Council) sector specific recommendations for rationalizing the trawl fishery are provided here and will be finalized and forwarded to the National Marine Fisheries (NMFS) for approval later in 2009. The recommendations were adopted at the Council's November 2008 meeting. In general, the Council recommends the following:

Shoreside Trawl Sector (nonwhiting groundfish species and whiting):
Manage with IFQs.
Provide 90% of the initial allocation of nonwhiting IFQ to holders of vessel permits; and set aside 10% of the initial allocation for an adaptive management program that may benefit processors and communities, among others.
Provide 80% of the initial allocation of whiting IFQ to holders of vessel permits; and provide 20% of the initial allocation of whiting to processors.

Mothership Trawl Sector (whiting and groundfish bycatch species):
Manage with a harvester co-op system and limited entry for mothership processors.
Require that vessels declare preseason the mothership processor for which they will fish in a coming year.

Catcher Processor Sector (whiting and groundfish bycatch species):
Create a permit endorsement to prevent expansion of the number of participants.
Allocate whiting and bycatch to the existing voluntary co-op.[1]
Provide an IFQ program if the voluntary co-op fails (initially allocate IFQ equally among all permit holders).

[1] When the Council took final action, NMFS indicated its preliminary intent to license the voluntary co-op. However, this was not part of the Council's final action.

The amount of allocation available for these sectors will be determined through the intersector allocation process. IFQ for the shoreside fishery may not be delivered to at-sea processors, nor may quota allocated to the mothership or catcher-processor sectors be delivered shoreside.

The following sections provide a general summary of the program for each sector, followed by a complete description that also identifies trailing actions the Council has been working on in 2009. These actions will be completed prior the time it submits the package to NMFS for approval.[2] *The trailing actions pertain to eligibility to own IFQ, accumulation limits, and adaptive management. Implementation is not expected earlier than 2011.*

2.0 Shoreside Trawl Sector: IFQ Program (Appendix A of the EIS)

This section details the IFQ program that the Council is recommending for the shoreside sector of the groundfish fishery. The first part of the section describes major components of the program. Table 1, which starts on page 5, presents complete details on elements of the recommended IFQ program.

2.1 Overview of the IFQ Program Elements

Under this program, most status quo management tools would remain in place. The main exceptions are cumulative landing limits for nonwhiting groundfish species and a closure period to control whiting harvest at the start of the year.[3] Other measures, such as RCA boundaries, may be adjusted as experience is gained with the IFQ program.

An IFQ will grant an entity the privilege to catch a specified portion of the trawl sector's allocation. Within the IFQ program, vessels will be allowed to use a variety of directed groundfish commercial gear (including nontrawl gear) to take the shoreside trawl sector allocation, which will thus allow for "gear switching." IFQs will be created for most species of groundfish under the Groundfish FMP (although some will still be managed collectively at the stock complex level, e.g. remaining minor slope rockfish). Some groundfish species rarely caught by trawl gear and dogfish will be excluded from the IFQ program. To ensure that optimum yields (OY) for species not covered by IFQ are not exceeded, catch of those species will be monitored and deductions made from the OY in anticipation of the expected level of shoreside trawl sector catch. For trips targeted on whiting, IFQ will be required only for whiting and the main bycatch species.

Halibut individual bycatch quota (IBQ) will be required to cover the incidental catch[4] of Pacific halibut in the groundfish trawl shoreside fishery. Under an IBQ program, retention would not be allowed.

The following sections describe the major provisions of the IFQ program.

2.1.1 Initial Allocation

The program will initially allocate IFQ as quota share (QS) to fishery participants based mainly on their historic involvement in the fishery. Following the initial allocation, transfers (described below) will

[2] During its March and April 2009 meetings the Council also clarified a number of its recommendations. These clarifications are reflected in the version of the trawl rationalization recommendation provided here.
[3] This closure period is necessary because of Endangered Species Act concerns related to salmon.
[4] At its June meeting the Council will consider a recommendation by the GAC to interpret previous Council action under Amendment 21 as creating an IBQ program to cover incidental mortality rather than catch.

allow for others to also participate in the fishery as quota holders. The initial allocation can be viewed in two segments:

First, in developing its recommendation the Council considered the groups that should be included in the initial allocation, and the proportional split among the groups. The Council recommended that harvesters (those holding limited entry permits for trawl vessels) be given an initial allocation of 90% of the nonwhiting QS and 80% of the whiting QS. Ten percent of the QS for nonwhiting species would be made available for an adaptive management program and processors would receive 20% of the whiting QS.

Second, the Council considered specific allocation formulas that will determine the amount of QS each eligible entity will receive. These calculations are based primarily on the delivery history associated with a vessel permit or processing company over a set number of years. For the allocation to permits, the QS associated with the history of permits retired in the buyback program will be distributed equally among the remaining qualified permits (just less than 45% of the QS will be allocated in this fashion). A special calculation is provided for incidentally caught overfished species. For these species the allocation will be based on the QS recipient's need to cover incidental catch under current fishing practices (as measured by bycatch rates, individual permit logbooks for recent years, and the amount of target species QS that an entity receives). None of the QS for these species will be allocated equally among harvesters. A similar approach would be used for the allocation of halibut IBQ.

2.1.2 Stock Management Units for IFQs

QS will be issued for the species groups and areas for which there are OYs (management units). However, QS will not be required for some rarely-caught species. Catch of these species would be monitored to ensure they don't exceed any established allocations. There may be further area subdivisions for species for which there is an area specific precautionary harvest policy. There are also provisions that provide for both species group and area subdivision of QS after initial allocation.

2.1.3 Annual Issuance, Holding Requirements and Transfer Rules

In designing the management regime for the IFQ program, the Council is balancing the benefits of flexibility and individual accountability with program costs and the constraints of the very low allowable catch levels of overfished species. Prior to the start of each fishing year, NMFS will issue quota pounds (QP) to entities based on the amount of QS they hold and the shoreside trawl sector allocation. The QP would have to be transferred to a vessel account in order to be used. When a vessel goes fishing under the IFQ program, all catch must be recorded (including discards) and must be matched by an equal amount of QP from the vessel's QP account. If there is not enough QP to cover the catch from a trip, there is a 30-day grace period during which adequate QP must be transferred into the vessel's account. A vessel's fishing will be limited, and its permit cannot be sold, until the overage is covered. A carryover provision will allow for an overage in one year to be covered by up to 10 percent of the following year's QP; likewise, the provision also will allow QP that were not used in one year to be carried over into the following year, up to 10 percent.

Bycatch reduction and greater efficiency are expected to occur in the groundfish fishery under the IFQ program because of the transferability of QS and QP. Through the transfer of QS/QP (bought and sold or "leased" through private contract), it is anticipated that those best able to avoid catching overfished species, and those who are most efficient, will increase the amount of QS/QP registered to them, while those who consistently have high bycatch rates or operate less efficiently might choose to sell their QS and leave the fishery. Generally, anyone eligible to own a U.S.-documented fishing vessel could also acquire QS and QP, and the QS and QP could be acquired in very small increments.[5] These provisions will allow for new entrants into the fishery; for example, a crew member could slowly purchase amounts of quota. The also allow for ownership of QS by entities that do not otherwise participate in the fishery. *In early 2009,during its trailing actions the Council considered but rejected substantially modifying provisions pertaining to who is eligible to own the QS.*

While transferability is an important component, in order to protect against unintended consequences some provisions limit transferability. For example, there will be accumulation limits on the amount of QS or QP that can be controlled by an entity, and accumulation limits on the amount of QP registered to a vessel. The intent of these limits is to prevent excessive control of quota by a participant. *The exact percentages which will be used in these limits will be determined through a trailing action.*

An adaptive management provision will allow the Council to use 10 percent of the trawl allocation to provide incentives, support, or other compensation to offset adverse impacts of the program. This program may benefit communities and processors, among others. *Details will be the subject of a trailing action.*

2.1.4 Tracking and Monitoring

A tracking and monitoring program is necessary to assure that all catch (including discards) is documented and matched against QP. At-sea observers would be required on all vessels and shoreside monitoring during all off-loading (100 percent coverage). Cameras may be used to augment the observers and assure compliance. Compared to status quo monitoring, this will be a significant increase for a large portion of the trawl fleet, particularly non-whiting shoreside vessels. More accurate estimates of total mortality will benefit stock conservation goals. Discarding will be allowed, though all fish discarded will also have to be covered by QP. There would be 100 percent shoreside monitoring; and there may be limited landing hours to control costs. Additionally, a program for the mandatory submission of economic data is included to facilitate monitoring program performance.

2.1.5 Costs and Fee Structure

Program costs are of concern and ongoing Federal administrative costs are estimated in the EIS at $2.4 to $2.9 million per year for the entire trawl rationalization program, including the co-ops for the at-sea segment of the fishery (see Section 3). Program benefits are expected to significantly exceed costs. The costs listed here do not include initial implementation costs or the costs that industry will bear for observers. Fee structures will be proposed to recover program costs from industry, up to the limit of 3% of exvessel value.

2.1.6 Program Monitoring, Review and Future Auction

The Council will conduct a formal review of program performance no later than 5 years after implementation and every four years thereafter. The result of the evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. At the time of its first review, the Council will consider also the use of an auction or other non-history based method when distributing quota share that may become available after the initial allocation.

2.2 Detailed Specification of IFQ Program Elements and Options

Table 1 provides a complete description of the IFQ program.

[5] To be eligible to own QS the person need not actually own a U.S. documented fishing vessel.

Table 1. Full description of the IFQ Program for shoreside trawl deliveries.

	Element	SubElement	
A. ***Trawl Sector Management***			
A-1.1	Scope for IFQ Management, Including Gear Switching		For trips delivered shoreside, QP will be required to cover catch of all groundfish (including all discards) by LE trawl vessels with certain gear and species exceptions. Gear Exception: Vessels with an LE trawl permit using the following gears would not be required to cover their groundfish catch with QP: exempted trawl, [a] gear types defined in the coastal pelagic species FMP, gear types defined in the highly migratory species FMP, salmon troll, crab pot, and LE fixed gear when the vessel also has a LE permit endorsed for fixed-gear (longline or fishpot) AND has declared that they are fishing in the LE fixed-gear fishery. Species Exception: The following would be excepted from the QP requirement longspine thornyheads south of 34º27' N latitude, minor nearshore rockfish (north and south), black rockfish (WOC), California scorpionfish, cabezon, kelp greenling, shortbelly rockfish, and spiny dogfish. *This definition of the scope allows an LE trawl vessel to switch between trawl and nontrawl groundfish gears, including fixed-gear, for the purpose of catching their QP ("gear switching"). It also allows a nontrawl vessel to acquire a trawl permit, and thereby use trawl QP to catch the LE trawl allocation using nontrawl gear.*[b]

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-1.2	IFQ Management Units, Including Latitudinal Area Management		QS will carry designations for the species/species group, area, and trawl sector to which it applies (see A-1.3 for the list of trawl sectors). The QP will have the same species/species group, area, and sector designations as the QS on the basis of which the QP was issued. QP will not be used in a trawl sector other than that for which it was issued,[c] and will not be used in a nontrawl sector (i.e. by vessels without trawl permits).[d] QP will not be used in a catch area or for a species/species group other than that for which it is designated. The QS/QP species, species groupings and area subdivisions will be those for which OYs are specified in the ABC/OY table that is generated through the groundfish biennial specifications process and those for which there is an area-specific precautionary harvest policy[e] QS for remaining minor rockfish will be aggregated for the shelf and slope depth strata (nearshore are excluded from the scope, see Section A-1.1). Changing the management units. After initial QS allocation the Council may alter the management units by changing the management areas or subdividing species groups. Section A-2.1.6 provides methods for reallocating QS when such changes are made after initial implementation of the program.[f] *Hereafter, all references to species include species and species group, unless otherwise indicated.*
A-1.3	General Management and Trawl Sectors		Unless otherwise specified, status quo regulations, other than trip limits, will remain in place. If individual vessel overages (catch not covered by QP) make it necessary, area restrictions, season closures, or other measures will be used to prevent the trawl sector (in aggregate or the individual trawl sectors listed here) from going over allocations.[g] The IFQ fishery may also be restricted or closed as a result of overages in other sectors. There will be three trawl sectors: shoreside, mothership, and catcher-processors. However, as per Section A-1.1, IFQ will be required only for the shoreside trawl sector. The mothership and catcher-processor sectors will be managed using co-ops, as specified in the co-op section of the trawl rationalization program. If the industry organized voluntary co-op program for the catcher-processor sector collapses, IFQ will be required for the catcher-processor sector, as specified in the co-op program described for that sector. *Allocation among trawl sectors will be determined in the intersector allocation process.*[h] *Trawl vessels fishing IFQ with nontrawl gear will be required to comply with the RCA lines applicable for that gear. Such restrictions, as necessary, will be determined in a separate process.*
A-1.4	Management of NonWhiting Trips		Nonwhiting trips are those with less than 50% whiting. No changes to management measures, other than those identified in Section A-1.3, have been identified at this time.
A-1.5	Management of Whiting Trips[i]		Whiting seasons will not be changed under the IFQ program, and so the current spring openings will be maintained to control impacts on ESA-listed salmon.[j] When the primary whiting season for a sector is closed for shoreside deliveries, sector-specific QP will be required plus cumulative whiting catch limits apply.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-1.6	Groundfish Permit Length Endorsements		Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained; however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e., length endorsements will not change when a trawl-endorsed permit is transferred to a smaller vessel)..
A-2. ***IFQ System Details***			
A-2.1	**Initial Allocation and Direct Reallocation**		
A-2.1.1	Eligible Groups	a Groups and Initial Split of QS	***Eligible Groups*** The initial allocation of QS will be made either only to permit owners and processors, as follows. Whiting QS: 80% to permits, 20% to processors and 0% for adaptive management. Nonwhiting QS: 90% to permits, 0% to processors, and 10% for adaptive management. *After initial allocation, trading will likely result in changes in the distribution of shares among permit owners and processors. Additionally, entities that are neither permit owners nor processors may acquire QS (see below: "IFQ/Permit Holding Requirements and IFQ Acquisition").*
		b Permits	Landing history will accrue to the permit under which the landing was made. The owner of a groundfish LE permit at the time of initial allocation will receive the QS issued based on the permit. (Also, see Section A-2.1.4 on permit combinations and other exceptional situations.)
		c Processors and Processing Definition	A special definition of "processor" and "processing" will be used for initial QS allocation. A main intent of the definition is to specify that only the first processor of the fish be credited for the history of that delivery when the initial allocation formula is applied (see footnote for definition).[k]
		d Attributing and Accruing Processing History	For an allocation for **shoreside processors (applies only to whiting):** attribute history to the receiver reported on the landing receipt (i.e. the entity responsible for filling out the state fish ticket), except history may be reassigned to an entity not on the landings receipt, if parties agree or through an agency appeals process. *The intent of this option is to provide an opportunity for catch history to be assigned to the entity that actually processed the fish.* For shoreside processors, allocations go to the processing business and successor-in-interest will be recognized. NMFS will develop criteria for use in determining the successor in interest with respect to the entities listed on the landings receipts or otherwise eligible for an initial QS allocation based on being the first processor of the fish.[l]
A-2.1.2	Recent Participation	a Permits (including CP permits)	Recent participation is not required in order for a permit to qualify for an initial allocation of QS.
		b Processors (motherships)	Not applicable because a co-op program was provided for this sector rather than IFQs. *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis.)*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		c Processors (shoreside)	Recent participation is required to qualify for an initial allocation of whiting QS: 1 mt or more of deliveries from whiting trips in each of any two years from 1998-2004.
A-2.1.3	Allocation Formula	a Permits with catcher vessel history	For all fish management units, as specified in Section A-1.2: Equal Division: There will be an equal division of the buy-back permits' pool of QS among all qualifying permits (except the incidentally caught overfished species). Qualifying permits include all catcher vessel permits, including those that have been used only in the mothership sector. (The QS pool associated with the buyback permits will be the buyback permit history as a percent of the total fleet history for the allocation period. The calculation will be based on total absolute pounds with no other adjustments and no dropped years.) Permit History: Tithe remaining QS will be allocated based on each permit's history (see following formulas). **For the portion of the allocation based on each permit's history .** For **non-whiting** trips, permit history used for QS allocation will be calculated: **For non-overfished species**: using an allocation period of 1994-2003. Within that period use relative history and drop the three worst years.[m] **For overfished species taken incidentally:**[n] use target species QS as a proxy based on the following approach: Apply fleet average bycatch rates to each permit's depth and latitude distributions and target species QS allocations. Fleet average bycatch rates for latitudinal areas[o] divided shoreward and seaward of the RCA will be developed from West Coast Observer Program data for 2003-06. For the purposes of the allocation, a permit's QS for each target species will be distributed shoreward and seaward of the RCA and latitudinally based on the permit's logbook information for 2003-06. If a permit does not have any logbooks for 2003-06, fleetwide averages will be used.[p] For **whiting** trips, permit history used for QS allocation will be calculated as follows: **For whiting**, use an allocation period of 1994-2003. Within that period, use relative history and drop the two worst years. [q] **For bycatch species** (if IFQ is used for bycatch species): use the whiting history as a proxy (i.e., allocation will be pro rata based on the whiting allocation). **Area Assignments:** Landings history will be assigned to catch areas based on port of landing.[r] **Relative history (%).** For each sector, the permit history for each year is measured as a percent of the sector's total for the year.
.		b Permits with catcher-processor history	Not applicable because a co-op program was provided for this sector rather than IFQs. *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis).*
		c Processors (motherships)	Not applicable because a co-op program was provided for this sector rather than IFQs *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis).*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		d Processors (shoreside)	For whiting: • Allocate whiting QS based on the entity's history for the allocation period of 1994-2004 (drop two worst years) and use relative history.
A-2.1.4	History for Combined Permits and Other Exceptional Situations		Permit history for combined permits will include the history for all the permits that have been combined. For history occurring when two or more trawl permits were stacked, split the history evenly between the stacked permits. History for illegal landings will not count toward an allocation of QS. Landings made under nonwhiting Experimental Fishing Permits (EFPs) that are in excess of the cumulative limits in place for the non-EFP fishery will not count toward an allocation of QS. Compensation fish will not count toward an allocation of QS.
A-2.1.5	Initial Issuance Appeals		There will be no Council appeals process on the initial issuance of IFQ. NMFS will develop a proposal for an internal appeals process and bring it to the Council for consideration. Any revisions to an entity's fish tickets must be approved by the state in order to be accepted. Any proposed revisions to fish tickets should undergo review by state enforcement personnel prior to finalization of the revisions.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.1.6	Direct Reallocation After Initial Issuance		**Reallocation With Change in Overfished Status**: When an overfished species is rebuilt or a species becomes overfished there may be a change in the QS allocation within a sector (allocation between sectors is addressed in the intersector allocation process). When a stock becomes rebuilt, the reallocation will be to facilitate the re-establishment of historic target fishing opportunities. When a stock becomes overfished, QS may be reallocated to maintain target fisheries to the degree possible. That change may be based on a person's holding of QS for target species associated with the rebuilt species or other approaches deemed appropriate by the Council. **Reallocation With Changes in Area Management** (Changes in management lines are expected to be rare; however, when they occur the following provides for the reallocation of QS in a manner that will give individual QS holders with the same amounts of total QP before and after the line changes.) **Area Subdivision**: If at any time after the initial allocation an IFQ management unit is geographically subdivided, those holding QS for the unit being subdivided will receive an amount of QS for each newly created area that is equivalent to the amount they held for the area before it was subdivided. **Area Recombination**: When two areas are combined, the QS held by individuals in each area will be adjusted proportionally such that (1) the total QS for the area sums to 100%, and (2) a person holding QS in the newly created area will receive the same amount of total QP as they would if the areas had not been combined. **Area Line Movement**: When a management boundary line is moved, the QS held by individuals in each area will be adjusted proportionally such that they each maintain their same share of the trawl allocation on a coastwide basis (a fishing area may expand or decrease, but the individual's QP for both areas combined wouldn't change because of the change in areas). In order to achieve this end, the holders of QS in the area being reduced will receive QS for the area being expanded, such that the total QP they would be issued will not be reduced as a result of the area reduction.[s] Those holding QS in the area being expanded will have their QS reduced such that the total QP they receive in the year of the line movement will not increase as a result of the expansion (nor will it be reduced). **Reallocation With Subdivision of a Species Group**: If at any time after the initial allocation an IFQ management unit for a species group is subdivided, those holding QS for the unit being subdivided will receive an amount of QS for each newly created IFQ management units that is equivalent to the amount they held for the species group before it was subdivided. For example, if a person holds 1% of a species group before the subdivision, that person will hold 1% of the QS for each of the groups resulting from the subdivision.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.2	**Permit/IFQ Holding Requirements and Acquisition** **(after initial allocation)**		
A-2.2.1	Permit/IFQ Holding Requirement		1. Only vessels with LE trawl permits are allowed to fish in the trawl IFQ fishery. 2. For a vessel to use QP, the QP must be in the vessel's QP account. 3. All catch a vessel takes on a trip must be covered with QP within 30 days of the landing for that trip unless the overage is within the limits of the carryover provision (Section A-2.2.2.b), in which case the vessel has 30 days or a reasonable time (to be determined) after the QP for the following year are issued, whichever is greater.[t] 4. For any vessel with an overage (catch not covered by QP), fishing that is within the scope of the IFQ program (Section A-1.1) will be prohibited until the overage is covered, regardless of the amount of the overage. Vessels which have not adequately covered their overage within the time limits specified in paragraph 3, must still cover the overage before resuming fishing, using QP from the following year(s), if necessary. If a vessel covers its overage, but coverage occurs outside the specified time limit (paragraph 3), the vessel may still be cited for a program violation. 5. For vessels with an overage, the LE permit may not be sold or transferred until the deficit is cleared.
A-2.2.2	IFQ Annual Issuance	a Annual Quota Pound Issuance	QP will be issued annually to QS holders based on the amount of QS held. *As specified above, QS holders will have to transfer their QP to a vessel account in order for those QP to be used.*
		b Carryover (Surplus or Deficit)	A carryover allowance will allow surplus QP in a vessel's QP account to be carried over from one year to the next or allow a deficit in a vessel's QP account for one year to be carried over and covered with QP from a subsequent year. Surplus QP may not be carried over for more than one year. A vessel with a QP **surplus** at the end of the current year will be able to use that QP in the immediately following year, up to the limit of the carryover allowance (see below). A vessel with a QP **deficit** in the current year will be able to cover that deficit with QP from the following year without incurring a violation if (1) the amount of QP it needs from the following year is within the carryover allowance (see below), and (2) the QP are acquired within the time limits specified in A-2.2.1.[u] **Carryover Allowance**: Limit of up to 10 percent carryover for each species. This applies to both non-overfished species and overfished species. The percentage is calculated based on the total pounds (used and unused) in a vessel's QP account for the current year.[v]

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		c QS Use-or-Lose Provisions (Deleted)	*This section has been deleted but the numbering is being maintained as a placeholder so as not to change section numbering and corresponding references in the analysis.*[wx]
		d Entry Level Opportunities	Under the MSA, the Council is required to consider entry level fishermen, small vessel owners, and crew members, and in particular the possible allocation of a portion of the annual harvest to individuals falling in those categories. No special provisions have been identified for analysis. New entry is addressed indirectly by allowing crew, captains and others to acquire QS in small increments.
A-2.2.3	IFQ Transfer Rules	a Eligible to Own or Hold	Those eligible to own QS/QP will be restricted to (i) any person or entity eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12113 (general fishery endorsement requirements and 75% citizenship requirement for entities) and (ii) any person or entity that owns a mothership that participated in the west coast groundfish fishery during the allocation period and is eligible to own or control that US fishing vessel with a fishery endorsement pursuant to Sections 203(g) and 213(g) of the American Fisheries Act (AFA). *At its' April 2009 meeting, the Council considered and rejected other criteria for eligibility to own or hold (e.g., ownership interest in a vessel or permit). At it's June meeting, the Council will review some final adjustments to the above language. Those adjustments are intended to ensure consistency with the MSA and the existing license limitation program.*
		b Transfers and Leasing	QS/QP will be transferable and transfers must be registered with NMFS. NMFS will not differentiate between a transfer for a lease and a permanent transfer.[y] Each year, all QP must be transferred to a vessel account. A penalty for not meeting this transfer requirement has not been recommended; however, this requirement is intended to encourage its availability for use by the fleet.
		c Temporary Transfer Prohibition	NMFS may establish temporary prohibitions on the transfer of QS, as necessary to facilitate program administration. QS will not be transferred in the first two years of the program (QP will be transferable).
		d Divisibility	QS will be highly divisible and the QP will be transferred in whole pound units (i.e. fractions of a pound may not be transferred).

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		e Accumulation Limits (Vessel and Control)	*The Council is reviewing the accumulation limit policies as part of its trailing actions, to be completed before submission of the trawl rationalization program to NMFS for approval. At it's June 2009 meeting the Council will consider accumulation limits for overfished species and Pacific halibut and whether to allow entities to receive an initial allocation of QS in excess of the limits and then divest themselves of that excess.* Limits[z] may vary by species/species group, areas, and sector. See options listed in Table 2. **Vessel Use Limit**: A limit on the QP that may be registered for a single vessel during the year. This element will mean that a vessel could not have more used and unused quota pounds registered for the vessel than a predetermined percentage of the QP pool. **Control Accumulation Limit:** A person, individually or collectively, may not control QS in excess of the specified limit (because there is no the grandfather clause). QS controlled by a person shall include those registered to that person, plus those controlled by other entities in which the person has a direct or indirect ownership interest, as well as shares that the person controls through other means. The calculation of QS controlled by a person will follow the "individual and collective" rule. Individual and Collective Rule: The QS that counts toward a person's accumulation limit will include 1) the QS or QP owned by them, and 2) a portion of the QS owned by any entity in which that person has an interest. The person's share of interest in that entity will determine the portion of that entity's QS that counts toward the person's limit.[aa] **Grandfather Clause:** There will not be a grandfather clause for the accumulation limits. **Calculation of Aggregate Nonwhiting QS Holdings:** To determining how much aggregate nonwhiting QS an entity holds, an entity's QS for each species will be converted to pounds. This conversion will always be conducted using the trawl allocations applied to the 2010 OYs, until such time as the Council recommends otherwise. Specifically, each entity's QS for each species will be multiplied by the shoreside trawl allocation for that species. The entity's pounds for all nonwhiting species will then be summed and divided by the shoreside trawl allocation of all nonwhiting species to get the entity's share of the aggregate nonwhiting trawl quota. *Note: QS that is not allocated because of the accumulation limits and absence of the grandfather clause will be distributed to other eligible recipients in a manner that maintains the distribution among groups specified in A-2.1.1 and based on the allocation formulas specified in A-2.1.3.*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.3	**Program Administration**		
A-2.3.1	Tracking, Monitoring and Enforcement		**Discarding by Shoreside Sector** Non-whiting – *Discarding of fish covered by QP allowed*, discarding of fish covered by IBQ required, discarding of non-groundfish species allowed. **W**hiting *Maximized retention vessels:* Discarding of fish covered by QP and IBQ, and non-groundfish species prohibited. *Vessels sorting at-sea:* Same as for non-whiting. **At-Sea Catch Monitoring for Shoreside Sector** Nonwhiting – The sorting of catch, the weighing and discarding of any IBQ and IFQ species, and the retention of IFQ species must be monitored by the observer. Whiting *For maximized retention vessels*: video monitoring as proposed under Amendment 10. Observers would be required in addition to or as a replacement for video monitoring. *For vessels that sort at-sea:* The sorting, weighing and discarding of any IFQ or IBQ species must be monitored by an observer with supplemental video monitoring. **Shoreside Landings Monitoring** The sorting, weighing and reporting of any IFQ species must be monitored by a shoreside landings monitor (IBQ will have been discarded at sea). *(Description continued on next page.)*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
			(...continued from previous page) **Catch Tracking Mechanisms for Shoreside Sector** **Electronic vessel logbook report** VMS-based electronic logbook required to be transmitted from vessel. At-sea entry by vessel personnel required including catch weight by species and if retained or discarded. **Vessel landing declaration report** Mandatory declaration reports. **Electronic ITQ landing report** Mandatory reports completed by processors and similar to electronic fish ticket report. **Processor production report** Mandatory reports (possible inclusion of proprietary data included to be recommended as option is fleshed out). **Cost Control Mechanisms for Shoreside Sector** **Shoreside landing hour restrictions** Landing hours may be restricted. **Shoreside site Licenses** Mandatory license for shoreside deliveries. License can be issued to any site that meets the monitoring requirements. **Vessel Certification** Mandatory certification. Certificate can be issued to any vessel that meets the monitoring requirements. **Program Performance Measures for Shoreside Sector** Integrate into the tracking and monitoring program the collection of data on cost, earnings and profitability; Economic efficiency and stability; capacity measures; net benefits to society; distribution of net benefits; product quality; functioning of quota market; incentives to reduce bycatch; market power; spillover effects into other fisheries; contribution to regional economies (income and employment); distributional effects/community impacts; employment-seafood catching and processing; safety; bycatch and discards; administrative, enforcement, and management costs. (See A-2.3.2)
A-2.3.2	Socio-Economic Data Collection[bb]		The data collection program will be expanded and submission of economic data by harvesters and processors will be mandatory. Random and targeted audits may be used to validate mandatory data submissions. See footnote for a full description[cc] Information on QS transaction prices, will be included in a central QS ownership registry. *NOTE: Data collection started before the first year of implementation would be beneficial, in order to have a baseline for comparison.*
A-2.3.3	Program Costs	a Cost Recovery	Fees up to 3% of exvessel value, consistent with 303A(e) of the MSA, page 86, may be assessed. Cost recovery shall be for costs of management, data collection, analysis, and enforcement activities.
		b Fee Structure	To be determined. The TIQC recommended a fee structure that reflects usage. A fee structure that allows for equitable sharing of observer costs for smaller vessels may be developed.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.3.4	Program Duration and Modification		The Council shall begin a review of the IFQ program no later than 5 years after implementation of the program. The review will evaluate the progress the IFQ program has made in achieving the goal and objectives of Amendment 20. The result of this evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. Holders of quota shares should remain cognizant of this fact when making decisions regarding their quota shares, including buying selling, and leasing of these shares. The Council shall consider the use of an auction or other non-history based methods when distributing quota share that may become available after initial allocation. This may include quota created when a stock transitions from overfished to non-overfished, quota share not used by the adaptive management program, forfeited "use it or lose it" quota shares , and any quota that becomes available as a result of the initial or subsequent reviews of the program. The specific form of the auction or other method of distribution shall be designed to achieve the goals of Amendment 20, specifically including minimizing the adverse effects from an IFQ program on fishing communities to the extent practical. After the initial review, there will be a review process every four years. A community advisory committee will take part in the review of IFQ program performance.
A-3	***Adaptive Management***		It is the intent of the Council to have an adaptive management program for the shoreside non-whiting sector. Up to 10% of the non-whiting QS will be reserved for this program. QS will be divided among the three states. QS/QP will be provided through separate, but parallel, processes in each of the three states (e.g., through the use of regional fishery associations or community stability plans or other means). *The Council will take final action on further details of the adaptive management program at its June 2009 meeting. It will be considering a two phased implementation of the program, as reflected in the motion in writing from the April 2009 Council meeting (http://www.pcouncil.org/bb/2009/0409/F5d_SUP_MIW_0409.pdf) . Before it was passed, the April 2009 motion was modified to include two options for the first two years of the program: (1) the AMP QP may be passed through to QS holders in proportion to their QS holdings, or (2) there may be a simple formula designed to address objectives related to community stability, processor stability, conservation, facilitation of new entry and unforeseen consequences.*
A-4	***Pacific Halibut IBQ—non-retention***		IBQ for Pacific halibut bycatch in the trawl fishery will be established. The IBQ limit will be for legal and sublegal sized Pacific halibut bycatch mortality in the area north of 40°10 N latitude. Such IBQ will be issued on the basis of a bycatch rate applied to the target species QS an entity receives in a manner similar to that described in Section A-2.1.3.a, for overfished species caught incidentally. Area-specific bycatch rates may be used for allocation but halibut IBQ will not be geographically subdivided. *At its June 2009 meeting the Council will clarify whether the halibut mortality limit will be achieved by restricting individual vessel catch (with average fleet mortality rates applied) or by restricting individual vessel bycatch mortality.*

Table 1. Full description of the IFQ program (continued).

[a] California halibut gear of 7.5” or greater used in state waters would be exempted.

[b] Mandatory gear conversion (the permanent switching from trawl to some other gear) was considered but not included at this time.

[c] Since the shoreside trawl sector covers all shoreside deliveries, this implies that IFQ issued for the shoreside trawl sector may not be used for at-sea deliveries (i.e. may not be used to cover deliveries made to motherships or catch by catcher-processors).

[d] Not withstanding this provision, a vessel with a LE trawl permit may catch the trawl QP with a nontrawl gear, as per Section A-1.1.

[e] At present there are no groundfish species for which the harvest in the trawl fishery is managed differently by geographic area. An example of an area specific precautionary policy from outside trawl fishery management is the geographic differential recommended by the SSC for lingcod. Lingcod is monitored and managed differently in different geographic areas though there is a single coastwide ABC and OY for lingcod. Since there are no geographic subdivisions in the trawl management measures for lingcod, it is assumed that lingcod trawl IFQ will not be geographically subdivided.

[f] Such changes in latitudinal area management may occur as a result of changes in the management areas for species/species complexes in the ABC/OY table or as a result of separate Council action to change the trawl QS by area. In either case, specific Council action will be required to change the management areas and such action will be accompanied by appropriate supporting analysis and public comment opportunity.

[g] The Council authority to establish or modify RCAs will not be changed by this program.

[h] The allocation among trawl sectors will be determined as part of the intersector allocation process. The Trawl Individual Quota Committee (TIQC) recommended a number of options for determining the allocation among trawl sectors. One of these would have based the allocation on fleet history, but would not have included in the fleet history the history of any vessel not meeting the recent participation requirement. The Council rejected this application of a recent participation requirement to a determination of fleet history. The remaining TIQC options recommended that the division of allocation among trawl sectors be based on the fleet history over the same time periods used to allocate QS. The TIQC further recommended that if different periods are used for different trawl sectors, either (1) calculate the share for each sector based on its IFQ allocation period, then adjust all percentages proportionately such that they sum to 100%; OR (2) use the shortest period common to the allocation formula for all sectors.

The TIQC recommends allocation among the whiting sectors based on: Option 1: pro rata in proportion to the whiting allocation, or Option 2: weighted historical catch formula (for example, in projecting bycatch in the whiting fisheries prior to the start of the season, the GMT uses a four-year weighted average starting with the most recent year: 40%, 30%, 20%, 10%).

[i] A whiting QP rollover provision was considered but rejected from further analysis. This provision would have allowed unused QP to be reclassified so that they could be used in any whiting sector.

[j] The current process for changing the whiting fishery opening dates involves a regulatory amendment developed under the FMP through a framework process. Implementation of an IFQ program should not change this process.

[k] “**Processors”** are defined as follows:

Table 1. Full description of the IFQ program (continued).

An at-sea processor is a vessel that operates as a mothership in the at-sea whiting fishery or a permitted vessel operating as a catcher-processor in the at-sea whiting fishery.

A shoreside processor is an operation, working on US soil, that takes delivery of trawl-caught groundfish that has not been "processed at-sea" and that has not been "processed shoreside"; and that thereafter engages that particular fish in "shoreside processing." Entities that received fish that have not undergone "at-sea processing" or "shoreside processing" (as defined in this paragraph) and sell that fish directly to consumers shall not be considered a "processor" for purposes of QS allocations.

"Shoreside Processing" is defined as either of the following:

1. Any activity that takes place shoreside; and that involves: cutting groundfish into smaller portions; OR freezing, cooking, smoking, drying groundfish; OR packaging that groundfish for resale into 100 pound units or smaller for sale or distribution into a wholesale or retail market.

OR

2. The purchase and redistribution into a wholesale or retail market of live groundfish from a harvesting vessel.

[l] Transfer of physical assets alone should not be considered a basis for successor in interest. Business relationships such as transfer of the company name and customer base might be reasonable evidence of successor in interest.

[m] State landings receipts (fish tickets) will be used to assess landings history for shoreside deliveries.

[n] The intent is to provide an allocation method for QS for overfished species which addresses the vessel's need to have the QS to cover incidental catch in fisheries that target healthy stocks. The method would attempt to allocate the species to those who will be receiving QS for related target species. By allocating overfished species QS to those most in need of it, such an allocation would be expected to reduce transition costs. Currently, the list of overfished species that fall into this category is as follows: canary rockfish, darkblotched rockfish, Pacific Ocean perch, widow rockfish, and yelloweye rockfish. This list may change by the time the program is ready to be implemented. If a major target species became overfished, it would not be intended that such a species would be allocated via an alternative method (for example species such as Dover sole, sablefish, or Pacific whiting).

[o] The four areas are as follows: (1) north of 47°40 N Lat; (2) between 47°40 N Lat and 43°55 N Lat; (3) between 43°55 N Lat and 40°10 N Lat; and (4) south of 40°10 N Lat

[p] In order to determine an amount of aggregate target species to which bycatch rates will be applied, each vessel's QS will be multiplied by the trawl allocation at the time of implementation.

[q] State landings receipts (fish tickets) will be used to assess landings history for shoreside deliveries.

[r] Catch area data on fish tickets are not considered appropriate for this purpose. The catch area field is often filled out by fish receivers that do not know the area in which the vessel fished. Additionally catch area is often left unspecified. Therefore it will be assumed that all catch comes from ocean areas near the port of landing.

[s] Unless there is a change in the total OY or other factors affecting trawl allocation for the areas involved, in which case their change in QP would be proportional to the change in the trawl allocation.

Table 1. Full description of the IFQ program (continued).

[t] QP from a subsequent year may not be accessed until such QP have been issued by NMFS.

[u] Carryover of deficits provides some flexibility to use pounds from a year to cover a deficit from a previous year. Without a carryover provision, a vessel would still need to use pounds in a subsequent year to cover an overage but would incur a violation.

[v] There has been some GMT discussion of a possible need for the QP surpluses carried over to a following year be adjusted proportionally in the following year if the trawl allocation for the following year changes.

[w] No QS use-or-lose provision has been specified.. The need for this provision will be evaluated as part of program review process, and the provision could be added later, if necessary. *Section A-2.2.3.b contains a provision mandating the transfer of QP to vessels each year. This is intended to encourage QP use.*

[x] The following is the text deleted from this section: "No QS use-or-lose provision has been specified.. The need for this provision will be evaluated as part of program review process, and the provision could be added later, if necessary. *Section A-2.2.3.b contains a provision mandating the transfer of QP to vessels each year. This is intended to encourage QP use."*

[y] QS may be transferred on a temporary basis through private contract (leased) but NMFS will not track lease transfers differently than any other transfer.

[z] The "vessel" accumulation limit was originally termed a "permit" limit. The term "permit" was changed to "vessel" to be consistent with Section A-2.1.3, which indicates that QP go into vessel accounts, not permit accounts. The term "own or control" was shortened to "control" for simplicity. "Control" includes ownership and therefore is inclusive of "ownership."

[aa] For example, if a person has a 50 percent ownership interest in that entity, then 50 percent of the QS owned by that entity will count against the individual's accumulation limit.

[bb] Status quo **data collection** includes:

voluntary submission of economic data for LE trawl industry (status quo efforts);

voluntary submission of economic data for other sectors of the fishing industry; and

ad hoc assessment of government costs.

[cc] **Expanded data collection** would include:

mandatory submission of economic data for LE trawl industry (harvesters and processors),

voluntary submission of economic data for other sectors of the fishing industry,

transaction value information in a centralized registry of ownership, and

formal monitoring of government costs.

Mandatory Provisions: The Pacific Fishery Management Council and NMFS shall have the authority to implement a data collection program for cost, revenue, ownership, and employment data, compliance with which will be mandatory for members of the West Coast groundfish industry

Table 1. Full description of the IFQ program (continued).

harvesting or processing fish under the Council's authority. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.

A mandatory data collection program shall be developed and implemented as part of the groundfish trawl rationalization program and continued through the life of the program. Cost, revenue, ownership, employment and other information will be collected on a periodic basis (based on scientific requirements) to provide the information necessary to study the impacts of the program, including achievement of goals and objectives associated with the rationalization program. This data may also be used to analyze the economic and social impacts of future FMP amendments on industry, regions, and localities. The program will include targeted and random audits as necessary to verify and validate data submissions. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA. Additional funding (as compared to status quo) will be needed to support the collection of these data. The data collected would include data needed to meet MSA requirements (including antirust).

The development of the program shall include: a comprehensive discussion of the enforcement of such a program, including discussion of the type of enforcement actions that will be taken if inaccuracies are found in mandatory data submissions. The intent of this action will be to ensure that accurate data are collected without being overly burdensome on industry in the event of unintended errors.

Voluntary Provisions: A voluntary data collection program will be used to collect information needed to assess spillover impacts on non-trawl fisheries.

Central Registry: Information on transaction prices will be included in a central registry of QS owners. Such information will also be included for LE permit owners/lessees.

Government Costs: Data will be collected and maintained on the monitoring, administration, and enforcement costs related to governance of the trawl rationalization program.

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Table 2. Control and vessel limit options: Council **preliminary preferred alternative** for overfished species and halibut, **preferred alternative** for all other species (from March 2009).

	Preliminary Preferred (overfished species and halibut) and Preferred Alternative (all other species)	
Species Category	**Vessel Limit ***	**Control Lim**
Nonwhiting Groundfish Species	3.2%	2.7%
Lingcod - coastwide	3.2%	2.5%
Pacific Cod	20.0%	12.0%
Pacific whiting (shoreside)	15.0%	10.0%
Pacific whiting (mothership)	30.0%	20.0%
Sablefish		
N. of 36° (Monterey north)	4.5%	3.0%
S. of 36° (Conception area)	15.0%	10.0%
PACIFIC OCEAN PERCH*	5.0%	3.3%*
WIDOW ROCKFISH*	3.8%	2.5%*
CANARY ROCKFISH*	7.8%	5.2%*
Chilipepper Rockfish	15.0%	10.0%
BOCACCIO**	10.0%	7.5%**
Splitnose Rockfish	15.0%	10.0%
Yellowtail Rockfish	7.5%	5.0%
Shortspine Thornyhead		
N. of 34°27'	9.0%	6.0%
S. of 34°27'	9.0%	6.0%
Longspine Thornyhead		
N. of 34°27'	9.0%	6.0%
COWCOD**	10.0%	10%**
DARKBLOTCHED*	3.0%	2%*
YELLOWEYE**	3.9%	2.6%**
Minor Rockfish North		
Shelf Species	7.5%	5.0%
Slope Species	7.5%	5.0%
Minor Rockfish South		
Shelf Species	13.5%	9.0%
Slope Species	9.0%	6.0%
Dover sole	3.9%	2.6%
English Sole	7.5%	5.0%
Petrale Sole	4.5%	3.0%
Arrowtooth Flounder	20.0%	10.0%
Starry Flounder	20.0%	10.0%
Other Flatfish	15.0%	10.0%
Other Fish	7.5%	5.0%
Pacific Halibut***		
Min	1.5%	1.0%
Max	10.0%	8.0%

* These overfished species control limits are to be set at the maximum initial allocation to a permit. These percentages are based on preliminary estimates of those values.
** Because the maximum initial allocation for these overfished species were so high, the control limits were set at one half the maximum initial allocations. These percentages are based on preliminary estimates of those values.
*** Halibut IBQ
- Analyze a control limit range for quota share from 1-8%
- Analyze a vessel usage limit equal to control, up to 1.5 times control with a maximum of 10%

3.0 Whiting At-sea Trawl Sector: Cooperative Program (Appendix B of the EIS)

The at-sea whiting sector co-op program is described generally below. Table 3 provides an outline of the sections of the program. A full description of the co-op programs follows Table 3, beginning with a section on management of the whiting fishery and followed by sections on the mothership and catcher-processor sectors of the whiting fishery (the "at-sea" sectors).

The Council considered but did not adopt a co-op program for the shoreside whiting fishery. Instead, the shoreside whiting sector was merged with the nonwhiting sector, both to be managed with IFQs. However, section place holders for the shoreside whiting co-op program are maintained in this document to maintain a numbering system that will correspond to the numbering of the alternatives and sections of the analysis as they are laid out in the EIS.

3.1 Overview of Co-op Program Elements

3.1.1 At-sea Whiting Sector Management under Co-ops

While co-ops will be used to control the harvest within the at-sea whiting sectors, a number of management measures will still be required to control competition between the whiting sectors. This section covers those measures along with other measures which will apply to all sectors managed under co-ops, such as observer requirements and mandatory submission of economic data. The description of the co-op management program for each at-sea whiting sector starts in Section 3.1.2.

The existing allocation of whiting between the shoreside, mothership, and catcher-processor (CP) sectors will not change under the rationalization program (42, 24, and 34 percent, respectively).

Provisions also address bycatch in the at-sea whiting fishery (particularly that of certain overfished species). The Council is recommending incidental groundfish species caps for each of the whiting sectors, for the co-op and non-co-op fisheries within the mothership sector, and for the co-ops within the mothership sector. Within sectors, bycatch allocations would be pro rata, based on the amount of whiting allocated to that sector.

Area closures may be used to control the pace of the fishery. For the mothership sector, the fishery will be divided into a co-op fishery and a non-co-op fishery (for those who do not desire to take part in a co-op). Participants in the non-co-op fishery will not have a claim to a particular amount of the fish allocated to that fishery; therefore the vessels will likely race to harvest the available allocation.

NMFS will close the whiting fishery, a particular sector, the co-op or non-co-op fishery within a sector, or individual co-ops, as appropriate, when it is projected that a whiting catch or bycatch limit will be reached. With respect to co-ops, inseason monitoring and closure will be needed only at the highest level of aggregation of the co-ops. For example, if individual co-ops join together to form an inter-co-op that covers the entirety of one of the whiting sectors, then NMFS will track and close at the sector level. Nevertheless, vessel level monitoring will still be required to ensure that catch is accurately recorded.

Given the high level of monitoring already in place in the whiting fishery, only moderate changes in monitoring are needed to implement this program for the at-sea whiting fishery. For the at-sea segment of the fishery, 100 percent coverage aboard mothership and catcher processors will continue. A program for the mandatory submission of economic data is also included, to facilitate monitoring program performance.

3.1.2 Co-ops for Catcher Vessels Delivering to Motherships

Under this program, those who hold whiting-endorsed permits for catcher vessels in the mothership sector will choose each year whether to be part of a co-op or to register to fish in the non-co-op portion of the fishery. The holders of catcher vessel permits with mothership whiting endorsements will form the co-ops. Based on its catch history, each permit that qualifies for a mothership whiting endorsement will be capped at a portion of the history (endorsement share) of the mothership sector allocation of whiting and bycatch species. Each year, NMFS will distribute a catch allocation to each catcher vessel co-op based on the sum of the endorsement shares for the permits registered to that co-op. NMFS will also distribute a catch allocation each year to the non-co-op portion of the fishery, based on the collective endorsement shares of the permits opting to participate in the non-co-op fishery.

The co-op organization will coordinate harvest by its members. Although co-op agreements will include a mandatory clause that the catch allocation made to a member must equal the amount that the member brings into the co-op, co-op members may transfer catch allocations among themselves. Similarly, if multiple co-ops join together in an inter-co-op, one co-op will be allowed to transfer catch allocation to another co-op within that inter-co-op. NMFS will not necessarily need to track transfers among co-op members or within an inter-co-op.

The class of motherships will be closed by creating a LE permit for mothership vessels. There will be restrictions limiting a vessels ability to both catch and operate as a mothership in the whiting fishery in the same year. This will limit the ability of processing vessels to move between the catcher processor and mothership sectors.

Prior to the start of each season, each catcher vessel permit desiring to participate in the co-op fishery will obligate itself to deliver its catch to a particular mothership. The obligation to a particular co-op or mothership will not carry-over from one year to the next, it may be changed at the catcher vessel permit owners discretion based on its preseason declaration. While catch may be transferred among participants in a co-op or inter-co-op, such transfers would not change the mothership to which the catch is obligated, unless a mutual agreement is reached.

As in the IFQ program, accumulation limits will be imposed to prevent excessive concentration of catch allocations. They will cap the proportion of whiting that an individual or entity can process, cap the proportion of whiting an individual or entity could accumulate via ownership of catcher vessel permit(s), and cap the amount that can be landed by any one catcher vessel.

3.1.3 Co-ops for Catcher-Processors

Under the catcher-processor (CP) co-op program, as under status quo, a voluntary CP co-op may continue to be formed by CP permit holders. This system will continue as long the existing co-op system continues to operate successfully or until the FMP is otherwise amended. If the voluntary co-op system fails, it will be replaced with an IFQ system. Currently the co-op operates under a private contract that includes division of the harvest among participants according to an agreed schedule. In the event the co-op system fails, IFQ will be allocated equally to each CP permit (equally divided among all CP endorsed permits).

Under the catcher-processor (CP) co-op program, the main Council recommendations are the creation of a CP endorsement to close the CP fishery to new entrants and the assignment of an allocation to the voluntary CP co-op. The endorsement will be granted to LE permits registered to CP vessels if the vessels meet specified qualification criteria. Only vessels with a CP LE permit will be allowed to harvest fish from the CP sector's allocation. LE permits with CP endorsements will continue to be transferable. NMFS will not establish an allocation of catch or catch history among CP permits unless the co-op fails. NMFS will specify in regulation the assignment of the CP sector allocation to the CP sector co-op. If necessary, a closure will be used to keep the CP sector from exceeding its allocation of whiting and bycatch species.

3.2 Detailed Specification of Co-op Program Elements

Table 3 Overview of the co-op program.

B.1	***Whiting Sector Management Under Co-ops***
B-1.1	Whiting Management
B-1.2	Annual Whiting Rollovers
B-1.3	Bycatch Species Management
B-1.4	At-sea Observers/Monitoring
B-1.5	Mandatory Data Collection
B-1.6	Adaptive Management—Not included in recommendation. *(This section header is being maintained as a place holder so that numbering will correspond to that of the alternatives and analysis in the EIS).*
B-1.7	Length Endorsement
B-2	***Whiting Mothership Sector Co-op Program***
B-2.1	Participation in the Mothership Sector
B-2.2	Permits/Endorsement Qualification and Characteristics
B-2.3	Co-op Formation and Operation Rules
B-2.4	Obligations to Processors
B-2.5	NMFS Role
B-3	***Whiting Shoreside Sector Co-op Program***
	Not included in recommendation. *(This section header is being maintained as a place holder)*.
B-4	***Co-ops for Catcher-Processors***
B-4.1	Participation in the Catcher-Processor Sector and Endorsement Qualification
B-4.2	Co-op Formation and Operation Rules
B-4.3	NMFS Role

B-1 Whiting Sector Management Under Co-ops

B-1.1 Whiting Management

Under the co-op program, catcher vessel permits for the mothership sector will be endorsed for deliveries to motherships and amounts of history assigned; and catcher-processor permits will be endorsed for participation in the catcher-processor sector.

The whiting catch history calculation for each mothership-endorsed catcher vessel permit [CV(MS)] will be assigned to a pool for the co-op in which the permit will participate or a pool for the mothership non-co-op fishery. Co-ops are responsible for monitoring and enforcing the catch limits of co-op members. NMFS will make an allocation assignment to the catcher-processor sector co-op based on the allocation to the CP sector.

NMFS will monitor the catch in the mothership non-co-op fishery, the mothership co-op fishery, the CP fishery, and the overall whiting catch of all at-sea sectors. NMFS will close each segment of the fishery based on projected attainment of whiting catch. Additionally, all at-sea sectors will be subject to closure based on attainment of the overall trawl whiting allocation.

B-1.2 Annual Whiting Rollovers

There will not be a rollover of unused whiting from one sector to another.

B-1.3 Bycatch Species Management

For the foreseeable future, the whiting fishery will be managed under bycatch limits (hard caps) for widow, canary, darkblotched rockfish, and Pacific Ocean perch. The catch of all groundfish will be accounted for and tracked against the OY.

The ESA-listed salmon bycatch management measures—that is, the 11,000 Chinook threshold, 0.05 rate threshold, and triggered 100 fathom closure—will also continue to be in place.

The goal of bycatch management is to control the rate and amounts of rockfish and salmon bycatch to ensure each sector is provided an opportunity to harvest its whiting allocation.

There will be a set aside of Pacific halibut for the at-sea whiting fishery, as specified in the intersector allocation process (Amendment 21).

B-1.3.1 Bycatch Allocation Subdivision

Subdivide bycatch species managed with hard caps (widow, canary, darkblotched rockfish, and Pacific Ocean perch) among each of the whiting sectors; within the sectors subdivide between the co-op fishery and non-co-op fishery (subdivision for the non-co-op fishery does not apply to the catcher-processor co-op program); and subdivide among co-ops.

Bycatch will be allocated to each permit and co-op pro rata in proportion to its whiting allocation. The mothership sector's bycatch allocation will be divided between its co-op and non-co-op fishery, based on the allocations made to the permits participating in each portion of the fishery.

B-1.3.2 Bycatch Management

All sectors and co-ops will close based on projected attainment of the at-sea whiting fishery bycatch cap for any one species. The mothership co-op fishery, non-co-op fishery, and catcher-processor fishery will each be closed based on projected attainment of their individual allocation. Additionally, each co-op will cease fishing when its bycatch allocation is reached.

The Council may also use area closures (seasonal or year-round) to manage overfished stocks in the co-op and non-co-op fisheries. The area closures may be the same or different for different species. Area closures may be year-round, seasonal, or triggered automatically by the attainment of certain levels of catch.

Unused bycatch may be rolled over from one sector to another if the sector's full allocation of whiting has been harvested or participants in the sector do not intend to harvest the remaining sector allocation.

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B-1.4 At-sea Observers/ Monitoring

At-sea Whiting Fishery: 100 percent observer coverage aboard mothership and catcher-processors will continue.

For some coverage, cameras may be used in place of observers (feasibility to be determined).

B-1.5 Mandatory Data Collection

The following are the central elements of the data collection program that will be implemented as part of the co-op program.

- Mandatory submission of economic data for LE trawl industry (harvesters and processors).
- Voluntary submission of economic data for other sectors of the fishing industry.
- Include transaction value information in a centralized registry of ownership.
- Formal monitoring of government costs.

Mandatory Provisions. The Pacific Fishery Management Council and NMFS shall have the authority to implement a data collection program for cost, revenue, ownership, and employment data, compliance with which will be mandatory for members of the west coast groundfish industry harvesting or processing fish under the Council's authority. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.

A mandatory data collection program shall be developed and implemented as part of the groundfish trawl rationalization program and continued through the life of the program. Cost, revenue, ownership, employment and other information will be collected on a periodic basis (based on scientific requirements) to provide the information necessary to study the impacts of

the program, including achievement of goals and objectives associated with the rationalization program. These data may also be used to analyze the economic and social impacts of future FMP amendments on industry, regions, and localities. The program will include targeted and random audits as necessary to verify and validate data submissions. *Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.* Additional funding (as compared to status quo) will be needed to support the collection of these data. The data collected would include data needed to meet MSA requirements (including antirust).
The development of the program shall include a comprehensive discussion of the enforcement of such a program, including discussion of the type of enforcement actions that will be taken if inaccuracies are found in mandatory data submissions. The intent of this action will be to ensure that accurate data are collected without being overly burdensome to industry in the event of unintended errors. Annual reports will be provided to the Council.

Voluntary Provisions: A voluntary data collection program will be used to collect information needed to assess spillover impacts on non-trawl fisheries.

Central Registry: Information on transaction prices will be included in a central registry of whiting endorsed permit and mothership permit owners. Such information will also be included for sales and lessees.

Government Costs: Data will be collected and maintained on the monitoring, administration, and enforcement costs related to governance of the rationalization program.

B-1.6 Adaptive Management

There will not be an adaptive management set aside for the at-sea whiting fisheries. *(This section is being maintained as a place holder so that numbering will correspond to that in the alternatives and analysis of the EIS.)*

B-1.7 Length Endorsement

Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained, however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e. length endorsements will not change when a trawl endorsed permit is transferred to a smaller vessel).

B-2 Whiting Mothership Sector Co-Op Program

Overview. Qualified permits will be endorsed for mothership (MS) co-op participation. Each year the holders of those permits will choose whether their vessels will fish in the co-op fishery, in which individual co-ops will direct harvest, or fish in a non-co-op fishery that will be managed by NMFS as an Olympic style fishery. The co-op will be obligated to deliver its fish to specific mothership processors based on the obligations of each permit in the co-op determined based on preseason declarations. LE permits will be issued for motherships and required for a mothership to receive whiting from catcher vessels.

B-2.1 Participation in the Mothership Sector

a. Catcher Vessels

Vessels with CV(MS)-endorsed permits may participate in either the co-op or non-co-op portion of the mothership fishery. They will choose annually which fishery they will participate in for the coming year. Additionally, any groundfish LE trawl permitted vessels may participate in the co-op portion of the fishery if they join a co-op (as described in Section B-2.3.3).[6] No other catcher vessels may participate in the mothership fishery.

A vessel may not engage in the processing of whiting during any year in which a catcher vessel (mothership) (CV(MS)) endorsed permit is registered for use with the vessel.

b. Processors

Only motherships with a mothership LE permit may receive deliveries from catcher vessels participating in the co-op or non-co-op portions of the mothership sector whiting fishery. (Note: motherships may acquire such permits by transfer; see Section B-2.2.2.)

c. Vessels Excluded[7]

Motherships also operating as a catcher-processor may not operate as a mothership: during a year in which it also participates as a catcher-processor.

B-2.2 Permits/Endorsement Qualification and Characteristics

B-2.2.1 Catcher Vessel Mothership Whiting Endorsement (CV(MS) Whiting Endorsement)

a. Endorsement Qualification and History Assignment

Permits with a qualifying history will be designated as CV(MS) permits through the addition of an endorsement to their LE groundfish permit. At the time of endorsement qualification, each permit will also be assigned a catch history that will determine the share of the mothership whiting allocation associated with that permit.

Qualifying for a CV(MS) Whiting Endorsement. A LE permit will qualify for a CV(MS) whiting endorsement if it has a total of more than 500 mt of whiting deliveries to motherships from 1994 through 2003

6 When such permits participate in a co-op the co-op will not be allocated any additional fish based on participation by such a vessel.

7 A vessel that has been under foreign registry after the date of the AFA and that has participated in fisheries in the territorial waters or exclusive economic zones of other countries will not be eligible to participate as a mothership in the mothership sector of the Pacific whiting fishery, as per Section 12102(c)(6) of the AFA.

Catch History Assignment (Identification of Endorsement Related Catch History). The initial catch history calculation for CV(MS) whiting endorsements will be based on whiting history of the permit for 1994 through 2003, dropping 2 worst years. This catch history will be used by NMFS to assign both whiting and bycatch species allocations to the co-ops and non-co-op fishery pools, as per section B.1.3.2.

For the purpose of the endorsement and initial calculation, catch history associated with the permit includes that of permits that were combined to generate the current permit.

b. Whiting Permit and Endorsement Transferability and Endorsement Severability

The CV(MS) whiting endorsement (together with the associated catch history) *may not be* severed from the groundfish LE trawl permit. CV (MS) permits may be transferred two times during the fishing year, provided that the second transfer is back to the original catcher vessel (i.e. only one transfer per year to a different catcher vessel

c. Accumulation Limit

CV(MS) Permit Ownership: No individual or entity may own CV(MS) permits for which the allocation total is greater than 20%. Additionally, no vessel may catch more than 30% of the mothership sector's whiting allocation.

d. Combination

CV(MS) Permit Combination to Achieve a Larger Size Endorsement. When a CV(MS)-endorsed permit is combined with another permit (including unendorsed permits), the resulting permit will be CV(MS) endorsed[8]

B-2.2.2 Mothership Processor Permit

a. Qualifying Entities

The owners of qualifying motherships will be issued MS permits. In the case of bareboat charters, the charterer of the bareboat will be issued the permit.

b. Qualification Requirements

A qualifying mothership is one which processed at least 1,000 mt of whiting in each of any two years from 1997 through 2003.

[8] Specifically, a CV(MS)-endorsed permit that is combined with a LE trawl permit that is not CV(MS) endorsed or one that is CV(Shoreside) [CV(SS)] endorsed will be reissued with the CV(MS) endorsement. If the other permit is CV(SS) endorsed, the CV(SS) endorsement will also be maintained on the resulting permit. However, CV(MS) and CV(SS) catch histories will be maintained separately on the resulting permit and be specific to participation in the sectors for which the catch histories were originally determined. If a CV(MS) permit is combined with a CP permit, the CV(MS) endorsement and history will not be reissued on the combined permit. The size endorsement resulting from permit combinations will be determined based on the existing permit combination formula.

c. Transferability

1. MS permits will be transferable
2. MS permits may be transferred to a vessel of any size (there will be no size endorsements associated with the permit) MS permits **may not** be transferred to a vessel engaged in the *harvest* of whiting in the year of the transfer.
3. Limit on the Frequency of Transfers: MS permits may be transferred two times during the fishing year provided that the second transfer is back to the original mothership (i.e. only one transfer per year to a different mothership).

d. Usage Limit

No individual or entity owning a MS permit(s) may process more than 45 percent of the total MS sector whiting allocation.

B-2.3 Co-op Formation and Operation Rules.

B-2.3.1 Who and Number of Co-ops

Co-ops are not required but may be voluntarily formed among CV(MS) permit owners. The number of co-ops will be indirectly limited by the limit on the minimum number of vessels able to form a co-op (see Section 2.3.3-b).

B-2.3.2 When

Each year at a date certain prior to the start of the fishery, MS and CV(MS) permit holders planning to participate in the mothership sector must register with NMFS. At that time CV(MS) permit holders must identify which co-op they will participate in or if they plan to participate in the non-co-op fishery.

B-2.3.3 Co-op Agreement Standards

a. Submissions to NMFS and the Council

Co-op agreement. Co-op agreements will be submitted to NMFS for approval. Signed copies of the cooperative contracts must be filed with the Council and NMFS and available for public review before the co-op is authorized to engage in fishing activities.[9] Any material changes or amendments to the contract must be filed annually with the Council and NMFS by a date certain.

Letter to Department of Justice. Co-ops must also file with the Council and NMFS a copy of a letter from the co-op requesting a business review letter on the fishery cooperative from the Department of Justice and any response to such request.

[9] During council discussion this was flagged by NOAA GC as a potential legal problem.

b. Number of Participants in Each Co-op (Including Inter-co-ops)

CV permits may join together in separate harvester co-ops. A minimum of 20% of the CV(MS) permit holders are required to form a co-op.[10] Co-ops may form co-ops with other co-ops. Within one of the whiting sectors, these co-ops may be formed to manage directed catch and/or bycatch. Whiting and bycatch allocations may be transferred among co-ops through inter-co-op agreements.

c. Catch History Distributions Among Permits

Co-op agreements must stipulate that catch allocations to members of the co-op be based on their catch history calculation by NMFS used for distribution to the co-op.

d. Participation by Non-CV (MS) Endorsed Permits

Through temporary arrangements a co-op allocation may be harvested by any catcher vessel holding a valid LE trawl permit which has joined the co-op (including one that does not have a CV(MS) endorsement).[11]

e. Other Required Co-op Agreement Provisions

The Council's intent is to have mothership sector participants work with NMFS to develop and describe a process and co-op agreement requirements to include in implementing regulations for this action.

A co-op agreement must include:

1. A list of all vessels, and which must match the amount distributed to individual permit holders by NMFS
2. Signature of all permit holders participating in the co-op
3. A plan to adequately monitor catch and bycatch
4. Adequate enforcement and penalty provisions to ensure that catch and bycatch overages do not occur
5. Measures designed to reduce bycatch of overfished species
6. An obligation to manage inseason transfers of catch history
7. A requirement that agreement by at least a majority of the members is required to dissolve a co-op (**During council discussion this was flagged by NOAA GC as a potential legal problem**)
8. An obligation to produce an annual report to the Council and NMFS by a date certain documenting the co-op's catch and bycatch data and inseason transfers (the report is to be available for review by the public)
9. Identification of a co-op manager who will:
    a. serve as the contact person with NMFS, the Council and other co-ops,
    b. be responsible for the annual distribution of catch and bycatch,
    c. oversee transfers,
    d. prepare annual reports, and

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[10] The minimum threshold number of participants required to form a co-op balances the potential advantages for multiple co-ops while limiting implementation and management costs and administrative requirements for managing this sector.

[11] As a member of the co-op, such a vessel would be subject to Section B-2.4 and the indicated processor obligations.

   e. be authorized to receive or respond to any legal process against the co-op.
10. Provisions that prohibit co-op membership by permit holders that have incurred legal sanctions that prevent them from fishing groundfish in the Council region
11. A provision that requires new owners to comply with membership restrictions in the co-op agreements

f. Additional Provisions for Inter-co-op Agreements

1. In the case of two or more cooperatives entering into an inter-cooperative agreement, the inter-co-op agreement must incorporate and honor the provisions of the individual co-op agreements unless all such agreements (or modifications thereof) are resubmitted for approval.
2. The requirements of Sections 2.3.3.a-2.3.3.e apply to the inter-co-op agreement, except that for the purpose of Section 2.3.3.e., subparagraph 7, the members of the inter-co-ops are the co-ops and not the participants in each co-op.

B-2.3.4 Annual Allocation Transferability

1. The annual allocations received by a co-op based on catch history of the whiting endorsements held by its members may be transferred among co-op members and from one co-op to another so long as obligations to processors are met (as per Section B-2.4). Additionally, in order to transfer annual allocation from one co-op to another there must be a NMFS approved inter-co-op agreement.
2. Allocations may not be transferred from the mothership sector to another sector.

B-2.4 Obligations to Processors

There will not be a processor tie that carries from one year to the next. CV(MS) permits will be obligated to a single MS permit for an entire year but may change to a different MS permit through a preseason declaration of intent.

> By September 1 of the year prior to implementation and every year thereafter, each CV(MS) permit is required to contact NMFS and indicate whether CV(MS) permit will be participating in the co-op or non-co-op fishery in the following year. If participating in the co-op fishery, then CV(MS) permit must also provide the name of the MS permit that CV(MS) permit will be linked to in the following year (i.e., annual catcher vessel, mothership linkage that may be changed each year without requirement to go into the "non-co-op" fishery). Once established, the catcher vessel, mothership linkage shall remain in place until changed by CV(MS) permit.

B-2.4.1 Modification of Obligations

Mothership Permit Transfer. If a mothership transfers its MS permit to a different mothership or different owner, the CV(MS) permit obligation for that year remains in place and transfers with the MS permit to the replacement mothership unless the obligation is changed by mutual agreement. The obligation does not extend beyond the fishing year.

B-2.4.2 Flexibility in Meeting Obligations to Processors

a. Temporary Transfer of the Annual Allocation Within the Co-op or from One Co-op to Another

When CV(MS) permit owners transfer co-op allocations from one co-op member to another within the co-op or from one co-op to another within an inter-co-op such allocations must be delivered to the mothership to which the allocation is obligated through the preseason declaration, unless released by mutual agreement.

b. Mutual Agreement Exception

By mutual agreement of the CV(MS) permit owner and mothership to which the permit is obligated, a permit may deliver to a licensed mothership other than that to which it is obligated.

B-2.4.3 Mothership Processor Withdrawal

If a mothership withdraws subsequent to quota assignment, then the CV(MS) permit that it is obligated to it is free to participate in the co-op or non-co-op fishery. The MS permit shall notify NMFS and linked CV(MS) permits of its withdrawal, and CV(MS) permits shall notify NMFS of their intent to participate in the co-op or non-co-op fishery thereafter. If continuing in co-op fishery, then CV(MS) permit shall provide NMFS with the name of the new MS permit to which it will be obligated for that season.

B-2.5 NMFS Role

B-2.5.1 Permit and Endorsement Issuance

NMFS will issue all necessary permits and endorsements under the rules specified under this program. Appeals processes will be provided as appropriate and necessary.

