MANAGEMENT SPECIFICATIONS FOR 2007-2008 FISHERIES

The Council decided last November to develop an Environmental Impact Statement (EIS) to determine 2007-2008 groundfish harvest specifications and management measures, and to consider revisions to adopted rebuilding plans for seven depleted (overfished) groundfish species. The latter purpose has lead to Amendment 16-4 to the Groundfish Fishery Management Plan (FMP), where the Council's groundfish rebuilding framework and species' rebuilding plans are specified. The purpose and need and contextual basis for this EIS are detailed in a preliminary draft of Chapter 1 of the EIS (Agenda Item F.1.a, Attachment 1).

In November 2005, the Council also adopted a process and schedule for developing the EIS, adopted a range of alternative harvest specifications to analyze for 2007-2008 fisheries and Amendment 16-4 considerations, provided guidance for developing EIS alternatives for analysis, and delegated the task of further development of EIS alternatives for analysis to the Groundfish Management Team and Groundfish Allocation Committee (minutes for this February 2006 meeting are included in Agenda Item F.1.a, Attachment 2). EIS alternatives developed to date are described in Chapter 2 of the preliminary draft EIS (Agenda Item F.1.a, Attachment 3).

The Council is tasked with deciding three actions related to EIS considerations this week: 1) preliminary adoption of draft revised rebuilding plans, including optimum yields (OYs) and draft FMP amendatory language under Amendment 16-4 (Agenda Item F.1.a, Attachment 4 contains draft amendment language) for public review, 2) adoption of final preferred 2007-2008 groundfish harvest specifications (acceptable biological catches [ABCs] and OYs) for the rest of the groundfish species, and 3) adoption of a refined range of 2007-2008 groundfish management measure alternatives for analysis that are designed to stay within final preferred OYs. The first two actions are contemplated under this agenda item and the third action has been separated into two steps as agenda items F.5 and F.6 on Thursday and Friday, respectively.

The first two of the above actions are considered under this agenda item: preliminary adoption of revised rebuilding plans for seven depleted groundfish species and adoption of preferred 2007-2008 groundfish harvest specifications (Table 2-1 in Agenda Item F.1a, Attachment 3 shows ABC and OY values for all groundfish species, including the seven depleted species). These two actions are interconnected in that the selection of OYs for the seven depleted species with rebuilding plans needs to be identical between the rebuilding plans and the 2007-2008 biennial specifications. Therefore, it is suggested that the Council separate their deliberations as follows:

- First, consider the revised rebuilding plans, which entails deciding OYs for 2007-2008 in addition to a harvest strategy, and estimated median time to rebuild the stock (T_{TARGET}).
- Second, consider the draft amendment language for Amendment 16-4.
- Lastly, decide ABCs and OYs for all other groundfish species.

Rebuilding plans must meet the Magnuson-Stevens Fishery Conservation and Management Act (MSA) mandate to rebuild depleted stocks in as short a time as possible, while taking into account the status and biology of the depleted species, the socioeconomic needs of West Coast fishing communities, and the interaction of the depleted stocks within the marine ecosystem. Analyses of EIS alternatives are designed to demonstrate the short and long-term costs, benefits, and tradeoffs associated with alternative rebuilding plans. These analyses are included in Agenda Item F.1.a, Attachment 5 (Economic analyses); F.1.a, Attachment 6 (Socioeconomic analyses); and attachments under Agenda Item F.5 (management measure descriptions and impact analyses).

Council and NMFS staff will host a special session at 6:30 p.m. Sunday, April 2 in the Capital Ballroom to present EIS alternatives and results, discuss the biological and socioeconomic consequences of rebuilding alternatives, and answer questions relative to any of these issues (Agenda Item F.1.a, Supplemental Attachment 7, available Sunday evening).

Council Action:

1. **Adopt Preliminary Revised Rebuilding Plans for Overfished Species, including OYs for 2007-2008, a Harvest Strategy, and Target Rebuilding Time (T_{TARGET}).**
2. **Adopt Preliminary Fishery Management Plan Language for Amendment 16-4.**
3. **Adopt Final Preferred 2007-2008 ABCs and OYs for All Other Appropriate Groundfish Species.**

Reference Materials:

1. Agenda Item F.1.a, Attachment 1: Preliminary Draft of Chapter 1 of the Environmental Impact Statement Analyzing Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2007-2008 Pacific Coast Groundfish Fishery and Amendment 16-4: Rebuilding Plans for Seven Depleted Pacific Coast Groundfish Species.
2. Agenda Item F.1.a, Attachment 2: Draft Summary Minutes of the February 6-9, 2006 Groundfish Management Team and Groundfish Allocation Committee Meeting.
3. Agenda Item F.1.a, Attachment 3: Preliminary Draft of Chapter 2 of the Environmental Impact Statement Analyzing Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2007-2008 Pacific Coast Groundfish Fishery and Amendment 16-4: Rebuilding Plans for Seven Depleted Pacific Coast Groundfish Species.
4. Agenda Item F.1.a, Attachment 4: Draft Amendment 16-4 (Overfished Species Rebuilding Reprise) Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.
5. Agenda Item F.1.a, Attachment 5: Economic Revenue and Distributional Impacts Associated with Overfished Species Management in West Coast Commercial Groundfish Fisheries.
6. Agenda Item F.1.a, Supplemental Attachment 6: Analyses of Socioeconomic Impacts of 2007-2008 and Amendment 16-4 Alternatives on West Coast Fishing Communities.
7. Agenda Item F.1.a, Supplemental Attachment 7: Hard Copy of Slides Comprising the PowerPoint Presentations Provided at the April 2 Special Session on Rebuilding Alternatives.

Agenda Order:

a. Agenda Item Overview John DeVore
b. State, Tribal, and Federal Agency Recommendations
c. Reports and Comments of Advisory Bodies
d. Public Comments
e. **Council Action**: Adopt Final Preferred Acceptable Biological Catches (ABCs) and Optimum Yields (OYs), and Preliminary Revised Rebuilding Plans for Overfished Species

PFMC
03/20/06

Agenda Item F.1.a
Attachment 1
April 2006

DRAFT SUMMARY MINUTES

Groundfish Management Team
Groundfish Allocation Committee

Pacific Fishery Management Council
Red Lion Hotel – Convention Center
St. Johns Room
1021 NE Grand Avenue
Portland, Oregon 97232
503-235-2100
February 6-9, 2006

MONDAY, FEBRUARY 6, 2006

Members Present:
Ms. Susan Ashcraft (chair), California Department of Fish and Game
Mr. Merrick Burden (vice-chair), National Marine Fisheries Service Northwest Region
Ms. Deborah Aseltine-Neilson, California Department of Fish and Game
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Ms. Yvonne de Reynier, National Marine Fisheries Service Northwest Region
Mr. Robert Jones, Northwest Indian Fisheries Commission
Ms. Gway Kirchner, Oregon Department of Fish and Wildlife
Ms. Becky Renko, National Marine Fisheries Service Northwest Region
Mr. Mark Saelens, Oregon Department of Fish and Wildlife
Mr. John Wallace, National Marine Fisheries Service Northwest Fisheries Science Center

Others Present:
Ms. Laura Bozzi, Pacific Fishery Management Council
Ms. Eileen Cooney, National Oceanic and Atmospheric Administration General Counsel
Mr. John DeVore, Pacific Fishery Management Council
Dr. Steve Freese, National Marine Fisheries Service Northwest Region
Mr. Frank Lockhart, National Marine Fisheries Service Northwest Region
Ms. Heather Mann, West Coast Seafood Processors' Association and Groundfish Allocation Committee Representative
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Ms. Caroline Park, National Oceanic and Atmospheric Administration General Counsel
Mr. Brad Pettinger, Oregon Trawl Commission
Ms. Kate Quigley, National Marine Fisheries Service Northwest Region
Mr. Jim Seger, Pacific Fishery Management Council

A. Call to Order of the Groundfish Management Team

1. Roll Call, Introductions, Announcements, etc.

Ms. Ashcraft called the meeting to order at 8:30 a.m. Ms. Ashcraft noted changes in the Groundfish Management Team (GMT) membership: following this meeting, Debbie Aseltine-Neilson would be temporarily replaced by Ms. Deb Wilson-Vandenberg, who would likely remain on the GMT through June; add her to the GMT email list. Also, Ms. Gway Kirchner will be replaced on the GMT by a new ODFW staffer who has yet to be hired. Ms. Kirchner will remain on the GMT at least through the June meeting. Ms. Becky Renko replaced Carrie Nordeen as the NMFS Northwest Region Representative.

2. *Elect Chair and Vice Chair for 2006*

Although the GMT had decided that the positions of chair and vice-chair should be 2-year terms, the Council Operating Procedures (COPs) still call for yearly elections. Therefore, as a matter of process, the chair called for additional nominations to the 2 positions. None were proposed, and the GMT unanimously re-elected Susan Ashcraft as chair and Merrick Burden as vice-chair.

Ms. Culver noted that the GMT should look at the COPs and the new, proposed Efficiency and Standards Protocols (ESP) to clarify the roles and duties of the GMT members, as she finds that members sometimes have differing expectations about their responsibilities.

3. Goals and Objectives of this Meeting and Agenda Overview

Mr. DeVore overviewed the GMT meeting agenda as well as the key decisions for the GMT to make during the meeting. These decisions/products included:

- The range of management measure alternatives to prepare for the Groundfish Allocation Committee (GAC), by sector and region.
- A list of key management issues that the GMT would need to analyze.
- A list of potential management measures GMT members want to see analyzed based on their constituency meetings.
- A strategy to meet the March 15 deadline for GMT materials in the April Council meeting briefing book. The key materials are the final harvest specifications, including those for depleted species, which largely defines rebuilding plans. These initial analyses will aid the Council and advisory bodies refine a range of management measure alternatives for analysis. That decision is scheduled to occur at the April Council meeting.

4. Approve Agenda

Ms. Culver asked if Agenda Item B, *Review Updated Impact Analysis Models for 2007-08*, was necessary, particularly for the recreational analyses. She preferred to begin with the final numbers provided by the Groundfish Allocation Committee (GAC) and then structure the management alternatives to meet that limit. Her concern was to prioritize Agenda Item E, *Synopsis of Key Questions and Presentations for the Groundfish Allocation Committee*. Mr. DeVore countered that GMT consensus on the impact projection models needs to occur early in the process so there is no further deliberation on how analyses should be done.

The agenda was revised to allow for an initial drafting of the key questions to the Allocation Committee after lunch on Monday. The agenda was approved following the revision.

B. Review Updated Impact Analysis Models for 2007-08

Mr. DeVore explained that the purpose of this agenda item is for the GMT to agree that they support each of these models, as some are new or have been adjusted.

1. California Recreational Model

Ms. Aseltine-Neilson briefed the GMT on the California recreational impact projection model, summarizing that the model is very similar to the 2005-2006 model but that the base data is different. This model now has only California Recreational Fishery Survey (CRFS) data from 2004-2005. Since 2005 was such an anomaly in its oceanographic patterns – similar to a small El Niño – the model is driven by 60:40 weighting of 2005 to 2004 data. The estimates of historical percent catch by wave are calculated from RecFIN Marine Recreational Fisheries Statistical Survey (MRFSS) data from 1993-1999, as this was the period during which seasons and depths were unconstrained. **It is noted that the origin of the data (MRFSS or CRFS) and how it is used must be made explicit in the EIS.**

The model assumes that all B1 groundfish are discarded dead. The B2 (discarded live) component may be incorporated into the model in its next revision (2009-2010). There is concern that these discard mortalities should be included. Mr. Burden suggested using the open access model designed last year, which included differential mortalities. **Mr. DeVore requested that the California representative provide data on the magnitude of B2 for canary and yelloweye for the March 2006 Council meeting.**

Ms. Ashcraft recommended incorporating the barotrauma-induced discard mortality rates presented at the Western Groundfish Conference into the models. A subgroup was formed to research further details, such as depth information. Mr. Culver noted that this is a similar charge as given to the RecFIN Technical Committee, but this committee would want input from GMT. **The subgroup on barotrauma, which will work together via email, is Ms. Kirchner, Ms. Aseltine-Neilson, and Mr. Culver.**
Ms. Culver was unsure about the model expansion factors, so Ms. Aseltine-Neilson agreed to provide a more explicit written explanation of that element on Tuesday. **The GMT accepted by show of hands the California recreational model as a "relatively reasonable approach".**

2. Oregon Recreational Model

Ms. Kirchner briefed the GMT on the changes to the Oregon Recreational Model. The model applies 2004 and 2005 salmon fishery data to estimate that fishery's impacts on the groundfish fishery; 2003 catch temporal data is used to normalize the 2004 and 2005 seasons, accounting for closures; and 5% mortality rates are applied to released fish (B2) in nearshore fisheries to incorporate anticipated hooking mortality. With little discussion, **the GMT accepted by show of hands the Oregon recreational model as a "relatively reasonable approach".**

3. Washington Recreational Model

Mr. Culver explained the use of angler interviews to determine how deep the anglers fish. He also explained that with an effort shift inshore, the catch of canary and yelloweye has not been reduced, but the mortality of the released fish declined because of the shallower depth. Discussion turned to the problem of anglers misidentifying the species that they catch. Washington Department of Fish and Wildlife (WDFW) staff have worked to educate the public by providing species identification information on websites, through brochures, etc. This misidentification may be the cause of outliers in the data, some of which overestimate the catch estimates and some that underestimate catch. There is a particular problem in the over-identification of canary and yelloweye because of the media attention that they have received over the past years. **The GMT members discussed an interest in a future topic: approaches to validate recreational anglers' recorded data. The GMT accepted by show of hands the Washington recreational model as a "relatively reasonable approach".**

4. *Limited Entry Trawl Model*

Mr. Burden noted that there have been no changes to the Limited Entry (LE) Trawl model since last fall. Since the projected total annual catch for some species, such as canary and darkblotched, tend to be behind, he calibrated these projections by adjusting them up. **Mr. Burden will provide a written description of the LE trawl model for the March 2006 Council meeting.**

A discussion began on the use of new latitudinal breaks to geographically partition the LE trawl fishery, with a goal to more finely match trip limits with regional incidental catch limits. Mr. DeVore voiced concern about the regulatory difficulties of implementing such a management approach. Ms. Ashcraft asked if the current model could incorporate additional latitude breaks. Mr. Burden replied that such a change could not be made in time to include the analysis in the EIS; however, it was unclear whether such analysis would need to be included in the EIS.

Ms. Culver then asked whether it is necessary to structure management measures to support a year-round fishery, even if this is not necessarily the most economically efficient method. The GMT planned to ask the GAC whether or not the season must be started with lower catch limits so as to allow for a year-round fishery. Mr. DeVore suggested analyzing both year-round and less than year-round alternatives. The GMT noted the importance of understanding what defines a year-round fishery. The processor representative for the Groundfish Advisory SubPanel (GAP), **Ms. Heather Mann, volunteered to query processors about their definition of and need for a year-round groundfish fishery by the March 2006 Council meeting. She will provide summary results by area and by species.**

There have been no changes to the whiting model structure over the past year other than updating it with 2005 total catch by species information.

5. *Limited Entry and Open Access Fixed Gear Models*

Mr. Wallace provided information on the LE and Open Access (OA) fixed gear models. Someone asked why the data is truncated at 50 fm. **Mr. Wallace will find out whether this is because there is no data for depths greater than 50 fm or whether this was a decision in structuring the model and report back.** This should be footnoted in the model documentation to explain the cause. It is noted that this may impact the Rockfish Conservation Area (RCA) designations for the non-trawl commercial fishery.

No changes will be made to the primary sablefish model until next November when an updated observer data report is anticipated.

6. Tribal Model

Mr. Jones first provided background on the tribal fishery. The Makah tribal groundfish fishery is a full retention fishery. There are observers on bottom trawl boats, with an observer rate of 10% in 2004. The midwater trawl fishery averages higher observer rates because of the concern over incidental canary catch. The tribal longline groundfish fishery primarily targets sablefish, where two-thirds of the quota is allocated to each of the tribes, and the remaining one-third is fished in a competitive derby fishery. He assumed that the allocated quota could provide an incentive to high-grade, although there is no evidence of discarding. There are more of the larger sablefish (>3 lbs) in the quota fishery, which may be due to seasonal changes in size or availability of larger fish as well as high-grading. To estimate the maximum mortality resulting from high-grading, he subtracts the difference between the two fisheries and then multiplies by a 20% mortality rate. Mr. Culver suggested that Mr. Jones look at the length distribution of sablefish in tribal catches. These distributions should include a tail end of small sized fish. Mr. Culver also noted that there should be higher observer coverage for a fishery that is full retention but has an incentive to discard. **The GMT accepted by show of hands the tribal model as a "relatively reasonable approach".**

C. Discussion of the Analytical Approach Used to Decide 2007-2008 Harvest Specifications and Long-Term Rebuilding Plans

1. Overview of Proposed Analyses and Discussion of Rebuilding Alternatives

Mr. DeVore explained the revised approach to preparing analyses for the 2007-2008 harvest specifications and rebuilding plans. The first step in analyzing OY alternatives for depleted species will be the same as in the past, in which OY alternatives will be analyzed for each species to determine the tradeoff in predicted rebuilding periods versus allowable harvest. Additionally, these analyses are intended to highlight the potential impacts to each sector resulting from those harvest limits. This is coined the "horizontal" analysis.

The second step is to arrange OY alternatives for each of the depleted species into suites of rebuilding alternatives. Rebuilding alternatives were developed by mixing and matching OY alternatives for depleted species (Figure 1). The objective of this step is to demonstrate how each species can constrain other fisheries and to make explicit the tradeoffs that result from these varying constraints. The resulting predicted management regime under each of these alternatives should highlight the tradeoffs. It may be informative to vary allocations or other management assumptions when presenting these results. For instance, status quo allocations may be assumed under one model realization and other allocations considered under other realizations. Likewise, structuring a year-round fishing opportunity to the extent possible may be compared to another model realization where a more seasonal structure is presented. These proposed rebuilding alternatives used a truncated range of depleted species OYs to develop a reasonable range for analysis. Non-viable alternatives, such as the zero-harvest alternatives were not used because it was considered important to present realistic outlooks. The contrast between the different "vertical" alternatives is particularly important for the official record in the EIS.

Mr. Burden explained two different options for analyzing the tradeoffs in the vertically integrated OY suites. In order to stay within a lower OY value, cuts can be allocated either proportionately (making cuts to all sectors), or disproportionately (cutting out entire sectors, beginning at the bottom).

Ms. Ashcraft requested that an additional vertically integrated alternative be added to serve as a "status quo" reference point. She suggested an alternative determined by calculating the effective spawning output-per-recruit relative to that in an unfished state (SPR) harvest rate from the November 2005 bycatch scorecard and projecting this harvest rate forward to 2007 to develop "status quo" OYs. Mr. DeVore added this column to Figure 1.

2. *Overview of Proposed Socioeconomic Analyses*

Due to the recent 9th Circuit Court ruling on the challenge to the Council's darkblotched rockfish rebuilding plan, substantial additional socio-economic analysis will be included in the EIS. Dr. Freese explained that the court opinion gives little guidance on what is needed from these economic analyses. Dr. Freese further explained that the court case has changed the metric used to relate changes in fishing regulations to the effects on fishing communities. In the past the Council addressed the *impacts* on communities, whereas now they will need to address the communities' *needs*. He stressed that federal regulations do not require meeting the needs of the communities, but rather taking those needs into account and providing justification for why a management decision was necessary.

Dr. Freese outlined the array of proposed socioeconomic analyses to be used to assess the needs of west coast fishing communities, allows the Council to take them into account, and then assure that such actions are supported with justification. The elements include economic projections by sector and community, social and economic profiles of communities, developing perspectives on the "needs" of fishing communities (e.g. through reviews of legal documents, historical trends, and a "break-even" analysis), an indicator approach for communities, and an economic trade-off analysis. Someone suggested looking into the MRFSS pressure index, which has been used as a proxy for recreational effort per site, as a data source.

4. *Recommendations Regarding Proposed Analyses*

Mr. Burden described a proposed method to analyze the economic revenue and distributional impacts associated with the constraints on overfished species' mortality. He found that for single target sectors, an increase in ex-vessel revenue is linear to an increase in the allowable harvest of a constraining overfished species; whereas, in multiple target fisheries, this relationship is not proportional. Instead, an additional decrease in the allowable harvest of a constraining overfished species becomes increasingly more costly. For the latter situation, his analysis contains an implied goal to maintain the highest ex vessel revenue for the sector. Under this goal, the first target species to be eliminated would be those with a lower price per pound (e.g., arrowtooth flounder in the northern trawl fishery). This goal could be revised based on guidance from the Groundfish Allocation Committee (GAC). Ms. Culver suggested a different goal of providing an equitable distribution of impacts. Mr. Burden stated that he would further specify these analyses, including stratifying the results to the level of community complexes, as long as the GAC found the information useful.

The idea of trading quota among states arose in conversation; it was added to a list of issues to be discussed at a later time.

The GMT began drafting questions to pose to the Allocation Committee. See Agenda Item E for the final list.

D. Proposed 2007-2008 Management Measure Alternatives for Analysis

2. *Key Management Issues to Consider for 2007 and 2008*

Mr. DeVore included the following list of key management issues to be analyzed for 2007 and 2008:

- Modifying Boundaries in the Cowcod Conservation Areas
- Hotspot/Regional Management
- Selective Fishing Gears
- Fishing Seasons
- Bycatch Implications of Providing Increased Lingcod Fishing Opportunities
- Salmon Bycatch in Groundfish Fisheries
- Other Issues?

These do not all apply to all regions; states need to be specific about where they will propose to use each management measure and how to discuss/analyze these issues in the EIS. The proposed management measures for each state are based on the status quo OYs. If OYs are lowered, analyses may need to be redone to adjust.

Washington representatives provided an analysis of the fisheries impacts for various allocation tradeoffs between states and between sectors. California and Oregon representatives planned to create similar documents for Wednesday's Allocation Committee meeting.

TUESDAY, FEBRUARY 7, 2006 – 8:30 A.M.

GMT Members Present:
Ms. Susan Ashcraft (chair), California Department of Fish and Game
Mr. Merrick Burden (vice-chair), National Marine Fisheries Service Northwest Region
Ms. Deborah Aseltine-Neilson, California Department of Fish and Game
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Mr. Robert Jones, Northwest Indian Fisheries Commission
Ms. Gway Kirchner, Oregon Department of Fish and Wildlife
Ms. Becky Renko, National Marine Fisheries Service Northwest Region
Mr. Mark Saelens, Oregon Department of Fish and Wildlife
Mr. John Wallace, National Marine Fisheries Service Northwest Fisheries Science Center

GAC Members Present:
Mr. Don Hansen (chair), Dana Wharf Sportfishing, Pacific Fishery Management Council Chairman
Mr. Phil Anderson, Washington Department of Fish and Wildlife
Mr. Frank Lockhart, National Marine Fisheries Service Northwest Region
Mr. Curt Melcher, Oregon Department of Fish and Wildlife
Ms. Marija Vojkovich, California Department of Fish and Game

GAC Advisors Present:
Ms. Eileen Cooney, National Oceanic and Atmospheric Administration General Counsel
Ms. Kathy Fosmark, Open Access Representative
Mr. Pete Leipzig, Fishermen's Marketing Association, Limited Entry Non-Whiting Trawl Representative
Ms. Heather Mann, West Coast Seafood Processors' Association, Processor Representative

Mr. Dale Myer, Arctic Storm Inc., Limited Entry Whiting Trawl Representative
Mr. Bob Osborn, United Anglers of Southern California, Recreational Representative

Others Present:
Mr. Steve Bodnar, Coos Bay Trawlers' Association and Bandon Submarine Cable Committee
Ms. Laura Bozzi, Pacific Fishery Management Council
Ms. Yvonne de Reynier, National Marine Fisheries Service Northwest Region
Dr. Patty Burke, Oregon Department of Fish and Wildlife
Mr. John DeVore, Pacific Fishery Management Council
Dr. Steve Freese, National Marine Fisheries Service Northwest Region
Mr. Peter Huhtula, Pacific Marine Conservation Council
Mr. Dayna Matthews, National Marine Fisheries Service Office of Law Enforcement
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Dr. Don McIsaac, Pacific Fishery Management Council
Ms. Caroline Park, National Oceanic and Atmospheric Administration General Counsel
Mr. Brad Pettinger, Oregon Trawl Commission
Ms. Kate Quigley, National Marine Fisheries Service Northwest Region
Mr. Jim Seger, Pacific Fishery Management Council

A. Call to Order of the Groundfish Management Team (continued)

Ms. Ashcraft called the meeting to order at 9:05 a.m.

Legal perspective on the 2007-2008 Specifications and rebuilding plans

Ms. Cooney provided the GMT with background information on the 9th Circuit Court's interpretation of the Magnuson-Stevens Act with respect to rebuilding times, focusing on the language of rebuilding in a time "as short as possible" while taking into account the status and biology of the overfished species and the needs of fishing communities. She stressed that the Council can't look at OYs individually anymore and that the integrated alternatives are needed to demonstrate the leverage the tradeoffs allow for accessing healthy stocks. These different suites of OYs need to show contrast between them. Decisions by the Council can't be justified based on T_{MAX}. Ms. Cooney then stressed that NMFS is under a court order to have the new ABCs and OYs in place by January 1, 2007. She later explained that, for example, a status quo suite of OYs may only pass through a court ruling if a lower suite is analyzed and deemed not possible because of fishing community needs. Someone suggested that such community impacts could be demonstrated with more than ex-vessel revenue and should include other social impacts. Dr. Freese explained how difficult social impacts are to quantify. Ms. Culver voiced her concern that some communities rely on the low value, high volume species and that these are the first to be lost in reducing a constraining stock OY. She noted that it is important to document that the small amount of increase in OY results in a small increase in revenue, but it is critical at a more localized scale.

Further feedback on vertical integration OY tables:

- Someone proposed to create an additional matrix of information to demonstrate the tradeoffs between the proposed alternatives. The matrix could include rows/columns for: (1) areas most impacted by these mortalities, (2) sectors most impacted by these mortalities, and (3) how much healthy stock access is leveraged.
- There was concern that no set of OYs looked like one that the Council would pick – so should one be included that has the Council's preferred OYs? It is noted that the Council may choose to mix and match from within these sets; so this additional column isn't needed.
- A suggestion to add in a duplicate table that listed the associated rebuilding times for each of the OYs was considered, but the GMT decided not to add it since a table and figure is already developed to depict the tradeoff between allowable harvests and rebuilding times for each depleted species.
- Someone suggested changing the yelloweye OY from 12 mt to 17 mt in Rebuilding Alternative #2 to see a better contrast for the recreational fishery.

Feedback on "Relative Biological Risk to Overfished Species by Sectors"

The GMT discussed the table that Ms. Culver developed which shows the relative biological risk posed by each subsector to each overfished species. They found the table to be a good way to show the concept, and asked for it to be further developed (e.g., include the relationship of that stock to sectors and communities) and for it to incorporate Mr. Burden's work on economic tradeoffs between sectors. **This product will be prepared for the March Council meeting by a new subgroup: Mr. Burden, Ms. Culver, Mr. Saelens, Dr. Freese, and Ms. Ashcraft.**

E. Synopsis of Key Questions and Presentations for the Groundfish Allocation Committee

Ms. Culver provided a set of tables that depict the commercial and recreational yelloweye and canary allocation alternatives already decided for analysis. The GMT planned to ask the GAC for additional guidance on other allocation alternatives to be modeled for the 2007-2008 management cycle and whether, if the OYs were decreased, other allocation formulae should be analyzed. It was clarified that short-term catch shares can be decided each year, as long as they are not for the species with fixed allocations in the FMP and in federal regulations (e.g., sablefish and whiting). The FMP does allow a suspension of allocation agreements for any species under rebuilding.

There was a request to clarify an aspect of the recreational fishery harvest guideline specified in federal regulations for 2005-2006. The harvest guidelines were described in the Federal Register notice as cumulative harvest targets, rather than separate harvest guidelines for Oregon/Washington and California. The intent of the Council was to specify separate recreational harvest guidelines for fisheries north and south of the California-Oregon border with automatic state inseason actions to stay within those guidelines. **This needs to be corrected in the regulations by NMFS in order for CDFG to take inseason action (they can only close their fishery independently from a California Fish and Game Commission decision if an OY or a harvest guideline is exceeded inseason).**

Continuing the discussion from Monday, the GMT compiled its list of questions to pose to the Allocation Committee over the remainder of the week:

1. **What analyses are useful for considering reductions in the take of overfished species?**
    a. What management goals should be used to guide the analyses?

        i. Prioritization of cuts: cut entire individual sectors or cut proportionally across sectors?
        ii. Maximize utilization (take the whole OY) or maximize a year round fishery (stretching small OYs)?
    b. Types of analyses that may be worthwhile to consider:
        i. Economic return. For example, if the goal is to maximize economic return to the trawl sector, this would eliminate target species with lower price per pound values (e.g., arrowtooth flounder).
        ii. Possible types of value:
            1. Relative value
            2. Total ex-vessel value regardless of small vs. larger operations
            3. Value or effort in the recreational fishery
            4. Value by area and by sector
            5. Personal income rather than total ex-vessel revenue across entire fleet.
        iii. Minimize number of vessels/ports affected.
    c. Set RCA boundaries to maximize a certain fishery (or fisheries)?
    d. Consider additional latitudinal lines inside which to set differential trip limits (for lower OY scenarios)? (In other words, what is the priority for this kind of regional management?)

2. **Range of 2007-2008 Intersector and Regional Allocation Options to Analyze**
    a. Should the GMT analyze alternatives that are not realistic options but simply reflect the extremes? (e.g. 75/25 and 25/75 comm/rec splits for canary and yelloweye)
    b. Are there other catch-sharing ratios between states besides status quo that Washington, Oregon, and California want to consider? Base these on historical catch? Base these on the bycatch scorecard (i.e., based on how much states need to prosecute fisheries)?
    c. GMT needs clarity when an allocation is specified as to whether it is a firm number for the year or whether it is a management goal.
    d. In preseason planning, can the specifications initially be structured to be conservative (will not meet OYs or allocations) with the intent of adjusting management measures inseason to meet these?

3. **Can the GMT develop a pre-season structure that doesn't provide for year-round fishery as an alternative?**

4. **Should the GMT target catch levels that are lower than the OY with the intent of establishing a "buffer" to avoid dramatic inseason corrections***? (Note: from a legal perspective this strategy's logic would have to be carefully documented.)*

5. **What canary and widow bycatch caps should be analyzed for the whiting fishery besides status quo?**

6. **Yelloweye in North: Prioritize curtailing recreational fisheries or increase depth closure of non-trawl RCA?**

Groundfish Allocation Committee

F. Call to Order of the Groundfish Allocation Committee and Groundfish Management Team

1. Roll Call, Introductions, Announcements, etc.

Mr. Hansen called the meeting to order at 1 p.m. and introductions of the membership and audience were made.

2. *Goals and Objectives of this Meeting*

Mr. DeVore outlined the goals and objectives for the meeting, particularly:

- For the GAC to become familiar with a revised analytical approach for considering rebuilding plan revisions and 2007-2008 harvest specifications and management measures, so as to prepare the committee for what's ahead in this process.
- For the GAC to develop a range of 2007-2008 groundfish management measures that will then be analyzed in preparation for the Council's decision making at the April meeting.
- For the GAC to provide feedback on what analyses are useful for them and the Council when addressing the range of intersector and regional allocation options.

3. Agenda Overview

Ms. Vojkovich voiced concern about the ordering of agenda items, as she did not want to make allocation decisions based on something other than an analysis. Mr. DeVore replied that the agenda was structured so as to lay out management measure alternatives from the states and then use these with estimated impacts attached to develop the range of allocation options. Another GAC member noted that the agenda sets aside the major topic from the previous meeting, intersector allocations. Mr. DeVore replied that was intentional and that the 2007-2008 specifications and Amendment 16-4 issues were more time-sensitive. Building on Ms. Vojkovich's concern, Mr. Anderson stressed that effort shouldn't be spent trying to separate allocation from management. The agenda was therefore revised to integrate items K and L, beginning with L.1 and L.2. The agenda was approved as amended.

Legal Guidance Regarding Rebuilding Plan Revisions
(For further detail, see the summary of the Legal Perspective briefing during the 2/7 morning GMT meeting.)

Ms. Cooney provided a background on the impact of the 9th Circuit Court decision on the rebuilding plan and 2007-2008 specifications/Amendment 16-4 process. The Court based its decision on the basic language in the Magnuson-Stevens Act, rather than the NMFS National Standard 1 guidelines for establishing a rebuilding plan if the stock's rebuilding time is greater than 10 years. The Court focused on the language "as short as possible," rejecting NMFS' formulaic approach in the guidelines. Furthermore, taking the biology of the stocks and the impacts on communities into account can no longer be done implicitly.

She highlighted that, due to these changes, the rebuilding plan and 2007-2008 specifications/Amendment 16-4 process would be a very different one than in past years. For example, at its November meeting the Council specified a range of OYs; these can still be used, but they need to be related to each other and supported by an integrated analysis. Proposed suites of OYs have been drafted by the GMT.

G. Overview of Goals and Objectives of the Groundfish Fishery Management Plan and the Groundfish Strategic Plan

1. *Goals and Objectives of the Groundfish Fishery Management Plan*

Mr. DeVore reviewed the three management goals of the Groundfish FMP; Conservation, Economics, and Utilization; and the series of objectives associated with each goal. For further information, refer to the FMP available at:
http://www.pcouncil.org/groundfish/gffmp/fmpthru17.pdf

The Committee questioned the meaning of developing management measures that affected users "equitably". This does not imply "equally," but there is no formula for understanding how to operationalize the objective. Mr. Lockhart stressed that equitability will be a key consideration in the upcoming decision-making.

Someone asked if these goals and/or objectives could be revised. Ms. de Reynier clarified that they are revised as necessary when an amendment is approved by NMFS so that they remain consistent with the FMP. The last revision to the FMP occurred with the adoption of Amendment 18.

2. *Goals and Objectives of the Groundfish Strategic Plan*

Mr. DeVore then reviewed the goals and objectives in the Groundfish Strategic Plan, a non-binding policy document finalized in October 2000. For further information, refer to the document available at: http://www.pcouncil.org/groundfish/gfother/stratplan.pdf

H. Overview of the Purpose and Need for Action

1. *Considering Amendment 16-4 Rebuilding Plan Revisions*

Mr. DeVore briefed the GAC on a proposed new strategy for analyzing and considering revisions to rebuilding plans and harvest specifications. He explained that the first step is to analyze individual OY alternatives for each depleted species individually. He displayed graphs that demonstrate the tradeoff between allowable harvest and the predicted duration of rebuilding. Species with a small slope value show a small increase in rebuilding time results with a relatively larger increase in OY, and vice versa. The analysis will also address how each species' OY might impact associated fisheries. The second step is to develop integrated suites of OYs (Table 1*)*. Mr. DeVore showed seven of these rebuilding alternatives to the GAC, noting that they were developed to reflect the species' co-occurrences and strategically constructed to demonstrate the tradeoffs in relaxing different constraints independently. These sets of rebuilding alternatives include one that is "status quo," which had been added during the GMT meeting; it represents the current level of impacts from the November 2005 bycatch scorecard projected ahead to 2007.

Mr. Anderson proposed reducing the number of alternatives to analyze, while still maintaining an appropriate range. Mr. DeVore proposed reducing the POP and cowcod OYs in Alternative #6 (the most constraining rebuilding alternative). Mr. Lockhart expressed concern about the Council mixing and matching OYs within the rebuilding alternatives, because he wants to assure that the EIS contains adequate analysis with enough contrast with the preferred alternative.

A discussion on the recreational/commercial splits for canary clarified that selectivity is now assumed to be equal across gears, and so shifting the splits will not change the OY. This policy change allows for inseason allocation adjustments.

I. The Recommended Analytical Approach for Considering Rebuilding Plan Revisions and 2007-2008 Harvest Specifications and Management Measures

Dr. Freese briefed the GAC on the variety of analyses the socio-economic team is undertaking with respect to the needs of fishing communities. *(See the summary of Dr. Freese's briefing from the GMT meeting 2/6).*

In discussion, someone noted that the analyses are based on data from the past, but future projections are much more constraining. How can these future scenarios be incorporated? Dr. Freese replied that he and his team will rely on the GMT and others to put the data into its current context. Someone else suggested that the socio-economic team look into the studies by California Sea Grant and the Ecotrust study of Moss Landing.

Mr. Burden then briefed the GAC on his proposed method to analyze the economic revenue and distribution impacts associated with the constraints on overfished species mortality. *(See the summary of Mr. Burden's briefing from the GMT meeting 2/6).* When prompted for feedback on the proposed analyses, Mr. Myer expressed interest in seeing an analysis that stratified shoreside whiting trawlers and the at-sea fleet.

The chair adjourned the meeting for the day.

<u>WEDNESDAY, FEBRUARY 8, 2006 – 8:30 A.M.</u>

GMT Members Present:
Ms. Susan Ashcraft (chair), California Department of Fish and Game
Mr. Merrick Burden (vice-chair), National Marine Fisheries Service Northwest Region
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Mr. Robert Jones, Northwest Indian Fisheries Commission
Ms. Gway Kirchner, Oregon Department of Fish and Wildlife
Ms. Becky Renko, National Marine Fisheries Service Northwest Region
Mr. Mark Saelens, Oregon Department of Fish and Wildlife
Mr. John Wallace, National Marine Fisheries Service Northwest Fisheries Science Center

GAC Members Present:
Mr. Don Hansen (chair), Dana Wharf Sportfishing, Pacific Fishery Management Council Chairman
Mr. Phil Anderson, Washington Department of Fish and Wildlife

Mr. Frank Lockhart, National Marine Fisheries Service Northwest Region
Mr. Curt Melcher, Oregon Department of Fish and Wildlife
Ms. Marija Vojkovich, California Department of Fish and Game

GAC Advisors Present:
Ms. Eileen Cooney, National Oceanic and Atmospheric Administration General Counsel
Ms. Kathy Fosmark, Open Access Representative
Mr. Pete Leipzig, Fishermen's Marketing Association, Limited Entry Non-Whiting Trawl Representative
Ms. Heather Mann, West Coast Seafood Processors' Association, Processor Representative
Mr. Dale Myer, Arctic Storm Inc., Limited Entry Whiting Trawl Representative
Mr. Bob Osborn, United Anglers of Southern California, Recreational Representative

Others Present:
Mr. Steve Bodnar, Coos Bay Trawlers' Association and Bandon Submarine Cable Committee
Ms. Laura Bozzi, Pacific Fishery Management Council
Ms. Yvonne de Reynier, National Marine Fisheries Service Northwest Region
Dr. Patty Burke, Oregon Department of Fish and Wildlife
Mr. Mark Cedergreen, Washington Charter Association
Mr. John DeVore, Pacific Fishery Management Council
Dr. Steve Freese, National Marine Fisheries Service Northwest Region
Mr. Steve Joner, Makah Tribe
Mr. Chris Kubiak, Morro Bay Commercial Fishermen's Organization
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Dr. Don McIsaac, Pacific Fishery Management Council
Ms. Caroline Park, National Oceanic and Atmospheric Administration General Counsel
Mr. Brad Pettinger, Oregon Trawl Commission
Ms. Kate Quigley, National Marine Fisheries Service Northwest Region

F. Call to Order of the Groundfish Allocation Committee and Groundfish Management Team (continued)

The chair called the meeting to order at 8:45 a.m.

5. Review Wednesday Agenda and Outcomes From Yesterday

Ms. Culver made a proposal to change elements of the rebuilding alternatives. After much discussion, the rebuilding alternatives shown in Chapter 1 were developed. Someone noted that these alternatives do not include alternatives of recreational/commercial allocations. Mr. DeVore recommended that the analysis of these alternatives include suboptions depicting different recreational/commercial allocation scenarios. Someone suggested that the analysis should include the foregone values to fisheries because of restrictions on healthy stocks due to co-occurrence. The GAC gave the GMT leeway to adjust OY values in the rebuilding alternatives if necessary to best fit the management objective as described.

J. Key Management Issues to Consider for 2007 and 2008

Mr. DeVore explained the list of key management issues included in the agenda (listed below) were to indicate a comprehensive list of issues to be analyzed in addition to status quo measures, (status quo measures will automatically be analyzed). He wanted to compile a complete list rather than discuss how these issues should be analyzed. He noted that the term "hotspot" should not be used, and that the new name as used in the FMP, Groundfish Fishing Area, should replace it.

1. Modifying Boundaries in the Cowcod Conservation Areas
2. Hotspot/Regional Management
3. Selective Fishing Gears
4. Fishing Seasons
5. Bycatch Implications of Providing Increased Lingcod Fishing Opportunities
6. Salmon Bycatch in Groundfish Fisheries
7. Other Issues?

When prompted for additions to the list of management issues, Mr. Anderson noted that treaty/non-treaty allocation should be highlighted because of the additional reductions in OYs among the alternatives. Mr. DeVore said that this would be added to the list of key management issues in Chapter 1 of the EIS.

L. Determine the Range of Intersector and Regional Allocation Options to Analyze for 2007-2008 Groundfish Fisheries

Mr. DeVore displayed the commercial/recreational allocations currently in place and asked the GAC to discuss whether any changes were needed. He then explained that the 2005-2006 allocation splits between states would be reanalyzed in the 2007-2008 specifications EIS as the status quo alternative. **Mr. Hansen requested to have the allocations displayed as percentages of the OY.** Ms. Vojkovich, who originally requested the addition of 25:75 and 75:25 commercial:recreational allocation alternatives for canary and yelloweye, did not want to see these alternatives fully analyzed. **These alternatives for canary and yelloweye were moved to the "considered but eliminated from further analysis" section of the EIS.**

Mr. Anderson requested analyses for canary and yelloweye for what actually was taken by the fisheries (as percentages for each state), rather than what was allocated preseason. For example, the Washington/Oregon recreational allocation was changed in November from 8.5mt to 9.4mt (4.0 mt for Oregon + 5.1 mt for Washington + 0.3 mt as a buffer against uncertainty). Ms. Vojkovich was not supportive of this, explaining that it is because California is severely constrained that the fishermen cannot reach their allocated caps. Ms. Vojkovich then noted that Mr. Anderson's proposal would shift the allocation approach from using generic splits (e.g. 40/60 or 50/50) to one that uses the bycatch scorecard as a means of determining the allocation split percentages. Someone commented that in using the bycatch scorecard to make allocation decisions, those that have higher bycatch are rewarded rather than rewarding those that have avoided the depleted stocks. Mr. Anderson clarified that his proposal would maintain the status quo splits but would eliminate the residual. **Mr. Anderson's proposal of the additional alternative was approved for analysis.**

K. Determine the Range of 2007-2008 Groundfish Management Measures for Initial Analysis

1. California Management Alternatives

The California delegation provided a handout listing the core alternatives that will be analyzed, in addition to status quo. They hoped to have 2005 catch data by late February to come prepared for the March Council meeting.

No major new ideas for management measures came from stakeholder meetings or from the California Groundfish Taskforce; however, there is an interest in accessing more of the stocks that have been recently assessed and are considered healthy.

Mr. DeVore suggested the proposed new coordinates for the Cowcod Conservation Area should be included in the April briefing book.

2. Oregon Management Alternatives

The Oregon delegation provided a handout with a list of management alternatives compiled from their public meetings and from Oregon's advisory group. These preliminary measures are standard measures. It is noted that that "hotspot closures" should be renamed as Rockfish Conservation Areas.

3. Washington Recreational Management Alternatives

The Washington delegation provided a table that lays out different management alternatives in their primary fishing areas with related impacts for depleted species. These alternatives had not yet been vetted by the public.

4. Limited Entry Trawl Management Alternatives

Mr. Burden briefed the GAC on the whiting trawl model and provided information for different OY alternatives with respect to sector allocations, associated ex-vessel revenues, and the estimated impacts on depleted stocks.

The group discussed the coastwide ocean salmon conservation zones specified last year for the whiting fishery to reduce salmon bycatch. Mr. Burden replied that these zones were the result of an emergency action in 2005 and will be analyzed as a status quo action.

Mr. Myer mentioned that there are some whiting trawl sectors interested in sector-specific caps for certain overfished species. He suggested allocating these caps proportional to the sector whiting allocations. This alternative needs to be analyzed before the April meeting. He suggested the whiting industry should propose this alternative to the Council at the March meeting.

Mr. Burden then presented some strawman non-whiting trawl alternatives. The alternatives were constructed to analyze regional management of petrale sole, a reduction in the sablefish OY, an increase in the Dover sole OY, and other ranging options for 2007-2008. He noted that the effect of changing the trawl bimonthly limit regulations to allow only one type of trawl gear to be used in a landing period (with the associated gear-specific limits) has not yet been analyzed. Once this is taken into account, there would be lower petrale sole and canary rockfish catches.