B-2.5.2 Fishery Registration and Co-op Approval

NMFS will announce a deadline before which all co-op agreements must be received for the coming year. NMFS will review and approve or reject co-op agreements based on standards provided here and other standards that it deems necessary to achieve the policy intent of the Council’s actions.

B-2.5.3 Annual Allocation to Co-ops and the Non-co-op Fishery

a. Co-op Allocation

Each year NMFS will determine the percent of the mothership sector’s harvest allocation to be given to each co-op based on the catch history calculation of CV(MS) permits registered to participate in the co-op that year. NMFS does not allocate to the individual permit holder; rather, NMFS allocates an aggregate amount of harvest tonnage annually to the co-op based on the catch histories associated with the members of the co-ops.

b. Non-co-op Allocation

Each year NMFS will determine the distribution to be given to the non-co-op fishery based on the catch history calculation of permit holders registered to participate in that fishery.

B-2.5.4 Fishery Management and Co-op Monitoring

1. NMFS will track all permit transfers and the invocation of mutual agreement exceptions. Permit transfers will not be valid until registered and acknowledged by NMFS.

2. NMFS will monitor catch and close segments of the fishery as necessary to ensure catch limits are not exceeded for:
   a. the whiting mothership co-op fishery
   b. the whiting mothership non-co-op fishery
   c. the mothership whiting sector as a whole
3. NMFS will not necessarily monitor, but will investigate and enforce as it deems necessary, the permit and co-op obligations to motherships.
4. NMFS will not necessarily monitor or enforce (except as it deems necessary):
   a. an individual permit's progress towards its catch allocations (permit level catch control will be at the co-op level and enforced through execution of the private contract)
   b. a co-op's progress toward its catch allocation[12]
   c. actual performance of the co-op agreement (the parties to the contract will resolve through private contract and remedies any deviation from provisions such as that requiring that a vessel have the opportunity to harvest the catch allocated to the co-op based on that vessel's permit, Section B-2.3.3.c)
5. NMFS will monitor other program provisions as needed. In some situations, there may need to be a declaration procedure to determine where a permit is delivering its obligated catch, for example, if a mothership withdraws without transferring its permit or reaching a mutual agreement for the transfer of obligated deliveries to a different mothership.

B-3 Whiting Shoreside Sector Co-Op Program (placeholder, not recommended)

The shoreside whiting sector will be managed with an IFQ program. This section header is being maintained so that section numbering here will correspond to section numbering in the alternatives and analysis in the EIS.

[12] This assumes that there is an inter-co-op agreement in place that covers the entire co-op fishery. If such an agreement is not in place covering both catch and bycatch, NMFS may need to monitor catch by each individual co-op (but not by the individual vessels in the co-op).

B-4 Catcher-Processors Co-op Program

Catch by the catcher-processor sector will be controlled primarily by closing the fishery when a constraining allocation is reached.[13] As under status quo, vessels may form co-ops to achieve benefits that result from a slower-paced, more controlled harvest. The main recommendations are the creation of a limited number of catcher-processor endorsements and the specification in regulation of the amounts that will be available for harvest by the voluntary co-op. A new entrant will have to acquire a permit with a catcher-processor endorsement in order to enter the fishery. If the co-op system fails it will be replaced by an IFQ program and the initial issuance of IFQ will be allocated equally among the permits (equally divided among all CP endorsed permits).

B-4.1 Participation in the Catcher-Processor Sector , Endorsement Qualification and Permit Transferability.

Catcher-processor (CP) Endorsement. The class of CP endorsed permits (CP permits) will be limited by an endorsement placed on a LE permit. LE permits registered to qualified catcher-processor vessels will be endorsed as CP permits. A qualified permit is one that harvested and processed in the catcher-processor sector of the Pacific whiting fishery at any time from 1997 through 2003. Only vessels catcher-processor vessels with a CP endorsed LE permit will be allowed to process whiting at-sea. LE permits with CP endorsements will continue to be transferable.

Participation as Mothership. A catcher-processor cannot operate as a mothership during the same year it participates in the CP fishery.

CP Permit Combination to Achieve a Larger Size Endorsement. A CP permit that is combined with a LE trawl permit that is not CP endorsed will result in a single CP permit with a larger size endorsement. (A CV(MS) endorsement on one of the permits being combined will not be reissued on the resulting permit.) The resulting size endorsement will be determined based on the existing permit combination formula.

CP Permit Transfers to Smaller Vessels. Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained, however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e. length endorsements will not change when a trawl endorsed permit is transferred to a smaller vessel).

Number of Transfers Per Year. CP permits may be transferred two times during the fishing year, provided that the second transfer was back to the original CP (I.e., only one transfer per year to a different CP).

[13] All references to catcher-processors in this section references to vessels operating in the catcher-processor sector. Vessels under 75’ which catch and process at-sea as part of the shoreside sector are not covered here.

B-4.2 Co-op Formation and Operation Rules

No annual registrations or declarations are required. As under status quo, co-op(s) will be formed among holders of permits for catcher-processors. Participation in the co-op will be at the discretion of those permit holders. If eligible participants choose to form a co-op, the catcher-processor sector will be managed as a private voluntary cooperative and governed by a private contract that specifies, among other things, allocation of whiting among CP permits, catch/bycatch management, and enforcement and compliance provisions. Under the co-op program, if more than one co-op is formed, a race for fish could ensue absent an inter co-op agreement. NMFS will not establish an allocation of catch or catch history among permits unless the co-op fails to form. If the co-op system fails it will be replaced by an IFQ program and the initial issuance of IFQ will be divided equally among all CP endorsed permits.

Annual Reporting Requirements. The CP cooperative will submit an annual report to the Pacific Fishery Management Council at their November meeting. The report will contain information about the current year's CP fishery, including the CP sector's annual allocation of Pacific whiting; the CP cooperative's actual retained and discarded catch of Pacific whiting, salmon, rockfish, groundfish, and other species on a vessel-by-vessel basis; a description of the method used by the CP cooperative to monitor performance of cooperative vessels that participated in the CP sector of the fishery; and a description of any actions taken by the CP cooperative in response to any vessels that exceed their allowed catch and bycatch. The report will also identify plans for the next year's CP fishery, including the companies participating in the cooperative, the harvest agreement, and catch monitoring and reporting requirements.

B-4.3 NMFS Role

B-4.3.1 Permit and Endorsement Issuance

NMFS will issue all necessary endorsements under the rules specified under this program. Appeals processes will be provided as appropriate and necessary.

B-4.3.2 Annual Allocation

Harvest amounts for the co-op will be specified in regulation. If the co-op breaks up, harvest will be divided equally among the 10 permits.

The catcher-processor sector allocation may be divided among eligible catcher-processor vessels (i.e., those catcher-processor vessels for which a CP permit is held) according to an agreed catcher-processor cooperative harvest schedule as specified by private contract.

B-4.3.3 Fishery and Co-op Monitoring

1. NMFS will track all permit transfers. Permit transfers will not be valid until registered and acknowledged by NMFS.
2. NMFS will monitor catch and close the catcher-processor sector fishery as necessary to ensure catch limits are not exceeded.

STAFF RECOMMENDATION ON AMENDING THE GROUNDFISH FMP TO INCORPORATE THE TRAWL RATIONALIZATION PROGRAM

Proposed Structure of the Amendment Language

Staff envisions that the details of the trawl rationalization program would be specified in Federal regulations. The FMP would briefly describe the program. An appendix to the FMP would summarize the contents of the regulations. This descriptive appendix could be revised from time to time without going through the Magnuson-Stevens Act (MSA) §304(a) Secretarial Review Process.

This approach would effectively allow Council discretion over program changes and a full public process both through the Council and Administrative Procedures Act (APA) full notice and comment rulemaking but not require a somewhat duplicative MSA §304(a) FMP amendment process. Council Operating Procedure 11 specifies a three meeting Council process for considering FMP amendments, but this does not necessarily apply to how the Council considers regulatory amendments independent of any FMP change. If there is concern that proposals for regulatory changes would not get sufficient consideration in the Council process then the operating procedures could be modified to add a comparable requirement for regulatory proposals (of course, the Council is not prohibited from applying the three-meeting framework to regulatory amendments in the absence of any specific requirement in operating procedures). Other applicable law, such as the National Environmental Policy Act (NEPA), would still apply, affording public participation opportunities. In addition, full notice and comment rulemaking includes public comment on the proposed rule.

The October 2008 preliminary DEIS contains the following recommendation for structuring the amendment language:

> The language of the FMP will be amended to indicate the following:
>
> 1. the shoreside whiting and nonwhiting trawl fishery will be managed under a single IFQ system;
> 2. the mothership whiting fishery will be managed as a co-op with processor linkages;
> 3. the catcher-processor fishery will be managed with a catcher-processor endorsement or an IFQ program in which each permit starts with the same initial allocation;
> 4. the Council may use some of the trawl allocation for an adaptive management program;
> 5. the length endorsement will not apply with respect to LE trawl endorsements.
>
> The specific provisions of the trawl rationalization program provided here will be incorporated as appendices to the FMP but will be amendable through regulatory action. The recommendations for a halibut IBQ provision will be implemented as a regulatory action.

Rather than conceiving of the appendices as "amendable through regulatory action" it is probably more accurate to say that the appendices will summarize the regulations, which will specify the details of the program. As discussed above, the regulations could be changed by regulatory amendment (full notice and comment rulemaking) and the appendices could then be revised to reflect these changes without Secretarial Review. The Groundfish FMP currently incorporates several appendices containing descriptive material. Section 1.2 of the FMP includes the following statement:

> The appendices contain supporting information for the management program. Because these appendices do not describe the management framework or Council groundfish management policies and procedures, and only supplement the required and discretionary provisions of the FMP described in §303 of the Magnuson-Stevens Act, they may be periodically updated without

being subjected to the Secretarial review and approval process described in §304(a) of the Magnuson-Stevens Act. These appendices are published under separate cover.

Description of Proposed Changes to the Content of the Groundfish FMP Related to the Trawl Rationalization Amendment

To implement Amendment 20, in addition to adding appendices describing the IFQ and co-op programs, certain sections of Chapters 6 and 11 need to be modified. Those modifications are provided as an attachment and summarized here.

Chapter 6 in the FMP describes the range of management measures available to the Council, organized according to major categories. Section 6.9 of the chapter describes measures to control fishing capacity, including permits and licenses.

- Section 6.9.1 describes general provisions for permits. A section is added to cover the new requirement for processor permits for the mothership fishery.

- Section 6.9.3, "Individual Fishing Quota Programs" was incorporated into the FMP by Amendment 18 and authorizes an IFQ program. It has been rewritten to cover trawl rationalization in general (both IFQs and co-ops) and a separate subsection was created to preserve the language referencing IFQs as they would apply to other sectors.

Chapter 11 describes the license limitation program and the division that program created between the limited entry and open access segments.

- Section 11.2.1 identifies the Federal permit requirements and the regulations that apply when vessels with limited entry permits use open access gears. That language is modified to indicate that when a vessel with a trawl permit uses an exempted gear IFQ regulations apply, except with respect to those gears for which the IFQ program provides and exception (see Section A-1.1 of the IFQ program for the gear exceptions).

- Section 11.2.5 identifies the requirements for gear endorsements. Paragraph 6 of this section has been rewritten to clarify the ability of vessels with limited entry permits to use gears for which they do not hold an endorsement and to incorporate language that provides for gear switching.

- A new section was added "Section 11.2.6 Sector Endorsements." The existing sections on fixed gear sablefish were moved from Section 11.4 to this section and sections were added on catcher processor (CP) endorsements, and Pacific whiting mothership catcher vessel (CV(MS))endorsements.

- Section 11.2.7 addresses the size endorsement. It has been modified to indicate a trawl permit's size endorsement will not be reduced if it is transferred to a smaller vessel.

- Section 11.2.11 covers the rules for combining permits. A new paragraph was added to address the treatment of the new endorsements CP and CV(MS) endorsements when permit combination occurs.

- Section 11.5 contained the language implementing Amendment 15. As indicated in the first paragraph of that section, these provisions 15 sunset with the creation of a trawl rationalization program for the Pacific whiting fishery. Therefore, this language has been removed.

[N.B. Text to be added to Chapter 1 noting amendment of the FMP by Amendment 20 and citing the added Appendix E containing a description of regulatory measures.]

6.0 MANAGEMENT MEASURES

…

6.9 Measures to Control Fishing Capacity, Including Permits and Licenses

…

6.9.1 General Provisions For Permits

6.9.1.1 Commercial Fisheries Permits

All U.S. commercial fishing vessels are required by state laws to be in possession of a current fishing or landing permit from the appropriate state agency in order to land groundfish in the Washington, Oregon, and California area. Federal limited entry permits authorize fishing within limits and restrictions specified for those permits. Vessels without such permits are also subject to the specified limits and restrictions for the open access fishery. ~~Federal permits also may be required for groundfish processors.~~ In the event that a Federal fishing or access permit is required, failure to obtain and possess such a Federal permit will be in violation of this FMP.

6.9.1.2 Recreational Fisheries Permits

All U.S. recreational fishermen are required by state laws to obtain a recreational permit or license in order to fish for groundfish. In the event that a Federal license or permit is required, failure to obtain and possess such Federal permit will be in violation of this FMP.

6.9.1.3 Processor Permits

Federal permits also may be required for groundfish processors. Under the trawl rationalization program (see Section 6.9.3) mothership processors in the Pacific whiting fishery must possess a mothership (MS) permit. Like groundfish limited entry permits (see Chapter 11) Pacific whiting mothership (MS) permits are transferrable once initially distributed to qualifying vessels at the beginning of the trawl rationalization program. To qualify for initial issuance of an MS permit at the beginning of the program, a processing vessel must have processed at least 1,000 mt of Pacific whiting in each of any two years from 1997 through 2003.

6.9.2 Sector Endorsements

The Council may establish sector endorsements, such as with the limited entry fixed gear sablefish fishery (see Section 11.2.6). Sector endorsements would limit participation in a fishery for a particular species or species group to persons, vessels, or permits meeting Council-established qualifying criteria. Participants in a sector-endorsed fishery may be subject to sector total catch limit management. A sector endorsement, whether it is applied to vessels that already hold limited entry permits or to those in the open access or recreational fisheries, is a license limitation program.

6.9.3 *Fishery Rationalization*~~*Individual Fishing Quota*~~

6.9.3.1 The Trawl Rationalization Program~~s~~

The trawl rationalization program applies to vessels holding trawl-endorsed groundfish limited entry permits (and mothership processors registered to mothership permits). The program is intended to reduce fishery capacity, minimize bycatch, and meet other goals of the FMP. The program replaces most cumulative landing limits (in both whiting and nonwhiting shoreside limited entry trawl sectors) with individual fishing quotas. Under the Magnuson-Stevens Act, "an 'individual fishing quota' means a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person." The Council may establish IFQ programs for any commercial fishery sector. ~~IFQ programs would be established for the purposes of reducing fishery capacity, minimizing bycatch, and to meet other goals of the FMP. Participants in an IFQ fishery may be subject to individual total catch limit management (Section 6.7.1).~~The Pacific whiting mothership sector is managed through a system of cooperatives (co-ops) under which catcher vessels choosing to fish in a co-op would be obligated to deliver their catch to an associated mothership processor. Each year motherships and catcher vessels must identify which co-op they plan to participate in. If they do not plan to join a co-op for that year they participate in a non-co-op fishery. The Pacific whiting catcher-processor sector operates as a single, voluntary co-op. If the voluntary catcher-processor co-op dissolves any allocation to the sector will be divided equally among the catcher-processor endorsed permits.

Appendix E describes the details of the trawl rationalization program, which are also specified in Federal regulations at [cite].

The trawl rationalization program may be modified through regulatory amendments proposed by the Council per §303(c) of the MSA and reviewed by the Secretary per §304(b). Appendix E may be revised from time to time to reflect changes to the program as specified in regulations, but such changes can be made without submitting such changes for review by the Secretary as described in §304(a) of the MSA. The Council will establish a process for considering recommended changes to the regulations.

6.9.3.2 Rationalization of Other Fishery Sectors

IFQ programs could be established in other fishery sectors for the purposes of reducing fishery capacity, minimizing bycatch, and to meet other goals of the FMP. Participants in an IFQ fishery may be subject to individual total catch limit management (Section 6.7.1).

…

11.0 GROUNDFISH LIMITED ENTRY

11.1 Introduction

…

11.2 Management, Allocation and General Rules on the Issuance and Use of Groundfish LE Permits, Gear Endorsements Size Endorsements, and Fixed Gear Sablefish Endorsements

…

11.2.1 Federal LE Permits Required Only for Gears Fishing on the Limited Access Quota

1. Federal groundfish LE permits will be required and issued only for those vessels catching Council-managed groundfish species[1/] with groundfish limited entry gears (trawl, longline or fishpot gear) under the limited access quota.[2/]

2. Vessels using exempted gears (all gears other than trawl, longline and fishpot) or using longline or fishpot gear[3/] without a permit endorsed for one of those gears may continue to catch groundfish under an open access system. However catch by vessels with trawl-endorsed LE permits that use such gears may instead be managed with IFQs, as specified in the regulations for the IFQ program (see Appendix E). (Exempted, longline and fishpot gears used by vessels without endorsements for those gears are termed open access gears.)

11.2.2 Allocations between the Limited and Open Access Fisheries and Management of the Open Access Fishery

…

11.2.3 Initial Issuance of LE Permits

…

11.2.4 Ownership Restriction and Changes in Ownership

…

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1 All references to "Council-managed groundfish" refer only to groundfish species specified in the Council groundfish FMP which are caught in the exclusive economic zone or adjacent state waters off Washington, Oregon and California.

2 References to longline, pot and trawl gear are references to legal groundfish gears as defined by the groundfish FMP.

3 Trawl gear may not be used without a permit because the open access fishery for limited entry gears is aimed at accommodating small producers and will likely be managed under restrictive trip limits. The fishing power of trawl gear would result in excessive discards under these trip limits. Additionally, while longline and fishpot vessels catching small quantities of groundfish will be prevented from qualifying by the structure of the minimum landing requirements (MLRs) (a day's landings must be greater than 500 pounds in order for the day to count toward meeting the MLR; Section 11.3.1.3), this structure will provide little barrier for most trawl vessels. Thus, there is no strong reason to provide the open access opportunity to compensate for the 500 pound per landing day threshold.

11.2.5 Gear Endorsements

…

[N.B. In the following shaded text indicates there is corresponding text in the deleted version of paragraph6.]

~~***6. An LE permit will not allow the use of limited entry gears to catch any Council-managed groundfish unless a valid gear endorsement for the specific gear is affixed to the LE permit. Trawl gear and Council-managed groundfish may not be on board a vessel at the same time, nor may the gear be deployed, without an LE permit registered for the vessel and endorsed for trawl gear. If a vessel has longline or fishpot gear on board, an LE permit registered for the vessel and the permit is endorsed for the gear on board, regulations for the limited access fishery will apply.***~~

6. Gear endorsements are required for LE-permitted vessels to use limited entry gear types (see Section 11.2.1, paragraph 1) to catch groundfish under the regulations governing the limited entry fishery.

a. Longline and Fishpot Usage for Vessels with a Permit Endorsed for the Gear. If a vessel has longline or fishpot gear on board, and the vessel is registered to an LE permit that is endorsed for the longline or fishpot gear on board, regulations for the limited access fishery will apply to the vessel. If the vessel also has a trawl endorsement and has opted to participate for a period in the trawl rationalization program using the fixed gear (longline or fishopt) for which it holds an endorsement then the trawl rationalization portion of the limited entry fishery regulations will apply to the vessel for that period.

b, Exception for Longline and Fishpot Gear Usage for Vessels With a Limited Entry Permit Not Endorsed for the Gear Being Used

i. As specified in Section 11.2.1, paragraph 2, Limited Entry vessels may use longline and pot gear without an endorsement, in which case the use of the gear is governed by the open access fishery regulations unless the vessel's limited entry permit is endorsed for trawl gear.

ii. As specified in Section 11.2.2, if a vessel registered to a LE permit is fishing with longline or fishpot gear, but without an endorsement for that gear, the catch still counts against the limited entry fishery allocation (See Section 11.2.2).

iii. As specified in the trawl rationalization program (Section 6.9.3.1 and Appendix E) vessels registered to a trawl-endorsed LE permit and using longline or fishpot gear without a limited entry endorsement for those gears must cover their landings with trawl IFQ and comply with the provisions of the trawl IFQ program. Open access sector regulations will not apply to vessels participating under the IFQ program.

b. Trawl gear usage. Trawl gear and Council-managed groundfish may not be on board a vessel at the same time, nor may the gear be deployed, without an LE permit registered for the vessel and endorsed for trawl gear.

…

11.2.6 Sector Endorsements

11.2.6.1Fixed Gear Sablefish Endorsements

[N.B. Section 11.4, with the same title, is incorporated into this section as a housekeeping measure.]

1. The permit and gear endorsement requirements of the license limitation program limit the number of vessels which may participate in the groundfish fishery, however, there is still substantial opportunity for vessels to shift between segments of the groundfish fishery. One of the segments of the limited entry fishery subject to an increase in the number of vessels participating is the limited entry fixed gear sablefish fishery. To prevent the movement of vessels from non-sablefish segments of the limited entry fixed gear groundfish fishery to the sablefish segment of the fishery, a fixed gear sablefish endorsement for limited entry permits is required for longline and fishpot gear limited entry vessels to take sablefish against the fixed gear limited entry allocation and as part of the primary fishery, the major limited entry fixed gear sablefish harvest opportunities north of 36EN latitude. Such endorsements are not required to harvest under fixed gear limited entry daily-trip-limit or other regulations intended to allow low level or incidental harvest.

2. The fixed gear sablefish endorsement will be affixed to the permit.

3. The fixed gear sablefish endorsement will remain valid when the permit is transferred.

4. If permits are stacked such that a single permit has multiple sablefish endorsements, sablefish endorsements and associated cumulative limits may be transferred to other sablefish-endorsed permits so long as at least one sablefish endorsement and associated tier limit remains with the permit. Fixed gear sablefish endorsements may not be transferred from permits on which there is only one fixed gear sablefish endorsement.

5. Limitations which apply to the fixed gear sablefish endorsement and fishing thereunder shall not restrict the use of any trawl gear endorsement on the same LE permit, unless these restrictions are specific in their application to trawl gear.

6. Rules on the issuance of fixed gear sablefish endorsements and other characteristics of the endorsements are specified ~~in Section 11.4~~below.

[N.B. The following text is moved from Section 11.4, also entitled Fixed Gear Sablefish Endorsements]

The fixed gear sablefish endorsement is intended for operations participating in the fixed gear sablefish fishery which were significantly active and dependent on the fishery prior to the end of the qualifying period specified in paragraph 3. The following paragraphs describe qualifying criteria that were used for initial issuance of the fixed gear sablefish endorsement.

1. A fixed gear sablefish endorsement will be affixed to any LE permit which meets the fixed gear sablefish endorsement qualifying criteria.

2. The catch history used to determine whether a permit meets the fixed gear sablefish endorsement qualifying criteria is the permit catch history. Permit catch history includes the catch history of the vessel(s) that initially qualified for the permit and the catch of any other vessels with which the permit rights were associated during the time the rights were associated with the vessel (if the current permit is the result of the combination of multiple permits, then for the combined permit to qualify for an endorsement, at least one of the permits which were combined must have

sufficient sablefish history to qualify for an endorsement on its own; or the permit must qualify based on catch occurring after it has combined but within the qualifying period). Permit catch history also includes the catch of any interim permit held by the current owner of the permit during the pendancy of an appeal on a permit denied under the groundfish limited entry program, but only if (1) the appeal on which the interim permit was based was lost and (2) the owner's current permit was used by the owner in the 1995 limited entry sablefish fishery.

3. The fixed gear sablefish endorsement qualifying criteria are at least 16,000 pounds round weight of sablefish caught with longline or fishpot gear in one year from 1984 to 1994

4 All catch must be non-Indian harvest from Council managed areas. Harvest taken in tribal set aside fisheries does not qualify.

5. The NMFS issuing authority will have broad authority to examine information other than codes on landing tickets in determining whether the qualifying criteria is or is not met.

11.2.6.2 Pacific whiting Catcher-processor (CP) Endorsement

The class of CP endorsed permits (CP permits) is limited by an endorsement placed on an LE permit. LE permits registered to qualified catcher-processor vessels are endorsed as CP permits. A qualified permit is one that harvested and processed in the catcher-processor sector of the Pacific whiting fishery at any time from 1997 through 2003. A vessel that is 75 feet or less LOA that harvests whiting and, in addition to heading and gutting, cuts the tail off and freezes the whiting, is not considered to be a catcher/processor nor is it considered to be processing fish. Such a vessel is considered a participant in the shorebased whiting sector, and is subject to regulations and allocations for that sector (50 CFR 660.373(a)(3). Therefore, such vessels do not require a CP endorsement.

11.2.6.3 Pacific whiting Catcher Vessel (CV(MS)) Endorsement

Permits with a qualifying history are designated as CV(MS) permits through the addition of an endorsement to their LE groundfish permit. Only vessels registered to an LE permit with a CV(MS) endorsement may participate in the Pacific whiting mothership-processor fishery. A qualified permit is one that has a total of more than 500 mt of whiting deliveries to motherships from 1994 through 2003.

11.2.7 Size Endorsement Will Specify the Vessel Length

The LE base permit will be endorsed with the length overall (as defined for purposes of U.S. Coast Guard documentation) of the vessel for which the LE permit is initially issued. The length for which the LE permit is endorsed will be changed only when LE permits are combined, as per Section 11.2.11~~, or, in the case of LE permits endorsed for trawl gear, when the size of the vessel used with the permit is more than five feet less than the originally endorsed length. In the latter case, the LE permit will be reissued with a size endorsement for the length of the smaller vessel~~.[4] ~~Regulations may be promulgated to waive this downsizing requirement if the permit was transferred to a smaller vessel for the purposes of stacking (see Section 11.2.4, paragraph 3).~~ Vessels which do not have documents stating their length overall will have to be measured by a marine surveyor or the U.S. Coast Guard and certified for that length.[5]

[4] The FMP included an exception for when LE permits endorsed for trawl gear were transferred to a smaller vessel such that the LE permit will be reissued with a size endorsement for the length of the smaller vessel (from Amendment 6). This exception was removed by Amendment 20.

[5] While not an immediate cap on vessel capacity, the size endorsement places an upward limit on the amount by which the capacity used with an LE permit may increase.

If the Council establishes a permit stacking program, that program may or may not require that permits stacked on top of the base LE permit be endorsed with the length overall of the vessel holding the permits.

11.2.8 An LE Permit and Necessary Gear Endorsements Will Be Held by the Owner of Record of the Vessel

…

11.2.9 Transfer of an LE Permit to Different Owners or Vessels of the Same Owner

…

11.2.10 Loss of a Vessel

….

11.2.11 Combining LE Permits

1. Two or more LE permits with "A" gear endorsements for the same type of limited entry gear (either trawl, longline or fishpot) may be combined (based on specific criteria) to "step-up" to a permit with a larger size endorsement. NMFS, with professional advice of marine architects and other qualified individuals, and after consultation with the Council and review board, will develop and implement a standardized measure of harvest capacity for the purpose of determining the appropriate endorsed length for LE permits created by combining two or more permits possessing smaller length endorsements. The capacity represented by the appropriate length endorsement for the combined permit should not exceed the sum of the capacities of the LE permits being combined.

2. LE permits may not be divided to "step-down" to more than one permit with smaller size endorsements.

3. Survival of Gear Endorsements. When LE permits are combined, "A" endorsements identical on both LE permits will remain valid. Provisional "A", "B" and designated species "B" gear endorsements will generally become invalid because they are not separable from the vessel for which they are initially issued. (See table below for examples.) ~~Fixed gear sablefish endorsements will remain valid only if all the longline or fishpot permits being combined have fixed gear sablefish endorsements.~~

1st Permit Endorsement on 1st LE Permit	+	2nd Permit Endorsements on 2nd LE Permit	=	Combined Permit Endorsements on the Combined LE Permit
"A" - Trawl		"A" - Pot		None
"A" - Longline		"A" - Longline		"A" - Longline
"A" - Trawl		Provisional "A" - Trawl		None
"A" - Pot		"B" - Pot		None
"A" - Trawl		Designated Species "B" - Shortbelly - Trawl		None

4. Survival of Fixed Gear Sector Endorsements: Fixed gear sablefish endorsements will remain valid only if all the longline or fishpot permits being combined have fixed gear sablefish endorsements.

~~4~~5. Survival of Trawl Sector Endorsements. When a CP-endorsed LE permit is combined with an LE trawl permit without a CP-endorsement a single CP-endorsed permit with a larger size endorsement will result. A CV(MS) endorsement on a permit being combined with a CP-endorsed permit will not be reissued on the resulting permit. If a CV(MS) endorsed permit is combined with a permit without a sector endorsement the CV(MS) endorsement is retained on the resulting permit. The resulting size endorsement will be determined based on the permit combination formula authorized in paragraph 1 above.

11.2.12 Permit Renewal

…

11.2.13 Owner-on-board Requirements

…

11.3 Multilevel Gear Endorsement System

…

~~11.4 Fixed Gear Sablefish Endorsement~~

[N.B. Text in this section moved to Section 11.2.6 as shown above.]

~~11.5 Limited Entry Program for the Pacific Coast Whiting Fishery~~

~~Until the implementation of a trawl IQ or cooperative management program in the Pacific whiting fishery, no vessel may participate in the shoreside, mothership, or catcher-processor sector of the Pacific whiting fishery unless that vessel meets the following participation requirements for such vessel in such sector:~~

~~For catcher vessels participating in the shore-based sector, the participation requirements are that the vessel with a limited entry trawl-endorsed permit using mid-water trawl gear made at least one whiting delivery to a shoreside whiting processor in at least one primary whiting season for the shore-based sector between January 1, 1994, and January 1, 2007.~~

~~For catcher vessels participating in the mothership sector, participation requirements are that the vessel made at least one delivery to a mothership whiting processor during the at-sea processing season for the mothership sector between January 1, 1997, and January 1, 2007.~~

~~For catcher/processors vessels, participation requirements are having caught and processed whiting during the at-sea processing season for the catcher/processor sector in any one qualifying year from January 1, 1997, through January 1, 2007.~~

~~For mothership vessels, participation requirements are having received at least one delivery of whiting during the at-sea processing season for the mothership sector in any one qualifying year from January 1, 1997, through January 1, 2007.~~

~~A vessel may qualify for participation in each sector for which it meets the above standards.~~

~~Implementing regulations will specify the application procedures. NMFS will maintain a list of vessels or issue a certificate to vessels that qualify for participation in each sector.~~

[Added, Amendment 15]

11.~~6~~4 LE Permit Issuance Review Board

…

11.~~7~~5 Implementation, Application and Appeals Process

…

11.~~8~~6 Council Review and Monitoring

…

Agenda Item E.10.a
Attachment 4
June 2009

MISCELLANEOUS REMAINING ISSUES

Amendment 20

Eligible to Own Language

At its March meeting, the Council directed that the language on eligibility to own be adjusted as needed to (1) ensure that it is consistent with the Magnusen-Stevens Act (MSA), (2) ensure that it is consistent with the Amendment 6 license limitation program, and (3) include resident legal aliens among those eligible to own individual fishing quota (IFQ). At that time, the Council also indicated its desire to review that language when it is drafted. Based on these instructions the following language is presented for Council review.

> No person can acquire quota shares or quota pounds other than 1) a United States citizen, 2) a permanent resident alien, or 3) a corporation, partnership, or other entity established under the laws of the United States or any State, that is eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12113 (general fishery endorsement requirements and 75% citizenship requirement for entities).

The text below explains how the new eligible to own language above combined language in the Council's current preferred alternative, and the MSA statutory language adopted after the Council developed the current preferred alternative.

1) This language adds to the Council preferred alternative the provision that a corporation, partnership or other entity must be established under the laws of the US or a State. We need to put this in to make it consistent with the law.
2) This languages continues to contain the language that restricts entities to ones that are eligible to own a US fishing vessel, which is in the Council's current proposal, but not inconsistent with MSA law.
3) This language states that a permanent resident alien can own privileges. This language comes from the statute [MSA].
4) This does not contain the final language from the Council's preferred alternative regarding mothership ownership under the American Fisheries Act (AFA). We understand that is not longer needed. If it is needed, it could be included, but you should restrict it to "any entity" rather than "any person or entity", because, if it is a person who is not a US citizen or resident alien we don't think they could be included.

Since this excludes entities formed under US or State law who cannot own fishing vessels, there should be some discussion of why they are not "substantial participants" in the fishery. See 303A(c)(5)(E). Additionally, if for some reason the Council wants to exclude permanent resident aliens, we would need a discussion of why they are not "substantial participants."

See Agenda Item E.10,b GAC Report for the Groundfish Allocation Committee (GAC) recommendation to the Council regarding the proposed eligible to own language.

Carry-over and ACLs

With regard to the carry-over provision in the trawl rationalization program, the Council should be made aware of two potential issues with 1) changes in the optimum yield, and 2) working under the new annual catch limits policies.

1) Each individual trawl vessel account will be able to carry-over up to 10 percent of the total quota pounds (QP) held in its account during that year. If collectively the shoreside trawl sector had 10 percent unused QP and chose to use that in the following year AND the optimum yield (OY) goes down drastically, the collective effect of the carry-over could have unintended consequences. The Groundfish Management Team (GMT) and Scientific and Statistical Committee (SSC) have previously recommended that the Council consider modifying the carryover provision. For example, if the OY goes down substantially carry-over QP would be reduced by the same percentage as the OY decrease.
2) It is not clear from the new NS1 guidelines that the 10 percent carry-over would be allowed, because it could cause a species to exceed the annual catch limits (ACLs) in a given year. When setting ACLs for trawl dominant, fully exploited species the Council will need to consider the carry-over policy and how that will fit with the ACLs. Buffers might be used to account for a potential carry-over overage risk. As a next step, the Council may wish to identify this issue as a consideration that will need to be addressed when developing Groundfish Fishery Management Plan Amendment 23 – Annual Catch Limits.

Exclusion of Spiny Dogfish From the IFQ Program

In its November 2008 action, the Council excluded from the IFQ program a number of groundfish species that were taken in minimal amounts in the trawl fishery and one that is taken in larger quantities, spiny dogfish. However, the "Other Fish" category was maintained as part of the IFQ program.

The "Other Fish" stock complex contains all the unassessed Groundfish FMP species that are neither rockfish (family *Scorpaenidae*) nor flatfish. It includes dofish (Table 1). While there have been proposals in the past to remove dogfish from the "Other Fish" category it still remains part of that category.

Table 1. Groundfish species included under "Other Fish"	
Big skate, California skate, Leopard shark, Soupfin shark, Spiny dogfish, Finescale codling,	Pacific rattail, Ratfish, Cabezon (north of the California-Oregon border at 42E N latitude), and Kelp greenling

Therefore, the Council direction to include "Other Fish" but exclude dogfish needs to be addressed. There seem to be a number of possible approaches for resolving this issue.

1. Keep dogfish together with "Other Fish"
   - Exclude "Other Fish" from the IFQ program.
   - Include "Other Fish" under the IFQ program.
2. Separate dogfish from "Other Fish" and
   - Exclude dogfish from the IFQ program but include "Other Fish"
   - Include dogfish under the IFQ program as an IFQ management unit separate from "Other Fish"

Under the second set of approaches dogfish would have to be split out from "Other Fish" during the next biennial management cycle or some other method used to derive an amount of dogfish for the trawl fishery. There are a number of challenges that are entailed in a separation of dogfish from "Other Fish" at this time, including the lack of a biological basis for such a separation and the possible need that would be created to develop standards and criteria for dogfish that meet the requirements of National Standard 1. For these reasons, the focus here is on the options that keep dogfish with all other unassessed species in a single management unit (as part of "Other Fish").

The following is background that may be useful in considering this issue .

- There is some targeting by trawlers on the "Other Fish" category Table 2 and Table 3.

- Gear switching opportunities mean that the effects of IFQ coverage needs to be considered not just with respect to the potential for trawl gear to target each species but also with respect to the opportunity to use other types of vessels and gears (e.g. surplus trawl permits transferred to nontrawl vessels and fished under the IFQ program).

- For any species within the "Other Fish" category conservation protection may be somewhat limited. For example, if IFQ is issued for "Other Fish" and a high value skate fishery develops, much of the "Other Fish" IFQ might be purchased by vessel's which would use it to increase target on skate, changing the mix of species harvested under the category.

- The OY for this group is typically substantially under-harvested. For 2007, the observer program reports that only 62% of the "Other Fish" OY was caught (including discards, see Table 2). Depending on the amount of "Other Fish" allocated to the trawl fishery, current under-harvest could create opportunity to increase targeting on one species without substantially diminishing the opportunity of other vessels to hold the IFQ needed to cover incidental catch of other species in the category.

- Landings for the "Other Fish" category have been relatively stable, except for reported tribal deliveries.

- Under status quo regulations, there are no limits on "Other Fish" for any commercial gear group. For dogfish there are 2-month landing limits of 100,000 to 200,000 pounds, depending on the period. The dogfish limits are the same for all commercial sectors.

- There are several elasmobranchs in the other fish category. They have a life history such that they typically cannot handle much fishing pressure and they are the focus of some targeting activity.

- There are observer program estimates of "Other Fish" bycatch that might be used to estimate needs for trawl vessels but the estimates for other sectors may be more limited.

- There will be 100% observer coverage under the IFQ program. Therefore, the fleet of trawl licenses vessels will be fully accountable for its "Other Fish" catch, including dogfish, regardless of how catch is controlled. Without sector allocations there may be more management flexibility than if sector allcoations are made and there is a split out for trawl IFQ.

Table 2 “Other Fish” ABCs, OYs, and catch by sector for 2007.

	2007	
	MT	% of OY
ABC	14,600	200%
OY	7,300	100%
Total Estimated Catch (mt)	4,516	62%
Shoreside Trawl		
Kelp Greenling	-	0%
Dogfish	703	10%
Skates (including longnose)[a]	1,940	27%
Other	584	8%
Total	3,227	44%
All Other Commercial and Tribal		
Kelp Greenling	20	0%
Dogfish	782	11%
Skates (including longnose)	246	3%
Other	109	1%
Total	1,157	16%
Recreational		
Kelp Greenling	32	0%
Dogfish	5	0%
Skates (including longnose)	2	0%
Other	31	0%
Total	70	1%
Totals Including Research		
Kelp Greenling	52	1%
Dogfish	1,503	21%
Skates (including longnose)	2,194	30%
Other	765	10%
Total	4514	62%

[a] Longnose skate has since been moved out of the “Other Fish” category.

Table 3 "Other Fish" groundfish landings in metric tons (including Spiny dogfish and longnose skate)

	2001	2002	2003	2004	2005	2006	2007	2008
WA	579	860	439	398	473	382	412	557
OR	237	261	254	119	104	110	94	142
CA	471	405	439	348	311	288	228	222
Total	1,288	1,526	1,131	865	887	780	734	922
LE Trawl	581	650	425	266	321	215	201	195
LE Fixed Gear	293	480	246	159	261	213	221	209
Other Gear	216	226	232	274	163	122	110	134
Recreational*	197	168	224	125	136	154	82	81
Tribal	0	1	4	40	6	77	119	302

* RecFIN type "A" landings only.

Table 4. Spiny dogfish landings in metric tons.

	2001	2002	2003	2004	2005	2006	2007	2008
WA	544	850	429	386	457	370	404	551
OR	21	15	10	5	4	9	9	42
CA	12	25	29	30	12	18	15	47
Total	578	890	469	421	473	398	428	640
LE Trawl	346	466	201	155	222	119	108	128
LE Fixed Gear	216	404	193	131	230	191	195	180
Other Gear	4	5	53	91	11	7	2	27
Recreational	11	14	18	2	4	4	3	2
Tribal	0	1	4	40	6	77	119	302

* RecFIN type "A" landings only.

Impacts of Each Approach

In considering advantages and disadvantages, status quo conditions should be kept in mind as a reference point. Currently

- stocks in the "Other Fish" category are unassessed
- the "Other Fish" OY is substantially under harvested
- there are no trip limits on "Other Fish," but there are trip limits on dogfish

Option 1: Dogfish as Part of "Other Fish" Under IFQs

Impact Category	Description of Effect
Biological Protection	Protection for any species within the complex is somewhat limited because the "Other Fish" OY is under harvested and there is substantial potential to shift targeting among species. If it is determined that an undesirable effort shift is occurring, 2-month cumulative limits could be imposed to discourage targeting. A 2-month landing limit could achieve the effect of reducing targeting without inhibiting the flexibility provided by the IFQ program. On the other hand, a 2 month catch limit could reduce that flexibility.
Potential Fishery Constraint	Depends on amount of "Other Fish" allocated to trawl relative to need (observer program catch estimates are available) and amounts left for other sectors.
Economic Development and Efficiency	If markets develop and harvest grows to the point where restrictions are needed, IFQs provide more flexibility for continued fishery development than a 2-month cumulative trip limit.
Contingency Considerations	If an assessment is developed for dogfish and it is split out from "Other Fish," under the rules of the IFQ program all "Other Fish" QS holders would receive a comparable share of the dogfish QS (i.e. a person holding 1% of the "Other Fish" QS would receive 1% of the dogfish QS).

Option 2: Dogfish as Part of "Other Fish" Not Under IFQs

Impact Category	Description of Effect
Biological Protection	Similar to status quo, including opportunity to impose cumulative limits as needed. See Option 1 for a discussion of the differential effects of cumulative landing and catch limits.
Potential Fishery Constraint	Depends on whether cumulative limits are imposed. Greater flexibility to adjust limits if there is not a sector allocation.
Economic Development and Efficiency	If markets develop and harvest grows to the point where restrictions are needed, a 2-month cumulative limit on "Other Fish" or a species within the complex may constrain and even set back development of the fishery.
Contingency Considerations	If IFQs are needed in the future a new allocation formula will need to be developed (permit based allocation formulas will be of limited relevance after QS trading begins).

Another approach would be to figure out a way to split dogfish from "Other Fish" in the upcoming biennial specifications process. The following table lists some of the effects of managing "Other Fish" with IFQs but not dogfish.

Separate Dogfish from "Other Fish" and Only Manage "Other Fish" under IFQs.

Impact Category	Description of Effect
Biological Protection	**Dogfish:** Similar to status quo, including 2-month cumulative limits. **Remaining "Other Fish":** Similar to Option 1.
Potential Fishery Constraint	**Dogfish:** Greater flexibility to adjust limits if there is not a sector allocation. **Remaining "Other Fish":** Depends on amount allocated to trawl relative to need (observer program catch estimates are available) and amounts left for other sectors.
Economic Development and Efficiency	**Dogfish:** Under status quo 2-month limits are already in place to control targeting. **Remaining "Other Fish":** Same as Option 1.
Contingency Considerations	**Dogfish:** If IFQs are needed in the future a new allocation formula will need to be developed (permit based allocation formulas will be of limited relevance after QS trading begins).

Measurement of Catch History in the Mothership Whiting Co-op Alternative

The IFQ program specifies that the initial allocation formulas will measure catch history in "relative pounds" (i.e. an entity's catch history for a particular year will be measured as its share (%) of the total catch for that year rather than the total pounds for the year). When the co-op alternatives were presented they were silent on this issue, indicating only that catch history would be evaluated. When this issue was raised with the TIQC in the context of both the shoreside and mothership co-ops, those present at the time indicated they did not want the complexity of using relative pounds for the co-op alternatives. The analysis proceeded assuming that catch history for a permit would be measured as a straight sum of the pounds across all years.

Recently, members of industry have come forward stating that it was their understanding that relative pounds were to be used for the co-op alternative and noting that while the document does not say that relative pounds would be used it also does not indicate that catch history would be measured in a straight summing of pounds.

Summary of Analysis of Measuring Catch History Using Relative Pounds (Annual Shares) (From Appendix A of the EIS)

The impact of using a relative history (annual shares) to calculate an allocation is to weight each year's catch by the ratios displayed in Table A-58. For example, a pound of whiting caught in the mothership sector in 1998 would give a permit about half as much credit toward an allocation as a pound caught in 2003.

Table A-58 (Rows Excerpted from EIS). Illustration of relative lb "weights" (sector catch in year 2003 divided by annual catch): 1994 to 2004.

Stocks or Stock Complex	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Pacific Whiting											
Shoreside Whiting	0.70	0.68	0.62	0.59	0.58	0.61	0.60	0.70	1.12	1.00	0.55
At-Sea Whiting (MS)	0.46	0.79	0.58	0.53	0.52	0.55	0.61	0.73	0.98	1.00	1.08
At-Sea Whiting (CP)	0.48	0.67	0.63	0.58	0.59	0.61	0.61	0.70	1.13	1.00	0.56

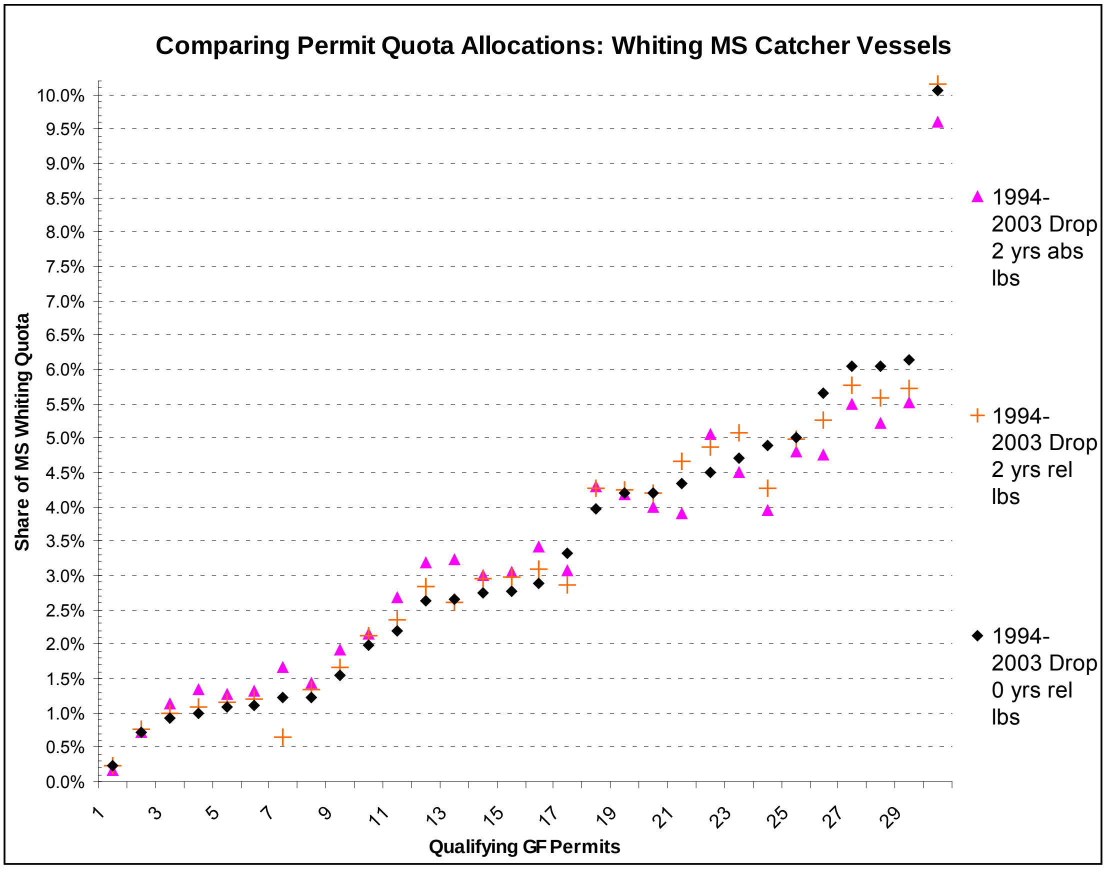
On the one hand, relative history may be considered more fair and equitable because it weighs each vessel's performance each year based on how it did in its competition with the rest of the fleet given the opportunities present that year (its relative effort level). On the other hand, the amount and distribution of private and community capital involved in the fishery may be more related to total harvests than the proportion of harvest each year. It should also be noted that under a relative weighting scheme, as compared to a straight summing scheme, catch histories that diverge from the pattern exhibited by the entire fleet tend to be rewarded when determining an initial allocation.

The relative pounds (annual share) measure of history puts a heavier emphasis on more recent landing history because landings of whiting have declined during the 1994-2003 allocation period. This may be consistent with MSA language that encourages consideration of current harvests when making an initial allocation. Increasing the emphasis on more recent years through the mechanism of relative weighting could better reflect the distribution of capital and labor in the fishery, depending on how long the capital persists in a particular use after the investment is made. The MSA also encourages consideration of historic harvests. In a situation where the harvest in recent years has diminished, such as is the situation here, recent year harvest could be less of a driver of the current distributions of capital than older history. Because capital is generally a long lived asset, harvests during years of higher production may drive the current distribution of capital in the fishery more than years of lower harvest, even if those higher years of harvest were in the more distant past.

Alignment of the initial allocation to existing patterns of investment and participation in the fishery reduces disruption to labor, capital, the fishing sector and communities. Reduced disruption implies greater net benefits because there will be less need for transactions to bring the distribution of capital and labor into line with the distribution of QS.

Additional Analysis

A choice to use relative pounds (annual shares) will benefit those expected to receive the largest amount of the initial allocation (those with the most catch history) while a choice to use a straight summing of the pounds (absolute pounds) will tend to benefit those that would receive a lesser initial allocation (Figure 1). This pattern of effect on initial allocation is likely a result of a harvest pattern whereby those receiving more have a greater catch history from having participated more consistently over a larger number of years (including significant participation in more recent years) while those receiving less tend to have stronger participation in earlier years relative to their participation in more recent years.



Mothership whiting sector permit allocation formulas:

- ▲ 1994-2003 catch history, at least 500 mt, use absolute lbs, drop lowest 2 years.
- + 1994-2003 catch history, at least 500 mt, use relative lbs, drop lowest 2 years.
- ♦ 1994-2003 catch history, at least 500 mt, use relative lbs, no drop years.

Figure 1. Effect of the choice between using relative pounds (shares) and absolute pounds (straight sum of pounds) on the allocations to individual permits.

Amendment 21

Application of Amendment 21 Action on Halibut to Amendment 20 IBQ Limits

An adjustment is needed to make Amendment 20 (trawl rationalization) consistent with the Council final action on Amendment 21 (intersector allocation). The Amendment 20 individual bycatch quota (IBQ) provisions had been based on a limit on an individual vessel's bycatch catch, while the final alternative adopted in Amendment 21 infers a limit on an individual vessel's halibut mortality.

Under a catch based IBQ, fleet average bycatch mortality rates would be used to adjust the amount of IBQ issued to ensure that fleet morality limits are not exceeded. Under an IBQ provision based on individual vessel mortality, individual vessel bycatch mortality estimates would be based on condition of the fish at time of discard.

Under Amendment 21 a number of halibut allocation alternatives were presented. The analysis of the alternative selected by the Council (Alternative 4) indicated that it was the only alternative which addressed all of the objectives, including the provision of incentives to reduce bycatch mortality (not just reduce bycatch). On this basis, the Amendment 21 action is interpreted to signal the Council's intent that the Amendment 20 IBQ provisions should apply to halibut mortality rather than halibut catch. Applying IBQ to vessel specific mortality will require that observers record the weight and survival viability for each halibut a vessel catches and that the estimated mortality be fed into the catch/QP accounting system.

The Amendment 20 language and analysis needs to be modified to reflect the Amendment 21 action. The GAC reviewed this issue at its May meeting and concurred that such a modification should be made.

INTERSECTOR ALLOCATION (AMENDMENT 21)
DESCRIPTION OF FINAL COUNCIL ACTION, APRIL 2009

The Council adopted the intersector allocations for trawl and non-trawl sectors recommended by the Groundfish Allocation Committee for Amendment 21 species (Table 1). No allocation was made for longspine thornyhead south of 34°27' N latitude since this stock is not targeted in trawl fisheries and the stock will not be managed using IFQs under trawl rationalization. The at-sea whiting sector set-asides were also adopted and are provided here in Table 2. Allocations for the at-sea sector are provided in the footnotes to Table 3. The within-trawl sector allocations between the shoreside whiting and shoreside non-whiting sectors are provided in Table 3. These were developed using 1995-2005 sector catch percentages, except as noted for darkblotched rockfish, Pacific Ocean perch, widow rockfish, and yellowtail rockfish.

The Council recommended that the trawl mortality limit for legal and sublegal halibut be set at 15% of the Area 2A constant exploitation yield for legal size halibut, not to exceed 130,000 pounds for the first four years of trawl rationalization and not to exceed 100,000 pounds starting in the fifth year. This total bycatch limit may be adjusted downward through the biennial management process in future years. Part of the overall total catch limit is a set-aside of 10 mt of Pacific halibut to accommodate bycatch in the at-sea whiting fishery and bottom trawl bycatch south of 40°10' N latitude.

All Amendment 21 allocations will be implemented when trawl rationalization is implemented. The Council will review these Amendment 21 allocations five years after implementation, when the trawl rationalization program will also be reviewed.

All other species managed with IFQs not included under Amendment 21 allocations will be allocated every two years in the biennial management process. Amendment 21 allocations and the status quo Pacific whiting and northern sablefish allocations will require a regulatory amendment to revise. A formal allocation for a stock will be suspended in the event that the stock is declared overfished.

Table 1. The preferred limited entry trawl and non-trawl allocations recommended by the Pacific Fishery Management Council in April 2009.

Stock or Complex	All Non-Treaty LE Trawl Sectors	All Non-Treaty Non-Trawl Sectors
Lingcod - coastwide	45.0%	55.0%
Pacific Cod	95.0%	5.0%
Sablefish N. of 36° a/	52.5%	47.5%
Sablefish S. of 36°	42.0%	58.0%
PACIFIC OCEAN PERCH	**95.0%**	**5.0%**
WIDOW	**91.0%**	**9.0%**
Chilipepper S. of 40°10'	75.0%	25.0%
Splitnose S. of 40°10'	95.0%	5.0%
Yellowtail N. of 40°10'	88.0%	12.0%
Shortspine N. of 34°27'	95.0%	5.0%
Shortspine S. of 34°27'	50 mt	Remaining Yield
Longspine N. of 34°27'	95.0%	5.0%
Longspine S. of 34°27'	No Allocation	
DARKBLOTCHED	**95.0%**	**5.0%**
Minor Slope RF North	81.0%	19.0%
Minor Slope RF South	63.0%	37.0%
Dover Sole	95.0%	5.0%
English Sole	95.0%	5.0%
Petrale Sole - coastwide	95.0%	5.0%
Arrowtooth Flounder	95.0%	5.0%
Starry Flounder	50.0%	50.0%
Other Flatfish	90.0%	10.0%

a/ The Council is not recommending a modification of the status quo allocation of sablefish N. of 36º. The LE trawl percentage is status quo but re-calculated as a percent of the total non-treaty available yield (90.6 % (the LE allocation) × 58% (the LE trawl allocation of the total LE amount)).

Table 2. Yield set-asides to accommodate the bycatch in future at-sea whiting fisheries under trawl rationalization.

Allocation Process	Stock or Stock Complex	At-sea Set-Aside (mt) [a/]
Sector Allocations Decided Through the Intersector Allocation Process	Lingcod	6
	Pacific Cod	1
	Pacific Whiting (U.S.)	NA
	Sablefish N. of 36º	50
	Sablefish S. of 36º	NA
	PACIFIC OCEAN PERCH	Formal Allocation [b/]
	WIDOW ROCKFISH	Formal Allocation [b/]
	Chilipepper S. of 40°10'	NA
	Splitnose S. of 40°10'	NA
	Yellowtail N. of 40°10'	300
	Shortspine Thornyhead N. of 34º27'	20
	Shortspine Thornyhead S. of 34º27'	NA
	Longspine Thornyhead N. of 34º27'	1
	Longspine Thornyhead S. of 34º27'	NA
	DARKBLOTCHED	Formal Allocation [b/]
	Minor Slope RF N.	55
	Minor Slope RF S.	NA
	Dover Sole	5
	English Sole	1
	Petrale Sole - coastwide	1
	Arrowtooth Flounder	10
	Starry Flounder	1
	Other Flatfish	20
	Pacific Halibut	10
Sector Allocations Decided Through the Biennial Specifications and Management Measures Process	CANARY ROCKFISH	Formal Allocation
	BOCACCIO	NA
	COWCOD	NA
	YELLOWEYE	0
	Black Rockfish	NA
	Blue Rockfish (CA)	NA
	Minor Nearshore RF N.	NA
	Minor Nearshore RF S.	NA
	Minor Shelf RF N.	35
	Minor Shelf RF S.	NA
	California scorpionfish	NA
	Cabezon (off CA only)	NA
	Other Fish	520
	Longnose Skate	1

a/ The Pacific halibut set-aside would apply to the at-sea sector as well as all trawl activity south of 40° 10’ N. latitude.
b/ See Table 3 footnotes.

Table 3. The initial allocation to shoreside trawl sectors decided by the Council under Amendment 21.

Stock or Complex	Shoreside Whiting Trawl	Shoreside Non-whiting Trawl
Lingcod - coastwide	0.3%	99.7%
Pacific Cod	0.1%	99.9%
Sablefish N. of 36°	1.8%	98.2%
Sablefish S. of 36°	0.0%	100.0%
PACIFIC OCEAN PERCH	The greater of 7.14% or 12.6 mt[a]	Remainder[b]
WIDOW ROCKFISH	If under rebuilding, 21.8%[c] If rebuilt, the greater of 4.2% or 210 mt[d]	Remainder [b]
Chilipepper S. of 40°10'	0.0%	100.0%
Splitnose S. of 40°10'	0.0%	100.0%
Yellowtail N. of 40°10'	300 mt	Remainder [e]
Shortspine N. of 34°27'	0.1%	99.9%
Shortspine S. of 34°27'	0.0%	100.0%
Longspine N. of 34°27'	0.0%	100.0%
DARKBLOTCHED	The greater of 3.78% or 10.5 mt[f]	Remainder [b]
Minor Slope Rockfish North	1.4%	98.6%
Minor Slope Rockfish South	0.0%	100.0%
Dover Sole	0.0%	100.0%
English Sole	0.1%	99.9%
Petrale Sole - coastwide	0.0%	100.0%
Arrowtooth Flounder	0.0%	100.0%
Starry Flounder	0.0%	100.0%
Other Flatfish	0.1%	99.9%

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a The greater of 17% or 30 mt of the trawl allocation will be allocated to the whiting sectors. This table provides the shoreside whiting share of that (42%).
b Remainder for shoreside non-whiting trawl sector after allocations to whiting sectors.
c Under rebuilding, 52% of the trawl allocation will be allocated to the whiting fishery. This table provides the shoreside whiting share of that (42%).
d If rebuilt, the greater of 10% or 500 mt of the trawl allocation will be allocated to the whiting sectors. This table provides the shoreside whiting share of that (42%).
e Remainder for shoreside non-whiting trawl sector after deducting the 300 mt allocation for the shoreside whiting fishery and setting aside yield estimated to accommodate incidental bycatch in the at-sea whiting fishery.
f The greater of 9% or 25 mt of the trawl allocation will be allocated to the whiting sectors. This table provides the shoreside whiting share of that (42%).

PROPOSED MODIFICATIONS TO RECOMMENDATIONS ON AMENDING THE GROUNDFISH FMP TO INCORPORATE THE TRAWL RATIONALIZATION PROGRAM

The following changes to amendatory language in Attachment 3 are proposed to clarify the relationship between the detailed description of the trawl rationalization program that will be included in Fishery Management Plan (FMP) Appendix E (which will be in the form shown in Agenda Item E.10.a, Attachment 2 as updated to incorporate the Council's final action) and implementation of the program in Federal regulations. Appendix E describes the program and regulations would be consistent with that description.

Proposed changes to Attachment 3:

1. A sentence would be added to the end of the paragraph in Chapter 1 of the FMP describing the appendices (see pages 1-2 of Attachment 3):

   Appendix E contains a detailed description of the trawl rationalization program (see Section 6.9.3.1).

2. Changes proposed for Section 6.9.3.1 are shown other side of this sheet, which reproduces page 4 of Attachment 3, with those changes as incorporated.

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in a sector-endorsed fishery may be subject to sector total catch limit management. A sector endorsement, whether it is applied to vessels that already hold limited entry permits or to those in the open access or recreational fisheries, is a license limitation program.

6.9.3 Fishery Rationalization~~Individual Fishing Quota~~

6.9.3.1 The Trawl Rationalization Program~~s~~

The trawl rationalization program applies to vessels holding trawl-endorsed groundfish limited entry permits (and mothership processors registered to mothership permits). The program is intended to reduce fishery capacity, minimize bycatch, and meet other goals of the FMP. The program replaces most cumulative landing limits (in both whiting and nonwhiting shoreside limited entry trawl sectors) with individual fishing quotas. Under the Magnuson-Stevens Act, "an 'individual fishing quota' means a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person." The Council may establish IFQ programs for any commercial fishery sector. ~~IFQ programs would be established for the purposes of reducing fishery capacity, minimizing bycatch, and to meet other goals of the FMP. Participants in an IFQ fishery may be subject to individual total catch limit management (Section 6.7.1).~~The Pacific whiting mothership sector is managed through a system of cooperatives (co-ops) under which catcher vessels choosing to fish in a co-op would be obligated to deliver their catch to an associated mothership processor. Each year motherships and catcher vessels must identify which co-op they plan to participate in. If they do not plan to join a co-op for that year they participate in a non-co-op fishery. The Pacific whiting catcher-processor sector operates as a single, voluntary co-op. If the voluntary catcher-processor co-op dissolves any allocation to the sector will be divided equally among the catcher-processor endorsed permits.

Appendix E describes the details of the trawl rationalization program, which ~~are also specified~~will be implemented in Federal regulations~~ at [cite]~~.

The trawl rationalization program descripbed in Appendix E may be modified through regulatory amendments proposed by the Council per §303(c) of the MSA and reviewed by the Secretary per §304(b). Appendix E may be revised from time to time to reflect changes to the program~~ as specified in regulations~~, but such changes can be made without submitting such changes for review by the Secretary as described in §304(a) of the MSA. The Council will establish a process for considering recommended changes to the regulations.

6.9.3.2 Rationalization of Other Fishery Sectors

IFQ programs could be established in other fishery sectors for the purposes of reducing fishery capacity, minimizing bycatch, and to meet other goals of the FMP. Participants in an IFQ fishery may be subject to individual total catch limit management (Section 6.7.1).

…

Agenda Item E.10.b
GAC Report
June 2009

GROUNDFISH ALLOCATION COMMITTEE REPORT ON AMENDMENT 20 – TRAWL RATIONALIZATION

The Groundfish Allocation Committee (GAC) met in Portland, Oregon on May 5, 6, & 7, 2009 to discuss aspects of Amendment 20 - Trawl Rationalization program. The following written GAC recommendations and rationale to the Council were vetted by the committee members at the GAC meeting and through email.

Eligibility to Own Language

The GAC recommends that the Council adopt the "eligibility to own" language proposed by NMFS General Counsel, and leave in the AFA exception language (part ii from the eligibility to own PPA) but changing "any person or entity" to "any entity".

Rationale: In order to make the trawl rationalization language consistent with the MSA and the intent of the Council, the language suggested by NMFS GC should be adopted. In order to be sure of accommodating all current vessel ownership structures, the AFA exception should be included. Some may argue that this language is no longer needed given the recent changes in ownership, particularly in the mothership sector; however, the effect of removing this exception language is unknown and there is no harm in keeping it, so the GAC recommends it be retained. NMFS GC recommends that the language be revised to indicate that exception refers only to entities.

Overfished Species and Pacific Halibut Control and Vessel Limits

The Council should have a discussion of intent with respect to the formation of risk pools and application of control limit to such pools.

Rationale: The GAC would like to retain flexibility so people can form voluntary and informal risk pools, but a third entity would not need to be formed to facilitate the risk pool.

The GAC recommends QP transfers be allowed only from the QS holder to vessels and from one vessel to another. Control limits would limit QS ownership and vessel QP limits would restrict the accumulation of QP.

Rationale: The GAC discussed the need for a limit on the accumulation of QP outside of vessel accounts, the need for an "entity QP limit." While there is a limit on QS ownership and a limit on the amount of QP in a vessel account, there is no limit on the amount of QP that could be accumulated outside the vessel account. Staff indicated that current policy did not restrict the amount of QP transferred among QS holders or to other entities, other than vessels. The GAC identified that the policy intent was to ensure the QP is moved to vessels in a timely manner, to increase the probability of its use. The desire is to have a link between the QS/QP and a vessel. At the same time, the intent is to provide an opportunity for crew members, processors and other to hold QS and direct the associated QP. The possibility of addressing this issue by requiring the

QP be transferred to a vessel by a certain time was discussed. However, this would restrict flexibility of non-vessel owners to direct the use of their QP or create complexities in the catch and QP usage tracking system. To address this problem, the GAC recommends that transfer of QP be allowed only from the QS holder to the vessel and among vessels. QP could not be transferred among other entities. Thus the QS control limit would effectively restrict the amount of QP held by anyone other than a vessel owner. The limit on QP transfers addresses both the need to limit the accumulation of QP during the year and reinforces the policy requiring that QP be moved onto the vessel during the year.

The GAC recommends the Council adopt the preliminary preferred overfished species control and vessel limits from the GMT.

Rationale: The GMT control limits are the highest initial allocations using the bycatch allocation approach for OF spp. The motion did not recommend the unused QP limit idea from the GMT/GAP; however, the staff analysis on that will be presented to the Council in June.

For Pacific halibut, the GAC recommends the Council adopt a 5.4 percent control limit, and a vessel limit of 14 percent.

Rationale: The control limit of 5.4% is the maximum initial allocation to a single permit. This approach is the same as that used for the overfished species. The vessel limit levels should provide the opportunity for vessels to take the full vessel limit for arrowtooth (20%) or petrale sole (4.5%), assuming they can achieve a halibut bycatch mortality rate that would be low enough for the fleet to take the full OYs of both arrowtooth and Petrale (a rate of 0.006 pounds of legal and sublegal halibut per pound of arrowtooth or Petrale). Based on some of the bycatch rate reductions observed in Washington EFPs, it is thought that it will be possible for trawl vessels to get down to this halibut bycatch rate.

Divestiture

The GAC recommends the following three options for Council consideration, no single one of which is preferred. All recommend allowing divestiture of QS in excess of control limits, but vary in the amount of excess QS temporarily retained by original owners and the issuance of annual QP for excess QS.

Under all options, the two year moratorium on QS transfers remains in effect (QP transfers are allowed during that period).

Option 1: 100% of Excess QS Temporarily Retained by Original Owners but No QP issued to the Owner of the Excess QS.

> Initial Allocation of Target Species QS In Excess of Control Limits
> Target species QS will be issued on the basis of the initial allocation formula. The control limits will not restrict the initial allocation, but the amount above the control limit is to be considered as temporary ownership to allow for voluntary divestiture.

Divestiture Requirement: Entities receiving a temporary initial allocation of QS in excess of control limits must divest themselves of the excess QS between the onset of year 3 and the end of the 5th year of the program. After that time, any QS still held in excess of the limits will be revoked and distributed among other QS holders on a pro rata basis.

Initial Allocation of Overfished Species QS
QS in excess of the target species control limits will not be included in the allocation formulas for overfished species allocations.

QP for QS Held in Excess of Limits

- At the start of each year when QP is issued, original QS holders will not receive QP for any QS held in excess of the control limits. (100% of such QP will be distributed to all other QS holders below the control limits on a pro-rata basis.)
- QP will be issued to new QS holders who have received divested QS at the start of the year after the QS divesture transaction was completed.

Option 2: 50% of Excess QS Temporarily Retained by Original Owners, but No QP Issued to the Owner of the Excess QS

Initial Allocation of Target Species QS In Excess of Control Limits
Target species QS will be issued on the basis of the initial allocation formula, except that half the amount an entity qualifies for in excess of the limit will be withheld and redistributed to those below the control limits and half will be temporarily retained by the original entity for the purpose of divestiture.

Divestiture Requirement
Same as Option 1

Initial Allocation of Overfished Species QS
Same as Option 1

QP for QS Held in Excess of Limits
Same as Option 1

Option 3: 50% of Excess QS Temporarily Retained by Original Owners, with Full QP Issued to the Owner of the Excess QS

Initial Allocation of Target Species QS In Excess of Control Limits
Same as Option 2

Divestiture Requirement
Same as Option 2

Initial Allocation of Overfished Species QS
Same as Option 2

QP for QS Held in Excess of Limits

- Each year QP will be issued for all QS initially allocated to the original entity, including any amount temporarily held in excess of control limits.
- At the time of divestiture of QS by an original entity to a new owner, the seller can transfer associated QP to the new owner, and at the start of the year after the QS divesture transaction was completed, all associated QP will be issued to new QS holders who have received divested QS.

The above GAC options are relative to a No Divestiture option. If the Council decides to allow divestiture, then the GAC recommends the Council adopt a cutoff date between 2003 and June 2009.

Rationale: If a divestiture provision is adopted, entities may accumulate additional permits prior to the time of initial allocation. The cut-off date is needed so that NMFS will know whether to apply the divestiture rules for all permits an entity owns at the time of initial allocation or only those accumulated up to a certain date. There was discussion of rationale for a number of possible cut-off dates including the originally published control date of November 6, 2003, the date at which the option to not have a grandfather clause was first included as a formal option (November 2007), the date on which the no grandfather clause was adopted by the Council (November 2008) or a later date.

Adaptive Management Program (AMP)

The GAC recommends the Council treat AMP as a pass through in the first two years of the trawl rationalization program.

Rationale: Having a pass through for the first two years of the program would allow the Council to better understand the effects of the rationalization program and structure an AMP more appropriately after that two year period. Furthermore, implementing a non-pass through option in the first two years of the rationalization program would create additional complexity and administration that may not be feasible given the implementation burden of the broader program during the first two years.

The GAC asked for the GMT to further discuss "buffers," holdback concepts for AMP and the carryover provision, and develop recommendations for the Council. Additionally, the GAC acknowledged that buffers and the carryover provision should be brought up during Amendment 23 (Annual Catch Limits) discussions.

Fishery Management Plan Amendment

The GAC indicated the Council should follow the DEIS decision document recommendation on the framework approach to amending the FMP. The GAC reviewed the draft language provided by Council staff and made a number of recommendations for modifications. The draft language with staff modifications based on GAC comments is provided in Agenda Item E.10.a, Attachment 3.

Pacific Halibut Individual Bycatch Quota

The GAC reviewed this issue and concurred with staff's recommendation that the Amendment 20 language be modified to reflect the action taken for Amendment 21.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
2725 Montlake Boulevard East
Seattle, WA 98112-2097

May 26, 2009

Mr. John DeVore, Groundfish Management Team
Pacific Fisheries Management Council
7700 Ambassador Place, Suite 101
Portland, OR 97220

Dear Mr. DeVore,

Thank you for your letter of April 30th in which you requested, on behalf of the Pacific Fisheries Management Council, input from the Northwest Fisheries Science Center (NWFSC) regarding methods of estimating total mortality for trawl-caught Pacific halibut. The Council brought forth two methods which could be used to estimate halibut mortality when the fleet moves to an IFQ fishery. The first method would be to apply a fleet-wide bycatch mortality rate to Pacific halibut as determined either from a prior year or an average of recent years from the West Coast Groundfish Observer Program (WCGOP) to any halibut caught and discarded at sea. Alternatively, the viability of discarded halibut could be recorded by WCGOP observers and used to determine a vessel's share of total mortality instead of using a fleet-wide average bycatch mortality rate.

The NWFSC recommends using the first approach, applying a fleet-wide bycatch mortality rate to Pacific halibut for the trawl IFQ fishery. This approach is currently used in other fisheries where Pacific halibut is a limiting species, such as the Alaska flatfish trawl fishery. Observers would continue to estimate viability on a randomly selected sub-sample. Each year, the mortality rate will be updated with new data from the fishery.

Although the second method could encourage individual vessel behavior to reduce mortality, the NWFSC has a number of concerns about applying this approach. One problem is that the dichotomous key used to determine halibut viability is subjective in nature. Subjectivity would be a concern due to the lower Pacific halibut bycatch allocation expected under IFQ management.

Other concerns about this approach are related to the amount of additional sampling time for IFQ species already required under the proposed program. This could result in Pacific halibut on deck for longer periods of time than normal, and the potential for increased mortality. Additionally, it is not clear that this approach would allow for adequate sample sizes.

If you have further questions, please contact Janell Majewski, WCGOP supervisor at (206) 860-5616.

Sincerely,

Dr. Elizabeth Clarke, PhD
Director
Fishery Resource Analysis and Monitoring Division

Cc Frank Lockhart, Assistant Regional Administrator, NWR/NMFS
Don McIsaac, Executive Director, PFMC

NMFS NORTHWEST REGION REPORT ON MISCELLANEOUS CLARIFICATIONS FOR AMENDMENT 20: TRAWL RATIONALIZATION

TRACKING AND MONITORING

The current provisions as listed under section A-2.3.1 Tracking, Monitoring and Enforcement in the Council's current preferred alternative analysis (see Agenda Item E.10, Attachment 2) specify the methods for the following components of the tracking and monitoring program: discarding by the shoreside sector; at-sea catch monitoring for the shoreside sector; catch tracking mechanism for the shoreside sector; cost control mechanisms for the shoreside sector; and program performance measures for the shoreside sector. In NMFS's initial discussions regarding the design and implementation of the tracking and monitoring program, the need for flexibility when designing this aspect of the TIQ program became apparent. Therefore, we would like to confirm that the Council's intent was to provide NMFS sufficient flexibility in the design and implementation of the program to achieve the goals and objectives of the trawl rationalization program. The tracking and monitoring provisions of the TIQ program are essential to its success and although NMFS believes that current suite of Council recommendations provide a strong foundation, there are likely refinements that will be necessary to achieve the overall goals of the program. For example, how the observer program is structured and implemented will need to be designed within the recommendations of the Council's and within the constraints of NMFS staffing, timing and budgets. NMFS is also interested in exploring the efficacy of human observers and electronic monitoring as a means to achieve the monitoring requirements currently recommended in the Council's preferred alternative.

In addition, NMFS would like to confirm that, if approved, we have the flexibility to implement Amendment 20 either through a series of rule makings, or in a single rule making process. At this time, we believe that a series of rulemakings is the more likely path forward.

Because of these issues and others that may be discovered during implementation, NMFS requires this flexibility to design the specifics of the tracking and monitoring program.

ENFORCEMENT CONSULTANTS REPORT ON FISHERY MANAGEMENT PLAN (FMP) AMENDMENTS 20 AND 21 – TRAWL RATIONALIZATION AND INTERSECTOR ALLOCATION – REGULATORY OVERVIEW AND FINAL ACTION ON MISCELLANEOUS REMAINING ISSUES AND FMP LANGUAGE

The Enforcement Consultants (EC) would like to take this opportunity to affirm its statement on Trawl Rationalization made at the 2008 November Council meeting on catch monitoring.

Quota pounds held in Trawl Individual Quota (TIQ) vessel accounts will be deducted from those accounts through three mechanisms; landing reductions, transfer reductions, and reductions correlating to at-sea observations of discards. Accurate and timely accounting of these observations and subsequent reductions is an essential element of trawl rationalization for industry participants, fishery managers, and enforcement. To that end the EC makes the following recommendations.

At-Sea Catch Monitoring for the Shoreside Sector

Non-whiting. The EC recommends 100 percent observer coverage for this sector of the fishery. Discards of non marketable product are inevitable in this fishery, but still need full accounting. It is the EC's position that human observers are the only viable way of achieving an acceptable level of accountability in an accurate and timely manner.

Shoreside Whiting

There has been some discussion over the necessity of human observers versus camera monitoring in this sector. The EC believes human observation on the vessels is critical. Under Amendment 10, shoreside whiting is a maximized retention fishery monitored by cameras. A maximized retention fishery allows for up to two baskets of discard per tow, which is different than full retention. Discards that exceed this amount must be self reported and require the operator to terminate their trip. The amount of discards are "estimated," and then incorporated into the fishery management process. TIQ fisheries cannot rely on "estimates," so the precision that human observation brings is important. There are a number of other negatives associated with reliance upon cameras versus human observation. They include: difficulties in the ability to identify species depending on conditions, resolution and camera placement, stand alone camera monitoring has the potential to cause debate over what was caught or discarded, and time lags in data evaluation could affect efficiencies in enforcement and fishing.

In order to achieve the Council's requirements for accuracy and accountability, the EC recommends 100 percent observer coverage be deployed in the TIQ shoreside whiting fishery to achieve catch monitoring goals, and the use of cameras as a backup, or secondary monitoring tool.

At-Sea Mothership Whiting Fishery

The EC recommends 100 percent human observers be deployed on at-sea catcher vessels delivering whiting to motherships, to best achieve the catch monitoring goals of the Trawl Rationalization Mothership Coop Fishery. The EC acknowledges that using a person to monitor the transfer of cod ends from the catcher vessel to a mothership requires the same level of accuracy, timeliness, and accountability as the shoreside sectors of the Trawl Rationalization Program. Much can happen with the catch between the time the cod end is filled and later transferred.

PFMC
06/16/09

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN (FMP) AMENDMENTS 20 AND 21 -- TRAWL RATIONALIZATION AND INTERSECTOR ALLOCATION - REGULATORY OVERVIEW AND FINAL ACTION ON MISCELLANEOUS OUTSTANDING ISSUES AND FMP LANGUAGE

The Groundfish Advisory Subpanel (GAP) received a report from Mr. Jim Seger about several issues related to Amendments 20 and 21, including Amendment 20 – Eligible to Own Language, Carry-over and annual catch limits (ACLs), Exclusion of Spiny Dogfish From the individual fishing quota (IFQ) Program, Measurement of Catch History in the Mothership Whiting Co-op Alternative, and Amendment 21 – Application of Amendment 21 Action on Halibut to Amendment 20 individual bycatch quota (IBQ) Limits. The GAP also reviewed the various agency reports provided, including the National Marine Fisheries Service (NMFS) report about implementation of the tracking and monitoring program, and the Northwest Fisheries Science Center (NWFSC) and International Pacific Halibut Commission (IPHC) letters related to monitoring halibut mortality under the trawl quota share (QS) program. The GAP also received a report from Dr. Christopher Dahl about Council staff recommendations for amending the Groundfish FMP to incorporate the trawl rationalization program.

The GAP has the following recommendations for each of these items.

Amending the Groundfish FMP

The GAP recommends the Council adopt the approach developed by staff and the FMP amendment language as written in the document – Staff Recommendation on Amending the Groundfish FMP to Incorporate the Trawl Rationalization Program (Agenda Item E.10.a Attachment 3). The GAP believes this approach will provide greater flexibility if future adjustments are needed. The GAP also believes the draft FMP amendment language is an accurate representation of the Council's November 2008 final action.

Amendment 20

Eligible to Own Language

The GAP agrees with the Groundfish Allocation Committee (GAC) recommendation and rationale to adopt the "eligibility to own" language proposed by NMFS General Counsel, and leave in the AFA exception language, but to change "any person or entity" to "any entity." As noted by the GAC, this would make the trawl rationalization language consistent with the Magnuson-Stevens Act and the intent of the Council.

Carry-over and ACLs

The GAP affirms our previous recommendation and the Council action to include the provision for each individual trawl vessel account to carry-over up to 10 percent of the total quota pounds (QP) held in its account. The GAP recommends the Council modify the carry-over provision such that if the optimum yield (OY) goes down substantially then carry-over QP would be reduced by the same percentage as the OY decrease.

Exclusion of Spiny Dogfish from the IFQ Program

The GAP recommends leaving spiny dogfish in the Other Fish category and excluding the Other Fish category from the QS holding requirements.

Measurement of Catch History in the Mothership Whiting Co-op Alternative

The GAP recommends the relative pounds approach be used to determine catch history in the Mothership (MS) Co-op Alternative. The relative pounds approach better acknowledges the greater fishery dependence of those vessels that consistently participate in the MS sector. The Council staff report (Agenda Item E.10.a, Attachment 4, page 9) indicates that the absolute pounds approach would penalize those with most active participation in recent years, resulting in greater disruption to labor, capital, the fishing sector and communities, and therefore, a reduction in net benefits. Staff also notes that the relative pounds approach may be more consistent with Magnuson-Stevens Act language that encourages consideration of current harvests when making an initial allocation. Finally, use of the relative pounds approach is consistent with the approach adopted by the Council for determining shoreside catch history under the trawl QS program.

Tracking and Monitoring

The GAP reviewed the NMFS-Northwest Region letter, which covers several topics: flexibility in design and implementation of the tracking and monitoring program, implementation of the Council's action for 100 percent observer coverage, and notice that trawl rationalization will likely be implemented through a series of rulemakings.

The GAP supports the Council confirming their intent to provide NMFS flexibility in design and implementation of the tracking and monitoring program. However, the GAP requests clarification from NMFS because there is some ambiguity in the NMFS letter. That is, the sentence that reads "Therefore, we would like to confirm that the Council's intent was to provide NMFS sufficient **flexibility in the design and implementation of the program** to achieve the goals and objectives of the trawl rationalization program" (emphasis added) seems to indicate NMFS is seeking flexibility related to design of the Trawl Rationalization Program in total. The GAP seeks clarification that NMFS is only requesting flexibility for designing and implementing the tracking and monitoring program.

Related to the use of human observers and electronic monitoring (EM), the GAP's understanding of the Council's November 2008 final action was to require 100 percent monitoring via the use of human observers. Given that understanding, the GAP believes that, over time, EM may play an important role in tracking and monitoring the trawl rationalization program and, thus, supports NMFS exploring the efficacy of human observers and electronic monitoring as a means to achieve the monitoring requirements.

The GAP is also concerned about the cost of observer coverage and wishes to reiterate that NMFS and the Council should be actively exploring ways to keep costs down including the use of “compliance monitors” or third-party monitors. In addition, the GAP highlights that, as they craft the details of the tracking and monitoring program, NMFS should seek industry input on tradeoffs between flexibility and cost. Finally, the GAP notes that New England received a significant amount of Federal money to cover observers as part of the development of their groundfish catch share fishery. As a matter of fairness, NMFS should fully consider also providing financial assistance for observers in our fishery to help ease the transition to catch share management.

Application of Amendment 21 Action on Halibut to Amendment 20 IBQ Limits

The GAP carefully reviewed the letters from NMFS-NWFSC and the IPHC about monitoring halibut bycatch mortality in the trawl QS program. In line with the IPHC recommendation, the GAP believes that tracking based on an individual vessel’s halibut bycatch mortality is the best approach. The GAP understands the concerns expressed by the NWFSC, but we agree with and find more compelling the benefits described by IPHC, including: greater incentive for individuals to use methods that both avoid halibut bycatch and reduce halibut bycatch mortality, increased individual accountability, and maintenance of benefits to individuals who use methods to avoid bycatch and reduce bycatch mortality.

The GAP notes that there are several problems with the Pacific halibut allocation to the trawl sector. First, there is no provision that allows the trawl allocation to increase if the total Constant Exploitation Yield (CEY) increases. Moreover, the bycatch rates will increase as the CEY increases. Second, the trawl allocation is 15 percent of the CEY, but does not include corresponding sublegal halibut, so the trawl allocation is even smaller than it appears. Finally, the trawl allocation seems completely arbitrary and based on an unrealistic bycatch rate.

PFMC
06/15/09

Agenda Item E.10.b
Supplemental GMT Report
June 2009

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON FISHERY MANAGEMENT PLAN (FMP) AMENDMENTS 20 AND 21-TRAWL RATIONALIZATION AND INTERSECTOR ALLOCATION-REGULATORY OVERVIEW AND FINAL ACTION ON : MISCELLANEOUS OUTSTANDING ISSUES AND FMP LANGUAGE

The Groundfish Management Team (GMT) received a report from Mr. Jim Seger regarding the miscellaneous remaining issues under Amendment 20 and 21 and offers the following comments on the carryover provision, the exclusion of spiny dogfish from the individual fishing quota (IFQ) program, and establishing a holdback to allow for management flexibility.

Carryover

Currently, the carryover provision in the trawl individual quota (TIQ) program would allow for an overage in one year to be covered by up to 10 percent of the following year's quota pounds (QP); this provision also would allow up to 10 percent of unused QP to be carried over into the following year for both overfished and non-overfished species.

The GMT discussed possible issues with the carryover provisions mainly focusing on the interaction with optimum yield (OY) and annual catch limits (ACL). In relation to staying within OYs, the GMT has previously recommended that if an OY for a species decreases significantly from one year to the next, the carryover amount for all TIQ participants should be reduced in proportion to the OY reduction of that species to keep the sum total of the fleets' QP within the OY for a given year. This may be something the Council wants to consider specifying under this agenda item. Second, in relation to ACLs, the GMT acknowledged that the carryover provision will need to be addressed and further developed during the Amendment 23 process. However, it is the GMT's understanding that regardless of the management tool, carryovers would not be allowed to result in exceeding a specified OY, ACL, or other management threshold.

Exclusion for Spiny Dogfish from the IFQ Program

The GMT discussed the dogfish and Other Fish situation described in detail in Agenda Item E.10.a, Attachment 4. Because of the lack of a biological basis for separating spiny dogfish from the Other Fish complex, the GMT recommends that the Council choose option 2 (p. 7).

At the same time, there are species in the complex with vulnerable life history characteristics. We therefore recommend taking a close look at the Other Fish complex during the ACL amendment and 2011-2012 harvest specification process. We envision analyzing trip limits for the complex as a whole, and evaluating the appropriateness of managing the stock complex as a complex given the new National Standard 1 guidelines. This could result in a framework for species-specific catch limits for a subset of species within the Other Fish complex (e.g., spiny dogfish).

Lastly, in anticipation that spiny dogfish and the other species in the Other Fish complex might be managed with IFQs in the future, the GMT recommends that the Council put the public on notice that the allocation of quota for this species will not based on future catch history. Allocating based on future catch history might cause vessels to speculatively target Other Fish during the early years of the program. Given the improved total catch monitoring under the TIQ program, we should have sufficient information to allocate Other Fish using alternative methods.

Management Flexibility

At the May 2009 meeting of the Groundfish Allocation Committee (GAC), discussions were made regarding the uncertainties associated with fishing activities and the translation of those uncertainties into the possibility that one harvester in a trawl sector could pre-empt the opportunities for other harvesters in that sector. In addition, GAC discussions involved the possibility of one sector catching more than their allocation, thereby negatively impacting the opportunities for another sector. In either case, the possibility of one harvester, or one sector, impacting the opportunities of another creates conditions necessary for a race for fish. It is the elimination of race for fish incentives which create many of the positive outcomes associated with rationalization programs. In an attempt at hedging against the possibility that such conditions could be created, the GAC provided direction to the GMT to consider tools that could be used to reduce the possibility of such occurrences. The GMT discussed this issue and offers the following comments and recommendations.

The GMT recommends that the Council retain the option of implementing a "holdback" for any groundfish species as necessary. The GMT recommends that this holdback be reserved prior to any sector allocations, to be used for any sector, not just the trawl sector. The existing management structure requires a substantial degree of flexibility in offering fishing opportunities while staying within OYs. Several examples are readily available including the need to respond to higher than expected catches of overfished species in the National Marine Fisheries Service trawl survey and year to year variations in bycatch rates across sectors that necessitate trading overfished species from one sector to another. While the trawl rationalization program is likely to greatly improve the management performance of the trawl fishery there may still be cases where the ability to move some additional amount of a particular species to the trawl fishery may provide flexibility in attainment of target species OYs. Furthermore, other sectors will be managed with existing management and monitoring tools and the catch uncertainty associated with these sectors can be managed with a holdback that responds to unforeseen catch events as necessary. Being able to respond to such unforeseen catch rates may make a large difference in determining whether a fishery should be closed prematurely, or whether that fishery can continue.

The GMT acknowledges that a "holdback" could be developed through a variety of mechanisms, including Amendment 20, Amendment 23, or through the biennial specifications process. If the Council should elect to retain the option of implementing a "holdback" for management flexibility, the GMT recommends that the Council indicate its intent to reserve the option of doing so under the E.10 agenda item. The appropriate holdback size and the species to which it would be applied would then be developed through the biennial specifications process.

GMT Recommendations:

1. Consider specifying that carryover pounds may be reduced in proportion to a reduction in an OY.
2. Adopt option 2 on page 7 of Agenda item E.10.a Attachment 4 in regards to removing the Other Fish complex from the TIQ program.
3. Manage spiny dogfish within the Other Fish complex and suggest that species-specific management measures (e.g., catch limits) for species within the Other Fish complex be evaluated in the analysis for the 2011-2012 Biennial Specifications and Management Measures.
4. Consider putting the public on notice that the allocation of quota for spiny dogfish and or Other Fish will not be based on future catch history.
5. Retain the ability to holdback a portion of groundfish species OYs to be used for management flexibility.

PFMC
6/16/09

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA

AND THE UNITED STATES OF AMERICA

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June 11, 2009

Mr. Don Hansen, Chair
Pacific Fishery Management Council
7700 Ambassador Place, Suite 101
Portland, OR 97220

Dear Don:

The staff of the International Pacific Halibut Commission (IPHC) has read the letter of 26 May 2009 from Dr. Elizabeth Clarke to Mr. John DeVore regarding monitoring halibut bycatch mortality in the trawl IQ fishery. In the letter, Dr. Clarke states the National Marine Fisheries Service (NMFS) recommendation to continue with the current fleet-wide bycatch mortality rate, instead of tracking an individual vessel's bycatch mortality using real-time observer sampling. While we understand the substantial changes to observer sampling required by the IQ program, we believe the IQ plan provides a significant opportunity to reduce halibut bycatch to the benefit of both the halibut resource and the industry's ability to land groundfish.

The halibut IBQ program is an opportunity to implement incentives to reduce halibut bycatch mortality. Individual vessel quotas for halibut bycatch will allow each vessel operator to fish more efficiently and effectively for a given amount of groundfish. Incentives for improved handling and discard practices are created by monitoring the halibut mortality on each vessel. Continued use of fleet-wide mortality estimates will dissipate the benefits achieved through bycatch reduction by some operators when other operators do not undertake similar improvements. Vessel operators need to have individual bycatch accountability in order to realize increased groundfish fishing opportunities as a result of their own actions.

We also disagree with the implication that the dichotomous key is a negative factor to individual monitoring. As background, the key was developed in 2000 by IPHC staff to minimize the subjectivity that had previously existed in the release viability determinations by observers. It is the standard method used for bycatch mortality estimation and is successfully used by observers off Alaska, including vessels fishing with industry cooperatives. It will be used by observers whether a fleet-wide or individual vessel mortality monitoring plan is adopted for the west coast trawl IQ fishery.

The Canadian trawl fishery has successfully operated with a Groundfish IFQ and halibut IBQ program since 1995. Halibut mortality is monitored on each individual vessel. Observers do not use the key but employ the same condition criteria developed by IPHC which forms the basis for the dichotomous key. Even without the key, observer sampling of halibut bycatch proceeds quickly when proper incentives are available to harvesters. For example, in 2007, 80% of the fish (n = 20,712) were sampled within 15 minutes of being dumped on deck.

NMFS/NWFSC may be reasonably concerned about an increase in the observer workload required for catch estimation and a subsequent inability to conduct individual vessel monitoring. If so, we recommend that the Council identify its priorities for observer sampling and request from NMFS/NWFSC and the West Coast Groundfish Observer Program an estimate of the resources that would be required to conduct individual vessel halibut mortality monitoring. Such resources are integral to successful implementation of the Individual Quota program and the maximizing of industry support, and should be a priority for Council action with participating agencies.

Gregg Williams of the Commission staff will be attending the Council meeting and can address any questions you may have.

Sincerely,

Bruce

Bruce M. Leaman
Executive Director

cc: Commissioners

environmental defense fund
finding the ways that work

June 10, 2009

Mr. Donald K. Hansen
Chair, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

Dear Mr. Chairman and members of the Council:

We are entering the home stretch. Your dedication to both developing the west coast trawl catch share program in a timely manner and to making sure it gets done right throughout this long process will pay valuable dividends once the program is implemented.

While only a small handful of trailing actions remain, some of those actions are core to ensuring that the program meets all of its goals. With that in mind we wish to comment on the adaptive management program, divestiture, and the carryover provision. And in addition to the trailing actions the Council has on its plate, there are several related items that will affect the success of the program. These items include implementation funding, data that should be collected to provide meaningful information at the five year review, and the structure and design of the tracking and monitoring system. While these items are not formally before the Council at this time, we wish to offer our services in any way we are able in order to help shepherd this program through this final phase.

Adaptive management

While we firmly believe that the IFQ will produce significant economic and conservation benefits, we recognize that some ports may lose some boats or landings if quota is leased or sold to fishermen working in different areas of the coast. We believe the Adaptive Management Program could help ease the transition for fishing communities from current management to the new regime by creating incentives for fishermen to continue to land in their historic ports.

We are concerned however, that waiting until the third year of the program to use the pounds might be too long for some plants dependent on landing in their communities and other fishing-related infrastructure to weather. One of the rationales for waiting until the third year is to develop additional data to determine where quota should be directed. However, due to the administrative timeline there will be very little data to make a meaningful decision in order to utilize the quota by year 3. Therefore, we recommend beginning the program in the first year with a simple formula that would allocate pounds to fishermen who agree to land at the plant where they have predominately landed, based on a 3 year rolling average of the pounds they have brought into that community. While implementation in year one would be desirable given transition concerns, we do not want to have the entire IFQ program held up while the formula is completed. Therefore, if the Council cannot agree on a formula at this meeting, then we recommend that the Council commit to initiating a formulaic distribution of AMP starting in year 2 with the principal objectives plant and community stability. In either case, this use for the

AMP should be revisited by the Council at the five year review at which time the Council could change the objectives in the formula or move towards an EFP type application process.

Carryover provision

We understand there is concern regarding whether a carryover provision would comply with ACLs and whether it might lead to overfishing. That said, a carryover is actually likely to diminish the total removals in any given year. In the absence of a carryover fishermen would have the incentive to fish right up until their cap. Experience suggests that with a carryover in place fishermen may leave that fish in the water. In the face of decreasing TACs, the carryover could be reduced proportionally to ensure that overfishing or exceeding ACLs would not occur.

Divestiture

We recommend allowing a three year divestiture period in which those entities that are over the accumulation caps could sell or otherwise dispose of their excess quota. The GAC options currently on the table largely prohibit sales as well as use during the first two years. We would suggest that use of the excess quota pounds be allowed during the first two years, but not in the third year. That would provide the incentive for those entities to get rid of their excess before the end of the divestiture period. Conversely, we could support an option that allowed sale but not use during the first two years. Prohibiting both sale and use during that period is unduly constraining and doesn't help solve the problem of some entities remaining over the cap.

Data Collection Associated with the Five Year Review

We recommend that the Council think carefully about what will be necessary in order to conduct a meaningful five year review. We recommend that the Council identify at this meeting the priority issues to be examined at the five year review and request that NMFS report back in September with a data collection plan that will identify what information will be collected in the first five years of the program so that a meaningful assessment of these issues can take place. In addition to the broad question of how well the program is meeting program objectives, we suggest that the five year review include an assessment of changes in net economic value of the fishery, community impacts, ownership and leasing patterns, crew and skipper impacts, and other related ownership and use patterns.

It is critical that the appropriate data is collected so that the Council can determine what modifications to the program may be necessary to address documented impacts and better address the overall program goals. EDF and other stakeholders have expressed concern that the broad definition of eligibility to own could result in "armchair fishing" by quota share owners interested solely in holding and leasing quota as an investment. It is in the best interest of the fishery to have the ability to determine if ownership is moving away from the fishery; and if this is having an impact. Therefore, it will be important to have the data to objectively assess whether this has become a problem requiring an adjustment in the definition of eligibility or some other modification of the program.

Monitoring Halibut Bycatch Mortality

Finally, we would like to support the comments of the International Pacific Halibut Commission regarding estimating halibut mortality at sea. We ask that the Council urge the NWFSC to modify their observer protocol to allow estimation of halibut bycatch mortality on an individual vessel basis. This is necessary to maximize the individual incentives to reduce bycatch mortality.

We thank you again for your commitment to this process and stand ready to work with you though implementation and beyond.

These motions may have been modified by amendments; which will be available in the Final June 2009 Council Meeting Minutes and Voting Log.

1) Eligibility to Own

No person can acquire quota shares or quota pounds other than 1) a United States citizen, 2) a permanent resident alien, or 3) a corporation, partnership, or other entity established under the laws of the United States or any State, that is eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12113 (general fishery endorsement requirements and 75% citizenship requirement for entities).

Any ~~person or~~ entity that owns a mothership that participated in the west coast groundfish fishery during the allocation period and is eligible to own or control that US fishing vessel with a fishery endorsement pursuant to Sections 203(g) and 213(g) of the American Fisheries Act (AFA).

2) Carry-Over Provision

Each individual trawl vessel account will be able to carry-over up to 10 percent of the total quota pounds (QP) held in its account during that year. In addition, if the OY goes down substantially carry-over of QP would be reduced by the same percentage as the OY decrease.

3) Dogfish/Other Fish in the IFQ Program

Option 2: Dogfish included as Part of the Other Fish complex. Other Fish complex would not be included in the IFQ program. If at a future time Other Fish were added to the IFQ program, QS would be determined using the same catch history criteria as the other IFQ species, unless otherwise specified by a future Council action.

4) Determining Catch History in the Mothership Whiting Cooperatives

Determine catch history in the mothership whiting co-op alternative using relative pounds.

5) Trawl Sector Limits for Pacific Halibut and Managing Halibut IBQ in the Trawl Rationalization Program

The trawl mortality limit for legal and sublegal halibut is set at 15% of the Area 2A Total Constant Exploitation Yield not to exceed 130,000 lbs for the first 4 years of trawl rationalization program, and not to exceed 100,000 lbs beginning in the 5th year of the program. This total bycatch limit may be adjusted through the biennial management process.

Halibut IBQ will be based on halibut bycatch mortality, not on total halibut catch.

Agenda Item E.11
Situation Summary
June 2009

FMP AMENDMENT 20 – TRAWL RATIONALIZATION—FINAL ACTION ON ACCUMULATION LIMITS AND DIVESTITURE

Completion of the specifications for accumulation limits is one of the three trailing actions identified in the Council's final trawl rationalization action in November 2008. Initial actions on accumulation limits were taken at the Council's March meeting. The Council has made the following decisions on accumulation limits (the meeting at which the decision was made is indicated in parentheses).

1. There will be accumulation limits. Limits on the accumulation of quota share (QS) and quota pound (QP) are envisioned for individual species (including overfished species) as well as for aggregate limits on all nonwhiting species combined. (November 2008)
    a. Control limits will apply to QS ownership (March 2009)
    b. Vessel use limits will apply to QP (March 2009)
2. Control limits on the accumulation of QS will be measured by direct ownership by any entity as well as indirect control by such entity. An individual and collective rule will be used to evaluate control through ownership (Section A-2.2.3.e of Agenda Item E.10.a, Attachment 2). (November 2008)
3. Aggregate nonwhiting species QS control limits will be evaluated by converting QS to QP using the 2010 optimum yields (OYs) and trawl allocations. To simplify and provide stability, the 2010 OYs will be used for this calculation until the Council recommends otherwise. (March 2009)
4. There will not be a grandfather clause (November 2009), however, the Council will reconsider this matter (consider a divestiture provision) at its June meeting (March 2009). Without a grandfather clause, at the time of initial QS allocation, the QS that would otherwise go to those who would qualify for an allocation greater than the accumulation limits would instead be redistributed to those who are under the limits. A divestiture provision would allow entities to receive QS in excess of the limits and then to divest themselves of that QS via sale or other transaction that relinquishes direct or indirect control.
5. Final preferred alternative percentages for accumulation limits for all non-overfished groundfish species have been adopted (Agenda Item E.11.a, Attachment 1) (March 2009)
6. Preliminary preferred alternative percentages for accumulation limits for all overfished groundfish species have been identified. (March 2009)
7. A range of options have been adopted for accumulation limits for Pacific halibut individual bycatch quota (IBQ). (March 2009)
8. The Council requested analysis of a vessel use limit based on the concept of limiting the amount of unused QP in a vessel account, rather than limiting total QP.

Additional information on the issues to be covered under this agenda item is provided in Agenda Item E.11.a, Attachment 1.

At its May 5-7, 2009 meeting, the Groundfish Allocation Committee (GAC) reviewed these issues and provided recommendations (Agenda Item E.11.b, GAC Report). It was brought to the GAC's attention that with the March 2009 Council action to apply control limits only to QS there is no effective limit on the amount of QP an entity could accumulate during the year outside of a vessels account. In response, the GAC has recommended that QP transfers be allowed only from QS holders to vessel accounts and from one vessel account to another. In making its recommendations, the GAC relied on reports provided by the Groundfish Management Team (GMT). An updated and expanded GMT report is provided here for the Council (Agenda Item E.11.b, GMT Report). If divestiture is allowed (Item 4 in the above list) the Council will also need to discuss whether or not there should be a cut-off date for the accumulation of permits. This issue is also addressed in Attachment 1.

The GAC also discussed the ability of overfished species insurance pools to form in the presence of control limits. It was agreed that the Council should have a discussion of its intent with respect to the application of control limits to insurance pools and other types of cooperative ventures that might arise.

Council Task:

1. **Specify accumulation limits for overfished species and Pacific halibut.**
2. **Consider GAC recommendation to specify that QP can only be transferred to vessel accounts.**
3. **Determine whether or not to allow divestiture of QS after the initial allocation. If so, address the need for a cut-off date on permit acquisition.**
4. **Discuss applicability of control limits to cooperative ventures.**

Reference Materials:

1. Agenda Item E.11.a, Attachment 1: Issue Summary and Analysis: Accumulation Limits, Divestiture and Related Provisions
2. Agenda Item E.11.b, GAC Report, GAC Recommendations on Accumulation Limits, Divestiture and Related Matters.
3. Agenda Item E.11.b, GMT Report.
4. Agenda Item E.11.c, Public Comment.

Agenda Order:

a. Agenda Item Overview — Jim Seger, Merrick Burden
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action**: Adopt Final Preferred Alternative

PFMC
06/01/09

Agenda Item E.11.a
Attachment 1
June 2009

ISSUE SUMMARY: ACCUMULATION LIMITS, DIVESTITURE AND RELATED PROVISIONS

Accumulation Limits - Final Preferred and Preliminary Preferred

At it's March 2009 meeting the Council selected

1. a set of final preferred accumulation limits for non-overfished species individual fishing quotas (IFQ)
2. a set of preliminary preferred accumulation limits for overfished species (OFS) IFQ
3. a range of preliminary preferred accumulation limits for Pacific halibut IBQ

The limits selected are provided in Table 1. The limits for the groundfish species were based largely on recommendations from the Groundfish Advisory Subpanel (GAP). The options and some of the data that the GAP used in developing these recommendations (including Groundfish Management Team (GMT) recommendations) and the GAP rationale is provided in the Appendix to the document (Table 8 and Table 9).

Table 1. Control and vessel limit options: Council **preliminary preferred alternative** for overfished species and halibut, **preferred alternative** for all other species (from March 2009).

Species Category	Preliminary Preferred (overfished species and halibut) and Preferred Alternative (all other species) Vessel Limit *	Control Limit
Nonwhiting Groundfish Species	3.2%	2.7%
Lingcod - coastwide	3.2%	2.5%
Pacific Cod	20.0%	12.0%
Pacific whiting (shoreside)	15.0%	10.0%
Pacific whiting (mothership)	30.0%	20.0%
Sablefish		
N. of 36° (Monterey north)	4.5%	3.0%
S. of 36° (Conception area)	15.0%	10.0%
PACIFIC OCEAN PERCH*	5.0%	3.3%*
WIDOW ROCKFISH*	3.8%	2.5%*
CANARY ROCKFISH*	7.8%	5.2%*
Chilipepper Rockfish	15.0%	10.0%
BOCACCIO**	10.0%	7.5%**
Splitnose Rockfish	15.0%	10.0%
Yellowtail Rockfish	7.5%	5.0%
Shortspine Thornyhead		
N. of 34°27'	9.0%	6.0%
S. of 34°27'	9.0%	6.0%
Longspine Thornyhead		
N. of 34°27'	9.0%	6.0%
COWCOD**	10.0%	10%**
DARKBLOTCHED*	3.0%	2%*
YELLOWEYE**	3.9%	2.6%**
Minor Rockfish North		
Shelf Species	7.5%	5.0%
Slope Species	7.5%	5.0%
Minor Rockfish South		
Shelf Species	13.5%	9.0%
Slope Species	9.0%	6.0%
Dover sole	3.9%	2.6%
English Sole	7.5%	5.0%
Petrale Sole	4.5%	3.0%
Arrowtooth Flounder	20.0%	10.0%
Starry Flounder	20.0%	10.0%
Other Flatfish	15.0%	10.0%
Other Fish	7.5%	5.0%
Pacific Halibut***		
Min	1.5%	1.0%
Max	10.0%	8.0%

* These overfished species control limits are to be set at the maximum initial allocation to a permit. These percentages are based on preliminary estimates of those values.

** Because the maximum initial allocations for these overfished species were so high, the control limits were set at one half the maximum initial allocations. These percentages are based on preliminary estimates of those values.

*** Halibut IBQ

- Analyze a control limit range for quota share from 1-8%
- Analyze a vessel usage limit equal to control, up to 1.5 times control with a maximum of 10%

Overfished Species Accumulation Limits

The Council adopted as preliminary preferred options overfished species limits based mainly on recommendations provided by the GAP but higher vessel limits than recommended by the GAP. The GAP recommended that control limits for each species be set at the highest amount of quota shares (QS) for that species allocated to any single permit. The estimates of the highest amounts were provided and adopted as part of the motion. These estimates have been updated since that time. The updates are provided in the Agenda Item G.10.b, GMT Report. The GAP also recommended that vessel limits be set to the same level as control limits but that the vessel limit be specified as an unused QP limit.

Unused QP Approach for Overfished Species Vessel Limits

One important element of the GAP's recommendations was the "Unused QP" provision for the overfished species vessel usage limits.

Two specific reasons have been identified for considering the unused QP approach

1. **Choosing the Right Limit for OFS.** The unused QP approach may diminish the effect of improperly matching the overfished species vessel limits to the target species vessel limits.
2. **Choosing a Lower Limit.** If maintaining a broader distribution of QP control is desirable (e.g. maintaining more participants in the market during the year), the unused QP approach may reduce the adverse effects of a smaller vessel limit, as compared to a similar sized limit using the standard limit (limit on the total used and unused QP).

Potential disadvantages of the unused QP approach for vessel limits are discussed below. Also discussed is the possibility of using an adaptive approach to setting both the level of the accumulation limits and the nature of the vessel limits (unused QP limits or total QP limits).

Choosing the Right Limit

If the overfished species limits are set too low relative to the amounts needed to access target species limits, they could inhibit vessels from taking the target species limits. While low limits could be set to encourage vessels to avoid overfished species, limits set too low could be unnecessarily constraining. On the other hand, limits set too high would allow some vessels to sequester large amounts of OFS QP as insurance against an unexpected bad tow.

Given the variety of target strategies along the coast and the variation of those strategies by geographic area, identifying a single value for a vessel limit that is appropriate for the entire coast is difficult. A low limit could automatically disadvantage certain areas of the coast while a higher limit might allow excessive concentration and control.

Setting the Limit Too Low

With an unused QP vessel limit, the system would be more forgiving of a limit that is set too low than with a standard total QP vessel limit. With an unused QP approach, a vessel which maxes out its OFS limit will not be forced to stop fishing for the year but rather would have the opportunity to acquire the QP needed to cover its deficit and then resume fishing. Under a standard total QP limit a vessel would have to stop fishing once the overfished species limit is reached. While the vessel could then generate some revenue by selling its excess target species QP to other vessels there would still be a number of negative effects.

A vessel which must stop fishing because of an overfished species limit might not be able to recoup all of its consequent losses through the sale of its remaining target species QP and there might be adverse impacts on the local community. If a vessel uses target species QP itself, it earns revenue to pay captain and crew, cover other variable costs, cover some of its fixed costs, a reasonable profit, and an amount that reflects the market value of the QP (assuming well functioning markets). If it bumps against an overfished species limit and sells its excess target species QP onto the market the captain and crew would not receive pay for the QP sold,[1] the vessel would lose the associated revenue that would have otherwise have gone to its annual profits, and some of the vessel's fixed costs might not get covered (profitability would be further diminished to cover fixed costs). Additionally, suppliers of the inputs representing the other variable costs might lose income (depending on where the QP is sold to). Further, the vessel's ability to recoup some of its revenue from selling the target species QP might be substantially diminished if OFS QP are in short supply. Under such circumstances, much of the value of the target species QP may be captured by the price at which the OFS QP is traded.

Setting the Limit Too High

If the OFS limit is set too high, there is little difference between the unused QP approach and the standard total QP vessel limit. The higher the OFS vessel limits are set the more OFS QP a vessel will be able to acquire and sequester in its account. Vessels may desire to acquire more than their average need in order to insure their ability to cover greater than average bycatch rates. Any vessel will be able to carry more OFS QP than its average need by reducing the amount of target species QP it carries. However, the higher that limits are set the more OFS QP vessels will be able to hold in excess of their average need. If some vessels hold more than their average need until they are certain of their ability to take their target species then by implication[2] there may be other vessels which would carry less OFS QP than their average need. Vessels holding more than their average needs might drive OFS QP prices higher (though market dynamics may diminish this effect).[3] In the mean time, other vessels that are short on the needed OFS QP could end up (1) being unable to fish until vessels with excess QP decide to release their unneeded QP, or (2) being forced to incur the loses that may be associated with selling their target species QP (as described in the previous paragraph).

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[1] Unless the crew happens to also work the vessel to which the QP is transferred.

[2] Assuming that the amount of OFS available to the fishery is approximately what is needed given the amount of target species available.

[3] A number of dynamics affect whether or not price seasonality would occur. Higher limits providing more opportunity to acquire and hold larger volumes of unused OFS QP may affect these dynamics. These are discussed below in the section "Potential for a Race."

Choosing a Lower Limit

The unused QP approach could be used to set a vessel usage limit lower than might be considered reasonable with a standard total QP limit. Setting a lower limit would keep more QP off vessels until it is needed and by keeping QP more dispersed, potentially increasing market availability. This discussion assumes there is no opportunity for QP to be accumulated other than in a vessel account (see section "Absence of an Entity QP Limit and Direct QP Transfer Requirement"). As an example, assume that the control limit for QS is set at the vessel limit for QP. If a vessel owner at the maximum QS limit for an OFS places all of its OFS QP on its own vessel, it would have to wait until some of its OFS QP is used before acquiring additional OFS QP. This could potentially leave more QP available on the market than if the vessel limits were higher.

Vessels will have incentives to secure access to OFS QP to diminish the risk that may be entailed in having to enter the OFS QP market to cover OFS catch. In this regard there are some tactics which may be employed that could diminish the effectiveness of an unused QP limit. For example, rather than immediately transferring its own QP to its vessel, a QS owner might acquire QP from others to put on its vessel. Then, as it uses QP acquired from others, it could transfer its own QP to the vessel. With this approach the QS owner/vessel could effectively control an amount of unused QP equal to the unused QP limit for vessels plus the amount of QP associated with the QS control limit. Another tactic would be for vessel owners to enter into contingency contracts for acquiring QP from other QS owners, effectively locking up the QP for when they need it. Those with the QP to sell would have to evaluate whether they are better off entering into such contracts or waiting to see what market prices develop. If an unused QP approach is used, the availability of these tactics may be reason to consider lower limits.

Concerns About the Unused QP Approach

Lack of an Ultimate Limit

With the unused QP approach there is not necessarily an ultimate limit on the amount of OFS QP a vessel could use. There may be concern that the absence of an ultimate limit could reduce the incentive to avoid overfished species and result in excessive accumulation of OFS QP by individual vessels as the vessels use up their QP and recharge their accounts. However, there is a strong incentive for vessels to avoid OFS so that they don't have to incur the expense of acquiring them and can generate revenue from selling their surplus QP. While there would still be incentives not to use OFS QP, the unused limit could potentially allow a fisherman who is less skilled in avoiding bycatch to acquire and use substantial amounts of OFS QP, adversely affecting OFS QP availability for the remainder of the fleet. Over the long run we would expect these fishermen to leave the fishery as they would be less profitable than others and do better by selling their assets rather than operating at lower levels of efficiency. However, if they have sufficient assets they might choose to remain because of non-financial rewards or lack of alternative opportunities. The opportunity for this to occur could be limited by placing a cap on the total amount of used and unused QP a vessel could have in its account.

Potential for a Race

Another concern that has been expressed is that an unused QP approach would lead to an early season race, that vessels concerned about the availability and price of OFS QP later in the year might front load their seasonal activity. However, even if a vessel uses this tactic, it would still have incentive to avoid OFS as much as possible.

The degree to which this issue is a concern depends on the degree to which there is seasonality in the price of OFS. Theoretically, the anticipation of higher prices later in the year should be self dampening. Those with OFS QP anticipating higher prices later in the year will be more likely to hold QP to sell late in the year. This dynamic will tend to make more QP available then, reducing the degree of the price rise. If enough people hold out hoping for a higher price, in the extreme there could be a late season glut and reduction in price. On the other end, if enough fishermen fish early in order to use their OFS QP and make room to acquire more, the early season demand will increase, increasing early season OFS QP prices. Together, these two dynamics would be expected to flatten out the initial expectation of a price swing during the year. In systems such as the New Zealand system, where there are constraining species in a multispecies fishery, strong late season increases in price are not typical.

Given that one of the main potential downsides of the unused QP approach is dependent on whether a strong seasonality develops in the markets, an adaptive approach might be taken. The Council could adopt (1) an unused QP approach with an unused QP limit and an ultimate vessel limit (maximum unused and used QP limit), and (2) framework a process by which it could suspend the unused limit if experience showed that the approach was generating a race for fish or other unintended negative consequences. Or a standard total QP limit could be adopted with the unused approach as a backup

Adaptive Approach for Setting Accumulation Limits

The accumulation limits are one of the provisions that will have the greatest effect on long term performance of this program. Because of this, the Council may want to take an adaptive approach, making adjustments to the accumulation limits as it gains experience with the program.

> Note: Adaptive management is the "process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring." The Council's adaptive management set aside program specifies amounts of QP for use in adaptive management and other purposes. The Council may develop other adaptive management approaches outside of the adaptive management QP set aside program.

Relying on an adaptive approach has its own consequences as program participants will likely scale their business plans in accordance with the accumulation limits. A person's QS holdings will be affected by the control limits, and the amount of physical capital investment will be affected mainly by the vessel usage limits but also by the control limits. Setting limits high and making downward adjustments to will impact investments made during the IFQ program. Additionally, if there is anticipation that limits are set too high and may be adjusted downward, that anticipation may result in more rapid consolidation by those hoping they will be grandfathered in at higher levels of control. Setting limits low with the intent of possibly making upward adjustments will constrain initial rationalization benefits but raising the limits later might not have as significant a negative impact on investments made during the IFQ program (as compared to lowering a limit). The Council will always have an opportunity to change the IFQ program in a wide variety of manners (including abolishing the program). However, if the Council anticipates there is a reasonable probability that it may want to make adaptive adjustments to the size of the accumulation limits, it may want to consider explicitly noting that the accumulation limits, in particular, may be subject to adjustments both during the planned program reviews and potentially prior to that time.

Switching from an unused QP vessel limit to a standard total QP limit may be done with little immediate direct adverse impact on scale of operation, depending on where the standard total QP limits are set relative to the unused QP limits. Similarly, it would be possible to switch from the standard total QP vessel limit to an unused QP approach with little immediate direct adverse impact on scale of operation. Whichever approach the Council chooses to use, it may want to framework in the alternative approach to facilitate a more rapid adaptive response (potentially even changing in the second year of a biennial management cycle).

Pacific Halibut Individual Bycatch Quota (IBQ) Accumulation Limits

The Council requested the evaluation of a range of accumulation limits for halibut IBQ quota shares (IBQ-QS control limits) and IBQ quota pounds (IBQ-QP vessel limits). The directions provided were to evaluate control limits over a range from 1% to 8% and vessel limits that are 1.5 times control limits, not to exceed 10%. Using this guidance if the control limit is set at 6.66% or higher the vessel limit would max out at 10%.

Halibut Control Limits

Some of the main factors considered by the Council and advisors in setting target species control limits included:

1. the maximum initial allocation to a single permit
2. the maximum recent share of harvest by a single permit
3. the amount of harvest needed to achieve a given vessel income level with QS owned by the entity that owns the vessel.

Maximum Initial Allocation

Information on the expected maximum initial IBQ-QS allocation to a single permit is provided in Figure 1 (5.4%). The primary species with which halibut are most closely associated are Petrale and arrowtooth. Figure 1 shows the IBQ allocations per permit ordered along the horizontal axis according to the amount of QP allocation an entity would receive for Petrale and arrowtooth, the two species on which basis the halibut IBQ will be allocated. The IBQ-QS amount is indicated on the right hand vertical axis and the corresponding IBQ-QP amount, assuming 2008 conditions, is displayed on the left hand vertical axis.

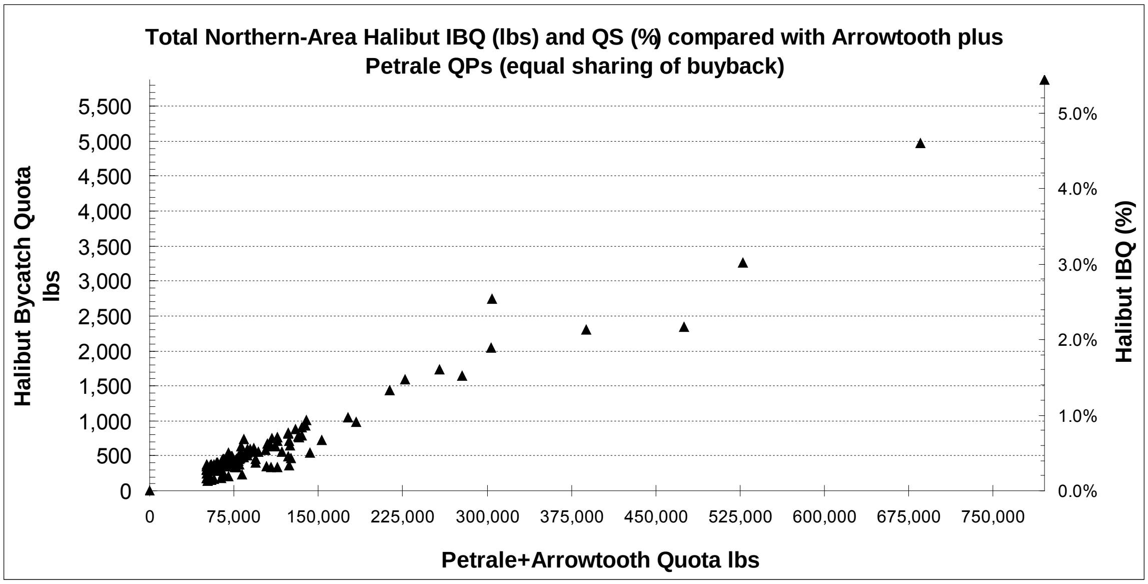


Figure 1. Amount of halibut IBQ quota pounds (left vertical axis) and quota shares (right vertical axis) by permit (permits are arrayed from the smallest to greatest based on amount of Petrale sole and arrowtooth quota pounds allocated assuming 2006 OY levels.

Maximum Recent Share of Harvest

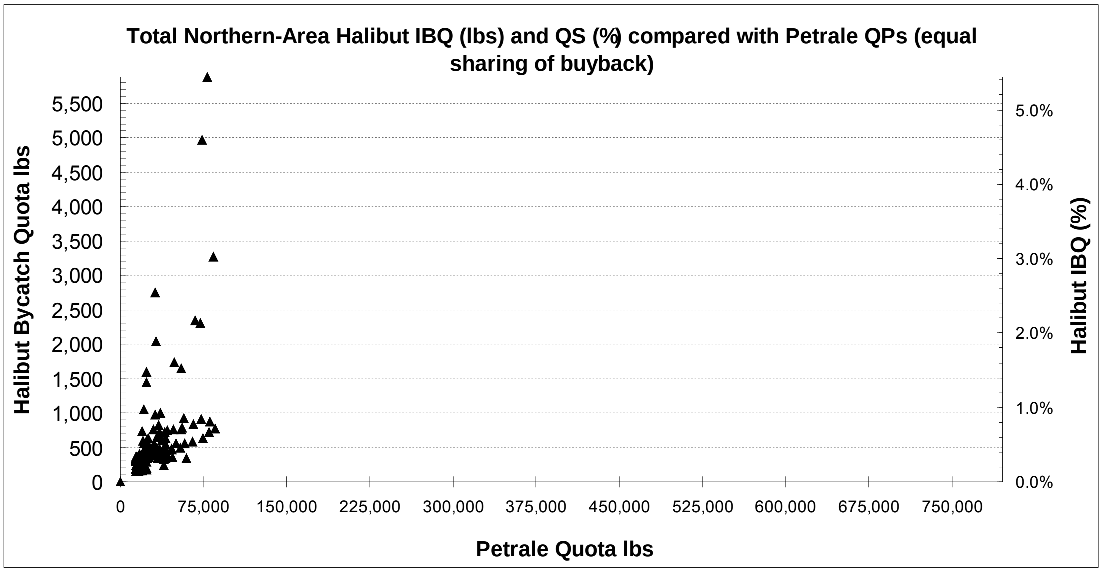
There are not per permit data on maximum recent share of harvest or catch because retention of Pacific halibut is not allowed and there is not 100% observer coverage.

Achievable Income Levels

Halibut IBQ does not contribute directly to income because Pacific halibut is a prohibited species; however, a shortage of halibut IBQ could prevent a vessel from achieving the potential income levels allowed under the target species accumulation limits.

The initial allocation formulas offer some insight on the amount of halibut that may be necessary to achieve the Petrale and arrowtooth harvest levels allowed under the control limits specified for those species. The initial allocation formula for halibut allocates on the basis of permit specific logbooks and Petrale and arrowtooth QS allocations, combined with fleet average bycatch rates. Given this relationship between halibut and the initial allocation of target species QS in the allocation formula, the maximum initial allocation of halibut IBQ-QS might be a reasonable match for the maximum initial allocations of target species QS. However control limits were set about 60% and 75% above the initial allocations for arrowtooth and Petrale, respectively (Table 2). Given that the highest initial allocations of halibut is correlated more with arrowtooth allocations than Petrale allocations (Figure 3), if one were to set the halibut IBQ-QS control limit proportional to need with respect to target species control limit, one might want to emphasize the arrowtooth allocation and set a halibut IBQ control limit at 60% above the initial halibut IBQ QS allocation (160% x 5.4% = 8.6%).

Table 2. Accumulation limits and some of the criteria considered in setting those limits.					
Council Preferred Options	Vessel Limit	Control Limit	Maximum Initial QS Allocation	Maximum Share of Fleet Allocation	Maximum Share of Landings '04-'06
Petrale	4.5%	3%	1.7%	5.9%	8.0%
Arrowtooth	20%	10%	6.2%	8.3%	19.1%



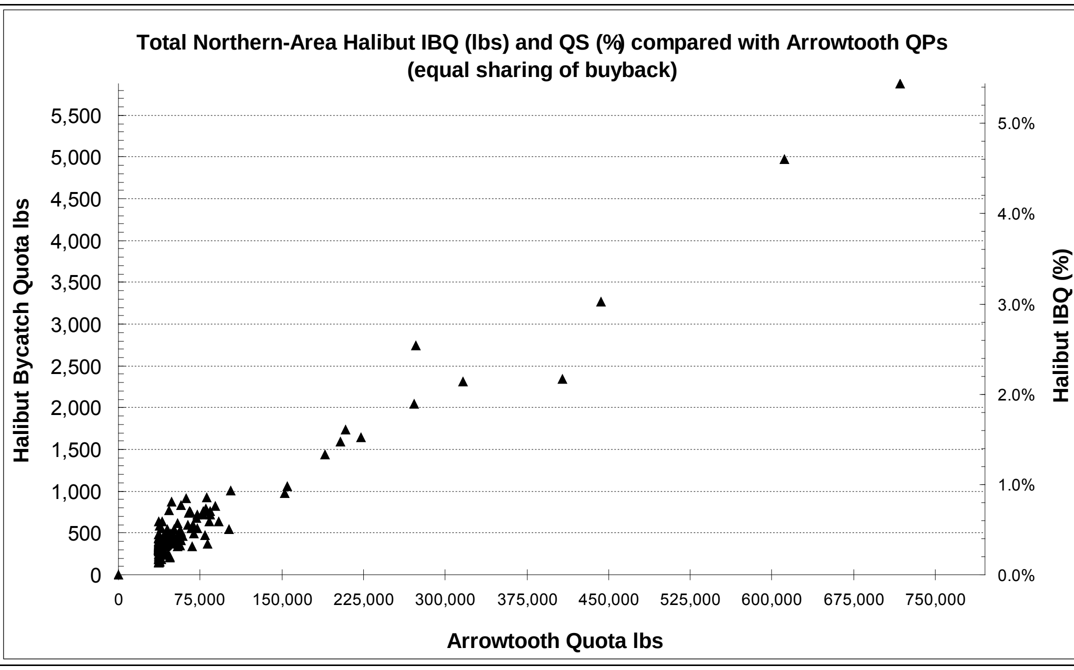


Figure 2. Halibut bycatch QP and target species quota distributed to entities based on initial QS allocations, applying 2008 OYs and halibut total CEY.

The amount of control over the fishery that would be potentially conveyed by a bycatch species control limit may be another consideration. With an 8.6% halibut IBQ-QS control limit, 12 individuals (100%/8/6%) could control all the halibut IBQ-QS while the Petrale QS would be spread among at least 23 entities (100%/4.5%). If this balance between number of individuals needing Petrale and the number who could control all the halibut IBQ-QS is not acceptable, one could set lower halibut IBQ-QS control limits and rely on annual transfers to get the IBQ-QP to the vessels in need of it. Alternatively, vessels could avoid the need to acquire IBQ-QP from others if they can reduce their bycatch rates. Similar issues of balance between control limits for different species may exist anytime different control limits are set for species that are typically caught together.

Halibut Vessel Limits

To evaluate the vessel limits we will

1. Calculate the maximum pounds of a target species that can be harvested for each target species vessel limit.
2. Evaluate the amount of halibut that might be needed to achieve that target species catch.
3. Determine the percent of the total trawl bycatch represented the pounds of halibut needed.

This evaluation will be conducted using 2008 OYs for Petrale and arrowtooth, with the available halibut IBQ determined based on applying the Council's Amendment 21 trawl halibut bycatch formula to the 2008 halibut total CEY (Table 3).

Table 3. OYs and halibut mortality limits based on 2008 fishery conditions.

2008 Halibut Mortality Limits (Trawl)	Pounds (thousands)
a. Total 2008 CEY (Legals)	940
b. Trawl Bycatch Calculation: 15% of CEY	141
c. Trawl Bycatch Mortality Max (not more than 130,000)	130
d. The greater of b and c = amount available for legal and sublegal trawl bycatch (dressed weight total mortality)	130
e. Set Aside for South of 40 10 (5 mt) and At-sea (5 mt)	22
f. **Trawl Halibut IBQ**	108
2008 OYs	
Petrale OY	5,509
Arrowtooth OY	12,787
Petrale + Arrowtooth	18,296
2008 Catch	
Petrale OY	4,873
Arrowtooth OY	5,887
Petrale + Arrowtooth	10,761

The first calculation is to determine the pounds represented by each vessel limit. This value is provided in the first two columns of Table 4.

Table 4. Target species vessel limits and halibut needed to take those limits based on various assumed bycatch rates.

	Vessel Limit	Vessel Limit (thous pounds)	Assumed Lbs Halibut Mortality (Mty) /Target Species LB Caught	Halibut Mty Needed to Take Vessel Limit (thous pounds)	Halibut Needed as % of Available Halibut
Petrale	4.5%	248			
Minimum average bycatch rate strata.			0.017	4	3.8%
Closest to midpoint average bycatch rate strata.			0.039	10	8.9%
Maximum average bycatch rate strata.			0.065	16	14.8%
Average bycatch rate to achieve full target species harvest [a/ b/]			0.006	1	1.4%
Arrowtooth	20.0%	2,557			
Minimum average bycatch rate strata.			0.017	42	39.2%
Closest to midpoint average bycatch rate strata.			0.039	99	91.5%
Maximum average bycatch rate strata.			0.065	165	153.0%
Average bycatch rate to achieve full target species harvest [a/ b/]			0.006	15	14.0%
Total					
Total halibut required to take maximum vessel limits of Petrale and arrowtooth using assumed average bycatch mortality rate. [b/]			0.006	16	15.4%

a/ The rate of 0.006 represents the bycatch mortality rate that would need to be achieved for the fleet to take the entire Petrale and arrowtooth harvest in 2008. It is the total halibut that would have been available based on the Council's Amendment 21 recommendations (108,000 pounds) divided by the total Petrale and arrowtooth available (18,296,000 pounds).

b/ If a rate of 0.006 is achieved then a vessel would require the percent of the total trawl halibut IBQ indicated in the last column in order to take the vessel limits for this target species. The last rows of the table (total) shows the amount of halibut a vessel would need in order to take the vessel limit for both Petrale and arrowtooth.

The second step is to apply a bycatch rate to determine an amount of halibut needed. A number of bycatch rates can be assumed. In Table 4, a range is provided based on stratified observer data. Additionally, estimates are provided using the average bycatch rate (halibut/(Petrale+arrowtooth)) that would have to be achieved in order to fully harvest the target species OYs with the available halibut IBQ (0.006). The bycatch rates used were originally reported by the observer program in round pounds of legal and sublegal halibut catch per round pound of arrowtooth and Petrale catch. They have been converted to account for discard survival and measurement in dressed weight (Table 5). Figures illustrating the degree of variation in the bycatch rates are proved in an Appendix to this document.

Table 5. Observer program halibut bycatch rates by strata ((legal plus sublegal halibut lbs)/(Petrale + arrowtooth lb)) (2003-2006)

	North-South Area Strata	Depth Strata <115 Fm	Depth Strata >115 FM
Catch Round	North of 47°05' N Lat	0.117	0.061
Discard Mortality (dressed wt)		0.065	0.034
Catch Round	South of 47 °05' N Lat	0.07	0.03
Discard Mortality (dressed wt)		0.039	0.017

As an example using Table 4, if the Council believes that it is reasonable to expect vessels to achieve an average bycatch rate of 0.17, the Petrale vessel limit could be fully harvested if the halibut vessel limit is set at 3.8% and the arrowtooth vessel limit could be fully harvested if the halibut vessel limit is set at 39.2%. Neither of these assumed bycatch rates would allow either of the OYs to be fully harvested. Full harvest of the OYs would require average bycatch rates for both target species to be reduced to 0.006 pounds per pound of target species. At this assumed rate, a halibut vessel limit set at 1.4% would allow full harvest of the Petrale limit and a halibut vessel limit set at 14% would allow full harvest of the arrowtooth limit. From this it can be seen that there are two considerations,

1. If the vessel halibut limits is to be chosen to allow vessels to achieve the maximum target species limit, what level of bycatch should be assumed or required?
2. How should the halibut vessel limit be balanced between the limit necessary to take the Petrale vessel limit and that needed to take the arrowtooth vessel limit or should both be accommodated?

The value of the potential Petrale and arrowtooth harvest for which halibut IBQ is needed is shown in Table 6, OYs assuming 2008 prices. While the value of potential Petrale harvest to the fleet as a whole is much higher than that of the arrowtooth harvest, the arrowtooth harvest may be more important to particular vessels in particular areas.

Table 6. Exvessel value of the 2008 Petrale and arrowtooth OYs assuming 2008 prices and landing of the entire OY.

	Pounds (OY) (millions)	Price Per Pound	Exvessel Value ($ millions)
Petrale	5.5	1.49	8.2
Arrowtooth	12.8	0.10	1.3

Finally, it should be noted here, as the GMT report notes for overfished species, that the halibut IBQ-QP vessel limit needed to fully harvest the target species limits will vary from year to year depending on the target species OYs and the amount of halibut IBQ-QP available for use to cover trawl bycatch.

Absence of an Entity QP Limit and Direct QP Transfer Requirement

Under the IFQ program, many different types of entities will be able to hold QS. Each year those entities will be issued QP for the QS they hold. In Figure 3, an entity with an IFQ account is represented by the box on the left. The shaded circle shows its QS holdings and the unshaded circle shows the QP it receives each year based on its QS holdings. In order to be used, the QP must be transferred to a vessel account. The vessel account is represented by the shaded circle on the right hand side of Figure 3. The Council's March 2009 actions specified that control limits would apply only to QS, not QP, and that vessel usage limits would apply to QP. This left no limits on the amount of QP an entity can accumulate outside of the vessel account. In Figure 3, the lack of such a limit is indicated by the absence of shading in the circle representing the entity's QP holdings. At present QP can be transferred between QS holders and to and between vessels, as indicated by the arrows in Figure 4. Additionally, nothing has been specified that would prevent an entity not holding QS from acquiring QP (as represented by Entity 3 in Figure 4).[4]

[4] However, it should be noted that even if there were a provision requiring that QP holders be either QS holders or vessels, by purchasing some small amount of QS an entity could qualify as an eligible QP buyer and act primarily as a QP broker.

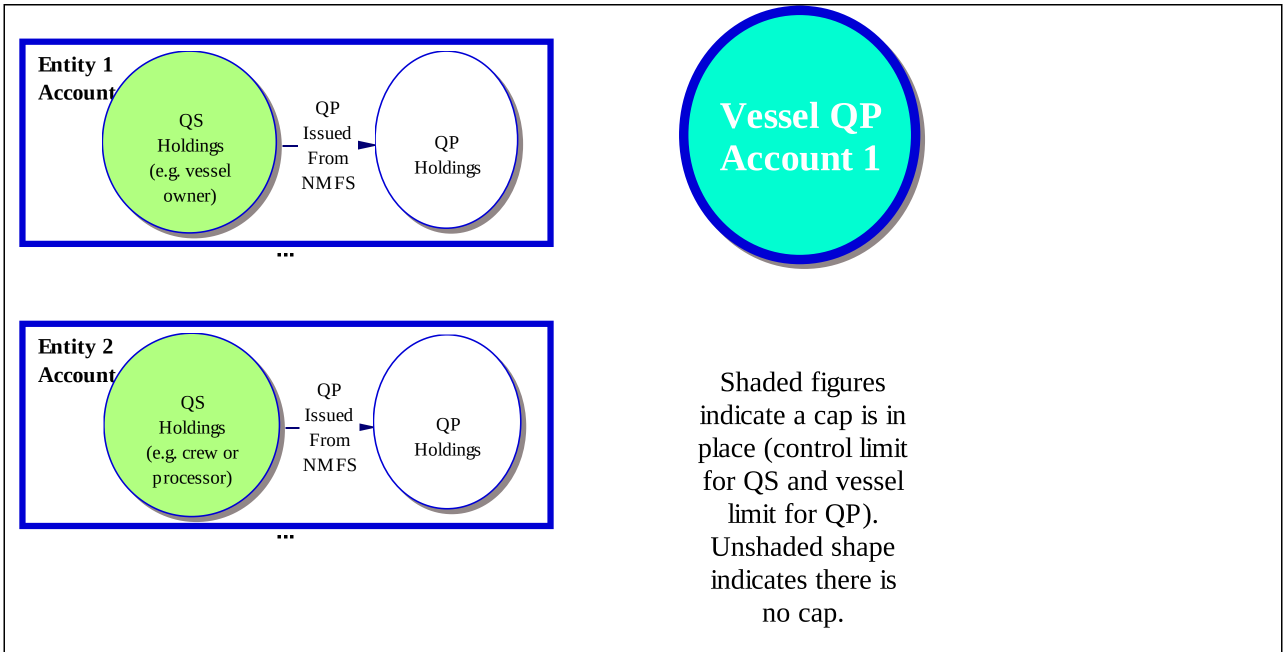


Figure 3. An entity's QS holdings will be capped and a vessel's QP holdings will be capped but there is no cap on an entity's holding of QP.