5. Limited Entry and Open Access Fixed Gear Management Alternatives

Mr. DeVore explained the GMT uses a simple model for Limited Entry and Open Access fixed gears and that there is not much new information to provide to the GAC at this point. The model uses depth-stratified, species-specific retention rates determined from the West Coast Groundfish Observer Program (WCGOP) and discard mortality rates from the literature to estimate total mortality impacts by depth in nearshore fisheries. He also noted the data were limited and very sparse for California waters south of Ft. Bragg.

Discard rates from the WCGOP are used to model impacts in the limited entry primary sablefish fishery and the daily trip limit fishery. He recommended following the management measures proposed by the GAP in November as a guide to formulating an alternative. He recommended the proposed pattern of the fishery was more informative than the recommended trip limits by period. He highlighted the proposed measure of closing the second period of the year south of Cape Mendocino.

The GAP also recommended analysis of alternative seaward lines of the non-trawl RCA that west of the current depth line. The GAC also requested the GMT analyze 125 fm and 150 fm line options as a means of reducing yelloweye impacts.

<u>Public Comment:</u> *Proposal from Environmental Defense and Chris Kubiak (Morro Bay trawl fisherman)*

Mr. Kubiak spoke to the GAC about a proposal that Morro Bay fishermen are formulating with the assistance of Environmental Defense. The community is interested in creating a collective of fishermen to share an allocation of groundfish, as the fishermen in Morro Bay currently don't have access to healthy stocks in their region. The GAC was generally supportive of the proposal, but they had numerous questions about the allocation process as well as the consequent management details. Mr. Burden mentioned that gear switching, which is part of the Morro Bay proposal, has already been analyzed in the EFH EIS and the concept of small group allocations are allowed through Amendment 18. Mr. Anderson mentioned this proposal fit better with the trawl IFQ initiative and recommended the analysis occur in that process, not the 2007-2008 management process. The GAC agreed.

6. *Tribal Management Alternatives*

Mr. Jones explained the new proposed tribal management alternatives for a dogfish fishery, which will be implemented in 2006, and an arrowtooth flounder bottom trawl fishery with the primary objective to test gear. Mr. Anderson noted that if the depleted species' OYs decrease, the tribes planned to still fish as usual and so would take a higher percentage. Mr. Jones replied that that would be an issue to take up with the individual tribes, although he surmised that they might voluntarily decrease their take under such a circumstance. This issue highlighted Mr. Anderson's earlier concern that treaty and non-treaty fisheries may require allocations for additional species.

M. Requests for Immediate Analyses to the Groundfish Management Team

Ms. Ashcraft read the GMT's list of questions they had prepared to pose to the GAC. (Refer to the list in the minutes from the GMT meeting.) GAC guidance is listed below each major topic:

1- Regional allocation considerations:
- The Groundfish FMP gives guidance that impacts should be spread across sectors and regions.
- Regional allocations should be a low priority in Council decision-making. However, there is interest in seeing the analysis for such regional management, if possible.

2- Regional priorities and goals: finer resolution using other latitudinal lines?
- Analysis and management should be kept as simple as possible. There is no support among the GAC for such an option.
- Mr. DeVore recommended postponing this as a possibility for later analyses since there is insufficient time to change the impact models and the added complexity to fishery management is an added workload in an already burdensome process.

3- Organizing trip limits to allow for year-round opportunities:
- The chair reminded the GAC that this has been tried in the past and that it was not successful.
- Ms. Mann confirmed that she will compile a summary of what processors recommend for a year-round fishery would be for each species.
- Proposed alternative for GMT analysis: year-round slope fisheries while allowing only seasonal shelf fishery opportunities, if necessary.

4- What analyses for depleted species are useful?
- Equitably share impacts across all sectors, based on FMP objectives.
- If there's a situation in which equitable sharing of impact is at odds with rebuilding in the fastest time possible, then proportionality by sector should be prioritized and then proportionality by region, with a review of the result to look for aberrations.

5- Other guidance:
- Proposed analysis: analyze an alternative that highlights the reduction of bycatch in different fisheries and rewards those sectors that have already reduced bycatch.

Ms. Culver requested flexibility for the GMT to perform their analyses using GAC guidance and the indicated range of options, but the GMT could reduce the amount of analysis, if necessary. The GMT would bring these analyses to the GAP at the April Council meeting. The GAC agreed to that flexibility is needed given the tight timelines.

There was some concern about the perception the GMT or GAC might be setting policies in this process. Mr. Anderson assured folks that is only the purview of the Council. Mr. DeVore explained the Council delegated the task of developing alternatives for analysis to the GAC, but final decisions will only be made by the Council.

Ms. de Reynier encouraged creating analyses that create simple descriptions/scenarios, rather than exhaustive quantitative analysis to portray community impacts. She likened the approach to telling a compelling story using data, trends, and facts. This kind of depiction would be more easily understood by a judge in a court case.

There was discussion about the difficulty of the Council adopting final OYs in April. Due to the requirements for developing the EIS, the public notice and comment periods, and with the increased attention to analyses under the court order, the Council is discouraged from postponing this action until June. The court has also mandated final implementation of rebuilding plans no later than January 1, 2007.

The GAC completed their necessary business and therefore canceled their planned February 9 meeting. The chair adjourned the meeting at 4:50 p.m.

THURSDAY, FEBRUARY 9, 2006 – 8:30 A.M.

GMT Members Present:
Ms. Susan Ashcraft (chair), California Department of Fish and Game
Mr. Merrick Burden (vice-chair), National Marine Fisheries Service Northwest Region
Mr. Brian Culver, Washington Department of Fish and Wildlife
Ms. Michele Culver, Washington Department of Fish and Wildlife
Mr. Robert Jones, Northwest Indian Fisheries Commission
Ms. Gway Kirchner, Oregon Department of Fish and Wildlife
Ms. Becky Renko, National Marine Fisheries Service Northwest Region
Mr. Mark Saelens, Oregon Department of Fish and Wildlife
Mr. John Wallace, National Marine Fisheries Service Northwest Fisheries Science Center

Others Present:
Ms. Laura Bozzi, Pacific Fishery Management Council
Mr. John DeVore, Pacific Fishery Management Council
Ms. Yvonne de Reynier, National Marine Fisheries Service Northwest Region
Dr. Steve Freese, National Marine Fisheries Service Northwest Region
Ms. Heather Mann, West Coast Seafood Processors' Association and Groundfish Allocation Committee Representative
Ms. Mariam McCall, National Oceanic and Atmospheric Administration General Counsel
Mr. Brad Pettinger, Oregon Trawl Commission
Ms. Kate Quigley, National Marine Fisheries Service Northwest Region

Ms. Ashcraft called the GMT meeting to order at 8:50 a.m.

When reviewing the outcomes from the GAC meeting, it was noted that the GMT did not clarify with the GAC what recommendations were provided to them during the meeting. The GMT therefore constructed the following list:

Recommendations from the GAC to the GMT:

1. Final rebuilding alternatives for analysis.
2. Treaty/ non-treaty allocation issues to be highlighted in the EIS.
3. Allocation alternatives:
    a. Include a 52:48 recreational:commercial allocation alternative for yelloweye.
    b. Do not include the 75:25 or 25:75 allocation alternatives for canary and yelloweye.

4. Analyze additional seaward non-trawl RCA lines north of 40°10' N latitude: 125 fm, 150 fm, and 200 fm lines, especially under low yelloweye OY alternatives.
5. Make sure that the management options are arranged in an easy to understand order.
6. Analyze coastwide and regional management strategies, as well as the regional differences based on the biology and distribution of the species.
7. GMT has latitude to identify a range of suboptions in the analysis of rebuilding alternatives.
8. Analyze a trawl alternative with seasonal shelf opportunities coupled with year-round slope opportunities. GMT should schedule a joint meeting with the GAP to gain feedback on the threshold at which fishing is no longer profitable.
9. Analyze what a year round fishery means by looking at the differences in definition for this between processors (using the Heather Mann survey) and between different sectors.
10. Assure equity in how the different vessels and ports are impacted. Analyze proportional impacts by sector and address implications by region.
11. Do not analyze additional latitudinal management lines for commercial fisheries.
12. GMT will analyze bycatch impacts for the full range of whiting OY alternatives.
13. Qualitatively assess measures different sectors have taken to reduce bycatch to highlight successful strategies.
14. Demonstrate the human side of the impacts of reducing fishing opportunities to translate the analysis into something more easily understood by the courts.
15. Provide the needed analyses of harvest alternatives to allow the Council to adopt as many OYs as possible in April, although some may be postponed, if necessary, until June. However, the analyses must be completed by the June briefing book deadline (May 24) and must include all the contrasting alternatives.
16. It is important to analyze regional impacts of management alternatives; such impacts may differ depending on the relative value of a fishery to a region, what mitigation measures (e.g. bycatch reduction efforts) are in place, or the biological attributes of a species (e.g. survival rate), etc.
17. If new policies are embedded in or result from any analysis, then these should be highlighted to the Council for ultimate decision-making.
18. Inseason issues should be considered a lower priority now due to time constraints.

T. Tasks for Groundfish Management Team Members Regarding Amendment 16-4 and 2007-2008 Harvest Specifications and Management Measures Analyses

March 15 is the April briefing book deadline and all submissions must be "camera ready." This includes the critical socioeconomic analyses needed to understand rebuilding tradeoffs. The Council will also need to decide a formal and refined range of management measure alternatives for analysis. Therefore, comprehensive analysis of viable alternatives needs to be included in the April briefing book.

Mr. DeVore constructed a list of prioritized tasks with assignments and corresponding deadlines for each GMT member.

The GMT discussed the format for analyses and clarified the suboptions for analyzing rebuilding alternatives.

Other discussion points:

- The GMT requested to a joint meeting with the GAP for a day or more during its April 17-21 meeting in Portland. Mr. DeVore said he would broach that request with Dr. McIsaac. The GMT discussed the seriousness of the need to reduce OYs and the need to prepare constituencies (particularly the GAP) for the upcoming decisions.
- The GMT discussed the possible use of "buffers". An idea was put forth to use the retrospective difference between projected impacts in past bycatch scorecards and actual total catches for determining an uncertainty "buffer" for managing fisheries to stay within specified OYs. NOAA General Counsel considered this an appropriate approach to further investigate.
- Ms. de Reynier suggested the GMT brainstorm and organize data delivery for the heavy load of analyses needed for the EIS.
- Ms. Renko noted the extensive discussions of species' co-occurrence in the EFH EIS.
- The GMT needs to fully document total catch projections for the open access sector in the bycatch scorecard.

U. Planning for the March 2006 Council Meeting

Planning the March 2006 Groundfish Management Team Agenda

The GMT reviewed a draft agenda for their March meeting. Ms. Ashcraft recommended planning a meeting with the CDFG time management consultant. Some noted that such a meeting during the Council meeting would add to the stress level. However, there may not be another opportunity before the consultant's contract expires in June; therefore, the meeting was scheduled for Wednesday, March 8 at 3:30 p.m.

V. Scheduling Future Groundfish Management Team Meetings

Following the March Council meeting, the GMT plans to meet according to the following schedule:

- April 2-7 (during the Council meeting) in Sacramento, beginning at 1 p.m. on the 2nd.
- April 17-21 in Portland, beginning at 1 p.m. on the 17th. This will be a working meeting for developing the 2007-2008 specifications EIS. The GMT recommended inviting the GAP to attend on Tuesday, April 18.
- June 11-16 (during the Council meeting) in Foster City, beginning at 1 p.m. on June 11.
- September 11-15 (during the Council meeting; venue to be determined), beginning at 8 a.m. September 11. The GMT decided not to meet during the summer to prepare for the September Council meeting.
- Tentative: October 10-13 in Seattle starting at 1 p.m. on the 10th to prepare for the November Council meeting.
- November 13-17 (during the Council meeting) in Del Mar, California starting at 8 a.m. on the 13th.

The chair adjourned the GMT meeting at 3:40pm Thursday.

Table 1. Amendment 16-4 rebuilding alternatives developed by the Groundfish Allocation Committee.

		2007-2008 OYs (mt)					
Stock	Association	"Status Quo" Reb. Alt. a/	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
Yelloweye	Northern Shelf	27	21	17	21	12	12
Canary		44	24	44	68	24	24
Cowcod b/	Southern Shelf	8	8	18	22	14	4
Bocaccio		149	149	218	424	315	40
Darkblotched	Northern Slope	229	330	229	472	472	130
POP		87	405	87	749	405	44
Widow	Midwater	329	456	329	917	329	120

a/ The species' OYs described in the "status quo" rebuilding alternative are determined by calculating the effective SPR harvest rate from the November 2005 bycatch scorecard and projecting this harvest rate forward to 2007.

b/ OY alternatives for Conception and Monterey areas combined.

Agenda Item F.1.a
Attachment 2
April 2006

1.0 INTRODUCTION

1.1 How This Document is Organized

This document provides background information about, and analyses for two related actions. The first action is to establish 2007-2008 biennial harvest specifications and management measures for fisheries covered by the *Pacific Coast Groundfish Fishery Management Plan* (FMP), which are developed by the Pacific Fishery Management Council (hereafter, the Council) in collaboration with the National Marine Fisheries Service (NMFS). The second action is to consider revising rebuilding plans for seven depleted (overfished) groundfish species. This action requires a potential amendment to the groundfish FMP, which contains the current overfished species rebuilding plans. The two actions are related because the rebuilding plans determine the range of harvest levels that may be considered for depleted species. These actions must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore. These actions must also conform to a recent court ruling in the Ninth Circuit Court of Appeals, which held that, among other things, the purpose of the MSA is to give conservation of fisheries priority over short-term economic interests. The Court interpreted the rebuilding requirements of the MSA as: 1) the rebuilding periods must be as short as possible; 2) short-term needs of fishing communities may be taken into account in setting rebuilding periods, even when the biology of the species dictates exceeding the 10-year statutory cap. As an example, the Court noted that in order to avoid disastrous short-term consequences, NMFS may set limited quotas that allow for some fishing of plentiful species, despite the inevitability of bycatch.

In addition to addressing MSA mandates, this document is an environmental impact statement (EIS), pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. According to NEPA (Sec. 102(2)(C)), any "major federal action significantly affecting the quality of the human environment" must be evaluated in an EIS. Based on a preliminary determination by Council and NMFS staff, implementing the two actions referenced above may have significant impacts. Therefore, rather than preparing an environmental assessment (EA), which provides "sufficient evidence and analysis for determining whether to prepare an environmental impact statement," NMFS and the Council have decided to proceed directly to preparation of an EIS. This document is organized so that it contains the analyses required under NEPA, the Regulatory Flexibility Act (RFA), and Executive Order (EO) 12866, which mandates an analysis similar to the RFA. For the sake of brevity, this document is referred to as an EIS, although it contains required elements of an Initial Regulatory Flexibility Analysis (IRFA) pursuant to the RFA and a Regulatory Impact Review (RIR) pursuant to EO 12866.

Federal regulations (40 CFR 1502.9) require agencies to prepare and circulate a draft EIS (DEIS), which "must fulfill and satisfy to the fullest extent possible the requirements established for final statements in Section 102(2)(C) of the Act" (i.e., NEPA). Federal regulations (40 CFR 1506.10(c)) and agency guidelines (NOAA Administrative Order 216-6.5.01.b.1(i)) stipulate a minimum 45-day public comment period on the DEIS. At the end of this period a final EIS (FEIS) is prepared, responding to comments and revising the document accordingly. After the EIS is completed, a 30-day "cooling off" period ensues before the responsible official may sign a record of decision (ROD) and implement the proposed action.

Environmental impact analyses have four essential components: a description of the purpose and need for the proposed action, a range of alternatives, including the proposed action, that represent different ways of accomplishing the purpose and need, a description of the human environment affected by the proposed action, and an evaluation of the predicted direct, indirect, and cumulative impacts of the alternatives.[1/] (The human environment is interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment, 40 CFR 1508.14.) These elements allow the decision maker to look at different approaches to accomplishing a stated goal and understand the likely consequences of each choice or alternative. EISs are commonly organized around four chapters covering each of these topics. This EIS is organized differently; Chapters 1 and 2 cover the purpose and need for the action and describe the alternatives, and the next five chapters focus on parts of the biological, physical, and human environments potentially affected by the proposed action. These chapters describe both the status quo environment potentially affected by the proposed action and the predicted impacts of each of the alternatives. Based on this structure, the document is organized in 14 chapters:

The rest of this chapter, Chapter 1, discusses the reasons for federal regulation of West Coast groundfish fisheries in 2007-2008 and for considering revisions to established groundfish rebuilding plans. This description of purpose and need defines the scope of the subsequent analysis.

- Chapter 2 outlines different alternatives that have been considered to address the purpose and need. The Council will choose their preferred alternatives from among these alternatives. The preferred alternative covering revisions to the six rebuilding plans will be submitted to NMFS as an FMP amendment. The preferred alternative for harvest specifications and management measures provides the basis for establishing the regulations governing groundfish fisheries in 2007-2008.

- Chapter 3 describes West Coast marine ecosystems and essential fish habitat (EFH) potentially affected by the proposed action and discloses the predicted impacts of the alternatives on that segment of the physical and biological environment.

- Chapter 4 describes fish species affected by the proposed action and discloses the predicted impacts of the alternatives on that segment of the biological environment. These include target and non-target groundfish fishery management unit species and non-target, non-groundfish species.

- Chapter 5 describes protected species potentially affected by the proposed action and discloses the predicted impacts of the alternatives on that segment of the biological environment.

- Chapter 6 describes the fisheries management regime. Impacts, considered in terms of public sector costs, are evaluated in Chapter 7.

- Chapter 7 describes the socioeconomic environment, which includes commercial, tribal, and recreational fisheries and coastal communities in the action area and how they would be affected by the different alternatives.

- Chapter 8 addresses additional requirements of NEPA and implementing regulations, including

1/ Federal regulations at 40 CFR 1502 detail the required contents of an EIS. Although there are several additional components, this list is of the core elements.

the identification of any measures that will be implemented to mitigate significant impacts of the proposed action.

- Chapter 9 details how this amendment meets 10 National Standards set forth in the MSA (§301(a)) and Groundfish FMP goals and objectives.

- Chapter 10 provides information on those laws and EOs, in addition to the MSA and NEPA, that an action must be consistent with, and how this action has satisfied those mandates.

- Chapters 11 through 14 include required supporting information: the list of preparers, who received copies of the document, a glossary and acronym list, and the bibliography.

1.2 Purpose and Need for the Proposed Actions

The proposed actions fall within the management framework described in the Groundfish FMP, which enumerates 18 objectives that management measures must satisfy (organized under three broad goals), describes more specific criteria for determining the level of harvest that will provide the greatest overall benefit to the Nation (defined as optimum yield [OY]), and authorizes the range and type of measures that may be used to achieve OY. The management regime described in the Groundfish FMP is itself consistent with 10 National Standards described in the MSA. Harvest specifications (OYs) and management measures must be consistent with the goals, objectives, and management framework described in the Groundfish FMP.

1.2.1 The Proposed Actions

The Council's/NMFS' *proposed actions*, evaluated in this document, are:

1. Re-evaluate and revise, if necessary, adopted rebuilding plans for seven depleted (overfished) groundfish species, so that the rebuilding periods are as short as possible, taking into account the status and biology of the depleted species, and the socioeconomic needs of West Coast fishing communities, and the interaction of the depleted stocks within the marine ecosystem.

2. Specify acceptable biological catch (ABC) and OY values for species and species' complexes in the fishery management unit and establish management measures to constrain total fishing mortality to these specifications. These specifications and management measures will be established for calendar years 2007 and 2008, although they are considered within the context of past management and long-term sustainability of managed fish stocks.

The harvest specifications (OYs) established for 2007 and 2008 are in part determined by potential revisions to rebuilding plans, the first proposed action. Management measures are intended to keep total fishing mortality during each year within the OY established for that year. Specifications include new harvest levels for species with new stock assessments and projected harvest levels for species with stock assessments completed in prior years. Management measures may be modified during the biennial period, so total fishing mortality is constrained to the OYs identified in the preferred alternative. The environmental impacts of any such changes in management measures are expected to fall within the range of impacts evaluated in this EIS. Federally-managed Pacific groundfish fisheries occurring off the coasts of Washington, Oregon, and California (WOC) establish the geographic context for the proposed action.

1.2.2 Need (Problems for Resolution)

The proposed actions are needed because:

1. The Council's policies for rebuilding depleted groundfish species, as described in rebuilding plans, must be re-evaluated and potentially adjusted so that they are consistent with guidelines pursuant to National Standard 1 (50 CFR 660.310) and a recent opinion rendered in the Ninth District Court in the matter of *Natural Resources Defense Council, Inc., and Oceana, Inc. vs. National Marine Fisheries Service, et al.*, 421 F.3d 872 (9th Cir.2005)..

2. Commercial and recreational harvests in 2007 and 2008 must be constrained to levels that will ensure groundfish stocks are maintained at, or restored to, sizes and structures that will produce the highest net benefit to the nation, while balancing environmental and social values.

1.2.3 Purposes of the Proposed Actions

The purposes of the actions are:

1. Rebuild depleted groundfish stocks to a size and structure capable of supporting MSY according to the requirements of the MSA. The MSA mandates rebuilding periods "be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish within the marine ecosystem" (§304(e).)

2. Ensure Pacific Coast groundfish subject to federal management are harvested at OY during 2007 and 2008 and in a manner consistent with the aforementioned Groundfish FMP and National Standards Guidelines (NSGs) (50 CFR 600 Subpart D), using routine management tools available to the specifications and management measures process (FMP at 6.2.1, 50 CFR 660.323(b)). Chapter 10 of this EIS describes how the proposed action (preferred alternative) is consistent with the FMP and MSA.

1.3 Background

1.3.1 Revising Groundfish Rebuilding Plans

National Standard 1 Guidelines establish criteria for rebuilding depleted or overfished[2] stocks that the Council used when it adopted rebuilding plans for the eight groundfish stocks[3] the Secretary of Commerce had formally declared as overfished. One of these stocks, lingcod (*Ophiodon elongatus*) has been subsequently rebuilt to its MSY stock size; the remaining seven stocks still managed under Council rebuilding plans are: bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinniger*), cowcod (*S. levis*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S.

---

[2] The MSA and NSGs use the term "overfished" to describe stocks whose biomass has fallen below the minimum stock size threshold (MSST), triggering a management response to rebuild the stock. However, the concept of an overfished stock, defined by biomass, is frequently confused with the concept of "overfishing," or a situation where the fishing mortality rate has exceeded a threshold, which, if sustained, could lead to the stock becoming overfished. In order to make a clearer distinction between these two concepts, in this document the term "depleted" is used to mean overfished, or a biomass level below the MSST.

[3] Nine groundfish stocks were formally declared overfished by the Secretary of Commerce; however, one of those stocks, Pacific whiting, was subsequently found not overfished before the Council could recommend a rebuilding plan to the Secretary of Commerce.

entomelas), and yelloweye rockfish (*S. ruberrimus*). According to NSG 1, rebuilding should bring stocks back to a population size that can support MSY (B_{MSY}). In order to do this, a rebuilding plan must specify a target year (T_{TARGET}) based on the time required for the stock to reach B_{MSY}. This target is bounded by a lower limit (T_{MIN}) defined as the time needed for rebuilding in the absence of fishing (i.e., a zero fishing mortality rate, F = 0). T_{MIN} is the shortest possible rebuilding period given the stock's estimated productivity. According to NSG 1, rebuilding plans for stocks with a T_{MIN} less than 10 years must have a target less than or equal to 10 years. If, as is the case with all of the groundfish stocks currently managed under Council rebuilding plans, the biology of a particular species dictates a T_{MIN} of 10 years or greater, then, again according to NSG 1, the maximum allowable rebuilding time, T_{MAX}, is the rebuilding time in the absence of fishing (T_{MIN}) plus "one mean generation time." Mean generation time is a measure of the time required for a female to produce a reproductively-active female offspring {Pielou, 1977 #653; and especially \Restrepo, 1998 #462} calculated as the mean age of the net maternity function (product of survivorship and fecundity at age). The MSA states the rebuilding time should be as short as possible, taking into account the status and biology of the overfished stocks and the needs of fishing communities (Sec. 304(e)(A)(i)).

Because of the uncertainty surrounding stock assessments and future population trends (due, for example, to variable recruitment), the rebuilding period limits and the target need to be expressed probabilistically. In past years, the Council's approach at the outset of the rebuilding period had been to set T_{TARGET} so there was at least a 50% probability of achieving B_{MSY} within the T_{MAX}.[4]

Although this approach gave some flexibility for the Council to choose a target rebuilding year falling anywhere between the T_{MIN} and T_{MAX} by considering tradeoffs between biological and socioeconomic impacts, a recent Ninth Circuit Court of Appeals decision requires a reconsideration of this approach and emphasizes on the need to rebuild stocks in as short a time as possible, taking into account: (1) the status and biology of the stocks, (2) the needs of fishing communities, and (3) interactions of depleted stocks with the marine ecosystem. The current action responds to this by reconsidering the targets and parameters in previously-established rebuilding plans with more emphasis placed on swift rebuilding.

Historically, the Council has focused on the first factor, noted above, and modified rebuilding periods to accommodate targeted fishing for healthy stocks that co-occur with depleted species. The depleted species' stock assessments and rebuilding analyses describe the status and biology of the stocks, and their anticipated rebuilding trajectories. Amendment 16-4, and groundfish harvest analyses in 2007 and beyond will include more analysis of the latter two factors.

This EIS, which includes an IRFA and an RIR, analyzes the connections between depleted species and fishing communities. Different fishery sectors rely on opportunities to fish for various healthy groundfish stocks, almost all of which occur in mixed stock complexes that include both healthy and depleted groundfish stocks. The EIS shows which fishing communities tend to be reliant on which sectors of the groundfish fishery, and whether those sectors encounter depleted stocks while targeting more healthy stocks. It reviews the effects of varying potential groundfish-related income on the duration of depleted stocks' rebuilding periods. For some stocks, a small sacrifice in near-term groundfish-related income may result in notable gains in the swiftness of the rebuilding period. For other stocks, large sacrifices in groundfish-related income could be required to gain even a few months difference in rebuilding period durations.

[4] The use of a low bound 50% probability is not specified in regulations; it is the result of litigation (*Natural Resources Defense Council v. Daley*, April 25, 2000, U.S. Court of Appeals for the District of Columbia Circuit).

Amendment 16-4 is also intended to better take into account the interactions of depleted stocks with the marine ecosystem. Amendment 19 to the FMP, approved in March 2006, addressed how all groundfish species interact with the marine ecosystem and essential fish habitat. For the action considered in this EIS, the more thorough communities-effects review has necessitated a closer look at how depleted stocks interact with target stocks and each other. Where the need to rebuild one depleted stock constrains the annual harvestable amount of a second depleted stock, the rebuilding period for the second stock will be constrained by the rebuilding needs of the first stock. This is a shift from past practices, where rebuilding periods were set for each species individually.

In addition, rebuilding plans also may have to be revised in response to new information about a stock. This new information is typically derived from stock assessments, which use the most recent available scientific information about a stock to estimate various characteristics of the stock relating to its size and productivity. These characteristics largely determine what portion of the stock can be harvested on an annual basis while maintaining the stock at, or rebuilding it to, B_{MSY}; this harvestable amount is the OY for a given stock. An important intermediate step in determining the OY for an overfished stock is the preparation of a rebuilding analysis. The rebuilding analysis, using information from the stock assessment, computes the values of the various parameters used to describe the rebuilding plan.

The rebuilding framework described in the FMP anticipates the likelihood that rebuilding plans will need revision in light of new information about stock characteristics. In order to alleviate the need for frequent FMP amendments, which describes the rebuilding plan for each depleted stock, the FMP states that two key rebuilding parameters, the target year and the harvest control rule (typically expressed as a fishing mortality rate, which is then translated into the harvestable amount, or OY) will be published in federal regulations. Upon receipt of new information that NMFS and the Council determine requires adjustment of these parameters, a regulatory amendment would be made to change the published values through a full rulemaking. The FMP would not normally be amended to update changes in the values of other parameters that are part of the rebuilding plan descriptions in the FMP. However, the Council has elected to pursue an FMP amendment (Amendment 16-4) in this case since they will be considering changes to all seven species' rebuilding plans, within the FMP at Section 4.5.

In considering potential alternatives to revise the seven groundfish rebuilding plans, this EIS used a two-step analysis to develop a range of "vertically-integrated" OY alternatives. First, the alternative OYs specified by the Council for each depleted species were analyzed individually to understand how each OY alternative, which corresponds to a longer-term mortality schedule defining the rebuilding strategy, affects the estimated duration of rebuilding (T_{TARGET}) and affects the various fisheries/fishing sectors. Second, the OY alternatives for each of the seven depleted species were analyzed "vertically", or across the different species, to better understand the interactions between the different rebuilding strategies for the overfished species, and the tradeoffs to the various fishing sectors and communities affected by alternative rebuilding plans. This vertical cross-species analysis of alternative OYs is important since future management regimes are most directly affected by the collective constraints of all rebuilding plans. Vertically integrated OY alternatives are strategically developed by comparing and contrasting relatively higher and lower OY alternatives for each species in turn. This analytical treatment is designed to show, to the extent practicable, how each stock under rebuilding might differentially constrain fishing opportunities by fishing sector, area, and time. Guidance from the Council and the Council's Groundfish Allocation Committee is to assume a status quo management regime (i.e., continuance of similar depth-based closed areas specific to each fishing sector (RCAs), similar intersector allocations of groundfish species, etc.) as a primary working assumption in these analyses. However, the status quo management regime is significantly perturbed under some of these OY scenarios. In these cases, alternative management regimes result and examples are presented under different base assumptions.

1.3.2 The Process for Establishing Harvest Specifications (OYs) and Management Measures

In accordance with the Groundfish FMP, beginning in 1990 the Council set Pacific Coast groundfish harvest specifications annually, with harvest specifications and management measures in effect for the calendar year January 1 to December 31. Amendment 17 to the Groundfish FMP, approved in 2003, shifted decision-making to a two-year, or biennial, cycle. Under the biennial management cycle, harvest specifications and management measures are established for the two-year period in advance of the biennium. Separate ABCs and OYs are established for each calendar year in the two-year cycle. The first biennial harvest specifications were established for 2005–2006; the current action represents the second round of biennial specifications.

Council decision-making for this action occurs over three meetings, culminating in June of the year preceding the biennium. For the 2007-2008 biennium, the Council identified a preliminary range of ABCs and OYs at their November 2005 meeting; at their April 2006 meeting they will select preferred alternatives for the rebuilding plan revisions and, directly related to that, preferred ABCs and OYs that will be used as harvest limits during the 2007-2008 period. At this meeting the Council also approves a range of management measures' alternatives for analysis. (They also have the option of identifying a preliminary preferred alternative, if there is sufficient information to do so.) The final decision point for the Council occurs at their June 2006 meeting when they finalize the full package of harvest specifications and management measures, choosing a preferred suite of management measures for 2007-2008.

Although Council decision-making is complete by June 2006, there are additional opportunities for public comment under NEPA and the rulemaking process. A DEIS will be released for public review and comment after the June Council meeting. Shortly thereafter, NMFS will publish a proposed rule to implement the 2007-2008 harvest specifications and management measures and Amendment 16-4, which will also include a public comment period. Changes to the rebuilding plans, which would be made via Amendment 16-4 to the groundfish FMP, will also be submitted to NMFS for Secretarial review. Subsequent to the public review periods on the proposed rule and on Amendment 16-4 itself, the approved changes to rebuilding plans will then be incorporated into the FMP. NMFS anticipates completing the Amendment 16-4 Secretarial review period in advance of implementing the 2007-2008 groundfish harvest specifications and management measures.

The choice of harvest specifications and the development of management measures are two separate sets of alternatives, which form the basis of the impact analysis. The OYs for 19 stocks or stock complexes differ among the harvest specification action alternatives. OYs for the remaining stocks are the same across all the action alternatives. (The No Action Alternative represents the status quo, or re-application of 2005-2006 harvest specifications. OYs for additional stocks are different under No Action in comparison to the action alternatives.) The differences among the harvest specification action alternatives reflect policy decisions based on various factors, such as scientific uncertainty in stock assessments (e.g., petrale sole), requirements of rebuilding plans, and whether to apply a precautionary reduction for stocks co-occurring with depleted species (e.g., chilipepper rockfish), among other factors.

The Council process for setting groundfish harvest specifications depends on periodic assessments of the status of groundfish stocks, rebuilding analyses of those stocks that are depleted and managed under rebuilding plans, and a report from an established assessment review body or a Stock Assessment Review (STAR) panel. As appropriate, the Council's Scientific and Statistical Committee (SSC) recommends the best available science for groundfish management decision-making in the Council process. The SSC reviews new assessments, rebuilding analyses, and STAR panel reports and recommends the data and analyses that should be used to set groundfish harvest levels and other specifications for the following biennial management period. A total of 23 groundfish stock assessments were conducted and approved in support of the process for setting 2007-2008 groundfish harvest specifications and management measures. This includes the 2005 Pacific whiting assessment, which was used to set 2005 harvest specifications and management measures for trawl fisheries targeting this stock. The 2005 assessment also forms the basis for ranging 2007-2008 Pacific whiting ABC/OY alternatives for analysis, primarily to understand the bycatch implications of potential future fisheries targeting Pacific whiting. However, new annual assessments of the West Coast Pacific whiting stock are anticipated for setting future Pacific whiting harvest specifications and management measures. The remaining 22 groundfish stock assessments conducted in 2005 are explicitly used for deciding 2007 and 2008 harvest specifications and management measures. An overview of the status of groundfish stocks and stock complexes is found in Chapter 4. How results from each of the current and past stock assessments are used to decide new harvest specifications is also discussed in Chapter 4.

1.3.3 The Range of Management Measures Considered by the Council

Management measure alternatives combine different management tools available to the Council and NMFS as specified in the FMP and in federal regulations. Each of these management measure alternatives (except for No Action) is intended to constrain fishing mortality to or below the Council-preferred OY levels determined by the choice among the ABC/OY alternatives mentioned above. (The action alternatives were crafted before performing the detailed analysis necessary to determine total fishing mortality for each stock. Therefore, one or more of the action alternatives may be projected to exceed the Council-preferred OY for one or more stocks. However, the Council-preferred alternative, chosen at the June Council meeting, must be projected to keep total fishing mortality for all stocks within their respective OYs.) This approach also makes it possible to compare the performance of alternative management measures against one standard: the Council-preferred ABC/OY levels chosen from the first set of alternatives.

The types of management measures included in the alternatives are likely to be substantially the same as those used during the 2005-2006 biennium, although their application will change so that they are suitable to available 2007-2008 harvest levels. Those which may be considered for modification include:
[add additional as appropriate]

- Two-month or monthly cumulative landing limits frequently referred to as "trip limits." These are separately established for the limited entry trawl sector, and the limited entry fixed gear and open access sectors.[5] Cumulative limits are established for species or species groups and specify an amount, by weight which a vessel may land during a two-month or monthly period.

- Gear requirements, principally relating to trawl gear. Since 2001 footrope restrictions have been in place for limited entry trawl gear. Footrope size limits the type of bottom habitat a trawl gear may operate in; trawlers with small footrope gear cannot operate in rocky areas, important habitat for some depleted groundfish. After extensive testing, beginning in 2005 selective flatfish trawl gear was required in the area shoreward of the trawl RCA in waters north of a management line at 40°10' N latitude (near Cape Mendocino, California). This modified bottom trawl gear reduces bycatch of most depleted rockfish species while maintaining or increasing catch efficiency for target flatfish species. (The modified trawl nets use a cutback

5 These sectors are defined by the requirement to possess a gear-endorsed limited entry permit, which is required to engage in specified types of groundfish fisheries. The "open access" sector refers to those vessels targeting or incidentally catching groundfish without a limited entry permit, although they may hold permits required for other federally- or state-managed fisheries.

headrope, which allows some species, including some rockfish species, to swim upward when disturbed, thus evading the net entrance. Bottom-hugging species like flatfish are still caught.)

- For recreational gear, size limits and bag limits. Bag limits are a number of fish, sometimes enumerated by type, that an angler may retain or land on a per-trip basis. Recreational measures are principally administered by state governments since most of this fishing occurs within state waters. Through the Council process, state-specific measures are developed. Bag limits may differ by zone or management subareas established by the states.

- Time/area closures for commercial vessels, particularly Rockfish Conservation Areas (RCAs). RCAs have been in place since 2002 to prohibit vessels from fishing in depths where depleted groundfish species are more abundant. Separate RCAs are established for the limited entry trawl and non-trawl (limited entry fixed gear and open access) sectors. RCAs for recreational vessels have been in place since 2004. For both commercial and recreational fisheries, RCAs are intended to reduce the incidental catch of these species. Their boundaries may vary seasonally and may be re-specified as part of the biennial management process. In both commercial and recreational fisheries, time/area closures may include seasons of varying durations. Amendment 18 to the FMP, under Secretarial review, specified that depth-based management measures, like RCAs, could also be used either to prevent overfishing a healthy groundfish stock and/or to constrain incidental catch of protected species other than groundfish (salmon, halibut, Dungeness crab.)

1.3.4 Key Management Issues in 2007 and 2008

Certain depleted species will continue to constrain harvest opportunities for healthier stocks. Harvest limits for depleted stocks may change dramatically and constrain fisheries by gear, time, or area much differently than in the recent past, depending on revisions to species' rebuilding plans. In response, various combinations of sector-specific trip limits and closed area configurations will be a central management feature. The most recent available fishery observer data will be used to adjust the bycatch rates used in modeling projected total fishing mortality. Although preventing overfishing and rebuilding depleted stocks is a paramount concern, management measures are intended to allow fishers access to healthy stocks by reducing bycatch rates. This addresses competing goals in the Groundfish FMP to maximize the value of the groundfish resource and rebuild overfished stocks. Striking this balance between conservation of and direct social benefit from groundfish is another way to understand the purpose of this action.

Inseason management of California recreational fisheries to constrain mortality of depleted groundfish and stay within other harvest allocations made to that sector will again play an important role in the formulation of management measures for the 2007-2008 period. Data from a new recreational catch estimation program, the California Recreational Fisheries Survey (CRFS), will be used in preseason and inseason recreational harvest projections. Since CRFS has only been used since 2004, only two years of catch estimates are incorporated in the California recreational impact model used to project harvests for this fishery.

As mentioned above, regionalizing recreational fisheries management will continue as an important management tool. Historically, the recreational fisheries have had some degree of regional management based on differing state regulations and the geographic distribution of groundfish stocks caught in the sport fishery. For 2007-2008, the Council, along with the states, is now considering more explicit regional allocations in the form of harvest guidelines or targets. The concern that a given sector or region could harvest a disproportionate share of the very low coastwide OYs for certain depleted groundfish, such as canary rockfish, has sparked this discussion.

Two large areas in the Southern California Bight south of Pt. Conception have been closed to bottom fishing since 2000 to minimize mortality of cowcod, a severely depleted groundfish stock under rebuilding. Termed the Cowcod Conservation Areas (CCAs), these areas are bounded with regular, rectangular lines to ease enforcement of fishing prohibitions. Some members of the fishing industry have asked that the boundaries of the CCAs be modified to allow fishing in areas that are not considered cowcod habitat, but where healthy slope species, such as blackgill rockfish, are more abundant. The Council agreed to consider modifying the CCAs. This EIS analyzes alternative CCA boundaries with respect to cowcod conservation needs and enforceability of fishing prohibitions.

Successful rebuilding of the coastwide lingcod stock has prompted consideration for higher trip and bag limits by commercial and recreational fishing interests. This EIS analyzes the effect of higher lingcod harvest limits in 2007 and 2008 with respect to the estimated bycatch of co-occurring rockfish species (with particular concern for the bycatch of depleted species) and the potential of localized depletion of lingcod in some areas south of Cape Mendocino, California where the stock is less abundant. One proposal by the Washington Trollers Association, that the Council agreed to consider, is to allow a landing limit of lingcod by salmon trollers who are exempt from RCA restrictions. The potential risks and benefits of this proposal are analyzed in this EIS.

Salmon bycatch in directed groundfish fisheries will receive a greater focus in this EIS than in the past. An ESA consultation is required for determining salmon bycatch limits in groundfish fisheries, particularly in directed Pacific whiting fisheries where there is a salmon bycatch of any significance (relative to other directed groundfish fisheries). Chinook salmon bycatch limits were exceeded in the 2005 whiting fishery prompting a re-initiation of ESA consultation. That experience, a more pessimistic outlook for future salmon returns, and a greater federal focus on the role of harvest in salmon recovery compels a closer look at salmon bycatch in this EIS.

Constraining environmental impacts in West Coast open access fisheries has become increasingly difficult with the small OYs in place for some depleted stocks under rebuilding. As an example, in 2005 a large factory longliner announced plans to target spiny dogfish in the unlimited open access fishery in waters off Washington. This proposed fishery threatened the balance of intersector allocations for species such as canary and yelloweye rockfish, which could have led to an early exceedance of OYs and early termination/cancellation of planned fishing activities across all sectors. In response, NMFS adopted emergency annual bycatch caps (or total mortality limits) for canary and yelloweye rockfish for all open access fisheries in 2005, which would have conceivably limited early closures to only that sector had bycatch exceeded those limits. While the proposed dogfish longline fishery did not occur, this does serve as an example of the difficulty of limiting participation and impacts in the open access fishery. Small limits alone may not adequately control this fishery, which is why this fishery needs more scrutiny in this EIS.

An implication of managing for lower OYs under some of the alternative harvest specifications analyzed in this EIS is the potential need to further constrain tribal groundfish fisheries. Ad hoc tribal/non-tribal allocations[6] under the status quo management regime have been worked out in the Council process. However, some of the lower OY alternatives for northern depleted species, such as canary and yelloweye rockfish, may prompt formal government to government negotiations in the ongoing *U.S. vs. Washington* district court venue to resolve how allowable harvests will be allocated between tribal and non-tribal fisheries, as well as how to effectively constrain tribal fisheries to stay

[6] Ad hoc tribal/non-tribal allocations exist for the depleted species and many target groundfish species. However, such allocations do not include those for sablefish and Pacific whiting, which are long-term allocations frameworked in the Groundfish FMP and specified in federal regulations.

within whatever allocations are ultimately decided. This is an added step in the process of deciding revised rebuilding plans under Amendment 16-4 and the 2007-2008 harvest specifications and management measures. It is unclear how any delay in this allocation decision, if it occurs in the more formal *U.S. vs. Washington* process, will affect final decisions on the actions contemplated in this EIS.

1.3.5 Changes to the FMP Affecting Annual Management

In 2005 the Council took final action on two amendments to the groundfish FMP that will affect management in the 2007-2008 season. Amendment 18 incorporates into the FMP the preferred alternative in the September 2004 Pacific Coast Groundfish Fishery Management Plan Bycatch Mitigation Program Final Environmental Impact Statement {NMFS, 2004 1074 /id}. The preferred alternative from that EIS includes the use of sector-specific total catch limits as a way of motivating fishery participants to reduce bycatch, especially of depleted groundfish species. The Council has already used total catch limits in certain circumstances, such as the at-sea whiting sector, where real-time monitoring systems are sufficient to make this approach workable. The amendment would also reorganize and update some of the chapters in the FMP to better describe the current management framework. This includes a description of current standardized bycatch monitoring methodologies and other measures for bycatch reduction. Amendment 19 incorporates the preferred alternative adopted by the Council for the identification and mitigation of essential fish habitat in a FEIS prepared by NMFS {NMFS, 2005 1073 /id}. Mitigation measures will have a direct effect on management in the 2007-2008 cycle. These measures include 43 areas closed to bottom trawling in waters off of all three West Coast states and 17 areas off of Oregon and California closed to all bottom-contact gear. Furthermore, all waters deeper than 700 fathoms would be closed to bottom trawling. An existing measure prohibiting the use of large footrope trawl gear shoreward of a line approximating the 100 fm depth contour; footrope gear larger than 19 inches is prohibited, as is dredge and beam trawl gear. NMFS approval of these amendments, along with implementation of any related regulations is expected to occur in advance of the 2007-2008 season.

1.4 Scoping Summary

1.4.1 Background to Scoping

According to the NEPA, the public and other agencies must be involved in the decision-making process for agency actions. "Scoping" is an important part of this process. Scoping is designed to provide interested citizens, government officials, and tribes an opportunity to help define the range of issues and alternatives that should be evaluated in the EIS. NEPA regulations stress that agencies should provide public notice of NEPA-related proceedings and hold public hearings whenever appropriate during EIS development (40 CFR 1506.6).