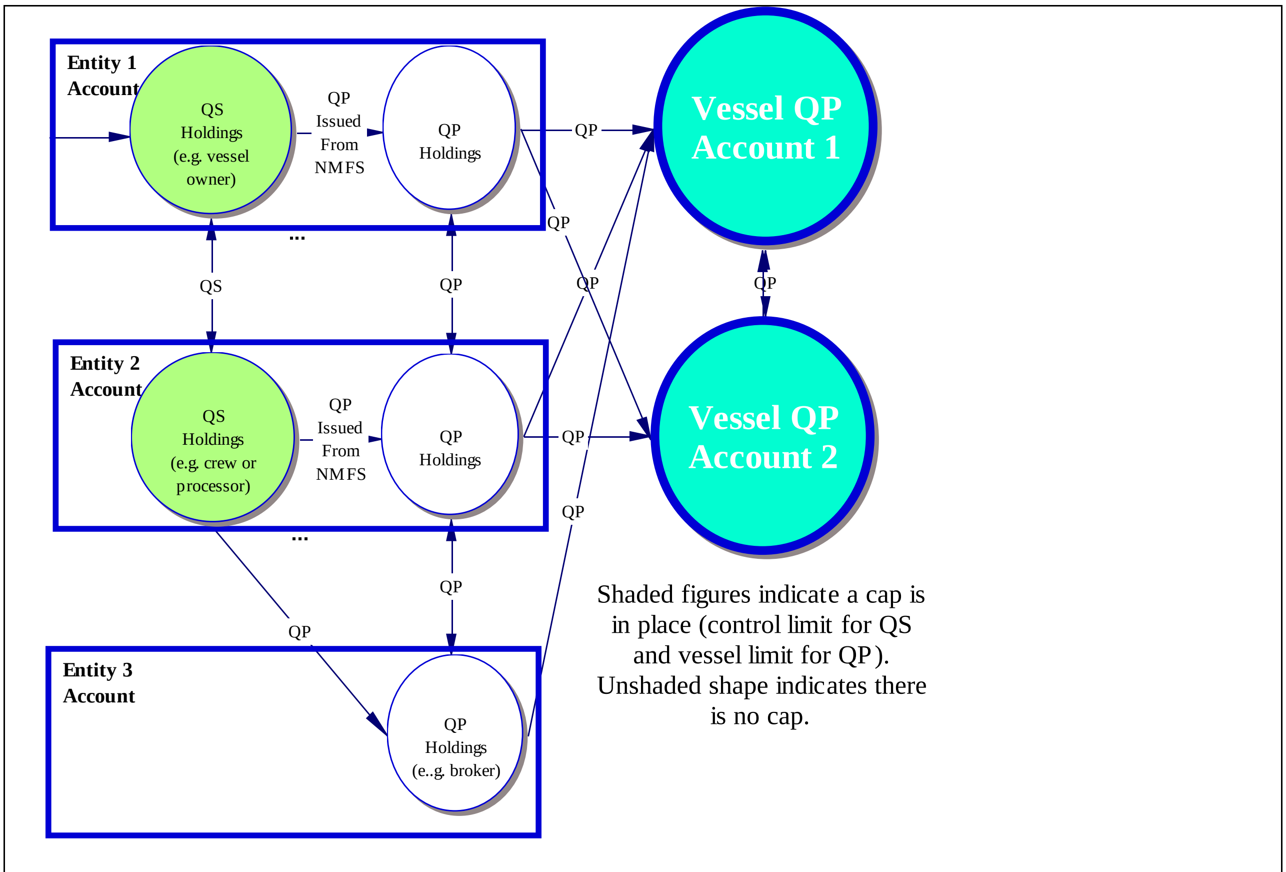


Figure 4. Each year after QP are issued to QS holders, the QP can be transferred among entities holding QS and possibly to entities not holding QS, as well as to the vessels which will use the QP.

This information was presented to the Groundfish Allocation Committee at its May 2009 meeting (GAC) along with the question of whether or not there should be an entity limit on QP holdings, i.e. is it a concern if during the year there is no limit on the amount of QP an entity can hold as long as it is not placed on a vessel? There are advantages to not having an entity limit. For example, it allows those wishing to reduce risk of being caught short to acquire more QP than is allowed under the vessel usage limits[5] and allows communities and others to acquire and provide QP for activities of more than one vessel. There are also advantages to having an entity limit in that it reduces the opportunity to acquire QP in an attempt to gain market power and makes it more difficult to circumvent QS control limits.[6]

The GAC has recommended that an entity limit not be created but instead that QP transfers be allowed only to and among vessel accounts (i.e. eliminate all the "QP" lines between the boxes in Figure 4 but leave the lines to the vessel). This restriction would prohibit an entity from acquiring more QP than it receives each year based on its QS holdings[7],

Divestiture

In its November 2008 action, the Council decided there would be no grandfather clause and that any QS that would go to someone in excess of control limits will instead be allocated to those below the limits, in proportion to their initial allocations of QS. In March 2009, the Council voted to consider at this meeting a motion that would instead allow everyone to receive their initial allocation but those receiving an initial allocation of QS in excess of accumulation limits would be given a period of time to divest themselves of that QS. The GAC reviewed this issue and has recommended three divestiture options for the Council to consider and contrast with continuation of the no divestiture provision.

Who is Affected

Those with multiple permits will be most strongly affected by the choice of whether or not to include a divestiture provision. The control limits were set to allow entities holding single permits to receive their entire initial allocations of all non-overfished species except sablefish south and starry flounder. For these two species the limits were set below the maximum expected initial allocation. The Council has not yet set the control limits for overfished species but has adopted preliminary preferred control limits for bocaccio and yelloweye that are below the maximum initial allocations for those species (preliminary control limits for other overfished species are set at the maximum initial allocation level). Those with a single permit will not be directly affected except with respect to these four species or others for which the Council chooses to set control limits below maximum initial allocations to a permit.

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[5] This would allow them to cover shortages without having to go to the QP markets when the shortage occurs. Vessels that catch more than the vessel use limits would be required to cover their overage with QP but may not resume fishing until the following year (unless the vessel limit is specified as a limit on unused QP.

[6] If an entity QP control limit is desired and if the QP control limit is to be set lower than the vessel usage limit, this could be achieved by exempting the pounds in a vessel QP account from the entity QP control limit.

[7] . . . , unless the QS owner also holds a vessel account. If it holds a vessel account then it will be able to acquire and place QP in that account up to the vessel usage limit.

Those with single permits[8] will be indirectly affected by the choice as to whether or not to have a divestiture provision. Under the current no grandfather clause provision QS not allocated will be redistributed to those under the control limits. With a divestiture provision those under the limits would not benefit from such redistributions. However, without a divestiture provision many of those with multiple permits may sell their permits in advance of the initial allocation, diminishing the amount of QS that may be redistributed.

Nature of Effect On Multiple Permit Holders

With a divestiture provision, holders of multiple permits will be able to acquire all of the QS associated with the history of those permits and benefit from the divestiture of those shares. The primary benefits of divestiture may be twofold:

1. Revenue from the sale of the QS.
2. The sale of the QS to those with whom the seller may have a long term beneficial relationship.

Examples of this second type of benefit include a harvester selling OFS QS to someone with whom it expects to enter a risk sharing pool or a processor selling QS to someone from whom it expects to receive fish.

Without a divestiture provisions, many holders of multiple permits would likely sell permits prior to the initial allocation. By doing so they may be able to capture a substantial portion of the revenue associated with the value of the QS that will be eventually issued for those permits and will be able to direct the permits into the hands of those with whom they expect to have a long term beneficial relationship.

Prior to initial allocation uncertainty and less flexibility will likely diminish the level of benefits those selling permits would expect as compared to the sale of the permit and QS after initial allocation. Prior to initial allocation there may be uncertainty about whether and when the program will be implemented, its final form, the actual amount of history and quota share that will be assigned to a particular permit, the trading value of the QS, and whether or not the program will be successful and survive over the long term. These uncertainties are likely to result in a lower price for the permit prior to QS allocation than for the permit and QS after initial allocation and initial experience with the program. Additionally, prior to initial allocation a permit with its entire suite of QS must be traded as a lump to someone who may be more interested in some of the associated species than other species. After the initial allocation, the QS can be divided and sold separately to those who place the highest value on each particular species.

[8] And those with multiple permits for which the total QS issued would be below the accumulation limits.

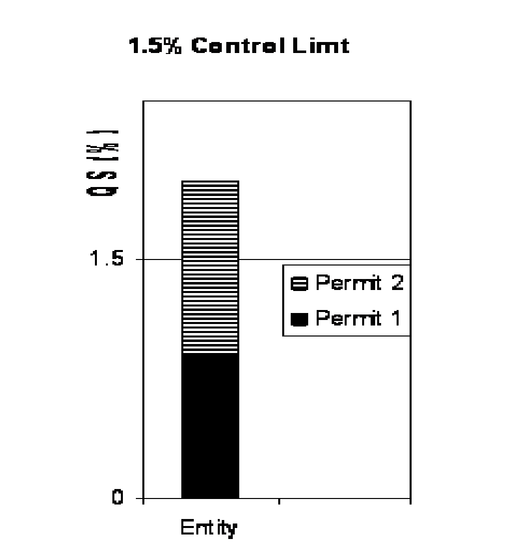

Figure 5. An entity with two permits selling one permit to get under the control limit may end up being far below the control limit.

If there is no divestiture provision, the opportunity to sell permits provides substantially less flexibility for a permit holder to get under the control limits than with divestiture after initial QS alloation. For example, if two permits put an entity over the limit, selling one permit might put them well under the limits, as illustrated in Figure 5.

Opportunity to Divest to CFAs and Others

With a divestiture provision it is possible that the Council could restrict to whom the divesture is made. This has been suggested in public comment provided in Agenda Item E.11.

Additionally, the entities available to receive divestitures of QS may be different than those available to receive permit transfers, depending on trailing amendments the Council may recommend. One potential amendment might provide special privileges to CFAs: higher accumulation limits. With a divestiture provision, entities holding multiple permits may have more opportunity to divest to CFAs because, if there is to be a trailing amendment to provide CFAs with higher accumulation limits, it is more likely that it will have been completed by the time divestiture is required.

Cutoff Date Needed?

If the Council decides to allow divestiture, it should also consider whether or not there needs to be a cutoff date on the acquisition of additional permits.

There are potential incentives for the accumulation of additional permits. For the reasons described above, it is possible that the value of the QS and permit after initial allocation will be higher than the value of the permit prior to initial allocation. This creates an opportunity for financial speculation. The more flexible opportunity afforded by divestiture to direct QS into the hands of those with whom a beneficial relationship is expected might also encourage some to accumulate additional permits prior to program implementation.

If the Council decides that accumulation of additional permits beyond some point in time is not desirable then a cut-off date might be considered. There are a range of dates the Council might choose. One possibility is the November 6, 2003 control date. *Federal Register* notices announcing that date are attached in the appendix to this document. During deliberations on the IFQ program there has always been an opportunity for a “no grandfather clause” option to be included. Such an option was first formally included by the Council in November of 2007. The Council adopted the no grandfather clause option as a preliminary preferred alternative in June of 2008 and its final preferred alternative in November 2008. With adequate supporting rationale any of these dates, including dates in between and those up to and after the June 2009 Council meeting, might be used as cut-off dates (if it is determined that such a cut-off date is desirable).

The number of entities with QS in excess of control limits is provided in Table 7 for three different points in time (the control limits used in the table are those adopted at the March 2009 Council meeting). For each point in time, the table shows the number of entities receiving some QS, the maximum QS given to any one entity, the number of entities that would receive QS in excess of the limits, and the amount of QS in excess that may be redistributed. It should be noted that the amount of QS subject to redistribution will be diminished if there is no QS divestiture opportunity and entities sell some of their permits in advance of the initial allocation.

Table 7. Number of entities expected to receive QS and amount of QS in excess of preliminary preferred overfished species control limits and Council preferred control limits for other species (evaluated based on available permit ownership information at three different points in time).

		January 1, 2004				"Fall 2006"				January 1, 2008			
Species category	Control Limit*	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit
All nonwhiting groundfish (in aggregate)	**2.70%**	142	2.37%	-	-	121	4.79%	2	2.80%	120	4.79%	2	3.27%
Lingcod - coastwide c/	**2.50%**	142	2.64%	1	0.14%	121	4.49%	2	2.13%	120	4.49%	2	2.13%
N. of 42° N (OR & WA)	**-**	142	2.98%	-	-	121	4.21%	-	-	120	4.21%	-	-
S. of 42° N (CA)	**-**	142	4.17%	-	-	121	6.14%	-	-	120	6.14%	-	-
Pacific Cod	**12.00%**	142	9.02%	-	-	121	10.23%	-	-	120	10.23%	-	-
Pacific Whiting (shoreside)	**10.00%**	150	8.59%	-	-	129	8.59%	-	-	128	8.59%	-	-
Sablefish (Coastwide)	**-**	142	2.36%	-	-	121	6.15%	-	-	120	7.31%	-	-
N. of 36° N (Monterey north)	**3.00%**	142	2.67%	-	-	121	4.23%	1	1.23%	120	4.23%	1	1.23%
S. of 36° N (Conception area)	**10.00%**	142	13.50%	1	3.50%	121	28.91%	2	22.42%	120	35.11%	2	28.61%
PACIFIC OCEAN PERCH	***2.80%***	142	3.59%	4	2.70%	121	4.03%	5	3.94%	120	4.03%	5	3.94%
WIDOW ROCKFISH	***1.86%***	142	5.06%	6	4.89%	121	5.06%	7	5.98%	120	5.06%	7	5.98%
CANARY ROCKFISH	***3.17%***	142	3.55%	1	0.38%	121	4.39%	3	2.06%	120	4.39%	4	2.64%
Chilipepper Rockfish	**10.00%**	142	8.75%	-	-	121	8.75%	-	-	120	8.75%	-	-
BOCACCIO	***13.22%***	61	13.22%	-	-	54	13.22%	-	-	53	13.22%	-	-
Splitnose Rockfish	**10.00%**	142	9.37%	-	-	121	9.37%	-	-	120	9.37%	-	-
Yellowtail Rockfish	**5.00%**	142	3.19%	-	-	121	5.71%	1	0.71%	120	5.71%	1	0.71%
Shortspine Thornyhead - coastwide	**-**	142	3.20%	-	-	121	4.04%	-	-	120	4.04%	-	-
Shortspine Thornyhead - N. of 34°27' N	**6.00%**	142	3.29%	-	-	121	4.06%	-	-	120	4.06%	-	-
Shortspine Thornyhead - S. of 34°27' N	**6.00%**	142	6.76%	1	0.76%	121	12.86%	2	7.62%	120	15.02%	2	9.78%
Longspine Thornyhead - coastwide	**-**	142	3.12%	-	-	121	4.17%	-	-	120	4.82%	-	-
Longspine Thornyhead - N. of 34°27' N	**6.00%**	142	3.12%	-	-	121	4.17%	-	-	120	4.82%	-	-
COWCOD - Conception and Monterey	***17.71%***	61	17.71%	-	-	54	17.71%	-	-	53	17.71%	-	-
DARKBLOTCHED	***1.71%***	142	4.48%	7	5.42%	121	4.48%	10	8.24%	120	4.48%	9	8.39%
YELLOWEYE	***4.67%***	137	4.67%	-	-	118	5.67%	1	1.00%	118	5.67%	1	1.00%
Minor Rockfish North													
Shelf Species	**5.00%**	142	3.87%	-	-	121	4.12%	-	-	120	4.12%	-	-
Slope Species	**5.00%**	142	3.63%	-	-	121	3.63%	-	-	120	3.63%	-	-
Minor Rockfish South													
Shelf Species	**9.00%**	142	7.06%	-	-	121	7.46%	-	-	120	7.91%	-	-
Slope Species	**6.00%**	142	6.95%	1	0.95%	121	11.96%	3	7.00%	120	13.00%	3	8.04%
Dover Sole	**2.60%**	142	2.72%	1	0.12%	121	4.46%	3	3.67%	120	5.32%	3	4.53%

Table 7. Number of entities expected to receive QS and amount of QS in excess of preliminary preferred overfished species control limits and Council preferred control limits for other species (evaluated based on available permit ownership information at three different points in time).

		January 1, 2004				"Fall 2006"				January 1, 2008			
Species category	Control Limit*	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit
English Sole	**5.00%**	142	3.13%	-	-	121	6.78%	1	1.78%	120	6.78%	1	1.78%
Petrale Sole (coastwide)	**3.00%**	142	3.40%	1	0.40%	121	4.44%	3	1.91%	120	4.44%	3	2.20%
Arrowtooth Flounder	**10.00%**	142	5.61%	-	-	121	5.61%	-	-	120	5.61%	-	-
Starry Flounder	**10.00%**	142	27.44%	1	17.44 %	121	27.44%	1	17.44%	120	27.44%	1	17.44%
Other Flatfish	**10.00%**	142	8.26%	-	-	121	8.26%	-	-	120	8.26%	-	-
Other Fish	**5.00%**	142	6.18%	2	1.92%	121	6.18%	2	1.92%	120	6.18%	2	1.92%

Allocations [Combined initial allocations to entities from participation in shoreside whiting (including whiting processing) and non-whiting fisheries]:

Non-whiting spp in non-whiting fishery (90% allocation to permits):

Non-OF spp: 1994-2003, relative lbs, drop 3 years, equal allocation of buyback permits' catch history.

OF spp: Alloc. based on finer area bycatch rates and 2003-2006 logbook target spp history (Average distribution was used in cases where logbook unavailable).

Whiting in shoreside fishery (80% allocation to permits, 20% to processors):

Permits: 1994-2003, relative lbs, drop 2 years, equal allocation of buyback permits' catch history.

Processors: 1994-2004 (at least 1 mt in any two years 1998-2003), relative lbs, drop 2 years.

Non-whiting in shoreside whiting fishery: allocated to permits in proportion to whiting QS, 90% allocation to permits.

*****"Control Limit" for OF spp is represented by maximum allocation to a permit using the new, finer-scale bycatch rate allocation method.

Control Limits and Cooperative Ventures

Some members of industry have expressed their intent to form risk sharing pools for overfished species. This raised the question of whether risk sharing pools could be developed without violating control limits. Also, one of the reasons for considering CFAs and providing them with higher limits is concern that control limits might prevent entities from working together cooperatively to use quota.

There are many different types of cooperative quota pooling arrangements that might be conceived. The following are a few examples.

- Overfished species insurance pool agreement:
  - contract among individuals (the contract is not a person and therefore not directly subject to a control limit)
  - individuals retain ownership of QS
  - individuals with the QS retain ownership of QP until the QP are transferred to the vessel account on an as needed basis under the terms of the contract
- Pool agreement among QS holders whereby QP for all species are shared but only one or a few entities operate a vessel, and as QP is “needed” it is transferred to that entity.
  - Backstop would be the vessel limit.
- Pool agreement among QS holders whereby QP is transferred to the accounts of vessels delivering to a certain processor on an as needed basis to insure that processor’s ability to sustain its processing activity.

The following are some examples of control that have been identified in the Amendment 20 EIS:

A person may be deemed to have control of an entity if the person
- Has the right to or does
  - direct business activities of an entity
  - direct the delivery of groundfish by an entity
  - replace an executive officer, member of the board of directors, a general partner or manager (in the ordinary course of business)
  - direct the sale or transfer of the entity’s QS/QP
  - restrict the day-to-day business activities and management policies through a loan covenant
  - control the management of the entity
- Absorbs all the costs and normal business risks associated with ownership and operation of the entity.

Grey areas that have been identified include:
- Employee or manager working for a harvesting or processing company.
- Someone leasing a vessel or plant.

Ultimately, the evaluation of possible control limit violations would be based on specific situational facts, regardless of the guidelines.

With respect to the formation of risk pools a question has been whether or not groups might work together via a contract without placing the QP into a single account and thereby avoid potential violation of control limits. Even if it were determined that such an arrangement in itself does not result in the counting of each individuals quota toward a control limit, specific situational facts could still lead to a determination that one party is in effective control of the quota of another party to the contract and that all QS of those parties should be counted toward a single limit. A Council discussion of its intent with respect to the application of control limits to groups of entities working together may be beneficial in developing the regulations.

Appendix

This appendix includes:

- Tables relating to the GAP recommendations provided at the March 2009 Council meeting and on which the Council action was largely based ***(pages 23-26)***
- Figures from a NMFS Observer program report illustrating the range of variation and patterns in halibut bycatch rates ***(pages 27-28)***
- Federal register notices related to the November 6, 2003 control date ***(pages 29-34)***

Table 8. GAP recommendations together with GMT, GAC and Existing options and other information used to develop the GAP recommendations.

	Existing Option 1		Existing Option 2		GAC Option 1[9]		GAC Option 2		GMT	GAP Recom-.mendation[10]		Maximums Historic and Initial QS Allocation			
Species Category	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Control Limits Identified in GMT Report	GAP Vessel Limit Option	GAP Control Limit Option	Max Annual Share of Trawl Fleet Allocation "04-'06	Max Initial Permit QS Allocations	Max Annual Share of Trawl Fleet Landings '94-'03	Max Annual Share of Trawl Fleet Landings '04-'06
Nonwhiting Groundfish Species	3.0%	1.5%	4.4%	2.2%	2.0%	1.0%	3.0%	1.5%		**None**	**2.7%**	1.8%	1.6%	4.1%	4.9%
Lingcod - coastwide	10.0%	5.0%	15.0%	7.5%	3.6%	1.8%	4.4%	2.2%		**3.8%**	**2.5%**	1.1%	2.2%	9.0%	3.7%
Pacific Cod	10.0%	5.0%	15.0%	7.5%	12.8%	6.4%	12.0%	6.0%	20.0%	**20.0%**	**12.0%**	7.2%	10.0%	22.7%	21.1%
Pacific whiting (shoreside)	20.0%	10.0%	22.5%	15.0%	15.0%	10.0%	15.0%	10.0%		**10.0%**	**15.0%**	6.9%	8.6%	9.1%	7.3%
Sablefish															
N. of 36° (Monterey north)	4.0%	2.0%	6.0%	***3.0%***	2.0%	1.0%	***3.0%***	1.5%	3.0%	**4.5%**	**3.0%**	4.3%	1.4%	2.4%	5.7%
S. of 36° (Conception area)	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%		**15.0%**	**10%**	22.0%	15.0%	38.4%	60.3%
PACIFIC OCEAN PERCH	10.0%	5.0%	15.0%	7.5%	5.4%	2.7%	7.4%	3.7%		**3.3%***	**3.3%**	3.1%	3.0%	7.3%	10.1%
WIDOW ROCKFISH	6.8%	3.4%	10.2%	5.1%	9.0%	4.5%	12.0%	6.0%		**2.5%***	**2.5%**	6.7%	5.4%	28.7%	31.9%
CANARY ROCKFISH	10.0%	5.0%	15.0%	7.5%	7.0%	3.5%	7.6%	3.8%		**5.2%***	**5.2%**	0.0%	2.8%	12.6%	45.7%
Chilipepper Rockfish	***10.0%***	5.0%	15.0%	7.5%	12.4%	6.2%	20.0%	***10.0%***	10.0%	**15.0%**	**10.0%**	0.5%	9.6%	46.8%	26.5%
BOCACCIO	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%			**15.0%**	0.0%	12.4%	78.9%	53.4%
Splitnose Rockfish	***10.0%***	5.0%	15.0%	7.5%	***11.4%***	5.7%	20.0%	***10.0%***	10.0%	**15.0%**	**10.0%**	8.5%	9.2%	19.9%	26.9%
Yellowtail Rockfish	10.0%	***5.0%***	15.0%	7.5%	***5.6%***	2.8%	10.4%	***5.2%***	5.0%	**7.5%**	**5.0%**	0.7%	3.7%	9.9%	11.5%
Shortspine Thornyhead															
N. of 34°27'	***9.6%***	4.8%	14.4%	***7.2%***	2.6%	1.3%	4.4%	2.2%	6%-10%	**9.0%**	**6.0%**	4.0%	1.9%	5.0%	8.7%
S. of 34°27'	9.4%	4.7%	14.2%	7.1%	8.4%	4.2%	17.6%	8.8%		**9.0%**	**6.0%**		3.3%	7.0%	16.0%
Longspine Thornyhead															
N. of 34°27'	4.0%	2.0%	***6.0%***	3.0%	2.8%	1.4%	4.4%	2.2%	6%-10%	**9.0%**	**6.0%**	2.0%	1.3%	2.0%	8.7%
COWCOD	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	0.0%	0.0%		**20.0%***	**20.0%**	0.0%	44.4%	100.0%	0.0%
DARKBLOTCHED	10.0%	5.0%	15.0%	7.5%	4.0%	2.0%	6.2%	3.1%		**2.0%***	**2.0%**	3.7%	4.4%	15.8%	5.6%
YELLOWEYE	10.0%	5.0%	15.0%	7.5%	18.8%	9.4%	20.0%	10.0%		**5.2%***	**5.2%**	0.0%	6.0%	35.8%	35.5%
Minor Rockfish North															
Shelf Species	8.0%	4.0%	12.0%	6.0%	5.8%	2.9%	4.4%	2.2%		**7.5%**	**5.0%**	3.1%	2.6%	30.6%	49.1%
Slope Species	***10.0%***	***5.0%***	15.0%	***7.5%***	4.0%	2.0%	***6.0%***	3.0%	6%-10%	**7.5%**	**5.0%**	3.5%	2.4%	11.9%	15.7%
Minor Rockfish South															
Shelf Species	10.0%	5.0%	15.0%	7.5%	12.2%	6.1%	20.0%	10.0%		**13.5%**	**9.0%**	1.7%	7.5%	46.6%	30.9%
Slope Species	***10.0%***	***5.0%***	15.0%	***7.5%***	11.6%	***5.8%***	20.0%	***10.0%***	6%-10%	**13.5%**	**9.0%**	12.1%	6.4%	24.8%	21.7%
Dover sole (total)	3.6%	1.8%	***5.4%***	2.7%	2.2%	1.1%	3.2%	1.6%	5%+	**3.9%**	**2.6%**	5.7%	1.3%	2.0%	5.6%
English Sole	20.0%	10.0%	30.0%	15.0%	3.0%	1.5%	**5.2%**	2.6%	5%+	**7.5%**	**5.0%**	2.3%	3.5%	13.9%	7.7%
Petrale Sole	5.8%	**2.9%**	8.8%	4.4%	**2.8%**	1.4%	4.6%	2.3%	3%	**4.5%**	**3.0%**	5.9%	1.7%	6.2%	8.0%
Arrowtooth Flounder	***10.0%***	5.0%	***15.0%***	7.5%	3.8%	1.9%	6.4%	3.2%	10%+	**20.0%**	**10.0%**	8.3%	6.2%	25.5%	19.1%
Starry Flounder	***10.0%***	5.0%	***15.0%***	7.5%	***20.0%***	***10.0%***	***11.0%***	5.5%	10%+	**30.0%**	**15.0%**	8.3%	30.5%	65.7%	54.5%
Other Flatfish	***20.0%***	***10.0%***	***30.0%***	***15.0%***	2.6%	1.3%	4.0%	2.0%	10%+	**15.0%**	**10.0%**	1.6%	9.2%	16.4%	8.1%
Other Fish	10.0%	5.0%	15.0%	7.5%	5.0%	2.5%	18.0%	9.0%		**7.5%**	**5%**	1.5%	3.9%	10.2%	21.3%

[9] Under the GAC option, the numbers provided for overfished species are for reference only and not part of the GAC option.

[10] *The GAP recommended maximum initial allocations for overfished species. These values do not reflect the final calculation of that maximum initial allocation.

Table 9. Notes on from informal discussion with fishing industry representation on rationale related to the GAP statement.

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes): Max share of fleet allocation ('04-'06)	Control Limit Greater than (+ =Yes): Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Pacific Whiting	15.0%	10.0%	Similar to GAC recommendation	+	+	+	
Lingcod	3.8%	2.5%	Limits relatively low because it is a coast wide species the catch of which is widely distributed among the fleet.	+	+	+	
Pacific cod	20.0%	12.0%	Higher vessel limits because the distribution is geographically limited, participants few, and opportunities intermittent. Keep the control limits down to prevent excess control. On this basis provide vessel limits that are greater than the 1.5 to 1 ratio used for other species.	0	+	+	
Sablefish N	4.5%	3.0%	Control limit lower than max share because of high dependence on a coast wide basis. Vessel limit is high enough to allow the vessel to achieve the recent maximum share of allocation.	+	0	+	+
Sablefish S	15.0%	10.0%	Underutilized, very few vessels operating there now. Potential for gear switching. 10% control limit, in line with GAC 90th percentile recommendation.	+	0	0	
POP	3.3%	3.3%	*Overfished species rationale.	+	+	+	
WIDOW	2.5%	2.5%	*Overfished species rationale.	+	+	+	
CANARY	5.2%	5.2%	*Overfished species rationale.	+	+	+	
Chilipepper	15.0%	10.0%	On the higher end because its taken in a smaller area, its not a coast wide fishery, and its under harvested. Similar to GAC recommendations.	+	+	+	+
BOCCACIO	15.0%	15.0%	*Overfished species rationale.				
Splitnose	15.0%	10.0%	Rationale similar to chilipepper.	+	+	+	+
Yellowtail	7.5%	5.0%	Control limit quite a bit higher than initial allocation because it has not been fully utilized in recent years. However, limits should not be too large because the stock is widely distributed and used in a lot of strategies along the coast.	+	+	+	+

Table 9. Notes on from informal discussion with fishing industry representation on rationale related to the GAP statement.

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes): Max share of fleet allocation ('04-'06)	Control Limit Greater than (+ =Yes): Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Shortspine N	9.0%	6.0%	Control limits somewhat higher than for Dover and sablefish, for example, because it is underutilized but at the same time need to maintain widespread availability to provide opportunity for many vessels over the majority of the coast.	+	+	+	+
Shortspine S	9.0%	6.0%	The same as limits set for other thornyheads.	+	0	+	+
Longspine N	9.0%	6.0%	Similar to shortspine in the north.	+	+	+	+
COWCOD	20.0%	20.0%	*Overfished species rationale.				
DARKBLOTCHED	2.0%	2.0%	*Overfished species rationale.				
YELLOWEYE	5.2%	5.2%	*Overfished species rationale.				
Shelf Rockfish N	7.5%	5.0%	Control limit is twice the maximum initial allocation because the stock has been substantially underutilized in recent years. (Note: While the control limit is less than what is in the GMT report, the vessel limit is in the report's range.)	+	+	+	
Slope Rockfish N	7.5%	5.0%	Rationale similar to shelf.	+	+	+	
Shelf Rockfish S	13.5%	9.0%	South, limits slightly higher than northern rockfish because of fewer vessels participating.	+	+	+	
Slope Rockfish S	13.5%	9.0%	Rationale similar to shelf.	+	0	+	
Dover sole	3.9%	2.6%	Lower limit than for many species, because its widely distributed and caught by many vessels. A large control limit would creates opportunities for a few vessels with a relatively lower amount of QS to completely supply the limited market. Even though relatively lower, the control limit is still over twice the maximum intitial allocation.	+	0	+	
English sole	7.5%	5.0%	Similar to Dover sole (widespread and soft markets) but it is underutilized and more important to a small subset of the fleet (beach boats). Therefore the limits are larger.	+	+	+	

Table 9. Notes on from informal discussion with fishing industry representation on rationale related to the GAP statement.

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes)		
					Max share of fleet allocation ('04-'06)	Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Petrale sole	4.5%	3.0%	The control limit is similar to sablefish and in line with the GMT report. The limit would constrain the maximum share, however, this maximum occurred in a year in which the OY was exceeded. similar to sablefish.	+	0	+	+
Arrowtooth	20.0%	10.0%	A larger vessel limit is needed because of the smaller number of vessels involved in the fishery and to allow for expansion of harvest on this underutilized species. Similar to Pacific cod, a control limits is needed that is lower than what is would be if the standard 1.5:1.0 ratio is applied.	0	+	+	+
Starry Flounder	30.0%	15.0%	Higher limits because it is one of the fisheries with the lowest number of participants. However, control limit is lower than the maximum initial allocation (30%) because that level would not accommodate enough of the beach draggers.	0	+	0	
Other Flatfish	15.0%	10.0%	This is a catch all category which includes sanddabs, rex sole, and true turbots. It has a fairly large aggregate OY. However, a larger control limit is recommended because of the need to specialize in single species within the complex.	+	+	+	
Other Fish	7.5%	5.0%	Lower end of the range of limits because this is a catch all category that everyone might need a little of.	+	+	+	

* Rationale for overfished species control and vessel limits: (1) Control limits are set at the maximum initial allocation (need to be adjusted based on a final determination of the maximum initial allocation). Of all the species, it is most important to minimize the chance of excessive control of the overfished species QS. The maximum initial allocation level is a reasonable level at which to set the control limit for this purpose. (2) There is significant incentive for vessels to avoid overfished species. The proposed rules for applying the vessel limits will allow any vessel to cover its catch regardless of the level at which the vessel limit is set, if it can find the QP to do it. Therefore, it is recommended that the vessel limit be set at the control limit.

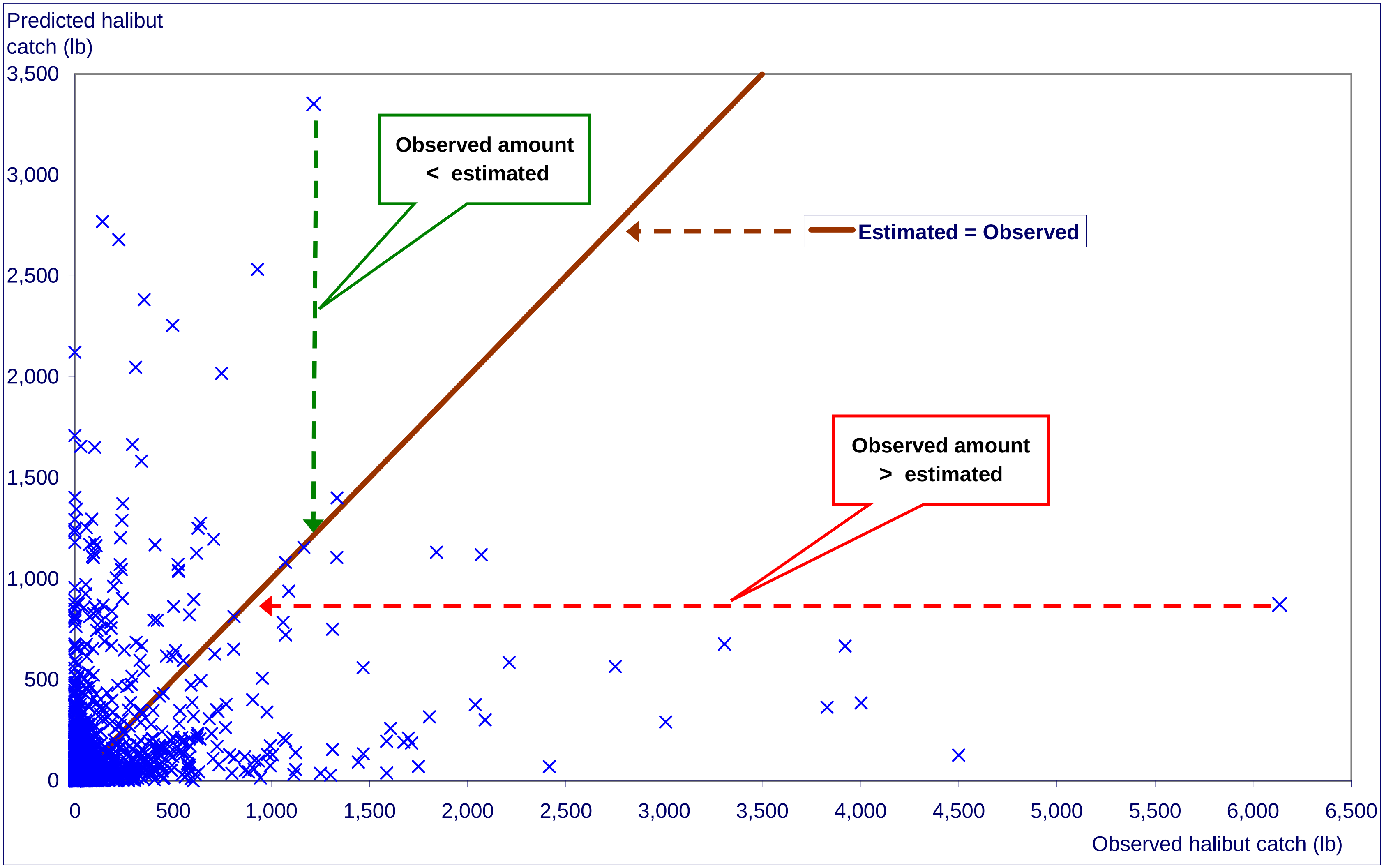

Figure 1. Plot of observed vs. predicted Pacific halibut catch, using the mean stratum rate of Pacific halibut pounds per pound of petrale sole and arrowtooth flounder caught in the area north of 47.5° N. lat. in depths less than 115 fathoms.

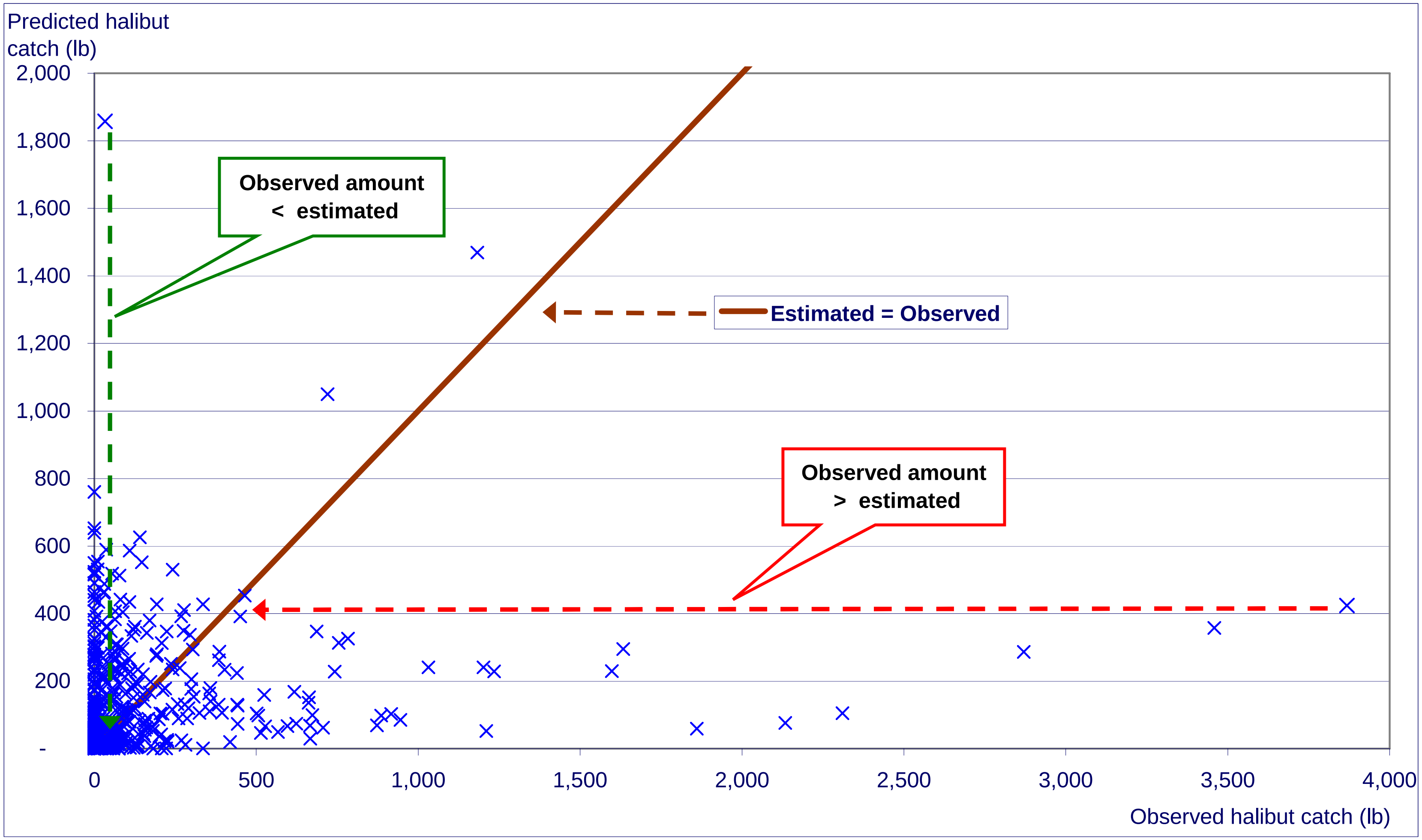

Figure 2. Plot of observed vs. predicted Pacific halibut catch using the mean stratum rate of Pacific halibut pounds per pound of petrale sole and arrowtooth flounder caught in the area north of 47.5° N. lat. in depths greater than 115 fathoms.

to lowest, would be Alternative 4, Alternative 2, Alternative 3, Alternative 4a, the preferred alternative, and finally, Alternative 1. As expected, the highest number of fleet DAS (Alternative 4) would have the greatest potential to ensure that vessels harvest the TAC, but at the expense of possibly exceeding the TAC.

According to section 8.8 of the Red Crab Specifications document, Alternative 1 would be expected to generate the lowest level of landings and revenue because it allocates 35 fewer fleet DAS than the preferred alternative. On the other hand, Alternatives 2, 3, and 4 would allocate more fleet DAS than the preferred alternative; 81, 60, and 94 more fleet DAS, respectively. The additional allocated DAS would enable each vessel to take extra trips, and the economic benefits would be expected to increase compared to FY2003 with more DAS available, depending on which alternative is selected. But each of these other alternatives would be more likely to result in exceeding the TAC. The opting out of one red crab vessel, however, means that the remaining four vessels will have 195 DAS each instead of 156 under the preferred alternative. This increase in individual DAS significantly increases the landings and economic benefits for these vessels, compared to FY2003. In balancing the FMP objectives of providing the fleet with the greatest number of landings without exceeding the TAC, the preferred alternative is considered to be the best. Section 5.0 of the FMP includes more detailed economic impact analysis of DAS measures.

Authority: 16 USC 1801 *et seq.*

Dated: January 6, 2004.

Rebecca Lent,

Deputy Assistant Administrtaor for Regulatory Programs, National Marine Fisheries Service.

[FR Doc. 04–465 Filed 1–8–04; 8:45 am]

BILLING CODE 3510–22–S

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

(3) Fax: 202–493–2251.

(4) Delivery: Room PL–401 on the Plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The telephone number is 202–366–9329.

(5) Federal eRulemaking Portal: *http://www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT: If you have questions on the Maritime Administration's proposed rule, call John T. Marquez, Jr., Maritime Administration, telephone 202–366–5320. If you have questions on viewing or submitting material to the docket, call Andrea M. Jenkins, Program Manager, Docket Operations, telephone 202–366–0271.

(Authority: 49 CFR 1.66.)

Dated: May 19, 2004.

By Order of the Maritime Administrator.

Joel C. Richard,

Secretary, Maritime Administration.

[FR Doc. 04–11656 Filed 5–21–04; 8:45 am]

BILLING CODE 4910–81–P

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.

• Federal eRulemaking Portal: *http://www.regulations.gov*.

•Fax: 503–820–2299.

•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.

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Table 7. Number of entities expected to receive QS and amount of QS in excess of preliminary preferred overfished species control limits and Council preferred control limits for other species (evaluated based on available permit ownership information at three different points in time).

		January 1, 2004				"Fall 2006"				January 1, 2008			
Species category	Control Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit
All nonwhiting groundfish (in aggregate)	2.70%	142	2.37%	-	-	121	4.79%	2	2.80%	120	4.79%	2	3.27%
Lingcod - coastwide c/	2.50%	142	2.64%	1	0.14%	121	4.49%	2	2.13%	120	4.49%	2	2.13%
N. of 42° N (OR & WA)	-	142	2.98%	-	-	121	4.21%	-	-	120	4.21%	-	-
S. of 42° N (CA)	-	142	4.17%	-	-	121	6.14%	-	-	120	6.14%	-	-
Pacific Cod	12.00%	142	9.02%	-	-	121	10.23%	-	-	120	10.23%	-	-
Pacific Whiting (shoreside)	10.00%	150	8.59%	-	-	129	8.59%	-	-	128	8.59%	-	-
Sablefish (Coastwide)	-	142	2.36%	-	-	121	6.15%	-	-	120	7.31%	-	-
N. of 36° N (Monterey north)	3.00%	142	2.67%	-	-	121	4.23%	1	1.23%	120	4.23%	1	1.23%
S. of 36° N (Conception area)	10.00%	142	13.50%	1	3.50%	121	28.91%	2	22.42%	120	35.11%	2	28.61%
PACIFIC OCEAN PERCH	***3.30%***	**142**	**3.59%**	**3**	**0.73%**	**121**	**4.03%**	**4**	**1.47%**	**120**	**4.03%**	**4**	**1.47%**
WIDOW ROCKFISH	***2.50%***	**142**	**5.06%**	**2**	**2.65%**	**121**	**5.06%**	**3**	**3.10%**	**120**	**5.06%**	**3**	**3.10%**
CANARY ROCKFISH	***5.20%***	**142**	**3.55%**	**-**	**-**	**121**	**4.39%**	**-**	**-**	**120**	**4.39%**	**-**	**-**
Chilipepper Rockfish	10.00%	142	8.75%	-	-	121	8.75%	-	-	120	8.75%	-	-
BOCACCIO	***7.50%***	**61**	**13.22%**	**2**	**9.62%**	**54**	**13.22%**	**3**	**12.47%**	**53**	**13.22%**	**3**	**13.31%**
Splitnose Rockfish	10.00%	142	9.37%	-	-	121	9.37%	-	-	120	9.37%	-	-
Yellowtail Rockfish	5.00%	142	3.19%	-	-	121	5.71%	1	0.71%	120	5.71%	1	0.71%
Shortspine Thornyhead - coastwide	-	142	3.20%	-	-	121	4.04%	-	-	120	4.04%	-	-
Shortspine Thornyhead - N. of 34°27' N	6.00%	142	3.29%	-	-	121	4.06%	-	-	120	4.06%	-	-
Shortspine Thornyhead - S. of 34°27' N	6.00%	142	6.76%	1	0.76%	121	12.86%	2	7.62%	120	15.02%	2	9.78%
Longspine Thornyhead - coastwide	-	142	3.12%	-	-	121	4.17%	-	-	120	4.82%	-	-
Longspine Thornyhead - N. of 34°27' N	6.00%	142	3.12%	-	-	121	4.17%	-	-	120	4.82%	-	-
COWCOD - Conception and Monterey	***10.00%***	**61**	**17.71%**	**2**	**12.93%**	**54**	**17.71%**	**2**	**12.93%**	**53**	**17.71%**	**2**	**12.93%**
DARKBLOTCHED	***2.00%***	**142**	**4.48%**	**5**	**3.76%**	**121**	**4.48%**	**6**	**5.89%**	**120**	**4.48%**	**7**	**6.15%**
YELLOWEYE	***2.60%***	**137**	**4.67%**	**4**	**5.92%**	**118**	**5.67%**	**7**	**11.73%**	**118**	**5.67%**	**7**	**12.08%**
Minor Rockfish North													
Shelf Species	5.00%	142	3.87%	-	-	121	4.12%	-	-	120	4.12%	-	-
Slope Species	5.00%	142	3.63%	-	-	121	3.63%	-	-	120	3.63%	-	-
Minor Rockfish South													
Shelf Species	9.00%	142	7.06%	-	-	121	7.46%	-	-	120	7.91%	-	-
Slope Species	6.00%	142	6.95%	1	0.95%	121	11.96%	3	7.00%	120	13.00%	3	8.04%

Table 7. Number of entities expected to receive QS and amount of QS in excess of preliminary preferred overfished species control limits and Council preferred control limits for other species (evaluated based on available permit ownership information at three different points in time).

		January 1, 2004				**"Fall 2006"**				**January 1, 2008**			
Species category	**Control Limit**	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit	# Entities receiving QS	Max QS	# Entities Over the Limit	QS over the Limit
Dover Sole	**2.60%**	142	2.72%	1	0.12%	121	4.46%	3	3.67%	120	5.32%	3	4.53%
English Sole	**5.00%**	142	3.13%	-	-	121	6.78%	1	1.78%	120	6.78%	1	1.78%
Petrale Sole (coastwide)	**3.00%**	142	3.40%	1	0.40%	121	4.44%	3	1.91%	120	4.44%	3	2.20%
Arrowtooth Flounder	**10.00%**	142	5.61%	-	-	121	5.61%	-	-	120	5.61%	-	-
Starry Flounder	**10.00%**	142	27.44%	1	17.44%	121	27.44%	1	17.44%	120	27.44%	1	17.44%
Other Flatfish	**10.00%**	142	8.26%	-	-	121	8.26%	-	-	120	8.26%	-	-
Other Fish	**5.00%**	142	6.18%	2	1.92%	121	6.18%	2	1.92%	120	6.18%	2	1.92%

Allocations [Combined initial allocations to entities from participation in shoreside whiting (including whiting processing) and non-whiting fisheries]:

Non-whiting spp in non-whiting fishery (90% allocation to permits):

Non-OF spp: 1994-2003, relative lbs, drop 3 years, equal allocation of buyback permits' catch history.

OF spp: Alloc. based on finer area bycatch rates and 2003-2006 logbook target spp history (Average distribution was used in cases where logbook unavailable).

Whiting in shoreside fishery (80% allocation to permits, 20% to processors):

Permits: 1994-2003, relative lbs, drop 2 years, equal allocation of buyback permits' catch history.

Processors: 1994-2004 (at least 1 mt in any two years 1998-2003), relative lbs, drop 2 years.

Non-whiting in shoreside whiting fishery: allocated to permits in proportion to whiting QS, 90% allocation to permits.

Agenda Item E.11.a
Supplemental Staff Powerpoint
June 2009

E.11. Accumulation Limits and Divestiture

1

Topics for This Presentation

Overfished species (OFS) and Pacific halibut
- Control Limits and Vessel limits
  - Unused QP approach for vessel limits
  - Are QP control limits needed?
    - GAC recommendation to allow QP transfers only to vessels.
- Council discussion on the application of control limits to cooperative arrangements such as risk pooling of OFS QP
- Divestiture

2

Preliminary Preferred Limits

OFS
- Control limits set at maximum initial allocation to a permit
  - reduced for bocaccio, cowcod and yelloweye
- Vessel limits at 1.5 x control limits

Halibut – range
- Control limits – 1% - 8%
- Vessel limits – 1.5 x control limits, but not more than 10%

3

Unused QP Approach for Overfished Species (OFS) Vessel Use Limit

4

Unused QP Approach

- Caps the amount of unused OFS QP on a vessel but not used OFS QP
  - A vessel can acquire OFS QP up to the limit then replace the used QP, as they are able to and the need arises.
  - Relies on strong incentive to avoid OFS

5

Why Consider This Approach

- More leeway for error in setting the right limit
- Allows for lower OFS vessel limits
  - using this approach those lower limits can be imposed without constraining fleet consolidation

6

Why Consider This Approach

- More leeway for error in setting the right limit
  - Getting the OFS vessel limit right is tough.
  - If set too low,
    - "Straight" approach shuts a vessel down.
    - Unused approach provides an opportunity to keep fishing if a vessel hits the limit (if they can get the QP)
    - Option of selling targets species QP potentially reduces profits, and changes distribution of benefits among communities, crew, etc.
- Allows for lower OFS vessel limits.

  Lower limits under this approach:
  - may keep OFS QP control dispersed longer into the season
    - potentially maintaining more OFS QP sellers and a more active market
  - its easier to make adaptive adjustments later in the program by raising limits than by lowering them
  - Using this approach, these ends can be achieved without substantially reducing consolidation benefits.

7

Concerns

- Lack of an ultimate limit.
- Potential for a race for fish.

12

Potential for a Race

- In anticipation of high OFS QP prices later in the season, vessels would fish their target species early so that if needed they can recharge their vessel's OFS QP early in the season.
- A concern if OFS QP markets are strongly seasonal.

14

These Reasons are Reflected in GAP Recommendations and Rationale from March

Low vessel limits (equal to control limits)

- did not need to worry about getting the vessel limit exactly right
- allows vessel a chance to continue fishing if they have a "disaster" tow.
- "more likely to be able to find someone to buy from at a reasonable price"

10

Lack of an Ultimate Limit

- Ultimately, vessels would not have a limit on their use of OFS QP. This could
  - reduce incentive for OFS avoidance, and
  - maintain high bycatch vessel in the fishery
- There are strong incentives to avoid OFS
  - avoid cost of acquiring QP
  - conserve OFS QP to sell ("opportunity cost")
- Over the long run those who are less skilled in avoiding OFS will likely depart.
- A high "straight" limit could be provided as a back stop.

13

Dynamics of QP Market

- If strong late season prices are anticipated.
  - buyers will want to buy early (tending to increase early season demand and prices)
  - sellers will want to sell late (tending to increase late season supply and decrease prices)
  - expectation of price seasonality will tend to reduce seasonality.
  - may be that prices are just high and relatively constant

15

Process for Changing Limits

- Consider specifying adjustments to
  - levels of vessel limits
  - the vessel limit approach (unused or "straight")

through the biennial specifications process.

16

Are QP control limits needed?

17

Are QP Control Limits Needed?

- Control limit on QS
- Vessel limit on QP
- No limit on QP that is not in a vessel account.
- GAC was asked if a control limit on QP is needed.
- GAC provided a recommendation intended to achieve that end and other objectives by allowing QP to be transferred only to and among vessel accounts.

18

Mechanism for Effectiveness

- Makes it so there is no way to accumulate QP outside the vessel account.
  - Folks get QP for their QS (QS is capped)
  - The only place they can transfer QP to is the vessel. (Vessel QPs are capped).
- Also, ties QS more closely to vessels.

19

Application of Control Limits to Cooperative Ventures (e.g. OFS risk sharing pools)

20

Application of Control Limits to Cooperative Ventures

- Good for Council to discuss this issue and articulate its general intent for NMFS to take into account while developing regulations and administering the program.

21

Example

- Overfished species risk/insurance pool:
  - contract among individuals
  - individuals retain ownership of QS
  - individuals retain ownership of QP until the QP are transferred to the vessel account, on an as needed basis under the terms of the contract

22

Other Examples

- Pool agreement among QS holders whereby QP for all species are shared but only one or a few entities operate a vessel, and as QP is needed it is transferred to that entity.
  - Backstop would be the vessel limit.
- Pool agreement among QS holders whereby QP is transferred to the accounts of vessels delivering to a certain processor on an as needed basis to insure that processors ability to sustain its processing activity.

23

Divestiture

24

What happens to QS that would go to someone in excess of control limits?

- The final Council action would reallocate the QS to those below the limits.
- In March, the Council agreed to consider divestiture.
- Divestiture would allow individuals to receive that QS and then divest (sell) to someone else.

25

Who Is Most Affected?

- Entities holding multiple permits at the time of initial allocation.
  - Single permit holders should be under the limits for most species.

26

Main Types of Effects

- Benefits from revenues from sale.
- Benefits from choosing who to sell to.
- Whether or not higher control limits have been established for CFAs.
- Effect on allocation to those under limits.

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With Divestiture

- Get the QS then divest
  - more revenue and flexibility to direct sales
- Higher control limits for CFAs may be in place
- No QS to roll downhill to those under limits.

Without Divestiture

- Sell permits in advance of initial allocation
  - there is more uncertainty and permits are "lumpy"
  - less revenue and flexibility
  - may have to divest to levels below control limits.
- Higher control limits not in place for CFAs.
- Selling of permits in advance of initial allocation will reduce the amount of QS that rolls downhill (Table 7 of E.11.b, Attachment 1).

Cut-off Date

If there is divestiture, should there be a cut-off date on accumulation of additional permits?

There may be incentive to accumulate additional permits

- value of the permit plus QS after QS issuance may be greater than before QS issuance, creating some profit opportunity
- after initial issuance there is a greater flexibility to direct QS to those with whom one expects to have a long term beneficial relationship

Cut-off Date Options

- The November 6, 2003 control date?
- A more recent date? Examples:
  - Date on which a "no grandfather clause" option was explicitly included in the package (Nov 2007).
  - Date on which the "no grandfather clause" was adopted (Nov 2008)
  - This Council meeting.
  - Some other date for which rationale can be provided.

Agenda Item E.11.b
GAC Report
June 2009

GROUNDFISH ALLOCATION COMMITTEE REPORT ON FINAL ACTION ON ACCUMULATION LIMITS AND DIVESTITURE

The following GAC recommendations, excerpted from the Agenda Item E.11.b GAC Report, pertain to this agenda item.

Overfished Species and Pacific Halibut Control and Vessel Limits

The Council should have a discussion of intent with respect to the formation of risk pools and application of control limit to such pools.

Rationale: The GAC would like to retain flexibility so people can form voluntary and informal risk pools, but a third entity would not need to be formed to facilitate the risk pool.

The GAC recommends QP transfers be allowed only from the QS holder to vessels and from one vessel to another. Control limits would limit QS ownership and vessel QP limits would restrict the accumulation of QP.

Rationale: The GAC discussed the need for a limit on the accumulation of QP outside of vessel accounts, the need for an "entity QP limit." While there is a limit on QS ownership and a limit on the amount of QP in a vessel account, there is no limit on the amount of QP that could be accumulated outside the vessel account. Staff indicated that current policy did not restrict the amount of QP transferred among QS holders or to other entities, other than vessels. The GAC identified that the policy intent was to ensure the QP is moved to vessels in a timely manner, to increase the probability of its use. The desire is to have a link between the QS/QP and a vessel. At the same time, the intent is to provide an opportunity for crew members, processors and other to hold QS and direct the associated QP. The possibility of addressing this issue by requiring the QP be transferred to a vessel by a certain time was discussed. However, this would restrict flexibility of non-vessel owners to direct the use of their QP or create complexities in the catch and QP usage tracking system. To address this problem, the GAC recommends that transfer of QP be allowed only from the QS holder to the vessel and among vessels. QP could not be transferred among other entities. Thus the QS control limit would effectively restrict the amount of QP held by anyone other than a vessel owner. The limit on QP transfers addresses both the need to limit the accumulation of QP during the year and reinforces the policy requiring that QP be moved onto the vessel during the year.

The GAC recommends the Council adopt the preliminary preferred overfished species control and vessel limits from the GMT.

Rationale: The GMT control limits are the highest initial allocations using the bycatch allocation approach for OF spp. The motion did not recommend the unused QP limit idea from the GMT/GAP; however, the staff analysis on that will be presented to the Council in June.

For Pacific halibut, the GAC recommends the Council adopt a 5.4 percent control limit, and a vessel limit of 14 percent.

Rationale: The control limit of 5.4% is the maximum initial allocation to a single permit. This approach is the same as that used for the overfished species. The vessel limit levels should provide the opportunity for vessels to take the full vessel limit for arrowtooth (20%) or petrale sole (4.5%), assuming they can achieve a halibut bycatch mortality rate that would be low enough for the fleet to take the full OYs of both arrowtooth and Petrale (a rate of 0.006 pounds of legal and sublegal halibut per pound of arrowtooth or Petrale). Based on some of the bycatch rate reductions observed in Washington EFPs, it is thought that it will be possible for trawl vessels to get down to this halibut bycatch rate.

Divestiture

The GAC recommends the following three options for Council consideration, no single one of which is preferred. All recommend allowing divestiture of QS in excess of control limits, but vary in the amount of excess QS temporarily retained by original owners and the issuance of annual QP for excess QS.

Under all options, the two year moratorium on QS transfers remains in effect (QP transfers are allowed during that period).

Option 1: 100% of Excess QS Temporarily Retained by Original Owners but No QP issued to the Owner of the Excess QS.

Initial Allocation of Target Species QS In Excess of Control Limits
Target species QS will be issued on the basis of the initial allocation formula. The control limits will not restrict the initial allocation, but the amount above the control limit is to be considered as temporary ownership to allow for voluntary divestiture.

Divestiture Requirement: Entities receiving a temporary initial allocation of QS in excess of control limits must divest themselves of the excess QS between the onset of year 3 and the end of the 5th year of the program. After that time, any QS still held in excess of the limits will be revoked and distributed among other QS holders on a pro rata basis.

Initial Allocation of Overfished Species QS
QS in excess of the targets species control limits will not be included in the allocation formulas for overfished species allocations.

QP for QS Held in Excess of Limits

- At the start of each year when QP is issued, original QS holders will not receive QP for any QS held in excess of the control limits. (100% of such QP will be distributed to all other QS holders below the control limits on a pro-rata basis.)
- QP will be issued to new QS holders who have received divested QS, at the start of the year after the QS divesture transaction was completed.)

Option 2: 50% of Excess QS Temporarily Retained by Original Owners, but No QP Issued to the Owner of the Excess QS

Initial Allocation of Target Species QS In Excess of Control Limits
Target species QS will be issued on the basis of the initial allocation formula, except that half the amount an entity qualifies for in excess of the limit will be withheld and redistributed to those below the control limits and half will be temporarily retained by the original entity for the purpose of divestiture.

Divestiture Requirement
Same as Option 1

Initial Allocation of Overfished Species QS
Same as Option 1

QP for QS Held in Excess of Limits
Same as Option 1

Option 3: 50% of Excess QS Temporarily Retained by Original Owners, with Full QP Issued to the Owner of the Excess QS

Initial Allocation of Target Species QS In Excess of Control Limits
Same as Option 2

Divestiture Requirement
Same as Option 2

Initial Allocation of Overfished Species QS
Same as Option 2

QP for QS Held in Excess of Limits
- Each year QP will be issued for all QS initially allocated to the original entity, including any amount temporarily held in excess of control limits.
- At the time of divestiture of QS by an original entity to a new owner, the seller can transfer associated QP to the new owner, and at the start of the year after the QS divesture transaction was completed, all associated QP will be issued to new QS holders who have received divested QS.

The above GAC options are relative to a No Divestiture option. If the Council decides to allow divestiture, then the GAC recommends the Council adopt a cutoff date between 2003 and June 2009.

Rationale: If a divestiture provision is adopted, entities may accumulate additional permits prior to the time of initial allocation. The cut-off date is needed so that NMFS will know whether to apply the divestiture rules for all permits an entity owns at the time of initial allocation or only those accumulated up to a certain date. There was discussion of rationale for a number of possible cut-off dates including the originally published control date of November 6, 2003, the date at which the option to not have a grandfather clause was first included as a formal option (November 2007), the date on which the no grandfather clause was adopted by the Council (November 2008) or a later date.

GROUNDFISH MANAGEMENT TEAM (GMT) AND COUNCIL STAFF REPORT ON AMENDMENT 20 – ACCUMULATION LIMITS FOR OVERFISHED SPECIES

A. Introduction

At the March 2009 Council meeting, the Council adopted accumulation limits for non-overfished species and a preliminary set of overfished species accumulation limits. The Council tasked the GMT and Council staff with further analysis of overfished species accumulation limits, paying particular attention to the vessel usage limits and how they impact prosecution of the fishery. The analysis presented in this report was developed for presentation to the Groundfish Allocation Committee in May. The GMT will be having further discussion on the issue at this meeting and may present clarification or further analysis to the Council during this agenda item.

1. Accumulation Limits – Basic Policy Considerations

The Council included accumulation limits in the trawl rationalization program as a measure against excessive control and consolidation in the fishery.[1] The shoreside trawl individual fishing quota (IFQ or TIQ) program will be subject to two sets of accumulation limits: control limits that apply to ownership and control of quota share (QS); and, vessel usage limits that apply to the quota pounds (QP) a vessel may use in a year. In essence, control limits are intended to prevent entities from obtaining undue influence over the fishery through the ownership or command of large amounts of QS. They also ensure that profits associated with the exclusive privilege to access the limited public groundfish resource are shared by a minimum number of owners. Vessel usage limits, in contrast, are aimed primarily at keeping a minimum number of vessels active in the fishery for the socioeconomic benefits associated with a larger fleet (e.g., more crew employment).

In setting the two sets of accumulation limits, the Council considered the tradeoffs associated with setting limits that are “too high” versus limits that are “too low.” In short, limits that are “too high” would undermine the Council’s control and vessel usage limits policy objectives. That is, control limits that were set “too high” would allow entities to reach unreasonable levels of control or profit. With vessel usage limits, limits that were “too high” would permit more fleet consolidation than desired. The Council evaluated this side of the equation by looking at the absolute minimum number of vessels or owners made possible by the limit (e.g, a control limit of 5% would ensure at least 20 entities held QS).

Our March 2009 analysis focused mainly on the “too low” side. Conceptually speaking, limits that are “too low” would prevent excessive control and consolidation yet at an unacceptable cost to the Council’s other goals for the TIQ fishery. Control limits that were “too low” constrain organizational flexibility and might even prevent harvesting entities from owning enough QS to

[1] A more detailed summary of the policy considerations involved in setting accumulation limit can be found in Agenda Item G.4.b, GMT Report, Groundfish Management Team (GMT) and Council Staff Report On Amendment 20 - A Framework Approach For Setting Control and Vessel Usage Limits For Non-Whiting Target Species” in the March 2009 Briefing Book (www.pcouncil.org/bb/2009/bb0309.html).

operate profitably. For vessel usage limits, limits that were "too low" would prevent vessels from generating enough exvessel revenue to achieve profitability and improved harvesting efficiency.

To aid the Council's consideration of the "too high"–"too low" tradeoffs, our March 2009 report suggested a revenue-based approach that estimated potential annual exvessel revenues associated with a set of accumulation limits based on a hypothetical but realistic trawl sector allocation and exvessel prices.

2. Additional Considerations for Overfished Species

Given the multi-species, multi-strategy nature of the fishery and its regional diversity, identifying the levels at which accumulation limits become "too low" or "too high" is an uncertain and imprecise task. For target species, however, there seemed to be a relatively wide range within which the Council could set limits and achieve an acceptable balance between policy objectives. Yet as we noted in March, the acceptable range between "too high" and "too low" appears narrower for overfished species and the implications of missing too high or too low could be more significant.[2]

To fit overfished species within the context of the revenue-based approach, it is instructive to think of bycatch QP as an essential input of production, like fuel or crew wages. The objective of a harvesting operation is, of course, to earn profit through the sale of landed catch and in this multispecies trawl fishery, bycatch QP will be necessary to bring in that landed catch. The importance and value of bycatch QS/QP will thus derive primarily from the target species exvessel revenue it makes possible. Vessels will be able to sell overfished rockfish in the TIQ program, yet the revenue from the sale of the fish themselves may be insignificant compared to that generated from the target species. Halibut IBQ is the extreme example in that it will have no other value given that halibut is a prohibited species and cannot be retained.

For control limits, the fact that overfished species quota is an essential input means that the basic tradeoffs between limits that are "too high" and "too low" are very similar to those for the most important target species. As we noted in March, given the high importance and non-substitutability of overfished species quota, a large amount of QS could grant the holder considerable leverage over access to target species, and hence market control over the fishery. Our focus in this report is on vessel limits; however, we raise this point again here because of the important relationship between control and vessel limits and the potential of control limits to affect vessel operations. We discuss these reasons below in detail.

For vessel usage limits, the "too low" side of the equation is also similar to the situation with target species in that small limits would hamper improvements in harvesting efficiency. A "too low" limit can be thought of as one that would give vessels no realistic chance of harvesting enough target species to achieve improved efficiency and profitability. In other words, unreasonably low limits would effectively cap the target species that a vessel harvest to something considerably less than what is allowed by the target species QP usage limits. As

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[2] Our March 2009 report on overfished species accumulation limits can be found at Agenda Item G.4.b, Supplemental GMT Report & Supplement GMT Report 2, in the March 2009 Briefing Book.

discussed in the next section, it is on the "too high" side where considerations for overfished species vessel usage limits become different.

3. Overfished Vessel Usage Limits and Impact on Fleet Consolidation

The question of what "too high" vessel usage limits might mean to the Council's policy objectives has been more difficult to analyze than for target species. Again, while the concern with target species was increased fleet consolidation, the relationship between letting vessels use more overfished species QP and increased fleet consolidation is not as direct. This is because (a) a vessel's total harvest is ultimately capped by the target species QP limits; and (b) the central incentive in the TIQ program is to avoid using more bycatch QP than necessary.

To elaborate on these two points, QP will be just another production input or cost for vessels like fuel and crew compensation. Thus to harvest a given set of target species QP limits most profitably, vessels will attempt to minimize the amount of overfished species QP. Vessels will attempt to avoid fishing at a high bycatch rate because having to purchase additional bycatch QP on the market could be costly. Even with QP that vessels do not need to pay for (e.g., QP received through initial allocation), there will be an opportunity cost to using the QP inefficiently because unneeded QP could be sold to other vessels for a profit. Given these strong economic incentives, vessel usage limits for bycatch QP might even be unnecessary if the TIQ market functioned efficiently. Each vessel would find its optimal bycatch amounts given its target strategy and location and the fleet would consolidate down to no less than what would be permitted by the target species QP usage limits.

Yet, there is a lot of uncertainty surrounding this multispecies TIQ program and so it is reasonable to be concerned that the TIQ market may function less than perfectly and to expect that overfished species QP usage limits could have some impact on fleet consolidation. In general, higher limits would be expected to decrease the number of vessels operating in the fishery, yet the magnitude of this effect is uncertain and consolidation would still be capped by the absolute minimum number established by the target species QP limits. Lower limits would be expected to increase the number of vessels in the fleet with some corresponding tradeoff in harvesting efficiency.

The mechanism by which overfished species QP usage limits might affect the functioning of the QP market and fleet consolidation centers on the nature of bycatch in the multispecies groundfish trawl fishery. The TIQ program does create a disincentive against using more bycatch QP than needed, yet as discussed in the next section, bycatch rates are unknown and variable. There may be two consequences to this fact.

First, anything that increases the probability of vessels reaching the target species QP limits would be expected to increase the likelihood of fleet consolidation. As described in the next section, vessel usage limits will be based on statistically derived estimates of bycatch rates. Even if the overfished species QP limits was placed exactly at the "true" average bycatch rate for a species, the variation in bycatch rates among the fleet would mean that many vessels with above average bycatch rates would be kept from reaching the maximum target species limits. The number of vessels likely to reach the maximum target species limits, and hence fleet consolidation, would be expected to increase as the overfished species QP limits are placed higher relative to the "true" averages.

The second reason that the nature of bycatch might affect QP market function and consolidation is that vessels will have imperfect information about their QP need. There may be no incentive to use more overfished QP than necessary, yet the risk posed by the uncertainty and variation in bycatch may create an incentive to hold QP. Larger vessel usage limits would allow vessels to hold more QP in their accounts and could intensify the dynamic, thereby making QP less available on the market. And with less QP available on the market, there may be less willingness to face the risk of fishing, especially in certain areas of the coast, and thus fewer vessels and more geographic consolidation. The strength of this theoretical effect would depend on the quality of information and fleet confidence on bycatch. Again, if vessels had perfect information about bycatch, there would be no incentive to hold onto surplus overfished species QP because of the opportunity cost.

4. Estimating the Expected Bycatch

Above we noted that bycatch QP is an essential input in the "production" of landed catch. If it were an ordinary input, the Council might approach the setting of vessel usage limits according to need. That is, conceptually speaking, the Council might attempt to match the overfished species QP limits to might reasonably be needed to fully "produce" the Council's vessel usage limits for target species. Yet, bycatch is not an ordinary input in that it is subject to uncertainty and variation meaning that the amount of overfished QP needed to "produce" a given amount of target species could vary by area, by trip, by year, by season, and so on.

Given this uncertainty, the best we can do is to examine the expected bycatch need. To do so, the Council has focused on the maximum initial allocation of overfished species QS as a starting point. The initial allocation of overfished species QS is based on a formula that applies a bycatch rate for each overfished species to each permits' initial allocation of target species QS. The bycatch rates come from data collected from 2003-2006 by the West Coast Groundfish Observer Program (WCGOP) and are subdivided into subareas to better reflect the geographic distribution of overfished species distribution (*see* Figure 1). The formula then uses a permit's logbook records to assign the appropriate subarea bycatch rates. The end result for each permit can therefore be thought of as the expected amount of overfished species needed to harvest that permit's initial allocation of target species in areas they have historically fished. The Council has focused on the maximum allocation for each overfished species based on the rationale that the maximum allocations should be high enough to reasonably accommodate everyone else. That is, the permits with the highest allocations of yelloweye, canary, cowcod, and so on are representative of relatively larger target species opportunities in areas of high overfished species abundance areas, and so should accommodate those with smaller fishing opportunities and/or in areas of lower overfished species abundance.

The preliminary overfished species accumulation limits recommended would set overfished species control limits equal to the maximum allocations and then the vessel limits equal to the control limits. We discuss the allocation data in more detail below for each overfished species, here we simply note that the WCGOP bycatch rates are still statistical estimates subject to variation and error. Applied to a particular allocation of target species quota, the rates can be roughly thought of as the mean, average, or expected bycatch needed to harvest that allocation in the subarea where the rates comes from. Thus the maximum canary rockfish QS allocation may be reflective of the average canary bycatch needed to harvest a relatively large amount of QP in a high bycatch area. Yet it is not the equivalent of applying a canary bycatch rate to the Council's set of target species usage limits. Even if it was, we would still expect that certain vessels attempting to reach the target species QP limits in high canary bycatch subareas to exceed the average rate because of the variance in bycatch estimates.

In sum, although the maximum initial allocations are the best available information for the Council to gauge expected overfished species QP needs they are still imperfect and involve significant uncertainty.

5. Adding Flexibility to the Vessel Usage Limits

The bottom line of the section above is that the maximum allocation method could still constrain a significant number of vessels because of the uncertainty inherent in bycatch. Vessel owners will have some ability to control their bycatch to some degree by deciding when, where, and how to fish. However, compared to inputs like fuel and crew wages, vessel owners will have much less control. By using the maximum allocation method, we might expect only mostly vessels close to the usage limits to be affected. Nonetheless even smaller producers could be affected, especially considering the small amounts of certain overfished species that are likely be available to the trawl sector. For example, as shown below, the Council's preliminary usage limit for yellow rockfish QS could be the equivalent of a mere 75 lbs.

For this reason, the GMT has recommended building flexibility into the Council's overfished species QP limits. In March, we suggested that the limit could be structured as a limit on unused QP that would allow vessels the flexibility to replenish their QP accounts if necessary. The Groundfish Advisory Subpanel focused on this method in their recommendations to the Council. This report focuses on providing flexibility to the fleet by establishing vessel usage limits higher than the control limits and maximum initial allocation amounts. We will provide some elaboration on the unused QP limit idea in a separate report.

B. The Concept of Risk Pools

In further analyzing accumulation limits for overfished species, we identified "risk pools" as a factor the Council might consider when attempting to strike the appropriate balance. Risk pools have been discussed for several years as a tool trawl harvesters might employ in the TIQ program for managing risk posed by individual accountability for total catch and unpredictable overfished species catch events ("lightening strikes"). Risk pool arrangements would be formed through private formal or informal contract and could take several forms.

There are two basic insights we wish to convey that suggest the Council may wish to err on the side of setting accumulation limits on the "too low" side of the tradeoff. First, as described further below, accumulation limits can affect the incentive and ability to form and maintain risk pooling arrangements. In short, setting accumulation limits "too high" might decrease the incentive to form risk pools. Second, risk pools could provide the fleet with a means for responding to relatively small overfished species accumulation limits.

In addition, although risk pooling arrangements would be voluntary in nature and designed to protect the financial interests of harvesting entities, they could also have wider benefits to the overall performance of the TIQ program. For example, collaborative harvesting arrangements (such as risk pools) tend to improve information sharing, which in turn tends help in the avoidance of overfished species on a fleet-wide basis and improved access to target stocks.

C. The Relationship Between Control Limits, Vessel Limits, and Risk Pools

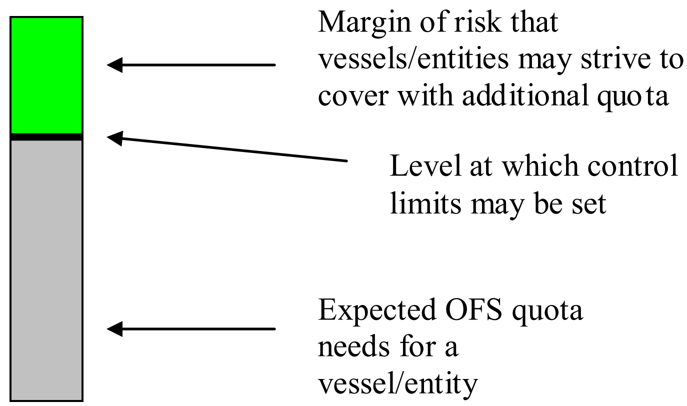
Risk pooling arrangements are likely to form among harvesters as an insurance arrangement to protect against potential financial risk. This financial risk exists because of the possibility for "lightning strike" catch events, and the high cost that is likely to exist to purchase enough overfished species quota pounds to cover that event. Through a pooling arrangement, a vessel encountering a "lightning strike" event is protected by the collective overfished species quota that is held by members of that risk pool.

Control limits can have an effect on the development of risk pools. If control limits are set at a high enough level, an individual may acquire enough quota that he/she is less inclined to form pooling arrangements with others. This may happen because that individual can acquire enough quota that they meet what they expect to need as well as cover their expected margin of risk. If individuals can cover the risk associated with a potential "lightning strike" event independently, there is little reason to develop pooling arrangements with others. However, the fact that an individual has acquired sufficient quota share (which creates annual quota pounds) to cover his or her operations does not mean that the overfished species management problem has gone away. This overfished species management problem may indeed be universal across the trawl fishery for several reasons that have been described during the development of the trawl rationalization program[3]. In fact, it may be exacerbated to some degree if individuals holding overfished species quota share elect to hoard their annual quota pounds to cover their own risk margins rather than sharing that quota through the market or through a pooling arrangement.

If one believes that insurance-like mechanisms such as risk pools will be necessary within the industry, then the formation of those risk pools can be facilitated by setting quota share control limits on overfished species relatively low and in this way make it difficult for an operator to accumulate enough quota share to independently cover their expected overfished species needs into the future. Instead, setting control limits relatively low would tend to lead to cases where the annual OFS quota pounds may not be sufficient to cover the amount of risk for an entity. This latter point leads to the thrust of the OFS control limit approach. Control limits on quota share can be set at a level that encourages the development of risk pools. To do so, the control

[3] Several situations may exist in the case of overfished species that may make overfished species management a universal problem. Quota hoarding may ensue, diminishing the amount of quota available on the market and exacerbating the cost harvesters must realize to cover a lightning strike event. If the cost becomes too large, some may forego acquiring quota to cover a deficit and instead elect to face an enforcement action. This type of behavior creates problematic conditions for a variety of reasons. Furthermore, as past fishery practices have shown, lightning strike events may occur which can take a substantial portion of a sector's allocation of an overfished species (if not the entire allocation), meaning participants in the fishery will continue to be joined at the hip to some degree.

limit should be set at a level that may accommodate the expected need of overfished species, but not allow for the accumulation of quota shares to the degree that one can cover their own perception of risk independently. This concept is identified in the following figure.



Vessel limits for overfished species can be viewed somewhat differently. In some cases the vessel limit of quota pounds will be the de facto entity level quota pound limit. This might occur in the case of owner-operators for example. From this perspective, a vessel owner operator would want to be able to have access to enough quota pounds to cover an unexpectedly large incidental catch event and to continue fishing after that event has occurred. Therefore, vessel limits would need to be set at a large enough level that they allow that vessel to acquire OFS quota pounds from their risk pool, cover that incidental catch event, and still allow the vessel operator to continue fishing – within some degree of reason.

Another important consideration for vessel limits is the fact that vessel limits may help protect participants within a risk pool from one another. For example, if a risk pooling agreement is formed with a relatively weak contract, one vessel could continually take relatively large amounts of overfished species, depleting the collective overfished species quota that exists among the members of that pooling arrangement, and negatively impacting other members of that pool. A vessel limit ensures that the take of one vessel is limited and in certain cases this may help protect participants in a risk pool from one another. This protection would tend to facilitate more stability among members of that pooling arrangement.

D. Developing Overfished Species Control Limits

During the consideration and establishment of non-overfished species control and vessel limits, the GMT proposed an approach which would take into account regional target strategies. A similar approach can be taken for overfished species, even though the motivation for overfished species control limits is different than that of target species. This approach would conceptually set a limit that accounts for the expected need of various fishing operations along different areas of the coast and in different strategies. Fortunately, the Council's decision to allocate overfished stocks using "finer area bycatch rates" uses a method that can be described as allocating overfished species based on regional differences and fishing strategies. Since this approach allocates based on area-based bycatch rates, logbook information on a permit by permit basis, and the initial allocation of quota share, it can be reasonably stated that the bycatch rate allocation approach takes into account the expected overfished species that may be needed by operations in different areas of the coast based on where they fish and what target opportunities they will realize through the initial allocation of quota share. Because of this reason, the analysis showing the initial allocation of overfished species quota share also helps to inform appropriate control limits.

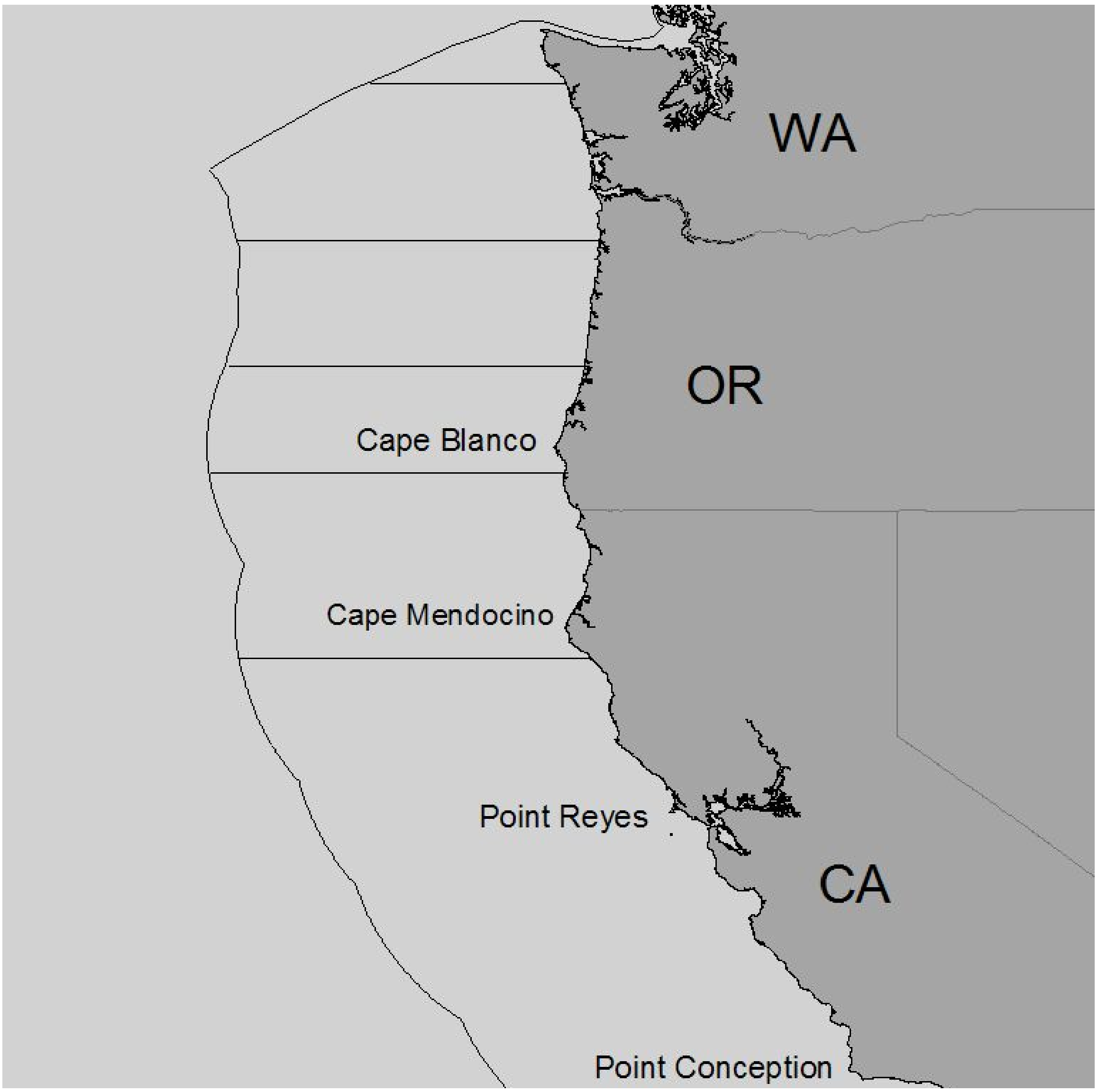


Figure 1 Map of Finer Areas Used in Initial Allocation

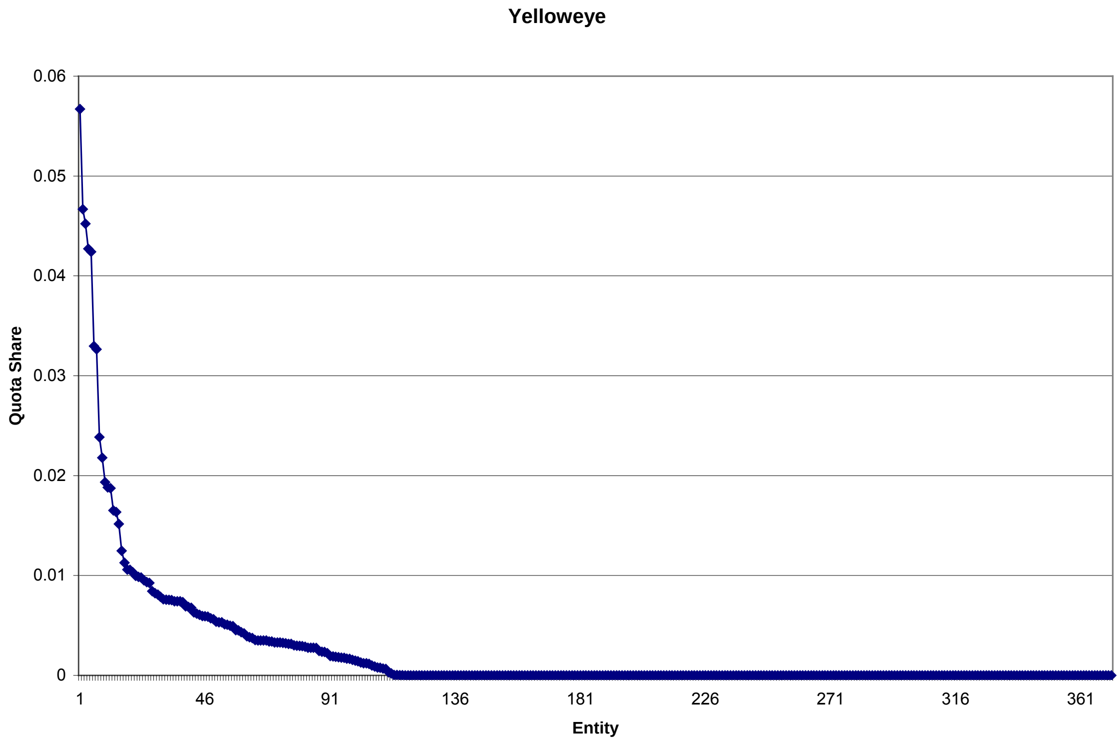
When considering overfished species control limits it is appropriate to consider control limits on QS at levels that accommodate the expected amount/needs of OFS quota share, but not so high as they may allow the accumulation of quota in a manner that would allow individuals to hedge against perceived risk. To allow quota share holders to accumulate quota shares to a point where they can independently cover their perception of risk would tend to reduce the need for entities to reach out to other quota share holders and form risk pooling arrangements with their quota pounds. These pooling agreements have financial benefits to harvesters within that pool, but also have fishery benefits as such arrangements tend to encourage information sharing which helps the broader fishery avoid overfished species.

Unfortunately, establishing the expected need of one operation may be vastly different from the expected need of another operation, yet a control limit will apply equally to both entities. If a control limit is established for canary rockfish which allows vessels operating in relatively high areas of canary abundance to cover their expected need, then this control limit will be much higher than the expected need of entities operating in low canary abundance areas. To facilitate the maximum amount of pooling, one might be inclined to set control limits that are less than the expected need of entities operating in relatively high canary areas. However, to do so appears to be directly at odds with the Council's decision to use "finer area rates" in the initial allocation of quota share.

The Council's conscious use of finer area bycatch rates for the initial allocation of quota share allocates relatively more overfished species to those entities with a history of operating in areas with relatively large populations of overfished species. Setting a control limit at a lower level would tend to run counter to this initial allocation approach, especially if there is no grandfather clause or opportunities for divestiture. For this reason, we assume that the Council's intent is to make an initial allocation of overfished species in a manner that distributes relatively more to those entities historically operating in areas of relatively high overfished species populations. To the extent practicable we approach overfished species control limits from the perspective of maintaining the Council's apparent intent for the initial allocation of overfished species while also facilitating the development of risk pooling arrangements. The result tends to be the setting of control limits that are higher than the initial allocation of most (if not all) entities. While this approach may allow entities in low bycatch areas to acquire more quota share than they expect to need (because they will not be constrained by the control limit, but may need less than the control limit), we believe that it is most important for risk pools to form among entities operating in high overfished species abundance areas. Based on our experience with the fishery, it is within these areas that the potential "lightning strike" events appear to be largest and the need for pooling arrangements to be greatest. Therefore setting control limits at a level that accommodates the expected need (but no more) of entities operating in high bycatch areas would tend to encourage pooling among those entities where the need for pooling is greatest. Pooling among these entities will tend to have the largest benefit from both the individual financial perspective, but also to the management perspective. Most of the gains in overfished species avoidance at the aggregate level will need to be realized by these vessels operating in relatively high bycatch areas. Greater degrees of cooperation and information sharing appear to be stimulated by cooperative-like arrangements, such as risk pools, and such collaboration will tend to increase the probability of avoiding overfished stocks.

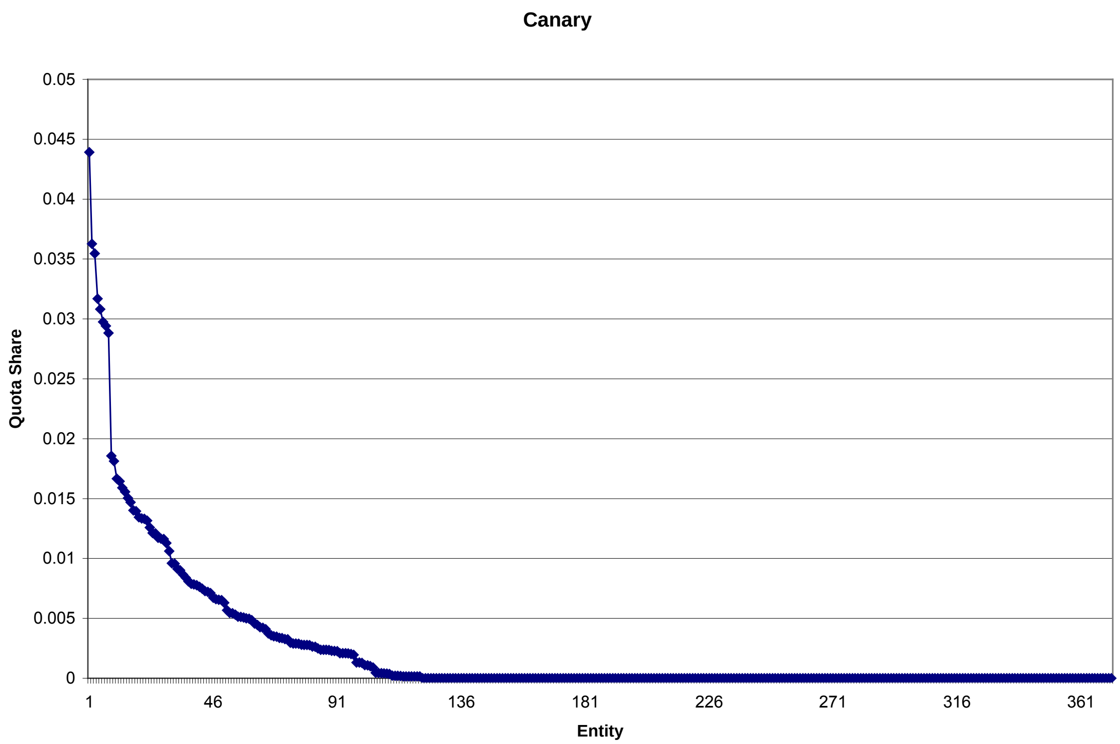
Yelloweye Rockfish

The following figure illustrates the yelloweye rockfish initial allocation results for a combined shoreside sector. From this figure, it is apparent that a handful of entities receive much larger amounts than others. However, this appears to have been a conscious intent on the part of the Council when the Council voted to use "finer area bycatch rates" for the initial allocation. The handful of entities that receive relatively higher amounts of initial allocation than others operate in a distinct area where yelloweye are more abundant. To accommodate their average, or expected, rate of yelloweye encounters it may be appropriate to set accumulation limits in a manner that accommodates these individuals, but no more. This control limit level would be approximately 5.7%. If current catch amounts are reflective of a future allocation to the sector, this 5.7% would equate to 75 lbs.



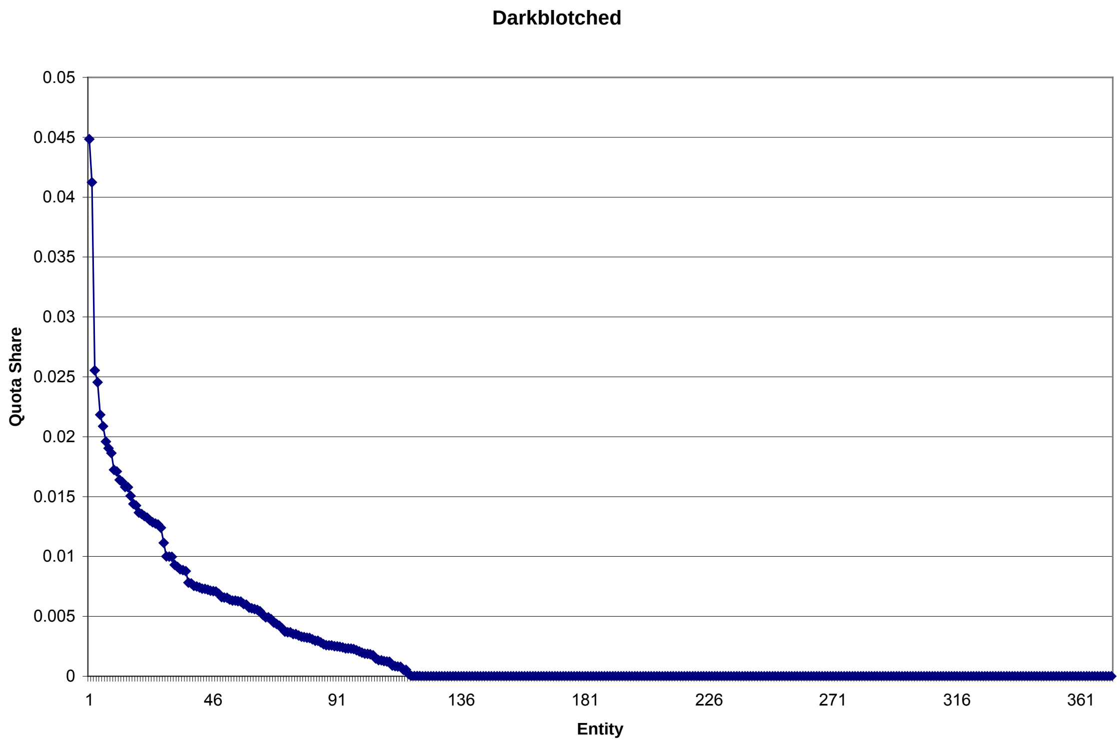
Canary Rockfish

The canary rockfish initial allocation plots are fairly similar to the case of yelloweye. Through the Council's decision to use "finer area rates" for the initial allocation of OFS, a handful of entities receive initial allocations that are noticeably larger than other permits. This results from the fact that those permits have historically operated in areas where canary rockfish are more abundant and the use of finer area bycatch rates in the initial allocation allocates relatively more canary to those entities. This is combined with shoreside whiting activity and the pro-rata bycatch allocation made to those permits based on their whiting history. The resulting initial allocation results are the weighted average of the two initial allocation formulas to derive the common shoreside trawl sector initial allocation results. To accommodate the average, or expected, amount of canary rockfish necessary for entities that are expected to operate in relatively high canary bycatch areas, the control limit on canary may be set at approximately 4.4%. If existing catch levels are reflective of a future allocation, this may equate to 1,571 lbs.



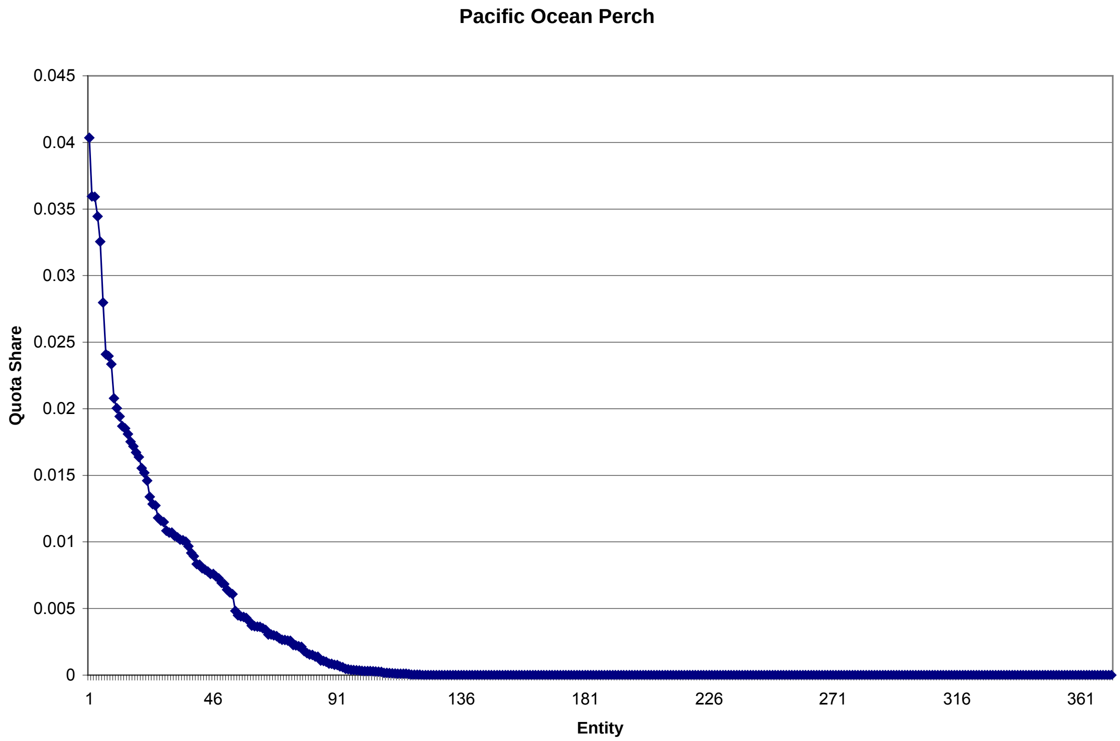
Darkblotched Rockfish

The use of "finer area bycatch rates" in the initial allocation of OFS quota shares to non-whiting activity, and a pro-rata distribution of darkblotched to vessels with whiting history results in the initial allocation estimates shown in the figure below. To accommodate the expected need of vessels operating in relatively high darkblotched abundance areas, the control limit may need to be set at the maximum initial allocation, or 4.5%. Applying this percentage to the Council's intersector allocation decision and applying that to the status quo OY yields an equivalent poundage of 25,000 lbs.



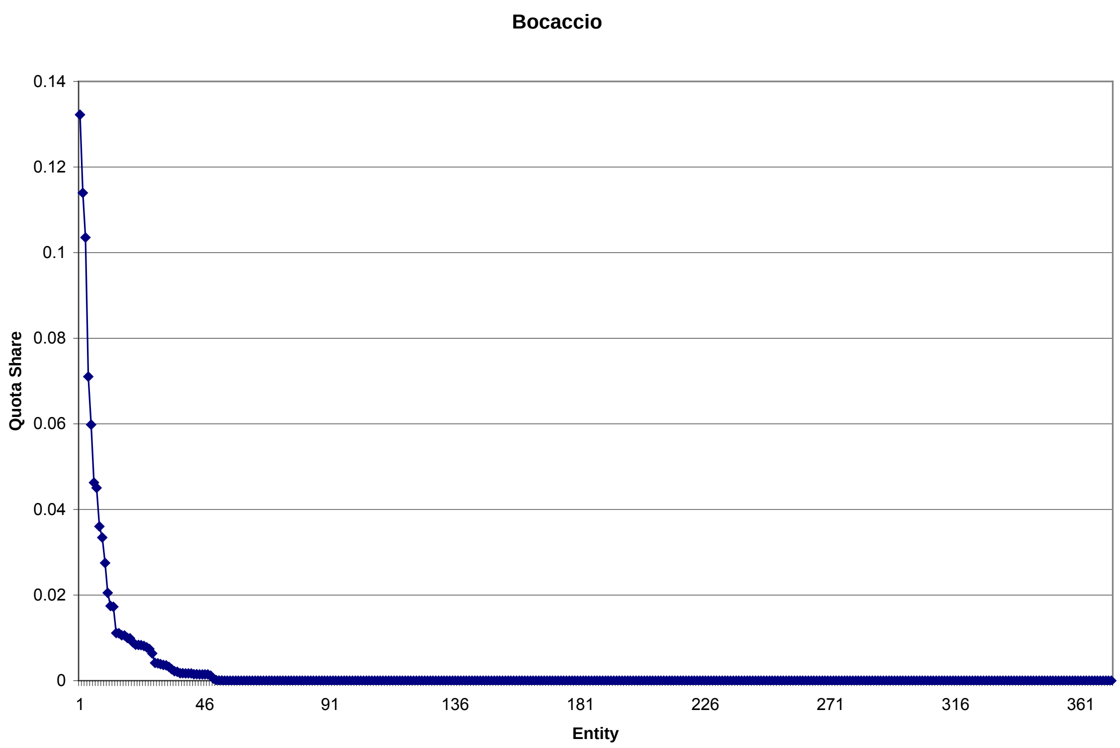
Pacific Ocean Perch

If the intention is to accommodate the expected needs of entities operating in areas where Pacific ocean perch are relatively abundant, then an appropriate control limit may be at the maximum initial allocation level. Based on the estimates in the figure below, this figure would be approximately 4%. Applying this percentage to the Council's decision on intersector allocation and the status quo OYs yields an equivalent poundage of 14,374 lbs.



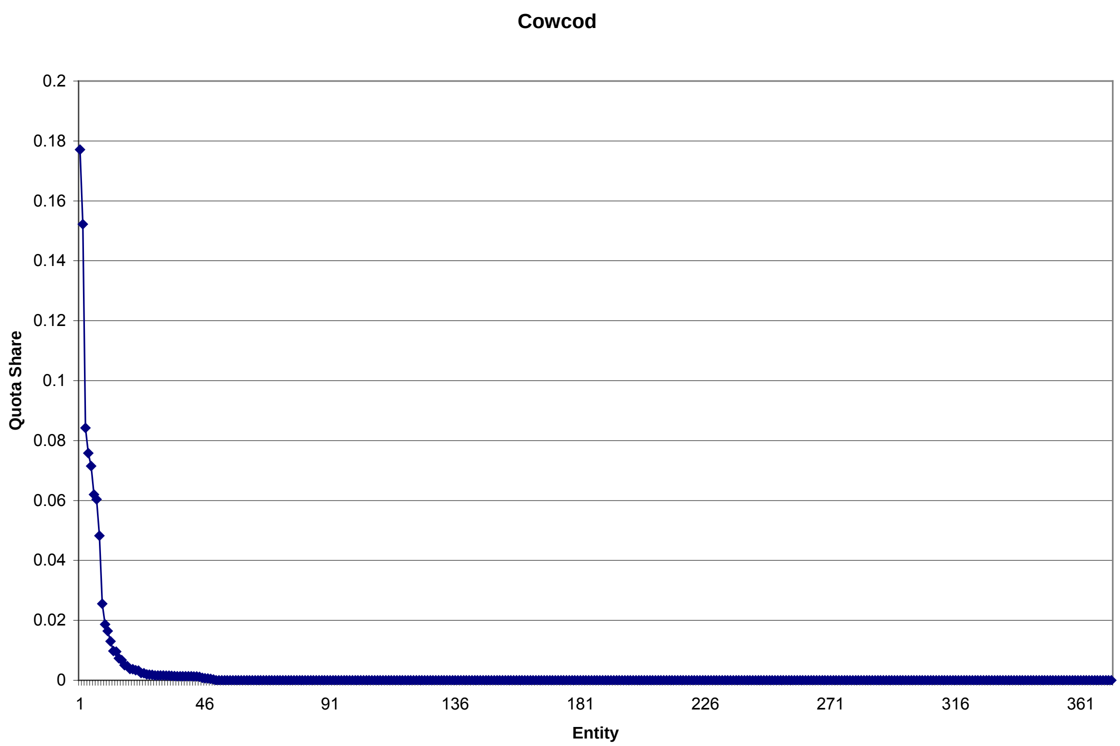
Bocaccio

Bocaccio is an interesting case. The Council's use of a bycatch rate approach for initial allocation of OFS is intended to reasonably accommodate potential OFS quota share needs. However, the application of this approach to bocaccio results in a handful of permits receiving initial allocations of bocaccio that are orders of magnitude larger than most other permits. Based on initial allocation analysis, one permit may receive approximately 13.2% of the initial allocation of bocaccio, absent some accumulation limit. This level of initial allocation for the quota shares of an overfished species has raised some concern among Council staff and some members of the Groundfish Management Team simply because of the amount of fishery access that is indirectly controlled through the holding of this level of overfished species quota share. Nevertheless, if one believes that the initial allocation formula does indeed represent the need of entities operating in relatively high bocaccio abundance areas, then an appropriate control limit may be up to 13.2%. However, if one believes that the handful of permits at the upper end of the spectrum would truly gain too much control over the fishery, then a more measured approach may be to set a control limit that is somewhat less than the highest potential initial recipients. This level may be on the order of 8%. Applying 13.2% and 8% to recent harvest of bocaccio in the trawl fishery and assuming this is reflective of a future sector allocation yields 3,579 and 2,169 lbs respectively.



Cowcod

Cowcod is similar to bocaccio. The application of the bycatch rate allocation approach results in a few entities receiving initial allocations of cowcod QS that are orders of magnitude larger than most others. Like bocaccio, Council staff and some members of the Groundfish Management Team have some concerns about the ability of an entity to accumulate quota shares up to this level (nearly 18%) because of the amount of fishery access that is controlled by the holding of overfished species quota share. Nevertheless, if one believes that this approach does indeed reflect the expected need of entities operating in areas where cowcod are found, then control limits up to 17.7% may be appropriate. However, if one believes that the handful of permits at the upper end of the spectrum would truly gain too much control over the fishery, then a more measured approach may be to set a control limit that is somewhat less than the highest potential initial recipients. This level may be on the order of 8%. Applying these percentages to recent harvest volumes in the trawl fishery and assuming they are reflective of a future allocation decision yields 507 and 229 lbs respectively.



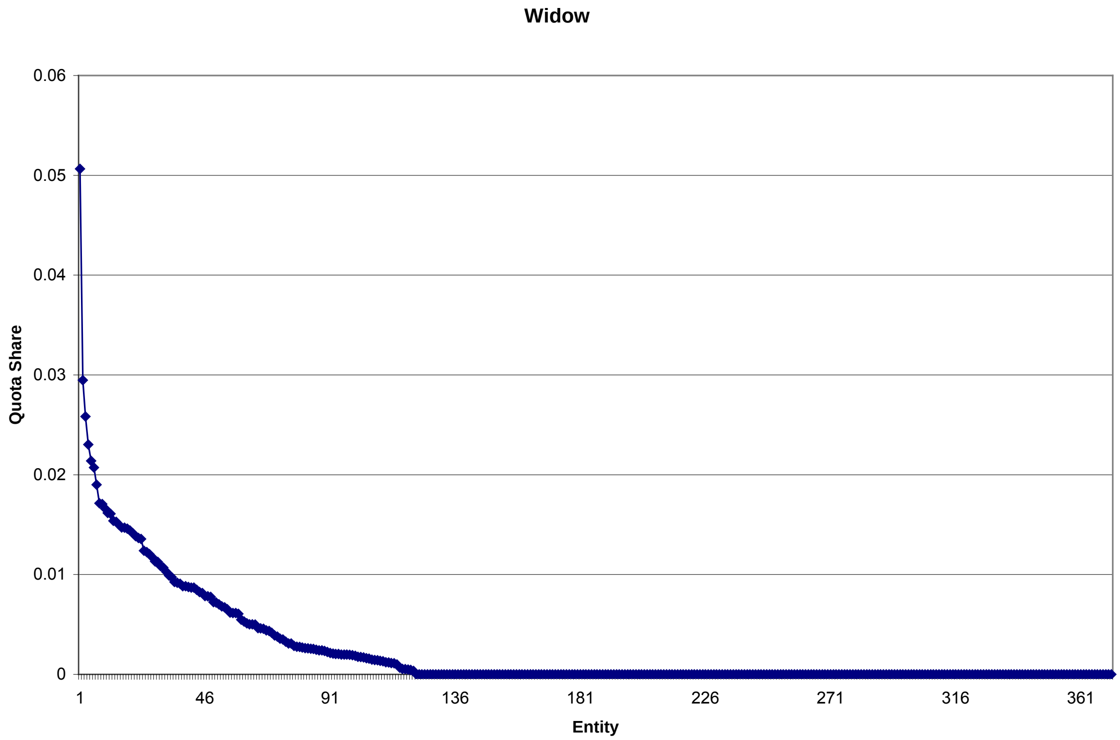
Widow Rockfish

Widow rockfish must be viewed in terms of its interaction with the Pacific whiting component of the shoreside fishery. Recall that the shoreside whiting and non-whiting fisheries will be merged in this program. Also recall that widow rockfish may be rebuilt at the advent of the rationalization program, however this is not for certain. Therefore, the Council may wish to set accumulation limits in two ways – one if the widow rockfish stock is rebuilt, another if widow is not rebuilt.

In recent years, individual shoreside whiting vessels have encountered over 20 metric tons of widow rockfish due to a classic case of "lightning strike" catch events. However, most vessels have not encountered these volumes of widow rockfish. Using the Council's decision on intersector allocation and applying that decision to the 2010 widow OY, a 20 metric ton catch event may represent approximately 7% of the combined shoreside sector allocation.

During the time period when widow was a target species, non-whiting vessels prosecuted much larger volumes than are currently harvested by whiting vessels. If the widow rockfish allocation were to be made as if it was a target species, one permit may receive approximately 8% of the shoreside allocation, applied to the Council's decision on intersector allocation and the 2010 widow OY, this may represent approximately 51,600 lbs. Applied to a 2,000 mt OY (a possible rebuilt OY based on the last assessment) and applying the Council's decision on intersector allocation yields 218,874 lbs.
Alternatively, if widow is allocated based on a bycatch rate, one entity may receive 5.1%. This 5.1% level translates into a poundage that is not too dissimilar from some of the typical incidental catch made by shoreside whiting vessels under current conditions. Therefore if the intention is to accommodate expected needs for vessels operating in a condition where widow is overfished, a 5.1% control limit.

If widow is rebuilt, it may be more appropriate to consider a control limit in the context of various target strategies. If 2,000 mt is a good approximation for a rebuilt widow rockfish OY, then the combined shoreside sector would be expected to be allocated 1,241 metric tons. The largest initial allocation under a non-overfished status is approximately 8%, and this translates into roughly 218,874 lbs, or $109,437 based on $0.50 per pound. An 8% control limit is in line with target species control limits recommended by the GMT that are somewhat regionally specific, such as thornyheads (6%), slope rockfish (10%). Given the somewhat regionally distinct distribution of widow rockfish, and the fact that prosecuting widow requires the capacity to handle midwater gear suggests targeting opportunities for this species will be somewhat specialized, like thornyheads and slope rockfish. Therefore, a control limit on the same order of magnitude as other species with moderately distinct regional focus appears to be appropriate.



Summary of Recommended Control Limits By Species

Species	Control Limit
Yelloweye	5.70%
Canary	4.40%
Darkblotched	4.50%
POP	4.00%
Bocaccio with upper range	13%
Bocaccio without upper range	8%
Cowcod with upper range	18%
Cowcod without upper range	8%
Widow (rebuilding)	5%
Widow (rebuilt)	8%

E. Developing Overfished Species Vessel Limits

Vessel limits establish the amount of quota pounds that can be placed on a vessel during a year. If vessel limits are set higher than control limits, vessels owners will be able to acquire QP from other owners to supplement their own quota holdings. With overfished species, QP above and beyond what is allowed by the QS limits can be acquired through risk pools or market trading.

In addition, as OYs change, the corresponding amount of poundage that can be placed on a vessel will also change. In dealing with overfished species, it will be important to maintain an appropriate relationship between the quota pounds capped by the vessel limit and the control limit on quota shares if one wishes to construct accumulation limits in a manner that encourages the development of risk pools. Therefore, it may be important to revisit vessel limits every two years during the biennial spex process – especially if OYs for overfished species change substantially.

Yelloweye Rockfish

Available data from the WCGOP shows the size and frequency of individual discard events. This information shows that over the life of the observer program, discard events of yelloweye have occurred which are as large as 150 pounds. A vessel incurring one of these discard events almost certainly encountered additional yelloweye rockfish throughout the year.

If the existing shoreside trawl take of yelloweye (approximately 0.6 mt) serves as a guide for future allocations to the shoreside trawl sector, then a 200 pound yelloweye event may represent 15%, while a 150 pound event may represent 11% of the shoreside trawl allocation. Percentages of this magnitude are not inconsequential. The appropriate vessel limit is in some ways a balance between allowing a vessel to cover an incidental encounter of yelloweye and continue fishing, versus imposing a restrictive fishing standard, that if met, would require that vessel to stop fishing.

The GMT recommended control limit percentages translate into roughly 75 lbs of yelloweye rockfish (assuming status quo catch amounts are reflective of future sector allocations). In order to accommodate this need, plus some margin for an accidental tow, a reasonable limit may allow an additional 50 to 75 lbs. Additional margins of this size may allow for some accidental events, but would still hold vessels to a higher standard than what appears to occur under status quo conditions. This would translate into a vessel limit of 9.5% to 11.4%.

Canary Rockfish

Available data from the WCGOP shows the size and frequency of individual discard events of canary. This information shows that over the life of the observer program, discard events of canary have occurred which are as large as 150 pounds, however the information made available is also truncated at 150 pounds, meaning events may have occurred which are larger. To help fill this potential gap, we examine the Washington Arrowtooth Flounder EFP data. Since this EFP occurred under conditions similar to a rationalized fishery – and in an area where canary are relatively abundant – the results may be particularly useful. This information shows that during the EFP, some vessels incidentally caught as much as 1,000 lbs of canary during the year. When taking into account the whiting component of the shoreside fishery, some of these whiting vessels have encountered nearly 1,000 pounds of canary rockfish during the 2004 – 2007 time period. If vessels participate in both whiting activity and non-whiting activity then an appropriate vessel limit may be 1,000 to 2,000 lbs above the amount implied by the recommended control limit. Assuming status quo catch levels are reflective of future allocations for this species, the resulting vessel quota pound percentage is approximately 7.2% to 10%

Darkblotched Rockfish

Darkblotched rockfish displays some different characteristics in the fishery compared to other types of rockfish. In general, it appears that darkblotched rockfish are not subject to the same "disaster tow" risk as other types of overfished species. This can be explained due to their tendency to aggregate to a lesser degree than other types of rockfish (Parker, 2005. Personal communication). Since it appears that considering a disaster tow or lightning strike catch event for this species may not be entirely appropriate, it may be more appropriate to use the Council's predominant decision in setting vessel limits for non-overfished species, which is to allow the vessel limit to be 1.5 times the control limit. Taking this approach yields a vessel limit of 6.8%.

Pacific Ocean Perch

Pacific ocean perch can be viewed similarly to darkblotched rockfish. They do not appear to be as subject to "disaster tows" or "lightning strikes" as other types of overfished species, but they are a species that limits access to other types of target species. Since it appears difficult to use incidental catch amounts for purposes of setting a vessel limit, it may be more appropriate to continue with the Council's primary policy in setting vessel limits for non-overfished species, which is to set the vessel limit at 1.5 times the control limit. Using this approach yields a vessel limit of 6%.

Bocaccio

Bocaccio is one of the two highly constraining species to southern trawl activity. Available fishery data is more limited for this species than some others because of the relatively small number of trawl vessels operating in the area. However, by examining WCGOP data on discard events, we see that individual discard events have occurred which exceed 150 lbs, though this information is truncated meaning catch events may actually be larger. Furthermore, when examining west coast research landings, we see that trips have taken in excess of 4,000 lbs of bocaccio in recent years. The highest initial allocation of bocaccio (if applied to status quo trawl sector harvest amounts) would result in quota pound equivalents of approximately 3,579 lbs for the year. If a vessel were to incidentally encounter bocaccio that is of the same magnitude as the highest research trip, that vessel may need roughly 4,300 lbs, or a vessel limit of 15.8%. However, given that research data is not reflective of fishery practices, accommodating this degree of unintended catch does not seem necessary.

If the intention is to set a vessel limit that allows for some margin of uncertainty above a control limit, then an appropriate level might be the poundage implied by the control limit, plus some additional percentage. Available information suggests that a reasonable margin for uncertainty may be an additional 1,000 to 2,000 lbs. Using status quo catch volumes as an indicator of potential future allocations, and assuming the lower GMT recommended control limits, an appropriate vessel limit may be 15.4% using this approach. This limit translates into approximately 4,169 lbs using recent harvest amounts as an indicator of future allocations.

Cowcod

Cowcod is the other highly constraining species to southern trawl activity. Like bocaccio, available fishery data is relatively limited for this species because of the small number of vessels operating in the area. Available observer data and research data indicates that some encounters of cowcod have been as high over 150 lbs. The highest initial allocation of cowcod applied to status quo sector catch levels may result in a quota pound equivalent of approximately 507 lbs. If the Council elects to set control limits at the highest initial allocation level, then there may be no need to set vessel limits at a different level than control limits. However, if the Council elects to adopt a control limit that is lower than the highest potential initial allocation level (possibly 8%), then a vessel limit that is higher than the control limit may be appropriate.

Data from the WCGOP indicates that discard events of cowcod have occurred which exceed 150 pounds. However, those events appear to have occurred only in one year. In many years the larger discard events are less than 100 pounds. Based on this information, an appropriate margin for accidental catch events may be on the order of 100 pounds. If the control limit is set at 8%, this may mean that an appropriate vessel limit is 11.5%.

Widow

Like the control limit for widow, an appropriate vessel limit appears to be quite different depending upon the status of the stock. Under existing conditions, some shoreside whiting vessels have incidentally encountered upwards of 20 metric tons, or close to 7% of a future widow allocation to the trawl fishery if the stock is still overfished (though most vessels catch far less). Given the potential for "lightning strikes" to occur with widow rockfish, it may be appropriate to set vessel limits that are higher than the control limit. Assuming an overfished status for widow rockfish, and the GMT recommended control limits for an overfished widow stock, an appropriate vessel limit may allow for some reasonable margin above the control limit to accommodate some unintended catch events. Based on available data, a reasonable margin may be an additional 10 metric tons. Applying this amount to the GMT recommended control limits under an overfished status yields 8.5%, or 54,989 lbs.

If widow rockfish are rebuilt, an approach for setting appropriate vessel limits could be similar to the approach taken for non-overfished species. In most cases the Council elected to set vessel limits that were 1.5 times the control limit. Taking the GMT recommended control limit of 8% and expanding by 1.5 yields a vessel limit of 12%.

F. Summary Recommendations for Overfished Species Accumulation Limits

Species	Control Limit	Control Limit LBS	Vessel Limit	Vessel Limit LBS
Yelloweye	5.7%	75	11.4%	150
Canary	4.4%	1,571	10.0%	3,572
Darkblotched	4.5%	25,000	6.8%	37,501
POP	4.0%	14,374	6.0%	21,561
Bocaccio with upper range	13.2%	3,579	15.4%	4,176
Bocaccio without upper range	8.0%	2,169	15.4%	4,169
Cowcod with upper range	17.7%	507	17.7%	507
Cowcod without upper range	8.0%	229	11.5%	329
Widow (rebuilding)	5.1%	32,944	8.5%	54,990
Widow (rebuilt)	8.0%	218,875	12.0%	328,312

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20-TRAWL RATIONALIZATION-FINAL ACTION ON ACCUMULATION LIMITS AND DIVESTITURE

Accumulation limits for overfished species

The Groundfish Advisory Subpanel (GAP) recommends adopting the unused quota pound approach for overfished species. The GAP further recommends setting the vessel cap equal to the control cap in order to minimize hoarding and keep as much quota available to the market as possible. The unused quota pound approach will provide additional flexibility in the event of unexpected catches of overfished species. The GAP also believes that the expense of covering this fish in the market will prevent people fishing through several limits of overfished species. The GAP notes that this decision reflects our intent from earlier meetings.

Accumulation limits for halibut

The GAP supports the general concept of individual bycatch quota (IBQ) for halibut, but raised many concerns about the overall amount of halibut to be allocated to trawl, the projected bycatch rate that would need to be met in order to harvest the entire arrowtooth and petrale optimum yields (OYs), and the initial allocation which does not adequately reflect current fishing practices.

Several members highlighted that the amount of halibut available to trawl may shut down the entire fishery in Oregon and Washington. It was also noted that while reductions in the halibut bycatch rate may be possible, it will be impossible to meet such a low rate on day one of the IFQ program.

It was noted that the benefits of the trawl individual fishing quota (IFQ) program are predicated on landing larger quantities of current OYs. The drastic reduction in the halibut available to the trawl sector is likely to reduce or prevent attainment of those benefits, at least in the north.

The GAP discussed the potential for a sector cap and a trailing action to develop the IBQ program. Several members felt that this idea might create a race for fish on halibut and it was ultimately rejected.

The GAP believes that individual accountability for halibut is important and further believes that halibut mortality should be estimated on an individual vessel basis.

As with overfished species, the GAP recommends using the unused quota pounds approach. Provided this approach is used, the GAP further recommends setting the accumulation limit for halibut at 3.5 percent. That level is low enough to prevent hoarding and keep quota available in the market. The unused quota pound approach will allow those that need it to acquire additional halibut. The requirement to obtain this fish in the market will be a powerful disincentive to fishing in high halibut bycatch areas.

Divestiture

After a lengthy debate on the subject of divestiture, a large majority (13-3) of the GAP voted in favor of allowing a 2 year divestiture period from the date of implementation. Use of the quota pounds in excess of accumulation caps would be prohibited, however transfers of the excess quota shares would be allowed. The motion also set a new control date as of November 2008 (the date of final Council action closing the door on the issue of a grandfather clause).

A minority of the GAP from the processing sector (2) opposed the motion because it did not allow for the use of quota pounds during the divestiture period, and one other GAP member opposed the motion because it was felt that setting a new control date was bad precedent.

The issues and concerns discussed by the GAP prior to this motion are summarized below.

There was significant discussion on the issue of the control date. Some felt that permits acquired after the control date were at risk because the date and the trawl individual quota (TIQ) and Council discussions of the program gave adequate notice, while others felt that the initial date was vague and seemed to refer only to fishing activity, not permit acquisitions.

Some also felt that there was adequate time for people in excess of the caps to sell permits prior to the date of implementation, while others felt that selling permits is an imperfect remedy because it is difficult to know exactly what the quota allocation for each permit is, and it may take more time than expected to line up buyers.

It was noted that it seemed like a lot of time and effort was being expended for the benefit of two entities.

From a procedural standpoint it was noted that if divestiture is allowed, it makes little sense to prohibit sale of the excess quota share during the first two years because that merely creates a delay in achieving the desired result.

Finally, several members expressed that not allowing divestiture allows the earned history of the asset to benefit those who didn't invest in or earn the asset.

Control limits in relation to voluntary risk pools

The GAP recommends that the Council make clear that they do not intend for control limits to apply to voluntary risk pools. Voluntary risk pools may be a valuable tool for fishermen to deal with low levels of overfished species and at present it is unclear whether this type of pooling would be subject to control caps.

PFMC
06/16/09

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON AMENDMENT 20 – TRAWL RATIONALIZATION ON ACCUMULATION LIMITS AND DIVESTITURE

The Groundfish Management Team (GMT) report (Agenda Item E.11.b) identifies specific considerations for setting vessel usage limits for catch of overfished species. In that report, we recommended setting vessel limits higher than control limits as a means of providing vessels flexibility for unexpected bycatch events ("higher vessel limit" approach). We revisit an alternative approach in this report that would fashion the vessel limit as a maximum quota pound (QP) balance of overfished species that could be held in a vessel account at any one time ("unused QP limit" approach).

The GMT received a presentation on the unused QP limit from Mr. Jim Seger (Agenda Item E.11.a, Attachment 1, Staff Presentation) and find that his presentation effectively captured the pros and cons of the unused QP limit approach, including several that have come up during GMT discussion. After further consideration the GMT recommends the approach is a viable alternative to setting vessel limits higher than the control limits.

We originally suggested analysis of the unused QP limit approach in March based on two observations: (1) the Trawl Individual Quota (TIQ) program itself creates a strong disincentive on the use of bycatch QP; and, (2) given uncertain information, it would be difficult for the Council to identify the "right number that strikes the appropriate balance between "too high" and "too low." We recognize that the tradeoff between vessel limits that are "too high" or "too low" is different for overfished species than for target species; for overfished species, the danger of setting vessel limits "too low" creates negative impacts for individual vessels (i.e., either the vessel is forced to tie up or additional QPs would need to be acquired, likely at a high price, to continue fishing), whereas vessel limits that are "too high" would likely have more of an indirect effect on fleet consolidation.

We can compare the two approaches to using the "too low" / "too high" framework we revisited in our main report. Both approaches to setting bycatch or overfished species QP limits would provide some hedge against "too low" limits. However, the higher vessel limit approach would appear more limited in this regard because there is a "hard cap" on usage. Yet, as long as the limit was close to the "right number"—or at least was not "too low"—we would expect the approach to sufficiently flexible.

The unused QP approach, on the other hand, has been thought of as possibly inferior on the "too high" side of the equation because it is theoretically a "limitless limit." Yet, in discussing the issue, the GMT has been unable to conclude that the approach would, practically speaking, lead to higher fleet consolidation than the higher vessel limit approach.

We use canary rockfish to illustrate this conclusion. In our main report, under the higher vessel limit approach we would recommend setting the control limit at 4.4 percent and the vessel limit at 10 percent. This creates a gap that would allow a vessel at the 4.4 percent quota share (QS) limit to acquire an additional 5.6 percent QP each year, irrespective of whether any of the QP was used or not. The unused QP approach, in contrast, would set the QP vessel limit equal to the

QS control limit (4.4 percent). And, while it would theoretically allow a vessel to acquire more than 10 percent of the QP, the vessel would be required to *use* that 10 percent. It is therefore difficult to conclude that the fleet would more likely to achieve a higher average bycatch QP usage level under the unused QP approach—and hence a greater degree of consolidation—than under the higher vessel limit approach.

The other issue we used to contrast the two approaches centers on the distinction between *using* QP and *holding* QP. As referenced above, the TIQ program creates an incentive to not use bycatch QP. Yet, as we addresses in our main report, the TIQ program also creates two major incentives to hold onto QP for overfished species. Those incentives arise because holding bycatch QP allows the holder the ability to direct the use of that QP. The ability to direct the use of bycatch QP, in turn, grants the holder some degree of control over the fishery because bycatch QP constrains access to target species in this multispecies fishery. Preventing undue control over the fishery has been a major policy objective of the Council's accumulation limits.

The other incentive to hold QP derives from the uncertainty of bycatch. As long as the potential for variable, large bycatch events exist, certain participants will seek to hold bycatch quota to cover the risk, perhaps to the detriment of proper QP market functioning.

The unused QP limit approach appears to be the superior approach for those most worried about the potential negative impacts associated with the holding of bycatch QP. Again, using canary rockfish as an example, our suggested higher vessel limit approach would allow vessels to acquire and hold 5.6 percent irrespective of use. In contrast, the unused QP limit is based on use and, by design, would prevent holding onto more than the control limit at one point in time.

In conclusion, the unused QP approach is not without risks and uncertainties, yet neither is higher vessel limit approach. There appears to be no appreciable difference in the effect of either approach on fleet consolidation or bycatch of overfished species. However, the unused QP limit approach would not have the same negative effects on the market as higher limits could.

PFMC
06/17/09

Agenda Item E.11.b
Supplemental ODFW Report
June 2009

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT SUMMARIZING PUBLIC COMMENT RECEIVED REGARDING THE ADAPTIVE MANAGEMENT PROGRAM AND ACCUMULATION LIMITS FOR OVERFISHED SPECIES

The Oregon Department of Fish and Wildlife (ODFW) held public meetings in Newport (May 28, 2009) and Astoria (June 1, 2009). Public comment was also solicited on the south coast by the ODFW Port Biologists. The primary goal was to share information with the public and to gain insight on public perspectives regarding two trawl rationalization issues, the Adaptive Management Program and accumulation limits for overfished species. This report summarizes that feedback.

These meetings were designed to openly describe and discuss issues, answer questions, and obtain input and concerns from the public regarding issues that are critical to Oregon coastal communities. It was our intent to help the public better understand the basis and specifics of these complex issues. At the same time, these meetings were designed to help us better understand the concerns and needs of the public surrounding these three issues.

Eleven public stake holders attended the Newport meeting (8 associated with groundfish vessels and 3 associated with processors) whereas three from the public attended the Astoria meeting (all associated with processors). Even though attendance was sparse, the public actively engaged in discussions; they asked important questions and provided critical insight.

We asked attendees specific questions regarding Adaptive Management and Accumulation Limits. The responses are summarized below. Note that these responses were from a <u>very small number of stake holders (N < 14)</u> (harvesters and processors). It is important to note that this feedback may not be representative of all stakeholders, given the small sample size.

Adaptive Management Program

Concerns and questions regarding the Adaptive Management Program were diverse. In many cases, individuals at the meetings were not all in agreement. One reason for varied opinions on these issues is the fact that they are complex, difficult to understand, and impact different stake holders in different ways.

Following are some (not all) general comments and questions from the public regarding the Adaptive Management Program.

- The Adaptive Management Program, as currently outlined, is too ambiguous to understand.

- Harvesters and vessel owners were concerned about giving up to 10% of their quota share to the Adaptive Management Program without a clear idea about how to get the resulting quota pounds back. These individuals felt that quota pounds from their vessels may go to other vessels or even outside of the state and they may not have the opportunity to get those pounds back. Some expressed the need to have a well defined opportunity to recover the quota pounds taken from their quota share for the Adaptive Management Program.

- The amount of quota pounds provided to an entity through the Adaptive Management Program should be limited. For example, no entity should be allowed to receive more Adaptive Management Quota Pounds in a single year than was taken from their quota share during that year. The rationale being that if the harvester surrendered up to 10%, then they should only be eligible to recover up to 10%.

- The definition of an entity that is entitled to Adaptive Management Program quota pounds needs to be clearly defined.

- Some were skeptical of the proposal driven process for distribution of Adaptive Management Program quota pounds. The concern was that individuals (or groups of entities) that hire consultants to prepare proposals for these quota pounds may outcompete those who cannot or will not hire professionals to prepare extensive proposals.

Attendees were asked specific questions about the Adaptive Management Program. Some individuals did not vote. Following is a summary of answers provided by those who openly answered questions.

1. In which year of the Trawl Rationalization Program should the Adaptive Management Program Begin?
    a. Year 1 or 2 (4 votes)
    b. Year 3 (3 votes)
    c. Never (2 votes)

2. How should Adaptive Management Pounds be allocated?
    a. Formula Approach: 8 votes
    b. Proposal Approach: 1 vote

3. How long should an entity receive Adaptive Management Pounds before it is reallocated?
    a. 2 years: 3 votes
    b. 5 years: 6 votes

4. Who should directly receive Adaptive Management Pounds before ultimately being transferred to a vessel?
    a. Harvesters: 5 votes
    b. Processors: 6 votes
    c. Port Authority: 0 votes
    d. Community Organizations: 1 vote

Control and Vessel Limits for Overfished Species

Similar to that observed for the Adaptive Management Program, concerns and questions surrounding control and vessel limits for overfished species were diverse. Most of the attendees understood control and vessel limits better than the Adaptive Management Program. However, few (if any) could determine the quantity of overfished species needed to prosecute their target fishery. This is compounded by the fact that the initial allocation of target species quota share for each permit holder is currently unknown. Permit holders felt that they could not adequately comment on the appropriateness of the overfished species limits since they did not know how much target species they would be attempting to harvest under the rationalization program.

We provided attendees with an example of maximum control and vessel limits (pounds) that could be allocated during the initial years of the Trawl Rationalization Program (see Agenda Item E.11.b). We then asked attendees whether these amounts would be enough to allow them to harvest target species. None could answer this question because they truly did not know the quantity of overfished species that their crew discards during a year. This problem is compounded by the current inability of permit holders to receive information regarding the initial allocation of target species they can expect to receive once trawl rationalization begins.

Following is a small sample of comments, questions, and concerns about control and vessel limits for overfished species that were voiced by individuals who attended these meetings. Note that these responses were from a very small number of stakeholders (harvesters and processors). These comments are not comprehensive and may not be representative of all stakeholders in the groundfish fishery.

- Uncertain how control and vessel limits for overfished species will be calculated.
- Uncertain about the amount of control and vessel limits needed to fully prosecute their target fishery.
- Some did not realize that control limits would apply to each permit (not to each vessel under a permit).
- Some did not understand that once a vessel limit was reached, the remaining quota pounds in that vessel account could be sold or leased even though the vessel would be tied up for the remainder of the year.
- Confusion regarding the halibut individual bycatch quota and whether harvesters would be rewarded for best practices, like shorter tow times and shorter time on deck, that reduce mortality.

Agenda Item E.11.b
Supplemental SSC Report
June 2009

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION – FINAL ACTION ON ACCUMULATION LIMITS AND DIVESTITURE

Mr. Jim Seger and Mr. Merrick Burden briefed the Scientific and Statistical Committee (SSC) on the proposed final actions being considered for accumulation limits and divestiture. The SSC reviewed the Issue Summary (E.11.a, Attachment 1) and the GMT Report (E.11.b). Many of the issues involved in setting accumulation limits are quite complex, and the SSC commends Council Staff and the Groundfish Management Team (GMT) for carefully laying out, discussing, and analyzing a great number of these issues.

The SSC views accumulation limits and divestiture primarily as policy decisions to be made by the Council. Accumulation limits affect the trade-offs between economic efficiency and wider distribution of fishing opportunities. Higher limits will tend to encourage more fleet consolidation and economic efficiency. However, if the limits are too high, a large degree of the harvest and quota market could be controlled by a small number of entities. Lower limits will tend to spread fishing opportunities over more entities, but can limit the efficient prosecution of the fishery. In addition, accumulation limits for overfished, non-target species will affect the ability and cost required of harvesters to fully utilize target species quota, and thus impact the overall functioning of the quota market and the rationalized fishery.