The scoping process is designed to ensure all significant issues are properly identified and fully addressed during the course of the EIS process. The main objectives of the scoping process are to provide stakeholders with a basic understanding of the proposed action; explain where to find additional information about the project; provide a framework for the public to ask questions, raise concerns, identify issues, and recommend options other than those being considered by the agency conducting the scoping; and ensure those concerns are included within the scope of the EIS.

1.4.2 Council and Agency NEPA Scoping

On October 25, 2005 (70 FR 61595), NMFS and the Council published a Notice of Intent (NOI) in the *Federal Register* announcing their intent to prepare an EIS in accordance with NEPA for the 2007-2008

ABC and OY specifications and management measures for the Pacific Coast groundfish fishery.[7] The NOI described the proposed action and the way in which alternatives to be analyzed in the EIS would be formulated; it also enumerated a preliminary list of potentially significant impacts that could result from implementing the proposed action. A period for accepting written public comments on the scope of the EIS ended on November 25, 2005, as announced in the NOI.

The Council process, which is based on stakeholder involvement, allows for public participation and public comment on fishery management proposals during Council, subcommittee, and advisory body meetings is the principal mechanism to scope the EIS. The advisory bodies involved in groundfish management include the Groundfish Management Team (GMT), with representation from state, federal, and tribal fishery scientists; and the Groundfish Advisory Subpanel (GAP), whose members are drawn from the commercial, tribal, and recreational fisheries, fish processors, and environmental advocacy organizations. The Ad Hoc Allocation Committee, a subpanel of the whole Council, provides advice on allocating harvest opportunity among the various fishery sectors. Meetings of the Council and its advisory bodies constitute the Council scoping process, involving the development of alternatives and consideration of the impacts of the alternatives.

The Council and its advisory bodies considered 2007-2008 specifications and management measures at several meetings. As noted above, the Council considers the proposed actions at four meetings in November 2005, March 2006, April 2006, and June 2006. The Ad Hoc Groundfish Allocation Committee and the GMT met on February 6–9, 2006, to review the range of harvest specifications and provide guidance on allocation of harvest opportunity among different fishery sectors for 2005-2006. When the Council considers groundfish management at their meetings, the GMT and GAP provide advice and guidance on the development of harvest specifications and management measures. The GMT also meets outside of Council meetings to develop management recommendations. For the 2005-2006 harvest specifications process, they met in October 2003, and February, May, and June 2004. All these meetings are open to the public and are duly noticed.

In addition, both the Oregon and California state fish and game departments hold public hearings to solicit input on the formulation of management measures. Comments made at these hearings are summarized and will be made available to the Council in advance of their June 2005 meeting.

1.4.3 Summary of Comments Received

To gauge public attitudes toward the effects of management on fishing communities, we reviewed all written and oral public comment on inseason management and inseason adjustments between March 2002 and November 2005. Any comments relating to communities were excerpted in Table 1-1. (Most oral comments were recorded in handwritten notes by staff officers during Council meetings, although some were transcribed from tapes of the meetings). In addition, the table includes comments summarized for the 2004 and 2005/2006 groundfish annual specifications environmental impact statements. In total, X comments were recorded.

[Broadly summarize all comments here.] The text below merely summarizes comments made, and makes no claims as to their validity. *[Note that 2002 comments have not yet been transcribed and some may be missing]*.

- *Summarize comments that did not have any geographic area assigned*
- *Commercial vs. recreational comments (very general)*
- *Comments having to do with safety (general)*

[7] The NOI was amended to include revision of rebuilding plans as part of the proposed actions (.

- *Comments having to do with cumulative impacts (general)*
- *Other themes that appeared in the comments*

Many comments referred to specific geographic locations. Those are summarized below, from north to south. Comments that did not specifically refer to geographic locations are not included in the summary immediately below.

1.4.3.1 Washington Comments

Northern Washington

Comments from ten different people referred to northern Washington communities, including Bellingham, Forks, LaPush, Neah Bay, Port Angeles, Summamish and Westport. The comments are summarized here.

- A Bellingham processor was concerned about the effect of potentially moving a management line to 150 fathoms (April 2004). He was concerned that this depth restriction would eliminate or sharply reduce the harvest of dogfish and the setline blackcod fishery, resulting in economic hardship.
- Recreational fishers in LaPush were concerned about the lack of regional management in relation to a potential closure of groundfish fisheries. They noted "Groundfish fisheries are critically important to our coastal economy and tourism." (April 2004)
- Recreational fishers from Neah Bay noted that the community had invested heavily in a new marina and other facilities that were dependent on recreational fisheries. (April 2004)
- Recreational CPFV businesses in Westport called for regional management of fisheries and said they depended upon groundfish and halibut for a major part of their livelihood. (April 2004)
- Commercial fishers from Neah Bay were concerned that their small boat fishery was being discriminated against, as small boats could only fish during certain seasons due to safety concerns. They emphasized the importance of the small trawl fishery to local communities and expressed frustration at the delay in making management decisions. They noted "We have already lost so much with the cable crossing, the Vessel Traffic Lane Change, and other inseason adjustments that we have no reserves left to fall back on…." And that "many of us have been fishing our small family boats for generations. But sadly, many of us do not encourage our children to partake of our tradition of being a fisherman...competition and politics have put an end to that dream." (June 2002 and June 2003)
- The mayor of Forks, Washington and the Quileute Tribe both wrote to support proposed changes in the Halibut Catch Sharing Plan that were important to the recreational fishery. The Forks mayor noted that "would greatly benefit the Washington North coast communities." (November 2003)
- A CPFV business owner in Sammamish noted that a sport groundfish closure in late 2004 would "require that I cancel all my trips and let my customers also cancel all hotel and dinner plans for October and November of 2004…"

Southern Washington

Three comments from three different people were received from Ilwaco and elsewhere in southern Washington. In sum, they said that Ilwaco had been negatively affected by recreational groundfish closures, that there was a perception that the system favored other states over Washington, and that regional management was needed; and commenters described the importance of recreational fisheries to small coastal communities (April 2004).

1.4.3.2 Oregon Comments

We recorded comments from approximately 74 individuals from Oregon (some of these were provided to the Council in the form of a Sea Grant study that did not differentiate between individual commenters). Forty-four comments did not specify a location in Oregon. Of these, recreational commenters expressed concerns about the economic impacts of fewer recreational fishers coming to the Oregon coast. They named hotels, restaurants, tackle shops, boat repair shops, charter companies, guides, gas stations, and shopping malls as potentially suffering from cuts in recreational fishing, and noted that many communities were already suffering economic distress. They called for more data on the economic impacts of recreational fisheries, and several expressed the belief that recreational fisheries created more economic benefits and fewer environmental impacts than commercial fisheries.

Commercial fishermen and people commenting on commercial fishing expressed distrust of the management process ("Many no longer go to meetings because they feel it makes no difference, they won't be listened to anyway and decisions have been made ahead of time"), and some believed that management was determined to do away with commercial fishing. They expressed concern about neglect, reduced maintenance, and lack of insurance for fishing vessels ("Many fishermen are going on a 3-year haul out schedule instead of a 1-year schedule"); and lack of support services such as ice plants, fuel docks, gar suppliers and processors. They expressed frustration over the difficulty in planning for business purposes and the loss of family-wage jobs. A fisherman's wife reported on an increase in divorce in her social circle ("The financial stress was too much - that and husbands always being angry, moody, and withdrawn. After four years of that, they couldn't take it anymore.") Processors reported layoffs and reductions in the type of species purchased from fishermen ("I quit buying groundfish because I couldn't get the mix I needed for my market").

Non-fishing businesses also reported losses. (These reports were part of the Oregon Sea Grant study presented to the Council in September 2002). An auto dealer said he hadn't sold a car to a fisherman in two years; a radio station owner said advertising was down due to a loss of family wage jobs in his community; a jewelry store owner was said to have laid off four workers; a trucking company reported on cutbacks in hours; a grocery store was said to be keeping fewer accounts for fishing vessels; and gear store managers reported on lost revenue due to fishing regulations and feared that thousands of dollars worth netting they had ordered months in advance would be obsolete by the time it arrived.

Community members in Oregon who were not affiliated with the fishing industry also expressed concerns about crumbling infrastructure, loss of family wage jobs, and impacts on families from economic stress and uncertainty.

<u>Northern Oregon Coast</u>

There was one comment each from the commercial sector in Warrenton and Astoria. One comment described the economic impacts of a potential closure on Warrenton. The speaker noted that there were 30 trawl vessels fishing out of Warrenton, with an average gross exvessel value per vessel of $60,000. He noted that these 30 vessels produced an impact of $1.8 million in exvessel value for Warrenton alone (September 2003). A commenter from Astoria noted that local vessels were not benefiting from the northern Oregon sardine fishery, but that most of the benefits were going out of state (September 2002).

Central Oregon Coast

We summarized comments from 18 individuals from the communities of Garibaldi, Pacific City, Depoe Bay, Newport, Toledo, Seal Rock, and Florence.

- A commenter from Depoe Bay voiced concern over the economic and social impacts of a potential sport fishery closure. She noted, “The closure would not only impact the owners of the boats, as they lose their business, but it would also affect from one degree to another all businesses that are touched by charter fishing. Any business that benefits from the tourism generated by the fishing fleet to the marine supply, to fuel docks, restaurants and motels, just to name a few...” She also expressed concern over the fate of the Memorial Day Fleet of Flowers, a 57-year-old tradition in which the charter boat and commercial fleet pay respects to fishermen lost at sea, and other impacts of a weakened charter fleet: “It will mean that no longer will the handicapped, the blind, the deaf, the mentally challenged be able to go ocean fishing. It will mean that many of elderly will not be able to continue with the pleasure of ocean fishing, because there will be no one to take them...” (June 2002)
- The Port of Siuslaw (Florence) wrote with concerns about possible recreational closures outside of 50 fathoms. They noted that “Recreational angling provides a great economic stimulus for Florence and the surrounding area” and expressed concern over the ripple effect of a fishery closure. (September 2003)
- The Garibaldi fishing community was concerned about a recent Labor Day groundfish closure. A processor wrote “that had a tremendous economic impact … [and] a very large psychological impact on my community. It was kind of like a kick in the face...all these people from all over the country who had plans to come to the Oregon coast to go fishing, to spend their money, those plans were stopped with 72 hour notice [or less].” A Garibaldi port commissioner wrote that the pre-Labor Day closure had cost Garibaldi $529,000. Both commercial and recreational fishers in Garibaldi stressed the economic impacts of management decisions on their community: “You have hurt us financially, putting our [three] boats… into dry dock because of the low quotas... You've made us ready to quit and sell our boats than to keep our profession of [fishing].” (November 2005)
- Commenters in Newport pointed out that the coastal economy had been depressed for quite some time. A joint letter from Senators Gordon Smith and Ron Wyden to the Secretary of Commerce noted, “the fishing communities of Oregon are in their worst financial condition in recent history and are depending upon you to carefully craft a balanced management plan…” (September 2002), and a commercial fishing family member wrote “be aware that the West Coast fishery as a whole is experiencing an overall depression. Depressed prices for salmon, shrimp, crab and tuna are adding to the general poor outlook for fisheries” (November 2002). A petition with 43 co-signers notified the Council that “the reduction in fish harvest levels [has] had a drastic impact to our community and that further reduction in groundfish harvest levels will continue to adversely affect every business and family in Newport. The reduction in harvest levels means direct jobs are lost, not only in the commercial fishing industry but also in the recreation fishing industry, processing plants, boat repair businesses and gear shops… The repercussions trickle down to the lodging, restaurant, attraction, entertainment, and retail industries. And when these tourism-based businesses lay off employees due to reduced revenues, this has an effect on other local businesses... It would be difficult to measure the number of jobs and revenues lost to the whole business community.” A net shop owner noted “[We] plead the case here for expanding some fishing grounds or quotas to the draggers deploying this year.... A year from now, if these quotas and closed zones stay in effect, we will be having to turn fishermen away for fears of not being paid. Inventories at shoreside services are dwindling and the entire market infrastructure seems ready to collapse...” (June 2003). Another commenter wrote, “All over Oregon, our skippers and deckhands depend on the ground

fishery to make a living and feed their families. Winter months through early Spring especially, all they were allowed to catch was bottom fish, to carry them through until salmon season starts again. This is the cycle you have put us in. Now you have ruled to take this away from us leaving nothing to make a living with this winter" (September 2004). The Embarcadero Resort Hotel & Marina estimated 1650 occupied rooms would be lost to the Resort with severe cuts or complete stoppage of groundfish fishing, and estimated total economic loss at $421,887 per year (September 2002). A processor expressed alarm over whiting being listed as overfished, saying "80-90 people will be laid off [as result of whiting being listed as overfished]."

- In Toledo, a recreational fisher wrote "When [ODFW] shut down bottom fishing it devastated the Oregon coast economy. Not only was the sport industry affected; restaurants, hotels, gas stations, public sector, police, firemen (because of the tax base) - we lost a lot of money on the Oregon coast because of this. It is heartwrenching, because there [were] people on the Oregon coast who... lost their families, who lost their businesses. There were businesses reported losing $1400 per week... that had a devastating affect on our tax bases..."
- A commercial fisher from Pacific City, which hosts a dory fleet, expressed concern that VMS would force small vessels with limited income out of the fishery.
- A Seal Rock resident spoke in favor of potential closures, saying "I realize the importance of fishing to this community. However, I am also aware that no single species can be lost without contributing to the loss of another, eventually impacting the very quality of human life that we are all eager to maintain."

Southern Oregon Coast

We summarized comments from 10 different people in Winchester Bay, Bandon, Coos Bay, Charleston, Port Orford, and Brookings-Harbor. (One comment was gathered as part of a Sea Grant study presented during public comment in September 2002).

- In Winchester Bay, a recreational fisher recalled the impacts of an earlier salmon closure on this primarily recreational port: "Many fishing related businesses closed and this area lost all our charter fishing businesses. We currently have only four charter offices providing offshore angling opportunities for our visitors." He noted, "Recreational angling provides a great economic stimulus for Winchester Bay and the surrounding area. If recreational angling were stopped, we would experience the ripple effect from another loss of fishing species." (September 2003)
- The Port Orford Port Manager commented, "Port Orford fishermen, the Port and the community of Port Orford have long derived economic benefit from groundfish landings from around our area. All are now suffering hardship because of declining stocks and harvest regulations." (March 2005)
- The Coos Bay Trawlers' Association expressed concern about the cumulative effect of management measures, including the trawl buy-back program, prohibitions on large roller gear, other gear restrictions, observer requirements, VMS, the Rockfish Conservation Area, and ITQs, which "reduced time on the water by 75 to 80 percent; reduced our earnings by at least 75%" (June 2005). The cost of VMS was problematic: "The state that has the highest unemployment rate, the state with the highest poverty level…has to pay for the system themselves..." (March 2004). In addition, trawlers were frustrated by frequent changes in management direction: "Changing the process again, midstream…is taking all these small [trawl] businesses by surprise, and will hurt many coastal communities… How can any business effectively operate in this kind of environment?..." (September 2003).
- In Charleston, a processor pointed out the difficulty in planning a business when faced with unexpected cuts: "Without proper notice the RCA zone was moved out to 250 fm, which causes

a devastating ripple effect within our company. Over the past several months our company has invested approximately $80,000 to develop our new fillet room with the anticipation of Petrale season opening in October of this year. We are a small company just starting out in this business and this has made an enormous impact on our financial situation... Last year during the months of October, November and December we purchased several thousands pounds of Petrale, which made it possible for us to continue doing business by compensating enough income to keep paying wages of our employees." (November 2004) Another processor emphasized the seasonal importance of the Petrale fishery: "The fall Petrale sole fishery has been a valuable economic asset to both the fishermen and processors at a time when both the weather and the late year limits put an economic hardship on the industry. By the current position of the 250 fm line the Petrale fishery has been eliminated. The Petrale fishery has become an established holiday season marketing item for the processors, brokers, wholesalers, restaurants, and grocery stores." (November 2004)

- Commenters from Brookings-Harbor were concerned about impacts to the recreational fishery. Responding to a sport groundfish closure, one commenter wrote, "The impact is being felt already by this community and is expected to multiply extensively in the next few days. Southern Oregon is struggling to create employment opportunities and keep this one key element of the tourism industry alive, which is our recreational fishing industry. This is a blow to our economy that is unexpected and, plainly speaking, should be justified to the general public…" (September 2004). Another commented that the on-again, off-again regulatory pattern "tears families apart, making it impossible to hire, train, and keep good employees, not to mention maintaining boats, trucks, fishing gear, and montages [sic]. It also tears at the social fabric of coastal communities, ports, fuel docks, suppliers, banks, and restaurants and other support industries, and the employees and families of those businesses" (November 2005). An RV park manager noted that when there are closures in California, it should be made clear to the public that they do not necessarily affect recreational fisheries out of Brookings (September 2002).

1.4.3.4 California Comments

We summarized comments from 57 individuals in California. Of these, 15 did not specify a city or town in California. Nine were form letters from an angling organization which promoted angling's economic importance and lack of environmental impact. Two other comments from recreational anglers echoed the same concerns.

Four comments from commercial fishers expressed concern about the economic impacts of restrictions on sanddabs, California halibut, and the possibility of being restricted to fishing outside 200 fathoms. Another fisherman noted that "Over the last several years most of the hook and line fishermen have gone out of business because restrictive regulations have made fishing in this manner economically unrealistic."

Northern California

We summarized comments from 14 individuals in northern California (defined as San Francisco and points north). Comments came from people located in Crescent City, McKinleyville, Samoa, Newport and Fort Bragg.

- In Crescent City, commercial fishermen expressed concern about protecting markets for "beach fish" (sanddabs, sole, and flounder) and other nearshore markets. A fisherman noted, "We badly need to have an increase in the black and blue rockfish component of our catch allowances. Without the seasonal increases in these fish, some of the last nearshore markets will be lost along with the infrastructure that supports them. Many fishermen, especially those who fish outside of the areas that can supply the live market, cannot make enough money to support their fishing efforts…" (June 2003) Another commercial fisherman was concerned about the effect of VMS requirements on blackcod fishermen (March 2005). The Crescent City Harbor District expressed concern over recreational seasons, saying "the reduction in our groundfish season will have a devastating impact on our port and local community...." Other recreational fishers noted that the recreational fishing season had been cut in 2004 to seven months, leading to economic losses; and the season was cut in 2005 to four months: "with the offshore weather we have here at Crescent City in the summer, the season will be less than [four months]...This is pure and simple economic damage caused by the federal government to our small community…" (April 2005). The mayor of Crescent City wrote with similar concerns, saying "The recent development of the recreational groundfish regulations is of much concern to the City of Crescent City and its residents. As you know, we have a deep and strong interest in both the commercial and sport fishing activities in our area. Any reduction in this season would have a detrimental effect on our economy and way of life" (April 2005).

- In Samoa, a groundfish trawl gear supplier said that his business had been cut in half during the past five years, that processing and supply infrastructure had contracted, and that fishermen were putting off maintenance on their vessels: "A blanket closure would mean the loss to the nation of these fisheries and the loss of the participants' livelihoods...." (June 2002). A recreational fisher in nearby McKinleyville wrote that a black rockfish closure would hurt California both economically and socially (June 2004).
- In Newport, a commenter said that a thornyheads/sablefish closure had "killed" the Newport dory fleet (September 2002).
- In Fort Bragg, a series of alarming newspaper articles in June 2002 led to a letter from the mayor saying, "This raises concerns in the City of Fort Bragg, because fishing is an important part of the economy. In addition, there are many residents who depend on local fish as a source of food." A charter business commented that "our community has been hit with several extreme newspaper articles… claiming that all fishing, sport and commercial, will be prohibited as of Jan 03 from Mexico to Canada. Our entire community is up in arms." In November 2005, salmon trollers in Fort Bragg expressed concern about increased fuel costs, asking for higher weekly and daily limits for sablefish.
- In June 2003, a recreational fisher passed along an editorial saying "We are already seeing several party boat operations being sold or forced out of business…many boats and supporting businesses (tackle shops, fuel docks, hotels etc.) depend on rockfish for winter their income. It's not a large part of their annual total but enough to pay their employees, insurance and berthing fees until the more lucrative salmon season opens. We are literally one bad salmon season away from losing most of the party boat operations along the Central coast. In a good salmon season these small businesses can scratch out a living but if the salmon don't show the cost of running a boat and paying its crew becomes impossible. Most at risk are boats and businesses in the smaller ports. Two of the largest party boat operations in Bodega Bay are currently selling out or closing down and more are sure to follow from Ft. Bragg to Bodget Bay…"

Central California – Moss Landing Area

We summarized three comments from individuals in the Moss Landing area. Two were in response to potential cutbacks to protect bocaccio. One fisherman said there were no bocaccio where he fished for sablefish, and asked, "Have pity on us. There are no other job opportunities" (June 2002). A commercial fish buyer said his business had lost $1.5 million in potential business during the last three years, and that 40 restaurants had gone out of business due to management restrictions (June 2002). The Harbormaster wrote "There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. …" (June 2005).

Southern California – Morro Bay Area

We summarized comments from five individuals in the Morro Bay area.

- In response to concerns raised by the Essential Fish Habitat Environmental Impact Statement (June 2005), the Mayor wrote that "Many of the alternatives in the [EFH] DEIS would appear to close fishing grounds to the extent that would eliminate landings in Morro Bay and finally put an end to our commercial fishing harbor…" and that "our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on." She noted that "In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City." Others from Morro Bay also wrote with concerns about potential regulations resulting from the EFH EIS.
- In Port San Luis, the Harbor Master wrote (also in response to the EFH EIS) that "there are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the [EFH] EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has had a direct effect on coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities..." (June 2005)

Southern California – Los Angeles/Santa Barbara Area

We summarized comments from 16 different sources in this region, including a study conducted by the United Anglers of Southern California that was presented during public comment in June 2003 and recorded comments by recreational fishing business owners. Comments came from Balboa, Channel Islands Harbor, Long Beach, Oxnard, Port Hueneme, Port Wainimi, Santa Barbara Channel, Santa Barbara County, Ventura County, and other points in Southern California.

Recreational fishers made the following comments:

- A sportfishing business in Balboa, California noted that several state and federal closures had "contributed to what can only be described as a catastrophic situation for the sportfishing industry in southern California. A lack of catchable species is now being recognized by our attending and prospective customers and their interest and participation is at an all-time low for this time of year." He noted that groundfish are a staple for recreational fishing businesses during the winter months when migratory species are absent, and went on to say "Those who will be affected directly include boat and landing owners, captains, crewmembers, bait haulers, landing office personnel, etc. The businesses indirectly impacted would be tackle providers, fuel docks, boat maintenance and repair facilities (shipyards), manufacturers of fishing electronic equipment, vessel food and beverage vendors, and the list goes on" (June 2003).

- Another sportfishing business owner (in the UASC study) said she had reduced payroll by half and cut back hours to stay in business. She said "The regulations in place take away any chance of making any money…I don't know what else to do." Other business owners in the UASC study reported on lost clients, declines in charter bookings, lower revenues, layoffs, difficulty in paying harbor fees, and other challenges to their businesses (June 2003).
- A saltwater lure manufacturer (in the UASC study) said that December 2002 was the worst December in 42 years of business, and that dealers were reluctant to spend money on fishing lures (June 2003).
- Recreational fishermen were very concerned over limits on rockfish. A charterboat owner in Channel Islands Harbor wrote, "We have been regulated and pushed into shorter bag limits, depth restrictions, tackle cut backs, and an extremely short rockfish season in 2005. The toll of these regs have pushed many of us to borderline bankruptcy. Many of us depend upon groundfish to survive. We have been crippled by the extremely conservative approach... many of our livelihoods may lie in the balance of the Council's decision..." (April 2005)
- Concerns were noted all along the southern California coast. One commenter said, "Ten fathom restrictions would cause a major economic impact [to sport fishers in California south of Pt. Conception]" (June 2002). Another recreational fisher noted at a Council meeting, "[There has been] economic harm to the southern California sport fishery. It's a disaster. The further north you go, the greater the dependence on rockfish" (June 2003).

Commercial fishermen expressed concerns about fisheries infrastructure and cumulative effects:

- A letter from the Southern California Trawlers Association noted, "A significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial "working" fishing ports and harbors along the 1,100 mile coastline of California. ... How much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?" (June 2005)
- A fixed gear fisherman commented, "In Southern California, with the Cowcod Conservation Area, Rockfish Conservation Area, deeper nearshore permit, nearshore permit, marine sanctuary, whatever, we're running out of stuff to do. And we can't afford to lose this fishery... if we implement this [observer] data, it's going to kill us" (September 2003).
- Others were concerned about small artisanal fisheries in Santa Barbara Channel: "There are small, local, artisanal fisheries that have been fishing sustainably with little bycatch in the Santa Barbara Channel for decades that are going to be eliminated with most of the alternative regulation packages you are considering for resolving the canary, yelloweye, and bocaccio rockfish problems" (June 2002).
- One fisherman commented on the difficulty in planning for business: "How do fish businesses…[recreational boats], processors, buyers, restaurants, fish markets, how do they function and pay taxes and keep the port working if they're not allowed to catch their allocated OY? How do they do their financial planning? Some folks are considering marketing campaigns [to sell] the fish that are caught - to get the highest value added, and certain marketing campaigns go out - and then all of a sudden the season's closed, and people have spent a great deal in marketing their fish... or in the case of the recreational fishermen, putting out ads for their season..." (March 2004)

Southern California – San Diego Area

There were comments from three individuals in the San Diego area.

- A manufacturer of plastic baits (in the UASC study) noted that business was down 20% in 2002 compared to 2001. He said he had considered moving his business out of state or to Mexico to lower costs, and had cut back on his employee's hours. He also noted that historically his business had participated in "every underprivileged kids' fishing trip out there. Is stopping all of this - he can no longer afford it." (June 2003)
- A commercial live fish fisherman wrote, "I and others had been able to maintain a sustainable [live fish] fishery as well as keep a successful business - with employees! That was when we were allowed to fish all year (with quotas) and target more than one species. Now, we have been regulated to fish only four months of the year! … Regulations are putting me out of business..." (June 2003)

1.4.4 Criteria Used to Evaluate the Impacts of the Proposed Action

Council and NMFS staff began their work by assessing the proposed actions in order to identify environmental impacts and narrow the scope of the present analysis to the significant issues that will be analyzed in depth and eliminating from detailed study the issues which are not significant (40 CFR 1501.7). They used nine factors enumerated in National Oceanic and Atmospheric Administration (NOAA) National Environmental Policy Act (NEPA) guidance (NAO 216-6) §6.02, specific guidance on fishery management actions, in order to screen for potentially significant impacts and determine the scope of the analysis. These factors generally focus on components of the human environment[8] potentially affected by a fishery management action. (Regulations at 40 CFR 1508.27 list characteristics related to the intensity—or severity—of the impact, which were considered in the context of the environmental components listed below.) As part of this process NMFS and Council staff reviewed the 2005-2006 groundfish harvest specifications and management measures EIS. This review assessed whether the impacts of the current proposed action would differ substantially from those of the interim allocation, increasing the likelihood of significant impacts.

The nine factors from NOAA Administrative Order (NAO) 216-6 §6.02 are listed below.

a. *The proposed action may be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action.*

b. *The proposed action may be reasonably expected to jeopardize the sustainability of any non-target species.*

c. *The proposed action may be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act (MSA) and identified in FMPs.*

d. *The proposed action may be reasonably expected to have a substantial adverse impact on public health or safety.*

[8] Regulations (40 CFR 1508.14) state "Human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment."

e. *The proposed action may be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species.*

f. *The proposed action may be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species.*

g. *The proposed action may be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc).*

h. *If significant social or economic impacts are interrelated with significant natural or physical environmental effects, then an EIS should discuss all of the effects on the human environment.*

i. *A final factor to be considered in any determination of significance is the degree to which the effects on the quality of the human environment are likely to be highly controversial. Although no action should be deemed to be significant based solely on its controversial nature, this aspect should be used in weighing the decision on the proper type of environmental review needed to ensure full compliance with NEPA. Socioeconomic factors related to users of the resource should also be considered in determining controversy and significance.*

As mentioned above, additional factors for evaluating the intensity of impacts, in determining whether they are significant, are listed in 40 CFR 1508.27 (and NAO 216 6.01b). These factors are listed below.

(1) *Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*

(2) *The degree to which the proposed action affects public health or safety.*

(3) *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*

(4) *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

(5) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

(6) *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*

(7) *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*

(8) *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

(9) *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*

As discussed above, the potential effects of the proposed action on ESA-listed salmon species are evaluated in Chapter 5.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Table 1-1. Scoping comments related to community impacts.

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
2002: April			
Pt. Adams Packing Co. will not operate; 80-90 people will be laid off [as result of whiting being listed as overfished]	April 2002	Hammond, OR	Commercial
[Talked about impacts to Crescent City]	April 2002	Crescent City, CA	Commercial
2002: June			
Losing rockfish would be catastrophic. [Sportfishing business]	June 2002	Long Beach, CA	Recreational
Closing rockfish would put us out of business. [Charter skipper]	June 2002	Oxnard, CA	Recreational
Closing the shelf will kill us. [Sportfishing business]	June 2002	Los Angeles, CA	Recreational
Neah Bay trawlers need to fish in July-August; can't fish later in our small boats. Can only fish on the shelf. Seven ninths of the Neah Bay fleet are small boats.	June 2002	Neah Bay, WA	Commercial
Ten fathom restrictions would cause a major economic impact [to sport fishers in California south of Pt. Conception].	June 2002	Southern California	Recreational
Licenses would be cut by 80% by having to fish in less than 10 fathoms. Might make a living fishing at less than 20 fm. [Sport fishing operator]	June 2002		Recreational
Consider economic impacts [Sport fishing operator]	June 2002	Oxnard, CA	Recreational
Concerned with restrictions in less than 10 fm. Lots of communities will be put out of business. [Charter operator]	June 2002	Port Wainimi, CA	Recreational
[There are no bocaccio where we fish for sablefish.] Have pity on us. There are no other job opportunities. [Commercial fisherman]	June 2002	Moss Landing, CA	Commercial
There has been $1.5 million in foregone benefits in the last three years in my business. Forty restaurants have gone out of business due to these restrictions. [Commercial fish buyer]	June 2002	Moss Landing, CA	Fishing-related business
The northern ports in southern California depend heavily on groundfish. People are scared. [There have been] $2.5 billion in recreational impacts in California.	June 2002	Northern California	Recreational
There has been recent publicity in regional papers that the Council may impose severe measures on commercial and sport fishing for 2003. This raises concerns in the City of Fort Bragg, because fishing is an important part of the economy. In addition, there are many residents who depend on local fish as a source of food.	June 2002	Fort Bragg, CA	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
We are in the commercial fishing industry and in the paper we read that we could face worse cutbacks next year [than] we already have. … Someone needs to get their head out of the sand and really see what is happening. … We are all having to be put out of business because of someone's assumptions. Why not let the fishermen show what is out there? We all have to sit back and wait while you drive us into bankruptcy when we see the stocks are there. ... It's time to check [your data] or give us a way out without going totally broke!!!!!	June 2002		Commercial
…The Pacific Fishery Management Council is recommending eliminating all bottom fishing by January 2003. If this passes through the Council and is adopted, it will be a disaster for Oregon's coastal economy, as well as a huge disappointment for all sports fishermen. ... I think the economic impact of this decision must be balanced with any concern for the fish.... if there is anything you can do to help keep the sport fishing open, it will keep the charter boats, the guides and the private fishermen on the water. If bottom fishing is eliminated for sportsmen, all the ocean charters will cease to exist... sportsmen make a huge contribution to the local economy. Depending on the area, we are talking about millions and millions of dollars, from gas stations to shopping malls to hotels and restaurants, etc. ... Sportsmen generate 40 times as much money per pound of fish caught than commercially caught fish for the economy...	June 2002	Oregon	Recreational
We operate a charter boat business in Fort Bragg, California. Our community has been hit with several extreme newspaper articles… claiming that all fishing, sport and commercial, will be prohibited as of Jan 03 from Mexico to Canada. Our entire community is up in arms. For several years, we have asked for biologists to board our vessels and actually document what fish we are catching...	June 2002	Fort Bragg, CA	Recreational
I implore you NOT to implement closures. Closures are unwarranted. Closures are not needed to help the fish populations. Closures destroy industries. … Those of us who spend time on the water constantly are opposed to closures because we know they are not needed for the fish, and because we know the impact on our industry and related industries will be totally devastating. ...	June 2002	Santa Barbara, CA	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
… I urge you to make a thorough study of the anecdotal experiences of long time recreational anglers and sportboat captains on a regional basis. In California, we are talking about a constituency of nearly 1 million anglers that pay to use and conserve the resource, not exploit and profit from it. You will find that our reality, times several hundred million dollars of economic impact, differs widely from those who craft research to gain grants, and those who fish for profit alone. [This wording appeared in 9 different emails from anglers]	June 2002	California	Recreational
Please try to see all sides of the story before making any decisions. The angling community is a large one that contributes to our economy as well as the well being of our oceans.	June 2002		Recreational
You are certain to hear the many economic reasons of how the closure of the sport fishing industry would impact our already failing economy. The closure would not only impact the owners of the boats, as they lose their business, but it would also affect from one degree to another all businesses that are touched by charter fishing. Any business that benefits from the tourism generated by the fishing fleet to the marine supply, to fuel docks, restaurants and motels, just to name a few. The loss in dollars to the oil companies who supply the fuel and oil for the fleets will not be insignificant, and will certainly spell doom for many of their business[es].	June 2002	Depoe Bay, OR	Recreational
I would like to address a more finite aspect of a possible loss of the charter fishing fleet. Memorial Day; for the past 57 years the small community of Depoe Bay, Oregon has paid tribute to those lost at sea… Without a charter fleet there will be no Memorial Day Fleet of Flowers. For those of us who have someone "at sea," who have no grave to go to, this one day has deep meaning for us...	June 2002	Depoe Bay, OR	Recreational
The loss of the charter fleet spells other things as well. It will mean that no longer will the handicapped, the blind, the deaf, the mentally challenged be able to go ocean fishing. It will mean that many of elderly will not be able to continue with the pleasure of ocean fishing, because there will be no one to take them...	June 2002	Depoe Bay, OR	Recreational
The charter fishing industry is unique; it is not something that can be shut down with the expectation that we can import it from another country. It will be the loss of an important part of a special way of life, of private enterprise; and, more to the point, the loss of a large part of the coastal economy.	June 2002	Depoe Bay, OR	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The economic impact of the elimination of the rockfish fishery off the California coast will be devastating, and will surely lead to bankruptcy for many and to major dislocation for others.	June 2002	California	Recreational
…The closure, if it comes, will have a devastating effect on the small businesses operating charter and open party sportfishing boats in [Congressman Gallegly's district], and appears to be in direct conflict with the overwhelming view of the fishermen that the stocks are, in fact, in better shape that just three years ago!	June 2002	California	Recreational
My business has been supplying trawl gear to the groundfish fleet on this coast since 1979. In the past five years, we have seen our business cut in half as a result of the starvation policy you have carried out in an attempt to manage the fisheries on this coast. I feel that a closure of the shelf would mean we could no longer remain in business. The Council's policy of ever-decreasing trip limits has reached its final conclusion; the resource has been wasted, the processing and supply infrastructure has contracted, the fishing vessels have become unsafe and in some cases, completely unseaworthy. These vessels are now faced with fishing for less fish and less money, while paying more for the necessary supplies with which to do so. ... A blanket closure would mean the loss to the nation of these fisheries and the loss of the participants' livelihoods.... Systematically destroying the economic viability of commercial fishing and thus precipitating a Final Full Closure is not a management method.	June 2002	Samoa, CA	Fishing-related business
Let me list the fisheries which my business supplies and which will be impacted by this closure: ... Petrale and English sole, sand dabs, pink shrimp, California halibut, and cucumber...hake and chilipepper...prawns.	June 2002	Samoa, CA	Fishing-related business
There are small, local, artisanal fisheries that have been fishing sustainably with little bycatch in the Santa Barbara Channel for decades that are going to be eliminated with most of the alternative regulation packages you are considering for resolving the canary, yelloweye, and bocaccio rockfish problems.	June 2002	Santa Barbara Channel, CA	Commercial
2002: September			
Businesses need to plan - need information. Don't hide [information]. Provide some information early on.	September 2002	[Coastwide organization]	General

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The Embarcadero Resort Hotel & Marine (Newport, OR) estimates 1650 occupied rooms would be lost to the Resort with severe cuts or complete stoppage of ground fishing. This would further impact the restaurant with local fishing families no longer being able to have a night out, come for Sunday brunch, or have banquets. In addition, the transient tourist who does charter fishing would not be dining either, nor would some of the groups come who focus on fishing as their extracurricular activity. ... Total economic loss [is estimated at] $421,887 [per year]. Quite an impact to what you know will devastate the economy of Newport, Lincoln County, the Oregon Coast, Oregon, the Northwest, and the West Coast. It is obvious the disaster ahead and the many who will suffer.	September 2002	Newport, OR	Non-fishing business
We, the undersigned citizens and business people of the City of Newport and members of the Greater Newport Chamber of Commerce, notify the PFMC that the reduction in fish harvest levels have had a drastic impact to our community and that further reduction in groundfish harvest levels will continue to adversely effect every business and family in Newport. The reduction in harvest levels means direct jobs are lost, not only in the commercial fishing industry but also in the recreation fishing industry, processing plants, boat repair businesses and gear shops. However, the impact doesn't end there. The repercussions trickle down to the lodging, restaurant, attraction, entertainment, and retail industries. And when these tourism based businesses lay off employees due to reduced revenues, this has an effect on other local businesses... It would be difficult to measure the number of jobs and revenues lost to the whole business community. We urge the PFMC to seriously reconsider the social and economic impacts their decision will have to coastal communities depending on the fishing industry. [43 co-signers]	September 2002	Newport, OR	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
…Oregon's commercial fishing industry helped build our state and continues to employ thousands of people involved in catching, processing and distributing high quality seafood across the country. But that industry, its workers and families, are being threatened by drastic reductions to the amount of fish that can be caught off the Oregon coast - reductions that may be made with little regard to the economic consequences. ... We remind you that the fishing communities of Oregon are in their worst financial condition in recent history and are depending upon you to carefully craft a balanced management plan. ... We urge you to direct NMFS to adopt reasonable 2003 groundfish catch guidelines made by the Council that consider sound science and the economic impact to coastal communities.	September 2002	Newport, OR	Commercial
Significant socioeconomic impacts are already occurring. Community fisheries infrastructure is eroding and all fisheries are being impacted by the reductions in groundfish. Trickle down effects should be considered and are already occurring. The Council should assess the impacts to secondary and tertiary businesses.	September 2002	Oregon	Community
Landings and value should not be the only data considered in any socioeconomic impact analysis. This will not give you an accurate picture of what is happening at the ground level in coastal communities as a result of management decisions. Landings and value data alone do not reflect the negative impacts to individuals and businesses.	September 2002	Oregon	Community
Many fishermen fervently feel that fisheries management agencies have an agenda to close down the fishery. Many no longer go to meetings because they feel it makes no difference, they won't be listened to anyway and decisions have been made ahead of time. ... Most fishermen and their families cannot afford the travel time and expense away from home.	September 2002	Oregon	Commercial
People need information so they can make adjustments to their business strategies now rather than after all their resources are used up trying to hang on.	September 2002	Oregon	General
I haven't sold a vehicle to a fisherman in 2 years. [Salesman, auto dealer]	September 2002	Oregon	Non-fishing business
We are losing family wage jobs on the coast and we can't afford to do that. Consider the trickle down effect that is now occurring. Advertising is down at my radio station due to the shrinking base of family wage jobs - fishing is critical to our communities. [Radio station owner]	September 2002	Oregon	Non-fishing business

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
How will the full range of economic impacts be considered? We've had a fire disaster in our region this summer and we're already hurting badly from that. [County commissioner]	September 2002	Oregon	Community
Coast communities don't have many opportunities for family wage jobs like we see in the valley. Fishing is critical to us here. [Mayor]	September 2002	Oregon	Community
The Council and NMFS should try harder to do a better job of releasing information to the media. People think that because there are recreational closures in California, that Brookings is closed also - not true… [RV park manager]	September 2002	Brookings, OR	Non-fishing business
We need to fight to save coastal family wage jobs. [Mayor]	September 2002	Oregon	Community
More vessels are now operating without insurance. That could easily ruin the family business. Ports and communities will have to respond and pay for things like cleanup. Plus, there are significant costs associated with Coast Guard search and rescue. When maintenance is put off, more accidents happen and taxpayers will have to cover the costs. [Port manager]	September 2002	Oregon	Commercial
The local jewelry store laid off four workers. They don't have the business they need anymore from fishermen and their families. [Port commissioner]	September 2002	Oregon	Non-fishing business
The industry isn't collapsing but we need help right now with readjustment initiatives. We are a community of survivors. Rural communities need to remain independent. Don't take that away. [Port manager]	September 2002	Oregon	Community
There are limited jobs you can retrain for in our community which will support a family. [Port manager]	September 2002	Oregon	Community
A buyback program will help some fishermen but won't help other businesses. [Radio station owner]	September 2002	Oregon	Non-fishing business
Shipyard business is way down. Many fishermen are going on a 3-year haul out schedule instead of a 1-year schedule. We are concerned about safety. [Insurance agent]	September 2002	Oregon	Non-fishing business
The local fuel dock is ready to shut down. [Fishing family member]	September 2002	Oregon	General
Consider the time and goods and services involved in getting ready for fishing seasons that don't happen. This is significant lost revenue for my store. [Gear store manager]	September 2002	Oregon	Fishing-related business
I couldn't get ice this summer so even though we had a good salmon fishery, we couldn't get the ice to hold the fish. My fish plant closed. [Salmon troller]	September 2002	Oregon	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
My firm is cutting back and may go out of business. I can hardly afford to keep working because of the reduced demand for trucking. There's now only a few months of work. [Trucker for firm that transports product from fish plants]	September 2002	Oregon	Fishing-related business
Our fish plant closed and we couldn't get a market with another plant. So we've moved our fishing business out of state. [Fisherman's wife]	September 2002	Oregon	Commercial
I quit buying groundfish because I couldn't get the mix I needed for my market. I laid off 15 workers. [Fish buyer]	September 2002	Oregon	Processing
The local grocery store used to carry lots of boat accounts - those are way down now and there are more and more accounts in arrears.	September 2002	Oregon	Non-fishing business
In fact, lots of associated businesses are being hit - marine electronics included. Business is down and what business they have, it's hard to get folks to keep their accounts current.	September 2002	Oregon	Fishing-related business
It isn't reasonable for NMFS to seek to enact regulations that will eradicate family businesses without a specific economic plan in place to assist those businesses and replace those jobs. And I'm not talking about 10 dollar an hour jobs - I'm talking about jobs for crewmen who earn between $35,000 and $40,000 per year. [Fisherman's wife]	September 2002	Oregon	Commercial
Families are so frustrated - we feel we never know what's next. No one can plan a successful fishing business with so many unknowns. Who will be in, who will be out. If you are out then what - nothing. Nothing is clear-cut. We won't even know next year's restrictions until just before the season actually starts - and that's if we are lucky. Our financial reserves are gone - what can we do? [Fisherman's wife]	September 2002	Oregon	Commercial
Two of my friends are now getting divorces. The financial stress was too much - that and husbands always being angry, moody, and withdrawn. After four years of that, they (the wives) couldn't take it any more. [Fisherman's wife]	September 2002	Oregon	Commercial
I'm very concerned about the crumbling infrastructure - it's worse in some ports than others but all are experiencing it. Processors, fuel docks, gear suppliers - they are shutting down. Once that happens, I fear we won't be able to go back and rebuild. There may well be no infrastructure left to support the industry of the future. [Gear store owner]	September 2002	Oregon	Fishing-related business