Due the large amount of uncertainty associated with bycatch of overfished species, it would be prudent to design a system that is flexible and adaptable as actual conditions on the ground play out. These uncertainties include the degree of randomness of bycatch harvest, the potential for unusually large bycatch tows, the ability of harvesters to avoid bycatch, how the quota market for bycatch species may function through the fishing season, the degree to which risk pooling agreements and information sharing will be effective, and the lack of concrete data and models. Given the operational and market disruptions that could result from changing accumulation limits after rationalization occurs, fewer disruptions and more flexibility may be attained by initially setting the accumulation limits at the lower end of the range rather than upper end.

Section C of the GMT Report addresses the relationship between control limits, vessel limits and risk pools. The report posits that higher limits may discourage the formation of risk pools. The SSC does not regard this as a certain outcome, and expects that the formation of risk pools would depend on many factors. There is insufficient information to analytically select a level of control limits or vessel limits that would encourage the formation of risk pools, even though such information may be of interest to the Council.

PFMC
06/15/09

WEST COAST SEAFOOD PROCESSORS ASSOCIATION
1618 SW First Avenue
Suite 318
Portland, OR 97201
503-227-5076
May 27, 2009

Mr. Don Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384
Re: Agenda Item E.11, Amendment 20: Accumulation limits and divestiture

Dear Chairman Hansen:

We believe the council acted prematurely in March by adopting accumulation limits without giving the Groundfish Management Team (GMT) enough time to develop fully its suggested revenue-based framework, in spite of recommendations from the GMT that further work was needed. With this in mind, we would like to call the Council's attention to the attached white paper written by Bruce Turris, president of Pacific Fisheries Management Inc., in British Columbia.

The British Columbia quota system, now in existence for more than a decade, is often touted as a success and served in part as the model for our proposed Individual Quota (IQ) system. However, it appears that fishery managers there made a similar mistake in setting accumulation limits, as is pointed out in the paper, which raises the issue of increasing the Total Holding Caps (the Canadian version of our control caps) in their groundfish fishery so vessels can maintain economies of scale and be economically viable when faced with the additional costs of management under an IQ system.

The Pacific Coast groundfish fleet may face the same situation. While it is probably too late to revisit the accumulation limits, we should take this lesson to heart when considering divestiture of quota shares (QS) above the accumulation limits. We suggest divestiture of QS should not be mandated right away. Ownership of QS in excess of accumulation limits should continue for five years, with 100 percent usage of QS and quota pounds (QP) that are owned or controlled as of the date of this council meeting. At the planned five-year review date for the IQ system, the Council could then determine whether the accumulation limits had been set properly (i.e., whether vessels can operate economically under those limits). At that time, the Council can adjust the accumulation limits if necessary or could require divestiture.

This approach would help alleviate unintended consequences and minimize any impacts that are unknown at this time. The fishing industry would benefit by having more time to realize the impact of QS and QP ownership and adjust their fishing patterns.

Sincerely,

Susan Chambers
Deputy Director

DISCUSSION PAPER

ON

TOTAL HOLDINGS CAPS IN THE GROUNDFISH TRAWL FISHERY

MARCH 2009

Introduction

Over the last couple of years, a number of vessel operators have expressed concerns about Total Holdings Caps. They believe that licensing changes alone will not be enough by themselves to kick start and re-invigorate the groundfish trawl industry and bring it out of the current economic problems caused primarily by fluctuating exchange rates, increasing fuel prices and operating costs and the onset of a worldwide recession. Some also suggest that the current rules limit the industry's ability to adapt to an ever changing economy and world market. For these reasons, it has been suggested that rule changes allowing for the stacking or expansion of Total Holdings Caps should be considered.

Total Holding Caps are a significant component of the negotiated IVQ/GDQ plan introduced in 1997. The plan was the product of considerable consultation with industry, GTAC (Groundfish Trawl Advisory Committee) and GSIC (Groundfish Special Industry Committee) on how to reform the groundfish trawl fishery to improve resource sustainability and economic viability. Therefore, any changes to Total Holdings Caps need to be discussed with all industry participants.

GTAC has recommended that a background discussion paper on the Total Holdings Cap issue be sent out to industry participants and that feedback be collected and provided to GTAC and GSIC for consideration and possible revisions to future management plans.

Background

When the IVQ program was being designed and developed, one of the concerns raised was that quota may accumulate onto a small number of vessels resulting in a large loss of crew employment and a concentration of the benefits from the fishery by only a few vessels. At the same time, however, most in the industry believed that the fishery, even under an IVQ program, could not support 142 active vessels annually. Not only was there not enough value in the fishery, but the added costs and operational problems associated with 100% at-sea observer coverage was expected to further limit participation of small vessels and those with smaller IVQs. Industry agreed that there needed to be some level of controlled fleet rationalization and acceptable quota concentration. Therefore, the IVQ program was designed with a stated objective of allowing the active groundfish trawl fleet to shrink to between 60 and 80 vessels.

To control quota concentration and fleet rationalization, two measures were implemented – Coastwide Species Caps and a Total Vessel Holdings Cap. The Coastwide Species Caps limit accumulation of an unreasonably large amount of any specific species IVQ by a single vessel. The size of the Coastwide Species Caps vary by species based on distribution, availability, abundance, and catch and/or bycatch frequency. While the permanent Coastwide Species Caps (i.e. amount of permanent IVQ held by a vessel for a specific species) have not changed over the years, there has been the introduction of temporary Coastwide Species Caps (i.e. the amount of temporary IVQ held by a vessel for a specific species) which can vary throughout the year based on time of year, abundance, fleet activity, and market conditions.

While Coastwide Species Caps may help to limit fleet rationalization and quota concentration, their primary purpose is to ensure that important bycatch species are readily available to the fishery participants that need it. By limiting concentration of some species, incentives are created for everyone to fish more selectively. The more selective the fishing, the more accessible that species will be for others requiring it for bycatch purposes.

The second measure, and the one primarily aimed at controlling fleet reduction and quota concentration, was the implementation of the Total Holdings Cap. Each groundfish trawl license is subject to a Total Holdings Cap measured in groundfish equivalents (GFEs). A groundfish trawl license's Total Holdings Cap was originally determined by using the largest number of the following three options:

- 800,000 pounds GFEs, or
- twice the 1994/1995 average percentage of landings taken by the license multiplied by the total 1996 groundfish catch, or
- a 25% increase above the initial IVQ allocation.

For the purposes of calculating the Total Holdings Cap for each license, and for measuring IVQ holdings of a license against its cap, GFEs were established. GFEs essentially turn all groundfish into a common currency and are based on the relative price of each groundfish species to Pacific Ocean Perch (i.e. Pacific Ocean Perch = 1). If you refer to the annual groundfish trawl management plan you will find a table displaying the GFE values of each species relative to POP. Over the years these relative values have not changed, with the exception of Offshore Pacific hake. However, there have been some species added to the mix (Big skate, Longnose skate, and Arrowtooth flounder).

There have also been a few changes to Total Holdings Caps over the years. Initially a vessel's annual Total Holdings Cap measured in pounds of GFEs would fluctuate based on changes in the total pounds of GFEs for the entire fishery. This was caused by annual changes to species TACs. Each year a few TACs might go up and a few might go down and the total GFEs would change slightly. However, large fluctuations in the Offshore Pacific hake TACs could create significant changes in the total GFEs and create problems where some vessels would be within their Total Holdings Cap one year, when the hake TAC was high, but over the next because of a large decline in the hake TAC. Prior to the 1998 season, DFO agreed to fix the Total Holdings Caps based on the largest GFE year. A second change occurred in 2004 when everyone's Total Holdings Cap was increased by 12.5% to accommodate the addition of Big skate and Longnose skate TACs. A third change occurred in 2006 after Arrowtooth flounder was assigned a TAC of 15,000 tonnes and added to the IVQ program. Every license's Total Holdings Cap was increased by 4%.

Current Situation

The intent of the Total Holdings Cap is to restrict the amount of GFEs that can be placed on a single licensed vessel, thus limiting the extent of fleet reduction. While some may debate the merits of Total Holdings Caps, one cannot argue that they have achieved the stated objective (i.e. to maintain an active fleet of between 60 and 80 vessels). In the 2007/2008 groundfish trawl fishery, there were 72 active vessels of which 66 operated in the Option A fishery and 6 operated in the Option B fishery.

The attached spreadsheet is provided by DFO and shows for the 142 groundfish trawl licenses the Total Holdings Cap in order of smallest to largest for the 2008/2009 fishing year. The numbers 1 through 142 are not the groundfish trawl category "T" license numbers. Rather, they are simply the number assigned to the license in order of progression from lowest to highest Total Holdings Cap. The spreadsheet provides two snap shots for each license. One is the license's permanent IVQ holdings as a percentage of the license's Total Holdings Cap as of April 4, 2008 (the start of the fishing year) and the second is the licenses permanent plus temporary IVQ holdings as a percentage of the license's Total Holdings Cap as of February 20, 2009 (the end of the fishing year). As you can see, there are 45 licenses that have the current minimum Total Holdings Cap of 938,157 lbs of GFEs. The largest GFE is 8,077,862 lbs.

At the start of the 2008 fishing year, there were 3 licenses with permanent IVQ holdings at more than 90% of their Total Holdings Cap, 6 licenses at more than 80%, 13 licenses at more than 70%, 25 licenses at more than 60%, and 41 licenses at more than 50%. At the end of the 2008 fishing year, based on combined permanent and temporary IVQ holdings, there were 7 licenses at more than 90% of their Total Holdings Cap, 10 licenses at more than 80%, 18 license at more than 70%, 30 licenses at more than 60%, and 37 licenses at more than 50%.

Discussion

The discussion focuses around the following statement:

The existing Total Holdings Caps limit the amount of groundfish you can put on a groundfish trawl license.

This is an accurate statement and flows from the design of the original program. The question is whether or not we need to change the original Total Holdings Cap rules because the world in which the groundfish trawl fishery operates has changed and the fleet needs to change to remain competitive and economically viable.

Not all licenses have the same cap and not everyone has the same business model or vision for how they want to operate their fishing enterprise in the future. There are existing vessels that are not restricted by their Total Holdings Cap but are restricted by the various Coastwide Species Caps. Some vessels already have a large cap and combined with the new licensing rules on length and license splitting can make changes that expand their fishing platform and production. Other vessels may not have a sufficient Total Holdings Cap on their license to expand their operation or justify investing in a larger fishing platform.

Generally, the groundfish trawl fishery is a low margin fishery, and economy of scale is very important to viability. Increasing the Total Holdings Cap allows for improved economies of scale either by increased specialization (for some species) and/or greater diversification through the utilization of a more comprehensive package of quota species. With the opportunity for increased production, vessel owners may purchase a larger vessel, put on another drum, put in a freezer, take more crew and catch more groundfish.

Increasing the Total Holdings Cap also provides the vessel operator with greater flexibility to develop a business plan that best suites his overall operation. Some license holders already own more than one groundfish trawl license and vessel. They may wish to consolidate operations during difficult economic times or expand the number of operations during strong market periods. Having such flexibility allows operators to plan for the future and determine what investments they need to make that are consistent with their long-term vision and direction.

While there are positive reasons for considering changes to the Total Holdings Cap rules, there are also impacts that may raise concerns and need discussion. For example, what would be the impact on employment? Most would agree that allowing for increases in the Total Holdings Cap will result in fewer active vessels. But does this equate to fewer crew jobs or fewer person years of employment? Furthermore, are they better quality jobs that are stable and provide fair compensation? There are different scenarios and all are possible. Operations like the Osprey No.1 and the Viking Enterprise may actually result in additional employment (both number of crew and person years). It is also possibly that one vessel may expand its operation by absorbing all the quota of another vessel while at the same time utilizing the crews from both vessels for an equivalent number of jobs and person years as existed when the two vessels were both fishing. However, it is also possible that one vessel may absorb the entire quota of another vessel and, because of a significant increase in the vessel's operating economies of scale, only require some of the other vessel's crew and not create as many jobs or person years of employment as existed when both vessels were fishing.

What will be the impact on quota values and quota leasing costs? While quota values and lease prices are a function of many factors (i.e. exchange rates, fish prices, operating costs, species, supply and demand), it is possible that allowing expansion of the license's Total Holdings Cap could increase competition for permanent and temporary quota resulting in upward price pressure for both. Some believe that if the cost of purchasing or leasing quota increases it reflects a healthy market since the economics of the vessel's operation and the fishery will allow for such increases. Would there be increasing pressure on species caps? This is difficult to answer. Some would suggest that regardless of changes to Total Holdings Cap rules that they are already restricted by Coastwide Species Caps and would like to see them increased for some species.

Options for Consideration

This discussion paper is about whether or not there should be changes to the Total Holdings Cap rules in the groundfish trawl fishery. For many people, before they can assess the situation they need to understand how the Total Holdings Cap could change. Below are three possible options on how this can happen:

1. Stacking of Total Holdings Caps
2. Increasing the Total Holdings Cap
3. A combination of Stacking and Increasing Total Holdings Caps

Option 1 takes the approach that for a license to increase its total IVQ holdings beyond its existing Total Holdings Cap the operator has to purchase additional Total Holdings Cap either by stacking the entire cap from another vessel or a portion of another vessel's cap. Assuming the vessel owner doesn't already own another license, this option adds costs to vessels that are trying to expand their operation and wish to increase their Total Holdings Cap while compensating those who wish to reduce or remove their investment in the groundfish trawl fishery.

Option 2 simply increases every license's cap. This could range from no limit to a fractional increase in the license's Total Holdings Cap. For example, the Total Holdings Cap for every groundfish trawl license could be increased by 50%. This approach does not add costs to vessel owners wishing to expand their operation beyond their existing cap level (they still have the costs of purchasing or leasing the IVQ).

Option 3 is a combination of Options 1 and 2. For example, the Total Holdings Cap on every license may be increased by 25% but any license may be allowed to increase its cap by a total of 50% with the remaining 25% obtained from other license holders and stacked onto the license wishing to increase its Total Holdings Cap.

Summary

This is a discussion paper on the issue of whether or not there should be changes to the Total Holdings Cap rules in the groundfish trawl fishery. The paper is meant to provide you with some background about how the Total Holdings Cap was created and the possible benefits and problems associated with increasing them. If you wish to comment on this issue, please contact your GTAC representative (look in the groundfish trawl management plan for GTAC representative names and contact information) or Bruce Turris at 604-524-0005 or by e-mail at bruce_turris@telus.net.

David Bitts
President
Larry Collins
Vice-President
Tom Hart
Secretary
Marlyse Battistella
Treasurer
In Memoriam:
Nathaniel S. Bingham
Harold C. Christensen

PACIFIC COAST FEDERATION
of FISHERMEN'S ASSOCIATIONS

STEWARDS OF THE FISHERIES

http://www.pcffa.org

W.F. "Zeke"
Grader, Jr.
Executive Director
Glen H. Spain
Northwest Regional Director
Mitch Farro
Fishery Enhancement Director
Vivian Helliwell
Watershed Conservation Director

Please Respond to:

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San Francisco, CA 4129-0370
Tel: (415) 561-5080
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☐ **Northwest Office**
P.O. Box 11170
Eugene, OR 97440-3370
Tel: (541) 689-2000
Fax: (541) 689-2500

27 May 2009

Dr. Don McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Briefing Book Agenda Items: E.2 FMP Amendment 22: Open Access Fishery Limitation; E.11 FMP Amendment 20 – Accumulations Limits and Divestiture; E.12 Adaptive Management Program

Dear Dr. McIsaac and members of the Pacific Fishery Management Council,

The Pacific Coast Federation of Fishermen's Associations (PCFFA) represents working men and women in the West Coast commercial fishing fleet. Among the fishermen belonging to PCFFA member organizations that we represent are many engaged in the open access groundfish fishery, as well as some in the fixed gear limited entry and trawl fisheries.

PCFFA respectfully submits these comments on three briefing book agenda items.

• • • •

[A full copy of this letter is provided in Agenda Item E.3 on Open Access Fishery Limitation. Excerpts related to Agenda Item E.10 are provided here.]

E.11 FMP Amendment 20 – Accumulations Limits and Divestiture

PCFFA has supported and continues to support low accumulation limits in the trawl fishery. PCFFA is troubled by the accumulation limits that the Council has considered adopting. An accumulation limit of 1 percent for most species seems prudent and has been a figure widely used in other IFQ fisheries to avoid excessive consolidation and control of a particular fishery.

It bears repeating that high accumulations limits, which lead inexorably to fleet consolidation, affect adjacent fisheries and smaller ports. The Council should consider the needs of smaller ports and fishing communities when setting accumulation limits. A fleet of 40 to 60 trawl vessels for the entire coast, as predicted in the Amendment 20 EIS, would have a large impact on smaller ports and other fisheries that depend on trawl boats to help support dockside businesses and infrastructure.

In previous public comment PCFFA has advocated for using divestiture fish to fund Community Fishing Associations (CFAs). At the April 2009 meeting the Council adopted a motion to consider allowing CFAs to be "first in line" to access these fish. The question of whether or not CFAs would have to pay for these fish was deliberately not addressed. PCFFA supports the motion made by the Council in April for CFAs to be first in line to access divestiture fish. PCFFA believes that if smaller ports and fishing communities are to survive this "rationalization" process, CFAs are going to have to play a part in allowing these communities to maintain access to their resources. Funding CFAs with fish through various "pockets" of fish is imperative to their success.

Sincerely,

W.F. "Zeke" Grader
Executive Director

RECEIVED

FEB 2 5 2009

PFMC

February 24, 2009

PFMC Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place #101
Portland OR 97220
FAX 503-820-2299

RE: IQ PROGRAM PREFERRED ALTERNATIVE ALLOCATION

Dear Council Members:

My name is Paul Ranstrom and, I am the owner of the fishing vessel. Joy Ann. I am also a member of the Fishermen's Marketing Association. This is to advise that I request that any and all decisions on Ownership and Control be delayed until I, as a permit owner, have receipt of what I am going to receive under the the preferred alternative allocation and what the individual costs of the IQ program will be. I cannot make an informed decision until I know how I will be impacted.

Sincerely,

Paul Ranstrom

March 3, 2009

Mr. Donald K. Hansen
Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Ste. 101
Portland, OR 97220-1384

RECEIVED
MAR 1 2 2009
PFMC

Dear Chairman Hansen:

The Council is scheduled to take action in March on trailing amendments to the TIQ Preferred Alternative. At this point, groundfish permit owners who are affected by past and future decisions have no information available to them. Without information about how this plan affects me, I cannot provide informed public input on future or past decision-making on this very important regulatory change.

I strongly urge that the Council move to defer any future decisions relating to the Trawl IQ plan until permit owners, like myself, have the information necessary to evaluate and understand the impacts of the plan on our own businesses.

I appreciate the opportunity to comment. If you have any questions about this important matter, please contact me at 541-867-6135

Sincerely,

Denny Burke

F/V Timmy Boy

Mr. Hansen I believe we need to know what our gata pounds are before we go further down the path. To correctly address the alacation isues we need to know the math. Thank you for the open door policy and the chance to particapate

F/V Timmy Boy inc. Denny Burke

May 28, 2009

Mr. Don Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Re: Agenda Item E.11, Amendment 20 – RELEASE OF INFORMATION RELATING TO INDIVIDUAL PERMIT ALLOCATION FORMULA

Dear Chairman Hansen:

The Council has been asked before and at the November 2008 meeting; before and at the March 2009 meeting; before and at the April 2009 meeting; and most recently at the May Groundfish Allocation Committee meeting; "please release council staff's allocation formula and amounts to individual permit owners." The request for this information has also been made via letter or public comment by each of the three Coastal state representatives on the Council.

There are no legal or other barriers to providing valuable information to individual permit owners so that they might be able to provide informed public comment on the decisions that have been made and are yet to be made by the Council.

I urge you to provide this information to individual permit owners before the June Council meeting.

As always, I appreciate your service and attention to this very important issue. I have attached with this request a few pages of permit owners who have signed in support of this effort for information. These are independent vessel owners.

Sincerely,

Craig Urness

April 28, 2009

Dear Mr. Chairman and Council Members:

Please provide us with our permit allocation information as soon as practical. We have no way to accurately determine how the Trawl IQ program will impact us. The only persons with accurate information are those who developed the allocation formulas; Pacific Fisheries Management Council staff. That information, with the permission of the states, must be shared, confidentially, with each individual permit owner.

2011 is rapidly approaching. As vessel and permit owners, we need to understand how the proposed regulatory changes impact our businesses. Decisions about different investments in our businesses depend on us understanding our future. Many of the daily business decisions we make today are based on our understanding of what we can do in the near future. Without the changes, we can reasonably estimate what we will be doing. In the face of these sweeping regulatory changes, we simply do not know.

There is no rational basis for NOT sharing the allocation formula to individual permit owners. Your prompt attention to our concerns is appreciated.

Thank you.

F/V Sea Clipper x. [illegible] Pres

F/V ORION x. Ken P. Bearde

F/V Verda Marie x. Denny Stopsen

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

F/V ______________ x. ______________

April 28, 2009

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Thank you.

F/V ENDEAVOR (GF0013) x. [signature]

F/V GOD'S WiLL x. [signature]

F/V Columbian STAR x. [signature]

F/V Home Brew x. [signature]

F/V Cape Windy x. Paul [signature]

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

April 28, 2009

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There is no rational basis for NOT sharing the allocation formula to individual permit owners. Your prompt attention to our concerns is appreciated.

Thank you.

F/V Washington x. Matt Hall

F/V Sundo[illegible] x. [illegible]

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

F/V ______ x. ______

April 28, 2009

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There is no rational basis for NOT sharing the allocation formula to individual permit owners. Your prompt attention to our concerns is appreciated.

Thank you.

F/V EXCALibur	x. [illegible]
F/V PACIFIC	x. [illegible]
F/V Miss Joe	x. [illegible]
F/V SEEKER	x. [illegible]
F/V Last Straw	x. Brett H[illegible]
F/V Miss Bernie	x. [illegible]
F/V Western Breeze	x. [illegible]
F/V	x.
F/V	x.
F/V	x.
F/V	x.
F/V	x.

Amendment 20 – Divestiture and Control
Issues Related to Initial Allocation

Prepared by **Erika Feller, Marine Project Director**
The Nature Conservancy
201 Mission Street, 4th Floor
San Francisco, California 94105
(415) 281-0453 or efeller@tnc.org

Introduction

The Nature Conservancy requests that the Pacific Fishery Management Council (PFMC) authorize participants in the fishery to divest of excess quota share (QS) as a means of bringing all participants into compliance with ownership and control caps (hereafter referred to as "control caps"). One of the reasons to implement an Individual Fishing Quota (IFQ) system is to create a market mechanism for achieving fishery goals. A market mechanism should be used to transition participants in the fishery to the established control caps.

Specifically we request that the PFMC take the following actions at the June 2009 meeting:

- Establish reasonable individual control limits for target and overfished species that achieve Magnuson Stevens Fishery Conservation and Management Act (MSFCMA) requirements to avoid an individual gaining excessive control over the fishery.
- Allow participants to receive QS based on the allocation formula adopted by the PFMC that includes catch history related to permits they held as of the date of the PFMC final rationalization decision – November 7, 2008.
- If an individual is eligible for and receives more QS than the individual limit, he or she must divest of the excess within five years of the date of implementation of the IFQ. Individuals should have all quota pounds (QP) associated with these QS deposited in their account each year until the QS is divested.
- QS that is not sold or transferred within the specified divestiture period should be forfeited to the National Marine Fisheries Service to be redistributed through an auction with the proceeds available to federal or state agencies to support implementation of the IFQ program or as grants to address impacts of the transition.

Further, as the PFMC agreed at its April 2009 meeting, guidelines for Community Fishing Associations will be developed as a trailing amendment to Amendment 20 in autumn 2009. We request that the PFMC authorize these entities to acquire quota share during the divestiture period and consider creating incentives to encourage divestiture to community fishing associations that support long-term community economic stability. For example, the PFMC could require that QP associated with excess QS might be used by a Community Fishing Association (CFA) and the QS subsequently purchased by the CFA.

Description of the Problem to be Solved by Divestiture

In November 2008, the PFMC agreed that initial allocations of groundfish trawl QS in excess of the individual accumulation limits would not be "grandfathered"[1]. At that time, the PFMC had not yet established control caps on individual QS holdings, but did agree that control limits were to be part of the program and deferred the decision until March 2009. During the PFMC meeting in March 2009, the PFMC voted to recommend that individual control be capped at 2.7% in aggregate, with different control caps for individual species.[2]

However, a number of participants in the trawl groundfish fishery hold permits with catch history that would qualify for them for more than 2.7% aggregate QS or such that they would qualify for QS for a species in excess of one or more species caps. Presumably, participants in either situation would receive QS up to the cap and see the remainder redistributed among the rest of the fleet.

The argument in support of this approach is that those who "speculated" should not be rewarded for this behavior with a windfall benefit on initial allocation. We would argue that the situation is considerably more complex than this statement would suggest. First, as the program is currently conceived all permit holders will receive a windfall benefit on initial allocation as they receive QS that in other fisheries has proven to be worth considerably more than the market price of Limited Entry permits. It is reasonable to expect the same will be true in this fishery. The issue is one of degrees and the reasons behind those differences in degree. Second, some participants in the fishery, such as The Nature Conservancy, acquired permits and catch history that likely places them in this situation. This was not done in an effort to speculate on the future value of QS associated with those permits, rather to mitigate the economic impacts of a habitat protection measure on fishermen and to find ways to redeploy those permits for the benefit of the resource, communities and fishermen. TNC's view of the regulatory context was that the risk was acceptable that our investment would be honored and future plans possible. Others perhaps took a similar view of the likelihood that some sort of grandfathering would be allowed – given that this alternative was viable until the November 2008 meeting and in view of the precedent set by other U.S. IFQ programs. Finally, during the six years that this program has been under development the economics of the fishery have evolved – making continued participation by some impossible, and inspiring others to make the business decision to increase their permit holdings.

Further, much has been made of the argument that participants should have been aware that the program would include accumulation limits and that it is possible that permits/catch history accrued after the control date would not be considered in these decisions. The control date notice warns that catch history based on fishing activity after the control date might not be credited under the rationalization program, but it does not warn that permits and catch history acquired after the control date might not be credited. The principal purpose of a control date notice is to discourage increased fishing intensity in a race to build catch history after a transition announcement is made; not as an attempt to freeze the fishery in time. We request that the PFMC carefully consider this distinction, the ambiguity that has surrounded this question over the years that the PFMC has invested in developing the IFQ program, and the potentially disruptive effects of applying control caps at initial allocation as factors that support allowing divestiture.

The MSFCMA requires that the decision regarding initial allocation be fair and equitable and consider the social and cultural framework of the fishery, which is compatible with the PFMC objective to minimize adverse impacts on fishing communities. Many of the "impacts" of the transition to an IFQ system stem from the transition from one management system to another. The NMFS Technical Memorandum on Limited Access Privilege Programs points out that flexible transferability rules and non-expiring harvest privileges mean that allocation decisions need only be made once, arguably a benefit to managers. Provided the program is well-designed with clear and enforceable control limits and other appropriate constraints, the market will reshape the fishery making the exact makeup of the initial allocation decision entirely independent from these other considerations – such as control limits.

The forced redistribution of QS upon initial allocation currently contemplated is inconsistent with MSFCMA considerations and would create several significant transition problems that the PFMC should carefully consider and address.

1. <u>The current redistribution approach is inequitable and dislocating</u>. MSFCMA requires that Councils developing a limited access privilege program develop procedures to ensure fair and equitable initial allocations, including consideration of: (i) current and historical harvests; (ii) employment in the harvesting and processing sectors; (iii) investments in and dependence on, the fishery; and (iv) the current and historical participation of fishing communities. Section 303A(c)(5)(A). Redistributing catch shares upon initial allocation would disrupt current harvest patterns, disrupt employment in the harvesting and processing sectors, expropriate investments made in limited entry permits that generate catch shares in excess of the QS cap, and disrupt current patterns of fishing community participation in the Pacific Coast groundfish fishery. It is very difficult to see how this aspect of the trawl IFQ program could be defended as "fair and equitable".

2. <u>Practical issues loom if Control Caps are applied at initial allocation.</u> Even if the important policy considerations are not persuasive, there are practical problems associated with applying the QS cap at initial allocation.

    a. The only method for complying with the QS caps, other than simply accepting an uncompensated loss of QS, would be to divest permits (those that represent the excessive catch history) before QS is issued. However, until QS is issued, participants have no way of accurately calculating the amount of QS that will be generated by the permits they hold. The catch history data that could be used to estimate QS allocations are confidential, and are not available to persons who did not hold the related limited entry permit when the catch history was accrued. Further, some states are unable to release any catch history out of capacity constraints or other concerns about the data. Therefore, it is not possible for participants to accurately calculate the amount of catch history they would have to divest to be in compliance with the anticipated QS cap. While the calculator developed by the Fishermen's Marketing Association is an excellent tool, without accurate data it is unlikely to provide useful guidance for a divestiture strategy.

    b. In the event that excess QS are redistributed, there is no policy guidance for how that redistribution would be taken. An individual could be within the limit for each and every species in his QS portfolio and still exceed the aggregate accumulation limit. In such a situation, how would the exact amount and composition of the overage be calculated for the purpose of redistribution? Would that individual have the option of maximizing his initial allocation of the most valuable species and redistribute less valuable species? Would redistribution be taken evenly across all species or would there be some effort to ensure that redistribution leaves the individual with a mix of QS that is compatible with their current harvesting strategies?

c. Under the current limited entry permit system, it is not possible to transfer a fraction of the catch history earned under a permit. It has been suggested that those permit holders who have holdings that would put them in excess of caps should divest of permits in advance of the implementation of the QS system. To divest catch history, a potential QS recipient will be forced to transfer the limited entry permit on which the history was earned. As a result, persons who hold a single permit are faced with an "all or nothing" divestiture choice, and persons who hold more than one permit could be forced to divest far more catch history than necessary to comply with QS control caps.

For these reasons, every other rationalization program implemented in the U.S. has included some type of initial allocation provision that grants initial recipients with a limited exemption from otherwise applicable QS holding and use caps. Including a first generation grandfather or divestiture clause mitigates the social and economic disruption associated with the transition to a rationalized fishery, and provides the initial recipients of QS with the opportunity to maintain their fishery participation at a level commensurate with their investments in and dependence on the fishery. This will also insure a smoother transition in which the desired QS consolidation limits are effectively applied as QS changes hands.

What are the benefits of divestiture?

Initial allocation should be as administratively simple as possible and should rely on generally available and transparent data. The potential for appeals and challenges increases when large values are at stake. Offering full initial allocation with divestiture will be easier to administer and predict and is more likely to minimize costly and implementation-delaying appeals or challenges.

The benefits of divestiture are:

- Individuals will be allowed to recoup their investment in the fishery and will not have catch shares expropriated.
- The likelihood of challenges to the rationalization program based on an inequitable or ambiguous application of QS caps will be reduced.
- Fishing communities will have time to organize, find financing, and purchase quota in the amounts necessary to preserve their access.

The mitigation that divestiture offers has special significance in connection with the Pacific Coast groundfish trawl IFQ program. California Central Coast fishermen and fishing communities are building a Community Fishing Association (CFA) that is designed to stabilize their fishing economies through the transition to rationalization and provide for long-term economic stability. The CFA initiative depends on the ability to maintain the QS that have been earned in the Central Coast and aggregated through trawl limited entry permit purchases, and to employ that access under arrangements that the PFMC has twice approved through Exempted Fishing Permits. It will be cruel irony indeed if the PFMC applies QS consolidation limits in a manner that precludes any chance for the Central Coast CFA's success, or the ability of other communities to develop similar organizations, and instead exacerbates the disruption associated with transitioning to rationalization by redistributing catch shares that are currently anchored in Central Coast communities.

Will there be efforts to circumvent the control rules if divestiture is permitted?

Implementing the IFQ will require development of new regulations and systems to ascertain the amount of QS an individual controls, either directly through ownership or that they may indirectly "control through other means." While control through direct ownership may be relatively simple to manage, ascertaining and tracking "control through other means" may be more difficult. In other fisheries, the types of relationships have been described that might indicate affiliation or a control relationship that might trigger the control limit. Some examples are included in Table 1.

For example, Appendix A includes copies of IFQ transfer and ownership change documentation required for the Alaska halibut and sablefish fishery. This is included as an example of the type of application used to gather information necessary to determine whether a particular transaction would run afoul of control rules, including relationships between the buyer and seller, information on partnerships, sale price, etc. (Similar documentation is used in other IFQ fisheries.) By contrast, the transfer form for a West Coast Limited Entry Permit (LEP) – used for trawl permit transfers (leases and sales) – is mainly used to determine eligibility to hold an LEP. With the documentation required, it seems unlikely NMFS will have access to information necessary to understand and regulate permit transactions that may involve affiliates or other control relationships until after the IFQ is implemented.

In all likelihood, the agency will develop similar rules and tests to determine where relationships exist that might affect control. We might expect that initial allocation will include some sort of application process in which eligible applicants must answer a series of questions about their business relationships and their holdings that would allow the agency to accurately ascertain the amount of QS – both species and in aggregate – under that individual's control either directly or through other means. Presumably, this disclosure requirement would be reinforced by penalties for false or incomplete statements. Further, it is likely that any subsequent QS transactions would involve a similar disclosure. These disclosure requirements, which should be part of the IFQ program, would help fishery managers track inappropriate divestiture transactions – those designed to ensure that the seller retains some degree of control despite giving up ownership.

Finally, the value of QS will remain unsettled until it is allocated and a market develops. In the mean time, estimating catch history to QS ratios and calculating QS values will be a highly speculative activity, at best, making transactions difficult and risky. Further, allowing divestiture after initial allocation may actually facilitate implementation and enforcement of control caps as transfers that take place after QS is issued are likely to be more transparent. Moving these transactions to the period after implementation of the IFQ will enable the development of mechanisms to collect information about relationships that may be relevant to implementation of control limits.

For all of these reasons, it makes much more sense to require divestiture after QS has been allocated.

Table 1 - How might control be tracked? Examples of ways the federal government tracks affiliation and other control relationships that do not necessarily involve ownership. These are drawn from fishery regulations at 50CFR679.2 and 50CFR680.2 for other rationalized fisheries, and MARAD regulations at 46CFR356.	
Indicators of Affiliation Besides ownership interests, it may also be useful to understand how entities are affiliated with one another and how those relationships might lead to control. Business concerns, organizations, or individuals may be considered to be affiliates of one another if, directly or indirectly, either one controls or has the power to control the other – or a third party controls or has the power to control both, such as. • Interlocking management or ownership; • Identity of interests among family members; • Shared facilities and equipment; • Common use of employees; • A QS holder or employee takes the leading role in establishing an entity that will hold QS. • If one QS holder has the right to preclude another holder of QS from engaging in other business activities; • If QS holders use the same law firm, accounting firm, share office space, phones, administrative support, etc. • If a QS holder provides start up capital for another QS holder on a less than arms length basis; • If a QS holder has the right to inspect the books and records of another QS holder; • If one QS holder uses the same insurance agent, law firm, accounting firm, or broker of any other QS holder with whom the former has entered into a mortgage, long-term or exclusive sales or marketing agreement, unsecured loan agreement, or management agreement; • A business entity organized after the decertification, suspension, or proposed decertification of another business entity that has the same management, ownership, or principal employees.	Indicators of Control Relationships Control may be deemed to exist if an individual, corporation, or other business concern has any of the following relationships or forms of control over another individual, corporation, or other business concern: • Control over a large portion of the voting stock; • Has the authority to direct the business of the entity which owns a fishing vessel or processor; • Has the authority to limit the actions of or to replace the chief executive officer, a majority of the board of directors, or any person serving in a management capacity of an entity that holds a large interest in a fishing vessel or processor; • Provisions that require consent of a minority shareholder to sell all or a substantial part of the assets, to enter into a different business, to contract with the major investors or to guarantee the obligations of majority investors; • Has the authority to direct the transfer, operation, or manning of a fishing vessel or processor; • Has the authority to control the management of and entity that owns a large interest in a fishing vessel or processor; • Absorbs all the costs and normal business risks associated with ownership and operation of a fishing vessel or processor; • Has the responsibility to procure insurance on a fishing vessel or processor, or assumes any liability in excess of insurance coverage; • Has the ability through any other means whatsoever to control the entity that controls a large interest in a fishing vessel or a processor.

Conclusion

In summary, the PFMC should authorize full initial allocation and require divestiture as the transition mechanism to bring QS holders into compliance with control caps. This approach is fair and equitable and is consistent with the MSFCMA and supports the goals and objectives of the West Coast Groundfish Fishery Management Plan and Amendment 20. Implementation of control limits upon initial allocation is not only inconsistent with these requirements; it is also fraught with practical problems.

The benefits of divestiture are:

- Individuals will be allowed to recoup their investment in the fishery and will not have catch shares expropriated.
- The likelihood of challenges to the rationalization program based on an inequitable application of QS caps will be reduced.

- Fishing communities will have time to organize, find financing, and purchase quota in the amounts necessary to preserve their access to the resource.

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[1] **How is "grandfather clause" defined?** As described in the November 2008 Decision Document: "This clause allows a person, if initially allocated QS in amounts in excess of the cap, to maintain ownership of the QS. The grandfather clause will expire with a *change in ownership* [emphasis added] of the QS. If the owner divests some of the QS, the owner may not reacquire QS or QP until the owner is under the cap. Once under the cap, the grandfather clause expires and additional QS or QP may be acquired but not in excess of the control caps." "Change in ownership is defined as follows: "For the purpose of the grandfather clause, ownership of a legal entity is defined to change with the addition of a new member to the corporation, partnership or other legal entity. Members may leave without causing the grandfather clause to expire for that entity." Interestingly, the grandfather provision considered in November 2008 appears only to consider control through ownership as an ownership change that would trigger the end of grandfather protection. It is unclear whether grandfathering would apply to relationships that result in "control by other means." This may seem to suggest that divestiture is a significantly clearer and effective approach to initial allocation as it could be applied to excess QS an individual owns <u>or</u> controls.

[2] **Control limits in the April 2009 description of preferred alternatives.**

Council Preferred Trawl Rationalization Programs

Table 2. Control and vessel limit options: Council **preliminary preferred alternative** for overfished species and halibut, **preferred alternative** for all other species (from March 2009).

	Preliminary Preferred (overfished species and halibut) and Preferred Alternative (all other species)	
Species Category	**Vessel Limit ***	**Control Lim**
Nonwhiting Groundfish Species	3.2%	2.7%
Lingcod - coastwide	3.2%	2.5%
Pacific Cod	20.0%	12.0%
Pacific whiting (shoreside)	15.0%	10.0%
Pacific whiting (mothership)	30.0%	20.0%
Sablefish		
N. of 36° (Monterey north)	4.5%	3.0%
S. of 36° (Conception area)	15.0%	10.0%
PACIFIC OCEAN PERCH*	5.0%	3.3%*
WIDOW ROCKFISH*	3.8%	2.5%*
CANARY ROCKFISH*	7.8%	5.2%*
Chilipepper Rockfish	15.0%	10.0%
BOCACCIO**	10.0%	7.5%**
Splitnose Rockfish	15.0%	10.0%
Yellowtail Rockfish	7.5%	5.0%
Shortspine Thornyhead		
N. of 34°27'	9.0%	6.0%
S. of 34°27'	9.0%	6.0%
Longspine Thornyhead		
N. of 34°27'	9.0%	6.0%
COWCOD**	10.0%	10%**
DARKBLOTCHED*	3.0%	2%*
YELLOWEYE**	3.9%	2.6%**
Minor Rockfish North		
Shelf Species	7.5%	5.0%
Slope Species	7.5%	5.0%
Minor Rockfish South		
Shelf Species	13.5%	9.0%
Slope Species	9.0%	6.0%
Dover sole	3.9%	2.6%
English Sole	7.5%	5.0%
Petrale Sole	4.5%	3.0%
Arrowtooth Flounder	20.0%	10.0%
Starry Flounder	20.0%	10.0%
Other Flatfish	15.0%	10.0%
Other Fish	7.5%	5.0%
Pacific Halibut***		
Min	1.5%	1.0%
Max	10.0%	8.0%

* These overfished species control limits are to be set at the maximum initial allocation to a permit. These percentages are based on preliminary estimates of those values.

** Because the maximum initial allocation for these overfished species were so high, the control limits were set at one half the maximum initial allocations. These percentages are based on preliminary estimates of those values.

*** Halibut IBQ

- Analyze a control limit range for quota share from 1-8%
- Analyze a vessel usage limit equal to control, up to 1.5 times control with a maximum of 10%

Trawl Rationalization 22 April 2009

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APPLICATION FOR TRANSFER OF QS/IFQ

U.S. Dept. of Commerce/NOAA
National Marine Fisheries Service (NMFS)
Restricted Access Management (RAM)
P.O. Box 21668
Juneau, AK 99802-1668
(800) 304-4846 toll free, (907) 586-7202 in Juneau
(907) 586-7354 fax

NOTE: A separate application must be submitted for each Quota Share (QS) or IFQ Transfer.
If you want to do a self sweep-up, please use the self sweep-up form.

BLOCK A – TEC

Does the Transferee (Buyer) hold a Transfer Eligibility Certificate (TEC)? ☐ YES ☐ NO

BLOCK B – CHECKLIST

USE THIS LIST TO ENSURE YOUR APPLICATION IS COMPLETE. INCOMPLETE APPLICATIONS WILL NOT BE PROCESSED. NOTE: Faxed Applications Are Not Acceptable. Please Submit Originals.

☐ Completed, signed, and notarized application
☐ Copy of signed & notarized sales
☐ Documentation for Authorized Agent (if applicable)
☐ Transfer of IFQ (Category "A" Shares, Surviving Spouse Lease): Copy of permit

BLOCK C - TRANSFEROR (SELLER)

1. Name:	2. NMFS Person ID:	
	3. Date of Birth:	
4. Permanent Business Mailing Address:	5. Temporary Business Mailing Address (see instructions):	
6. Business Telephone No.:	7. Business Fax No.:	8. E-mail Address (if available):

BLOCK D - TRANSFEREE (BUYER)

1. Name:	2. NMFS Person ID:	
	3. Date of Birth:	
4. Permanent Business Mailing Address:	5. Temporary Business Mailing Address (see instructions):	
6. Business Telephone No.:	7. Business Fax No.:	8. E-mail address (if available):

BLOCK E - QUESTIONS FOR TRANSFEREE (BUYER)

1. Do you request that this QS be included in a **sweep up**, if possible? ☐ YES ☐ NO

2. If YES, list the Group I.D. on the QS Holder Summary Report into which this new piece should be combined:

____

3. If this is Catcher Vessel CDQ Compensation QS and the vessel category has never been declared, check the one Catcher Vessel Category in which you would like to have your QS issued.

Length Overall:	☐ 0' to 35'	☐ 36' to 60'	☐ greater than 60'
Vessel Category:	☐ D	☐ C	☐ B

BLOCK F - IDENTIFICATION OF QS AND IFQ TO BE TRANSFERRED

Complete Block F if QS and IFQ are to be transferred together or if you want to transfer QS only.

1. ☐ Halibut or ☐ Sablefish	2. IFQ Regulatory Area:

3. Vessel Category:	4. Number of QS Units to be Transferred:	5. Transferor (Seller) IFQ Permit Number:

6. Numbered To and From (Serial Numbers are shown on the QS Holder Summary Report):

7. Do you want all remaining pounds for the current fishing year transferred? ☐ Yes ☐ No

If **no**, specify the number of pounds to be transferred: ____________________

-Pounds transferred includes a pro-rata share of any overage based on the QS units held or transferred and is non-negotiable.
-Pounds transferred includes a pro-rata share of any underage based on the QS held and transferred UNLESS OTHERWISE INSTRUCTED

BLOCK G - TRANSFER OF IFQ ONLY

Complete this Block if you want to Transfer IFQ Only (Applies only to Category "A" & Surviving Spouse IFQ)

1. ☐ Halibut or ☐ Sablefish	2. IFQ Regulatory Area:	3. Number of Units:

4. Numbered To and From (Serial Numbers are shown on the QS Holder Summary Report):

5. Actual Number of IFQ Pounds:	6. Transferor (Seller) IFQ Permit No.	7. Fishing Year: 20________

REQUIRED SUPPLEMENTAL INFORMATION
YOUR APPLICATION WILL NOT BE PROCESSED UNLESS YOU PROVIDE THE FOLLOWING INFORMATION

BLOCK H - TO BE COMPLETED BY THE TRANSFEROR

1. Give the price per pound (including leases) $ _________________ / # IFQ (Price divided by IFQ pounds) Including fees
   Give the price per unit of QS $ _________________ / Unit of QS (Price divided by QS Units)

2. What is the **total amount** being paid for the QS/IFQ in this transaction, including all fees? ______________________________

3. What are your reasons for transferring the QS/IFQ? (check all that apply)
   - ☐ Retirement from Fisheries
   - ☐ Shares Too Small to Fish
   - ☐ Consolidation of Shares
   - ☐ Pursue Non-Fishing Activities
   - ☐ Trading Shares
   - ☐ Other (explain)
   - ☐ Health Problems
   - ☐ Enter other Fisheries

4. Is there a broker being used for this transaction? ☐ Yes ☐ No

   If **yes**, how much is being paid in brokerage fees? $ ________________________ or _________________ % of total price.

BLOCK I - TO BE COMPLETED BY THE TRANSFEREE

1. Will the QS/IFQ being purchased have a lien attached? ☐ Yes ☐ No

   If yes, name of lien holder____

2. What is the primary source of financing for this transfer (*check one*)?
   - ☐ Received as a Gift
   - ☐ Personal Resources (cash)
   - ☐ AK Com. Fish & Ag. Bank
   - ☐ NMFS Loan Program
   - ☐ Private Bank/Credit Union
   - ☐ Transferor/Seller
   - ☐ Processor/Fishing Company
   - ☐ Alaska Dept. Of Commerce
   - ☐ Other (explain): ____

3. How was the QS/IFQ located (*check all that apply*)?
   - ☐ Relative
   - ☐ Advertisement / Public Notice
   - ☐ Broker
   - ☐ Personal Friend
   - ☐ Other (explain): ____

4. What is the Buyer's relationship to the QS/IFQ Holder (*check all that apply*)?
   - ☐ Unrelated
   - ☐ Family Member
   - ☐ Business Partner
   - ☐ Friend
   - ☐ Other (explain): ____

5. Is there an agreement to return the QS or IFQ to the Transferor (seller), or any other person, or a condition placed on resale?
   ☐ Yes ☐ No

   If **yes**, please explain: ____

NOTE:* This Application for Transfer must be completed, signed, and notarized by both parties. Failure to have signatures properly notarized will result in delays in the processing of this application.** ***BLOCK J - TRANSFEROR (SELLER)

Under penalties of perjury, I declare that I have examined this application, and to the best of my knowledge and belief, the information presented here is true, correct, and complete.

1. Signature of Transferor (Seller) or Authorized Agent:	2. Date:
3. Printed Name Transferor (Seller) or Authorized Agent **Note:** If this is completed by an agent, attach authorization:	
4. Notary Public Signature: **ATTEST**	5. Affix Notary Stamp or Seal Here:
6. Commission Expires:	

BLOCK K - TRANSFEREE (BUYER)

Under penalties of perjury, I declare that I have examined this application, and to the best of my knowledge and belief, the information presented here is true, correct, and complete.

1. Signature Transferee (Buyer) or Authorized Agent:	2. Date:
3. Printed Name Transferee (Buyer) or Authorized Agent **Note:** If this is completed by an agent, attach authorization:	
4. Notary Public Signature: **ATTEST**	5. Affix Notary Stamp or Seal Here:
5. Commission Expires:	

Revised: 02-02-09 OMB Control No. 0648-0272 Expiration Date: 10-31-2011

Instructions

APPLICATION FOR TRANSFER OF QS/IFQ

Submit a separate application for each Quota Share (QS) or Individual Fishing Quota (IFQ) Transfer. If you want to apply for a "self sweep-up," please use the *Self Sweep-Up Form*.

The original application must be submitted — an application sent by fax will **not** be processed.

When completed, mail the original application form to:

NMFS Alaska Region
Restricted Access Management (RAM)
P.O. Box 21668
Juneau, AK 99802-1668

or deliver to:

Room 713, Federal Building
709 West 9th Street

Please allow at least ten working days for your application to be processed. Items will be sent by first class mail, unless you provide alternate instructions ***and*** include a prepaid mailer with appropriate postage or corporate account number for express delivery.

If you need assistance in completing this application or need additional information, call Restricted Access Management at **(800) 304-4846 (#2)** or **(907) 586-7202 (#2)**.

Note: It is important that all blocks are completed and all necessary documents are attached. Failure to answer any of the questions, provide attachments, or to have signatures notarized could result in delays in the processing of your application.

BLOCK A -- TEC

Any person that received QS/IFQ as an Initial Issuee or that holds a Transfer Eligibility Certificate (TEC) is eligible to receive QS/IFQ by transfer.

BLOCK B -- CHECKLIST

Use this list as a guide to make sure you have included all the necessary items in the mailing of your application. This will ensure timely processing of your transfer application. If you have lost your original QS certificate, you will need to complete an Application for Replacement of Certificates, Cards, or Permits.

BLOCK C -- TRANSFEROR (SELLER)

1. Name: Full name as it appears on QS Holder Summary Report and/or TEC.
2. NMFS Person ID: As found on QS Holder Summary Report or TEC.
3. Date of Birth.
4. Permanent Business Mailing Address: Include street or P.O. Box number, city, state, and zip code.
5. Temporary Business Mailing Address: Address you want the transfer documentation sent if somewhere other than to the permanent address. Include street or P.O. Box number, city, state, and zip code.

6-8. Business Telephone No., Business Fax No., and Business E-mail address (if available): Include the area codes.

BLOCK D -- TRANSFEREE (BUYER)

1. Name: Full name as it appears on QS Holder Summary Report and/or TEC.
2. NMFS Person ID: As found on QS Holder Summary Report or TEC.
3. Date of Birth.

4. Permanent Business Mailing Address: Include street or P.O. Box number, city, state, and zip code.

5. Temporary Business Mailing Address: Address you want the transfer documentation sent if somewhere other than to the permanent address. Include street or P.O. Box number, city, state, and zip code.

6-8. Business Telephone Number., Fax Number., and e-mail address (if available): Include the area codes.

BLOCK E - QUESTIONS FOR TRANSFEREE (BUYER)

1. Indicate if you wish to combine ("sweep up") the transferred block together with a block you already hold. Blocked QS's may be swept up into one block if the total amount of QS being combined is less than or equal to the following amounts of QS units per area.

Halibut		**Sablefish**	
Area	**Units**	**Area**	**Units**
2C	33,320	SE	33,270
3A	46,520	WY	43,390
3B	44,193	CG	46,055
4A	22,947	WG	48,410
4B	15,087	AI	99,210
4C	30,930	BS	91,275
4D	26,082		

2. Group I.D number to be swept up.

3. If this is a transfer of Catcher Vessel CDQ compensation QS, there is a **one time** opportunity at the time of the first transfer to **permanently** designate the catcher vessel category of the QS being transferred.

BLOCK F - IDENTIFICATION OF QS AND IFQ TO BE TRANSFERRED

This block should only be completed if you are transferring QS and the IFQ resulting from these shares. Persons wishing to transfer IFQ only (Category "A" shares, lease), should fill out Block G.

1. Species: halibut or sablefish.

2. IFQ Regulatory Area.

3. Vessel Category.

4. Number of units to be transferred.

5. Transferor (seller) IFQ permit number.

6. Starting and ending serial number of shares to be transferred [For example, **H-2C-C-B-123,456** THROUGH **H-2C-C-B-789,493**]

7. A **specific number of pounds** must be indicated for each transfer. A pro-rata amount of IFQ **(overage pounds)** will be debited from any IFQ transferred based on the QS unit held or transferred. The current QS holder may retain **underage pounds**. However, unless otherwise specified, the underage associated with the QS will be transferred. Please indicate your specific intention.

BLOCK G - TRANSFER OF IFQ ONLY

This box should be completed if IFQ pounds only are being transferred (leased) and the QS will remain with the current holder of those shares. Only Category "A" or those shares received as a Surviving Spouse under the provisions in 50 CFR 679 may be transferred in this manner.

1. Species: halibut or sablefish.

2. IFQ Regulatory Area.

3 Number of units to be transferred.

4. Starting serial number of shares to be transferred to the ending serial number of shares to be transferred.

5. Specific number of pounds being transferred.

6. Transferor's (seller's) IFQ permit number.

7. The fishing year is the current year or year in which IFQ should be transferred. A transfer of IFQ only cannot be completed until the IFQ has been awarded for that year.

BLOCK H - REQUIRED SUPPLEMENTAL INFORMATION (Completed by Transferor)

1. The price per pound of IFQ must be entered, including IFQs **only** "leased". (To derive the number of dollars per unit of QS or pound of IFQ, divide the total amount paid, including fees, by the number of QS units **or** the number of IFQ pounds being transferred.)
2. The total amount entered should include **any and all** monies collected on behalf of the seller for the shares involved, including any fees that will be paid out to other parties for the expenses of brokering or assisting in the sale of these shares.
3. Please check all boxes that apply to this transaction.
4. Are you paying a third party to assist with this transaction? If **No**, go to question #2. If **Yes**, put the total price paid to the broker or calculate how much was paid to the third party as a percentage of the total sale price. (The percentage can be derived by using this formula: divide the brokerage fee by the total price paid for the QS/IFQ, then multiply the result by 100.)

BLOCK I - REQUIRED SUPPLEMENTAL INFORMATION (Completed by Transferee)

1. Indicate if the QS will be used as collateral. List the name of entity or person(s) who will hold the Security interest lien. This name will appear on the QS Certificate.

2-4. Please check any and all boxes that apply to this transaction.

5. Regulations governing the IFQ program do not permit transfer of QS subject to any conditions of repossession or resale to the transferor except by court order, operation of law, or security agreement.

BLOCKS J & K
CERTIFICATION OF TRANSFEROR, TRANSFEREE, AND NOTARY PUBLIC

- Sign and print your name and date the application in the presence of a Notary Public. Application forms submitted to RAM must bear the **original signatures** of the parties — **RAM will not process faxed applications**.
- Representatives signing for a Transferor or Transferee must submit proof of authorization to submit this application on their behalf.
- A Notary Public must Attest and affix Notary Stamp. The Notary Public cannot be the person(s) submitting this application.

PUBLIC REPORTING BURDEN STATEMENT

Public reporting for this collection of information is estimated to average 2.0 hours per response, including the time for reviewing the instructions, searching the existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Assistant Regional Administrator, Sustainable Fisheries Division, NOAA National Marine Fisheries Service, P.O. Box 21668, Juneau, AK 99802-1668.

ADDITIONAL INFORMATION

Before completing this form please note the following: 1) Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information, subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number; 2) This information is mandatory and is required to manage commercial fishing efforts under 50 CFR part 679 and under section 402(a) of the Magnuson-Stevens Act (16 U.S.C. 1801, *et seq*.); 3) Responses to this information request are confidential under section 104(b) of the Magnuson-Stevens Act as amended in 2006. They are also confidential under NOAA Administrative Order 216-100, which sets forth procedures to protect confidentiality of fishery statistics.

Appendix A-2

Revised: 10-27-08 OMB Control No. 0648-0272 Expiration Date: 10-31-2011

QUOTA SHARE (QS) HOLDER: IDENTIFICATION OF OWNERSHIP INTEREST

U.S. Dept. of Commerce/NOAA
National Marine Fisheries Service (NMFS)
Restricted Access Management (RAM)
P.O. Box 21668
Juneau, AK 99802-1668

BLOCK A -- IDENTIFICATION OF QUOTA SHARE HOLDER

1. Name of QS holder: ____

2. Is this business a publicly held corporation? ☐ Yes ☐ No

   If yes, proceed to Block C.

3. Is this a corporation, association, or partnership? ☐ Yes ☐ No

   If yes, is this entity still active? ☐ Yes ☐ No

4. Is this an estate that has been probated? ☐ Yes ☐ No

   If yes, on what date was probate finalized: ____________________

BLOCK B - - IDENTIFICATION OF MEMBERS
SHAREHOLDERS, PARTNERS, JOINT VENTURERS, SUCCESSOR-IN-INTERESTS

NOTE: if ownership consists of separate/additional corporations or partnerships the individual owners of those entities and the percentage of interest those individuals hold in their respective corporations or partnerships must also be listed.

Name	% Interest Held

Do these ownership percentages represent the addition of any new owners since QS was initially issued?

☐ YES ☐ NO

TOTAL OWNERSHIP:	**100 %**

BLOCK C – CERTIFICATION	
Under penalty of perjury, I declare that I have examined this form, and to the best of my knowledge and belief, the information I have presented here is true, correct, and complete.	
1. Signature	2. Date
3. Printed Name	4. Title
5. Signature of Notary Public	6. Affix Notary Stamp or Seal Below
7. Commission Expires:	

PUBLIC REPORTING BURDEN STATEMENT

Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Assistant Regional Administrator, Sustainable Fisheries Division, NOAA National Marine Fisheries Service, P.O. Box 21668, Juneau, AK 99802.

ADDITIONAL INFORMATION

Before completing this form please note the following: 1) Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number; 2) This information is mandatory and is required to manage commercial fishing efforts under 50 CFR part 679 and under section 402(a) of the Magnuson-Stevens Act (16 U.S.C. 1801, *et seq.*); 3) Responses to this information request are confidential under section 402(b) of the Magnuson-Stevens Act as amended in 2006. They are also confidential under NOAA Administrative Order 216-100, which sets forth procedures to protect confidentiality of fishery statistics.

Instructions

QS HOLDER: IDENTIFICATION OF OWNERSHIP INTEREST

This form must be submitted by corporations, partnerships, associations, and other non-individual entities that hold quota share (QS) under the Pacific halibut and sablefish Individual Fishing Quota (IFQ) Program (50 CFR part 679).

Please type or print legibly in ink; you may photocopy and attach additional sheets as necessary. Please sign in ink, have your signature notarized, retain a copy for your records.

When complete, mail the original form to:

NMFS Alaska Region,
Restricted Access Management (RAM),
P.O. Box 21668,
Juneau, AK 99802-1668.

or deliver to:

Room 713, Federal Building
709 West 9th Street

For information, contact RAM at 800-304-4846 or 907-586-7202.

GENERAL INFORMATION

The information requested herein is needed by RAM to determine compliance with two IFQ program requirements, including:

1) **Limitations On Use of QS and IFQ.** This information is needed to determine if persons who hold QS have exceeded their allowable use limits under the "individually and collectively" language set out in the IFQ regulations at 50 CFR 679.42(e) and (f); and,

2) **Changes in corporations or partnerships.** This information is also needed to determine if a Corporation or Partnership has changed. Under Sec. 679.42(j)(1) - (4), upon a "change" (i.e., the addition of a new member) to a corporation or partnership that holds catcher vessel QS, the entity may no longer hire a master to fish the IFQ resulting from the QS it holds; further, such an entity must notify NMFS of the change within 15 days of its effective date and must then transfer its QS to a qualified individual.

BLOCK A - IDENTIFICATION OF QS HOLDER

1. Provide name of QS holder.
2. Indicate whether the QS Holder is a publicly held corporation.
   If YES, sign the certification in Block C and return the form to RAM.
3. Indicate whether the QS Holder is a corporation, association, partnership, or other non-individual entity.
   If YES, indicate whether the entity is still active.
   If YES, go to Block "B".
   If NO, sign the certification in Block C and return the form to RAM.
4. Indicate whether the QS Holder is an estate that has been probated. You must answer YES if the non-individual QS Holder is an estate and all estate matters with regard to the disposition of the assets, including QS, have been finalized. Provide the date the estate was settled.

BLOCK B - IDENTIFICATION OF MEMBERS

1. If ownership consists of separate or additional shareholders, partners, joint venturers, successors-in-interest, associations, corporations, partnerships, or other non-individual entities, list the individual owners of those entities and the percentage of interest those individuals hold in their respective entities.
2. Enter the percentage of ownership interest that each constituent member holds; for example, if there are three equal owners, enter "33-1/3" for each. The total interest of all members should equal 100 percent.
3. Indicate whether the ownership percentages represent the addition of any new owners since QS initially was issued. If any of the owners listed have been added since QS were issued, you must answer "yes".

BLOCK C - CERTIFICATION

1-3. Sign and date the application in the presence of Notary Public, and print your name.

4. Authorized representatives must submit proof of authorization from QS owner and state title.

5-7. Signature, commission expiration date, and stamp of notary public. Not to be completed by the person submitting this application.

Motion 1: Accumulation Limits (passed as amended)

1. Confirm the Control and Vessel Limits for all non-overfished species consistent with the preliminary preferred option, as specified in Agenda Item E.11.a, Attachment 1, Table 1 on page 2.

2. Adopt Control Limits for all overfished species consistent with Table F of Agenda Item E.11.b, GMT Report (page 21). Set Vessel Limits equal to the Control Limits. Permit owners may replenish their vessel accounts back to the Control/Vessel Limit, as quota pounds are used. Vessel accounts will be subject to an annual Cumulative Usage Limit set equal to the Vessel Limit percentages identified in Table F (page 21, Agenda Item E.11.b, GMT Report). If widow rockfish is declared rebuilt before initial allocation of QS, set the Vessel Limit equal to 1.5 times the Control Limit.

   Amendment: Adopt a bocaccio control limit of 13.2% and a cumulative usage limit of 15.4%; for cowcod- a control limit and a cumulative usage limit of 17.7%. (passed)

3. For Pacific halibut, adopt a Control Limit of 5.4% and a Vessel Limit equal to the Control Limit. Allow quota pound holders to replenish their vessel accounts up to the vessel limit, as quota pounds are used. Vessel accounts will also be subject to an annual Cumulative Usage Limit of 14%.

4. The Council ~~will~~ may revisit vessel Cumulative Usage Limits for overfished species and Pacific halibut in the first biennial specifications process after implementation of the trawl rationalization program. (amendment passed)

Motion 2: QP Transfers (passed)

QP transfers be allowed only from the QS holder to vessels and from one vessel to another.

PFMC
06/18/09

Agenda Item E.11.d
Supplemental Motion in Writing (CDFG)
June 2009

Divestiture Motion:

1. Divestiture of non-overfished species quota shares in excess of adopted control limits will be an element of the PFMC's Trawl Rationalization Program.
2. The date through which permit acquisition will be qualified is November 8, 2008. Permits acquired after that date, and the attending catch history, will not be used in calculating a permit holder's quota share (on a species or aggregate basis). This qualifying date only applies to the amount of quota shares above the control limit.
3. The permit holder will be allowed to utilize all of the quota pounds associated with their permits until divestiture is completed.
4. Quota share holders have full flexibility of divesting excess quota shares as long as they follow quota share transfer rules and procedures developed by NMFS for this Trawl Rationalization Program.
5. Divestiture will not require or limit the transfer of a LE trawl permit.
6. The divestiture period is defined as a 24 month period (two years) immediately following the end of the moratorium on quota share transfer.
7. Full divestiture must be completed, and quota share control limits (on a species or aggregate basis) attained by December 31 of the fourth year after implementation of the program.
8. Any quota shares not fully divested by the above date will be revoked and re-distributed on a pro-rata basis to the rest of the shoreside trawl fleet. No compensation will accrue to the divesting quota share holder for any revoked shares.
9. For divestiture purposes, those in excess of control caps are held to the control limits even if those limits happen to change after year one of the program.

Side by side comparison of options on the table leading up to today's action.

Table. Overfished species control limit options leading up to today.			
	GAP From March 2009* (Maximum Initial Allocation to a Permit)	Council Preliminary Preferred Alternative	GMT Recommendation, (Maximum Initial Allocation to An Entity)
POP	2.80	3.3	4.03
Widow	1.86	2.5	5.06
Canary	3.17	5.2	4.39
Bocaccio	13.22	7.5	13.22
Cowcod	17.71	10.0	17.71
Darkblotched	1.71	2.0	4.48
Yelloweye	4.67	2.6	5.67

* Updated based on the general direction to set at "maximum initial allocation to a permit.

Agenda Item E.12
Situation Summary
June 2009

FMP AMENDMENT 20 – TRAWL RATIONALIZATION—FINAL ACTION ON ADAPTIVE MANAGEMENT PROGRAM

The Adaptive Management Program (AMP) is one of the trailing actions of trawl rationalization scheduled to be completed at this meeting. At the April Council meeting, the Council preliminarily adopted a set of goals and objectives and specified the use of a formulaic approach to allocating AMP quota pounds (Agenda Item E.12.a, Attachment 1). The preliminary motion specified that the details of the AMP during years three through five would be decided during the first two years of the trawl rationalization program. For the first two years of the rationalization program the Council forwarded two options to be decided at this meeting. One option is described as a "pass through" and would effectively call for no AMP during the first two years of the program. The second option tasked the Groundfish Management Team (GMT) with developing a simple formulaic approach that could be implemented during the first two years of the program. The GMT's response to that direction is attached as Agenda Item E.12.b, GMT Report.

At the May meeting of the Groundfish Allocation Committee (GAC), the GAC considered the GMT report on AMP and voted to recommend that the year one and two pass through option be adopted by the Council. The May GAC report is found at Agenda Item E.11.b, GAC Report. The relevant section of that report is included here as Agenda Item E.12.a, Attachment 1. The Council's task under this agenda item is to specify whether a "pass through" option will be used during the first two years of a trawl rationalization program, or whether a simple formulaic approach will be adopted during years one and two.

Council Task:

1. Confirm or modify the year three through five adaptive management program approach as specified in the April motion.
2. Adopt a year one and two adaptive management program approach or specify the use of a "pass through" for years one and two of the trawl rationalization program.

Reference Materials:

1. Agenda Item E.12.a, Attachment 1: April 2009 Supplemental Motion in Writing.
2. Agenda Item E.12.a, Attachment 2: GAC Report Excerpts.
3. Agenda Item E.12.b, GMT Report.
4. Agenda Item E.12.c, Public Comment.

Agenda Order:

a. Agenda Item Overview — Merrick Burden
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Final Preferred Alternative

PFMC
05/29/09

Agenda Item E.12.a
Attachment 1
June 2009

Move the Council preliminarily adopt the following motion to be finalized in June 2009:

Amendment 1 (passed): Include a non-pass through option under methods for allocating AMP QP to be used in the first or second year (include all objectives).

Main motion passed as amended.

Program goals and objectives	▪ Community stability ▪ Processor stability ▪ Conservation ▪ Unintended/unforeseen consequences of TIQ program ▪ Facilitate new entrants (both processors and harvesters)	
	First 2 years of TIQ program	**Year 3-5 of TIQ program**
Method for allocating AMP quota pounds	Pass-Through For first two years AMP quota pounds will be distributed consistent with initial distribution of TIQ quota pounds. During this period, Council staff will work with states to determine details of the formula for determining community and processor eligibility, as well as methods for allocation consistent with additional goals.	Formulaic Quota pounds distributed consistent with the formulas developed during the first two years.
Decision making organizational structure	Pass-Through (see above) Options to consider after year 2: NMFS State → Council →NMFS Council →NMFS	Based on selection of option.
Division of AMP quota pounds	Pass-Through (see above) During first two years, consider division of quota pounds among the states for application in year 3. Additional considerations to be determined.	Allocate based on Council action relative to division of AMP quota pounds.
AMP quota pound duration	N/A Analyze a program using a quota pound duration of variable number of years.	3 years, then determined through the 5 year TIQ program review.
Program review	N/A	Initial program review at year 5 as part of the comprehensive review of the TIQ program.
Program duration	N/A	Analyze a range of program sunset dates as part of the 5 year TIQ program review, 10, 15, 20 years, including an option of no sunset.

[Note: This paragraph is taken from the May 2009 Groundfish Allocation Committee report. The main report can be found under Agenda Item E.10]

Adaptive Management Program (AMP)

The GAC recommends the Council treat AMP as a pass through in the first two years of the trawl rationalization program.

Rationale: Having a pass through for the first two years of the program would allow the Council to better understand the effects of the rationalization program and structure an AMP more appropriately after that two year period. Furthermore, implementing a non-pass through option in the first two years of the rationalization program would create additional complexity and administration that may not be feasible given the implementation burden of the broader program during the first two years.

The GAC asked for the GMT further discuss "buffers," holdback concepts for AMP, and the carryover provision and develop recommendations for the Council. Additionally, the GAC acknowledged that buffers and the carryover provision should be brought up during Amendment 23 (Annual Catch Limits) discussions.

GROUNDFISH MANAGEMENT TEAM (GMT) AND COUNCIL STAFF REPORT TO THE GROUNDFISH ALLOCATION COMMITTEE ON FORMULA-BASED USES OF THE ADAPTIVE MANAGEMENT SET ASIDE

I. Introduction

This report addresses a request from the Council to the Groundfish Management Team (GMT) for guidance on the design and implementation of an adaptive management program (AMP) made at the April 2009 meeting. The principal question before the Groundfish Allocation Committee (GAC) is whether to pursue a formula-based AMP for years 1 and 2 of the trawl individual fishing quota (IFQ or TIQ) program or to postpone implementation until year 3.

A. Brief Summary of the Council's Consideration

In November 2008 the Council recommended converting management of the shoreside whiting and non-whiting bottom trawl fisheries to a combined IFQ program. The Council's November 2008 motion on the matter also included the following language:

> It is the intent of the Council to have an adaptive management program for the shoreside non-whiting sector. . . Further details will be developed through a trailing action with the

intent of having the adaptive management provisions apply during the first year of implementation of the trawl rationalization program.[1]

At the GAC meeting in January 2009, the National Marine Fisheries Service (NMFS) informed the GAC that the agency did not believe it was possible or necessary to complete the trailing action in time for the start of the TIQ program. During the Council's consideration of the issue in April, NMFS reiterated concerns about the potential administrative complexity of the AMP and offered a motion to allocate the 10% set-aside to permit holders pro-rata to the allocation of quota share (QS) for the first two years of the program. In effect, this "pass-through" approach would allocate 100% of the quota pounds (QP) in both years 1 and 2 of the TIQ fishery based on QS holdings. The AMP would then switch to a formula-based program in year 3.

The Council amended the NMFS motion to add an AMP option for the first 2 years of the TIQ fishery and requested that the GMT and Council staff identify formulaic approaches to address the various objectives of the AMP for consideration by the GAC and its advisors at this meeting.

B. Brief Background on the Adaptive Management Program

The Council's groundfish IFQ program is essentially a "cap and trade" program designed to create individual accountability for total catch and improve harvesting efficiency in the shoreside non-whiting and whiting trawl fisheries. At the same time, these improvements will come with tradeoffs to some of the Council's other management objectives. In particular, the Trawl Rationalization DEIS estimates that the non-whiting fleet will consolidate from 100-120 vessels participating annually down to 40-60 vessels. This, in turn, may cause geographic shifts in landings and adverse impacts to some businesses and fishing communities with historical participation in the fishery.[2]

The Council has long recognized these potential tradeoffs and has been considering the AMP as a major tool for addressing those tradeoffs. In November 2008 the Council recommended setting aside up to 10% of the QS for use in the AMP. The AMP goals and objectives specified in the Council's April 2009 motion include:

- Community stability
- Processor stability
- Conservation
- Unintended/unforeseen consequences of the TIQ program

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[1] November 2008 Briefing Book, Agenda Item F.3.i, Supplemental WDFW Motion Package 1 (As Amended) (www.pcouncil.org/bb/2008/bb1108.html).

[2] *See, e.g.*, sec. 4.6.2.1 (p. 304) and sec. 4.9.2.2 (p. 410) \in Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery; Preliminary Draft Environmental Impact Statement, October 2008 ("Trawl Rationalization DEIS or Decision Document") (www.pcouncil.org/groundfish/gffmp/gfa20/gfa20decdoc.html).

- Facilitate new entrants (both processors and harvesters).[3]

The Council also recognizes that the objectives for the AMP could differ regionally because of different local priorities and impacts of the TIQ program. For this reason the Council's November 2008 motion envisioned that the AMP would be run through "separate, but parallel processes in each of the three states."

II. General Policy Considerations for Year 1 of the TIQ program

A. Formula-Based Adaptive Management – Year 1 or Year 3?

The April 2009 GMT statement highlighted a basic difference between proactive and reactive approaches to the AMP. Given that the fundamental policy decision before the GAC is a question of when to apply a formula-based approach—that is in year 1 or year 3 of the TIQ program—the policy considerations appear different. The GMT did not spend much time discussing and framing the issue; yet in essence, those advocating waiting until year 3 might believe that there is not much cost in waiting, or alternatively, some unacceptable cost to implementing the AMP in year 1 (e.g., a potential delay in implementation of the full TIQ program). In contrast, those advocating implementing AMP in year 1 might believe that there could be considerable cost to not acting in year 1, and perhaps at the same time, not much benefit to waiting to year 3 if there isn't much more to be learned (by year 2) that would aid in the design of a formula option.

Either way, the question of which formula-based approaches could be implemented, and what it would take to implement them, is a fundamental consideration. To address the Council's request, we focused on identifying formula-based options that could be employed without (i) requiring extensive Council consideration, or, (ii) creating burdensome implementation tasks, and (iii) extra tracking and monitoring requirements for NMFS. For each formula discussed below, we attempted to explicitly address these three factors by identifying Council decision points, NMFS implementation steps, and tracking and monitoring needs.

Lastly, we made an effort to identify a formula-based approach for each of the AMP objectives identified in the Council's motion. In doing so, we relied heavily on ideas offered through public testimony, including comments presented by the Environmental Defense Fund on a series of stakeholder workshops they held on design of the AMP.[4] Although we considered and treated each objective in isolation, the Council could attempt to address multiple objectives at the same time by designating sub-pools of AMP quota that would apply to the objective-specific formulas.

[3] For more discussion of the different AMP objectives, *see* April 2009 Briefing Book, Agenda Item F.5.b, Supplemental GMT Report (http://www.pcouncil.org/bb/2009/bb0409.html).
[4] See Agenda Item F.5.c, Supplemental Public Comment 2, April 2009 (http://www.pcouncil.org/bb/2009/0409/F5c_SUP_PC2_0409.pdf).

B. Year 1 Allocation Method

With the exception of the processor stability formula, the formula-based AMP options described below would still involve a non-targeted allocation of the AMP quota set aside in year 1 of the TIQ program. The GMT discussed an alternative year 1 allocation approach involving equal sharing of the AMP QP rather than an apportionment pro-rata to QS holdings as per the Council's April motion. In short, this approach would divide the AMP equally among the set of permits that met criteria designed to target non-whiting vessels (e.g., all permits that made at least one non-whiting landing during the 2006-2008 window period).[5]

This equal sharing approach would involve an extra calculation for NMFS at initial allocation. The major benefit potentially offsetting this extra workload would be that smaller operators (i.e., those receiving less initial allocation) would receive more QP than under the pro-rata approach. In addition, if the Council were to adopt one of the formulas that allocate AMP QP in year 2 of the TIQ program based on vessel behavior in year 1, the equal sharing allocation would mean that all participants start from the same AMP QP "baseline." The following table uses a 2010 sablefish (N. of 36° N. latitude) trawl allocation of 3,500 mt to illustrate the difference for three hypothetical permit holders if 100 permits were eligible for equal sharing of the AMP QP.

Table 1. Comparison of Year 1 Allocation of AMP Quota Between Pro-Rata Pass-Through and Equal Sharing Approach.

Vessel	Sablefish (N. of 36° N. lat.) QS allocation	Year 1 QP	Pro Rata AMP QP	Total under Pro Rata	Equal Sharing AMP QP	Total under Equal Sharing	Difference
A	0.040	277,780	30,864	308,644	7,716	285,496	92.5%
B	0.017	118,056	13,117	131,174	7,716	125,772	95.8%
C	0.005	34,722	3,858	38,581	7,716	42,439	110.0%

Note: Based on a hypothetical scenario involving a sablefish (N. of 36° N. lat.) trawl allocation of 3,500 mt and a total of 100 permits qualifying for equal sharing of AMP quota.

[5] In contrast, the equal sharing of buyback history for the initial allocation of QS goes to all permits that pay the buyback tax, which includes the shoreside and mothership sector whiting vessels.

C. Data Sources Available for Alternative Formula-Based Approaches

Since the TIQ tracking and monitoring systems have yet to be designed, it is difficult to know which data sources will be readily available to management at the start of the program. However, the program will continue to have fish tickets and logbooks and will involve increased observer coverage. NMFS will also track QP and QS holdings. From these types of data sources we could track the following:

- Disposition, date, location, and quantity of catch and landings made by a vessel;
- Disposition, date, location, and quantity of purchases made by a buyer;
- Gear type used in prosecuting trawl fishing activities;
- Hours spent fishing; and
- QS and QPs held by entities and vessels over time.

III. Community Stability Formulas

In short, concerns over community stability center on worries regarding fishing communities losing landings and vessels through fleet consolidation. The two formulas described in this section seek to address these concerns by providing vessels with an incentive to continue delivering to their principal ports or to deliver to ports most at risk of losing landings in the first years of the TIQ program.

A. Principal Port Formula

1. <u>Basic Objective</u>

The goal of this formula would be to reduce the potential shift in delivery activity in years 1 and 2 by providing an incentive for harvesters to continue delivering to their "principal port."

2. <u>Outline of Design Elements</u>

A vessel's principal port would be defined by where it made its largest overall tonnage of landings in a year or window period prior to the start of the TIQ program. In year 1 of the program, NMFS would pass-through the AMP quota pro rata to QS or use an equal sharing approach. The year 2 allocation would be based on vessel activity in year 1, thereby providing the incentive from the start of the beginning of the program. In other words, if a vessel's principal port in year 1 is the same as the principal port in the baseline year or window period, then the vessel receives AMP quota in year 2.

The amount of AMP QP the vessel would receive in year 2 of the program would be either: (a) pro-rata to their percentage of coastwide landings in year 1, or, (b) pro-rata to their used and unused QP at the end of year 1, depending on which method is easier to calculate. If a vessel's principal port in year 1 differs from the principal port in the baseline year or window period, then the vessel receives no AMP quota in year 2.

3. Council Decisions Required for Implementation

The Council would need to determine the year or window period in which to define vessels' principal ports. The GMT discussed two time periods for establishing a principal port. One is to use 2010 as the base year for establishing principal ports. If a vessel were to stay with the same principal port in 2011 (the first year of trawl rationalization), then that vessel would receive AMP quota in year two of the trawl rationalization program.

The second option was to use 2004 through 2008 as the time period identifying a vessel's principal port. Using a time period prior to 2009 would prevent speculative movement by a vessel to a different principal port. In other words, if vessel operators know that they will receive AMP quota based on their principal port in 2010, the geographic shifts associated with rationalization might occur prior to the implementation of the rationalization program. However, if a principal port is defined by activity from 2004 to 2008, AMP quota would be awarded based on activities that clearly occur prior to the effect of rationalization.

4. Required Implementation Steps

For year 1, NMFS would only need to pass-through the AMP QP based on a pro rata or equal sharing approach. However, the formula would need to be in regulation by the start of the TIQ program so that vessels would know which port NMFS identified as their principal port.

For year 2, NMFS would need to calculate the set of eligible vessels (i.e., those that maintained their principal port) at the end of the year and then distribute the AMP quota pro-rata sometime during the second fishing year. NMFS doesn't need to allocate the AMP QP on Day 1 of the second year as long as the QP is made available early enough in the year to be useful in a vessel's annual fishing strategy. Allowing some extra time for NMFS to determine eligibility and make the QP distributions should make this year 2 implementation more feasible.

5. Required Data Elements

A vessel's principal port could easily be determined from fish ticket records.

6. Other issues

This same approach could also be taken focusing instead on a vessel's "principal buyer" or "principal port-buyer" combination.[6] The approach focuses on maintaining current vessel relationships and so would not have a beneficial impact for communities where current relationships are insufficient. Some communities have been disadvantaged by status quo management and will be in need of new vessels and landings.

B. At-Risk Ports Formula

1. Basic Objective

The goal of this formula would be to provide an incentive for vessels to land their catch in communities that the Council believes to be at risk of losing significant landings during the early years of the TIQ program.

2. Outline of Design Elements

The Council would establish the incentive by identifying a set of eligible ports or landing regions and then creating AMP quota pools specific to each. The following two tables illustrate this for a hypothetical set of ports/regions and of target species QP and bycatch QP. The percentages in the tables refer to percentages of the total AMP set-aside (which is up to 10% of the total trawl allocation). If the Council chose to set aside the full 10% of sablefish AMP quota, then, in the Table 2 example, they would assign 15% of that 10% (or 1.5% of the total) to all ports/regions except CA Port/Region #3, (which is assigned 1% of the total sablefish QP).

Table 2. Hypothetical Port/Region-Specific Target Species Quota Pools (rows add to 100%; percentages refer to apportionments of the 10% AMP set-aside).

	N. WA	S. WA	OR Port/ Region #1	OR Port/ Region #2	CA Port/ Region #1	CA Port/ Region #2	CA Port/ Region #3
Sablefish	15%	15%	15%	15%	15%	15%	10%
Petrale sole	15%	15%	15%	15%	15%	15%	10%
Dover sole	15%	15%	15%	15%	15%	15%	10%
Shortspine	0%	15%	25%	15%	15%	20%	10%
Longspine	0%	15%	25%	15%	15%	20%	10%
Lingcod	15%	15%	15%	15%	15%	15%	10%
English sole	0%	20%	15%	20%	15%	20%	10%
Pacific cod	100%	0%	0%	0%	0%	0%	0%
Arrowtooth	50%	25%	15%	10%	0%	0%	0%

[6] Buyer codes combine abbreviations for company name and port where the buying activity occurred. Therefore, it should be relatively easy to identify unique port-buyer combinations.

Table 3. Hypothetical Port/Region-Specific Bycatch Species Quota Pools (rows add to 100%; percentages refer to apportionments of the 10% AMP set-aside).

	N. WA	S. WA	OR Port/ Region #1	OR Port/ Region #2	CA Port/ Region #1	CA Port/ Region #2	CA Port/ Region #3
Canary	30%	15%	15%	25%	15%	--	--
Darkblotched	15%	25%	25%	25%	10%	0%	0%
Widow	20%	15%	20%	15%	10%	10%	10%
POP	30%	20%	20%	20%	10%	0%	0%
Halibut IBQ	30%	20%	20%	15%	10%	5%	0%
Yelloweye	35%	10%	10%	35%	5%	5%	0%
Bocaccio	--	--	--	--	--	--	100%
Cowcod	--	--	--	--	--	75%	25%

In this example, the coastwide target species (e.g., Dover sole, petrale sole, and sablefish) are distributed more or less evenly between the three states. Species with a more limited distribution (e.g., Pacific cod) are matched to the port/region in which they occur. Likewise, the bycatch species'quota pools are matched to ports/regions located near high bycatch areas for particular overfished species (e.g., Northern WA and yelloweye rockfish).

With the separate quota pools established, vessels that landed into those ports/regions would become eligible for AMP quota from the pool in year 2. The quota could be distributed to vessels pro rata based on their landings into the port/region at the end of the year, or on a per-landing basis (e.g., for every 1,000 lbs landed a vessel receives 100 lb of AMP QP). In other words, under either method, the year 2 AMP quota allocation would be based on landings activity in year 1. It would also be possible to structure the program around an inseason release of the AMP QP (i.e., late in year 1, based on vessel activity earlier in the year.

3. <u>Council Decisions Required for Implementation</u>

The Council would need to create tables like the ones shown above. Thus the formula would require more consideration by the Council than the Principal Port formula and would involve some equitable division of the AMP set-aside between the states. At the same time, the approach would provide more flexibility to target AMP QP for ports/regions the Council believes to be most at risk of losing landings during the transition to the IFQ program. This approach would also provide flexibility for the states to differ in how they establish an incentive. For example, one state could target AMP quota to a single port or region. On the other side of the spectrum, another state, not wishing to treat its ports differently, could establish a single statewide quota pool.

4. <u>Required Implementation Steps</u>

For year 1, NMFS would pass-through the AMP quota based on the pro rata or equal sharing approach. The agency would also need to publish the rules, including defining the at-risk ports/regions and establishing the specific quota pool tables, no later than early in year 1 of the TIQ program so that vessels are aware of how AMP quota will be distributed in year 2.

For year 2, NMFS would allocate the AMP quota based on the pro-rata or per-landing basis to qualifying vessels.

5. Required Data Elements

The formula could be based on fish ticket data identifying port of landing and total pounds landed. To establish the port/region specific quota pools, the Council could use landings, logbook, and observer data, much of which is already available in the Trawl Rationalization DEIS.

6. Other issues

In contrast to the Principal Port formula, this approach does not depend on maintaining past vessel-port or vessel-buyer relationships. Instead, it is focused on providing vessels with an incentive to land into the ports or regions that are most at risk of losing landings. The approach would thus hinge on the Council's confidence in being able to single out certain ports for this differential treatment (and, alternatively, confidence that some ports would be stable enough in the first two years of the program to exclude them from eligibility). The Trawl Rationalization DEIS does include analysis that could be helpful in this determination. In particular, the DEIS analyzes initial conditions in trawl communities to determine which ports are likely to benefit from rationalization and those that are most at risk. These factors include port infrastructure, efficiency of the existing fleet, amount of initial quota allocation expected to go to that port's fleet, and bycatch rates in the port's fishing grounds.[7] Aligning the AMP quota pools to the most at-risk ports would help mitigate the risk of losing trawl fishing activities in these ports.

This approach seems especially well suited to providing some assistance to ports located near high bycatch areas. Vessels fishing from ports near high bycatch areas may have a more difficult time adjusting to the IFQ program and may be more likely to sell out of the fishery. New vessels may be unwilling to fish from the port because of the risk and potentially high price for bycatch QP. Targeting the AMP bycatch QP to these ports might provide existing vessels with more opportunity to adjust to the IFQ program and also offset some of that risk for new vessels.

IV. Processor Stability Formula[8]

[7] *See*, *e.g.*, sec.4.14.5 (p. 503) of the Trawl Rationalization DEIS.
[8] This section only concerns shoreside processors of groundfish. At-sea processors' concerns were already addressed in the harvest cooperative arrangement made for the at-sea whiting sectors in the trawl rationalization program.

The processor stability objective can be distinguished from the community stability objective in that processor stability is focused on individual business entities. The question of whether to allocate harvesting quota to processors was a major issue during development of the TIQ alternatives. One argument processors made during the debate was that QS would provide them with stability, certainty, and leverage to build relationships with harvesters under the new management regime.[9] The Council chose to allocate 20% of the whiting QS to processors, yet allocated them no non-whiting QS. Some Council members indicated that they would look to the AMP as a tool for addressing processor concerns about the transition to the TIQ fishery.

A. Processing History Formula

1. <u>Basic Objective</u>

This formula would allocate AMP QP directly to processors (defined as the first receiver on a fish ticket) with the goal of providing existing businesses some leverage to negotiate exvessel prices and other delivery conditions with vessels and QS holders.

2. <u>Outline of Design Elements</u>

The allocation formula in year 1 of the TIQ program would be based on a window period (e.g., 2004-2008), with AMP quota allocated pro rata for each IFQ species management unit based on the processor's fraction of coastwide purchases of each species.

The Council could use the same window period to allocate AMP QP in year 2 or transition to a running average of the preceding 3-5 years of processing activity.[10] The running average could easily be extended to year 3 and beyond. A longer running average time period would dampen the immediate effect of shifts in delivery patterns among buyers/processors. For example, should a vessel move to another processor, the original processor would continue to receive a comparable fraction of the AMP quota pounds for several years based on that vessel's landings pattern. This might provide incentive for the vessel to remain with the original processor because that vessel may lose access to the AMP quota if it chooses to leave. A shorter timeframe would better accommodate shifts in the fishery and new entrants into the processing sector while still providing processors with the bargaining advantages provided by the AMP QP.

3. <u>Council Decisions Required for Implementation</u>

For year 1 of the program, the Council would need to identify the allocation formula window period. For year 2, the Council would need to decide whether to use the same window period or

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[9] For more detailed discussion of the issue, *see* sec. A-2.1.1.a (p. A-48) of the Trawl Rationalization DEIS.

[10] The GMT did not spend much time discussing the optimal time period, yet a range of 3-5 years was suggested during public comment.

to switch to a running average. As mentioned above, this formula could be easily extended past year 2 of the program by employing the running average approach.

4. Required Implementation Steps

In year 1, NMFS would need to allocate the AMP quota based on the window period formula, much like the agency will be doing for the whiting QS. The formula's window period might change to a running average yet the implementation steps would be the same in year 2 and beyond.

5. Required Data Elements

This formula would not be data intensive. The first receiver and total pounds on the fish ticket would be enough to determine processors' AMP quota.

6. Other issues

To ease tracking, the AMP quota allocated under this formula would be completely transferable with no restrictions placed upon those entities that receive the quota. Moreover, given that the purpose of this approach would be to provide assistance to specific businesses, it seems appropriate to permit businesses to use QP in a manner they judge most beneficial to their operations. However, the Council could conceivably choose to place conditions on the use of the QP received through this formula, such as restrictions on the location of landing and a requirement that the QP be used only on non-processor-owned vessels. Such requirements would need some method for tracking compliance.

V. Methods for Addressing Unforeseen or Unintended Consequences, Incentivizing Enhanced Conservation Objectives, and Facilitating New Entrants

A. Unforeseen/Unintended Consequences

By definition, addressing unforeseen/unintended consequences is not easily accomplished, or perhaps not even possible, through a formula-based approach. If unforeseen/unintended consequences did occur in year 1, the Council could attempt to address the situation with the year 2 allocation of AMP quota. This, of course, would involve tailoring the year 2 AMP quota allocations to the specific harms the Council wished to remedy.

To address unforeseen impacts inseason during year 1, the Council would need to hold back some of the AMP quota and have some capacity to recognize and respond to harm, including a way to evaluate or prioritize competing harms. In the limited time for discussion, we developed two concepts that focused on potential unintended consequences of managing overfished species in the trawl rationalization program. The GMT discussed the types of overfished species high bycatch events that may cause disruption in the trawl fishery – an unexpectedly high bycatch event that affects an individual, one that affects the sector (shoreside, mothership, catcher-processor), and one that affects all trawl sectors.

Individual

An individual may encounter a high bycatch event and be unable to purchase sufficient quota to cover the overage – either because it is cost prohibitive or because no QP are available on the market. Analyses in the DEIS indicate that OFS QP will be scarce and thus, relative to non-overfished species, more expensive. As the year progresses and OFS QP are used, fewer QP will be available on the market, possibly increasing the price. One unintended consequence of managing OFS within the trawl rationalization program maybe that the price of OFS QP becomes prohibitively expensive for certain individuals due to scarcity or simply because no overfished species QP are available on the market, due to hoarding or that all OFS QP have been used. The GMT discussed how the OFS QP of the AMP could be used to resolve these problems.

The AMP could be structured in a manner that OFS QP could be released into the market on a seasonal basis, in order to provide a year round supply of overfished species QP, which in turn would promote a year round fishery. Only those harvesters with an overage would be eligible to purchase the released OFS QP. Since the OFS QP would be sold in the marketplace, the incentive to avoid the species still remains. Alternatively, the OFS QP could be provided free of charge to harvesters with overages.

In both of the abovementioned scenarios there may be more harvesters with deficits than available QP, thus it would be necessary to further develop qualifying criteria for the OFS QP. One such criterion could be that only those vessel accounts with below average bycatch rates (excluding the high bycatch event that caused the overage) would be eligible for a one time purchase or distribution of the OFS QP. This approach would meet both the community stability goal (i.e., keeping harvesters fishing and delivering) and conservation goals since eligibility is linked to performance.

Sector

With regard to high bycatch events either within the trawl sectors or in the non-trawl sectors, some in the discussion believes that better solutions to these problems exist outside of the AMP. These tools include implementing buffers between the allowable biological catch and the optimal yield (i.e., do not set the ABC = OY), before the non-trawl and trawl sector allocations are made, or prior to the within the trawl sector allocations.

Summary

In summary, these two program options may provide solutions to potential unintended consequences of managing OFS in the trawl rationalization program. However, it is recognized that if non-overfished AMP QP are distributed without corresponding overfished species QP, that component of the program may be compromised. Therefore, the Council may wish to implement a pass-through for target species in years 1 and 2, while maintaining the OFS AMP.

B. Conservation Objectives

Recognizing that conservation encompasses a wide range of objectives, our discussions focused only on two formulas. The first formula would provide an incentive to reduce bycatch of overfished species. The second formula would provide an incentive to reduce gear contact with bottom habitat. Both formulas would allocate AMP QP in year 2 of the TIQ program based on vessel performance in year 1.

4. Providing an Incentive to Reduce Catch of Overfished Species

a) Basic Objective

The objective would be to reduce the total catch of overfished species below the trawl sector allocation.

b) Outline of Design Elements

This concept would involve rewarding vessels with the largest amount of unused overfished species QP at the end of the year. To apply the formula, NMFS would tally each vessel's unused QP for each overfished species at the end of year 1 and calculate the remaining balance as a percentage of the trawl allocation. NMFS would rank each vessel based on its aggregate unfished percentage and allocate the AMP QP in year 2 pro rata based on this percentage.

Table 4 illustrates this approach for two hypothetical vessels. Vessel A and B have unused QP for overfished species at the end of year 1. When viewed in absolute terms, the amount of unused QP is quite similar between the two vessels. However, when measured against the trawl allocation for those species, the results begin to diverge. Vessel A has a noticeably higher percentage of unused overfished species' quota because Vessel A has higher amounts of unused yelloweye and POP. Unused QP for these two species is inherently weighted more heavily than that for darkblotched because the trawl allocation is smaller.

Table 4. Hypothetical Example of Unused Overfished Species QP Incentive Option.

Vessel ID	Species	Unused QP (mt)	Trawl Allocation	Result (% of trawl allocation)
Vessel A	Darkblotched	8	200	4%
	Yelloweye	.02	0.6	3.33%
	POP	12	180	6.7%
	Result (average)			**4.7%**
Vessel B	Darkblotched	10	200	5%
	Yelloweye	.01	.6	1.7%
	POP	10	180	5.56%
	Result (average)			**4.1%**

c) Council Decisions Required for Implementation

The Council would need to adopt the formula, and perhaps, identify the set of overfished species to which the formula would apply.

d) Required Implementation Steps

Again, the four steps involved in this approach would be:

1. Calculate the amount of unfished quota pounds in each vessel account for each overfished species;
2. Divide these unfished QP amounts by each species' trawl allocation to derive a percent value;
3. Average these percent values for each vessel account; and
4. Allocate AMP quota pounds to vessels pro-rata to their aggregate unfished quota pound percentage.

e) Required Data Elements

The formula would only need the amount of QP remaining in each vessel account at the end of the year.

f) Other issues

The GMT included this formula as an illustration of how a formula-based AMP might possibly address an enhanced conservation objective. The actual conservation benefit of the approach would require more consideration.[11] In addition, some believed that this program might reduce the effectiveness of the TIQ program by potentially decreasing the availability of quota on the market.[12]

The GMT also discussed structuring the incentive in terms of rewarding a reduction in an incidental catch rate. That is, vessels with below average bycatch rates in year 1 would be preferentially awarded AMP QP in year 2. However, unlike rewarding unused overfished QP, rewarding vessels with the lowest incidental catch rate might not actually result in a reduction in overfished species mortality. This is because vessels with below average bycatch rates could transfer QP they do not use to other vessels.

5. <u>Providing an Incentive to Reduce Gear Impacts to Bottom Habitats</u>

a) Basic Objective

To create an incentive for reduced trawl gear bottom contact by rewarding vessels with the fewest tow-hours per pound of IFQ management unit species in year 1.

b) Outline of Design Elements

The formula would use total tow hours for the year and total target species catch for each vessel. A rate for each vessel would be calculated based on total catch divided by total tow hours. This individual vessel rate would be divided by the median rate for all vessels. These values would then be divided by the sum of the values to determine the percentage of AMP quota the vessel would receive. Using the median means that +/-half the vessels should receive some amount of AMP quota. The following table shows some example calculations.

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[11] Some would argue that an incentive to reduce total catch of overfished species below the limits set by the OY/trawl sector allocation could have other conservation benefits, such as more rapid rebuilding of the stock. Yet these benefits may be difficult to measure. To take canary rockfish as an example, even if the Council reduced the OY to 0 mt, the rebuilding analysis predicts that the time to rebuild would only be reduced by 1 year in comparison to the current OY of 105 mt (*see* Table 2-3 in the 2009-2010 groundfish harvest specifications, page 21).

[12] In other words, the AMP incentive would give some value to unused QP in the form of the QP the holder stands to receive in year 2 and possibly increase hoarding, especially with the low abundance species like yelloweye and cowcod.

Table 5. Hypothetical Example of the Reduced Gear Impact AMP Option (Vessel 29 represents the median).

Vessel	lb/hour	% median	% of AMP
Vessel 30	409	146%	7%
Vessel 2	400	143%	7%
Vessel 7	400	143%	7%
Vessel 21	394	141%	7%
Vessel 27	392	140%	7%
Vessel 10	378	135%	6%
Vessel 19	375	134%	6%
Vessel 3	361	129%	6%
Vessel 25	356	127%	6%
Vessel 24	343	123%	6%
Vessel 20	339	121%	6%
Vessel 26	338	121%	6%
Vessel 23	322	115%	5%
Vessel 31	321	115%	5%
Vessel 4	301	108%	5%
Vessel 6	286	102%	5%
Vessel 29	**280**	**100%**	**5%**
Vessel 22	270	96%	exclude
Vessel 5	266	95%	exclude
Vessel 13	256	91%	exclude
Vessel 32	243	87%	exclude
Vessel 9	241	86%	exclude
Vessel 15	232	83%	exclude
Vessel 16	209	75%	exclude
Vessel 14	208	74%	exclude
Vessel 1	193	69%	exclude
Vessel 18	178	64%	exclude
Vessel 28	155	55%	exclude
Vessel 11	152	54%	exclude
Vessel 8	147	53%	exclude
Vessel 17	145	52%	exclude
Vessel 12	140	50%	exclude
Vessel 33	127	45%	exclude

c) Council Decisions Required for Implementation

The Council would only need to adopt the formula and assign a pool of QP to be awarded (i.e., the full 10% AMP set-aside or some lesser amount/subset of species).

d) Required Implementation Steps

For year 1, NMFS would need to establish the incentive in regulation. The allocation of the AMP quota under the formula would occur in year 2.

e) Required Data Elements

This formula would require monitoring of tow hours and total catch, which would presumably be available from the 100 percent observer coverage and landings receipts.

f) Other issues

The conservation benefits from this formula would be based on a presumption that less trawl gear contact with the bottom is beneficial for habitat. Although only half of the vessels could qualify each year, it is assumed that the incentive would increase overall catch per tow hour.

C. Facilitating New Entrants into the Harvesting or Processing Sector

The GMT concluded that facilitating new entry into the fishery would not easily be done via a formula-based approach. One potential method would involve setting aside a pool of quota for crew that did not receive initial allocation of QS and then allocating that pool based on an individual's number of years in the fishery. This would, of course, require some verifiable history of employment or involvement in the fishery. We did not have sufficient time to explore the feasibility of such an approach.

VI. GMT Recommendations to the GAC

1. Consider the suitability of the formulaic options for meeting the Council's adaptive management program objectives.
2. Discuss the pros and cons of implementing an AMP formula in year 1 versus year 3.
3. Give the GMT and Council Staff guidance on any additional analysis for June.

GROUNDFISH ADVISORY SUBPANEL REPORT ON FMP AMENDMENT 20 – TRAWL RATIONALIZATION – FINAL ACTION FOR ADAPTIVE MANAGEMENT PROGRAM

The Groundfish Advisory Subpanel (GAP) reviewed the Council's preferred option and the amendment from the April 2009 meeting. The GAP discussed the pros and cons of the pass-through in addition to many related issues. That discussion is summarized below.

Some members expressed support for a formulaic approach that would begin concurrently with the implementation of the rest of the individual fishing quota program. They expressed the belief that immediate use of the Adaptive Management Program (AMP) may help prevent problems, while that same amount of AMP quota may be insufficient to remedy problems once they occur. There was concern that some communities, processors, or other infrastructure may not make it until year three. It was pointed out that trawl landings maintain infrastructure in ports for other fisheries, and that if the trawler leaves or leases quota out of that port, then the implications may be broader than anticipated.

In opposition to the idea of establishing a formula in year one, many members of the GAP pointed out that it is problematic to assume what the problems will be in the absence of concrete data. They advocated waiting at least two years in order to generate that information. Some members highlighted the difficulty of addressing unforeseen circumstances with a formula. It was noted that there will be winners and losers under this program and that quota shifting out of ports will be based on valid considerations such as bycatch rates and areas, distance to fishing grounds, and fish prices. Attempting to restrict that movement may impede some of the expected benefits of the program. Several members also noted that impacts from trawlers leaving a port could occur today without any remediation.

- A motion was made to implement the AMP program in year 1. That motion FAILED 3-6.

- After additional discussion, a separate motion was put forward supporting a two-year pass-through. That motion PASSED unanimously (9-0).

The GAP expressed general support for the remainder of Frank Lockhart's motion including the goals outlined, as well as the potential use of a formula in years 3-5.

PFMC
06/16/09

Agenda Item E.12.b
Supplemental GMT PowerPoint
June 2009

GMT/Council Staff Report on Adaptive Management

Presentation on
Agenda Item E.12.b, GMT Report

Council Motion April 2009

"**Pass-through**" 10% AMP set aside pro-rata to quota share in Year 1 and Year 2, develop formula approach for implementation in Year 3.

Explore **non pass-through**, formula-based options for year 1 and 2.

Adaptive Management Objectives

- Community stability
- Processor stability
- Conservation
- Unintended/unforeseen consequences of TIQ program
- Facilitate new entrants (both processors and harvesters)

Basic Considerations

For each formula, we attempted to identify:

- – The Primary Objective
- – Council Decision Points
- – NMFS implementation steps
- – Data Needed to Run the Formula
- – Other Considerations

The Principal Port Formula

<u>Primary Objective</u>: community stability

- Reduce potential shifts in delivery activity in years 1 and 2 by providing an incentive for harvesters to continue delivering to their "principal port."

- In year 2, AMP will be allocated to vessels that delivered to their principal port in year 1.

The Principal Port Formula

<u>Basic Design</u>:

- Principal port is defined for each vessel as the port where it made its largest landings (mt) during a baseline year or window period (e.g., 2006-2009).
- If a vessel's principal port is the same in Year 1 of the TIQ program, it is eligible for AMP allocation in year 2.
- If eligible, a vessel's Year 2 share of the AMP is awarded pro-rata based on landings or used QP.

The Principal Port Formula

<u>Major Council Decisions</u>:

- Identify baseline year or window period for establishing "principal port"
  - E.g., 2010: would allow vessels to establish their principal port.
  - E.g., include years prior to 2010, vessels less (or no) influence on establishing principal port.

<u>NMFS Implementation</u>

- Year 1: Announce "principal port" to vessels, establish incentive in rule.
- Year 2: Apply the formula distribute QP to vessels.

The Principal Port Formula

<u>Other Considerations</u>:

- This same approach could also focus on a vessel's "principal buyer" or "principal port-buyer" combination.

- This approach will not help ports that have vessels that leave the fishery in Year 1, or that are already gone (e.g., Neah Bay).

The "At-Risk" Port Incentive

"Quota Pools" established for each eligible port, port group, or region.

	N. WA	S. WA	OR #1	OR #2	CA #1	CA #2	CA #3
Sablefish	15%	15%	15%	15%	15%	15%	10%
Petrale sole	15%	15%	15%	15%	15%	15%	10%
Dover sole	15%	15%	15%	15%	15%	15%	10%
Shortspine	0%	15%	25%	15%	15%	20%	10%
Longspine	0%	15%	25%	15%	15%	20%	10%
Lingcod	15%	15%	15%	15%	15%	15%	10%
English sole	0%	20%	15%	20%	15%	20%	10%
Pacific cod	100%	0%	0%	0%	0%	0%	0%
Arrowtooth	50%	25%	15%	10%	0%	0%	0%

	N. WA	S. WA	OR #1	OR #2	CA #1	CA #2	CA #3
Canary	30%	15%	15%	25%	15%	--	--
Darkblotched	15%	25%	25%	25%	10%	0%	0%
Widow	20%	15%	20%	15%	10%	10%	10%
POP	30%	20%	20%	20%	10%	0%	0%
Halibut IBQ	30%	20%	20%	15%	10%	5%	0%
Yelloweye	35%	10%	10%	35%	5%	5%	0%
Bocaccio	--	--	--	--	--	--	100%
Cowcod	--	--	--	--	--	75%	25%

The "At-Risk" Port Incentive

<u>Other Design Elements</u>:

- Vessels that land in an eligible port, receive a share of the port's "quota pool."
  - Pro-rata to Year 1 landings in that port, or
  - On a first come, first serve landing-by-landing basis (e.g., for every 1,000 lbs of species X in Year 1, receive 100 lbs of AMP QP in Year 2).

<u>Major Council Decisions</u>:

- Identify eligible ports or regions.
- Divide AMP QP between the ports by species.

The "At-Risk" Port Incentive

Other Design Elements:

- Vessels that land in an eligible port, receive a share of the port's "quota pool."
  - Pro-rata to Year 1 landings in that port, or
  - On a first come, first serve landing-by-landing basis (e.g., for every 1,000 lbs of species X in Year 1, receive 100 lbs of AMP QP in Year 2).

Major Council Decisions:

- Identify eligible ports or regions.
- Divide AMP QP between the ports.

The “At-Risk” Port Incentive

NMFS Implementation Steps:

– Year 1: establish eligible ports and quota pools in rule; Year 2 allocate.

Other Considerations:

– Bycatch quota pools matched to high bycatch ports to counter cost/risk of fishing for that port.
– Doesn’t rely on past relationships, could be used to attract new vessels into ports.
– Flexibility for different approaches in each state.

The Processor Stability Formula

Primary Objective: processor stability

- Provide buyers/processors with QP, which they can use to attract vessels.
- Distribution of AMP QP set aside occurs in Year 1 based on allocation formula

Basic Design:

- Uses window period (e.g., 2006-2009) to distribute AMP pro-rata based on buying history (first-receiver on the fish ticket).
- In Year 2, window could switch to a rolling average.

The Processor Stability Formula

Major Council Decision:

- Identify formula window period.
- Duration of program.

NMFS Implementation:

- Distribute AMP set aside based on buying history formula.

Other Considerations:

- Council could add conditions on use of QP received through formula for community stability (e.g., must be landed in traditional port); yet, this might require some additional tracking.

Incentivizing Reduced Tow Times

Objective: conservation

- Reward vessels with below average tow times with the intention of reducing trawl gear contact.

Basic Design:

1. Calculate average non-whiting tow lb/hour in year 1.
2. Vessels with a below average rate in year 1 become eligible for AMP quota pounds in year 2.

Incentivizing Reduced Overfished Species Mortality

Objective: conservation

- Reward vessels with unused overfished species QP at the end of Year 1.

Basic Design:

1. Calculate the amount of unfished quota pounds in each vessel account for each overfished species;
2. Divide these unfished QP amounts by each species' trawl allocation to derive a percent value;
3. Average these percent values for each vessel account; and
4. Allocate AMP quota pounds to vessels pro-rata to their aggregate unfished quota pound percentage.

Incentivizing Reduced Overfished Species Mortality

Table 4. Hypothetical Example of Unused Overfished Species QP Incentive Option.

Vessel ID	**Species**	**Unused QP (mt)**	**Trawl Allocation**	**Result (% of trawl allocation)**
Vessel A	Darkblotched	8	200	4%
	Yelloweye	.02	0.6	3.33%
	POP	12	180	6.7%
	Result (average)			**4.7%**
Vessel B	Darkblotched	10	200	5%
	Yelloweye	.01	.6	1.7%
	POP	10	180	5.56%
	Result (average)			**4.1%**

Unforeseen/Unintended Consequences

- To address in Year 1, hold back some or all of AMP set aside, respond to harm when it occurs.
- Or, address Year 1 harm with Year 2 AMP distribution.
- Supplemental GMT Report.

GMT Recommendations

1. Consider the suitability of the formulaic options for meeting the Council's adaptive management program objectives.

2. Consider AMP implementation in year 1 or 2 versus implementing a pass-through option in years 1 and 2

GROUNDFISH MANAGEMENT TEAM FMP AMENDMENT 20-TRAWL RATIONALIZATION-FINAL ACTION FOR ADAPTIVE MANAGEMENT PROGRAM

In April 2009, the Council adopted two options for the first two years of the trawl rationalization program. The first option is a pass through in years 1 and 2 of the trawl rationalization program, while the second option directed the Groundfish Management Team (GMT) to develop a simple formulaic approach that could be used in years 1 and/or 2. For years 3 through 5 the Council specified a formulaic approach for years 3 through 5 (whereupon the first review of the program would occur). The GMT presented a report (Agenda Item E.12.b GMT Report) at the May 2009 Groundfish Allocation Committee (GAC) meeting which discussed a variety of uses for the adaptive management pounds. In that we note tradeoffs between establishing a mechanism designed to address harm in years 1 and 2 versus year 3 that the Council should consider.

Although the GAC recommended a pass through option for the adaptive management program (AMP) in years 1 and 2 of the trawl rationalization program they also requested the GMT further analyze mechanisms to address harm, particularly unforeseen consequences, inseason during these first two years.

As discussed in the GMT report, by definition addressing unforeseen/unintended consequences is not easily accomplished, or perhaps even possible through a simple formula-based approach. To address unforeseen impacts inseason the Council would need some mechanism to recognize, quantify, and then mitigate against harm with AMP quota pounds. Doing this in the first year would require some midseason process. Alternatively, the Council could try to respond to harm that occurred in first year during the second year of the program.

In general the GMT believes that responding to unforeseen consequences may create administrative and process difficulties. However, if the Council wishes to retain a tool to mitigate potential harm or unforeseen consequences, the GMT recommends that the Council utilize the holdback proposal presented by the GMT under Agenda Item E.10, as this tool could be used to address unforeseen consequences within one or more of the trawl sectors, but also for one or more of the non-trawl sectors.

PFMC
06/17/09

Agenda Item E.12.b
Supplemental SSC Report
June 2009

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FMP AMENDMENT 20 – TRAWL RATIONALIZATION – FINAL ACTION FOR ADAPTIVE MANAGEMENT PROGRAM

Mr. Jim Seger and Mr. Merrick Burden briefed the Scientific and Statistical Committee (SSC) on the proposed final actions being considered for the adaptive management program (AMP) of the trawl rationalization program. Previously, the SSC had noted the need for clear goals and objectives to inform the analysis of the AMP and for tightly specified qualification requirements consistent with the objectives. At its April meeting, the Council defined goals and objectives for the AMP. As specified in the Groundfish Management Team (GMT) report (Agenda Item E.12.b) they include:

- Community stability
- Processor stability
- Conservation
- Unintended/unforeseen consequences of the Trawl Individual Quota program, and
- Facilitate new entrants (both processors and harvesters).

The SSC's previous comments on these issues remain pertinent:

1. If the AMP is intended to address unintended consequences associated with rationalization, those consequences will not be fully known until after rationalization occurs. These consequences may be different in the early periods of rationalization than in later periods after the industry has adjusted to the trawl individual quota program. Therefore, flexibility is a desirable design feature.
2. Given that 10 percent of the quota is the maximum amount that may be allocated to an AMP, trying to address too many objectives with the program could lead to diminished program results.

In addition:

- It is not clear how the adaptive management program can be used to facilitate the new entrants into the fishery objective.
- The GMT report discusses several ways to change behavior by rewarding vessels that engage in “desirable” practices. The SSC notes, however, that use of indirect proxies to alter behavior or practices may have unintended consequences, some of which may be perceived as negative or undesirable. For example, in order to provide an incentive to reduce gear impacts to bottom habitats, the report offers the option of rewarding vessels with the fewest tow-hours per pound of Individual Fishing Quota. Although for some cases tow-hours may be a good proxy for habitat damage, it is just a proxy and using it may result in other, unexpected changes in fishing behavior that may be undesirable. The SSC cautions that great care and much thought should be used before implementing such policies.

PFMC
06/15/09

Agenda Item E.12.c
Public Comment
June 2009

Proposal Concept for PFMC consideration
Ecotrust Fisheries Program (Edward Backus)
May 26, 2009

Statement of Intentions for the Development of the Adaptive Management Program

The Adaptive Management Program associated with Pacific Fisheries Management Council's groundfish trawl (non-whiting) individual quota (IQ) program is intended to reserve the Council's options to address issues of community and processor stability, conservation, new entrants, and unintended consequences among other issues.

Ecotrust, and its finance subsidiary the North Pacific Fisheries Trust, have been monitoring and evaluating several issues related to the patterns emerging from the quota fisheries that are in place in Alaska and British Columbia.

History in these fisheries shows that groundfish are an important economic development asset that provides the broadest set of benefits when access is tied to the traditional pattern of fishing communities on our coast. The IQ program needs the flexibility to meet the multiple goals it has defined either explicitly or implicitly such as bycatch avoidance, rebuilding of stocks, community stability, and economic "effectiveness" (not necessarily always efficiency) via different incentives. In changing resource, policy, and business environments, stability and flexibility can foster innovation and adaptation in new markets, fishery methods, and adaptive organizations such as Community Fisheries Associations.

We believe that the design of the IQ program and its Adaptive Management Program (AMP) has several key issues and risks associated with it that should be further investigated by the Council. The AMP needs to be defined broadly so that maximum and flexible adaptation can be achieved. These issues have additional importance in that how the Council addresses them may set a precedent for similar treatments in other future IQ programs the Council may consider.

<u>Issues/Risks/Evidence:</u>

Leasing effects:
Two recent publications[i] (see endnote) from the British Columbia experience have demonstrated that leasing of quota undermines the financial stability of remaining fleets after the implementation of an IQ program, particularly in situations where non-

fishing owners and processors control quota share. The current definition of “eligible to own” quota shares does not limit the ability of prospective owners of quota shares to lease those shares into the future. The biggest risk associated with this leasing approach is the dissipation of fishing revenues away from active owner/operators, new entrants, crewmembers and communities as leasing fees come “off the top” before regular expenses and wages are paid. In some cases lease fees are 70% of gross landing receipts. Whenever and wherever lease rates reach these levels, it is very difficult for non-owners to earn a fair return on their fishing assets and time.

Risk/insurance pooling:

One potential use of the AMT QS 10% allocation could be to reduce capital requirements for in-season needs to cover overages incurred by vessels (disaster tows). Paragraph 3 of the Supplemental GMT report (04/07/09) indicates that this allocation should be used for reasons beyond generating profit, for a **broad sector benefit.** For example, the AMT could also be used to buffer the “margin” needed to address Over Fished Species (OFS) allocations (see page 3 of GMT/staff report on Accumulation Limits on OFS.) “Lending” or temporarily assigning portions of the AMT to CFAs for these purposes could also reduce in-season **transaction costs** by making it easier for vessels to find and lease the needed marginal QS**.**

Debt:

A serious issue that will face the next generation of fleet members is debt associated with QS purchases. In order to enter the fishery, new entrants will buy quota shares, be gifted QS, or lease them from initial recipients. Alternatively they could also lease them at administrative rates (8%) from CFAs if that is set up properly.

We can use the data from the Alaska halibut IQ fishery from the period 2000-2007 as a benchmark example. Every year, between 38 and 52% of transfers in that period were financed. The Alaska halibut QS price has been tracking with dock prices but has inflated on a relative basis from 1995 to 2009 (graph at end)[ii] (see endnote). The historical ratio of QS/ex-vessel prices has been generally in the range of 3-5:1, but has been substantially above that range for the past several years. Recently, both QS and ex-vessel (dock) prices have been coming down, but dock price has fallen much faster (back to historic long term levels near $2.50 - $3.00/lb), with the result being that the QS price/dock earnings index is now double historical norms at approximately 8:1, worse by 100%. New entrants that need to finance QS in order to enter the fishery have been and are continuing to face a strong headwind in this environment.

One issue driving the run-up in this ratio appears to be Gifting of QS to new entrants. Gifting of AK QS halibut shares was 18-28% from 2000 - 2007[iii]. Gifting cuts the cost basis of acquiring new QS substantially, creating a major competitive advantage for further accumulation of QS by the Giftee. On the other hand, Gifting usually comes with an implied revenue commitment of at least 50-70% to the Giftor. Thus the Price/Earnings ratio is at least 25% better for the Giftee.

As a specific example, $25,000 lbs of halibut QS at $24/lb. = $600,000. If a new entrant could acquire a NMFS loan at 30% down, the cash upfront required would be $180,000. The remaining debt would be $420,000. At 8% interest for 30 years, payments would total $1.12M including principal and interest (interest of $700k , which is 166% of the principal.)

<u>Proposal for PFMC consideration:</u>
The Pacific Fisheries Management Council reserves the option to address the issues of leasing, risk pools, and debt in the context of the development of program details in the Adaptive Management Program and Trust.

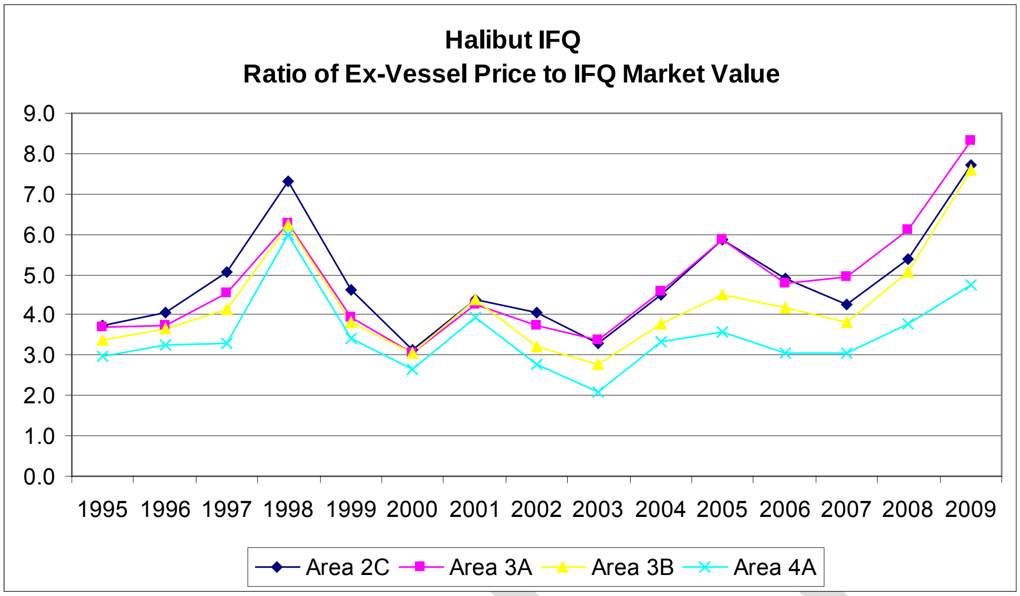
Among these options, the Council may consider:

1) **Augment the AMP allocation** by adding to it the initial QS allocation that would otherwise be in excess of control limits.
2) If Option 1 is not implemented, **give preference** for the purchase of divestiture QS amounts to CFAs.
3) **Make revocable assignments (grants)** of portions of the 10% AMP allocations to CFAs for defined periods of time for specific AMP program goals (described in next item - 4).
4) **Allow/Require leasing** of the AMP 10%+ pool via CFAs to existing boats with less than the accumulation limits and to new entrants at 8% (administrative overhead) to avoid debt loads, create low cost risk pools, lower QS access costs. This requirement could be specified in the bylaws required of a CFA (as **broad "fleet service" benefits**.) AMT QS allocations can be assigned to CFAs for a five year period to test this concept. This could also provide some start up revenues for CFAs to cover administration.
5) **Raise the accumulation limits for CFAs** so they can provide these **broad "fleet service" benefits**. CFAs can "acquire" QS through variety of means including grants via the AMP, purchase, gifting or bargain sale by initial recipients. This will help initial recipients of QS to address capital gains taxes and will mitigate future debt loads of new entrants seeking QS for lease or purchase. CFAs can lease to new entrants at 8% rates (for administrative overhead.)
6) **Create a significant time period** to implement and monitor these actions and whether these measures are effective, potentially 5 years. The AMP will not go into effect for the first two years of the IQ program. Five years would give ample time for CFAs to get established and for the initial effects of the IQ program to emerge.

Additional and separate element to consider:
Monitor leasing by non-CFA ownership entities and reserve the ability to take appropriate action to ensure that current and future market rates are affordable for

existing vessels and new entrants, based on measures of economic performance and viability.

Figures/Endnotes:



Summary of Halibut IFQ Transfers
2000 thru 2008
By Region (data courtesy NOAA RAM Program, March 2009)

REGION 2C

2000 through 2008 Financing Type	**Distinct Number of Transferees**	**Sum of QS Units**		
AKCFAB	7	326,128	1%	
AKDC	33	1,982,658	5%	
BANK	90	4,140,104	10%	
CASH	428	14,273,784	34%	
GIFT	252	11,850,628	28%	
NMFS	37	2,112,674	5%	
O	87	3,990,294	9%	
PROC	1	30,234	0%	
SELLER	63	3,673,467	9%	
	Sum	42,379,971	100%	
		Financed	***38%***	
		Gift	***28%***	66%

REGION 3A

2001 through 2008 Financing Type	**Distinct Number of Transferees**	**Sum of QS Units**	
O	103	9,880,499	10%
AKDC	56	4,378,850	4%
BANK	90	13,724,445	14%
CASH	510	34,953,812	35%

GIFT	318	20,478,670	21%	
NMFS	68	6,358,648	6%	
PROC	6	1,436,314	1%	
AKCFAB	12	1,203,786	1%	
SELLER	65	6,486,348	7%	
	Sum	98,901,372	100%	
		Financed	***44%***	
		Gift	***21%***	65%

REGION 3B

2001 through 2008 Financing Type	**Distinct Number of Transferees**	**Sum of QS Units**		
O	36	3,246,104	9%	
AKDC	17	939,157	3%	
BANK	76	11,345,947	33%	
CASH	132	7,388,288	22%	
GIFT	111	8,177,135	24%	
NMFS	15	808,804	2%	
AKCFAB	4	189,356	1%	
SELLER	31	2,258,855	7%	
	Sum	34,353,646	100%	
		Financed	***45%***	
		Gift	***22%***	67%

REGION 4A

2001 through 2008 Financing Type	**Distinct Number of Transferees**	**Sum of QS Units**		
O	26	1,421,752	7%	
AKDC	9	655,538	3%	
BANK	53	6,760,019	34%	
CASH	98	5,934,988	30%	
GIFT	68	3,642,942	18%	
NMFS	9	513,395	3%	
PROC	4	57,805	0%	
AKCFAB	2	50,838	0%	
SELLER	18	935,915	5%	
	Sum	19,973,192	100%	
		Financed	***52%***	
		Gift	***18%***	70%

Code	**Financer Description**
AKCFAB	AK Comm Fish & Ag Bank
AKDC	Alaska Dept Commerce
BANK	Other Private Bank
CASH	Cash
GIFT	Gift
NMFS	NMFS Loan Program
O	Other
PROC	Processor
SELLER	Seller

[i] *“A Cautionary Tale About ITQs in BC Fisheries”, Briefing, Issue 8, 2009, Draft 13 May 2009, Vancouver, BC: Ecotrust Canada.*
Pinkerton, E. and D. Edwards, 2009, “The elephant in the room: The hidden costs of leasing individual transferable fishing quotas”, Marine Policy, in press.

[ii] *Ex-vessel prices based on data from Alaska Commercial Fisheries Entry Commission for 1995 thru 2007. Estimated prices reflect weighted average ex-vessel prices reported for all fixed gear types (longline, troll, jig, and handline) and all delivery/condition types. Estimates reflect deliveries by catcher vessels to shoreside processors. 2008 and 2009 values based on anecdotal evidence.*
2) IFQ market value based on NMFS/RAM data for1995 thru 2005, PermitMaster for 2006 thru 2009.

[iii] *Table of Alaska Halibut Transfer data summary (2000-2007), courtesy of the Restricted Access Management Program, NOAA Fisheries, Juneau, AK, prepared March 2009.*

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The elephant in the room: The hidden costs of leasing individual transferable fishing quotas

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ABSTRACT

Despite the increasingly positive reviews of individual transferable quotas (ITQs), few studies have considered how quota leasing activities can reduce the economic benefits to society and to fishermen operating under the ITQ fisheries system. This analysis reveals negative economic impacts of ITQs previously overlooked by examining the extent of quota leasing and the relationship between the catch value, the cost of fishing, and the quota lease price in the BC halibut fishery, long considered a poster child for ITQs. Findings challenge assumptions of economic theory used to promote the benefits of ITQs.

1. Introduction

Individual transferable quotas (ITQs) are permits allowing the holder of the ITQ to catch or transfer a share of a total allowable catch (TAC). Typically, these permits do not expire, although if a fishery must be closed or diminished, the permit is similarly devalued. Most ITQ systems by definition allow these permits to be leased or sold to others. ITQs have received increasingly widespread positive evaluations from resource economists and fisheries managers, and have been widely adopted and accepted as a way of dealing with problems in fisheries management [1]. At the same time, problems with this approach have been raised by economists [2], political scientists [3], anthropologists [4], and geographers [5]. Yet, as some scholars have noted [6], there are few detailed empirical studies assessing changes in efficiency in the same fishery following the creation of individual quota programs. This discussion attempts to address this gap by examining how widely adopted quota leasing practices impact the delivery of economic benefits to society and to fishermen operating under an ITQ system.[1]

ITQ advocates posit that ITQs should be transferable via the market to allow quota to gravitate to the vessels and operators with the lowest fishing costs [9]. ITQ advocates also hold that these "efficient" vessels yield the greatest public benefit by virtue of the fact that they have the lowest fishing costs and thus their operations result in the least dissipation of wealth for society in general [10]. The role of quota leasing has been largely ignored in ITQ analyses, which can be explained by a common assumption that leasing automatically means a transfer of wealth rather than dissipation of wealth. This discussion questions the role of quota leasing as it relates to the achievement of an economically efficient fishery and the service of the public good. The impact of leasing on the financial viability of fishing operations, the costs of leasing, the extent of leasing, and the functioning of the quota leasing market are examined in the halibut fishery ITQ system in British Columbia, Canada. The BC halibut fishery was chosen because of its position as a "poster child" success story [11].

The leasing of quota is "the elephant in the room" of the BC halibut fishery. Despite the fact that the amount of the TAC which is leased out (i.e. not fished by the quota owner) has steadily increased to 79% in 2006, leasing is unmentioned, little mentioned, or considered insignificant by most analysts of the BC system. The discussion will reveal how hidden assumptions embedded in the analysis of ITQs, especially assumptions about the negligible impact of the initial allocation of permits, adequate information, and the effective functioning of capital markets have contributed to a failure to identify important impacts of quota leasing. An analysis of the impacts of leasing invites a new consideration of the benefits which have been claimed for ITQ systems that lack a mechanism to regulate leasing and control the concentration of holdings.

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[1] One study [7] did measure efficiency gains in the BC halibut fishery through 1994, but did not consider leasing, as the authors believed that "most of the active vessels are owner operated". By 1994, 34% of the quota was already being leased out, but the lease price at that time was only c. 50% of the catch value, enabling what lessee fishermen considered a reasonably fair distribution of benefits. The problems identified in this discussion did not become evident until 1998. An overview of ITQs [8] reviewed outcomes in less detail and noted leasing at 50–60% of the catch value in Iceland.

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2. Methods

Methods included 15 years of discussions with an array of BC fishermen and fish processors about the operation of ITQs, monitoring of the discussion among fishermen on the listserve BC FishNet, review of the literature on ITQs in several disciplines, and detailed analysis of business practices, transactions and fishing costs of the BC halibut fleet. The detailed analysis used data obtained from Department of Fisheries and Oceans, interviews with fishermen, and monitoring of service provider reports [12].

The analysis will focus on (a) the relationship of the catch value obtained by fishermen to the lease price paid by lessee fishermen, including the impact of the lease price on the financial viability of lessee's fishing enterprises, (b) the extent and nature of leasing in the fleet, and (c) the impacts of leasing on the achievement of management objectives for fleet stability, viability, safety, efficiency, and greatest net benefits to society.

3. ITQs in the BC halibut fishery

There are several reasons why ITQs in the BC halibut fishery should be among the most successful ITQ systems and why it, therefore, provides a best case scenario, a good test case of how an ITQ system can work. Since 1923, the Pacific halibut fishery has been managed by some iteration of the International Pacific Halibut Commission, which exercises considerable oversight and collects stock status information. There has been a history of reasonably effective conservation, keeping the TAC at a level that avoided stock swings and collapses, unlike many other fisheries [13]. Because of beneficial characteristics of halibut physiology (no swim bladder) and markets (same price per pound regardless of size), problems common in ITQ fisheries have been largely avoided in halibut. Thus there are fewer incentives to highgrade (retaining only the largest fish) because halibut has traditionally been sold at the same or similar price per pound whether the fish is larger or smaller. Although this has been changing in recent years, the change has not been significant enough to precipitate high-grading. Unlike many other groundfish, halibut has low discard mortality so that when juvenile or under-sized halibut are hooked and discarded, greater than 80% are expected to survive [14]. Highgrading and discard mortality of the target species are, therefore, two problems widely appearing in ITQ systems [15] which are absent or minimal in the halibut fishery.[2]

Because of the contentious nature of the halibut ITQ system, twice voted down by a majority of fishermen, a rule was created capping the holding of more than 1% of the TAC as quota on a single halibut license. This rule inhibits the concentration of vessel catches, although it does not inhibit quota ownership concentration, since nothing prevents a party from holding multiple vessels and multiple licenses.

ITQs were implemented in the BC halibut fishery as non-transferable individual quotas for the first two years, 1991–1992, and became temporarily transferable as leases in 1993. In 1999, restrictions were lifted on permanent transfers (sales), although a number of sources indicated that permanent transfers were easily made through private arrangements previous to the formal lifting of restrictions. Temporary transfers are an indicator of how much quota has been leased out annually since 1993.

[2] The discard mortality of species caught incidentally in the halibut fishery has been identified as a significant problem [16], but does not bear directly on this analysis.

4. Analysis: the relationship between catch value and quota lease price

The lease price of quota an increase from $1.95/lb (in constant 2008$) in 1993 to $3.80/lb in 2008, an increase of nearly double, (Table 1). The purchase price of quota increased during the same period of time by 2.5 times, from 3.5 times the ex-vessel price (landed value of the fish paid to the fisherman) in 1993 to more than eight times the ex-vessel price in 2007. The ex-vessel price of halibut has remained relatively stable over this time period, increasing at first due to improved product quality and enhanced fresh product flow from a longer season, but then stabilizing, while quota sale and lease prices continued to rise.

The relationship between the value of the catch (the ex-vessel value) and the lease (and sale) price of quota demonstrates that a lessee faces a cost-price squeeze between what he must pay to lease the quota and what he is paid for his catch. Therefore, the assumption that "the market value of the ITQs reflects the market's perception of the net present value of the future stream of net economic returns from the fishery" [17] applies only to the value of the fishery to quota owners and not to vessel operators who lease quota.

The rise of the quota lease price as an increasing proportion of the ex-vessel value (i.e. catch value) of the fish (from 53% in 1993 to 78% in 2008) should be considered in evaluating the financial viability of fishing enterprises. In analyzing the financial costs of fishing, it is useful to distinguish fixed annual costs, variable fishing costs, or "trip costs", and lease fees. Leasing is by far the largest fixed annual cost, and operations that lease the majority of the quota that they fish, are marginally profitable or unprofitable (Fig. 1).[3]

There are three factors which account for the high quota lease and purchase prices out of proportion to the value of the catch. The first two of these factors have generally not been identified by the fisheries economists prominent in the discussion of ITQs [1]. Nonetheless, it is clear that their claims about the efficiency benefits of ITQs rest on key unstated assumptions about the conditions under which trading of property rights will lead to efficient outcomes: (1) there are no wealth or income effects from the initial allocations of rights, (2) there is perfect information among all parties on all aspects of the negotiation, and trading of these rights, (3) there are low transaction costs for the negotiation, trading, and enforcement of the trade, and (4) there is a well-functioning capital market (access to capital by all actors). Many economists[4] would claim that if these conditions are *not* met, trading of property rights will *not* lead to efficient outcomes (i.e. in the case at hand, the transferability of ITQs to the most efficient operators will not occur). It is argued below that these conditions are not met in the halibut fishery.

4.1. Factor 1. There are large wealth effects from the initial allocation of quota

Vessels that were not granted quota in the initial granting process must recover their fixed costs, trip costs and lease fees.

[3] Two anomalies in the pattern of the rise of lease costs as a percent of catch value can be explained in the following way. The sudden higher lease price relative to catch value in 1998 occurred because of (a) expectations that the catch price would be remain as high as 1997 being reflected in the 1998 quota lease price and (b) an oversupply of frozen halibut from 1997 which lowered the catch price in 1998. The sudden lowering of this ratio in 2005 and 2006 resulted from fears that the new groundfish integration program would lower ability to catch halibut, and this was factored into the lease price. When this fear proved unfounded, the lease price rebounded in 2007.

[4] This claim is often attributed to the "Coase theorem", for example [18].

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Table 1
The relationship between ex-vessel value and halibut quota lease price and sale price.

Year	Lease price ($/lb)	Ex-vessel price ($/lb)	Quota purchase price ($/lb)	Ratio—lease/purchase (%)	Ratio—lease/ex-vessel (%)	Ratio—ex-vessel/purchase (%)
1993	1.96	3.73	11.73	17	53	32
1996	2.24	4.49	28.19	8	50	16
1997	2.08	4.16	29.01	7	50	14
1998	2.50	3.02	27.49	9	83	11
2002	2.68	4.49	29.65	9	60	15
2003	2.89	4.77	33.29	9	60	14
2004	3.05	4.55	39.21	8	67	12
2005	2.45	4.29	34.03	7	57	13
2006	2.25	4.54	28.13	8	49	16
2007	3.58	5.03	34.77	10	71	14
2008	3.80	4.90	38.00	10	78	13

All prices corrected for inflation to 2008 equivalent. Quota purchases technically are based on a percentage of the TAC, but in the market, the percentage is translated to poundage based on the current year's TAC, and prices based on $/lb. *Source:* Department of Fisheries and Ocean; license broker advertisements published in trade magazines; fisherman and processor interviews.

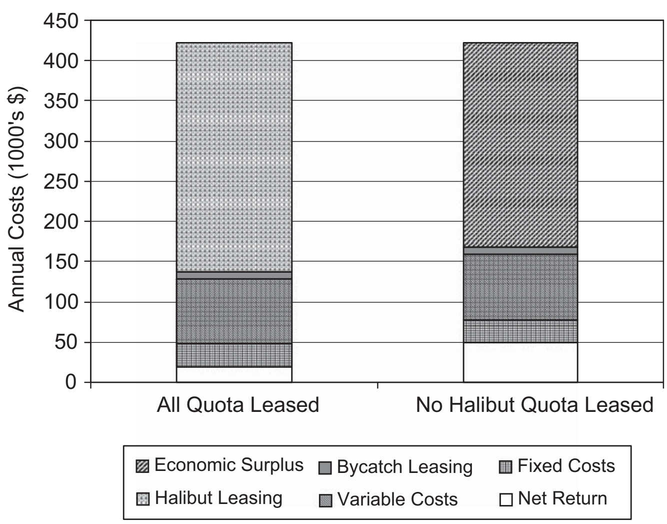

Fig. 1. The distribution of annual halibut revenue by cost category for an average halibut vessel catching a full block (1% of TAC) of halibut quota under two scenarios, one where all quota is leased at market price and the second where the halibut quota is owned and no lease fees paid.