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
I have $90,000 worth of netting on order - I had to place the order 6-8 months ago in order for it to be here for the 2003 season (needs one year lead time). The order has been shipped - it's on a ship in a container. I fear once it gets here it will be illegal and I won't be able to sell it. I can't send it back - it's happened to me before. I need to be able to plan my business better than the current management system allows. Seems like I could at least get a tax credit for merchandise I can no longer sell. I have to assume full liability. [Gear store owner]	September 2002	Oregon	Fishing-related business
Economic data mainly focuses on the commercial sector, not recreational. We need more recreational data. [Charter boat owner]	September 2002	Oregon	Recreational
Oregon's economy is a mess and the coastal economy is even worse. If you'd just let us work, we have a lot to contribute. [Fisherman]	September 2002	Oregon	Commercial
Other fisheries are already being negatively impacted by the groundfish crisis - more pressure in albacore tuna specialty markets for example - only so much room on the shelf and existing businesses are being pushed aside. [fisherman]	September 2002	Oregon	Commercial
Groundfish issues are of great concern to crabbers. There already have been impacts. There's now more pressure on the resource and there may be gear and habitat conflicts when we start implementing area closures. We're losing processing capacity. [Commodity commission manager]	September 2002	Oregon	Processing
What are the community impacts of fish businesses using less water and power? This translates to less income for the city/county. [Processor representative]	September 2002	Oregon	Community
Fishermen are treated as criminals by NMFS for even small overages. And this on top of everything else! Decriminalize the system and us! [Fisherman]	September 2002	Oregon	Commercial
The Magnuson Act should be the Sustainable Fishing Community Act. [Fisherman's wife]	September 2002	Oregon	Community
I'm very concerned about our crumbling infrastructure - once existing support facilities like fueling stations and fish processing plants are gone, environmental rules will make it hard for new ones to come in, even when fishing improves. [Sea Grant marine agent]	September 2002	Oregon	Community
The local women's shelter is full - families are breaking up - this thing has gone on so long and there are so many uncertainties that it's tearing some families apart. You can imagine how it gets at home when money is tight. [Groundfish Disaster Outreach Program staff]	September 2002	Oregon	Community
How will NMFS gather community impact data such as business impacts? [GDOP staff]	September 2002	Oregon	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
You'd think that all the news about sardines is helping the local [Astoria] fleet - no - no local fishermen have the gear or permits to benefit from the fishery. Much of the benefit from that fishery is going out of state. [GDOP staff]	September 2002	Astoria, OR	Commercial
[Relayed socioeconomic impacts in his area.] Council needs to rectify these problems	September 2002	El Granada, CA	Commercial
Thornyheads and sablefish [were] closed this summer - it killed the Newport dory fleet.	September 2002	Newport, CA	Commercial
Work quickly [on EFPs]; the industry needs help fast.	September 2002		Commercial
Economics of fishing should be given greater emphasis.	September 2002	California	Commercial
California recreational fisheries will suffer. Economic [impacts] are underestimated.	September 2002	California	Recreational
2002: November			
Keep flatfish species in the California halibut fishery. We need every dime we can get.	November 2002	California	Commercial
Although the Council is primarily concerned with groundfish, and the effect of restrictions in the groundfish fleet, be aware that the West Coast fishery as a whole is experiencing an overall depression. Depressed prices for salmon, shrimp, crab and tuna are adding to the general poor outlook for fisheries. There will be a smaller fleet regardless of what this Council does, and regardless of what happens in groundfish. This proposal [fixed gear permit stacking] will provide some economic relief both to those who choose to leave, and those who choose to stay.	November 2002	Newport, OR	Commercial
2003: April			
We need real time [observer] data. Need to observe where fishermen fish [now], not where they once fished. Closing down coastal communities. We need economic analyses of port impacts.	April 2003	California	Community
Consider community effects of rebuilding plans.	April 2003	[Coastwide organization]	Community
Small trawlers are fighting to survive. If we try to go offshore, there are safety risks.	April 2003	Neah Bay, WA	Commercial
We urge the Council not to adopt this change to the CCA boundaries…especially when the effects of this kind of change under the MSA must be looked at in a balanced view considering also the social and economic impacts to members of our Association, all of whom are individual family fishermen... We have been eking out market orders by adhering to all of the groundfish conservation measures, but barely. Now, with the proposed changes to the CCA, our last few spot prawn areas would be halved...	April 2003	Santa Barbara Channel, CA	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
2003: June			
[Change the bocaccio OY.] The Morro Bay economy is down 10% overall. The fishery-dependent industry is really hammered.	June 2003	Morro Bay	Community
[There has been] economic harm to the southern California sport fishery. It's a disaster. The further north you go, the greater the dependence on rockfish.	June 2003	Southern California	Recreational
Recreational fishing businesses, particularly landings and bait and tackle operations, do not benefit from the various programs designed to ease impacts of regulations on the commercial fishing community.	June 2003	Huntington Beach, CA	Recreational
Rockfishing regulations over the recent past has been dramatically affecting recreational fishing opportunities in Northern Los Angeles, Ventura, and Santa Barbara counties.	June 2003	Southern California	Recreational
In 1999, two landings, Hornet Sportfishing and Sea Landing, operated here [Santa Barbara Harbor]. Since then, the former has closed with no subsequent information available. Sea Landing had three sportfishing vessels available throughout the year. Now, it has one with a second available in October and November for offshore fishing... Essentially, Sea Landing had 437 fewer passengers in 2002 than 2001 for the three corresponding months (Oct-Dec).	June 2003	Santa Barbara County	Recreational
The one landing here [Ventura County] that had three vessels operating from it has closed its doors and no records are available. [A landing in Channel Islands harbor had 25.5% fewer passengers in Oct-Dec 2002 than in 2001]	June 2003	Ventura County	Recreational
Cisco's Sportfishing Landing [Channel Islands Harbor] has been in business and open 24 [hours] per day since 1964. It is the largest landing in the region… The following points are from a conversation with Marlene Wilcox, owner (Feb. 1, 2003): Lack of passengers most apparent on open party boats; overnight boats not getting out at all; [partial day] boats going light; running a two-for-one program; ... business is off a minimum of 25%; ... "The regulations in place take away any chance of making any money"; is reducing everything to stay alive; payroll has been cut in half...used to stay open 24 hours per day - now only 8-12 hours, which is the minimum necessary to stay in business; has cut all corners and still just falling further and further behind; can't pay bills; "I don't know what else to do."	June 2003	Channel Islands Harbor	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Captain Hook's Sportfishing [Channel Islands Harbor] opened in 1998 with a half-million-dollar investment… They enjoyed a 15% growth in 1999 and 2000. The downturn started in 2001, and Debbie reports that financially, her business is down 21% and between 45-55% behind on her original business model for the same time frame. ... There's been steady decline in business since May 2002. If the pattern continues or some form of relief isn't forthcoming, they'll be forced into bankruptcy. They never would have invested in the business if they had known this would happen.	June 2003	Channel Islands Harbor	Recreational
Port Hueneme Sportfishing reflects the same downturn in business that the others in the area show. The owner reports his November and December 2002, and January 2003, were 50% of what he did the previous year. He also reports that he experienced 50% cancellation of charters for the same three months that had been previously booked, and bookings for 2003 are running 75% behind last year. He can't make his monthly lease payments to the Harbor Department. He used to employ two part-time and two full-time employees. He has now laid everyone off.	June 2003	Port Hueneme, CA	Recreational
Booking of charters for upcoming year [is] over 20% off from last year, and last year was poor.	June 2003	Channel Islands Harbor	Recreational
New business is substantially curtailed.	June 2003	Channel Islands Harbor	Recreational
Between the 20 fm closure and island closures, where am I supposed to fish? Give us out to 30 or 40 fm or buy me out. Give me a long-term, low interest loan to fund my boats' transition to ecotourism and I'll never fish again. Right now I'm in the middle of a county sponsored engines, generator re-power that's costing me $200,000, so I can be eco-emission compliant. I'm doing this because they want me to; it's not required. While I'm doing this, other parts of government are putting me out of business.	June 2003	Southern California	Recreational
Going into savings to keep business afloat. Saltwater fishing business way off; freshwater helping to keep doors open. Sluggish economy not helping, but fishing restrictions most damaging. [Tackle shop owner]	June 2003	Southern California	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
As of October 15th, bottom fell out of business. November 2002 did 50% of November 2001. December was OK. Attributes [this] to excellent fishing in Santa Monica Bay that month. Laid off an employee of five years in October (shop had three; now has two). Spent less than 50% of what he spent last year at early season trade shows. Bought store six years ago. Retired to this business and loves it. Now he wants to sell. He can't stand the political uncertainty of future. He feels victimized; has no voice. He feels nobody is really listening. [Interview with tackle shop owner]	June 2003	Southern California	Recreational
Sales for December 2002 not even 50% of December 2001. Worst December in 42 years of business. November 2002 and January 2003 reflect similar trends. Dealers are scared and pulling in horns. They won't spend now. Historically, the industry depended on the quality of the bite, volume of fish that migrate into the region, water temperatures that controlled how eagerly resident fish bite. Now, the business is dependent on political issues. [Interview with saltwater lure manufacturer]	June 2003	Southern California	Recreational
Business down 20% overall in 2002 as compared to 2001. Considered moving manufacturing out of state (perhaps to Mexico) to lower costs. Has cut back employees' total hours; they are all part time now. These are all ESL employees who have been with him 4 to 8 years. Historically, Fishtrap Lures has contributed and partaken in every underprivileged kids' fishing trip out there. Is stopping all of this - he can no longer afford it. [Manufacturer of plastic baits]	June 2003	San Diego	Recreational
My concern is with a small footrope I can harvest 20,000 lbs of beach fish [sand dabs, Petrale, English, sand, and flounder sole], which may sustain the markets until we are able to harvest more, but [is] not enough to operate a fishing vessel on… The only option that I can see is to fish a large footrope, which 99% of the fleet will choose to do and the market for beach fish will go away. And that market will take years to get back and will not be there if or when you ever let us catch the beach fish... I will lose my markets and be forced to fish in an area that will be over fished and unsafe for my boat over a fish I do not catch. I believe this inseason management plan will devastate the trawl industry. Markets will be lost and large numbers of boats will be forced to fish in a small area which compromises the safety of the smaller vessels.	June 2003	Crescent City	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
We need to know what is happening with the current closure for the west coast groundfish. We are getting killed out here! When you first talked about closing the fishery…you said a two week closure…at the most three weeks. Well, we are on week four now...we still have not heard one word from the Council on how things are progressing. ... Do we all need to declare bankruptcy right now?? The appearance of discrimination against those of us that use small footropes nearshore is looking more and more as a fact. Some of us are not capable of fishing with big gear that can operate outside of 200 fathoms...you need to take that into consideration. As I write this, the large vessels continue to tow away... still making a living... they haven't missed a day of fishing. We (small boats) have been shut down for almost a month now...many of us will soon be in jeopardy of losing assets, like our homes or boats. We have already lost so much with the cable crossing, the Vessel Traffic Lane Change, and other inseason adjustments that we have no reserves left to fall back on. ...	June 2003	Neah Bay, WA	Commercial
The Council's action or lack thereof [has] real human impact. You are literally killing us off out here. ... PLEASE come up with some different restrictions for us that will still allow us to survive...we want a viable sustainable fishery that we can continue our livelihood into the future...many of us have been fishing our small family boats for generations. But sadly, many of us do not encourage our children to partake of our tradition of being a fisherman...competition and politics have put an end to that dream.	June 2003	Neah Bay, WA	Commercial
I have been told this OY [June 2003] is not large enough to allow the seasonal upward catch adjustments the fishermen need to take advantage of the good weather and strong market of the summer months. This has created a situation that threatens long established markets and infrastructure up and down the coast... We badly need to have an increase in the black and blue rockfish component of our catch allowances. Without the seasonal increases in these fish, some of the last nearshore markets will be lost along with the infrastructure that supports them. Many fishermen, especially those who fish outside of the areas that can supply the live market, cannot make enough money to support their fishing efforts...	June 2003	Crescent City	Commercial
The management regime for 2003 virtually ended groundfishing by recreational anglers.	June 2003	Southern California	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
[We] plead the case here [Newport, OR] for expanding some fishing grounds or quotas to the draggers deploying this year, as the value of the fish the quotas allow right now would force our net shop out of business, much less a drag boat. A year from now, if these quotas and closed zones stay in effect, we will be having to turn fishermen away for fears of not being paid. Inventories at shoreside services are dwindling and the entire market infrastructure seems ready to collapse...	June 2003	Newport, OR	Fishing-related business
If we do not get back some grounds or quotas in the next couple of catch periods, I am sure there will be some fishermen dangerously close to losing their ability to survive. Look at the value of the fish that you have left us and go through the economics of running a trawler. It does not add up to viable business.	June 2003		Commercial
…We are already seeing several party boat operations being sold or forced out of business…many boats and supporting businesses (tackle shops, fuel docks, hotels etc.) depend on rockfish for winter their income. It's not a large part of their annual total but enough to pay their employees, insurance and berthing fees until the more lucrative salmon season opens. We are literally one bad salmon season away from losing most of the party boat operations along the Central coast. In a good salmon season these small businesses can scratch out a living but if the salmon don't show the cost of running a boat and paying its crew becomes impossible. Most at risk are boats and businesses in the smaller ports. Two of the largest party boat operations in Bodega Bay are currently selling out or closing down and more are sure to follow from Ft. Bragg to Bodget Bay. ...A blown motor or other major breakdown can cost upwards of $40,000 and quickly force the owner to sell out or into bankruptcy.	June 2003	Central California	Recreational
I and others had been able to maintain a sustainable [live fish] fishery as well as keep a successful business - with employees! That was when we were allowed to fish all year (with quotas) and target more than one species. Now, we have been regulated to fish only four months of the year! And the license fees are going up! With more licenses! (Deeper nearshore rockfish - a cruel slap in the face to nearshore fishermen not levied on the sportfishing fleet). This situation is unacceptable to this open access participant... Regulations are putting me out of business, by a conspiracy of anti-fishing management staffing... Something must be done to put the commercial fishing industry back to a common sense, profitable state. ...	June 2003	San Diego, CA	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
…These current species, area and seasonal limitations will, in a relatively short time, cause the ultimate demise of the sportfishing industry. We have already realized a significant decline in our passenger loads and revenue since the most current stringent closure went into effect, i.e. [the] sculpin closure (March 1). This closure, in conjunction with the ongoing whitefish restriction, the "non-opening" for any species of rockfish and the 20 fathom...depth limitation have all contributed to what can only be described as a catastrophic situation for the sportfishing industry in southern California. A lack of catchable species is now being recognized by our attending and prospective customers and their interest and participation is at an all-time low for this time of year.	June 2003	Balboa, CA	Recreational
…The net result…of the closures has been that the sportfishing industry is now crippled by the limitations of allowable catch which has had a devastating effect on our potential customers' participation in the fishing activity. In other words, people are not going fishing because they can keep next to nothing that they catch! To pay to go fishing is not money well spent since the trips result in something more akin to simply a "boat ride."	June 2003	Balboa, CA	Recreational
Over the past 50 years of recreational sportfishing, we have been able to offer our customers a variety of species in the winter and spring months. Since migratory species, such as tuna, yellowtail, barracuda, etc., are not in our area during these months we have relied on whitefish, sculpin and rockfish (groundfish) as the mainstay of our trips. Needless to say both winter and spring seasons have been disastrous in terms of participation and catch due to the fact that we are unable to fish for any type of groundfish other than sheephead.	June 2003	Balboa, CA	Recreational
The demise of recreational sportfishing will also have a severe economic impact on those who derive their livelihood from sportfishing. Those who will be affected directly include boat and landing owners, captains, crewmembers, bait haulers, landing office personnel, etc. The businesses indirectly impacted would be tackle providers, fuel docks, boat maintenance and repair facilities (shipyards), manufacturers of fishing electronic equipment, vessel food and beverage vendors, and the list goes on.	June 2003	Balboa, CA	Recreational
2003: September			
If trawling is closed for three months, the filleters I have would have to get a new job; the truck drivers would leave, and I'd be out of business. It's that serious and that simple.	September 2003	California	Processing

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
If we implement this observer data inseason, it's not only going to shut down the trawl fishery; it's going to take the fixed gear fishery also. In Southern California, with the Cowcod Conservation Area, Rockfish Conservation Area, deeper nearshore permit, nearshore permit, marine sanctuary, whatever, we're running out of stuff to do. And we can't afford to lose this fishery... if we implement this data, it's going to kill us.	September 2003	Southern California	Commercial
Changing the process again, midstream…is taking all these small [trawl] businesses by surprise, and will hurt many coastal communities. …How do us small business owners tell our bankers that our government's inseason adjustment has ruined our business plan for the year? How can any business effectively operate in this kind of environment?...	September 2003	Coos Bay, OR	Commercial
I think a lot of this…is centered on biology rather than thinking about the fishing community… Fishing, fishermen, and fishing communities are all businesses… Communities should be considered. There are a lot of rural communities out there…that are all hurting. This closure could really impact rural communities, if not devastate them. Socioeconomic and drastic impacts must be considered in this decision. Businesses depend on a yearly revenue cycle to make decisions...an inseason adjustments makes no business sense... I can't fathom making decisions every two weeks in another kind of business...	September 2003		Commercial
If this season is shut down, the economic effect in Port San Luis, Morro Bay, and San Luis County in general is gonna take a real hit. The only processor in Port San Luis…will be out of business… There are approximately 15 trawl vessels that will be out of business in both ports...	September 2003	Port San Luis and Morro Bay, CA	Commercial
In terms of some of the economic impacts…In Warrenton, Oregon, last year...in period 6 (teh whole period that would be closed under on scenario here) the exvessel gross averaged about $60,000 per vessel for the trawl fleet. There are about 30 vessels fishing in Warrenton, so that comes out to about a $1.8 million impact. And if you use a conservative...multiplier (2.5), that's about a $4.5 million impact on the community of Warrenton.	September 2003	Warrenton, OR	Commercial
Please consider alternatives to protect fisheries who have taken drastic measures in their commitment to save and conserve fish. These changes create scenarios where fishermen cannot function as a business.	September 2003	Central California	Commercial
[Only 28 of 545 metric tons of shortspine thornyheads are caught in Washington]. You're now taking somebody who's not creating a problem, and trying to put us out of business. I don't understand…	September 2003	Neah Bay, WA	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The effects of a total closure could be pretty devastating to some people, and given the doubts about the science that's being used, I think you need to weight that very carefully.	September 2003	Fort Bragg, CA	Commercial
… One of my landings, Cisco Sportfishing, is out of business, bankrupt, because of the closure of the rockfish fishery.	September 2003	Southern California	Recreational
Keep the B platoon; it helps the industry. The trawl industry is on its knees.	September 2003	Oregon	Commercial
If areas outside of the 50 fm line are closed to recreational anglers, we would not have any opportunity to fish for groundfish [due to unique geology of area.] Recreational angling provides a great economic stimulus for Winchester Bay and the surrounding area. If recreational angling were stopped, we would experience the ripple effect from another loss of fishing species. We experienced this in the 80s and 90s with the closure of coho salmon fishing along the Oregon coast. Many fishing related businesses closed and this area lost all our charter fishing businesses. We currently have only four charter offices providing offshore angling opportunities for our visitors. [Received 2 copies from different people]	September 2003	Winchester Bay, OR	Recreational
The Port of Siuslaw [Florence, Oregon]…is greatly concerned about any pending recreational groundfish closures outside of the 50 fm line… We do not have any coastal reefs that support groundfish. The closest reefs to Florence are at Heceta Banks thirty miles offshore...Recreational angling provides a great economic stimulus for Florence and the surrounding area. If recreational angling for groundfish were stopped, we would experience the ripple effect from the loss of fishing. We experienced this in the 80s and 90s with the closure of coho salmon fishing on the Oregon coast. Many fishing related businesses closed and we lost all our charter fishing businesses.	September 2003	Florence, OR	Recreational
2003: November			
Closing the [sanddab fishery] makes it hard to pay for VMS.	November 2003	California	Commercial
I would catch 30% of what I could if forced out to 200 fm.	November 2003	California	Commercial
We are writing on behalf of Forks, Washington…to support the proposed changes to the Pacific Halibut Catch Sharing Plan… Our community has been struggling with a declining economy for the past fifteen years. We have been actively pursuing methods to improve all aspects of local commerce, including recreational fishing impacts. ... [Changes to the catch sharing plan] would greatly benefit the Washington North coast communities.	November 2003	Forks, WA	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The Quileute Tribe at LaPush, Washington is writing in support of the letter you have received from the City of Forks…Like Forks, our community has been struggling financially for many years. Having the only major recreational harbor for many miles, recreational fishing is extremely important to us as well. ...	November 2003	LaPush, WA	Tribal
2004: March			
Please don't push me out into 120 fm. It's not going to help the yelloweye, and it's going to be very hard on my economics.	March 2004	Port Angeles, WA	Commercial
I was talking to our harbor manager, and he says he's facing some revenue cuts. How do fish businesses…[recreational boats], processors, buyers, restaurants, fish markets, how do they function and pay taxes and keep the port working if they're not allowed to catch their allocated OY? How do they do their financial planning? Some folks are considering marketing campaigns [to sell] the fish that are caught - to get the highest value added, and certain marketing campaigns go out - and then all of a sudden the season's closed, and people have spent a great deal in marketing their fish... or in the case of the recreational fishermen, putting out ads for their season...	March 2004	South/Central California	Commercial
Sport fishermen come to the coast, rent a hotel, eat dinners out, buy tackle at the local shop, get their boat serviced/repaired in town… who supports the local economy more with the least impact on fish stocks???	March 2004	Oregon coast	Recreational
It seems strange to us that the hardest hit west coast fleet is the only U.S. fleet to have to pay for [VMS]… The state that has the highest unemployment rate, the state with the highest poverty level, the state with the most strict and radical regulations in the world and the state with much less powerful Senators has to pay for the system themselves. We now are forced to fish beside vessels who are using government paid for VMS units while we have to borrow money to pay for them. ...	March 2004	Coos Bay, OR	Commercial
2004: April			

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
… It has…come to the attention of Arrowac Fisheries that this depth management fisheries approach may result in the fishing depth restriction being moved to 150 fm perhaps as early as June. This depth restriction will be financially devastating to Arrowac Fisheries Inc., [its] employees...and the fishermen who derive their livelihood from the longline fishery off the coast of Washington. It appears the tradeoff for this devastation of the local economy would be to enable the Council to find additional rockfish bycatch biomass to be allocated to another user group... Arrowac Fisheries depends heavily on the dogfish harvest...moving the depth restriction to 150 fm would virtually eliminate the harvest of dogfish...[we also depend] on the set line blackcod fishery that takes place off the Washington Coast. With a depth restriction of 150 fm...an additional negative economic hardship would be experienced... Most likely Arrowac would see a reduction in blackcod pounds delivered...generating less dollar return and reduced work hours...	April 2004	Bellingham, WA	Processor
With respect to the blackcod fishery of the Washington coast the real negative economic impact would be borne by the setline fishermen. Moving the depth restriction to 150 fm would result in the harvest of small blackcod, generating an average revenue of about a dollar less per pound...	April 2004	Bellingham, WA	Processor
… I represent the LaPush Area Recreational fisheries in the North of Falcon and PMFC process. …We are extremely concerned about the lack of regional management…There is no fairness in allowing one state's excessive catch to preclude fishing in the other states. Groundfish fisheries are critically important to our coastal economy and tourism.	April 2004	Forks, WA	Recreational
Our city has been severely impacted by the decline of the groundfish. … The current system appears to favor other states over Washington.	April 2004	Ilwaco, WA	Community
…I represent the Ilwaco Charter Association. … We are extremely concerned about the lack of regional management on weak groundfish stocks… Groundfish fisheries are critically important for our coastal economies.	April 2004	Ilwaco, WA	Recreational
…The 30 vessel owner/operators that are members of our association depend upon groundfish and halibut for a major part of their livelihood. …[A call for regional management]	April 2004	Westport, WA	Recreational
…I am writing on behalf of Southwest Washington Anglers. … These various fisheries are of extreme economic value to our small coastal communities. [A call for regional management]	April 2004	Oregon and Washington	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
… The Port of Neah Bay has invested heavily in the newly constructed Makah Marina and additional upland facilities that both support and are reliant on the recreational fisheries. A vibrant groundfish and halibut fishery are critically important to Neah Bay's economy, as it is to other coastal communities relying on recreational fishing to survive. We are extremely concerned about the lack of regional management...	April 2004	Neah Bay, WA	Recreational
2004: June			
[California recreational fishery] needs a 10 month season to survive. About to lose [my] business.	June 2004	Southern California	Recreational
This [black rockfish] closure hurts California economically and socially while it does nothing to protect California's environment.	June 2004	McKinleyville, CA	Recreational
I believe you are completely wrong in recommending the closure of the bottom fishing season with all the implications for people who depend on the sea for their food and income…When you close the seasons as you often recommend, it puts an extreme hardship on businesses and their employees.	June 2004		General
2004: September			
All over Oregon, our skippers and deckhands depend on the ground fishery to make a living and feed their families. Winter months through early Spring especially, all they were allowed to catch was bottom fish, to carry them through until salmon season starts again. This is the cycle you have put us in. Now you have ruled to take this away from us leaving nothing to make a living with this winter. How can you sleep at night??? ... Your inaccurate estimates are interfering with peoples' lives and should be stopped. We have all worked with you, allowing observers to go out on our boats (no charge) and fish checkers to come down to our privately owned docks, to help them do their job. How and what would they feel and you, yourself, if we say - no more!!! ...Give us back our fishing rights.	September 2004	Newport, OR	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
As the news of the sports ground fishery closure moves like a storm through Brookings Harbor, numerous individuals have contacted the Port… The impact is being felt already by this community and is expected to multiply extensively in the next few days. Southern Oregon is struggling to create employment opportunities and keep this one key element of the tourism industry alive, which is our recreational fishing industry. This is a blow to our economy that is unexpected and, plainly speaking, should be justified to the general public, as each of our fishermen knows very well that there is a tremendous abundance of groundfish available in this area.	September 2004	Brookings, OR	Recreational
This [sport groundfish closure] will require that I cancel all my trips and let my customers also cancel all hotel and dinner plans for October and November of 2004. … I will now plan on leaving the northern Oregon coast upon the closure of the 2004 salmon season. ... It is sad that the few commercial interests far outdistance the revenue generated by public visiting and spending tourist dollars in these hard hit local coastal towns.	September 2004	Sammamish, WA	Recreational
[VMS] will force small vessels with limited income out of the fishery.	September 2004	Pacific City, OR	Commercial
2004: November			
[Wants specific Petrale areas opened.] Petrale is important to the limited entry trawl sector. [We] may not survive a closure. [My] career is probably over without a Petrale season.	November 2004		Commercial
The fall Petrale sole fishery has been a valuable economic asset to both the fishermen and processors at a time when both the weather and the late year limits put an economic hardship on the industry. By the current position of the 250 fm line the Petrale fishery has been eliminated. The Petrale fishery has become an established holiday season marketing item for the processors, brokers, wholesalers, restaurants, and grocery stores. We all traditionally look forward to this unique fishery opportunity, over the past years, to sell the best available sole we have to offer our customers and the general public. The loss of income produced by this fishery will not only affect the fishermen, their crews, and processing community, but the coastal communities as well.	November 2004	Charleston, OR	Processing

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
…Without proper notice the RCA zone was moved out to 250 fm, which causes a devastating ripple effect within our company. Over the past several months our company has invested approximately $80,000 to develop our new fillet room with the anticipation of Petrale season opening in October of this year. We are a small company just starting out in this business and this has made an enormous impact on our financial situation... Last year during the months of October, November and December we purchased several thousands pounds of Petrale, which made it possible for us to continue doing business by compensating enough income to keep paying wages of our employees. Currently we employ 11 employees...in the fillet room; if we continue to lose the upcoming months of Petrale season this number will dramatically decrease, leaving our employees without jobs. In order to help with Petrale season we also employ additional dock crew [and a supervisor].	November 2004	Charleston, OR	Processing
Taking away access to Petrale...obviously affects more than just the fishermen. It affects many jobs...and it has already taken a serious toll on our small company... By moving the RCA zone we have also lost access to rex sole, English sole, sanddabs, and shallow water dover, which is a smaller market but still provides income to local families that our company employs.	November 2004	Charleston, OR	Processing
2005: March			
Since a seven month recreational groundfish season in 2004 did not result in a catch exceeding the target harvest, it is difficult to understand why our fishing season has been reduced to four months in 2005. … Because the reduction in our groundfish season will have a devastating impact on our port and local community, and because we have significant new information indicating the reduced season is neither justified nor needed, the Board of Harbor Commissioners of the Crescent City Harbor District respectfully requests that you open the season for recreational rockfish on May 1 and allow it to remain open until October 31.	March 2005	Crescent City, CA	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Port Orford fishermen, the Port and the community of Port Orford have long derived economic benefit from groundfish landings from around our area. All are now suffering hardship because of declining stocks and harvest regulations. [Request for TIQC to consider fixed gear vessels and keep Port Orford informed.] We believe any groundfish planning should include all gears and harvesters and provide information to communities and a process for communities to participate in the decision-making that will affect their futures.	March 2005	Port Orford, OR	Commercial
2005: April			
…Blackcod fishermen will be affected [by VMS requirements]. It's going to be a situation where, according to this economic information, which may or may not be true, there's over a million dollars being brought in by those fishermen in our northern area. I don't believe there's been a multiplier applied to that to tell you what the true value is to our communities; it would be at least three times that much. ...I see the VMS being a much larger economic issue than what is being presented to you...	April 2005	Crescent City, CA	Commercial
In 2004 the [California] Department of Fish and Game cut our fishing season to seven months, with this shortened season Crescent City and Del Norte County suffered some tourism and revenue losses that year. In 2005 the CDFG cut our season to just four months...with the offshore weather we have here at Crescent City in the summer, the season will be less than [four months]...This is pure and simple economic damage caused by the federal government to our small community. This county cannot afford to let this continue. ...	April 2005	Crescent City, CA	Recreational
… I have a lot of friends here in Crescent City that fish the ocean waters, this year they are all taking their business to Brookings, Oregon. As you know, tourism is the largest part of Del Norte County's revenue, this county can not afford to let this continue, Crescent City used to be a destination point, not so these days, every business in Crescent City will lose more revenue this year than they did last year, it will be the same in 2006 with another four month fishing season if they're not stopped...	April 2005	Crescent City, CA	Recreational
The recent development of the recreational groundfish regulations is of much concern to the City of Crescent City and its residents. As you know, we have a deep and strong interest in both the commercial and sport fishing activities in our area. Any reduction in this season would have a detrimental effect on our economy and way of life.	April 2005	Crescent City, CA	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
I am a charter boat owner/operator that operates out of Port Hueneme CA. I am writing to convey the urgency for more groundfish opportunity when you are considering inseason adjustments… I ask the members of the Council to consider the fact that I have been driven to near bankruptcy by the extremely cautious approach you have taken in regard to this so-called groundfish crisis. Me and many others that rely on groundfish to survive have been mentally and financially torched by the MRFS data...	April 2005	Port Hueneme, CA	Recreational
…I own and operate the Seabiscuit (CPFV) out of Channel Islands Harbor… We have been regulated and pushed into shorter bag limits, depth restrictions, tackle cut backs, and an extremely short rockfish season in 2005. The toll of these regs have pushed many of us to borderline bankruptcy. Many of us depend upon groundfish to survive. We have been crippled by the extremely conservative approach... many of our livelihoods may lie in the balance of the Council's decision...	April 2005	Channel Islands Harbor, CA	Recreational
2005: June			
There are many small ports and harbors that have mutually beneficial relationships with fisheries industries, both sport and commercial, within the [EFH EIS] study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine to keep the community vibrant. In the case of several central California harbors, the past few years of increased regulatory actions have had a drastic negative effect on the ability of the fishing fleets to continue making a profit, which has a direct effect on coastal host community (harbors and marinas). The implementation of yet another...closure will have a great economically adverse effect on these local communities...	June 2005	Moss Landing, CA	Community
There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. ...	June 2005	Moss Landing, CA	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
There are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the [EFH] EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has had a direct effect on coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities...	June 2005	Port San Luis, CA	Community
There is a synergy that occurs which is unmeasurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public visits the ports and harbors and loves to get their fresh seafood while watching the boats offload their catch. Without community interest, these small craft harbors become stagnant and turn into yacht harbors for the wealthy, or marine malls selling plastic sharks and T-shirts. The small independent business persons (fishermen) are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. ...	June 2005	Port San Luis, CA	Community
[Comments on EFH EIS]: Consideration of the buyout program and the unintended effects to the local harbors should be considered and offset with mitigation measures to insure the continued infrastructure is in place, new markets are explored, funding for new shore side fisheries support facilities are provided and the economic synergy is maintained for the shoreside businesses in the local coastal communities.	June 2005	Port San Luis, CA	Community
…The extreme weather combined with the extreme and rapid harvest controls have made a large portion of the traditional groundfish fisheries economically unviable for the dominant sport charter fleet and small scale fixed gear rockfish fleet.	June 2005	Santa Barbara, CA	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Status quo here means a continuation of heavy management measures while the resources continue to rebuilding. For the trawl fleet, this has meant: fleet reduction via the buy-back program; prohibited large roller gear use…[other gear restrictions]…forced to carry observers for data collection activities; coerced to operate under "house arrest" with the unfunded mandatory VMS program; forced to develop the RCA and boundary modifications; engaged in collaborative research to help improve the science; current development of ITQ program to reduce discards with industry funding; reduced time on the water by 75 to 80 percent; reduced our earnings by at least 75%.	June 2005	Coos Bay, OR	Commercial
Fishermen feel that the Council is operating in fear of environmental group lawsuits and are willing to sacrifice every coastal community to appease them… The fleet in particular has made the most extreme sacrifices to ensure a healthy sustainable resource... It's our community's jobs at stake, not NMFS', that these environmental groups are willing to sacrifice. The nation needs to address the frustration level environmental groups are placing on our fishing communities. The nation needs to weigh the stress these groups are placing on our hard working families...	June 2005	Coos Bay, OR	Commercial
Under options C13 and C14 [of the EFH EIS], the area designated as it is would have devastating effects on the rest of the commercial and recreational fleets in both Coos Bay and Bandon as well as both ports. The Port of Bandon strongly urges the Council to revisit this map and remove the hard bottom designation that we were singled out with.	June 2005	Bandon, OR	Community
Many [of the alternatives in the EFH EIS] have large economic impacts to the downside on fishing sectors and communities.	June 2005	Oregon	Recreational
The City of Morro Bay treasures its fishing heritage and local commercial fishing fleet that provides fresh seafood for this country in a highly regulated and sustainable environment. Our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on.	June 2005	Morro Bay, CA	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Currently there are 5 Class A permittees who operate out of our port… Each Class A permittee generally fishes between 5-8 days to make up their 60 day quota; so on most of the days of the year there is no longer even one deep water complex trawler operating on this two hundred miles of coastline. Yet, the port still does get groundfish, and these are the consistent landings that allow our one remaining full service fish buying dock to keep employees working and pay the bills. The City is dedicated to supporting this remaining fish buying dock...	June 2005	Morro Bay, CA	Community
Clearly the policy of subsidizing more and bigger trawlers in the 1970s was a disaster, but just as clearly the resource for 15 years now has been very lightly harvested compared to historic levels. Many of our local restaurants no longer can get local fresh fish and have turned, like most of the country, to frozen fish which is oftentimes harvested in environmentally damaging ways in unregulated countries.	June 2005	Morro Bay, CA	Community
In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City.	June 2005	Morro Bay, CA	Community
Many of the alternatives in the [EFH] DEIS would appear to close fishing grounds to the extent that would eliminate landings in Morro Bay and finally put an end to our commercial fishing harbor. We do not believe it is the intent of [NMFS] to eliminate fresh seafood landings in our area and decimate our City...	June 2005	Morro Bay, CA	Community
Extend the timelines for adoption of groundfish EFH so that the coastal communities/fishing industry can fully engage the discussion with NMFS and the environmental community. Improve the outreach to community and fishing businesses by considering an ombudsman program, enhancing your sustainable fisheries outreach effort or some mechanism to empower local fishermen to give input and build trust with NMFS and the environmental community.	June 2005	Morro Bay, CA	Community

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
I would close by pointing out that virtually 100% of our commercial fishermen are owner operated small businesses. We don't have the corporate interests that can hire lobbyists… It is tremendously difficult for a small business owner/operator or a small city for that matter to take the time to become informed on these issues, much less to attend the many meetings that are needed to have an impact. Thus are voices are often not heard or we find that decisions are made at meetings we are unable to attend. ...All of the above facts lead to a feeling of lack of empowerment and even distrust of the process...	June 2005	Morro Bay, CA	Commercial
Any viable economic analysis of minimization measures should include not only the short-term direct costs of management measures, but also the long-term costs of continued habitat damage, as well as the long-term benefits of habitat protection.	June 2005	[Organization]	Environmental
With the array of closures already implemented along the California coastline, a significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial "working" fishing ports and harbors along the 1,100 mile coastline of California. ...Which additional layer of no-fishing regulation will cross the threshold of cutbacks to the number of boats required to harvest a sustainable yield from California's ocean resources, the number of buying stations still left in Morro Bay, San Pedro or Santa Barbara Harbors, the number of fish processors and/or retailers that can keep their doors open in order to serve the remaining few fishing boats that still go out? The cultural value of working ports and harbors is measured in both cultural heritage and tourism value: it is common knowledge that what attracts tourist dollars to the Morro Bay or Santa Barbara Harbor is "the quaint fishing boats" that still number in the tens, at least, in each harbor...	June 2005	Southern California	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
At some point, an additional regulation will be the last one necessary to remove the infrastructure, more or less permanently (due to the failure of the commercial fishing industry to recruit young people among its numbers), that supports this cultural heritage in California ports and harbors. It behooves the Council to carefully consider whether or not further draconian measures are actually required to effectively protect groundfish EFH, or whether these further measures are, in fact, "the last straw" for fisheries culture and infrastructure in these ports and harbors. ...How much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?	June 2005	Southern California	Commercial
[Pacific Marine Conservation Council] believes that NOAA Fisheries' outreach in coastal communities with regard to the [EFH] DEIS should have been more extensive. Additional constructive input from people who make their living on or near the water would have resulted in a more comprehensive EFH EIS, and in superior protection of sensitive marine habitats with minimal impact on fishing communities.	June 2005	[Organization]	Community
PMCC has consistently testified to the Council that we believe that it is important to assess whether disparate adverse economic impacts may accrue to individual communities if important opportunities are lost due to restricted access. NOAA Fisheries can determine this to some degree using economic and spatial effort data regarding the trawl fishery, but it remains essential to engage fishermen in this process.	June 2005	[Organization]	Community
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation. For more than three years, Oceana has been bringing science and information to the PFMC and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing. As you consider the [EFH EIS], please adopt a management alternative that protects habitat and maintains vibrant fisheries.	June 2005	Form postcard (755 comments)	Environmental

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation. For more than three years, Oceana has been bringing science and information to the PFMC and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing. As you consider the [EFH EIS], please adopt a management alternative that protects habitat and maintains vibrant fisheries.	June 2005	Form postcard (8,266 comments)	Environmental
...Pacific groundfish are in trouble. Years of heavy fishing have taken their toll so that today both the fish and the fishermen are suffering. We must take steps today to restore our oceans so that our marine wildlife and our fisheries can thrive in the future. Protecting EFH is one of the most important steps on this path. ...	June 2005	Form email (382 comments)	Environmental
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation. For more than three years, Oceana has been bringing science and information to the PFMC and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing. As you consider the [EFH EIS], please adopt Alternative 12, which protects habitat and maintains vibrant fisheries..	June 2005	Form email (18,529 comments)	Environmental
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation. A key to keeping the Pacific Ocean healthy is the protection of marine habitat necessary to support its diverse assemblage of ocean life... As you consider the [EFH EIS], please adopt a management alternative that protects these ecologically sensitive habitats necessary to maintain vibrant fisheries.	June 2005	Form email (58 comments)	Environmental
Closing the [recreational] bottom fishing in the warm months would not impact the industry nearly as bad as closing it in the cold months. The sportfishing landings are suffering, trying to find anything to fish for during the winter months with the closures to bottom fishing. ...	June 2005	California	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
In the middle of listening to all the rhetoric regarding the implementation of the [Marine Life Protection Act]…we receive your notice of further attacks on the fishing community. Honestly, does anyone consider that if this continues we will be importing all our fish from disease ridden fish farms, or unregulated fisheries of foreign countries. California has vast resources that are being wasted...Many fishermen are going out of business, there was a 50% reduction in fishermen just in our local Morro Bay community. We lost our local weather buoy and weather station recently with no effort to replace them. I feel the state/feds are too biased towards the environmental community and letting the fishing communities die on the vine. Ten years from now, after the current older fishermen retire, there will not be commercial fishing in California at the rate we are going because it will be economically impossible to survive, but maybe that is what everyone seems to want.	June 2005	Morro Bay, CA	Commercial
I am writing because a healthy Pacific Ocean is crucial for our way of life, which includes our economy and recreation. [Support for Oceana's efforts] … As you consider the EFH EIS, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.	June 2005	New York, NY	Environmental
It is not acceptable to close habitat areas to all fishing because some types of fishing have little or no impact on the habitat. Option C.3.1 or C.3.2 is a much more rational approach to the problem, and would have the least economic impact on the coastal communities. Alternative D3 - this could be the economic straw that breaks the back of the small vessel operators. The impact of these vessels is minimal or nonexistent, but more people work on the small vessels than on the larger ones in this area. Do you really want to put all those people out of work? Do you really want to turn off the lights of the small coastal communities? I know the main thrust of this draft proposal is environmental, but I would like to remind you that Homo Sapiens is also part of the environment...	June 2005	Newport, OR	Recreational
We have experienced some huge changes in the last few years. We have seen the bottom fish fleet reduced and their area reduced drastically. …I think it is time for the industry, the Council and the environmentalists to stop making rules that will harm the fishing community. ...	June 2005		Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The economic impact these closures would inflict to the coastal economies will be devastating. The demise of the commercial industries have already made a mark on the coastal community and caused them to focus more efforts on sport fishing. The closures proposed would kill not only the local fishers but also the thousands and thousands of tourists drawn to the area for that very reason. ...	June 2005		Community
I respectfully recommend that your office consider the economic disaster of imposing these new unproven regulations on the coastal communities that thrive on tourists visiting and recreating in these public areas. … I believe [NMFS] needs to better evaluate the impacts of these proposals and preserve fishing opportunities for future generations of anglers. I also believe that this plan is an economic disaster waiting to happen to the already economically depressed coastal communities.... I for one will review my monies spent on the Oregon Coast and all the clients that I draw to the coast to fish the waters off Oregon and Washington. I will better manage my assets and tax dollars and reinvest in areas that are not impacted by these inappropriate regulations.	June 2005		Recreational
… There are not huge numbers of sport fishermen, but the numbers represent a much bigger number of visitors to the coast of Oregon to do other activities. If the fishing is restricted unnecessarily, it will have a large negative impact on the economies of the coastal towns that are already in poor economic condition...	June 2005	Longview, WA	Recreational
…The (positive) economic factors in rural communities should be given priority.	June 2005	Shelton, WA	Recreational
Please do not continue to bow to special interest groups who are pressuring you to consider marine sanctuaries. This is the last thing we need on the west coast to continue our economic slide into oblivion. … I would urge all of you to think this proposal through carefully and weigh the ramifications both economically and recreationally...	June 2005	Portland, OR	Recreational
… Sport fishing has been the lifeblood of many small communities along the Oregon coast and represents a substantial infusion of money to local and the state economy… Please take into account when you consider the current closure proposals that the sport fishing fleet does represent a major influence on the economy and does virtually no harm to the ecology or the fishery.	June 2005	Oregon	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Under Alternative C.12, C.13 and C.14 there is only one near shore area listed for Oregon… This area is rarely trawled… but this area is the only area available to recreational groundfish fleet and a small number of hook and line groundfish commercial vessels. Alternative C.13 would eliminate those fisheries, a real blow to Coos Bay and Bandon. Alternative C.14 would also cut out a large portion of very productive salmon trolling grounds out of Coos Bay and Bandon. A double blow to the communities. ...	June 2005	Coos Bay and Bandon, OR	Commercial
In our area, where groundfish are particular important, the fishing industry is already hurting and has been in serious decline for years. Overfishing and the use of bottom trawl nets and other heavy fishing gear have depleted fish stocks and caused much damage to the marine habitats the fish depend on... Effective measures to protect those critical habitats and to regenerate and restore fish populations are essential if commercial fishing is to have a future here along the Pacific Coast. ...We believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.	June 2005	Bandon, OR	Commercial
For many years, a large percentage of my income was derived from fishing vertical gear for chilipepper rockfish, working from about the Cordell Banks to the Channel Islands; that fishery is now virtually closed to me forever. In order to replace this lost income, in recent years I have fished the same type of vertical hook-and-line gear for blackgill rockfish...The only fishing grounds accessible to me [from Morro Bay]...is the Santa Lucia Banks. I have already been displaced from all closer grounds... Please do not close the last place I have left to fish this highly selective gear type.	June 2005	Morro Bay, CA	Commercial
…Since most sportfishing probably does have less impact than most commercial fishing, and in many cases an equal or greater community economic impact, it seems clear that one way to minimize the impact on EFH would be to allocate more fish to sportfishers. This would have the added benefit of extracting a greater economic benefit from the limited allowable catches of some of the more constraining species of groundfish. ...	June 2005	Oregon	Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Being a lifelong resident [of Seal Rock, OR]…means I realize the importance of fishing to this community. However, I am also aware that no single species can be lost without contributing to the loss of another, eventually impacting the very quality of human life that we are all eager to maintain. ...	June 2005	Seal Rock, OR	General
The base years of 2000-2002 are questionable measures of fishing. One must remember that the fishery in those years was already significantly impacted by trip limits and area closures. In fact the entire west coast trawl fishery is much different today than in the past. Since 1994 75% of trawl effort has been removed by limited entry permit retirement, vessel buyback program and migration of part of the fleet to Alaska. ...	June 2005	Toledo, OR	Commercial
As a retired marine ecologist, I'm aware that, for decades, protection, even when intended, has fallen victim to more immediate economic pleas from fishermen. Please do protect the habitat of groundfish and manage the resource for the long run. …	June 2005	Eugene, OR	General
The fishing heritage of central California's harbors is iconic, inextricably woven into the state's history and culture. Moreover, this heritage is alive today--commercial fishing and working harbors provide significant benefits to society, including fresh seafood, tax revenue, tourist attractions, economic benefits that ripple through coastal communities, and a strong voice for conservation (e.g. opposition to pollution). Commercial fishing in this region has a long and colorful history and creates a culture worth sustaining for its own sake. Some communities have been almost entirely dependent on fishing for generations. But California's fishing heritage is at risk.	June 2005	[Organization]	General
Starting in the early 1990s, fishing opportunities for west coast groundfish…have become increasingly constrained as a result of reductions in total allowable catch. Efforts to keep the fishing open year-round resulted in reductions in smaller and smaller trip limits, making it difficult for fishermen to make a living, and for ports to maintain revenues. The establishment of very large areas closed to rockfishing resulted in further economic distress. As a result, the working harbors of the central California coast have become fragile - their health linked to declining fish landings and revenues. ...[Presented goals of the Fishing Heritage Group and consensus map of no-trawl zones]	June 2005	[Organization]	General