Since quota owners retain c. 70% of the catch value, fishing costs must be recovered from the 30% of catch value that remains for the skipper, crew, and vessel share. Vessels granted quota can cover both their fixed and variable costs from the full 100% of landed value, and can then afford to pay higher lease prices for additional quota, needing only to cover trip costs. Those vessels operating with granted quota are therefore more financially viable than new entrants and can afford to pay higher quota lease fees by virtue of the wealth effects accrued through the initial granting process. This eventually had the effect of bidding up the lease price.

4.2. *Factor 2. Asymmetric information held by buyers and sellers results in market power*

Many quota owners prefer to lease their quota out through a processor as a broker because the processor is in a better position to get the highest price and because, as several fishermen stated, they do not want to be "guilted by other fishermen" about the high lease price they are asking. Similarly, many lessee fishermen do not wish to deal directly with the quota owner because of their hostility toward the high lease prices. High lease prices violate the previous norms of the share system in which license-owning skippers and crew were considered co-venturers and both rental skippers and crew took a far higher percentage of the catch value. Because a "moral economy" [19] persists in the fleet, and because reputation matters in securing the best arrangements, quota owners prefer to keep their leasing arrangements secret. Processors compete to secure quota at the beginning of the season because of their desire to guarantee delivery of fish to themselves [20, interviews].[5] Securing a large amount of quota pre-season also puts processors in the best bargaining position to re-lease the quota in turn under the most advantageous conditions and to maintain relationships with reliable fishermen. Even when fishermen make leasing arrangements directly with quota owners, these leases are normally financed by a processor and, therefore, the fish is delivered to this processor as part of the bargain. Processors are brokers of most of the leases because they can afford to pay more upfront, both because of their access to capital and because of their power in allocating fishing opportunity through control of a large amount of quota. It is advantageous for fishermen to have ready access to additional quota during the season if they happen upon more fish than they currently hold quota for. The price of quota when it is leased out to fishermen by the processors is confidential; it varies with arrangements and the bargaining power of the lessee. The lessee usually agrees to deliver catch from other fisheries to the processor as part of the arrangement. There is, therefore, asymmetric information between buyers and sellers of quota leases (considered a transaction cost by economists, along with search and information costs, bargaining and decision costs [21]), which confers market power to quota owners and to a lesser extent to the processors who buy up and reallocate quota leases. Processors may not charge a fee for this transaction, but the guaranteed delivery of the fish to them gives them leverage over the price of the catch. This may be an even more important form of market power. The resulting allocation of quota leases, and the stated and unstated terms under which they are allocated, are not the product of a freely operating market with open competition.[6]

Economists have generalized from a few cases in the trawl fishery in which lease transactions operate transparently and

[5] A few interviewees reported that some processors offer Employment Insurance stamps to quota owners who lease to them, as an inducement to acquire their quota, even though the quota owners do not actually fish. In these instances, quota owners are able to collect Employment Insurance benefits for the weeks the leased quota is fished. We do not know how widespread this practice is.

[6] Since groundfish integration in 2006, the necessity of leasing bycatch often gives processors even more leverage. If a fisherman catches non-target species, which are recorded by the cameras on his vessel, he must lease quota for this by-catch to continue fishing. Under these circumstances, a processor is the swiftest and most reliable supplier of by-catch leases.

without appreciable cost, and have assumed that this is the rule in the halibut ITQ fishery: "To facilitate the clearing of the ITQ market, private quota trading companies have emerged. The companies have become so efficient that fishermen can call from their vessels, immediately after realizing the need for additional quota, and arrange for and complete the transfer of ITQ by the time that they reach port to offload their catch" [17]. While this practice may occur in the trawl fishery,[7] it normally occurs in halibut between a lessee and the processor who leases to them or finances their lease.

4.3. *Factor 3. Capital markets are not functioning well, and there is market distortion*

The initial fishermen grantees of quota, the processors, the investors, and new fishermen who have purchased quota distort the leasing market because they have far more access to capital than the lessees. This situation is exacerbated by expected future capital investment by the federal government, which leads to speculative investment in quotas. Unresolved aboriginal claims to access rights were not included in the initial allocation of quota, although the Nisga'a Treaty had been under negotiation since the 1970s and both federal policy and court decisions pointed to the fact that aboriginal people would end up with access rights recognized. Therefore, once ITQs had been created and became transferable, the expectation of federal buy-back of quotas from funds coming from outside the industry to settle aboriginal claims had an inflationary effect on price. This caused other sectors to reinvest in the fishery because they had extra capital, and could gain certain tax advantages [22]. Investors in halibut quota expected a 10% return on their investment in 2002 and treated quota as stock market investments [20]. Future federal investments in aboriginal ITQs is the one factor which has been identified as a problem by economists [22], although it is not seen as a significant threat to the system.

5. Analysis: the extent and nature of quota leasing

For a quota owner, leasing provides consistent high revenue with better income and tax implications than selling quota. Income from leasing can be treated almost like a pension, involving a tax on annual income each year, rather than a one time sale with capital gains [20, interviews]. Quota owners who leave the fishery often choose to lease their quota out during their entire lifetime and to will the quota to their children as an investment. By 2006, 79% of the quota was leased out instead of being fished by the quota owners, while only 4% of the quota was sold that year. These quota-owning "armchair fishermen", also now termed "investors", and even new investors have been attracted into buying quota because of the high lease prices they can charge. A clear separation is emerging between those who own quota and those who fish quota: by 2005, only about 80 of the initial quota owners were still fishing.

Of the 182 active halibut fishing vessels in 2006, 37 vessels leased 90% or more of the halibut quota they fished, 67 vessels leased 70% or more of the halibut quota they fished, and 91 vessels (half the active fleet) leased 50% or more of the halibut quota they fished, as shown in Fig. 2. It is impossible to know exactly what percent of leasing creates a marginal operation, because individual situations are varied and complex. But it is clear from

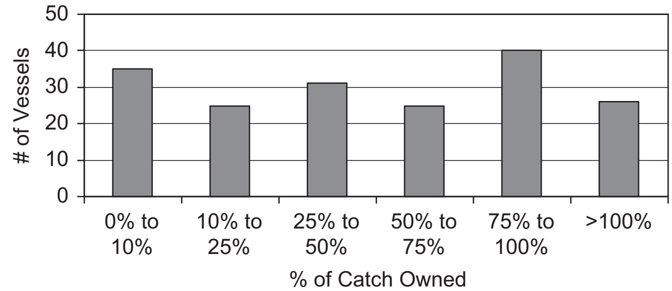

Fig. 2. Number of vessels owning percentages of the halibut quota they fish.

Fig. 1 that leasing is by far the largest fishing cost and that operations become increasingly less profitable, the more of their quota they must lease. It is also clear from Fig. 2 that a significant number of operations—more than a third of the fleet—currently fall in the less viable or marginally viable category (those leasing 70% or more of the quota they fish).[8]

Why do lessee skippers continue to fish if their operations are marginal? Why do not they correctly receive the market signals that they are financially non-viable? Economic theory predicts that such marginal operations will simply cease to lease quota and find more profitable employment. But there are many reasons why marginal operations continue. Sometimes a vessel owner leases quota to pay for the maintenance of the vessel. A vessel may serve multiple subsistence, transportation, identity, or prestige functions, or maintaining it may simply represent the hope that the price will go up. Operating a vessel may be the best or only way to offer a job to a son to help pay for his education, and to have a working experience with him. In some cases, fishermen know no other life, have no other skills, subsidize their fishing with another job or another fishery, or are unwilling to relocate to places with more economic opportunity because they have extended family and community and low cost housing where they live.

6. Analysis: assumptions about economic efficiency, optimal allocation, financial viability, and public benefits

In this situation, the assumption that quota will gravitate toward the most efficient units of production is clearly problematic. Vessels leasing most of their quota may have a very high level of technical efficiency (defined as using the least cost gear, most fuel-efficient engine, lowest ratio of crew to catch, etc.) and still not be financially viable, while vessels fishing their own quota are so highly profitable that they are under little pressure to be technically efficient. The latter case could be seen as an additional wealth effect of the initial allocation. In a system in which 79% of the quota is leased out by quota owners and half of the operating vessels are leasing more than 50% of the quota they fish, it is questionable whether an optimal allocation of resources is being achieved since many of these lessees are barely making a profit. It is questionable whether this system maximizes net benefits to society, since at least a third of operations are either not financially viable or marginally so, and crew are receiving a very

[7] It is questionable if leasing practices in the trawl fishery are transparent or without appreciable cost since within the private company leasing system, lease prices are confidential and fees are charged for each transaction.

[8] We made two assumptions to assess quota ownership relative to catch. We assumed that all quota permanently held on a license is owned by the vessel owner. This assumption was necessary because neither halibut licence nor quota ownership is recorded by DFO, only the ownership of the vessel. The second assumption, that the quota remaining on a license at the end of the fishing season was equivalent to the vessel's catch, was necessary because vessel specific catch data is considered confidential information, requiring that we use a proxy for catch.

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small share. It is questionable whether this system meets the management objectives identified in the 1999 halibut management plan which included the "stability and viability of the existing fleet" [23]. The 2000 halibut management plan elaborated on the stated objectives and included an assessment of the fishery: "The IVQ program has proven very successful. Not only has IVQ management resulted in a more sustainable, rational and safer commercial halibut fishery, it has also improved the *financial viability* of the industry" [24, emphasis added]. It appears from this statement that the system has been analyzed only from the perspective of the quota owner, excluding the perspective of skippers and crew who lease the quota from the owner and actually do most of the fishing. Clearly, a large number of operations and possibly the crew benefits on *all* operations are driven by the costs of the lease arrangement to the lessees, not benefits to quota owners.

While processors characterize these skipper lessees as "desperate", the situation of crew or deckhands is equally or more precarious. It is not surprising that the proposal to move to ITQs was opposed by the Deep Sea Fishermen's Union (the union of crew), as it constituted the end of bargaining rights that crew had formerly enjoyed [20]. They are now an unorganized surplus labor force (because so many crew jobs have been eliminated) hired at whatever the market will bear. They formerly got 10–20% of the catch value before ITQs and now get 1–5%. Whereas the value of the halibut fishery has increased by 25% between 1990 and 2007, the proportion of that value retained by the crew share has dropped by 73%. There is now a widespread industry practice of taking a lease fee "off the top" as a trip cost (subtracting it from the amount to be divided among the crew), even if a fisherman-skipper owns the quota (and thus pays the lease fee to himself).[9] The skipper/quota owner justifies this on the grounds that he could get this lease price on the market, and his crew would receive the remaining benefits if he did have to lease quota. Thus even owner-operated vessels which do not have to lease quota usually pay reduced wages to crew. The existence of the ITQ system has altered accounting practices in ways which fundamentally alter wealth distribution.

One consideration in thinking about the net benefits to society is the distributional aspects of the ITQ program. A way that economists might measure net societal benefits is to examine the sum of the "marginal value" to rich and poor alike. In this calculus, a small benefit has far greater value to the poor, which get a higher value for each additional increment of benefit than the rich, and so a policy attempting to maximize total social benefit will at least not penalize the poor more than the rich, and will even attempt to allow the poor to benefit a bit more than the rich. In other words, the greatest overall social benefit is achieved when the poor realize more marginal value than the rich. The halibut ITQ system does not meet this measure of social benefit, since the cost of leasing is passed on the crew, who can least afford to bear the cost. Secondarily, the costs are passed on to lessee skippers, who seek entry into the fishery as quota holders, but who face very high barriers to entry, since their operations are not profitable enough to buy quota. The situation rewards those who were fortunate enough to be gifted the public resource because they were fishing in the qualifying years. The situation also rewards those who already have capital to invest, such as investors outside the fishing industry. The situation punishes all those non-quota-holders in the fishery who would like to advance in the future, either through buying or leasing quota. The stated policy goal of both government and economists that ITQs will reduce fishing costs for the entire industry and will increase societal benefits has not been met in these cases.

It is also not clear that the public benefit of increased safety has been met as much as is claimed. Quota-holding vessels can pick their weather and fish under the safest conditions, but skippers who are desperate will take greater risks and fish earlier in the season when prices are often higher and weather less predictable. Windle et al. [25] found that quota systems which do not limit ownership, such as those of Iceland and New Zealand, tend to maintain relatively high accident and fatality rates under ITQ systems.

The other major area in which public benefit may be diminished is in innovation. Although it is possible for new processors to enter the halibut fishery, and examples of this include the processors that entered the fishery in response to the increased and longer supply of fresh halibut [20], enabling them to access a higher-value, white tablecloth market, other innovations from new processors are likely suppressed by continued delivery to the established processors who often compete more successfully for quota. Another source of innovation is from political debate. In New Zealand [26], where quota owners have become closely partnered with government in the system, government is receiving so much funding from quota owners who increasingly pay for research and management that criticism of the system from within has become unthinkable.

7. Conclusion

Increasingly, those who have advocated ITQs as economically efficient are making broader claims about the general health of the industry and broader public benefits. So in the question of "efficient for whom?", the answer is assumed to be "efficient not just for holders of ITQs but also for all actors in the fishery and the owners of the resource, the Canadian public". This discussion has shown that this assumption, as well other assumptions underpinning the indiscriminate promotion of ITQs, do not apply in the British Columbia halibut fishery.

(1) The usual assumption is that lease price reflects "the market's perception of the net present value of the future stream of net economic returns from the fishery. As such, the market value of quota is affected by the market prices for halibut, fishing costs and the long-term health of the resource" [17]. "Because lease prices are measures of profitability per unit of catch, (prices minus marginal cost of fishing), it follows that in a well-functioning lease market, lease price should be a fraction of ex-vessel prices" [27]. An examination of the escalating quota lease price in relation to the ex-vessel value of the catch has shown that lease price can be seen instead as an indicator of the non-viability of a large portion of the fleet, constituting an unsustainable financial burden for this portion of the fleet under ITQs rather than an improvement. Thus a significant portion of the halibut fleet is not economically viable, contrary to claims in both DFO reports [23,24] and in economic evaluations of the halibut ITQ fishery [7,10,17].

(2) It is usually assumed that the fishermen who can operate at the least cost will end up in possession of ITQs, regardless of the initial allocation of ITQs, e.g. "under the ITQ schemes the market, by facilitating the allocation of harvests among fishers…. and by directing harvesting to the most efficient, magnifies the returns from the cooperative fisher games to the benefit of the fishers, and to the benefit of the public at large" [17]. But an increasing number of barely viable operations exist because of the market power of the initial recipients of quota. Therefore, initial allocations have resulted in significant

[9] This practice has also been documented in the US surf clam ITQ system [8].

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wealth effects and market power imbalances that have hindered the transfer of quota in the market to those who can operate with the lowest fishing costs and highest rate of return.

(3) It is usually assumed that there are no wealth effects from initial allocations, no lack of information, and low transaction costs, although all of these are acknowledged to inhibit efficient trading if they do exist. It has been assumed in the BC groundfish fisheries that the dominant form of trading would be free public movement of quotas through brokers, auctions, or within fishermen's networks [17], that these activities would occur without significant transaction costs or wealth effects, and that, therefore, transferability through selling and leasing would lead to efficiency. But it has been shown that there is asymmetric information (a transaction cost) between buyers and sellers of quota leases, and that considerable market power is exercised by the holders of quota and by the processors who lease up and reallocate quota, thereby gaining significant influence over the catch price. The existence of transaction costs and market power means that efficiency should not be assumed to be achieved through trading in the BC halibut fishery. Economist Ronald Coase [30] warned that "One result of this divorce of the theory from its subject matters has been that the entities whose decisions the economists are engaged in analyzing have not been the subject of study and in consequence lack any substance", emphasizing that the market operates within institutional arrangement which must be understood in order to understand how the market functions. This discussion has attempted to provide more insight into how quota leasing arrangements actually operate.

It is clear that ITQs in the BC halibut fishery were an effective mechanism to promote efficiency gains through the concentration of fishing effort onto fewer vessels. However, there are low incentives for quota-owning vessels to maintain or increase efficiency after the first wave of consolidation. Furthermore, this discussion has shown that this efficiency is achieved at the expense of many lessees of quota, at the expense of crew even on owner-operated vessels, at the expense of the financial viability of many current operations, at the expense of future quota holders who have to buy quota from the original grantees vs. inheriting them as grandfathered public goods, and at the expense of those who will continue as lessees. Thus the efficiency achieved for quota owners comes with a cost in the lack of public benefits created by the ITQ system. Fishing operations are only sometimes conducted by parties who are able to obtain the most value from the resource.

The leasing of halibut quota is the "elephant in the room" because its importance has been missed by analysts, and not incorporated into the overall evaluation of quota programs. Instead, many argue for the complete relaxation of limits on transferability, as witnessed in Munro's [10] analysis of halibut ITQs and McRae and Pearse's [28] arguments for how a BC salmon ITQ system should be designed. These and other analysts have focused on the seemingly successful limits on vertical integration, without noting the reassertion of some traditional forms of market power [29] conferred on processors when they become the brokers of lease arrangements.

In a major study of ITQs, the US National Research Council [8] recommended: "The capacity of IFQs for transferability, consolidation, and leasing has led to a general concern that independent owner-operators of fishing vessels or crew members will be led into economic dependence on absentee owners as quota shares increase in value and small investors are excluded from the field. Consequently, some programs (e.g., Alaskan halibut and sablefish) have adopted owner-on-board and other provisions intended to prevent absentee ownership. Leasing of quota shares should generally be permitted but, if necessary, with restrictions to avoid creation of an absentee owner class. Making shares freely transferable is generally desirable to accomplish the economic goals of an IFQ program. However, if it is desired to promote an owner-operated fishery or to preserve geographic or other structural features of the industry, it may be necessary to restrict long-term transfers of quota shares to bona fide fishermen or to prohibit transfers away from certain regions or among different vessel categories". In future work we will elaborate on the economic and ecological alternatives which address the problems which ITQs systems intend to solve. It should be noted that mechanisms other than ITQs have been used in many fisheries to spread fishing effort over a longer season and promote a more even flow of fresh fish into the market. In the BC halibut fishery, the voluntary "layover" system operated successfully for a time to achieve this, but was not made mandatory.

The quota leasing market in the BC halibut fishery is limiting efficiency, stifling innovation, and causing financial hardship. It is clear that a well functioning ITQ fishery requires greater forethought, oversight, and regulation in the design and implementation of transferability rules.

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References

[1] Neher P, Mollett N, editors. Rights based fishing. Dordrecht: Kluwer Academic Press; 1989;
National Research Council. Sharing the fish: toward a national policy on individual fishing quotas. Washington, DC: National Academy Press; 1999;
Danielsson A. Efficiency of ITQs in the presence of production externalities. Marine Resource Economics 2000;15:37–43;
Hilborn R, Orensanz JM, Parma AM. Institutions, incentives and the future of fisheries. Philosophical Transactions of the Royal Society 2005;360:47–57;
Grafton RW, Arnason R, Bjørndal T, Campbell D, Campbell HF, Clark, CW, et al. Incentive based approaches to sustainable fisheries. Canadian Journal of Fisheries and Aquatic Science 2006;63:699–710;
Sanchirico JN, Holland D, Quigley K, Fina M. Catch-quota balancing in multispecies individual fishing quotas. Marine Policy 2006;30(6):767–85;
Costello C, Gaines SD, Lynham J. Can catch shares prevent fisheries collapse?. Science 2008;321(5896):1678–81.

[2] Copes P. A critical review of the individual quota as a device in fisheries management. Land Economics 1986;62:278–91;
Boyce JR. Individual transferable quotas and production externalities in a fishery. Natural Resource Modelling 1992;6(4):385–408;
Grafton RW. A note on the uncertainty and rent capture in an ITQ fishery. Journal of Environmental Economics and Management 1994;27:286–94;
Anderson LG. An economic analysis of highgrading in ITQ fisheries regulation programs. Marine Resource Economics 1994;9:209–26;
Grafton RW, Squires D, Kirkley J. Turning the tide? Private property rights and the crisis in fisheries management. Working Paper #9505E, Department of Economics, University of Ottawa; 1995;
Sumaila UR. Cooperative and non-cooperative exploitation of the Arcto-Norwegian cod stock in the Barents Sea. Environmental and Resource Economics 1997;10:146–7;
Criddle K, Macinko S. A requiem for the IFQ in US fisheries. Marine Policy 2000;24:461–9;
Armstrong CW, Sumaila UR. Optimal allocation of TAC and the implications of implementing an ITQ management system for the North-East Arctic Cod. Land Economics 2001;77(3):350–9;
Tietenberg T. The tradable permits approach to protecting the commons: what have we learned?. In: Ostrom E, Dietz T, Dolsak N, Stern PC, Stonich S,

Weber J, editors. The drama of the commons. Washington, DC: National Academy Press; 2002. p. 197–232;
Macinko S, Bromley D. Who owns America's fisheries?. Washington, DC: Island Press; 2002;
Wallace C, Weeber B. The devil and the deep sea-economics, institutions and incentives: the theory and the New Zealand quota management experience in the deep sea. FAO Corporate Document Repository, Food and Agriculture Organization, Rome; 2003.;
Schott S. New fishery management in Atlantic Canada: communities, governments and alternative targets. In: Doern B, editor. How Ottawa spends, 25th anniversary ed. Queens/McGill Press; 2004. p. 151–72;
Copes P, Charles A. Socioeconomics of individual transferable quotas and community-based fishery management. Agricultural and Resource Economics 2004;33(2):171–81;
Edwards D, Scholz A, Tamm EE, Steinback C. The catch-22 of licensing policy: socio-economic impacts in British Columbia's commercial ocean fisheries. In: Sumaila UR, Marsden AD, editors. North American Association of Fisheries Economists forum proceedings. Fisheries Centre Research Reports, vol. 14, no.1. Fisheries Centre. Vancouver, Canada: University of British Columbia; 2006;
Clark C, Munro G, Sumaila UR. Buyback subsidies, the time consistency problem, and the ITQ alternative. Land Economics 2007;83(1):50–8;
Bromley DW. The crisis in ocean governance: conceptual confusion, spurious economics, political indifference. MAST 2008;6:7–22;
Bromley DW. Abdicating responsibility: the deceits of fisheries policy. Fisheries 2009;34(4):22.

[3] Agrawal A. Common resources and institutional stability. In: Ostrom E, Dietz T, Dolsak N, Stern PC, Stonich S, Weber EU, editors. The drama of the commons. Washington, DC: National Academy Press; 2002. p. 41–85.

[4] McCay B, Creed C, Finlayson C, Apostle R, Mikalsen K. Individual transferable quotas (ITQs) in Canadian and US fisheries. Ocean and Coastal Management 1995;28:85–15;
Palsson G, Helgason A. Figuring fish and measuring men: the Individual transferable quota system in the Icelandic fishery. Ocean and Coastal Management 1995;28(3):117–46;
Wiber M, Kearney J. Stinting the commons: property, policy, or power struggle? Comparing quotas in the Canadian dairy and fisheries sectors. In: Wiber M, Spiertz J, editors. The Role of law in natural resource management. 's-Gravenhage: VUGA Press; 1996. p. 145–66;
McCay BJ, Apostle R, Creed CF. Individual transferable quotas, co-management, and community: reflections from Nova Scotia. Fisheries 1998;23(4): 20–23;
Pálsson G, Pétursdóttir G, editors. Social implications of quota systems in fisheries. Copenhagen: Nordic Council of Ministers; 1997;
Palsson G. The virtual aquarium: commodity fiction and cod fishing. Ecological Economics 1998;24(2–3):275–88;
Wiber M. Fishing rights as an example of the economic rhetoric of privatization: calling for an implicated economics. Canadian Review of Sociology and Anthropology 2000;37(3):267–88;
Eythorsson E. A decade of ITQ management in Icelandic fisheries: consolidation without consensus. Marine Policy 2000;24:483–92;
Butler C. Fishing for a pension or for peanuts?. Samudra Report 2004;39:8–14.

[5] Symes D, Steins N, Alegret JL. Experiences with fisheries co-management in Europe. In: Wilson DC, Nielsen JR, Degnbol P, editors. The fisheries co-management experience: accomplishment, challenges, and prospects. Dordrecht: Kluwer Academic Press; 2003. p. 119–34;
Bradshaw M. The market, Marx, and sustainability in a fishery. Antipode 2004;36(1):66–85.

[6] Wyman KM. Why regulators turn to tradable permits: a Canadian case study. University of Toronto Law Journal 2002;52:419–502;
Grafton RQ, Squires D, Fox KJ. Private property and economic efficiency: a study of a common pool resource. Journal of Law and Economics 2000;43:679–13.

[7] Grafton RQ, Squires D, Fox KJ. Private property and economic efficiency: a study of a common pool resource. Journal of Law and Economics 2000;43:679–13.

[8] National Research Council. Sharing the fish: toward a national policy on individual fishing quotas. Washington, DC: National Academy Press; 1999.

[9] Scott AD. Conceptual origins of rights based fishing. In: Neher P, Mollett N, editors. Rights based fishing. Dordrecht: Kluwer Academic Press; 1989. p. 11–38.

[10] Munro GR. The effect of introducing individual harvest quotas upon fleet capacity in the marine fisheries of British Columbia. In: Shotton R, editor. Case studies on the effects of transferable fishing rights on fleet capacity and concentration of quota ownership, FAO Fisheries Technical Paper 412, Food and Agriculture Organization of the UN, Rome; 2001. p. 208–20.

[11] Casey KE, Dewees CM, Turris BR, Wilen JE. The effects of individual vessel quotas in the British Columbia halibut fishery. Marine Resource Economics 1995;10(3):211–30;
Turris B. Canada's Pacific halibut fishery: a case study of an individual quota fishery. In: Gimbel K, editor. Limited access to marine fisheries: keeping the focus on conservation. Washington, DC: Center for Marine Conservation; 1995;
Macgillivray P. Canadian experience with individual fishing quotas. In: Gordon DV, Munro GR, editors. Fisheries and uncertainty: a precautionary approach to resource management. Calgary: University of Calgary Press; 1996. p. 155–60;
Dewees C. Effects of individual quota systems on New Zealand and British Columbia fisheries. Ecological Applications 1998;8(1):133–8;
Munro GR. The effect of introducing individual harvest quotas upon fleet capacity in the marine fisheries of British Columbia. In: Shotton R, editor. Case studies on the effects of transferable fishing rights on fleet capacity and concentration of quota ownership, FAO Fisheries Technical Paper 412. Food and Agriculture Organization of the UN, Rome, 2001. p. 208–20;;
Clark, Munro, and Associates. Impacts of harvesting rights in Canadian Pacific fisheries. Department of Fisheries and Oceans; 2009. p. 61, in press.

[12] Edwards DN, Sutcliffe T, Reid-Kuecks B. An evaluation of the socio-economics of the BC groundfish fishery. Ecotrust Canada Report Series, Vancouver, BC; 2009, in press.

[13] Munro GR. The effect of introducing individual harvest quotas upon fleet capacity in the marine fisheries of British Columbia. In: Shotton R, editor. Case studies on the effects of transferable fishing rights on fleet capacity and concentration of quota ownership. FAO Fisheries Technical Paper 412, Food and Agriculture Organization of the UN, Rome; 2001. p. 208–20.

[14] Trumble RJ, Kaimmer SM, Williams GH. Estimation of discard mortality rates for Pacific halibut bycatch in groundfish longline fisheries. North American Journal of Fisheries Management 2000;20:931–9.

[15] Copes P. A critical review of the individual quota as a device in fisheries management. Land Economics 1986;62:278–91.

[16] Pacific Fisheries Management Inc. (PFMI). Future direction of the commercial groundfish fisheries in British Columbia, Vancouver, 29 September 2003.

[17] Clark, Munro, and Associates. Impacts of harvesting rights in Canadian Pacific fisheries. Vancouver, Fisheries and Oceans Canada. Department of Fisheries and Oceans; 2009. p. 61, in press.

[18] Coase RH. The problem of social cost. Journal of Law and Economics 1960;3:1–44;
Stigler GJ. The theory of price, 3rd ed. New York: Macmillan; 1966 p. 113.

[19] Helgason A, Palsson G. Contested commodities: the moral landscape of modernist regimes. The Journal of the Royal Anthropological Institute 1997;3(3):451–71.

[20] Butler C. Fishing for a pension or for peanuts?. Samudra Report 2004;39: 8–14.

[21] Myerson RB. Perspectives on mechanism design in economic theory. American Economic Review 2008;98(3):586–603;
Coase RH. The firm, the market, and the law. Chicago: University of Chicago Press; 1988 p. 1–31.

[22] Clark C, Munro G, Sumaila UR. Buyback subsidies, the time consistency problem, and the ITQ alternative. Land Economics 2007;83(1):50–8.

[23] Department of Fisheries and Oceans (DFO). Pacific region 1999 halibut integrated fisheries management plan. Vancouver: Fisheries and Oceans Canada; 1999.

[24] Department of Fisheries and Oceans (DFO). Pacific region 2000 halibut integrated fisheries management plan. Vancouver: Fisheries and Oceans Canada; 2000.

[25] Windle MJS, Neis B, Bornstein S, Binkley M, Navarro P. Fishing occupational health and safety: a comparison of regulatory regimes and safety outcomes in six countries. Marine Policy 2008;32:701–10.

[26] Wallace C, Weeber B. The devil and the deep sea-economics, institutions and incentives: the theory and the New Zealand quota management experience in the deep sea. FAO Corporate Document Repository, Food and Agriculture Organization, Rome; 2003.

[27] Sanchirico JN, Holland D, Quigley K, Fina M. Catch-quota balancing in multispecies individual fishing quotas. Marine Policy 2006;30(6):767–85.

[28] McRae DM, Pearse PH. Treaties and transition: towards a sustainable fishery on Canada's Pacific coast. Vancouver: Hemlock Printers; 2004 p. 58.

[29] Pinkerton EW. Competition among BC fish processing firms. In: Marchak P, Guppy N, McMullan J, editors. Uncommon property: the fishing and fish processing industries of British Columbia. Vancouver: University of British Columbia Press; 1987. p. 66–91.

[30] Coase RH. The firm, the market, and the law. Chicago: University of Chicago Press; 1988 p. 1–31.

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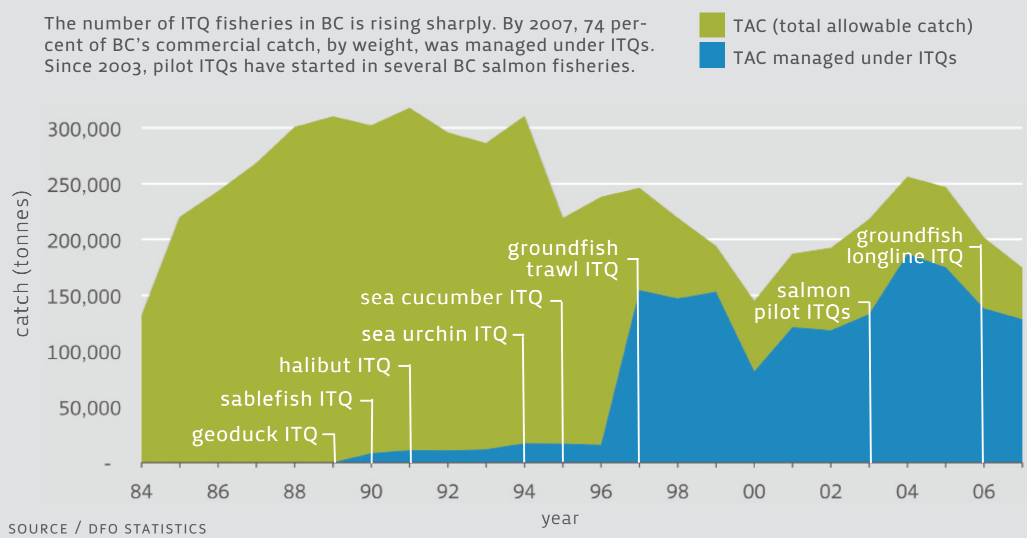
briefing / a cautionary tale about ITQs in BC fisheries

ISSUE 8 2009 ECOTRUST CANADA / INTELLIGENCE ON THE CONSERVATION ECONOMY

DRAFT MAY 13

A wave of ITQs in BC's commercial fisheries

The number of ITQ fisheries in BC is rising sharply. By 2007, 74 percent of BC's commercial catch, by weight, was managed under ITQs. Since 2003, pilot ITQs have started in several BC salmon fisheries.



SOURCE / DFO STATISTICS

A cautionary tale about ITQ fisheries

FISHERIES / Individual transferable quotas (ITQs) are being promoted as a panacea for global fisheries. However, analysis of BC fisheries raises serious questions about this new economic approach. Its time to rethink how ITQs are designed, managed and implemented.

Ecotrust Canada has undertaken this analysis, not to argue for the dismantling of existing ITQ programs, but rather to improve their design, and to inform policy discussions about new ITQ pilot programs currently under consideration.

Debate about ITQs is often polarized and fuelled more by ideology than reality. Proponents hail ITQs as a solution for both conservation and the financial ills plaguing the fishing industry. However, too many people—including some environmentalists—accept exaggerated claims about ITQs without clearly knowing the facts. Downplayed is the critical role that sound science and good governance—that is, inclusive, transparent co-management between government, and industry and stakeholders—plays in ensuring the sustainability of fisheries.

Unfortunately, a number of recent studies—including a high-profile 2008 article in the journal *Science*—have exaggerated the virtues of ITQs, drawn specious correlations, ignored unintended consequences and, generally, oversimplified the complex causes of fisheries collapses and how to stop them. Perspective is being lost as myth becomes received wisdom.

By ignoring the shortcomings of ITQs and overstating their effectiveness poor decisions are being made and will be made in the future. With refreshing facts and sobering analysis,

MORE

Ecotrust Canada offers a cautionary tale about ITQ fisheries. We use BC as our case study. The lessons learned are of global significance.

BACKGROUND

Historically, competition has characterized BC fisheries. Each fisherman competed against his fellow fishermen for a share of the catch. Under poorly managed competitive fisheries, fishermen were forced into a vicious cycle of acquiring bigger boats and better fishing technology to out perform each other. ITQs are supposed to end this so-called “race to fish.”

Under ITQ systems, each fisherman is allocated a defined share of the total allowable catch (TAC). These quotas are “transferable,” allowing fishermen to buy, sell, lease and trade them. ITQs go by many names, some of them misleading: catch shares, limited access privileges, dedicated access privileges, individual vessel quotas, individual fishing quotas. However, we define ITQs as having three common characteristics: they are a *defined share* of the catch, are allocated to *individual* fishermen or their vessels, and are *transferable* to some degree.

Reflecting a global trend, ITQs have been implemented in BC fisheries with growing frequency in the 1990s. Today, there are eleven ITQ fisheries representing 74 percent of the catch, by weight, of all BC fisheries. Pilot ITQs have also been introduced in select salmon fisheries. By contrast, only about one percent of global fisheries are managed under ITQs.

“Proponents of ITQ fisheries make many claims about the benefits of ITQs which do not hold up under scrutiny. Some of these claims have become incredibly pervasive and unquestioned.”

ITQs have met some goals in terms of conservation and the financial performance of fishermen. First, in many fisheries, ITQs make fishermen responsible for keeping within an individual catch limit thereby ensuring that the entire fleet stays within a strict TAC. That’s been good for conservation. And second, in many fisheries, quotas have provided fishermen with greater flexibility to schedule their fishing trips to meet market demand. Market gluts have been reduced and landed values, in some cases, have increased.

Many other claims about the benefits of ITQs do not hold up under scrutiny. Some of these claims have become incredibly pervasive and are largely unquestioned. Shortcomings have also been downplayed or completely ignored, especially regarding the fairness of ITQs to crews, rural coastal communities and First Nations. What follows are lessons learned from the practical experiences of designing, implementing and managing ITQs in BC.

Lesson 1

ITQs promote quota leasing.

It is often stated that ITQs provide fishermen with “a secure asset, which confers stewardship incentives” (Costello, 2008). By owning a financial stake in a fishing quota, fishermen have an incentive to maintain the value of this “secure asset” through responsible fishing practices. That’s the theory.

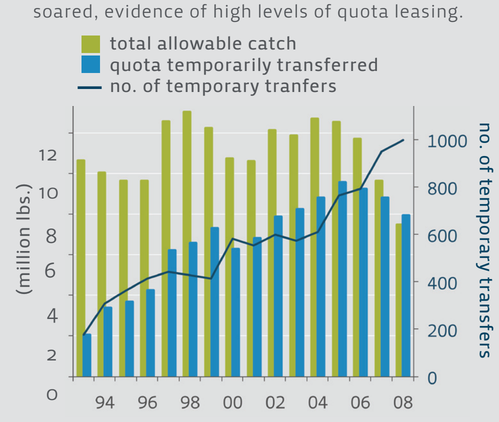
In reality, ITQs don’t promote ownership by active fishermen in BC. Rather, ITQs promote absentee ownership and quota renting or leasing. Once vessel owners are gifted their initial quota, they are free to retire and live off the proceeds of quota lease fees. Increasingly, “armchair fishermen” or “slipper skippers” lease their quotas to working fishermen. Unlike several other jurisdictions, such as Alaska and Atlantic Canada, there are no owner-operator rules in BC restricting or even regulating the ownership or leasing of fishing quota by non-active fishermen or outside investors.

According to a recent survey, 13 percent of current fishermen in BC plan to lease their quota when they retire (CCPFH, 2005). In a pilot ITQ fishery, almost half the Chinook salmon quota was leased from 2005 to 2007.

Leasing has steadily risen in the halibut fishery too. In 1993, 19 percent of the halibut quota was temporarily transferred from one vessel to another during the year. By 2008, the

Rent-a-halibut

The amount of halibut quota temporarily transferred from one vessel to another each year has soared, evidence of high levels of quota leasing.



SOURCE /DFO STATISTICS

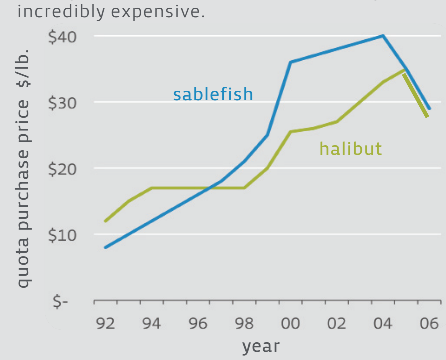
ratio skyrocketed to 106 percent of the TAC, evidence of high levels of leasing. Some leasing is necessary, especially in BC's integrated groundfish fishery in which the practice of fishermen leasing quota to each other significantly reduces bycatch. However, by far the greatest volume of leasing is motivated by the rents earned from quota ownership.

In some cases, processors even lease quotas and then sublease them to fishermen, passing on all the costs and risks. Stewardship incentives are lost as fishermen struggle to squeeze even a marginal profit out of leased quota. Working fishermen are increasingly becoming "tenants" paying exorbitant rents to landlords, or "sealords," who own the quota.

In addition, the high costs of purchasing quota in BC (see Lesson 4) may cause fishermen to lobby for increased TACs to help finance loans for buying quota, regardless of natural fluctuations in fish stock levels. As a result, short-term debt obligations may cause fishermen to over-fish stocks to meet their immediate financial needs.

High cost of ownership

Buying sablefish and halibut quota has grown incredibly expensive.



SOURCE / NELSON (2006), ECOTRUST CANADA (2005)

Lesson 2

ITQs give fishermen a false sense of security.

Fishing is an uncertain business. The weather, shifting allocations, fluctuating fish stock levels, market forces—all of these factors lead to a sense of insecurity. It's no wonder why some fishermen want ITQs to secure their slice of the pie. ITQs can reduce a bit of uncertainty, but they by no means eliminate it, and in some cases can exacerbate it.

First, in terms of allocations, quotas provide no more legal protection to fishermen than regular fishing licences. Whether a fisherman owns a licence or quota, the government can reallocate commercial catches to settle international or First Nations' treaties, or to meet demands of the sports-fishing sector. By way of example, 12 percent of the commercial halibut catch was reallocated to the sports-fishing sector in 2003. This was done without compensation to quota holders. ITQs don't strengthen the property rights of fishermen either to prevent reallocations or in seeking compensation.

Second, ITQs do nothing to mitigate ecological uncertainty. Climate change, marine survival rates, foreign over-fishing, and cyclical fluctuations in fish stock levels create the greatest uncertainty for fishermen. Quotas are not absolute, but are a percentage of the TAC which can fluctuate from year to year. That's particularly true in salmon fisheries. Marine survival rates, predation, habitat damage and other factors affect annual salmon runs. Scientists find it incredibly difficult to predict annual stock abundance, and typically change their estimates in-season. Setting an absolute TAC pre-season could be dangerous for conservation if test fishing and in-river fish counters determine that actual run sizes are smaller than pre-season forecasts. Quotas, therefore, can create a false sense of security if fishermen's quotas shift in-season because of changing abundance forecasts.

Third, in terms of market forces, ITQs can help fishermen respond better to the market by giving them flexibility to deliver catches when demand and prices are high. However, many fishermen lease quota in pre-season agreements, locking themselves into lease rates per pound. If fish prices drop or fuel costs rise, their profits could disappear. In some fisheries, 60 to 80 percent of the landed value goes to paying quota lease fees. As a result, quota leasing can actually increase fishermen's risk and exposure to changing market forces.

The only thing absolutely certain about ITQs is that some fishermen will opt to lease their quotas, thus guaranteeing themselves revenue without any risk of having to actually go fishing.

Lesson 3

ITQs encourage privatization.

Fishing licences and quota are "undeniably a property right."

SUPREME COURT OF CANADA, 2008

Privatization is probably the most controversial and convoluted issue in the ITQ debate. Some free-market proponents talk about ITQs in terms of "rights" and "property." Other proponents, attempting to downplay the privatization controversy, go out of their way to avoid such language. Thus, some ITQ advocates talk of dedicated or limited "access privileges."

Fishing licences and quotas are not property *de jure*, that is "in law." Rather, they are property *de facto*, that is "in practice."

In 1969, DFO introduced limited entry in BC fisheries, grandfathering a limited number of licences to existing fishing vessels. By law, these licences confer annual fishing "privileges." However, DFO allowed fishermen to buy, sell, trade and lease these privileges. As a result, the licences became valuable assets or *de facto* property. Quotas create new forms of *de facto* property, beyond limited licensing, that can be divided, capitalized and transferred with even greater ease.

In October 2008, the Supreme Court of Canada, in *Saulnier v. Royal Bank*, unanimously confirmed the *de facto* property rights inherent in fishing licences and quota. The Justices write: "A… licence confers to the holder a right to engage in an exclusive fishery under the conditions imposed by the licence, and a proprietary right in the fish harvested and the earnings from their sale. The subject matter of the licence, coupled with a proprietary interest in the fish caught pursuant to its terms, bears a reasonable analogy to a common law profit *à prendre* which is undeniably a property right."

Lesson 4

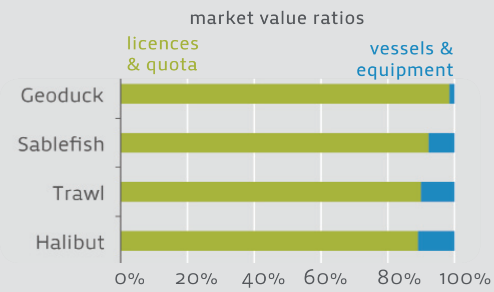
ITQs increase capitalization in fisheries.

"Too many fishermen chasing too few fish." That mantra drove fisheries reform in the 1990s. ITQs were implemented, in part, to downsize fishing fleets and thereby reduce over-capitalization. The number of vessels in several ITQ fisheries in BC has severely declined. The trawl fleet went from about 120 to about 75 active vessels. ITQs downsized the sablefish fleet by about 25 percent.

Capitalization has traditionally referred to investment in vessels and equipment. However, ITQs had an unintended consequence on another type of capitalization. Investment in quota and licences, described as "intangible assets" by accountants, soared. By 2007, intangible assets were estimated to be worth $1.8 billion, more than five times the value of all the vessels and equipment in BC fisheries. When licence and quota market values are taken into consideration, total capitalization—

Growing out of proportion

ITQs are the most capital intensive fisheries in BC. The value of licences and quota, compared to vessels and equipment, is considerably higher in the geoduck, sablefish, trawl and halibut fisheries, which are managed under ITQs.



SOURCE / NELSON (2007)

in both tangible and intangible assets—has actually increased in BC's fishing industry.

No matter how you measure it, ITQs are more capital intensive than fisheries managed under alternative systems. In BC, the market value of licences and quota compared to vessels and equipment is disproportionately higher in ITQ fisheries. This is also true when you compare the value of quota to the landed value of a fisheries' catch. In Atlantic Canada, the ratio of licences and quota value to landed value is 2 to 1. The ratio for BC halibut and sablefish ITQ fisheries is 4 to 1, or double. Quota values are completely out of proportion

BY THE NUMBERS

5 TO 1
ratio of quota and licence value to vessel and equipment value in ITQ fisheries

$1.8 billion
value of licences and quota in BC fisheries

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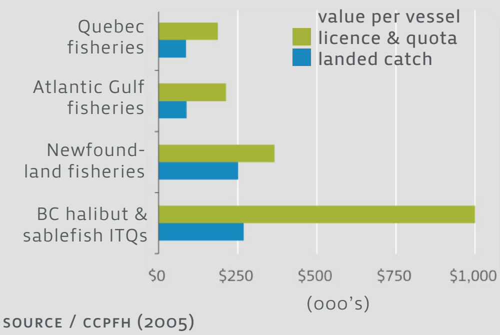
to catch landed value.

According to one industry study, "Few in the industry claim that [quota] lease rates are set according to economic rules or as a result of sophisticated business forecasting" (Nelson, 2006). A number of factors have led to the unusual appreciation of quota values and lease rates including transaction costs of brokers, market distortions from the initial gifting of quota, supply scarcity, imperfect information among buyers and sellers, low opportunity cost of aging fishermen and expectations of government buy-backs. All of these factors have put upward pressure on quota values.

Today, the market capitalization of quota is a growing problem. That's particularly true, as we'll see, for active fishermen, both captains and crewmen.

Money hungry ITQs

BC halibut and sablefish ITQs are unduly pricey relative to landed value and Atlantic fisheries.



SOURCE / CCPFH (2005)

Lesson 5

Quota leasing hurts the financial performance of working fishermen.

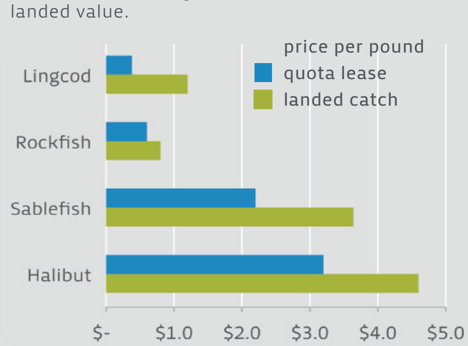
By allowing fishermen to better meet market demand, ITQs can reduce gluts and improve fish prices. Landed values often rise. While this is true in some fisheries, it is not true in others. The change to ITQs for BC dogfish fishermen in 2006 provided no market advantages and fish prices actually declined due to other factors.

Claims that ITQs increase overall landed value mask the deteriorating financial performance of working fishermen (crews and captains) compared to quota owners. Those vessel owners initially gifted quota enjoy a windfall profit. Many vessel owners subsequently lease their quota for lucrative lease fees. ITQs certainly improved their financial performance.

Crew shares of working fishermen usually decline as revenues are drained to pay quota leases. Analysis shows that the single largest cost in BC's longline groundfish fishery is the leasing of quota. Lease fees can often consume as much as 60 to 75 percent of the landed value of the catch, leaving the remainder to be divvied up by the crew.

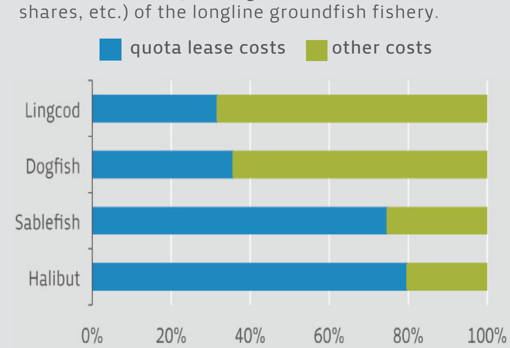
Fleecing by leasing

In the BC longline groundfish fishery, quota lease fees are as high as 75 percent of catch landed value.



SOURCE / ECOTRUST CANADA (2008)

Quota lease fees also account for 26 to 84 percent of the total operating costs (fuel, food, crew shares, etc.) of the longline groundfish fishery.



SOURCE / ECOTRUST CANADA (2008)

BY THE NUMBERS

75%
of landed value goes to pay quota lease fees in the BC halibut fishery

30%-50%
decline in crew shares occurs when all quota on a BC groundfish trawler is leased

84%
of the total costs in the halibut fishery is from quota lease fees

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Capital punishment

Capital wins, crews lose. Trawl crews are being pinched in two ways: First, as the percentage of quota leased onboard trawlers increases, crew shares decline to pay lease fees that finance the capital cost of expensive quota (Chart 1). Second, the lease fees themselves have risen since quotas were introduced in 1997 (Chart 2).

Chart 1 / trawl crew shares decline

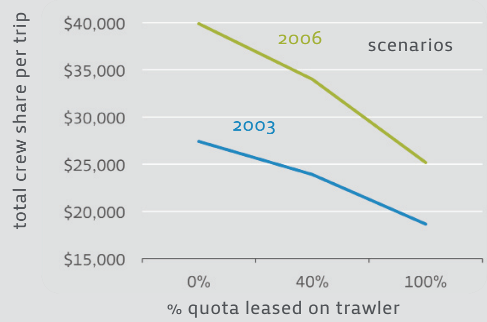
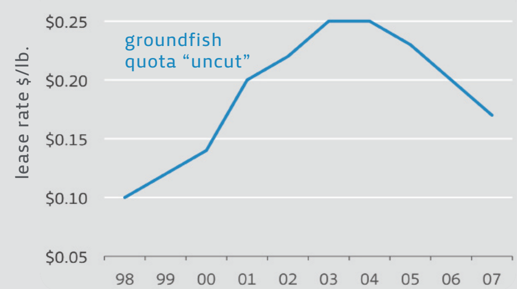


Chart 2 / trawl quota lease fees rise



SOURCE / NELSON (2006)

One study of scenarios in the trawl fishery showed that when 100 percent of quota is leased on a vessel, crew shares can decline by almost fifty percent. Complaints from crews suggest lease fees are being increasingly charged on quota whether or not it is owned or leased by the trawler, thereby reducing crew shares. This unfair settlement practice has yet to be seriously investigated.

In a 2006 memo to communities, the Groundfish Development Authority, which enforces a code of conduct to protect trawler crews, reported: "Crew members' take-home pay continues to diminish; sometimes they come back from a trip with deliveries of 80,000 lbs of high-value groundfish only to find that they are actually 'in the hole' after all expenses are deducted."

Lesson 6

Sound science and monitoring are not dependent on ITQs.

A number of reports claim that ITQs enhance monitoring and science. One U.S. study found three quarters of ITQ fisheries had monitoring compared to only a quarter of other fisheries. While ITQ fisheries can require stricter monitoring because of high-grading problems, monitoring and sound science are in no way dependent on ITQ programs.

In BC, stricter monitoring was often introduced concurrently with ITQs, giving the impression that these efforts were a direct result of the quota system itself. However, in the dogfish, lingcod and rockfish fisheries, dockside catch verification was in place a decade before the introduction of ITQs. And the halibut and sablefish fishery were managed with ITQs for some fifteen years before both fisheries had onboard monitoring.

One thing is certain: if strict catch monitoring isn't implement in ITQ fisheries catastrophe can result. ITQs were introduced in the BC abalone fishery in 1979, but poor monitoring led to poaching and over-fishing by licensed harvesters. The fishery collapsed and has remained closed since 1990.

Monitoring ITQs

In BC, strict dockside and at-sea monitoring was often introduced at the same time as ITQs, giving the impression that quotas are somehow responsible for better fisheries monitoring.

		100% monitoring	
	ITQ	dockside	at sea
Sablefish	1990	1990	2006
Halibut	1991	1991	2006
Groundfish trawl	1997	1996	1996
Longline dogfish	2006	1996	2006
Longline rockfish	2006	1996	2006
Longline lingcod	2006	1996	2006

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Lesson 7

ITQs have safety problems of their own.

It is often claimed that fishermen are forced to go out in bad weather in competitive fisheries to ensure that other fishermen don't get more fish in their absence. This risky behaviour leads to unsafe working conditions. ITQs stop this "race." While poorly managed competitive fisheries can create unsafe conditions, ITQ fisheries have problems of their own.

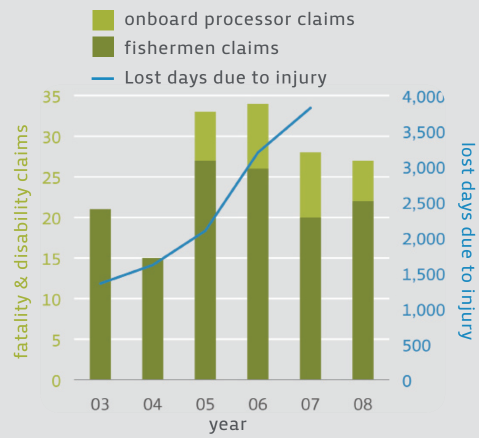
ITQs offer fishermen market incentives to engage in risky behaviour. Fish prices are often higher in winter months when less fresh fish is on the market due to bad weather. Fishermen may plan their annual fishery to take advantage of the increased prices, thereby exposing crews to the dangers of foul weather. This is particularly true if fishing vessels must lease a lot of quota which tightens their profit margins. Vessels may also stay at sea in bad weather to keep down the costs of fuel and dockside monitoring.

More seriously, the high cost of buying and leasing ITQs bleeds income away from working fishermen, causing boats to go out with inexperienced or insufficient crewmen, which can lead to accidents. At a 2007 Fish Safe BC workshop, "quota fisheries issues" and "too few crew on vessels" were identified as two weaknesses, among many, that need to be addressed to improve fishing safety.

In BC, the Groundfish Development Authority has received reports that trawl "vessel owners, in order to keep costs down, are sending their vessels to sea with three-man crews instead of four. This is a major safety concern that crewmembers believe is a contributing factor in the loss of several vessels in the past few years." A trawl industry study confirmed this practice: "Traditional four-man boats are sometimes manned with three, primarily as a means of improving per-person incomes. Neither vessel owners nor crewmen believe that this trend is in the best interests of safe operations" (Nelson, 2006). Falling fish prices and rising fuel costs are partly to blame for tighter margins, but quota leasing and unfair settlement practices have made a bad situation worse for working fishermen.

Trawl injuries rising

Despite claims that ITQs are safer, groundfish trawling, which became an ITQ fishery in 1997, is becoming more dangerous. The number of lost days due to injury has increase 182% in five years. Fatalities are on the rise as well.



SOURCE / WORK SAFE BC (2008); FISH SAFE BC (2009)

Safety statistics suggest that ITQs haven't made the trawl fishery safer. Indeed, the opposite may be true. From 2003 to 2008, seven trawl fishermen have been killed, double the annual fatality rate compared to the 18-year average. Lost days due to injury on trawl vessels skyrocketed by 182 percent from 2003 to 2007, too, and the number of fatality and disability claims in the same period jumped 33 percent. The introduction of several factory trawlers in 2005 and injuries sustained by onboard fish processing workers partly explains the increase.

Still, despite claims that ITQs have made trawling safer, fatalities are at a historic high for this fleet. Anecdotal and statistical evidence suggest that the economics of ITQs have created safety problems of their own.

Lesson 8

Sound science and co-management underpin fisheries sustainability.

Proponents often exaggerate the importance

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of ITQs in sustainable fisheries. Setting a scientifically defensible TAC and establishing an inclusive and transparent co-management process are by far the most important aspects of fisheries conservation. No fishery, ITQ or otherwise, will be sustainable in the long run without these two key measures.

First, ITQs cannot prevent over-fishing if TACs are based on faulty science, poor data or industry lobbying, or if a precautionary approach is not taken in harvesting.

A recent study (Costello, 2008), surveying 11,135 fisheries from 1950 to 2003 published in the journal *Science*, states that the implementation of variations on ITQs "halts, and even reverses, the global trend toward widespread collapse." The authors, however, over-stretch their findings by implying there is a causal link between ITQs and sustainable fisheries.

In fact, all the 121 ITQ fisheries in their study had "scientifically determined total catch" limits, suggesting that it could be sound science and strict TACs—and not necessarily ITQs themselves—that ensure the sustainability of fisheries. Further investigation may reveal that implementation of "scientifically determined total catches" in both ITQ and non-ITQ fisheries is the critical factor in halting and reversing fish stock collapses worldwide.

Good governance is another critical ingredient to ensuring sustainable fisheries. For proper decisions to be made, all those with an interest in fisheries need to be involved including First Nations, communities, sports fishermen, processors, commercial fishermen, environmental groups, etc. This is called inclusive, transparent co-management.

ITQs alone can't answer questions about seasonal closures to protect spawning fish, designing refugia areas for depleted species, habitat protection, restricting harmful fishing gear, weak-stock management and many other issues. Dozens of critical conservation and socioeconomic decisions are made every year by various co-management advisory processes set up to help the Department of Fisheries and Oceans (DFO) manage marine resources.

ITQ proponents often claim that quotas are easier to manage since the marketplace is supposed to take care of everything. Yet few people support a completely deregulated, laissez faire market. Quota markets need to be regulated and properly designed to prevent monopolies, excessive corporate concentration and other irresponsible behaviour. A properly designed quota market can also safeguard "social goods," such as fair crew payments, Aboriginal participation in fisheries and the interests of rural communities.

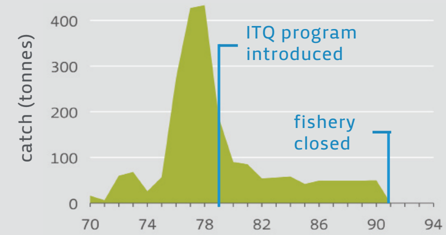
DFO advisory committees constantly deal with issues regarding ITQs including ownership concentration, transferability rules, vessel quota caps, sector allocations, quota lease rates, etc. In the BC trawl ITQ fishery, a Groundfish Development Authority was also established to safeguard the interests of crews and rural communities. Furthermore, commercial exchanges need to be established to facilitate quota trading, which adds complexity and costs to business operations.

In short, ITQs are no substitute for sound science and good governance. They represent only one alternative, among many input and output controls, to responsibly manage marine resources.

The central lesson of this brief investigation is that there are no simple solutions. In some cases, such as in BC's integrated groundfish fishery, ITQs, if properly designed, can play a positive role in a multi-faceted approach to responsibly managing fisheries. Rather than wholeheartedly embracing one alternative over another, Ecotrust Canada takes a practical approach to designing fisheries management systems and market incentives that create ecological, social and financial returns.

ITQs' first failure

ITQs did not curb poaching or irresponsible harvesting in the abalone fishery. Catches declined but conservation problems persisted. The fishery closed in 1990 due to depleted stocks.



SOURCE / DFO STATISTICS

SOURCES

• Costello, Christopher et al. "Can Catch Shares Prevent Fisheries Collapse?," *Science*. Vol 321, pp. 1,678-1,681 (2008).
• Ecotrust Canada. *Catch-22: Conservation, Communities and the Privatization of BC Fisheries* (2006).
• Nelson, Stuart. *Commercial Fishing Licence, Quota and Vessel Values - West Coast Fleet*. DFO. (2006).
• Nelson, Stuart. *Analysis of Quota Leasing in the Groundfish Trawl Fishery*. Canadian Groundfish Research and Conservation Society (2006).
• Canadian Council for Professional Fish Harvesters. *Setting a New Course* (2005).
• Edwards, Danielle N. *et al*. Ecotrust Canada. *Does Size Matter: An Investigation of the Financial Impacts of Vessel Size in the BC Groundfish Fisheries* (Unpublished).

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A Non-Profit Organization Since 1997

Trawl Rationalization Adaptive Management Considerations

Background

The Pacific Fishery Management Council approved a groundfish rationalization program for the west coast bottom trawl fishery and earmarked 10% of the quota for possible use for community stability, adaptive management issues and other unintended consequences of the trawl rationalization program. The Council also stipulated a cap for each state, up to three percent, to prevent one state from taking the entire 10%. It is unclear what the final community stability/adaptive manage segment will look like when the staff is finished writing and this uncertainty is making the trawl fleet uneasy.

One source of uncertainty comes from a simple permit count by state. Using permit information from the Northwest Regional Office of NOAA's NMFS taken on September 17, 2008, California had 49 trawl permits, Washington had 43 trawl permits and Oregon had 85 trawl permits. Oregon is home of the majority of the trawl fleet. Oregon has nearly twice as many trawlers as Washington; Oregon has seven less permits than California and Washington combined. So, if for some reason community stability and adaptive management programs become popular, Oregon would be required to give up quota to California and Washington. To Oregonian trawlers, this is unacceptable.

The trawl fleet isn't against community set-a-sides nor are we in favor of them at this time because we don't know what the program will look like and how it will function. What scares us a little is the discussions we have heard about how the communities will ask for and be granted quota. Besides the fact that Oregon fishermen don't want their quota moving north or south unless the fishermen have sold or leased quota shares or sold quota pounds, a committee deciding who they are "going to take from" and who they are going to "give to" removes the stakeholder from the action. If fishermen are going to give up some quota for a program, they want to be part of the decisions of that program; they want to be part of the effort that is going to benefit their community from the program they help design; they want to be an active a part of the plan for the future.

Fair, Equitable Split

The ideal program would require the formation of a community committee that would engage the fishermen, various components of that fishing community, other components of that community (including government agencies) to develop a plan for the use of the quota in that community.

Once the committee outlined the plan for that community, trawlers that call that port their home port would be required to deliver up to 10% of their quota to their home port for use in that program. Even if a trawler normally delivers to another port, the community set-a-sides would be for the trawlers' own home port and no other unless it is to compensate for "an unintended consequence" of the rationalization program. In that case, the state would use the quota to mitigate the consequence state wide or all three states would share the quota to mitigate the consequence coast wide.

Approaching the program in this manner would empower both the fishermen and community by developing the plan together, by assessing community needs, by looking at the community's infrastructure and facilities, by surveying fresh product availability within the community, by making it truly a community based project that would be long lasting with a healthy future in the cross hairs.

This approach would assure fishermen that their quota is being used to benefit their own community. This approach could encourage communities to support not only their local trawl fleet but every sector of the fishing industry.

The 10% Set-A-Side

The up to10% set-a-side quota reserved for adaptive management, and possibly community fishing associations with special projects, should only be **quota pounds**. Each state should have their own pool, created by calculating the total quota received by that state's own trawl fishermen, to deal with the set-a-side for that state. Oregon boats would be able to pool their 10% and that amount would stay in Oregon. Washington boats and California boats would pool their own quota amounts to benefit project need in their own states. California would not be able to attach Oregon quota unless it was also receiving Washington quota to mitigate an **unintended consequence** caused by the program. The only time all three states' quota should be combined is to mitigate unintended consequences that have caused harm in all three states.

Community Specific Design

Communities interested in receiving quota would have to organize to develop a plan. Community members, fishing organizations or fishermen would be the catalyst to establishing a committee within their port district. The goal of a community program would vary depending on the need established by the committee.

Local fishing organizations (our current associations) within each state could pool resources to reduce by-catch and discards and prosecute the fishery as the association's catch sharing plan. These same organizations could include members of the public, community leaders, local tribe representatives, other fishing sector participants, port staff to create special projects to improve the port facilities, educate the public, promote fresh local seafood, assure full utilization of the resource, prevent export of jobs, create new work opportunities and encouraged the delivery of their catch to their home ports. Community and state agencies would have to be part of the committee to assure tax credits or other enticements that could be offered to attract new participants. The boarder the committee base the greater the opportunity for success of the program.

The infrastructure in many ports has deteriorated or no longer exists and community set-a-side could help improve the facilities and keep the port a working port. Quota could be used to entice processors to process fish in the port rather than truck the product to another port for processing. Quota could be used to renovate processing facilities so they are tourist friendly offering tours of the operation. Quota could be used to create interpretive centers to educate the public about the resource, the harvesters, the gear, the end products, the watershed and surrounding features and other resources in the community. Quota could be used to help a community **brand** their products so quality products become synonymous with the region's name.

Example 1
A port has no processing capacity left within their port area. The committee's long-term goal might be to establish a processing facility to service their port. The initial phase may concentrate on getting a buying station in the port so at least fish are being landed in that port. Phase two might be establishing a small facility to assure local businesses have access to fresh locally caught product. A third phase might be establishing a small fillet line so local restaurants would not have to process the fish themselves.

Example 2
A port has some processing but some buyers truck the product they buy to another port for processing. The committee's long-term goal might be to create more jobs to support the fishing industry. The committee could stipulate that the community quota has to be process in their port.

The examples that could be dramatized here are endless and are only limited by the imagination. The concept of locally designed programs could attract new buyers, innovators of seafood products and production and even waste management processes that could enhance the community as a whole.

Adaptive Management programs can take on many shapes and forms. What ever the end program looks like, it is our hopes that AM will be a benefit to communities and the fishing industry as a whole and not a program of giving some group an advantage over other groups or communities. AM programs should benefit those that are giving up personal quota and not those wishing to line their pockets at other's expense. We might not mind giving when we are involved and when we may benefit from our action but we very much hate the thought of someone taking with no direct benefit considered to the givers

Sincerely,

Steve Bodnar

[Note: Below are excerpts from a letter submitted by the Pacific Coast Federation of Fishermen's Associations. The full public comment can be found under Agenda Item E.3]

E.12 FMP Amendment 20 – Adaptive Management Program

At the May GAC meeting, the GAC adopted a motion to support the "pass through" of Adaptive Management Program quota pounds to permit holders for the first two or three years of the "rationalized" fishery. The GAC recommended a reactive approach in addressing problems that will crop up in the rationalized fishery.

Given the warning contained in the EIS regarding the impacts that trawl rationalization will have on "vulnerable" fishing communities, PCFFA recommends the opposite approach of the GAC recommendation. The adaptive management program should anticipate problems and address them before they develop. PCFFA recommends using the Adaptive Management quota pounds for its original intent – to address the myriad social, economic, and conservation problems that are expected to form at the outset of the trawl rationalization program. The Adaptive Management program was originally designed to help address the transition from one management regime to the next. If the Adaptive Management Program is put on hold for two or three years, it will not be able to fulfill that function.

The experience from other IFQ fisheries has shown that problems due to management transitions need to be addressed before the implementation of a new system. The EIS, though insufficient in its analysis of likely impacts, already highlights some problems that are likely to develop. Additionally the EIS lists ports that are likely to be adversely affected by the management changes. A good starting point for the Adaptive Management Program would be to identify regions and ports that could benefit from the infusion of quota pounds in order to limit the socioeconomic impacts.

Agenda Item E.12.c
Supplemental Public Comment 2 (on screen)
June 2009

In November at final action council elected to remove from their preliminary preferred alternative harvest share allocation to shore-side processors.

At the time council indicated that the Adaptive Management program would be an alternative route to satisfy the processor concerns about the transition to the IQ fishery.

We propose the following:

- A formulaic distribution to begin in year 2 of the program
- The allocation formula at year 1 of the implemented AMP program would be based upon a 3 year window period.
    - We suggest year 2007 -2009.
- AMP quota pounds pro-rated to each vessel by species based upon processor fish ticket records.
- The formula then transitions in year 2, to a rolling average based upon the previous 3 years of landing history. This could be easily transitioned to year 3 and beyond.
- Should a vessel move to another processor, the remaining vessels would continue to receive a comparable fraction of the AMP rolling pounds based upon that vessels' historical landings.

Council Decisions for implementation:

- Year 1: Council would need to identify the window period for allocation.
    - We suggest year 2007 – 2009
- Council needs to decide whether to adopt the 3 year rolling period suggested above (i.e. 2007 – 2009).
    - GMT states the running formula could be easily extended past year 2 of the program.
    - GMT also reports this formula would not be data intensive. The first receiver and total pounds on the fish ticket would be sufficient to determine the vessel AMP Quota received through that processor.

Once the formula is set, the processor has no influence on the distribution. The vessel has the control to determine whether they receive or abandon the opportunity to receive these pounds.

This proposal satisfy's the needs of communities, processors and the fishermen as directed by the council.