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
The Del Norte County Board of Supervisors has been approached by the near-shore sport fishing community concerning shortened sport fishing seasons ordered by the PFMC. The public expressed frustration and concern regarding the impacts associated with shortened seasons...	June 2005	Del Norte County, CA	Recreational
Over the last several years most of the hook and line fishermen have gone out of business because restrictive regulations have made fishing in this manner economically unrealistic. …Since one of the mandates of the Magnuson Act is to preserve the economic stability of the industry, I urge you to formulate groundfish regulations which are realistic in providing me, and other fixed gear fishermen, with a meaningful opportunity to engage in our method of fishing.	June 2005	California	Commercial
2005: September			
When [ODFW] shut down bottom fishing it devastated the Oregon coast economy. Not only was the sport industry affected; restaurants, hotels, gas stations, public sector, police, firemen (because of the tax base) - we lost a lot of money on the Oregon coast because of this. It is heartwrenching, because there was people on the Oregon coast who... lost their families, who lost their businesses. There were businesses reported losing $1400 per week... that had a devastating affect on our tax bases... so, dealing with that was horrifying, when the general public was told that they were not allowed to go out and fish to provide food for their families... We shouldn't let the guessing game [of counting fish] [cause] economic damages to the community or destroy families.	September 2005	Toledo, OR	Recreational
…At least one week [of fishing] would have made sure they had… electricity, heating oil, stuff like to that to get them through the winter, pay their rent… their basic needs and their basic local taxes… it does have a tremedous effect all the way around.	September 2005	Toledo, OR	Recreational
2005: November			
Fort Bragg is one of the major DTL ports. Our concern has been with the increased fuel cost, it's considerably more beneficial to us to have higher daily and weekly limits on the sablefish… [With the lower limits and higher fuel costs,] it doesn't leave a lot of money left.	November 2005	Fort Bragg, CA	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
[Re: black rockfish]. What happened in Oregon, just before Labor Day, all groundfishing was stopped. That had a tremendous economic impact on my community, but… it had a very large psychological impact on my community. It was kind of like a kick in the face...all these people from all over the country who had plans to come to the Oregon coast to go fishing, to spend their money, those plans were stopped with 72 hour notice [or less]... And then again this year, [black rockfish was closed in October]. This is not a very safe thing for some of these sports fishermen [who may be tempted to go further out into unsafe waters]... I'm here to beg the [Council] to explore ways of increasing the ABC/OY for black rockfish in Oregon and California. ...	November 2005	Garibaldi, OR	Processor
The PFMC management style over the last few years has been off and on again more than I can count. This tears families apart, making it impossible to hire, train, and keep good employees, not to mention maintaining boats, trucks, fishing gear, and montages [sic]. It also tears at the social fabric of coastal communities, ports, fuel docks, suppliers, banks, and restaurants and other support industries, and the employees and families of those businesses. ...	November 2005	Brookings-Harbor, OR	Commercial
The decision of NMFS last year to cut off groundfish days before Labor Day, the largest tourist day on our coastline, was devastating. Over $529,000 was lost to Garibaldi alone. This kind of timing decisions are truly uncalled for and are based on speculation at best. As a Port commissioner to Garibaldi, it is difficult to see the economic impact on an already struggling portal city. Council members demand the facts, review the economic impact - lives are at stake.	November 2005	Garibaldi, OR	Processor
[In regard to sport canary and black rockfish regulations] - Please consider the economic effects you impose on our communities before you make any more mistakes.	November 2005	Garibaldi, OR	Recreational
We are northwest fishermen that have been severely affected by your recent change in the bottomfishing quotas. You have hurt us financially, putting our boats (three) into dry dock because of the low quotas. Someone is not properly assessing the fish stocks which we have complained of on numerous occasions...several times we've offered our services to show you fellows the multiple fish schools out there with no response... we feel it's not financially [beneficial] to sit around all summer to catch our few...quotas you've allowed us. You've made us ready to quit and sell our boats than to keep our profession of [fishing].	November 2005	Garibaldi, OR	Commercial

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
In past years we've created laws to protect the fishing fleet and industry. The reality today is that it's now slowly eliminating the small fisherman… Fishing areas are not being regulated evenly. The scientific data is wrong.	November 2005	Garibaldi, OR	Processor
My wife and I have been hook and line fishing commercially for over the past 11 years, for black rockfish. We fish out of Garibaldi, Oregon. We do this primarily to supplement our social security.	November 2005	Garibaldi, OR	Commercial
Other documents (scoping summaries from rebuilding plans and environmental impact statements)			
Consider effects of decisions on fishing community infrastructure (cumulative from all rebuilding plans)			Community
Consider socioeconomic impacts on coastal (not just fishing) communities.			Community
Create and distribute a document describing individual and cumulative effects on communities.			Community
Current limits will cause the demise of the California sportfish fishery and those who depend on it.		Newport Beach, CA	Recreational
Fishermen will have a hard time surviving unless quotas or fishing grounds increase; cannot operate business.			Commercial
Regulations are putting me out of business			Commercial
The market infrastructure seems about to collapse.			Community
With the current trip limits in the California sportfish fishery, people are not going fishing.		Newport Beach, CA	Recreational
If small trawl fishery in northern Washington cannot survive, will have negative impact on communities.		Neah Bay, WA	Commercial
Evaluate impacts on individual communities, not just fishery sectors.			Community
Small boats in northern Washington have suffered many setbacks already: can only fish nearshore; limited by weather; closures due to cable crossings, etc.		Neah Bay, WA	Commercial
Magnuson Act says that fisheries must be sustainable for fish AND fishermen; take this into account.		Neah Bay, WA	Community
Take into account small family-owned boats that fish in northern Washington state.		Neah Bay, WA	Commercial
The RCA isn't hurting communities as far as trawlers are concerned; the problem is that processors don't want to buy the types of fish that can be caught cleanly. Processor limits force fishermen to discard target species.			Commercial
Look at the sociocultural value of recreational fishery resources.			Recreational

Comment	Council meeting	Community impacted (when noted)	Sector (when noted)
Look at fish processing as part of the system and whether this system maintains the viability of processors.			Processing
The Council seems only to consider the economic value of processors.			Processing
Look more at social impacts of recreational fisheries management, including culture of recreational fishing and the relationship to tourism.			Recreational
Previous economic analyses have underestimated the economic costs of limiting catches in the January-February and November-February periods when Petrale sole catch is not limited by management measures.			Commercial

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

There are two suites of alternatives analyzed in this EIS. The first suite of alternatives is the range of 2007-2008 harvest specifications or acceptable biological catches (ABCs) and optimum yields (OYs) considered for groundfish stocks and stock complexes managed under the Groundfish FMP. The range of harvest specifications for depleted groundfish species is also analyzed to understand the potential conservation and socioeconomic consequences of alternative depleted species' rebuilding plans. Therefore, the Council's preferred 2007-2008 OY alternative serves two purposes: both as the harvest specifications for the years 2007 and 2008 and, for depleted species, as the next step in the longer term mortality schedules for rebuilding plans. The target rebuilding year for each depleted species under rebuilding is also set in this decision step as the most likely year to rebuild under the Council-preferred OY and mortality schedule. Harvest specification (and rebuilding plan) alternatives are described in section 2.1.

The second suite of alternatives analyzed in this EIS is alternative 2007-2008 management measures. 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. The overarching objectives of 2007-2008 management measures are to stay within the Council-preferred annual OYs for groundfish stocks and stock complexes and to equitably allocate fishing opportunities and other fishery benefits across fishing sectors and regions under Council jurisdiction. Alternative 2007-2008 management measures are described in section 2.2.

2.1 Alternative Harvest Specifications

Table 2-1 depicts the alternative harvest specifications for groundfish stocks and stock complexes managed under the FMP and considered by the Council for the 2007-2008 management period. The Council decided to average projected 2007 and 2008 OYs from adopted assessments and rebuilding analyses with the intent to specify an average OY, which is applied to both years. In cases where the OY might exceed a year-specific ABC in any one year, the OY is capped at that ABC since an ABC cannot be legally exceeded.

2.1.1 Depleted Groundfish Species

Depleted groundfish species are those with spawning biomasses that have dropped below the Council's depletion or overfished threshold of 25% of initial spawning biomass (or $B_{25\%}$). The Groundfish FMP mandates these stocks need to be rebuilt through harvest restrictions and other conservation measures to 40% of unfished biomass (or $B_{40\%}$). Furthermore, the MSA mandates these rebuilding periods need to be the shortest time 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 ecosystem. This mandate was underscored in an August 2005 ruling by the Ninth Circuit Court of Appeals in a challenge to the Council's darkblotched rockfish rebuilding plan. In accordance with that ruling, the Council decided to reconsider all adopted rebuilding plans to ensure they comply with the MSA as interpreted by the courts. Therefore, the range of harvest specifications for depleted groundfish species under rebuilding and analyzed in this EIS has been expanded to more effectively analyze the tradeoffs between the conservation objective to "rebuild in the shortest time possible" and the socioeconomic objective of allowing fisheries some access to healthy fish stocks by allowing some mortality of depleted species that are caught as bycatch in these fisheries. Any harvest of depleted groundfish stocks is anticipated to be unavoidable bycatch. The Council-preferred harvest specifications for depleted species are the mortality limits for these species the Council recommends under rebuilding to avoid disastrous short-term socioeconomic impacts to West Coast fishing communities. Rebuilding periods

Table 2-1. Council-adopted alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2007 and 2008. (Overfished stocks in CAPS; Stocks with new assessments in bold).

Stock	No Action Alternative				2007 and 2008 Action Alternatives a/													
	2005 ABC	**2005 OY**	**2006 ABC**	**2006 OY**	**Alt 1 2007 ABC**	**Alt 2 2007 ABC**	**Alt 1 2008 ABC**	**Alt 2 2008 ABC**	**Alt 1 OY**	**Alt 2 OY**	**Alt 3 OY**	**Alt 4 OY**	**Alt 5 OY**	**Alt 6 OY**	**Council 2007 ABC b/**	**Council 2008 ABC b/**	**Council OY b/**
Lingcod - coastwide a/	2,922	2,414	2,716	2,414	6,706		5,853		6,280	6,088					6,706	5,853	
Columbia and US-Vanc. areas		1,694		1,694					5,428	5,428							
Eureka, Monterey, and Conception areas		719		719					852	660							
N. of 42 (OR & WA)		1,801		1,801					5,558	5,558							
S. of 42 (CA)		612		612					722	530							
Pacific Cod	3,200	1,600	3,200	1,600	3,200		3,200		1,600						3,200	3,200	1,600
Pacific Whiting (U.S.)	269,545	269,069	488,850	269,069	188,682	350,409	188,682	350,409	188,348	349,790					To be determined in March 2007		
Sablefish (Coastwide)	8,368	7,761	8,175	7,634	6,210		6,058		4,574	5,934					6,210	6,058	5,934
N. of 36 (Monterey north)		7,486		7,363					4,411	5,723							5,723
S. of 36 (Conception area)		275		271					162	210							210
PACIFIC OCEAN PERCH	966	447	934	447	900		911		0	87	405	514	749		900	911	405
Shortbelly Rockfish	13,900	13,900	13,900	13,900	13,900		13,900		13,900						13,900	13,900	13,900
WIDOW ROCKFISH	3,218	285	3,059	289	5,334		5,144		0	329	456	917	1,369		5,334	5,144	456
CANARY ROCKFISH d/	270	47	279	47	172		179		0	24	44	68			172	179	44
Chilipepper Rockfish	2,700	2,000	2,700	2,000	2,700		2,700		2,000	2,700					2,700	2,700	
BOCACCIO	566	307	549	309	602		618		0	149	218	315	424		602	618	
Splitnose Rockfish	615	461	615	461	615		615		461						615	615	461
Yellowtail Rockfish	3,896	3,896	3,681	3,681	4,585		4,510		4,548						4,585	4,510	
Shortspine Thornyhead - coastwide					2,488		2,463		1,661	2,476					2,488	2,463	
Shortspine Thornyhead - N. of 34deg27'	1,055	999	1,077	1,018					1,240	1,634							
Shortspine Thornyhead - S. of 34deg27'									421	841							
Longspine Thornyhead - coastwide	2,851	2,656	2,851	2,656	3,953		3,860		2,696	3,930					3,953	3,860	
Longspine Thornyhead - N. of 34deg27' e/		2,461		2,461					2,220	2,989							
Longspine Thornyhead - S. of 34deg27' e/		195		195					476	941							
COWCOD - S. of 36 (Conception area)	5	2.1	5	2.1	17		17		0	4	7	9	11		17	17	
COWCOD - Monterey area	19	2.1	19	2.1	19		19		0	4	7	9	11		19	19	
DARKBLOTCHED	269	269	294	200	456		487		0	130	229	330	472		456	487	
YELLOWEYE	54	26	55	27	47		47		0	12	17	21	24	27	47	47	
Nearshore Species																	
Black Rockfish (WA)	540	540	540	540	540		540		540						540	540	540
Black Rockfish (OR-CA)	753	753	736	736	725		719		722						725	719	
Minor Rockfish North	3,680	2,250	3,680	2,250	3,680				2,250	2,270	2,290				3,680		
Nearshore Species		122		122					122	142	162						
Shelf Species		968		968			968		968	968	968						
Slope Species		1,160		1,160			1,160		1,160	1,160	1,160						
Remaining Rockfish North	1,612	1,216	1,612	1,216	1,612		1,612		1,216								
Bocaccio	318	239	318	239	318		318		239								
Chilipepper - Eureka	32	32	32	32	32		32		32								
Redstripe	576	432	576	432	576		576		432								
Sharpchin	307	230	307	230	307		307		230								
Silvergrey	38	29	38	29	38		38		29								
Splitnose	242	182	242	182	242		242		182								
Yellowmouth	99	74	99	74	99		99		74								
Other Rockfish North	2,068	1,034	2,068	1,034	2,068		2,068		1,034								

TABLE 2-1. Council-adopted alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2007 and 2008 (continued). (Overfished stocks in CAPS; Stocks with new assessments in bold).

Stock	No Action Alternative				2007 and 2008 Action Alternatives a/													
	2005 ABC	2005 OY	2006 ABC	2006 OY	Alt 1 2007 ABC	Alt 2 2007 ABC	Alt 1 2008 ABC	Alt 2 2008 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Council 2007 ABC b/	Council 2008 ABC b/	Council OY b/
Minor Rockfish South	3,412	1,968	3,412	1,968	3,403		3,403		1,753	1,855	1,898	2,006			3,403		
Nearshore Species		615		615					413	515	558	666					
Shelf Species		714		714					714	714	714	714					714
Slope Species		639		639					626	626	626	626					626
Remaining Rockfish South	854	689	854	689	854		854		689								
Bank	350	263	350	263	350		350		263								
Blackgill	343	305	343	305	292		292		292								
Gopher	97	48.5	97	48.5	302		302		49	151	227	302					
Sharpchin	45	34	45	34	45		45		34								
Yellowtail	116	87	116	87	116		116		87								
Other Rockfish South	2,558	1,279	2,558	1,279	2,558		2,558		1,279								
California scorpionfish	Not specified - managed as part of Minor RF				137	219	137	219	137	219							
Cabezon (off CA only)	103	69	108	69	94		94		69						94	94	
Dover Sole	8,522	7,476	8,589	7,564	28,522		28,442		16,500	28,482					28,522	28,442	
English Sole	3,100	3,100	3,100	3,100	6,773		5,701		6,237						6,773	5,701	
Petrale Sole (coastwide) c/	2,762	2,762	2,762	2,762	2,917		2,919		1,921	2,499	2,883				2,917	2,919	
Columbia and US-Vanc. areas									910	1,347	1,347						
Eureka, Monterey, and Conception areas									1,012	1,152	1,536						
N of 40deg10'									1,176	1,651	1,752						
S of 40deg10'									745	848	1,131						
Arrowtooth Flounder	5,800	5,800	5,800	5,800	5,800		5,800		5,800						5,800	5,800	5,800
Starry Flounder	Not specified - managed as part of Other Flatfish				1,221		1,395		890	1,186							
Other Flatfish	6,781	4,909	6,781	4,909	6,731		6,731		4,884						6,731	6,731	4,884
Other Fish	14,600	7,300	14,600	7,300	14,600		14,600		7,300						14,600	14,600	7,300
Kelp Greenling HG (OR)									No Fed HG	fed HG = state HG							

a/ The Council elected to average OY projections for 2007 and 2008 and analyze/specify the average OYs for each year. However, ABCs are year-specific.

b/ Council ABC and Council OY represent the Council's preferred harvest alternative for 2007 and 2008.

c/ Area OYs/HGs are stratified according to the assessment areas and alternatively adjusted by management areas for lingcod and petrale sole.

d/ The canary rockfish OY alternatives assume a 50:50 commercial:recreational catch share. The OY varies by the commercial:recreational catch share due to the fact that the recreational fishery takes smaller fish and therefore has a greater "per ton" imp

e/ The No Action alternative OYs for 2005 and 2006 were specified north and south of 36 deg. N latitude. The GMT recommends specifying longspine thornyhead OYs north and south of 34 deg.27' N latitude. OY apportionment may change based on further analys for depleted species are coincident with the Council's recommendation for OYs for these species and defined in the Council's rebuilding framework, as specified in the Groundfish FMP, as the median time to attain the target spawning biomass of $B_{40\%}$ under a given harvest rate or mortality schedule.

Prior to the new groundfish assessments conducted, reviewed, and adopted in 2005 under Council procedures, the depleted groundfish species under rebuilding were bocaccio (in waters south of 40°10' N latitude), canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific ocean perch, widow rockfish, and yelloweye rockfish. However, the 2005 lingcod assessment {Jagielo 2006} indicates that the coastwide lingcod stock has attained (and exceeded) the $B_{40\%}$ spawning biomass threshold and is now considered successfully rebuilt. No new species were declared depleted from the 23 groundfish assessments conducted in 2005. Therefore, the Council is continuing rebuilding plans for the other seven species only. All of these rebuilding plans are being reconsidered in response to the Ninth Circuit Court of Appeals ruling on a lawsuit challenging the darkblotched rockfish rebuilding plan. The ruling stated that West Coast groundfish rebuilding plans need to rebuild depleted stocks in as short a time as possible while taking into account the status and biology of the stock, the needs of the fishing communities, and the interaction of the overfished stock within the marine ecosystem. To fully analyze both the conservation needs of each depleted stock and the socioeconomic effects of alternative rebuilding plans, a wide range of OYs have been specified for analysis for each depleted species (Table 2-2a). Each of these OY alternatives is based on the best available science as recommended by Stock Assessment Review (STAR) panels and the Council's Scientific and Statistical Committee (SSC). Section 2.1.1 describes the scientific basis for each depleted species' OY alternative and describes the strategic analyses of these alternatives that are presented in more detail in subsequent chapters of this EIS.

Table 2-2a. Range of 2007-2008 OYs for depleted groundfish species decided at the November 2005 Council meeting.

		2007-2008 OYs (mt)					
Stock	**Association**	**OY Alt. 1**	**OY Alt. 2**	**OY Alt. 3**	**OY Alt. 4**	**OY Alt. 5**	**OY Alt. 6**
Yelloweye	Northern Shelf	0	12	17	21	24	27
Canary	Northern Shelf	0	24	44	68		
Cowcod a/	Southern Shelf	0	8	14	18	22	
Bocaccio	Southern Shelf	0	149	218	315	424	
Darkblotched	Northern Slope	0	130	229	330	472	
POP	Northern Slope	0	87	405	514	749	
Widow	Midwater	0	329	456	917	1,369	

a/ OY alternatives for Conception and Monterey areas combined.

The first set of analyses explores the consequences of each depleted species' OY alternative in isolation to understand the tradeoff between the amount of allowable harvest and alternative rebuilding periods and to identify the West Coast fisheries that are affected by the constraints posed by alternative rebuilding plans for each particular depleted species. The predicted rebuilding periods and the annual OYs that describe the alternative rebuilding schedules, each of which define a rebuilding plan, are estimated using the SSC's endorsed rebuilding program {Punt 2005}. The rebuilding program is a probabilistic population simulator that explores alternative harvest rates and predicts the total mortality and duration of rebuilding for each depleted species under a range of harvest rates. The depleted species' OY alternatives analyzed in this EIS, based on harvest rates estimated from the rebuilding simulation program, are calculated using an instantaneous rate of fishing mortality (F), which may be converted to a Spawning Potential Ratio. For ease of comparison among stocks and to standardize the basis of rebuilding calculations, it is useful to express any specific fishing mortality rate in terms of its effect on Spawning Potential Ratio (SPR = spawning per recruit at the current population level relative to that at the stock's unfished condition). Given fishery selectivity patterns and basic life history parameters, there is a direct inverse relationship between F and SPR (Figure 2-1). When there is no fishing, each new female recruit is expected to achieve 100% of its spawning potential. As fishing intensity increases, expected lifetime reproduction declines due to this added source of mortality. Conversion of F into the equivalent SPR has the benefit of standardizing for differences in growth, maturity, fecundity, natural mortality, and fishery selectivity patterns and, as a consequence, the Council's SSC recommends it be used routinely. The rebuilding program is more thoroughly described in Chapter 6. The OY alternatives for depleted species are described in section 2.1.1.1.

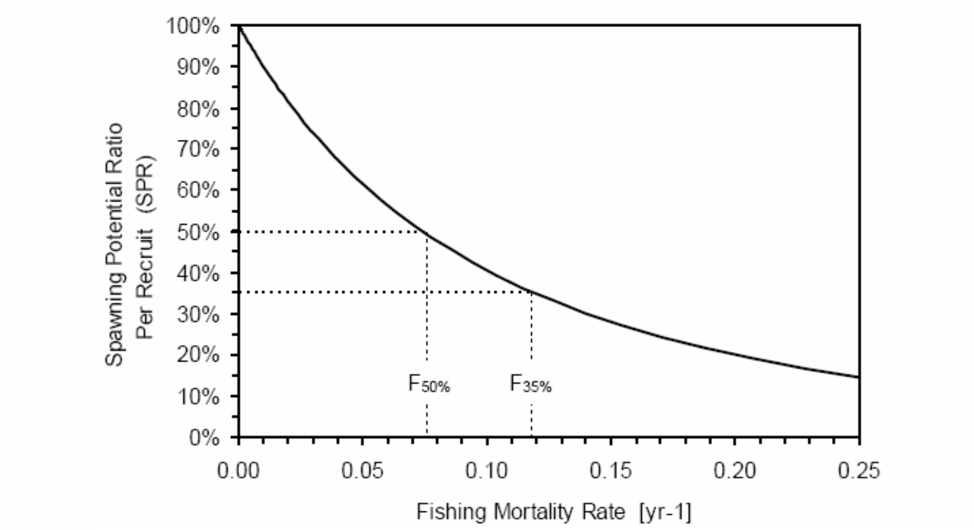


Figure 2-1. Relationship between spawning potential ratio (SPR) and instantaneous fishing mortality rate (F) for a hypothetical rockfish.

Next, rebuilding alternatives were developed by arranging the depleted species' OYs in various combinations (Table 2-2b) and then modeling changes to the current management regime to understand how rebuilding plans for different species interact to constrain fishing opportunities. The OYs in these rebuilding alternatives are strategically arrayed to illuminate how each species might differentially constrain fishing opportunities by sector (or gear type) and region along the West Coast, depending on the amount of allowable harvest of each species. It is important to note that the full range of OY alternatives described in Table 2-2a are not used to structure these rebuilding alternatives. For example, while it is important to analyze the effect of a zero harvest strategy to understand the consequences of the shortest possible rebuilding period for each of these species, it is not likely the Council and NMFS will seriously consider a zero harvest strategy due to the disastrous economic impacts to West Coast fishing communities. The Ninth Circuit Court of Appeals ruling on West Coast groundfish rebuilding plans acknowledges,

> "...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. To use an example relevant here, even if a fishing community is actively seeking not to fish for a certain species, it will inevitably catch some of the overfished species in the process of fishing for other, more plentiful fish — what is known as "bycatch." Because almost no groundfish that are caught as bycatch survive even if they are thrown back into the ocean, an absolute ban on catching any of a species of groundfish could mean a total moratorium on all fishing in the parts of the fishery containing groundfish, with obvious adverse consequences for fishing communities. Section 1854(e)(4)(i), then, allows the Agency to set limited quotas that would account for the short-term needs of fishing communities (for example, to allow for some fishing of plentiful species despite the inevitability of bycatch), even though this would mean that the rebuilding period would take longer than it would under a total fishing ban."

This indicates that the court explicitly rejected the zero harvest alternative (OY Alternative 1). Nonetheless, as mentioned above, this zero harvest level provides a useful benchmark for assessing the socioeconomic consequences of rebuilding in as short a time as possible *without* mitigating impacts to fishing communities. Furthermore, the rebuilding alternatives help to inform the Council's choice of a preferred OY alternative consistent with the court's interpretation of the MSA that "limited quotas" are acceptable to account for the short-term needs of fishing communities. Likewise, some of the higher OY alternatives in Table 2-2a are not used to structure the rebuilding alternatives in Table 2-2b. For example, the highest OY alternative for widow rockfish (OY Alternative 5) was not included among the rebuilding alternatives because it represents an amount of bycatch not observed in the current management regime. Prior to 2003, when there was a directed midwater trawl fishery for yellowtail and widow rockfish, catches of widow rockfish approached the level of mortality consistent with the OY Alternative 5 in Table 2-2a. However, the current understanding of the association of the more constraining canary rockfish stock with yellowtail rockfish leads to the conclusion the available potential harvest of canary rockfish (as described by the range of OYs in Table 2-2a) would constrain any directed midwater trawl opportunities for yellowtail rockfish before the widow rockfish bycatch would approach the higher available OYs for that stock. Therefore, the rebuilding alternatives in Table

Table 2-2b. Amendment 16-4 rebuilding alternatives.

		2007-2008 OYs (mt)					
Stock	**Association**	**"Status Quo" Reb. Alt. a/**	**Reb. Alt. 1**	**Reb. Alt. 2**	**Reb. Alt. 3**	**Reb. Alt. 4**	**Reb. Alt. 5**
Yelloweye	Northern Shelf	27	21	17	21	12	12
Canary		44	24	44	68	24	24
Cowcod b/	Southern Shelf	8	8	18	22	14	4
Bocaccio		149	149	218	424	315	40
Darkblotched	Northern Slope	229	330	229	472	472	130
POP		87	405	87	749	405	44
Widow	Midwater	329	456	329	917	329	120

a/ The species' OYs described in the "status quo" rebuilding alternative are determined by calculating the effective SPR harvest rate from the November 2005 bycatch scorecard and projecting this harvest rate forward to 2007.
b/ OY alternatives for Conception and Monterey areas combined.

2-2b are structured using a narrower range of depleted species' OYs than those depicted in Table 2-2a. The rebuilding alternatives are described in detail below, in Section 2.1.1.2.

At their April 2006 meeting, the Council selects a preferred OY alternative (a set of OYs for all managed species and species complexes as depicted in Table 2-1). In doing so, they will consider the full range of OY alternatives, but may also use information about the effects of the rebuilding alternatives to choose a preferred alternative that, while within the range of OY alternatives, differs from any one of them for one or more depleted species. As discussed above, the Council's preferred OY alternative for the 2007-2008 fisheries must be consistent with any intent to modify depleted species rebuilding plans. Therefore, the choice of a preferred OY alternative involves consideration of both short-term effects (during 2007-2008) and long-term effects (the future application of rebuilding plans as revised by Amendment 16-4). They also have the option to further narrow the range of OY alternatives by eliminating specific OY values from further consideration because further analysis demonstrates they are not "reasonable," such as the higher widow rockfish OYs that cannot be attained under management strictures required for co-occurring depleted species. (NEPA regulations state that an EIS must "rigorously explore and objectively evaluate all *reasonable* alternatives," 40 CFR 1502.14(a), emphasis added.)

2.1.1.1 Optimum Yield Alternatives for Depleted Species

Table 2.2a depicts the range of depleted species' OY alternatives specified for analysis by the Council in November 2005. Table 2-3 and Figure 2-2 indicate the median time to rebuild under each 2007-2008 OY alternative.

Table 2-3. Estimated time to rebuild relative to the 2007-2008 OY for depleted West Coast groundfish species.

Species	Ttarget in the FMP	OY Alternative	Median Time to Rebuild	2007-08 OY (mt)	2007 ABC (mt)	Current Tmin	Re-estimated Tmin	Current Tmax	Re-estimated Tmax
Bocaccio	2023	1	2022	0	602	2018	2018	2032	2032
(S of 40deg10')			2024	106					
		2	2024	149					
		3	2026	218					
		4	2029	315					
		5	2032	424					
			2050	602					
Canary	2074	1	2048	0	172	2057	2048	2076	2071
		2	2058	24					
		3	2063	44					
		4	2071	68					
Cowcod	2090	1	2035	0	26	2062	2035	2095	2074
(Concep.+ Monterey			2040	4.6					
Areas)		2	2043	8					
		3	2052	14					
		4	2062	18					
		5	2074	22					
Darkblotched	2030	1	2009.5	0	456	2011	2009.5	2044	2033
		2	2009.9	130					
		3	2010.2	229					
		4	2010.5	330					
		5	2012	472					
			2014	521					
			2016	581					
			2033	696					
POP	2026	1	2014	0	900	2014	2015	2043	2048
		2	2015	87					
		3	2021	405					
		4	2025	514					
		5	2048	749					
Widow	2038	1	2013	0	5,334	2026	2013	2042	2027
		2	2015	329					
		3	2016	456					
		4	2020	917					
		5	2027	1,369					
Yelloweye	2058	1	2036	0	47	2027	2036	2071	2080
		2	2050	12					
		3	2058	17					
		4	2068	21					
		5	2080	24					
		6	2099	27					

= Subject to change pending new rebuilding analysis.

Bocaccio (in Waters off California South of 40°10' N Latitude)

The OY alternatives specified for analysis for the bocaccio stock south of 40°10' N latitude are 0 mt, 149 mt, 218 mt, 315 mt, and 424 mt (Tables 2-1 and 2-2a). This compares to the status quo OYs of 307 mt in 2005 and 309 mt in 2006.

The zero harvest alternative would rebuild the stock by 2018, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 149 mt alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying the best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting rate to the projected exploitable biomass in 2007 and 2008 {MacCall 2006a} to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2024, or 6 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 218 mt OY alternative represents the OY under an 80% rebuilding probability (P_{MAX} or the probability of successfully rebuilding the stock in the maximum allowable time under the current National Standard 1 Guidelines) from the 2003 rebuilding analysis {MacCall 2003b}. The median time to rebuild the stock under this alternative would be 2026, or 8 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 315 mt OY alternative represents the current SPR harvest rate of 69.2% applied to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2029, or 11 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 424 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50% from the new rebuilding analysis {MacCall 2006}. This is the highest OY that can be considered for bocaccio in that it is based on the best available science and is at the 50% rebuilding probability threshold established in litigation (*Natural Resources Defense Council v. Daley*, April 25, 2000, U.S. Court of Appeals for the District of Columbia Circuit). The median time to rebuild the stock under this alternative would be 2032, or 14 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Canary Rockfish

The OY alternatives specified for analysis for the coastwide canary rockfish stock are 0 mt, 24 mt, 44 mt, and 68 mt (Tables 2-1 and 2-2a). This compares to the status quo OY of 47 mt in 2005 and 2006.

The zero harvest alternative would rebuild the stock by 2048, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 24 mt OY alternative represents the OY under a 60% rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis {Methot 2006}. The median time to rebuild the stock under this alternative would be 2058, or 10 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 44 mt OY alternative applies the current SPR harvest rate of 88.7% to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2063, or 15 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 68 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50% from the new rebuilding analysis {Methot 2006}. This is the highest OY that can be considered for canary rockfish in that it is based on the best available science and is at the 50% rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2071, or 23 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Cowcod

The OY alternatives specified for analysis for the cowcod stock occurring in the Conception and Monterey INPFC areas are 0 mt, 8 mt, 14 mt, 18 mt, and 22 mt (Tables 2-1 and 2-2a). This compares to the status quo OY of 4.2 mt in 2005 and 2006.

The zero harvest alternative would rebuild the stock by 2035, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 8 mt OY alternative represents the OY under a re-estimated 80% rebuilding probability from the new rebuilding analysis {Piner 2006}. The median time to rebuild the stock under this alternative would be 2043, or 8 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 14 mt OY alternative represents the OY under a re-estimated 70% rebuilding probability from the new rebuilding analysis {Piner 2006}. The median time to rebuild the stock under this alternative would be 2052, or 17 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 18 mt OY alternative represents the OY under a re-estimated 60% rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis {Piner 2006}. The median time to rebuild the stock under this alternative would be 2062, or 27 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 22 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50% from the new rebuilding analysis {Piner 2006}. This is the highest OY that can be considered for canary rockfish in that it is based on the best available science and is at the 50% rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2074, or 39 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Darkblotched Rockfish

The OY alternatives specified for analysis for the coastwide darkblotched rockfish stock are 0 mt, 130 mt, 229 mt, 330 mt, and 424 mt (Tables 2-1 and 2-2a). This compares to the status quo OYs of 269 mt in 2005 and 200 mt in 2006.

The zero harvest alternative would rebuild the stock by 2009.5, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 130 mt OY alternative represents the OY specified in 2001. The Ninth Circuit court ruling compelling the Council and NMFS to consider Amendment 16-4 disputed the 2002 darkblotched harvest specification, which had changed this 2001 OY to a higher value. The median time to rebuild the stock under this alternative would be 2009.9, or approximately 5 months longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 229 mt OY alternative is based on the effective harvest rate in 2005 (F = 0.0216) projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 {Rogers 2006a} to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2010.2, or approximately 8 months longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 330 mt OY alternative applies the harvest rate used to set the 2005 OY (F = 0.032) to the 2007 and 2008 projections of exploitable biomass (OYs averaged and applied to each year). The median time to rebuild the stock under this alternative would be 2010.5, or 1 year longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 472 mt OY alternative represents the OY capped at the average 2007-2008 ABC specification. This is the highest OY that can be considered for darkblotched rockfish in that the ABC cannot be legally exceeded. The re-estimated P_{MAX} under this alternative is 97%. The median time to rebuild the stock under this alternative would be 2012, or 2.5 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Pacific Ocean Perch

The OY alternatives specified for analysis for the coastwide Pacific ocean perch (POP) stock are 0 mt, 87 mt, 405 mt, 514 mt, and 749 mt (Tables 2-1 and 2-2a). This compares to the status quo OY of 447 mt in 2005 and 2006.

The zero harvest alternative would rebuild the stock by 2014, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 87 mt OY alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 {Hamel 2006b} to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2015, or 1 year longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 405 mt OY alternative represents the OY under a re-estimated 80% rebuilding probability from the new rebuilding analysis {Hamel 2006b}. The estimated SPR harvest rate under this alternative is 69.6%. The median time to rebuild the stock under this alternative would be 2021, or approximately 7 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 514 mt OY alternative represents the OY under a re-estimated 70% rebuilding probability (the status quo P_{MAX}) from the new rebuilding analysis {Hamel 2006b}. The median time to rebuild the stock under this alternative would be 2025, or 11 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 749 mt OY alternative represents the OY under a re-estimated P_{MAX} of 50% from the new rebuilding analysis {Hamel 2006b}. This is the highest OY that can be considered for POP in that it is based on the best available science and is at the 50% rebuilding probability threshold. The median time to rebuild the stock under this alternative would be 2048, or 34 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Widow Rockfish

The OY alternatives specified for analysis for the coastwide widow rockfish stock are 0 mt, 329 mt, 456 mt, 917 mt, and 1,369 mt (Tables 2-1 and 2-2a). This compares to the status quo OYs of 285 mt in 2005 and 289 mt in 2006.

The zero harvest alternative would rebuild the stock by 2013, which is the shortest possible time to rebuild (T_{MIN}) given our current understanding of stock productivity.

The 329 mt OY alternative is based on the effective harvest rate in 2005 projected forward to 2007 and 2008. The GMT determined the effective harvest rate by applying its best estimate of total mortality in 2005 divided by the exploitable biomass in 2005. The GMT then applied the resulting harvest rate to the projected exploitable biomass in 2007 and 2008 {He et al. 2006b} to determine projected OYs, which were then averaged for those years. The median time to rebuild the stock under this alternative would be 2015, or 2 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 456 mt OY alternative applies the current SPR harvest rate of 93.6% to the 2007 and 2008 projections of exploitable biomass. This is the harvest rate used to establish the status quo 2005 and 2006 OYs. The median time to rebuild the stock under this alternative would be 2016, or approximately 3 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 917 mt OY alternative represents the OY under a re-estimated 80% rebuilding probability from the new rebuilding analysis {He et al. 2006b}. The SPR harvest rate under this alternative is estimated to be 88.6%. The median time to rebuild the stock under this alternative would be 2020, or 7 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

The 1,369 mt OY alternative represents the OY under a re-estimated P_{MAX} of 60% from the new rebuilding analysis {He et al. 2006b}. The median time to rebuild the stock under this alternative would be 2027, or 14 years longer than T_{MIN} (Table 2-3 and Figure 2-2).

Yelloweye Rockfish

The OY alternatives specified for analysis for the coastwide yelloweye rockfish stock are 0 mt, 12 mt, 17 mt, 21 mt, 24 mt, and 27 mt (Tables 2-1 and 2-2a). This compares to the status quo OYs of 26 mt in 2005 and 27 mt in 2006.

2.1.1.2 Rebuilding Alternatives

There are six rebuilding alternatives analyzed in this EIS (Table 2-2b). Each alternative was strategically developed to better compare and contrast the tradeoffs associated with alternative rebuilding strategies. These alternatives are analyzed by predicting the effect on the status quo management regime. Multiple suboptions are presented for each alternative to explore potential effects under different allocation scenarios.

The "status quo" rebuilding alternative is comprised of OY alternatives based on the effective harvest rates for each of the depleted stocks in 2005 projected forward to 2007 and 2008. The effective harvest rates were determined by applying the GMT's best estimate of total mortality in 2005 divided by the exploitable biomass of each stock in 2005. These harvest rates were then applied to the projected best exploitable biomasses in 2007 and 2008 to determine projected OYs.

Rebuilding alternative 1 would result in an increase in slope and midwater trawl fishing opportunities with the higher darkblotched, POP, and widow OYs; and a corresponding decrease in shelf fishing opportunities with the lower OYs for bocaccio, canary, cowcod, and yelloweye.

Rebuilding alternative 2 would result in higher southern shelf fishing opportunities with the higher bocaccio and cowcod OYs; lower northern recreational and limited entry and open access fixed gear opportunities with the lower yelloweye OY; and close to status quo for northern bottom and midwater trawl fishing opportunities with the "status quo" OYs for darkblotched, POP, and widow.

Rebuilding alternative 3 would result in higher shelf fish opportunities north and south with the higher bocaccio, cowcod, canary, and yelloweye OYs; and higher slope and midwater trawl fishing opportunities with the higher OYs for darkblotched, POP, and widow.

Rebuilding alternative 4 would dramatically lower northern shelf opportunities and some additional constraints in southern shelf fisheries north of Point Conception with the lower canary and yelloweye OYs; higher shelf fishing opportunities south of Pt. Conception with the higher bocaccio and cowcod OYs; and higher slope and midwater trawl opportunities with the higher darkblotched, POP, and widow OYs.

Rebuilding alternative 5 would dramatically lower shelf fishing opportunities coastwide with the lower bocaccio, cowcod, canary, and yelloweye OYs; and dramatically lower slope and midwater trawl fishing opportunities with the lower darkblotched, POP, and widow OYs.

2.1.2 Precautionary Zone Groundfish Species

Cabezon (in Waters off California)

The Council has identified one OY alternative, 69 mt, to be analyzed for the cabezon stock in waters off California (Table 2-1) for 2007 and 2008. This is the same as the status quo OY alternative. The ABC alternative identified for analysis is 94 mt for both 2007 and 2008; this alternative is based on the sum of average 2007-2008 ABCs for the northern and southern substocks (north and south of Pt. Conception), as determined in the 2005 stock assessment.

Petrale Sole

Three 2007-2008 OY alternatives for petrale sole (coastwide) have been analyzed for Council decision: 1,921 mt, 2,499 mt, and 2,883 mt (Table 2-1). This compares to the status quo OY of 2,762 mt in 2005 and 2006. The OYs are also subdivided by INPFC regions (Columbia and US-Vancouver areas and Eureka, Monterey, and Conception areas) and by latitude (north and south of 40°10' N latitude).

The OY alternatives for the Columbia and US-Vancouver areas were identified by applying the following rationale: OY Alternative 1 is based on the low spawning biomass model from the 2005 stock assessment {Lai et al. 2005}; OY Alternatives 2 and 3 are the same, and are the result of a reduction from the ABC using the 40-10 rule. The ABC alternatives identified for analysis are 2,917 mt for 2007 and 2,919 mt for 2008. Using results from the 2005 stock assessment, each ABC was calculated by summing the north ABC and the south ABC/OY.

Sablefish

The Council identified the following alternatives to be analyzed for the coastwide sablefish stock (Table 2-1): 4,574 mt and 5,934 mt. This compares to the status quo OY of 7,761 mt in 2005 and 7,634 mt in 2006. 2007 and 2008 ABCs identified for analysis are 6,210 mt and 6,058 mt, respectively. OY Alternative 1 is calculated by applying the 40-10 adjustment to the ABC derived from the low stock/production model in the 2005 sablefish assessment {Schirripa and Colbert 2005}; OY Alternative 2 is calculated by applying the 40-10 adjustment using the assessment's base case model.

Each coastwide OY alternative is also divided north and south of 36^{o} N latitude using status quo proportions. Alternative methods for apportioning the OY were not considered because the STAR Panel {Barnes et al. 2005} recommended calculating coastwide biomass without including Conception area survey data.

2.1.3 Healthy Groundfish Species

Arrowtooth Flounder

As arrowtooth flounder is a healthy stock, the Council has identified a single ABC/OY alternative, 5,800 mt, to be analyzed (Table 2-1). This is the same as the status quo ABC/OY for 2005 and 2006; the stock has not been assessed since the previous harvest specifications process, and therefore there is no basis for identifying a value other than that of the status quo.

Black Rockfish (in Waters off Oregon and California)

The Council has specified one OY alternative for analysis for black rockfish (in waters off Oregon and California), 722 mt (Table 2-1), based on a projection from the base model in the 2003 assessment {Ralston 2003}. This compares to the status quo OYs of 753 mt in 2005 and 736 mt in 2006, both of which had been set equal to the ABC for that year. The ABC alternatives identified are 725 mt for 2007 and 719 mt for 2008, each calculated by summing the ABCs for Oregon and California.

Black Rockfish (in Waters off Washington)

As black rockfish (in waters off Washington) is a healthy stock, the Council has identified a single ABC/OY alternative, 540 mt, to be analyzed (Table 2-1). This is the same as the status quo ABC/OY for 2005 and 2006; the stock has not been assessed since the previous harvest specifications process, and therefore there is no basis for selecting a value other than the status quo. This value is based on 88% of the northern ABC for the assessed stock north of Cape Falcon.

California Scorpionfish

California scorpionfish was first assessed in 2005, and therefore 2007 will be the first year in which it is not managed as part of 'Minor Rockfish' and the first time that the Council adopts an ABC and an OY for the stock. The Council has specified two ABC/OY alternatives for analysis: 137 mt and 219 mt (Table 2-1). The first alternative, 137 mt, was derived using the recreational portion from the ABC/OY (based on the 2007-2008 average), multiplying it by 53%, dividing it by 88%, and then adding this modified value to the commercial portion of the ABC/OY (based on the 2007-2008 average). The second alternative provides an ABC/OY of 219 mt based on an average of the 2007 and 2008 ABC/OYs from the stock assessment {Maunder et al. 2005}.

Chilipepper Rockfish

The Council has specified status quo alternatives for chilipepper rockfish for 2007 and 2008 ABCs and OYs, as there is no new stock assessment from which to base new harvest specifications. These alternatives are an ABC of 2,700 mt and an OY of 2,000 mt for 2007-2008 (Table 2-1). The lower OY alternative is a precautionary specification to control the bycatch of bocaccio. The higher OY alternative equals the status quo ABC, since the stock is considered healthy. The rationale for considering this alternative is depth-based management may be an adequate bocaccio bycatch control mechanism.

Chilipepper rockfish within the Eureka INPFC region are managed within the Minor Rockfish North category, and therefore are not included within the ABC and OY alternative values.

Dover Sole

The OY alternatives specified for analysis for Dover sole stock are 16,500 mt and 28,482 mt (Table 2-1). This compares to the status quo OYs of 7,476 mt in 2005 and 7,564 mt in 2007. The first OY alternative is equal to the equilibrium MSY from the 2005 stock assessment {Sampson 2005}; the second alternative is set to the ABC alternative. The Council identified an ABC alternative of 28,522 mt for 2007 and 28,442 mt for 2008. These ABCs were calculated using the $F_{40\%}$ proxy harvest rate and represent the combined total of the south and the north portions of the stock.

English Sole

The OY alternative specified for analysis for English sole stock is 6,237 mt (Table 2-1). This compares to the status quo OY of 3,100 mt for 2005 and 2006. The Council identified an ABC alternative of 6,773 mt for 2007 and 5,701 mt for 2008. The OY alternative was determined by averaging of the 2007 and 2008 ABC alternatives. Projections from the 2005 stock assessment of English sole {Stewart 2005} were used to identify the ABC alternatives.

Lingcod

The OY alternatives specified for analysis for lingcod are 6,280 mt and 6,088 mt (Table 2-1). This compares to the status quo OY of 2,414 mt for 2005 and 2006; these 2005-2006 specifications were adopted by the Council with the lingcod rebuilding plan prior to the stock being declared rebuilt from its overfished status in November 2005. The first alternative was calculated by setting the OY equal to the coastwide ABC, as lingcod is a healthy stock. The second alternative is the sum of LCN and LCS (northern and southern lingcod substocks) OYs; the LCS OY was derived using a 40-10 adjustment. The OYs are also subdivided by INPFC regions (Columbia and US-Vancouver areas and Eureka, Monterey, and Conception areas) and by latitude (North of 42^{o} and South of 42 ^{o}). The Council's specified ABC alternatives for 2007 and 2008 are 6,706 mt and 5,853 mt, respectively.

Longspine Thornyhead

The OY alternatives specified for analysis for longspine thornyhead are 2,696 mt and 3,930 mt (Table 2-1). This compares to the status quo OY of 2,656 mt for 2005 and 2006. The first alternative, 2,696 mt, is based on assuming constant density throughout the Conception area and the proportion of the area north and south of Pt. Conception (21% of the Conception area) with a 25% precautionary reduction. The second alternative, 3,930 mt, is based on assuming constant density throughout the Conception area and the proportion of the area north and south of Pt. Conception (21% of the Conception area). As a healthy stock, the OY can be set equal to the ABC, which is how the second alternative was calculated. The OYs are also subdivided by latitude based on a GMT-recommended alternative where harvest guidelines north and south of 34°27' N latitude are analyzed. However the status quo alternative OYs for 2005 and 2006 were specified north and south of 36° N latitude. The Council's specified ABC alternatives for 2007 and 2008 are 3,953 mt and 3,860 mt, respectively.

Pacific Whiting

Pacific whiting are managed based on an annual assessment prepared jointly by U.S. and Canadian scientists. Pacific whiting harvest specifications are based on annual assessments and are only analyzed in this EIS to understand the potential bycatch implications of future whiting fisheries. The 2007 ABC and OY will be adopted by the Council at its March 2007 meeting. As placeholders, however, the Council specified the following coastwide OY alternatives for analysis: 188,348 mt and 349,790 mt (Table 2-1). This compares to the status quo coastwide OY of 364,842 mt for 2006. The placeholder ABC alternatives specified (for 2007 and 2008) are 188,682 mt and 350,409 mt.

Shortbelly Rockfish

As shortbelly rockfish is a healthy stock, the Council has identified a single ABC alternative, 13,900 mt, and also set the OY alternative to that value (Table 2-1). This is the same as the status quo ABC/OY for 2005 and 2006. Shortbelly rockfish is not an exploited stock due to its small size.

Shortspine Thornyhead

The shortspine thornyhead OY alternatives specified for analysis are 1,661 mt and 2,476 mt (Table 2-1). This compares to the status quo OY of 1,055 mt for 2005 and 1,077 mt for 2006. The coastwide OYs are the sum of OYs determined for north and south of Pt. Conception (34°27' N latitude). The Council's specified ABC alternatives for 2007 and 2008 are 2,488 mt and 2,463 mt, respectively.

For alternative 1, the OY for the area south of Pt. Conception is based on the base case assessment scenario in the 2005 stock assessment {Hamel 2005}, which indicated that 34% of the coastwide biomass is in this area, and with a 50% reduction to account for the paucity of survey data south of Pt. Conception. The 50% reduction is due to the SSC conclusion the assessment is marginally sufficient to estimate resource status compounded by the short duration and density of survey data south of Pt. Conception. The base case model assumed h = 0.6 and q = 1.0. The OY alternative 1 for the area north of Pt. Conception based on the base case assessment result indicating 66% of the coastwide biomass is in this area with a 25% precautionary reduction. The 25% precautionary reduction is due to the SSC conclusion the assessment is marginally sufficient to estimate resource status. The base case model assumed h = 0.6 and q = 1.0.

Alternative 2 OYs (for north and south of 34°27' N latitude) are based on the same biomass estimates from the 2005 stock assessment base case model, but with no precautionary reduction. Therefore, the OY alternative for the area south of Pt. Conception (841 mt) is based on an estimate of 34% coastwide biomass is in this area and the OY alternative for the north portion (1,634 mt) is based on an estimate of the remaining 66% of the coastwide biomass.

Splitnose Rockfish

As a stock assessment has not been undertaken for splitnose rockfish since the Council adopted the 2005-2006 harvest specifications, there is no basis for identifying alternatives other than the status quo. Therefore, the Council has identified the status quo OY alternative, 461 mt, and the status quo ABC alternative, 615 mt, to be analyzed for 2007 and 2008.

Starry Flounder

Starry flounder was assessed for the first time in 2005 and is now proposed to be managed with a separate ABC and OY. Previously the stock has been managed as a component stock of the Other Flatfish complex. Therefore, there are no status quo ABC or OY alternatives for the stock. The Council requested the following two OY alternatives for analysis: 890 mt and 1,186 mt (Table 2-1). Alternative 1 (890 mt) is based on a 25% reduction of the combined area OYs from the base model in the stock assessment {Ralston 2005} as a result of the 25% precautionary reduction for data poor stocks. Alternative OY 2 (1,186 mt) is based on the combined area OYs from the based model in the stock assessment. The ABC alternatives identified by the Council are 1,221 mt for 2007 and 1,395 mt for 2008.

Yellowtail Rockfish

The Council has identified the following ABC alternatives for yellowtail rockfish north of 40°10' N latitude based on the 2005 stock assessment {Lai 2006}: 4,585 mt for 2007 and 4,510 mt for 2008 (Table 2-1). As yellowtail rockfish is a healthy stock, the single OY alternative identified for analysis, 4,548 mt, is equal to the average of the 2007 and 2008 ABC alternatives.

2.1.4 Unassessed Groundfish Species and Those Managed as Part of a Stock Complex

2.1.4.1 Minor Rockfish South

The Council has identified four minor rockfish south OY alternatives for analysis: 1,753 mt, 1,855 mt, 1,898 mt, and 2,006 mt (Table 2-1). The OY alternatives calculated for nearshore species, shelf species, and slope species sum to equal the overall minor rockfish south value. The overall OY alternatives for 2007-2008 compare to the status quo OY of 1,968 mt.

The ABC alternative identified by the Council for analysis is 3,403 mt; this compares to a status quo ABC alternative of 3,412 mt for 2005 and 2006. The ABC alternative for 2007 and 2008 reflects three adjustments to account for the reassessment of blackgill rockfish and the new assessments for gopher rockfish and California scorpionfish. First, the status quo contribution of blackgill rockfish to the ABC (343 mt) was removed from the complex ABC and replaced with the new blackgill ABC/OY of 292 mt (based on the 2007-2008 average ABC/OY); this results in an overall reduction of 51 mt. Second, the status quo contribution of gopher rockfish (97 mt) was removed and replaced with the new gopher ABC/OY of 302 mt (based on the 2007-2008 average ABC/OY), resulting in an overall increase of 205 mt. Third, the status quo contribution of California scorpionfish (163 mt) was removed from the ABC as this species will now be managed under its own ABC/OY.

Minor Nearshore Rockfish Species

The complex, Minor Nearshore Rockfish south of 40°10' N latitude, is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*S. chrysomelas*); China rockfish (*S. nebulosus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*), and kelp rockfish (*S. atrovirens*)]; 2) deeper nearshore rockfish: [comprised of black rockfish (*S. melanops*), blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S.*

dalli); copper rockfish (*S. caurinus*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*)] and 3) California scorpionfish (*Scorpaena guttata*).

The Council adopted a southern minor nearshore rockfish species OY for 2003 of 541 mt. This OY was based upon the Groundfish FMP policy for specifying OYs for unassessed species using 50% of recent landings, and was recalculated from the 2001-2002 OY of 662 mt using updates estimates of recreational and commercial harvest. For the 2004 southern minor nearshore rockfish species OY, an adjustment was made to account for removal of black rockfish; however this adjustment started with the 2002 OY of 662 mt and not the 2003 OY of 541 mt. The resulting OY of 615 mt was adopted by the Council for 2004 for the 2005-2006 management cycles. For the 2007-2007 management cycle, the Minor Nearshore Rockfish South is corrected by subtracting the black rockfish OY of 47 mt from the 541 mt OY, resulting in a value of 494 mt.

This initial value for the southern minor nearshore rockfish species OY is then adjusted to account for the new California scorpionfish and gopher rockfish assessments. The current contribution for California scorpionfish of 81.5 mt is removed from the combined OY. Because gopher rockfish cannot be managed separately from other nearshore rockfish species without significantly increasing bycatch and because of uncertainty regarding the assessment because of its poor data quality, gopher rockfish will remain in the southern minor nearshore rockfish species OY and will have a point of concern set at a level determined appropriate to the adopted OY. The following four alternatives different methods for accounting for these changes.

The 413 mt OY alternative includes the 48.5 mt contribution of gopher rockfish (494 mt minus the California scorpionfish contribution of 81.5 mt equals 413 mt). OY alternative 2 is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY and then increasing the OY by 50% of the new gopher ABC/OY of 302 mt (based on the 2007-2008 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt); this calculation leads to a value of 515 mt. The 558 mt OY alternative is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY and then increasing the OY by 75% of the new gopher ABC/OY of 302 mt (based on the 2007-2008 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt). OY alternative 4 is determined by removing the current contribution for gopher rockfish (48.5 mt) from the OY and then increasing the OY by the new gopher ABC/OY of 302 mt (based on the 2007-2008 average ABC/OY; 2007 = 340 mt, 2008 = 264 mt); this calculation leads to an OY value of 666 mt. These four OY alternatives compare to the status quo OY alternative of 615 mt for 2004-2005, for which the calculation is discussed earlier.

Minor Shelf Rockfish Species

The minor shelf rockfish complex south of 40°10' N latitude is composed of the following species: bronzespotted rockfish (*S. gilli*); chameleon rockfish (*S. phillipsi*); dusky rockfish (*S. ciliatus*); dwarf-red rockfish (*S. rufianus*); flag rockfish (*S. rubrivinctus*); freckled rockfish (*S. lentiginosus*); greenblotched rockfish (*S. rosenblatti*); greenspotted rockfish (*S. chlorostictus*); greenstriped rockfish (*S. elongatus*); halfbanded rockfish (*S. semicinctus*); harlequin rockfish (*S. variegatus*); honeycomb rockfish (*S. umbrosus*); Mexican rockfish (*S. macdonaldi*); pink rockfish (*S. eos*); pinkrose rockfish (*S. simulator*); pygmy rockfish (*S. wilsoni*); redstripe rockfish (*S. proriger*); rosethorn rockfish (*S. helvomaculatus*); rosy rockfish (*S. rosaceus*); silvergray rockfish (*S. brevispinis*); speckled rockfish (*S. ovalis*); squarespot rockfish (*S. hopkinsi*); starry rockfish (*S. constellatus*); stripetail rockfish (*S. saxicola*); swordspine rockfish (*S. ensifer*); tiger rockfish (*S. nigrocinctus*); vermilion rockfish (*S. miniatus*); and yellowtail rockfish (*S. flavidus*).

The Council has identified the status quo ABC and OY as the only alternative to be analyzed for 2007-2008 management cycle. The OY is set to the ABC; therefore, the ABC alternative and OY alternative for analysis are both 714 mt.

Minor Slope Rockfish Species

The minor slope rockfish complex south of 40°10' N latitude is composed of the following species: aurora rockfish (*S. aurora*); bank rockfish (*S. rufus*); blackgill rockfish (*S. melanostomus*); Pacific ocean perch (*S. alutus*); redbanded rockfish (*S. babcocki*); rougheye rockfish (*S. aleutianus*); sharpchin rockfish (*S. zacentrus*); shortraker rockfish (*S. borealis*); and yellowmouth rockfish (*S. reedi*).

The Council identified one ABC/OY alternative for this complex: 626 mt. This value was determined by the following calculation: the status quo contribution of blackgill (305 mt) was removed from the complex and replaced with the new blackgill ABC/OY of 292 mt (based on the 2007-2008 average ABC/OY; 2007 = 294 mt, 2008 = 290 mt). This alternative compares to the status quo alternative ABC/OY of 639 mt.

2.1.4.2 Minor Rockfish North

The Council has identified three minor rockfish north OY alternatives for analysis: 2,250 mt, 2,270 mt, and 2,290 mt (Table 2-1). The OY alternatives calculated for nearshore species, shelf species, and slope species sum to equal the overall minor rockfish north values. The overall OY alternatives for 2007-2008 compare to the status quo OY of 2,250 mt. The Council identified the status quo ABC alternative, 3,680 mt, to be evaluated for the 2007-2008 management cycle.

Minor Nearshore Rockfish Species

The minor nearshore rockfish complex north of 40°10' N latitude is composed of the following species: black and yellow rockfish (*S. chrysomelas*); blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S. dalli*); China rockfish (*S. nebulosus*); copper rockfish (*S. caurinus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*); kelp rockfish (*S. atrovirens*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*).

When black rockfish was originally removed from the northern minor nearshore rockfish OY, a ratio of black to blue rockfish catch was used to determine what proportion of that OY was attributable to black rockfish. However, due to the variability of blue rockfish catches, there is some concern that this ratio (92%:8% black to blue rockfish) under-represents blue rockfish catch and therefore the resulting OY (since black rockfish is managed separately). To account for this uncertainty (that is, a range of possible levels of black rockfish removal from the OY), three alternatives have been identified by the Council. OY alternative 1 is equal to the status quo OY alternative of 122 mt. OY alternative 2 (142 mt) is equal to the status quo OY alternative plus 20 mt. OY alternative 3 (162 mt) is equal to the status quo OY alternative plus 40 mt.

Minor Shelf Rockfish Species

The minor shelf rockfish complex north of 40°10' N latitude is composed of the following species: bronzespotted rockfish (*S. gilli*); bocaccio (*Sebastes paucispinis*); chameleon rockfish (*S. phillipsi*); chilipepper rockfish (*S. goodei*); cowcod (*S. levis*); dusky rockfish (*S. ciliatus*); dwarf-red rockfish (*S. rufianus*); flag rockfish (*S. rubrivinctus*); freckled rockfish (*S. lentiginosus*); greenblotched rockfish (*S. rosenblatti*); greenspotted rockfish (*S. chlorostictus*); greenstriped rockfish (*S. elongatus*); halfbanded rockfish (*S. semicinctus*); harlequin rockfish (*S. variegatus*); honeycomb rockfish (*S. umbrosus*); Mexican rockfish (*S. macdonaldi*); pink rockfish (*S. eos*); pinkrose rockfish (*S. simulator*); pygmy rockfish (*S. wilsoni*); redstripe rockfish (*S. proriger*); rosethorn rockfish (*S. helvomaculatus*); rosy rockfish (*S. rosaceus*); silvergray rockfish (*S. brevispinis*); speckled rockfish (*S. ovalis*); squarespot rockfish (*S. hopkinsi*); starry rockfish (*S. constellatus*); stripetail rockfish (*S. saxicola*); swordspine rockfish (*S. ensifer*); tiger rockfish (*S. nigrocinctus*); and vermilion rockfish (*S. miniatus*).

No change from status quo was identified by the Council for analysis; therefore the status quo ABC/OY alternative for northern minor shelf rockfish species, 968 mt, is analyzed for the 2007-2008 management cycle (Table 2-1).

Minor Slope Rockfish Species

The minor slope rockfish complex north of 40°10' N latitude is composed of the following species: aurora rockfish (*S. aurora*); bank rockfish (*S. rufus*); blackgill rockfish (*S. melanostomus*); redbanded rockfish (*S. babcocki*); rougheye rockfish (*S. aleutianus*); sharpchin rockfish (*S. zacentrus*); shortraker rockfish (*S. borealis*); splitnose rockfish (*S. diploproa*); and yellowmouth rockfish (*S. reedi*).

No change from status quo is identified by the Council for analysis; therefore the status quo ABC/OY alternative for northern minor slope rockfish species, 1,160 mt, is analyzed for the 2007-2008 management cycle (Table 2-1).

2.1.4.3 Other Unassessed Species

Pacific Cod

No change from status quo is identified by the Council for analysis. The OY alternative is 1,600 mt and the ABC alternative is 3,200 mt (Table 2-1).

Other Fish

The Other Fish stock complex contains all the unassessed Groundfish FMP species that are neither rockfish (family *Scorpaenidae*) nor flatfish. These species include big skate (*Raja binoculata*), California skate (*Raja inornata*), leopard shark (*Triakis semifasciata*), longnose skate (*Raja rhina*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus acanthias*), finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*), ratfish (*Hydrolagus colliei*), cabezon (*Scorpaenichthys marmoratus*) (north of the California-Oregon border at 42° N latitude), and kelp greenling (*Hexagrammos decagrammus*).

No change from status quo is identified by the Council for analysis. The OY alternative is 7,300 mt and the ABC alternative is 14,600 mt (Table 2-1).

Other Flatfish

The Other Flatfish complex contains all the unassessed flatfish species in the Groundfish FMP. These species include butter sole (*Isopsetta isolepis*), curlfin sole (*Pleuronichthys decurrens*), flathead sole (*Hippoglossoides elassodon*), Pacific sanddab (*Citharichthys sordidus*), rex sole (*Glyptocephalus zachirus*), rock sole (*Lepidopsetta bilineata*), and sand sole (*Psettichthys melanostictus*).

The Council has identified an OY alternative of 4,884 mt to be analyzed. This OY is based on the ABC with a 25% precautionary reduction for sanddabs and rex sole and a 50% precautionary reduction for the remaining species. The starry flounder contribution is removed (25 mt). The status quo OY alternative is 4,909 mt for 2005 and 2006.

The Council has identified an ABC alternative of 6,731 mt to be analyzed for 2007 and 2008. This ABC alternative is based on the following historical catch levels: the highest landings of Pacific sanddabs (in 1995) and rex sole (in 1982) for the 1981-2003 period and on average landings during 1994-1998 for the remaining Other Flatfish species. The starry flounder contribution is removed (50 mt). The status quo ABC alternative is 6,781 mt for 2005 and 2006.

Economic Revenue and Distributional Impacts Associated with Overfished Species Management in West Coast Commercial Groundfish Fisheries

1. Introduction

The management of West Coast groundfish fisheries is heavily centered on the need to rebuild seven overfished groundfish species. A species is considered overfished when its biomass is below 25% of estimated unfished biomass level. West Coast groundfish stocks are highly inter-mixed, meaning that overfished species co-occur and are caught in common with more abundant groundfish stocks. This inter-mixed nature of groundfish stocks means that eliminating the directed targeting of overfished species usually does not achieve the catch reductions needed to meet rebuilding goals. To adequately constrain total catch of overfished species, management must also constrain targeted fishing on healthy stocks that co-occur with overfished species in order to reduce incidental overfished species catch. This need to constrain harvest of healthy stocks has economic implications to sectors and communities engaged in fish harvesting and processing, because of the loss in landings and revenue that could have been derived from both overfished species and many target species that co-occur with those overfished species.

According to the Magnuson-Stevens Fishery Conservation and Management Act, when a fishery is overfished, any fishery management plan, amendment, or proposed regulations shall:

A) *specify a time period for ending overfishing and rebuilding the fishery that shall—*

- *i)* *be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish within the marine ecosystem; and*
- *ii)* *not exceed 10 years, except in cases where the biology of the stock of fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise;*

B) *allocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery*

The MSA defines a fishing community as a “community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.” Social scientists and economists have struggled to come to a resolution with this definition of fishing community. Several perspectives have been proposed to identify fishing communities and include, for example: a collective fishing sector such as the “West Coast bottom trawl community”, a geographic port of landing such as “the community of Astoria, Oregon,” or a neighborhood within a large city such as the “Ballard fishing community” of Seattle, Washington where multiple fishing families have lived for generations. In the end, it may be worthwhile to consider any of the above possibilities when “taking into account…the needs of fishing communities.”

The analysis in this document is provided with the intention that it can be used to consider both the needs of fishing communities, and the fair and equitable distribution of overfishing and recovery benefits (FMP Objective #13). Analyses in this document include: an analysis of changes in commercial fishery sector specific revenues associated with reductions in the mortality of overfished species, an identification of sectors most likely to be affected by management designed to reduce mortality of overfished species – the assumption being that those sectors with the highest impact of overfished species are more likely to be constrained by management designed to achieve reductions in overfished species mortality, and an identification of ports affected by management designed to achieve reductions in overfished species mortality.

2. Approach

The Pacific Fishery Management Council's Groundfish Management Team (GMT) has developed several models for estimating the catch of overfished species in commercial groundfish fisheries. These models have used data from the West Coast Groundfish Observer Program, state fish ticket programs, and state logbook programs to estimate the correlation in catch of target species and overfished species that occur on depth and latitudinal bases. The NMFS Northwest Regional Office augmented these models with economic data to directly compare exvessel revenue and overfished species mortality. NMFS ran several simulations with these models to develop an exvessel revenue – overfished species mortality relationship. The assumption in this approach was to keep exvessel revenue at the highest possible level given a set of area closures and the relative price per pound of target species. In the case of a fishery with multiple targets, such as the nearshore fixed gear groundfish fishery, or the bottom trawl groundfish fishery, reductions in the allowable take of target species were prioritized toward target species with the lowest price per pound. Taking this approach assures that vessels are more able to continue prosecuting high value target species, while achieving reductions in the take of overfished species with reductions in the targeting of less valuable species. In the case of a fishery with a single target such as the Pacific whiting or fixed gear sablefish fisheries, a reduction in the mortality of overfished species is directly proportional to the catch of target species, and (if one assumes a constant price per pound), directly proportional to reductions in exvessel revenue.

To identify likely distributional affects of reductions in overfished species mortality, we (NMFS Northwest Region working with members of the GMT) constructed a relational database. This database used available data on the interaction of fishery sectors with overfished species, and historical management actions that have been taken to achieve management targets of overfished species. We also used information from the 2005 groundfish stock assessments to identify the distributional range of various overfished species, and then analyzed it in conjunction with the size of fishing sectors on a regional basis. The resulting combined effect of relative stock size and relative fleet size helps identify the risk that a regional component of a fishing sector poses to a stock of an overfished species. In this case, "risk" is the potential catch that a particular regional sector has the potential to attain relative to the OY and relative to the capability of other sectors operating in the same area. Using this information on the relationship of groundfish stock and fleet sizes, we constructed a data set that identifies sectors that have high, med-high, med-low, and low or no impact on each overfished species, within a coastwide series of latitude-bounded management areas. Fishing sectors that were analyzed include:

1. limited entry bottom trawl – deep;
2. limited entry bottom trawl –shelf;
3. limited entry midwater trawl – Pacific whiting;
4. limited entry fixed gear – sablefish;

5. limited entry fixed gear – nearshore;
6. limited entry fixed gear – dogfish;
7. open access fixed gear – sablefish;
8. open access fixed gear – nearshore; and
9. open access fixed gear – dogfish.

Although other commercial sectors arguably exist, one can reasonably assume that these other sectors are minor compared to those listed, or can be considered a component of one of those sectors listed. Our data set further divided sectors by coastal management area where different overfished species commonly occur: north of 40˚ 10’ N. lat., between 40˚ 10’ N. lat. and 38˚ N. lat., between 38˚ N. lat. and 36˚ N. lat., and south of 36˚ N. lat... The area north of 40˚ 10’ N. lat. is a traditional area used for management of commercial fisheries and tends to have the highest degree of impact for several overfished species, including darkblotched rockfish, yelloweye rockfish, and Pacific ocean perch. In the area between 38˚ N. lat. and 40˚ 10’ N. lat., darkblotched rockfish populations are more moderate, Pacific ocean perch is nearly non-existent, and the area, and the northern portion the assessed portion of bocaccio rockfish begins. The area south of 38˚ N. lat. and north of 36˚ N. lat. contains few, if any, of the more northern overfished species such as darkblotched rockfish, but canary rockfish still tend to be caught in the area, as well as more southern oriented stocks such as bocaccio rockfish. Few canary rockfish occur south of 36˚ N. lat., but this area contains both bocaccio rockfish and cowcod.

Information from the Pacific Coast Fisheries Information Network (PacFIN) was used to identify vessels that participate in each of the sectors, and a principal port for those vessels was also identified. Vessels were assumed to participate in a sector based on a filter of specific gear type, and if 50 percent of landings for that vessel occurred at any time over the past 4 years, though in the case of the LE trawl sector only 2004 and 2005 were used because that sector has changed substantially since the 2003 buyback program. The methods used to identify sectors in this case are the same methods used to identify historic catch by sector for the November 2005 Groundfish Allocation Committee meeting. The end result is a list of sectors and ports that are likely to be affected at some level based on the assumption that relatively high impact fisheries are likely to be most constrained to achieve reductions in overfished species mortality.

3. Exvessel Revenue – Overfished Species Catch Tradeoffs in Commercial Fisheries

This section presents the result of analysis displaying the tradeoff between the catch of overfished species and exvessel revenue of individual fishery sectors. In this case, catch of overfished species is defined as landings plus discard. In general, this analysis shows that reductions in the catch of overfished species become increasingly more costly in a sector with multiple targets, whereas reductions in the catch of overfished species in a single target sector is proportional to changes in exvessel revenue.

The analyses presented in this section are two-dimensional. That is, these analyses examine the relationship between exvessel revenue and overfished species catch by analyzing the relationship between catch of target species and catch of overfished species. These relationships will change as area management changes; however, for this analysis, area management is assumed to be constant.

3.1. Revenue – Overfished Species Catch Tradeoffs in the Pacific Whiting Fishery

The Pacific whiting fishery is a single target sector. Often the catches of overfished species in this sector are characterized by a random disaster tow where large amounts of overfished species are caught in a single tow of a trawl net. However, in more recent years the total annual catch of overfished species in this sector has become roughly proportional to the size of the Pacific whiting catch, though large random catches of overfished species still occasionally occur. Although random disaster tows still occur, for general diagnostic purposes, it is reasonable to analyze changes in the catch of overfished species mortality as being proportional to exvessel revenue to the Pacific whiting sector, while realizing that variability in the proportions (and therefore predicted relationships) will and do occur.

Figure 1 shows the relationship between exvessel revenue and overfished species caught in the Pacific whiting fishery. From this figure it is evident that widow rockfish is the predominant overfished species caught in this sector, and that a reduction in the catch of widow that is on the order of 25 metric tons without area-based management would correspond to a reduction in Pacific whiting revenues of $5.8 million. Because the catch of overfished species is predicted to be proportional to the catch of Pacific whiting, reductions in the metric tonnage catch of widow rockfish appear to be less costly per ton than reductions in the metric tonnage catch of other overfished species.

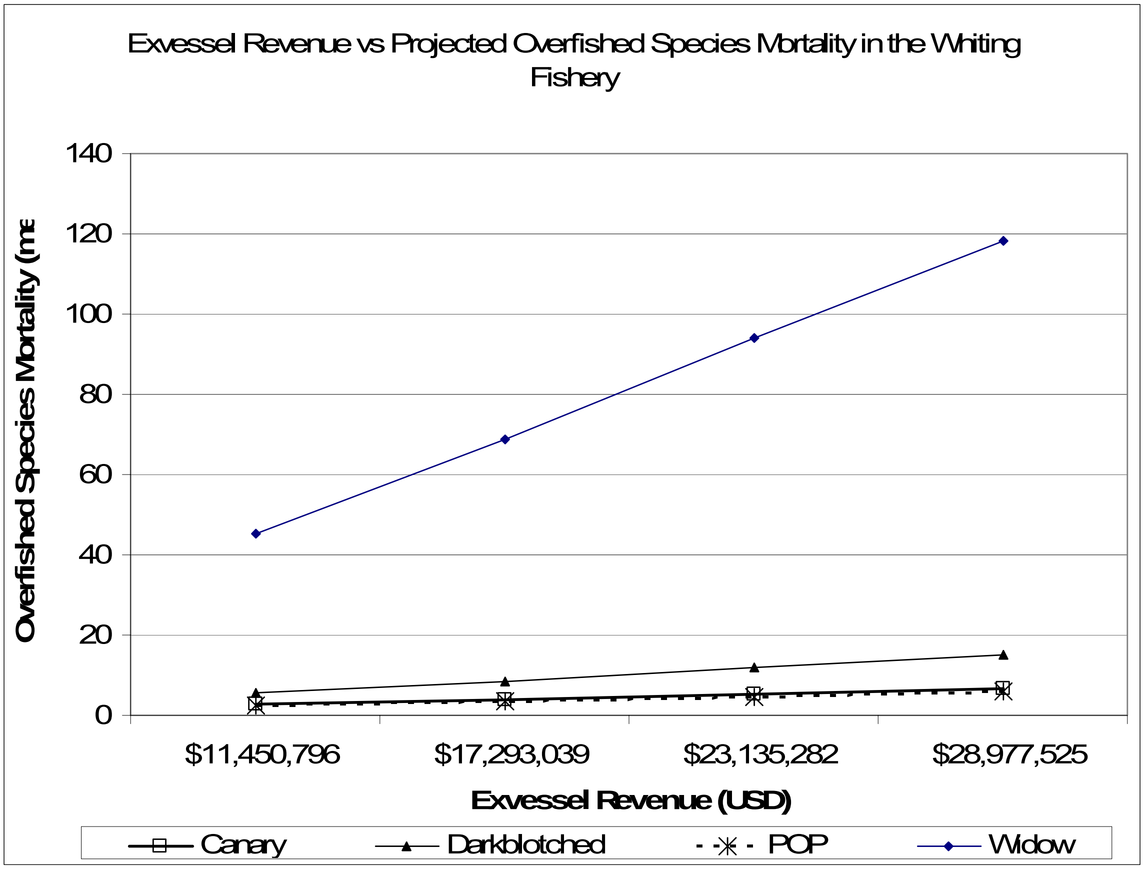


Figure 1. Exvessel Revenue vs Projected Overfished Species Catch in the Whiting Fishery

Figure 2 provides a better perspective on the relationship between overfished species other than widow rockfish and exvessel whiting fishery revenue. This figure shows the relationship between darkblotched rockfish, POP, and canary rockfish and exvessel revenue in the whiting fishery. From this figure, it is evident that darkblotched rockfish is predicted to be the second highest component of overfished species catch, followed by canary and POP respectively, and that a reduction in the catch of darkblotched rockfish that is on the order of 3 metric tons would correspond to a reduction in Pacific whiting revenues of $5.8 million.

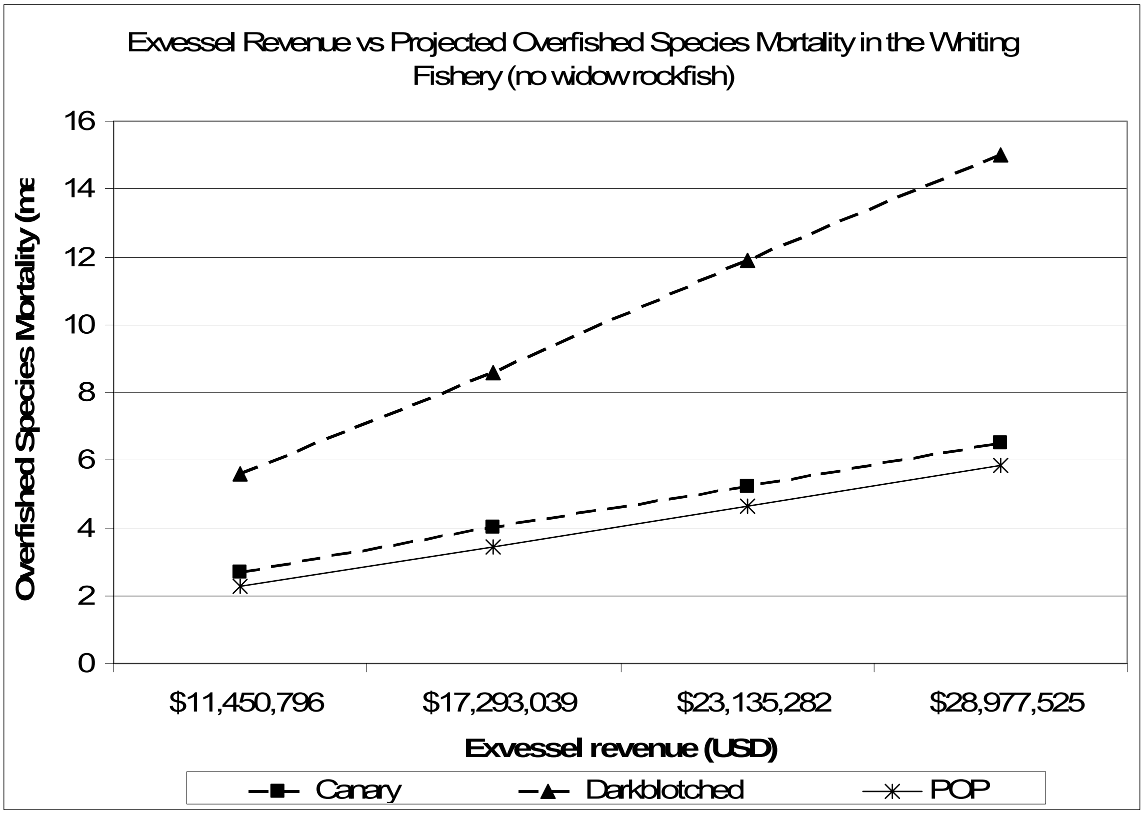


Figure 2 Exvessel Revenue vs Projected Overfished Species Catch in the Whiting Fishery (no widow rockfish)

3.2. <u>Revenue – Overfished Species Catch Tradeoffs in the Fixed Gear Sablefish Fishery</u>

Like the Pacific whiting fishery, the fixed gear sablefish fishery is a single target fishery. This sector is comprised of both open access and limited entry components, but both components are subject to the same area-based management, and therefore, the catch rate of overfished species in each component is assumed to be the same. While trawl fisheries are prone to "disaster tow" events where large quantities of overfished species can be caught in a single tow, fixed gear fisheries are typically not characterized by disaster-type catch events of the same degree. This means that it is likely the variability in the assumed proportion of overfished species to sablefish catch is small from year to year relative to trawl fisheries.

Figure 3 shows the predicted relationship between overfished species mortality and exvessel revenue. Based on these predictions, yelloweye rockfish is the largest component of overfished species mortality in this sector, and a reduction of approximately 0.2 metric tons of yelloweye rockfish in this sector would correspond to a reduction of approximately $1.8 million in exvessel revenues (holding area closures constant), while a reduction of 0.1 metric tons of darkblotched would correspond to a reduction of $1.8 million in exvessel revenue.

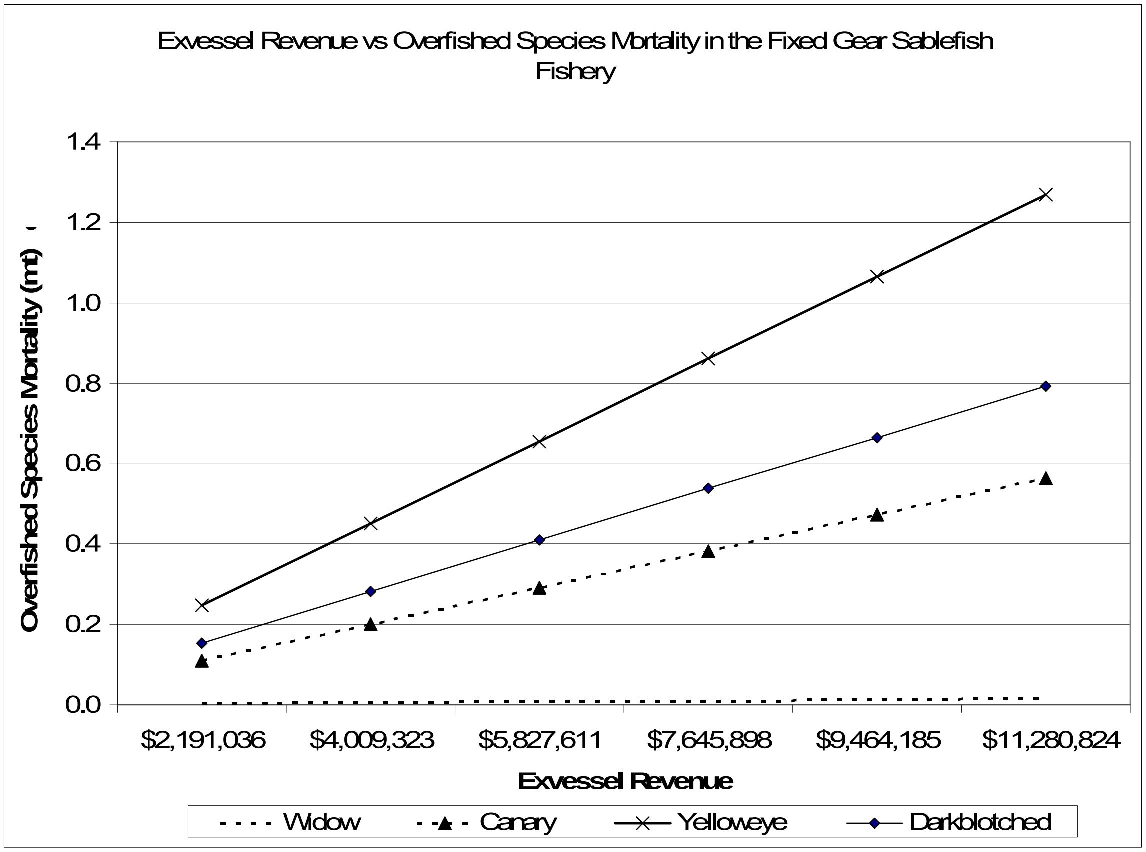


Figure 3 Exvessel Revenue vs Overfished Species Mortality in the Fixed Gear Sablefish Fishery

3.3. <u>Revenue – Overfished Species Catch Tradeoffs in the Nearshore Open Access Groundfish Fishery</u>

The nearshore open access fishery is a fishery that targets multiple species. Target species include shallow and deeper nearshore groundfish, cabezon, kelp greenling, black rockfish, and blue rockfish amongst others. Available data shows this fishery operates shallower than 50 fathoms, and primarily shallower than 20 fathoms. The targets in this fishery are often bound for different markets, and therefore have different prices per pound. In areas south of 40˚ 10' N. lat., the most valuable species are shallow nearshore rockfish, followed by cabezon, kelp greenling, and deeper nearshore rockfish, respectively. In areas north of 40˚ 10' N. lat., the most valuable species are "other minor nearshore rockfish" followed by kelp greenling, cabezon, black rockfish, and blue rockfish respectively. By prioritizing reductions in target species catch toward those species that are least valuable on a price per pound basis, reductions in the catch of overfished species can be achieved more cheaply than by reducing the catch of all target species on a proportional basis to achieve reductions in overfished species catch. To analyze reductions in overfished species catch, we prioritized those reductions toward the least valuable species, because vessels can alter their behavior to focus on or avoid different target species. This sector was analyzed as two components--north and south of 40˚ 10' N. lat. We analyzed these two areas separately because management objectives have historically differed in the two areas.

Figure 4 shows the relationship between exvessel value and the mortality of canary rockfish in areas south of 40˚ 10' N. lat. Based on West Coast groundfish observer data, canary rockfish is the only overfished species that is caught in this sector and region. The figure shows that a reduction in the catch of canary rockfish from 0.33 metric tons to 0.07 metric tons would cost approximately $400,000 (holding area closures constant), while a reduction in the catch of canary rockfish from 0.07 metric tons to 0.01 metric tons would cost over $1 million. However, over a range of values (approximately $1.3 million to $800,000) there is little or no reduction in the catch of canary rockfish. This is because over this revenue range, the approach taken to reduce the catch of overfished species is mostly being attributed to reductions in the catch of cabezon. Based on the depth range where cabezon is primarily caught, there is very little incidental catch of canary rockfish, and discard survival is high relative to deeper depths. Therefore, reducing the allowable cabezon catch in the area south of 40˚ 10’ N. lat. may not be necessary to achieve reductions in overfished species mortality.

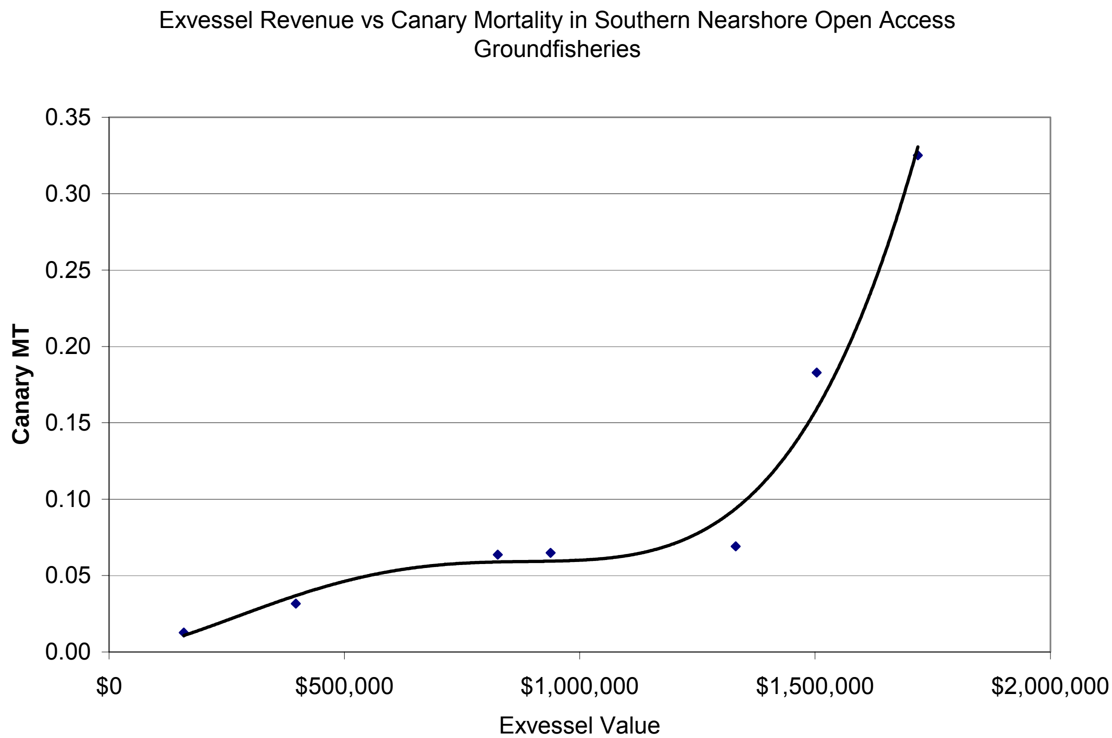


Figure 4 Exvessel Revenue vs Canary Mortality in Southern Nearshore Open Access Fisheries

Figure 5 shows the relationship between the catch of overfished species and exvessel revenue in areas north of 40˚ 10’ N. lat. This figure shows that yelloweye rockfish is the most frequently caught overfished species, followed by canary rockfish, and–although not shown on the figure–there are also small amounts of widow rockfish caught in the fishery. Information shown in this figure suggests that a reduction of yelloweye catch from 1.9 metric tons to 1 metric ton while holding area closures constant would decrease exvessel revenue by $400,000, while a reduction from 1 metric ton to 0.25 metric tons would decrease exvessel revenue by $500,000. A reduction in the catch of canary from 1.5 metric tons to 0.75 metric tons would decrease revenues by $400,000, and a reduction in the catch of canary from 0.75 metric tons to 0.25 metric tons would decrease exvessel revenues by approximately $500,000.

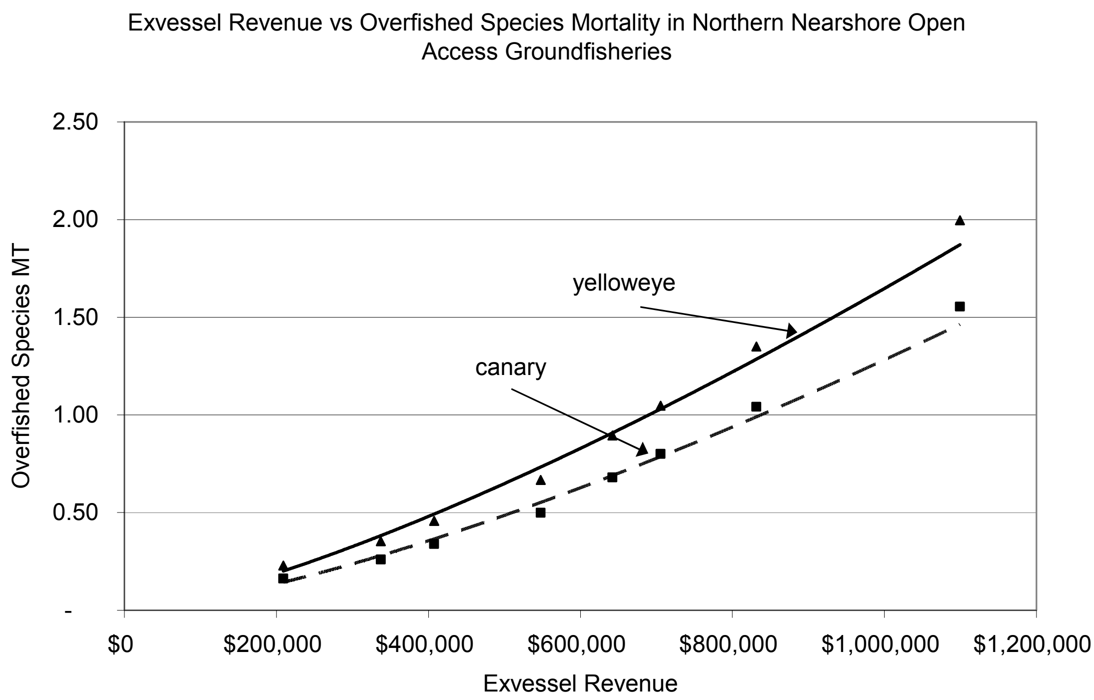


Figure 5 Exvessel Revenue vs Overfished Species Mortality in Northern Nearshore Open Access Fisheries

3.4. Revenue – Overfished Species Catch Tradeoffs in the Limited Entry Bottom Trawl Fishery

The limited entry bottom trawl fishery is a fishery that targets multiple species that include Dover sole, thornyheads, sablefish, petrale sole, arrowtooth flounder, Pacific sanddabs, and English sole, amongst others. This fishery operates on both the continental shelf and continental slope, and therefore has a relatively large impact on several overfished species including bocaccio rockfish, canary rockfish, darkblotched rockfish, cowcod, and Pacific ocean perch. The targets in this fishery all have a different price per pound. Typically sablefish and petrale sole have been the most valuable species on a price per pound basis, while arrowtooth has the lowest price per pound. Dover sole, Pacific sanddabs, English sole, and other types of flatfish tend to have a more moderate price per pound with Dover sole traditionally being one of the more valuable flatfish species.

The curves shown in this section are developed by taking the approach of reducing the catch of less valuable species (arrowtooth) first, and reducing the catch of the most valuable species (sablefish and petrale sole) last while attempting to maintain the same level of annual catch opportunity for target species both north and south. This approach assumes that vessels can alter their behavior to focus on or avoid different target species. For example, a reduction in the trip limit for the “other flatfish” complex in the northern areas is accompanied by an equivalent reduction in the southern areas. The effect of this approach is that it becomes increasingly more costly to reduce the catch of overfished species in this sector.

Figure 6 shows the relationship between the catch of canary rockfish and exvessel revenues in the LE bottom trawl fishery. Based on the curve that has been fitted to the various data points, reducing the catch of canary rockfish in this sector from 10 metric tons (a level comparable to 2005 estimated catch in this sector) to 8 metric tons would reduce exvessel revenues by approximately $2 million, while a reduction from 4 metric tons to 2 metric tons would reduce revenues approximately $7 million meaning that initial reductions in the catch of canary rockfish are relatively inexpensive per metric ton compared the cost per metric ton of more dramatic reductions.

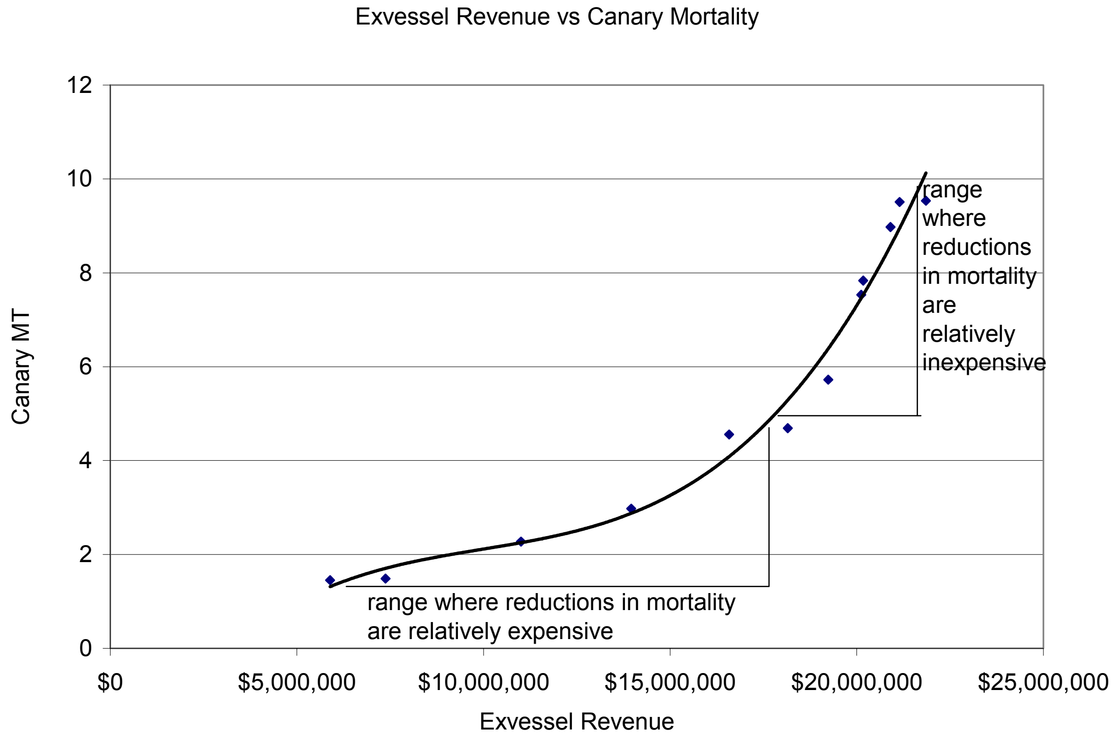


Figure 6 Exvessel Revenue vs Canary Mortality in the LE Bottom Trawl Sector

Figure 7 shows the relationship between Pacific ocean perch and exvessel revenues. According to Figure 7, reducing the catch of Pacific ocean perch in the bottom trawl sector from 100 metric tons to 80 metric tons would decrease revenues by approximately $3 million, while a reduction from 45 metric tons to 25 metric tons would decrease revenues by approximately $7 million. This shows that initial reductions in the catch of Pacific ocean perch in the bottom trawl fishery are relatively inexpensive per metric ton compared to the cost per metric ton of more dramatic reductions.

Also shown in the relationship between exvessel revenue and the catch of Pacific ocean perch is that the initial reductions in the catch of low valued species have little effect on the catch of Pacific ocean perch (the range of POP mortality corresponding to $20-$22 million). Since initial reductions in the allowable catch were targeted toward those species with a low price per pound (arrowtooth flounder), this means that the management of low valued species, such as arrowtooth flounder, have a relatively small impact on the catch of Pacific ocean perch compared to more moderately priced species such as Dover sole. Therefore, reductions in the mortality of Pacific ocean perch are likely to come from reductions in the targeting of more valuable species.

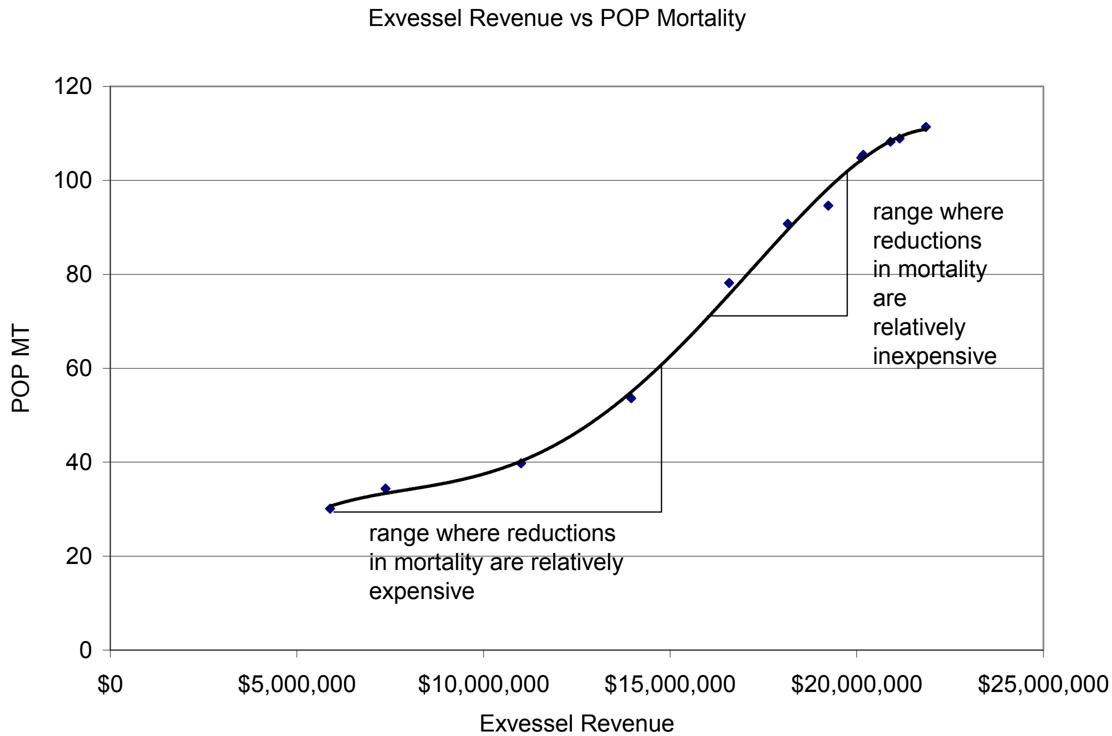


Figure 7 Exvessel Revenue vs Pacific Ocean Perch Mortality in the LE Bottom Trawl Sector

In Figure 8 the relationship between exvessel revenue and the mortality of darkblotched rockfish shows that reducing the catch of darkblotched rockfish from 140 metric tons to 120 metric tons would decrease revenues by approximately $2 million, while a reduction in the catch of darkblotched rockfish from 60 metric tons to 40 metric tons would decrease exvessel revenue by approximately $6 million. This shows that initial reductions in the catch of darkblotched rockfish in the bottom trawl fishery are relatively inexpensive per metric ton compared to the cost per metric ton of more dramatic reductions.

Like Pacific ocean perch, also shown in the relationship between exvessel revenue and the catch of darkblotched rockfish is that the initial reductions in the catch of low valued species have little effect on the catch of darkblotched (illustrated at the range of darkblotched mortality corresponding to $20-$22 million). Since initial reductions in the allowable catch were targeted toward those species with a low price per pound (arrowtooth flounder), this means that the management of arrowtooth flounder has a relatively small impact on the catch of darkblotched rockfish compared to more moderately priced species such as Dover sole, and reductions in darkblotched mortality are likely to correspond to reductions in the targeting of high valued species.

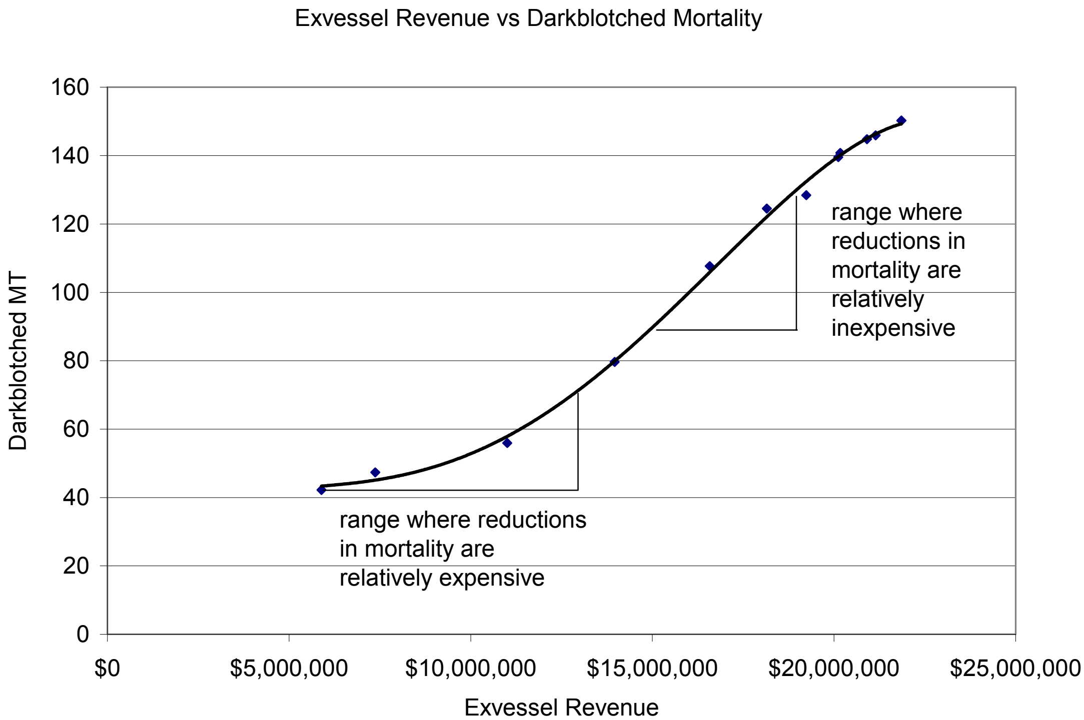


Figure 8 Exvessel Revenue vs Darkblotched Mortality in the LE Bottom Trawl Sector

Figure 9 shows the relationship between exvessel revenue and the catch of bocaccio rockfish. From this figure, reducing the catch of bocaccio rockfish from 45 metric tons to 25 metric tons would decrease exvessel revenues by approximately $2 million, while reducing the catch of bocaccio rockfish from 20 metric tons to 10 metric tons would decrease revenues by approximately $5 million. This shows that initial reductions in the catch of bocaccio rockfish in the bottom trawl fishery are relatively inexpensive per metric ton compared to the cost per metric ton of more dramatic reductions.

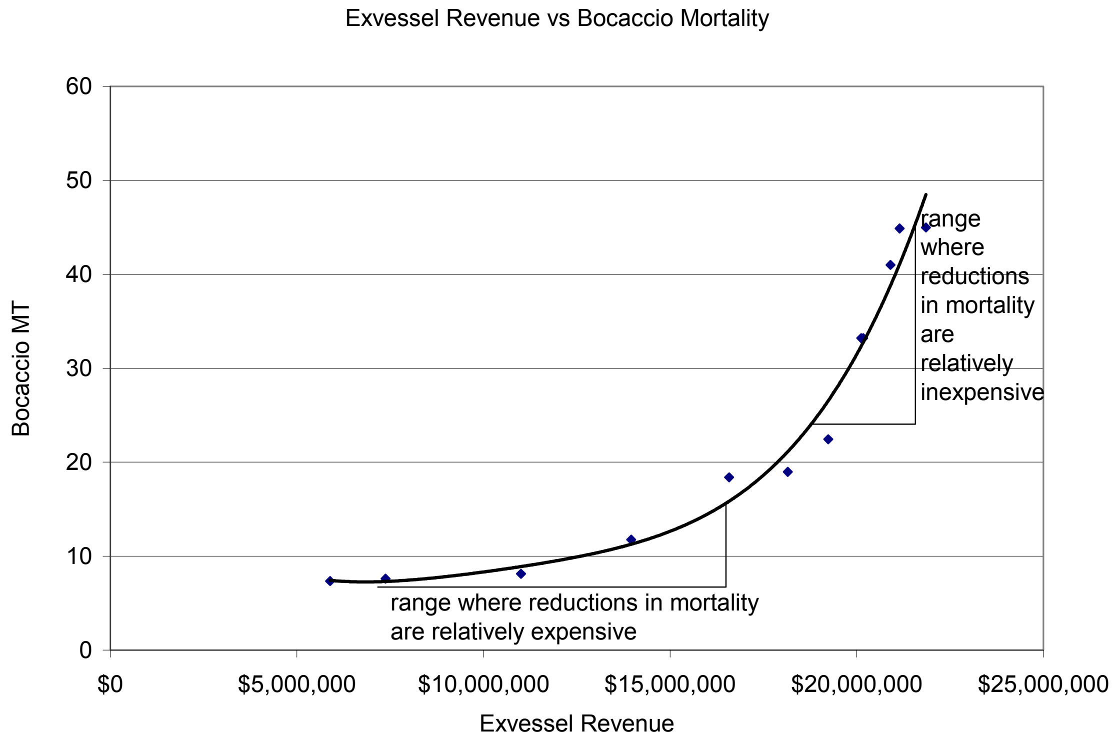


Figure 9 Exvessel Revenue vs Bocaccio Mortality in the LE Bottom Trawl Sector

Figure 10 shows the relationship between the catch of cowcod and exvessel revenue in the limited entry bottom trawl sector. This figure shows that reducing the catch of cowcod from 2 metric tons to 1.5 metric tons would decrease revenues by approximately $1 million, while reducing the catch of cowcod from 1 metric ton to 0.5 metric tons would decrease exvessel revenues by approximately $4 million.

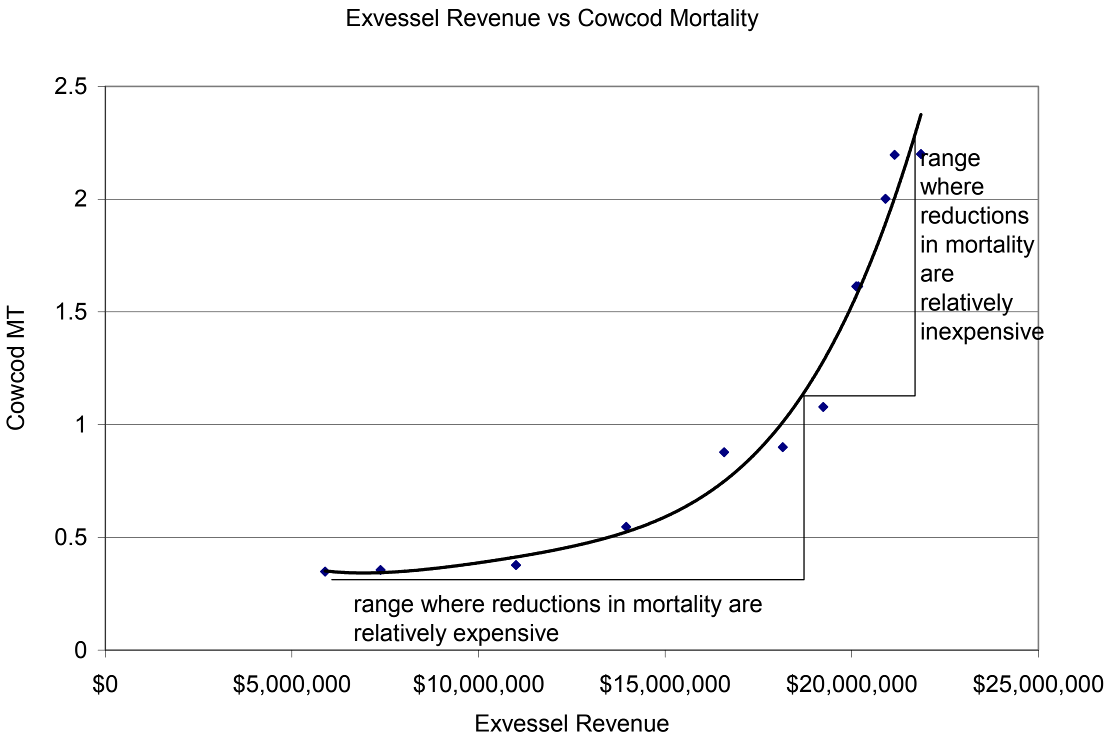


Figure 10 Exvessel Revenue vs Cowcod Mortality in the LE Bottom Trawl Sector

Figure 11 plots the mortality of all overfished species (in percentage terms) against exvessel revenue. In this case, the mortality of overfished species is normalized by estimating it as a percentage of initially predicted mortality in the 2006 fishery. The 100 percent mark is equivalent to predicted 2006 mortality. The difference between Figure 11 and other figures is that mortality is expressed on a percentage basis and compared to exvessel revenues, thus making changes in the mortality of overfished species more comparable.

Based on the information shown in Figure 11, percent reductions in the catch of darkblotched rockfish and POP are generally more costly than percent reductions in the catch of bocaccio rockfish and cowcod, while percent reductions in the catch of canary rockfish can be considered more moderate. The reason percent reductions in the catch of darkblotched and POP are more expensive than bocaccio, canary, and cowcod is because darkblotched and POP are caught in deep areas where more valuable species tend to be caught. Bocaccio rockfish and cowcod are caught largely on the shelf where less valuable flatfish are typically found. Canary rockfish on the other hand are primarily caught in the shelf areas, but small amounts of canary are also caught in deeper areas, thus making the value of a percent change in the catch of canary in-between the values of darkblotched and POP, versus bocaccio and cowcod. It is important to note that while some overfished species are caught together, many are not. Therefore, the information shown in Figure 11 should not be misinterpreted to mean that reductions in the mortality across multiple overfished species need to happen simultaneously.

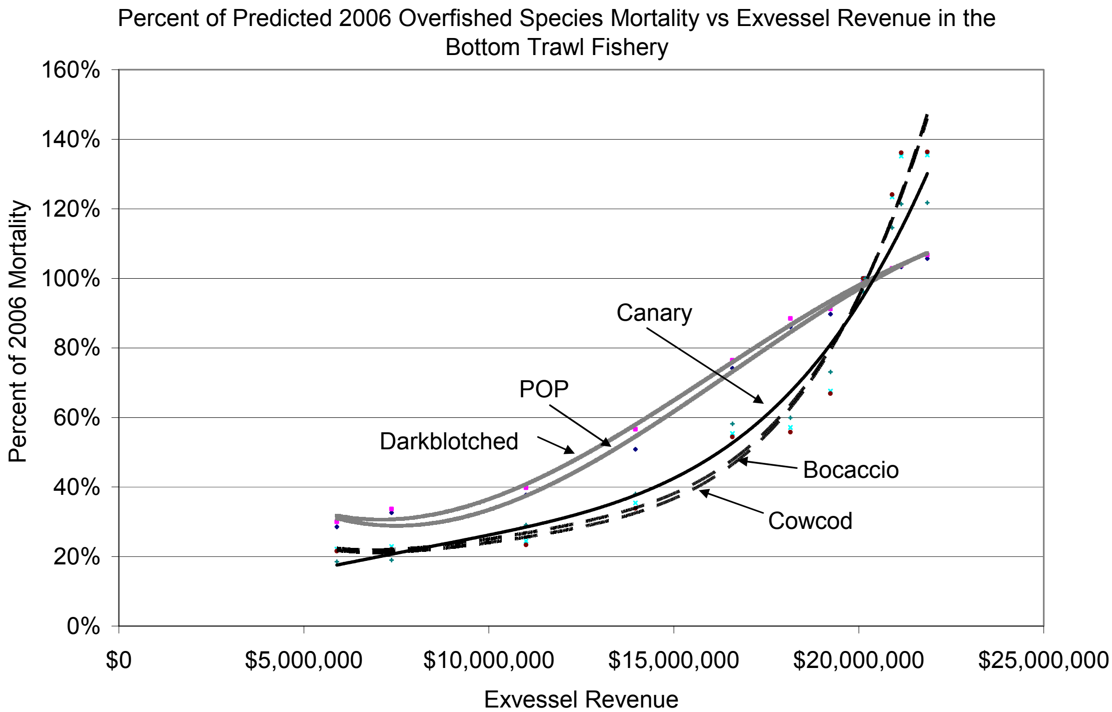


Figure 11 Exvessel Revenue vs Mortality for All Overfished Species

4. <u>Distributional Impacts of Changes in Overfished Species Catch in Commercial Groundfish Fisheries</u>

The analyses provided in the previous sections showed that overfished species have differential exvessel revenue associations and impacts across sectors. Some overfished species are primarily caught in a single sector, while other overfished species may be caught in multiple sectors. The sector and geographic distribution of economic impacts resulting from management designed to protect overfished species can be substantially different for each overfished species due to the occurrence of certain species across sectors, the latitudinal existence of overfished species, and the degree to which various ports are involved in different fisheries, among other things. This section provides information on the identification of sectors, regions, and ports that are affected by overfished species management, and identifies the degree to which those sectors, regions, or ports are likely to be affected by management that is designed to reduce the catch of overfished species. The underlying assumption is that fisheries with high impacts to overfished species are most likely to be restricted to achieve catch reductions in those overfished species. This assumption is reasonable given the fact that past approaches to achieve such reductions have prioritized catch reductions toward sectors with the highest degree of impact.

For reference purposes, available data on the range of overfished species, historical catch, and current catch of overfished species was used to show where overfished species are found and where they are currently caught in commercial fisheries. Areas where there are minimal amounts of overfished species caught were included, though in the next sections of the document, minimal amounts of impact are left blank and identified as a low or no impact. The relevance of the information shown in Table 1 and Table 2 is that commercial groundfish fisheries operating in the listed latitudinal areas pose some potential risk to the overfished stock even if that risk is minimal.

Table 1 Range Where Overfished Species are Currently Caught in the Commercial Fishery

	OVERFISHED SPECIES						
AREA	BOCACCIO	CANARY	COWCOD	DARKBLOTCHED	POP	WIDOW	YELLOWEYE
N 40 10		√		√	√	√	√
38 – 40 10	√	√		√		√	
36 - 38	√	√	√	√		√	
S 36	√		√				

1) although some of the species listed are caught outside the areas check-marked above, the check-mark only applies to the boundary where there is an ABC for these species
2) in some areas only minimal amounts of overfished species are currently caught. These areas are checked-marked

Table 2 Range Where Overfished Species are Potentially Caught in the Commercial Fishery

	OVERFISHED SPECIES						
AREA	BOCACCIO	CANARY	COWCOD	DARKBLOTCHED	POP	WIDOW	YELLOWEYE
N 40 10		√		√	√	√	√
38 – 40 10	√	√	√	√	√	√	√
36 - 38	√	√	√	√		√	√
S 36	√	√	√	√		√	

1) although some of the species listed are caught outside the areas check-marked above, the check-mark only applies to the boundary where there is an ABC for these species
2) in some areas only minimal amounts of overfished species have historically been caught. These areas are checked-marked

The following tables separate fishing sectors on a latitudinal basis and by the degree of impact on overfished species. We characterize each sector's overfished species effects as having one of four different possible degrees-of-impact: high, medium-high (MH), medium-low (ML), and low or no impact. The degree of impact was assigned relative to the ABC, the 2006 OY, and the relative 2004 and 2005 catch of overfished species estimated to have been taken in each sector. Table 3 shows the assigned level of impact criteria by region, sector, and overfished species. The criteria that were assigned are based partially on the catch of overfished species estimated to have been taken by sector in the 2004 and 2005 fisheries. If area boundaries and targeting opportunities were to be changed, these criteria may change as well. A blank cell means that sector has no, or low impact. While multiple cells are blank, it is important to note that does not necessarily mean a particular sector/area combination is ignored when it comes to reducing the catch of overfished species. In a relatively extreme case, sectors with a low impact may be constrained in addition to sectors with high, med-high, and med-low impacts. However, for the purposes of planning in the long term (one year or more), sectors with a low impact have not traditionally been subject to constraints to protect overfished species. Constraints on low impact fisheries have traditionally been limited to inseason actions.

Table 3 Level of Overfished Species Impact by Region and Groundfish Sector

		OVERFISHED SPECIES						
AREA	SECTOR	BCCCIO	CANARY	COWCD	D'BLTCH	POP	WIDOW	Y'EYE
N 40 10	LE FG-DOGFISH		ML					MH
	LE FG-NEARSHORE		ML					MH
	LE FG-SABLEFISH		ML					MH
	LE B-TRAWL-DEEP		ML		HIGH	HIGH		
	LE B-TRAWL-SHELF		HIGH					
	LE MW-TRAWL-WHITING		HIGH		ML	ML	HIGH	
	OA FG-DOGFISH		ML					MH
	OA FG-NEARSHORE		MH					MH
	OA FG-SABLEFISH		ML					MH
38 - 40 10	LE FG-NEARSHORE	ML	ML					
	LE FG-SABLEFISH	ML	ML					
	LE B-TRAWL-DEEP	ML	ML		MH			
	LE B-TRAWL-SHELF	HIGH	MH					
	OA FG-NEARSHORE	ML	ML					
	OA FG-SABLEFISH	ML	ML					
36 - 38	LE FG-NEARSHORE	ML	ML	ML				
	LE FG-SABLEFISH	ML	ML	ML				
	LE B-TRAWL-DEEP	ML	ML					
	LE B-TRAWL-SHELF	HIGH	ML	MH				
	OA FG-NEARSHORE	ML	ML	ML				
	OA FG-SABLEFISH	ML	ML	ML				
S 36	LE FG-NEARSHORE	ML		ML				
	LE FG-SABLEFISH	ML		ML				
	LE B-TRAWL-DEEP	ML						
	LE B-TRAWL-SHELF	HIGH		MH				
	OA FG-NEARSHORE	ML		ML				
	OA FG-SABLEFISH	ML		ML				

Table 4 and Table 5 show the relationship between fishery sectors and ports. In these tables, a check-mark identifies a port as being engaged in a particular sector. From this information it is apparent that the sablefish sectors are present in the largest number of ports, and the dogfish sectors are present in the fewest number of ports. What is not contained in this type of information is the scale and relative degree of dependence that each port has on the particular sectors that port is engaged in. However, if one defines a fishing community as a port, or as a port-sector combination, this information can be used to identify communities that are substantially engaged in commercial groundfish fisheries.

Table 4 Port Engagement in Groundfish Sectors in Areas North of 40 Degrees 10 Minutes Latitude

		SECTOR								
AREA	PORT	LE B-TRAWL-DEEP	LE B-TRAWL-SHELF	LE FG-DOGFISH	LE FG-NEARSHORE	LE FG-SABLEFISH	LE MW-TRAWL-WHITING	OA FG-DOGFISH	OA FG-NEARSHORE	OA FG-SABLEFISH
N 40 10	ABERDEEN									√
	ASTORIA	√	√		√	√	√			√
	BANDON									√
	BELLINGHAM BAY	√	√	√		√		√		√
	BLAINE	√	√	√		√				
	BROOKINGS	√	√			√			√	√
	CATHLAMET					√				
	CHARLESTON (COOS BAY)	√	√			√	√		√	√
	CHINOOK					√				√
	CRESCENT CITY	√	√		√	√	√		√	√
	DEPOE BAY								√	
	EUREKA	√	√			√	√		√	√
	EVERETT					√				
	FIELDS LANDING									√
	FLORENCE									√
	GARIBALDI (TILLAMOOK)					√			√	√
	GOLD BEACH								√	
	ILWACO					√	√			√
	LAPUSH					√				√
	MILL CREEK								√	
	NEAH BAY	√	√			√				√
	NEWPORT	√	√			√	√		√	√
	PACIFIC CITY								√	
	PORT ANGELES					√				√
	PORT ORFORD				√	√			√	√
	PORT TOWNSEND									√
	SEATTLE						√			√
	TOKELAND									√
	TRINIDAD								√	
	WESTPORT	√	√			√	√			√
	WINCHESTER BAY					√				√

Table 5 Port Engagement in Groundfish Fisheries in Areas South of 40 Degrees 10 Minutes Latitude

		SECTOR								
AREA	PORT	LE B-TRAWL-DEEP	LE B-TRAWL-SHELF	LE FG-DOGFISH	LE FG-NEARSHORE	LE FG-SABLEFISH	LE MW-TRAWL-WHITING	OA FG-DOGFISH	OA FG-NEARSHORE	OA FG-SABLEFISH
38 - 40 10	ALBION								√	
	BODEGA BAY					√			√	
	FORT BRAGG	√	√			√			√	√
	POINT ARENA								√	
	POINT REYES									√
	SHELTER COVE								√	
36 - 38	BIG CREEK								√	
	BODEGA BAY									√
	ELK									√
	MONTEREY	√	√			√			√	√
	MOSS LANDING	√	√			√			√	√
	PRINCETON / HALF MOON BAY	√	√			√			√	√
	SAN FRANCISCO	√	√		√	√			√	√
	SANTA CRUZ								√	
	SANTA CRUZ									√
S 36	AVILA					√			√	
	BERKELEY								√	
	DANA POINT					√				
	LONG BEACH					√				
	MISSION BAY					√				√
	MORRO BAY	√	√			√			√	√
	NEWPORT BEACH					√				
	OCEANSIDE					√				√
	OXNARD				√	√			√	√
	PLAYA DEL REY					√				
	POINT LOMA									√
	SAN DIEGO								√	√
	SAN PEDRO								√	
	SAN SIMEON								√	
	SANTA BARBARA				√				√	
	TERMINAL ISLAND					√				√
	VENTURA								√	√
	WILMINGTON				√					

Through the association of fishing sectors, management to achieve reductions in the catch of overfished species, and port of landing for vessels engaged in various fishing sectors, we can identify which ports would likely be affected by management designed to achieve reductions in the catch of certain overfished species. Table 6 associates regional fishing sectors with greater than a “low/no” impact to identify ports potentially affected if reductions in the catch of overfished species are necessary. This information shows that canary rockfish would potentially affect the largest number of ports, followed by bocaccio, yelloweye, cowcod, darkblotched, POP, and widow rockfish respectively. This table also shows that many ports in the north are potentially affected by up to five overfished species, while ports in the south are affected by two or three overfished species. Individual overfished species also have different regional impacts. For example, while cowcod and bocaccio may not impact the largest number of ports, they potentially affect all commercial groundfish ports south of 38˚ N. lat.

Table 6 Ports Potentially Impacted by Reductions in Overfished Species Catch

		OVERFISHED SPECIES						
AREA	PORT	BCACCIO	CANARY	COWCOD	DRKBLTCH	POP	WIDOW	Y'EYE
N 40 10	ABERDEEN		√					√
	ASTORIA		√		√	√	√	√
	BANDON		√					√
	BELLINGHAM BAY		√		√	√		√
	BLAINE		√		√	√		√
	BROOKINGS		√		√	√		√
	CATHLAMET		√					√
	CHARLESTON (COOS BAY)		√		√	√	√	√
	CHINOOK		√					√
	CRESCENT CITY		√		√	√	√	√
	DEPOE BAY		√					√
	EUREKA		√		√	√	√	√
	EVERETT		√					√
	FIELDS LANDING		√					√
	FLORENCE		√					√
	GARIBALDI (TILLAMOOK)		√					√
	GOLD BEACH		√					√
	ILWACO		√		√	√	√	√
	LAPUSH		√					√
	MILL CREEK		√					√
	NEAH BAY		√		√	√		√
	NEWPORT		√		√	√	√	√
	PACIFIC CITY		√					√
	PORT ANGELES		√					√
	PORT ORFORD		√					√
	PORT TOWNSEND		√					√
	SEATTLE		√				√	√
	TOKELAND		√					√
	TRINIDAD		√					√
	WESTPORT		√		√	√	√	√
	WINCHESTER BAY		√					√
38 – 40 10	ALBION	√	√					
	BODEGA BAY	√	√					
	FORT BRAGG	√	√		√			
	POINT ARENA	√	√					
	POINT REYES	√	√					
	SHELTER COVE	√	√					
36 - 38	BIG CREEK	√	√	√				
	BODEGA BAY	√	√	√				
	ELK	√	√	√				
	MONTEREY	√	√	√				
	MOSS LANDING	√	√	√				
	PRINCETON / HALF MOON BAY	√	√	√				
	SAN FRANCISCO	√	√	√				
	SANTA CRUZ	√	√	√				
	SANTA CRUZ	√	√	√				
S 36	AVILA	√		√				
	BERKELEY	√		√				
	DANA POINT	√		√				
	LONG BEACH	√		√				
	MISSION BAY	√		√				
	MORRO BAY	√		√				
	NEWPORT BEACH	√		√				
	OCEANSIDE	√		√				
	OXNARD	√		√				
	PLAYA DEL REY	√		√				
	POINT LOMA	√		√				
	SAN DIEGO	√		√				
	SAN PEDRO	√		√				
	SAN SIMEON	√		√				
	SANTA BARBARA	√		√				
	TERMINAL ISLAND	√		√				
	VENTURA	√		√				
	WILMINGTON	√		√				

Each sector/region combination has a different level of impact on overfished species, and therefore, a different likelihood that sector would be impacted by management if reductions in the catch of overfished species are necessary. Table 7 through Table 10 shows the relative likelihood that a particular area/sector/port combination would need to be restricted in order to achieve reductions in the aggregate catch of overfished species. Blank cells indicate a low/no likelihood that a particular area/sector/port combination would need to be restricted to achieve reductions in the aggregate catch of overfished species.

Table 7 Relative Likelihood of LE Trawl Ports Being Affected by Management to Reduce Overfished Species Catch

AREA	SECTOR	PORT	BCACCIO	CANARY	COWCOD	DRKBLTCH	POP	WDOW
N 40 10	LE B-TRAWL-DEEP	ASTORIA		ML		HIGH	HIGH	
		BELLINGHAM BAY		ML		HIGH	HIGH	
		BLAINE		ML		HIGH	HIGH	
		BROOKINGS		ML		HIGH	HIGH	
		CHARLESTON		ML		HIGH	HIGH	
		CRESCENT CITY		ML		HIGH	HIGH	
		EUREKA		ML		HIGH	HIGH	
		NEAH BAY		ML		HIGH	HIGH	
		NEWPORT		ML		HIGH	HIGH	
		WESTPORT		ML		HIGH	HIGH	
	LE B-TRAWL-SHELF	ASTORIA		HIGH				
		BELLINGHAM BAY		HIGH				
		BLAINE		HIGH				
		BROOKINGS		HIGH				
		CHARLESTON		HIGH				
		CRESCENT CITY		HIGH				
		EUREKA		HIGH				
		NEAH BAY		HIGH				
		NEWPORT		HIGH				
		WESTPORT		HIGH				
	LE MW-TRAWL-WHITING	ASTORIA		HIGH		ML	ML	HIGH
		CHARLESTON		HIGH		ML	ML	HIGH
		CRESCENT CITY		HIGH		ML	ML	HIGH
		EUREKA		HIGH		ML	ML	HIGH
		ILWACO		HIGH		ML	ML	HIGH
		NEWPORT		HIGH		ML	ML	HIGH
		SEATTLE		HIGH				HIGH
		WESTPORT		HIGH		ML	ML	HIGH
38 - 40 10	LE B-TRAWL-DEEP	FORT BRAGG	ML	ML		MH		
	LE B-TRAWL-SHELF	FORT BRAGG	HIGH	MH				
36 - 38	LE B-TRAWL-DEEP	MONTEREY	ML	ML				
		MOSS LANDING	ML	ML				
		PRINCETON / HALF MOON BAY	ML					
		SAN FRANCISCO	ML	ML				
	LE B-TRAWL-SHELF	MONTEREY	HIGH	ML	MH			
		MOSS LANDING	HIGH	ML	MH			
		PRINCETON / HALF MOON BAY	HIGH	ML	MH			
		SAN FRANCISCO	HIGH	ML	MH			
S 36	LE B-TRAWL-DEEP	MORRO BAY	ML					
	LE B-TRAWL-SHELF	MORRO BAY	HIGH		MH			

Table 8 Relative Likelihood of LE Fixed Gear Ports Being Affected by Management to Reduce Overfished Species Catch

			OVERFISHED SPECIES			
AREA	SECTOR	PORT	BOCACCIO	CANARY	COWCOD	YELLOWEYE
N 40 10	LE FG-DOGFISH	BELLINGHAM BAY		ML		MH
		BLAINE		ML		MH
	LE FG-NEARSHORE	ASTORIA		ML		MH
		CRESCENT CITY		ML		MH
		PORT ORFORD		ML		MH
	LE FG-SABLEFISH	ASTORIA		ML		MH
		BELLINGHAM BAY		ML		MH
		BLAINE		ML		MH
		BROOKINGS		ML		MH
		CATHLAMET		ML		MH
		CHARLESTON		ML		MH
		CHINOOK		ML		MH
		CRESCENT CITY		ML		MH
		EUREKA		ML		MH
		EVERETT		ML		MH
		GARIBALDI		ML		MH
		ILWACO		ML		MH
		LAPUSH		ML		MH
		NEAH BAY		ML		MH
		NEWPORT		ML		MH
		PORT ANGELES		ML		MH
		PORT ORFORD		ML		MH
		WESTPORT		ML		MH
		WINCHESTER BAY		ML		MH
38 - 40 10	LE FG-SABLEFISH	BODEGA BAY	ML	ML		
		FORT BRAGG	ML	ML		
36 - 38	LE FG-NEARSHORE	SAN FRANCISCO	ML	ML	ML	
	LE FG-SABLEFISH	MONTEREY	ML	ML	ML	
		MOSS LANDING	ML	ML	ML	
		PRINCETON / HALF MOON BAY	ML	ML	ML	
		SAN FRANCISCO	ML	ML	ML	
S 36	LE FG-NEARSHORE	OXNARD	ML		ML	
		SANTA BARBARA	ML		ML	
		WILMINGTON	ML		ML	
	LE FG-SABLEFISH	AVILA	ML		ML	
		DANA POINT	ML		ML	
		LONG BEACH	ML		ML	
		MISSION BAY	ML		ML	
		MORRO BAY	ML		ML	
		NEWPORT BEACH	ML		ML	
		OCEANSIDE	ML		ML	
		OXNARD	ML		ML	
		PLAYA DEL REY	ML		ML	
		TERMINAL ISLAND	ML		ML	

Table 9 Relative Likelihood of OA Fixed Gear Ports North of 40 Degrees 10 Minutes Latitude Being Affected by Management to Reduce Overfished Species Catch

			OVERFISHED SPECIES			
AREA	SECTOR	PORT	BOCACCIO	CANARY	COWCOD	YELLOWEYE
N 40 10	OA FG-DOGFISH	BELLINGHAM BAY		ML		MH
	OA FG-NEARSHORE	BROOKINGS		MH		MH
		CHARLESTON (COOS BAY)		MH		MH
		CRESCENT CITY		MH		MH
		DEPOE BAY		MH		MH
		EUREKA		MH		MH
		GARIBALDI (TILLAMOOK)		MH		MH
		GOLD BEACH		MH		MH
		MILL CREEK		MH		MH
		NEWPORT		MH		MH
		PACIFIC CITY		MH		MH
		PORT ORFORD		MH		MH
		TRINIDAD		MH		MH
	OA FG-SABLEFISH	ABERDEEN		ML		MH
		ASTORIA		ML		MH
		BANDON		ML		MH
		BELLINGHAM BAY		ML		MH
		BROOKINGS		ML		MH
		CHARLESTON (COOS BAY)		ML		MH
		CHINOOK		ML		MH
		CRESCENT CITY		ML		MH
		EUREKA		ML		MH
		FIELDS LANDING		ML		MH
		FLORENCE		ML		MH
		GARIBALDI (TILLAMOOK)		ML		MH
		ILWACO		ML		MH
		LAPUSH		ML		MH
		NEAH BAY		ML		MH
		NEWPORT		ML		MH
		PORT ANGELES		ML		MH
		PORT ORFORD		ML		MH
		PORT TOWNSEND		ML		MH
		SEATTLE		ML		MH
		TOKELAND		ML		MH
		WESTPORT		ML		MH
		WINCHESTER BAY		ML		MH

Table 10 Relative Likelihood of OA Fixed Gear Ports South of 40 Degrees 10 Minutes Latitude Being Affected by Management to Reduce Overfished Species Catch

			OVERFISHED SPECIES			
AREA	SECTOR	PORT	BOCACCIO	CANARY	COWCOD	YELLOWEYE
38 - 40	OA FG-NEARSHORE	ALBION	ML	ML		
		BODEGA BAY	ML	ML		
		FORT BRAGG	ML	ML		
		POINT ARENA	ML	ML		
		SHELTER COVE	ML	ML		
	OA FG-SABLEFISH	FORT BRAGG	ML	ML		
		POINT REYES	ML	ML		
36 - 38	OA FG-NEARSHORE	BIG CREEK	ML	ML	ML	
		MONTEREY	ML	ML	ML	
		MOSS LANDING	ML	ML	ML	
		PRINCETON / HALF MOON BAY	ML	ML	ML	
		SAN FRANCISCO	ML	ML	ML	
		SANTA CRUZ	ML	ML	ML	
	OA FG-SABLEFISH	BODEGA BAY	ML	ML	ML	
		ELK	ML	ML	ML	
		MONTEREY	ML	ML	ML	
		MOSS LANDING	ML	ML	ML	
		PRINCETON / HALF MOON BAY	ML	ML	ML	
		SAN FRANCISCO	ML	ML	ML	
		SANTA CRUZ	ML	ML	ML	
S 36	OA FG-NEARSHORE	AVILA	ML		ML	
		BERKELEY	ML		ML	
		MORRO BAY	ML		ML	
		OXNARD	ML		ML	
		SAN DIEGO	ML		ML	
		SAN PEDRO	ML		ML	
		SAN SIMEON	ML		ML	
		SANTA BARBARA	ML		ML	
		VENTURA	ML		ML	
	OA FG-SABLEFISH	MISSION BAY	ML		ML	
		MORRO BAY	ML		ML	
		OCEANSIDE	ML		ML	
		OXNARD	ML		ML	
		POINT LOMA	ML		ML	
		SAN DIEGO	ML		ML	
		TERMINAL ISLAND	ML		ML	
		VENTURA	ML		ML	

5. Summary

In general, this document can be separated in two parts. The first section shows the relationship between exvessel revenue and overfished species mortality. The second section shows the relationship between sectors, ports, and regions and overfished species management. Each section has an implied management strategy that is somewhat different but complimentary. The first section implies that incidental catch of overfished species is achieved by reducing the targeting of least valuable species first in order to maintain the highest level of exvessel revenue. The second section implies that sectors that have the largest impact on overfished species will be the most likely sector to be restricted in order to achieve reductions in overfished species catch. While these approaches appear different, both are used on a routine basis in management. The management strategy implied within the first section is used on a within-sector basis, while the management strategy implied within the second section is used on an across-sector basis. That is, in order to achieve some level of mortality for a specific sector (like the limited entry bottom trawl or open access sector), management has historically been designed to maintain targeting of the most valuable species within that sector. If total reductions in overfished species mortality on a coastwide basis are necessary, management strategies are more likely to look for those reductions to come from sectors that have the largest degree of impact. This second approach is routinely used because a smaller percent decrease in exvessel revenues is more likely to achieve substantial reductions in overfished species mortality in a sector that has a high impact on overfished species than in a sector with a small impact on overfished species. Put in other words, if a 5 metric ton reduction in the mortality of widow rockfish is necessary, it is estimated that it would cost the whiting fleet 3% of revenues (assuming a decrease in the whiting OY from 280,000 to 270,392 mt) whereas if that reduction came from other sectors, it may require a complete closure of multiple sectors to achieve that same reduction.

The first section of this document showed that management measures protecting different overfished species have different exvessel revenue impacts on a particular sector. The catch of darkblotched rockfish in the bottom trawl fishery for example is generally associated with the catch of high valued target species, whereas the catch of bocaccio rockfish is more often associated with the catch of lower valued shelf flatfish species. This means that it is more costly to achieve a given percent reduction in darkblotched rockfish catch than to achieve that same percent reduction in bocaccio rockfish catch. In addition to different overfished species having different implied relative values, the distribution of these impacts across fishing communities can also be substantially different. While darkblotched rockfish arguably has a higher implied value in the bottom trawl fishery than bocaccio rockfish, management designed to achieve a reduction in bocaccio rockfish catch would affect many more ports and sectors than management designed to achieve reductions in darkblotched rockfish catch.

These findings have several implications depending on the management objective. If the objective is to affect the fewest number of ports and sectors, then it would arguably make sense to keep the catch of species that impact large numbers of ports and sectors like bocaccio relatively high. However, if the objective is to maintain total exvessel revenues at the highest possible level, then it arguably would make sense to keep the catch of species associated with high valued target species–such as darkblotched rockfish in the bottom trawl fishery–relatively high. In reality, the objective may be some combination of both.

References/Sources

Magnuson-Stevens Fishery Conservation and Management Act - As Amended Through October 11, 1996.

Pacific Fishery Management Council. Groundfish Management Team. 2006. Bycatch Scorecard

Pacific Fishery Management Council. Groundfish Management Team. 2006. Limited Entry Bottom Trawl Bycatch Model

Pacific Fishery Management Council. Groundfish Management Team. 2006. Limited Entry Fixed Gear Bycatch Model

Pacific Fishery Management Council. Groundfish Management Team. 2006. Open Access Nearshore Bycatch Model

Pacific Fishery Management Council. Groundfish Management Team. 2006. Limited Entry Trawl Pacific Whiting Bycatch Model

Pacific States Marine Fisheries Commission. 2006. Pacific Fisheries Information Network. Personal communication.

Agenda Item F.1.a
Attachment 5
April 2006

DRAFT

Amendment 16-4
(Overfished Species Rebuilding Reprise)

PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN

FOR THE CALIFORNIA, OREGON, AND WASHINGTON GROUNDFISH FISHERY

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 200
PORTLAND, OR 97220
(503) 820-2280
(866) 806-7204
WWW.PCOUNCIL.ORG

APRIL 2006

This document is published by the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA03NMF4410067 and FNA17FC1641.

Changes to the FMP Since the Version Published in July 1993

The last generally available version of the Groundfish FMP was produced in July 1993 and incorporated changes made through Amendment 7. In addition to adding material required by the 1996 Sustainable Fisheries Act, Amendment 11 included a general editorial clean-up of Chapters 1–6. However, a revised version of the full document was never produced. Major changes to the content and organization of the FMP, since Amendment 7 and aside from the overall revisions of Chapters 1–6 made by Amendment 11, are summarized here to help clarify references to parts of the FMP in other Council documents.

Chapters in July 1993 FMP	Changes Made Through the Current Version of the FMP
Chapter 1 Introduction	No changes since Amendment 11
Chapter 2 Goals and Objectives	Amendments and additions, no substantial change in organization. (Amendments 12, 13, 16-1, and 17.)
Chapter 3 Areas and Stocks Involved	Amendments and additions, no substantial change in organization. (Amendment 16-1.)
Chapter 4 Optimum Yield	Substantially changed and expanded by Amendment 16-1, which moved and revised material on determining ABC, OY, precautionary thresholds, and rebuilding overfished species that was in Chapter 5 into this chapter. Amendments 16-2 and 16-3 add rebuilding plan summaries to section 4.5.4
Chapter 5 Specification and Apportionment of Harvest Levels	Substantially changed by Amendment 16-1, which moved material to Chapter 4, as noted above. Discussion of DAH, DAP, JVP, and TALFF deleted. (Also Amendments 12, 13, and 17.)
Chapter 6 Management Measures	Amendments and additions, no substantial change in organization. (Amendments 10, 11, 13, 16-1, 17.)
Chapter 7 Experimental Fisheries	No Changes
Chapter 8 Scientific Research	No Changes
Chapter 9 Restrictions on Other Fisheries	No Changes
Chapter 10 Procedures for Reviewing State Regulations	No Changes
Chapter 11 Appendices	This material is now produced under separate cover. An unnumbered section at the end of the FMP, “Appendices Contents,” summarizes the topic areas in the Appendices. It is intended that the unnumbered sections (also References, see below) will always appear at the end of the document. (Amendment 11 added material on essential fish habitat.)
Chapter 12 Management Measures that Continue	This chapter is renumbered Chapter 11. No other

in Effect With Implementation of Amendment 4	changes have been made.
Chapter 13 References	This chapter has been moved to an unnumbered section at the end of the document. (Amendment 16-1.)
Chapter 14 Groundfish Limited Entry	This chapter is renumbered Chapter 12. (Amendments 13 and 14.)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

ABC	acceptable biological catch
DAH	domestic annual harvest
DAP	domestic annual processing
EEZ	exclusive economic zone
EFH	essential fish habitat
EFP	experimental fishing permit
ESA	Endangered Species Act
MARPOL	International Convention for the Prevention of Pollution from Ships
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
FMP	fishery management plan
GAP	Groundfish Advisory Subpanel
GMT	Groundfish Management Team
HG	harvest guideline
IFQ	individual fishing quota
INPFC	International North Pacific Fisheries Commission
JV	joint-venture
JVP	joint-venture processing
LE	limited entry
MLR	minimum landing requirement
mt	metric ton
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
OY	optimum yield
POP	Pacific ocean perch
PRA	Paperwork Reduction Act
PSMFC	Pacific States Marine Fisheries Commission
Regional Director	Regional Director, National Marine Fisheries Service
SAFE	Stock Assessment and Fishery Evaluation
Secretary	U.S. Secretary of Commerce
SPR	spawning biomass per recruit
SSC	Scientific and Statistical Committee
TALFF	total allowable level of foreign fishing

A note on annotations: Amended parts of the FMP are denoted at the end of chapters or second-level *sections by amendment number. If applicable, changes to lower-level subsections are also noted at the end of second-level sections. Amendments subsequent to Amendment 4, which substantially revised the original FMP are so noted.*

1.0 INTRODUCTION

1.1 Evolution of the Management Plan

The Pacific Coast Groundfish Fishery Management Plan (FMP) was approved by the U.S. Secretary of Commerce (Secretary) on January 4, 1982, and implemented on October 5, 1982. Prior to implementation of the FMP, management of domestic groundfish fisheries was under the jurisdiction of the states of Washington, Oregon, and California. State regulations have been in effect on the domestic fishery for more than 100 years with each state acting independently in both management and enforcement. Furthermore, many fisheries overlapped state boundaries and participants often operated in more than one state. Management and a lack of uniformity of regulations had become a difficult problem, which stimulated the formation of the Pacific States Marine Fisheries Commission (PSMFC) in 1947. PSMFC had no regulatory power but acted as a coordinating entity with authority to submit specific recommendations to states for their adoption. The 1977 Fishery Conservation and Management Act (later amended and renamed the Magnuson-Stevens Fishery Conservation and Management Act (or Magnuson-Stevens Act,) established eight regional fishery management Councils, including the Pacific Council. Between 1977 and the implementation of the groundfish FMP in 1982, state agencies worked with the Council to address conservation issues. Specifically, in 1981, managers proposed a rebuilding program for Pacific ocean perch. To implement this program, the states of Oregon and Washington established landing limits for Pacific ocean perch in the Vancouver and Columbia management areas.

Management of foreign fishing operations began in February 1967 when the U.S. and U.S.S.R. signed the first bilateral fishery agreement affecting trawl fisheries off Washington, Oregon, and California. The U.S. later signed bilateral agreements with Japan and Poland for fishing off the U.S. West Coast. Each of these agreements was renegotiated to reduce the impact of foreign fishing on important West Coast stocks, primarily rockfish, Pacific whiting, and sablefish. When the U.S. extended its jurisdiction to 200 miles (upon signing the Fishery Conservation and Management Act of 1976), the National Marine Fisheries Service (NMFS) developed and the Secretary implemented the preliminary management plan for the foreign trawl fishery off the Pacific Coast. From 1977 to 1982, the foreign fishery was managed under that plan. Many of these regulations were incorporated into the FMP, which provided for continued management of the foreign fishery.

Joint-venture fishing, where domestic vessels caught the fish to be processed aboard foreign vessels, began in 1979 and by 1989 had entirely supplanted directed foreign fishing. These joint ventures primarily targeted Pacific whiting. Joint-venture fisheries were then rapidly replaced by wholly domestic processing; by 1991 foreign participation had ended and U.S.-flagged motherships, catcher-processors, and shore-based vessels had taken over the Pacific whiting fishery. Since then U.S. fishing vessels and seafood processors have fully utilized Pacific Coast fishery resources. Although the Council may entertain applications for foreign or joint venture fishing or processing at any time, provisions for these activities have been removed from the FMP. Re-establishing such opportunities would require another FMP amendment.

Since it was first implemented in 1982, the Council has amended the groundfish FMP 20 times in response to changes in the fishery, reauthorizations of the Magnuson-Stevens Act, and litigation that invalidated provisions incorporated by earlier amendments. During the first ten years of plan implementation, up to 1992, the Secretary approved six amendments. Amendment 4, approved in 1990, was the most significant early amendment; in addition to a comprehensive update and reorganization of the FMP, it established additional framework procedures for establishing and modifying management measures. Another important change was implemented in 1992 with Amendment 6, which established a license limitation (limited entry) program intended to address overcapitalization by restricting further participation in groundfish trawl, longline, and trap fisheries.

The next decade, through 2002, saw the approval of another seven amendments. Amendment 9 modified the limited entry program by establishing a sablefish endorsement for longline and pot permits. Amendments 11, 12, 13 were responses to changes in the Magnuson-Stevens Act due to the 1996 Sustainable Fisheries Act. These changes required FMPs to identify essential fish habitat (EFH), more actively reduce bycatch and bycatch mortality, and strengthen conservation measures to both prevent fish stocks from becoming overfished~~,~~ and promote rebuilding of any stocks that had become overfished. Amendment 14, implemented in 2001, built on Amendment 9 to further refine the limited entry permit system for the economically important fixed gear sablefish fishery. It allowed a vessel owner to "stack" up to three limited entry permits on one vessel along with associated sablefish catch limits. This in effect established a limited tradable quota system for participants in the primary sablefish fishery.

Most of the amendments adopted since 2001 deal with legal challenges to the three SFA-related amendments mentioned above, which were remanded in part by the Federal Court. These have required new amendments dealing with overfishing, bycatch monitoring and mitigation, and essential fish habitat. In relation to the first of these three issues, the Magnuson-Stevens Act now requires FMPs to identify thresholds for both the fishing mortality rate constituting overfishing and the stock size below which a stock is considered overfished. Once the Secretary determines a stock is overfished, the Council must develop and implement a plan to rebuild it to a healthy level. Since these thresholds were established for Pacific Coast groundfish, nine stocks have been declared overfished. The Court found that the rebuilding plan framework adopted by Amendment 12 did not comply with the Magnuson-Stevens Act. In response, Amendments 16-1, 16-2, and 16-3 established the current regime for managing these overfished species.[1] Amendment 16-1, approved in 2003, incorporated guidelines for developing and adopting rebuilding plans and substantially revised Chapters 4 and 5. Amendments 16-2 and 16-3, approved in 2004, incorporated key elements of rebuilding plans into Section 4.5.4. In 2005, a Court of Appeals ruling refined court interpretation of the Magnuson-Stevens Act rebuilding period requirements. Amendment 16-4, approved in [2006], revised the FMP to specify that rebuilding periods will be as short as possible, taking into account the status and biology of the stocks, the needs of fishing communities, and interactions of overfished stocks with the marine

[1] Although the Secretary declared Pacific whiting overfished in 2002, a 2004 stock assessment found that it had recovered to its rebuilt level. Thus, a rebuilding plan for this species was not adopted by these amendments.

ecosystem. As a result of this ruling, Amendment 16-4 also revised the rebuilding periods for [list stocks].

Amendment 17 modified the periodic process the Council uses to establish and modify harvest specifications and management measures for the groundfish fishery. Although not an SFA-related issue, this change did solve a procedural problem raised in litigation. The Council now establishes specifications and management measures every two years, allowing more time for them to be developed during the Council's public meetings.

Amendment 18, approved in 2006, addresses a remand of elements in Amendment 11 related to bycatch monitoring and mitigation. It incorporates a description of the Council's bycatch-related policies and programs into Chapter 6. It also effected a substantial reorganization and update of the FMP, so that it better reflects the Council's and the NMFS's evolving framework approach to management. Under this framework, the Council may recommend a range of broadly defined management measures for NMFS to implement. In addition to the range of measures, this FMP specifies the procedures the Council and NMFS must follow to establish and modify these measures. When first implemented, the FMP specified a relatively narrow range of measures, which were difficult to modify in response to changes in the fishery. The current framework allows the Council to effectively respond when faced with the dynamic challenges posed by the current groundfish fishery.

Amendment 19, also approved in 2006, revises the definition of groundfish EFH, identified habitat areas of particular concern, and describes management measures intended to mitigate the adverse effects of fishing on EFH. This amendment supplants the definition of EFH added to the FMP by Amendment 11.

1.2 How This Document is Organized

The groundfish FMP is organized into 11 chapters

Chapter 1 (this chapter) describes the development of the FMP and how it is organized.

Chapter 2 describes the goals and objectives of the plan and defines key terms and concepts.

Chapter 3 specifies the geographic area covered by this plan and lists the species managed by it, referred to as the fishery management unit, or FMU.

Chapter 4 describes how the Council determines harvest levels. These harvest limits are related to the maximum sustainable yield (MSY) and allowable biological catch (ABC) for FMU species. Precautionary reductions from these thresholds may be applied, depending on the management status of a given stock. If, according to these thresholds, a stock is determined to be overfished, the Council must recommend measures to end overfishing and develop a rebuilding plan, as specified in this chapter. Based on the thresholds, criteria and procedures described in this chapter, the Council specifies an optimum yield (OY), or harvest limit, for managed stocks or stock complexes.

Chapter 5 describes how the Council periodically specifies harvest levels and the management measures needed to prevent catches from exceeding those levels. Currently, the Council develops these specifications over the course of three meetings preceding the start of a two-year management period. (Separate OYs are specified for each of the two years in this period.) This chapter also describes how the stock assessment/fishery evaluation (SAFE) document, which provides information important to management, is developed.

Chapter 6 describes the management measures used by the Council to meet the objectives of the Magnuson-Stevens Act and this FMP. As noted above, this FMP is a framework plan; therefore, the range of management measures is described in general terms while the processes necessary to establish or modify different types of management measures are detailed. Included in the description of management measures is the Council's program for monitoring total catch (which includes bycatch) and minimizing bycatch.

Chapter 7 identifies EFH for groundfish FMU species and the types of measures that may be used to mitigate adverse impacts to essential fish habitat from fishing.

Chapter 8 describes procedures followed by the Council to evaluate and recommend issuing exempted fishing permits (EFPs). Permitted vessels are authorized, for limited experimental purposes, to harvest groundfish by means or in amounts that would otherwise be prohibited by this FMP and its implementing regulations. These permits allow experimentation in support of FMP goals and objectives. EFPs have been used, for example, to test gear types that result in less bycatch.

Chapter 9 provides criteria for determining what activities involving groundfish would qualify as scientific research and could therefore qualify for special treatment under the management program.

Chapter 10 describes the procedures used to review state regulations in order to ensure that they are consistent with this FMP and its implementing regulations.

Chapter 11 describes the groundfish limited entry program.

Appendix A contains descriptions of the biological, economic, social, and regulatory characteristics of the groundfish fishery.

Appendix B contains detailed information on groundfish EFH.

Appendix C describes the effects of fishing on groundfish EFH.

Appendix D describes the effects of activities other than fishing on groundfish EFH.

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.

[Amended: 11, 16-4, 18,19]

2.0 GOALS AND OBJECTIVES

2.1 Goals and Objectives for Managing the Pacific Coast Groundfish Fishery

The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a stable planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. In developing allocation and harvesting systems, the Council will give consideration to maximizing economic benefits to the United States, consistent with resource stewardship responsibilities for the continuing welfare of the living marine resources. Thus, management must be flexible enough to meet changing social and economic needs of the fishery as well as to address fluctuations in the marine resources supporting the fishery. The following goals have been established in order of priority for managing the West Coast groundfish fisheries, to be considered in conjunction with the national standards of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Management Goals.

> Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.
>
> Goal 2 - Economics. Maximize the value of the groundfish resource as a whole
>
> Goal 3 - Utilization. Within the constraints of overfished species rebuilding requirements, achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Objectives.

To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation.

> Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.
>
> Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group. Achieve a level of harvest capacity in the fishery that is appropriate for a sustainable harvest and low discard rates, and which results in a fishery that is diverse, stable, and profitable. This reduced capacity should lead to more effective management for many other fishery problems.
>
> Objective 3. For species or species groups that are overfished, develop a plan to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem. ~~required by the Magnuson-Stevens Act.~~

Objective 4. Where conservation problems have been identified for nongroundfish species and the best scientific information shows that the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a nongroundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of nongroundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

Objective 5. Describe and identify essential fish habitat (EFH), adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.

Economics.

Objective 6. Within the constraints of the conservation goals and objectives of the FMP, a~~A~~ttempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable. Encourage development of practicable gear restrictions intended to reduce regulatory and/or economic discards through gear research regulated by exempted fishing permits.

Utilization.

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvest and processing), in accordance with conservation goals, of the Pacific Coast groundfish resources by domestic fisheries.

Objective 10. Recognize~~ing~~ the multispecies nature of the fishery and establish a concept of managing by species and gear or by groups of interrelated species.

Objective 11. Develop management programs that reduce regulations-induced discard and/or which reduce economic incentives to discard fish. Develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. Promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

Social Factors.

Objective 12. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 13. Minimize gear conflicts among resource users.

Objective 14. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

Objective 15. Avoid unnecessary adverse impacts on small entities.

Objective 16. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

Objective 17. Promote the safety of human life at sea.

[Amended; 7, 11, 13, 16-1, 16-4, 18]

2.2 Operational Definition of Terms

Acceptable Biological Catch (ABC) is a biologically based estimate of the amount of fish that may be harvested from the fishery each year without jeopardizing the resource. It is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. The ABC may be modified to incorporate biological safety factors and risk assessment due to uncertainty. Lacking other biological justification, the ABC is defined as the MSY exploitation rate multiplied by the exploitable biomass for the relevant time period.

Biennial fishing period is defined as a 24-month period beginning January 1 and ending December 31.

Bottom (or flatfish bottom) trawl is a trawl in which the otter boards or the footrope of the net are in contact with the seabed. It includes roller (or bobbin) trawls, Danish and Scottish seine gear, and pair trawls fished on the bottom.

Bottom-contact gear types by design and through normal use make contact with the sea floor. Such contact is more than intermittent in duration and areal extent.

Bycatch means fish which are harvested in a fishery, but which are not sold or kept for personal use and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

Chafing gear is webbing or other material attached to the codend of a trawl net to protect the codend from wear.

Charter fishing means fishing from a vessel carrying a passenger for hire (as defined in section 2101(21a) of title 46, United States Code) who is engaged in recreational fishing.

Closure, when referring to closure of a fishery, means that taking and retaining, possessing or landing the particular species or species complex is prohibited.

Council means the Pacific Fishery Management Council, including its Groundfish Management Team (GMT), Scientific and Statistical Committee (SSC), Groundfish Advisory Subpanel (GAP), and any other committee established by the Council.

Commercial fishing is (1) fishing by a person who possesses a commercial fishing license or is required by law to possess such license issued by one of the states or the federal government as a prerequisite to taking, landing, and/or sale; or (2) fishing which results in or can be reasonably expected to result in sale, barter, trade, or other disposition of fish for other than personal consumption.

Density dependence is the degree to which recruitment declines as spawning biomass declines. Typically we assume that a Beverton-Holt form is appropriate and that the level of density-dependence is such that the recruitment only declines by ten percent when the spawning biomass declines by 50%.

Double-walled codend is a codend constructed of two walls of webbing.

$F_{x\%}$ is the rate of fishing mortality that will reduce female spawning biomass per recruit to x percent of its unfished level. $F_{100\%}$ is zero, and $F_{35\%}$ is a reasonable proxy for F_{MSY}.

Economic discards means fish which are the target of a fishery, but which are not retained because they are of an undesirable size, sex, quality, or for other economic reasons.

Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Exploitable biomass is the biomass that is available to a unit of fishing effort. Defined as the sum of the population biomass at age (calculated as the mean within the fishing year) multiplied by the age-specific availability to the fishery. Exploitable biomass is equivalent to the catch biomass divided by the instantaneous fishing mortality rate.

F is the instantaneous rate of fishing mortality. F typically varies with age, so the F values are presented for the age with maximum F. Fish of other ages have less availability to the fishery, so a unit of effort applies a lower relative level of fishing mortality to these fish.

F_{MSY} is the fishing mortality rate that maximizes catch biomass in the long term.

$F_{0.1}$ is the fishing mortality rate at which a change in fishing mortality rate will produce a change in yield per recruit that is ten percent of the slope of the yield curve at nil levels of fishing mortality.

F_{OF} is the rate of fishing mortality defined as overfishing.

Fishing means (1) the catching, taking, or harvesting of fish; (2) the attempted catching, taking, or harvesting of fish; (3) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or (4) any operations at sea in support of, or in preparation for, any activity described above. This term does not include any activity by a vessel conducting authorized scientific research.

Fishing year is defined as January 1 through December 31.

Fishing community means a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economy needs and includes fishing vessel owners, operators, crew, and recreational fishers and United States fish processors that are based in such community.

Fixed gear (anchored nontrawl gear) includes longline, trap or pot, set net, and stationary hook-and-line gear (including commercial vertical hook-and-line) gears.

Gillnet is a single-walled, rectangular net which is set upright in the water.

Harvest guideline (HG) is an specified numerical harvest objective which is not a quota. Attainment of a HG does not require closure of a fishery.

Hook-and-line means one or more hooks attached to one or more lines. Commercial hook-and-line fisheries may be mobile (troll) or stationary (anchored).

Incidental catch or incidental species means groundfish species caught when fishing for the primary purpose of catching a different species.

Individual fishing quota (IFQ) 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.

Longline is a stationary, buoyed, and anchored groundline with hooks attached, so as to fish along the seabed.

Maximum sustainable yield is an estimate of the largest average annual catch or yield that can be taken over a significant period of time from each stock under prevailing ecological and environmental conditions. It may be presented as a range of values. One MSY may be specified for a group of species in a mixed-species fishery. Since MSY is a long-term average, it need not be specified annually, but may be reassessed periodically based on the best scientific information available.

Midwater (pelagic or off-bottom) trawl is a trawl in which the otter boards may contact the seabed, but the footrope of the net remains above the seabed. It includes pair trawls if fished in midwater. A midwater trawl has no rollers or bobbins on the net.

MSY stock size means the largest long-term average size of the stock or stock complex, measured in terms of spawning biomass or other appropriate units, that would be achieved under an MSY control rule in which the fishing mortality rate is constant. The proxy typically used in this fishery management plan is 40% of the estimated unfished biomass, although other values based on the best scientific information are also authorized.

Nontrawl gear means all legal commercial gear other than trawl gear.

Optimum yield means the amount of fish which will provide the greatest overall benefit to the U.S., particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems, is prescribed as such on the basis of the maximum sustainable yield from the fishery as reduced by any relevant economic, social, or ecological factor; and in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overfished describes any stock or stock complex whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding. The term generally describes any stock or stock complex determined to be below its overfished/rebuilding threshold. The default proxy is generally 25% of its estimated unfished biomass; however, other scientifically valid values are also authorized.

Overfishing means fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. More specifically, overfishing is defined as exceeding a maximum allowable fishing mortality rate. For any groundfish stock or stock complex, the maximum allowable mortality rate will be set at a level not to exceed the corresponding MSY rate (F_{MSY}) or its proxy (e.g., $F_{35\%}$).

Processing or to process means the preparation or packaging of groundfish to render it suitable for human consumption, retail sale, industrial uses, or long-term storage, including, but not limited to, cooking, canning, smoking, salting, drying, filleting, freezing, or rendering into meal or oil, but does not mean heading and gutting unless additional preparation is done.

Processor means a person, vessel, or facility that (1) engages in processing, or (2) receives live groundfish directly from a fishing vessel for sale without further processing.

Prohibited species are those species and species groups which must be returned to the sea as soon as is practicable with a minimum of injury when caught and brought aboard except when their retention is authorized by other applicable law. Exception may be made in the implementing regulations for tagged fish, which must be returned to the tagging agency, or for examination by an authorized observer.

Quota means a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. Groundfish species or species groups under this FMP for which quotas have been achieved shall be treated in the same manner as prohibited species.

Recreational fishing means fishing for sport or pleasure, but not for sale.

Regulatory discards are fish harvested in a fishery which fishermen are required by regulation to discard whenever caught or are required by regulation to retain, but not sell.

Roller (or bobbin) trawl is a bottom trawl that has footropes equipped with rollers or bobbins made of wood, steel, rubber, plastic, or other hard material which keep the footrope above the seabed, thereby protecting the net.

Set net is a stationary, buoyed, and anchored gillnet or trammel net.

Stock Assessment and Fishery Evaluation (SAFE) document is a document prepared by the Council that provides a summary of the most recent biological condition of species in the fishery management unit, and the social and economic condition of the recreational and commercial fishing industries, and the fish processing industry. It summarizes, on a periodic basis, the best available information concerning the past, present, and possible future condition of the stocks and fisheries managed by the FMP.

Target fishing means fishing for the primary purpose of catching a particular species or species group (the target species).

A total catch limit is a portion of the OY for a groundfish FMU species, stock, or stock complex assigned to a defined fishery sector or to an individual vessel. Total catch is defined as landed catch plus bycatch (discard) mortality. The Council may specify total catch limits that are transferable or nontransferable among sectors or tradable or nontradable between vessels.

Trammel net is a gillnet made with two or more walls joined to a common float line.

Trap (or pot) is a portable, enclosed device with one or more gates or entrances and one or more lines attached to surface floats.

Spawning biomass is the biomass of mature female fish at the beginning of the year. If the production of eggs is not proportional to body weight, then this definition should be modified to be proportional to expected egg production.

Spawning biomass per recruit is the expected egg production of a female fish over its lifetime. Alternatively, this is the mature female biomass of an equilibrium stock divided by the mean level of recruitment that produced this stock.

Spear is a sharp, pointed, or barbed instrument on a shaft. Spears may be propelled by hand or by mechanical means.

Vertical hook-and-line gear (commercial) is hook-and-line gear that involves a single line anchored at the bottom and buoyed at the surface so as to fish vertically.

[Amended: 5, 11, 13, 17, 18, 19]

3.0 AREAS AND STOCKS INVOLVED

No changes in this chapter.

4.0 PREVENTING OVERFISHING AND ACHIEVING OPTIMUM YIELD

National Standard 1 requires that "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the OY from each fishery for the U.S. fishing industry." (50 CFR 600.310(a))

"The determination of OY is a decisional mechanism for resolving the Magnuson-Stevens Act's multiple purposes and policies, implementing an FMP's objectives and balancing the various interests that comprise the national welfare. OY is based on MSY, or on MSY as it may be reduced ... [in consideration of social, economic or ecological factors].... The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing." (50 CFR Section 600.310(b))

This chapter addresses the essential considerations suggested for National Standard 1, as identified in the NMFS guidelines on the standard (600.310):

- Estimating MSY, estimated the MSY biomass and setting the MSY control rule (50 CFR 600.310(c); Section 4.2 of this Chapter).
- Specifying stock status determination criteria (maximum fishing mortality threshold and minimum stock size threshold, or reasonable proxies thereof) (50 CFR 600.310(d); Section 4.4 of this Chapter).
- Actions for ending overfishing and rebuilding overfished stocks (including the development and adoption of rebuilding plans) (50 CFR 600.310(e); Section 4.5 of this Chapter).
- Setting OY and apportionment of harvest levels (50 CFR 600.310(f); Section 4.6 of this Chapter).

In establishing OYs for West Coast groundfish, this FMP uses the interim step of calculating ABCs for major stocks or management units (groups of species). ABC is the MSY harvest level associated with the current stock abundance. Over the long term, if ABCs are fully harvested, the average of the ABCs would be MSY.

OY is set and apportioned under the procedures outlined in Chapter 5.

[Added: 16-1]

4.1 Species Categories

BMSY, ABC and the overfished/rebuilding stock size threshold cannot be precisely defined for all species, because of the absence of available information for many species managed under the FMP. For the purpose of setting MSY, ABC, the maximum fishing mortality threshold (MFMT), the minimum stock size threshold (MSST), OY and rebuilding standards, three categories of species are identified. The first are the relatively few species for which a quantitative stock assessment can be conducted on the basis of catch-at-age or other data. ABCs and overfished/rebuilding thresholds can generally be calculated for these species. The second category includes a large number of species for which some biological indicators are available, but a quantitative analysis cannot be conducted. It is difficult to estimate overfished and overfishing thresholds for the second category of species a priori, but indicators of long-term, potential overfishing can be identified. ABCs for species in this category are typically set at a constant level and some monitoring is necessary to determine if this level of catch is causing a slow decline in stock abundance. The third category includes minor species which are caught, but for which there is, at best, only information on landed biomass. For species in this category, it is impossible to determine MSY, ABC, or an overfished threshold

[Amended: 16-1]

4.2 Determination of MSY, or MSY Proxy, and B_{MSY}

Harvest policies are to be specified according to standard reference points such as MSY (MSY, interpreted as a maximum average achievable catch under prevailing ecological and environmental conditions over a prolonged period). The long-term average biomass associated with fishing at F_{MSY} is B_{MSY}. In this FMP, MSY generally refers to a constant F control rule that is assumed to produce the maximum average yield over time while protecting the spawning potential of the stock. Thus the constant F control rule is generally the proxy for the MSY control rule. Fishing rates above F_{MSY} eventually result in biomass smaller than B_{MSY} and produce less harvestable fish on a sustainable basis. The biomass level that produces MSY (i.e., B_{MSY}) is generally unknown and assumed to be variable over time due to long-term fluctuations in ocean conditions, so that no single value is appropriate. During periods of unfavorable environmental conditions it is important to account for reduced sustainable yield levels.

The problem with an F_{MSY} control rule is that it is tightly linked to an assumed level of density-dependence in recruitment, and there is insufficient information to determine the level of density-dependence in recruitment for many West Coast groundfish stocks. Therefore, the use of approximations or proxies is necessary. Absent a more accurate determination of F_{MSY}, the Council will apply default MSY proxies. The current (2001) proxies are: F40% for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ for all species such as sablefish and lingcod. However, values ($F_{40\%}$, $F_{45\%}$, and $F_{50\%}$) are provided here as examples only and are expected to be modified from time to time as scientific knowledge improves. If available information is sufficient, values of F_{MSY}, B_{MSY}, and more appropriate harvest control rules may be developed for any species or species group.

At this time, it is generally believed that, for many species, $F_{45\%}$ strikes a balance between obtaining a large fraction of the MSY if recruitment is highly insensitive to reductions in spawning biomass and preventing a rapid depletion in stock abundance if recruitment is found to be extremely sensitive to reductions in spawning biomass. The long-term expected yield under an $F_{45\%}$ policy depends upon the (unknown) level of density-dependence in recruitment. The recommended level of harvest will reduce the average lifetime egg production by each female entering the stock to 45% of the lifetime egg production for females that are unfished.

Because the level of recruitment is expected to decline somewhat as a stock is fished at $F_{45\%}$, the expected B_{MSY} proxy is less than 45% of the unfished biomass. A biomass level of 40% is a reasonable proxy for BMSY. The short-term yield under an $F_{45\%}$ policy will vary as the abundance of the exploitable stock varies. This is true for any fishing policy that is based on a constant exploitation rate. The abundance of the stock will vary, because of the effects of fishing, and because of natural variation in recruitment. When stock abundance is high (i.e., near its average unfished level), short-term annual yields can be approximately two to three times greater than the expected long-term average annual yield. For many of the long-lived groundfish species common on the West Coast, this "fishing down" transition can take decades. Many of the declines in ABC that occurred during the 1980s were the result of this transition from a lightly exploited, high abundance stock level to a fully exploited, moderately abundant stock level. Further declines below the overfished levels in the 1990s were due in large part to harvest rate policies that were later discovered to not be sustainable. More recent stock assessments indicate that West Coast groundfish stocks likely have lower levels of productivity than other similar species worldwide. Based on this retrospective information, harvest rate policies in the 1990s were too high to maintain stocks at B_{MSY}.

The Council revised its harvest rate policies for lower levels of production, described below.

Scientific information as of 1997 (Clark 1993; Ianelli and Heifetz 1995; Mace 1994) indicated that $F_{35\%}$ may not be the best approximation of FMSY, given more realistic information about recruitment than was initially used by Clark in 1991. In his 1993 publication Clark extended his 1991 results by improving the realism of his simulations and analysis. In particular he (1) modeled stochasticity into the recruitment process, (2) introduced serial correlation into recruitment time series, and (3) performed separate analyses for the Ricker and Beverton-Holt spawner-recruit functions. For rockfish, these changes improved the realism of his spawning biomass per recruit (SPR) harvest policy calculations, because these species are known to have stochastic recruitment and they appear to display serial correlation in recruitments (especially on interdecadal time scales), and because the Beverton-Holt spawner-recruit curve may be biologically the most plausible recruitment model. The effect of each of these changes, in isolation and in aggregate, was to decrease FMSY. Consequently, the estimated SPR reduction needed to provide an optimal F_{MSY} proxy (defined as that level of fishing which produces the largest assured proportion of MSY), must necessarily be increased. Clark concluded that $F_{40\%}$ is the optimal rate for fish stocks exhibiting recruitment variability similar to Alaska groundfish stocks. Likewise, Mace (1994) recommended the use of $F_{40\%}$ as the target mortality rate when the stock-recruitment relationship is unknown. Lastly, Ianelli and Heifitz (1995) determined that F44% was a good F_{MSY} proxy for Gulf of Alaska Pacific ocean perch, although he subsequently indicated that a recent recruitment to that stock was larger than expected and that $F_{44\%}$ may be too conservative in that case.

Based on this information and advice by its Groundfish Management Team, in 1997 the Council concluded that $F_{40\%}$ should be used as the proxy for FMSY for rockfish in the absence of specific knowledge of recruitment or life history characteristics which would allow a more accurate determination of FMSY. This proxy was later revised based on further Scientific and Statistical Committee (SSC) investigation into the appropriate FMSY proxies in 2000.

In the spring of 2000, the Council's SSC sponsored a workshop to review the Council's groundfish exploitation rate policy. The workshop explored the historic use of different fishing mortality (F) rates and found that the Council's past practices have generally changed in response to new information from the scientific community. Starting in the early 1990s, the Council used a standard harvest rate of F35%. The SSC's workshop participants reported that new scientific studies in 1998 and 1999 had shown that the $F_{35\%}$ and $F_{40\%}$ rates used by the Council had been too aggressive for Pacific Coast groundfish stocks, such that some groundfish stocks could not maintain a viable population over time. A 1999 study, The Meta-Analysis of the Maximum Reproductive Rate for Fish Populations to Estimate Harvest Policy; a Review (Myers, *et al.* 2000) showed that Pacific Coast groundfish stocks, particularly rockfish, have very low productivity compared to other, similar species worldwide. One prominent theory about the reason for this low productivity is the large-scale North Pacific climate shifts that are thought to cycle Pacific Coast waters through warm and cool phases of 20-30 years duration. Pacific Coast waters shifted to a warm phase around 1977-1978, with ocean conditions less favorable for Pacific Coast groundfish and other fish stocks. Lower harvest rates are necessary to guard against steep declines in abundance during these periods of low productivity (low recruitment). After an intensive review of historic harvest rates, and current scientific literature on harvest rates and stock productivity, the SSC workshop concluded that $F_{40\%}$ is too aggressive for many Pacific Coast groundfish stocks, particularly for rockfish. For 2001 and beyond, the Council adopted the SSC's new recommendations for harvest policies of: $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish (including thornyheads) and $F_{45\%}$ for other groundfish such as sablefish and lingcod.

In the past, F_{MSY} fishing rates were treated by the Council (as intended) as targets. Under the Magnuson-

Stevens Act as amended in 1996, these fishing rates are more appropriately considered to be thresholds that should not be exceeded (see Section 4.4).

The Council will consider any new scientific information relating to calculation of MSY or MSY proxies and may adopt new values based on improved understanding of the population dynamics and harvest of any species or group of species.

While BMSY may be set based on the averaged unfished abundance ($B_{unfished}$) there are many possible approximations and estimates of mean $B_{unfished}$. If the necessary data exist, the following standard methodology is the preferred approach:

$$\text{mean } B_{unfished} = \text{mean } R * SPR(F{=}0)$$

Where mean R is the average estimated recruitment expected under unfished conditions, and SPR(F=0) is the spawning potential per recruit at zero fishing mortality rate. SPR(F=0) is normally available as part of the calculation leading to determination of $F_{45\%}$ and is equivalent to $F_{100\%}$.

[Amended: 5, 11, 16-1]

4.3 Determination of ABC

In establishing OYs for West Coast groundfish, this FMP utilizes the interim step of calculating ABCs for major stocks or management units (groups of species). ABC is the MSY harvest level associated with the current stock abundance. Over the long term, if ABCs are fully harvested, the average of the ABCs would be MSY.

4.3.1 Stocks with Quantitative Assessments, Category 1

The stocks with quantitative assessments are those that have recently been assessed by a catch-at-age analysis. Annual evaluation of the appropriate MSY proxy (e.g., F45%) for species in this category will require some specific information in the SAFE document. Estimated age-specific maturity, growth, and availability to the fishery (with evaluation of changes over time in these characteristics) are sufficient to determine the relationship between fishing mortality and yield-per-recruit and spawning biomass-per-recruit. The estimated time series of recruitment, spawning biomass, and fishing mortality are also required to determine whether recent trends indicate a point of concern. In general, ABC will be calculated by applying $F_{45\%}$ (or F40%, F50%, or other established MSY proxy) to the best estimate of current biomass. This current biomass estimate may be for a single year or the average of the present and several future years. Thus, ABC may be intended to remain constant over a period of three or more years.

4.3.2 Stocks with ABC Set by Nonquantitative Assessment, Category 2

These stocks with ABC set by nonquantitative assessments typically do not have a recent, quantitative assessment, but there may be a previous assessment or some indicators of the status of the stock. Detailed biological information is not routinely available for these stocks, and ABC levels have typically been established on the basis of average historical landings. Typically, the spawning biomass, level of recruitment, or the current fishing mortality rate for Category 2 stocks are unknown. The Council places high priority on improving the information for managing these stocks so that they may be moved to Category 1 status.

4.3.3 Stocks Without ABC Values, Category 3

Of the 80-plus groundfish species managed under the FMP, ABC values have been established for only about 25. The remaining species are incidentally landed and usually are not listed separately on fish landing receipts. Information from fishery independent surveys are often lacking for these stocks, because of their low abundance or they are not vulnerable to survey sampling gear. Until sufficient quantities of at-sea observer program data are available or surveys of other fish habitats are conducted, it is unlikely that there will be sufficient data to upgrade the assessment capabilities or to evaluate the overfishing potential of these stocks. Interim ABC values may be established for these stocks based on qualitative information, including advice from the Council's advisory entities.

[Amended: 11, 12, 16-1]

4.4 Precautionary Thresholds and Overfishing Status Determination Criteria

The National Standard Guidelines define two thresholds that are necessary to maintain a stock at levels capable of producing MSY: the maximum fishing mortality threshold (MFMT) and a minimum stock size threshold (MSST). These two limits are intended for use as benchmarks to decide if a stock or stock complex is being overfished or is in an overfished state. The MFMT and MSST are intrinsically linked through the MSY control rule, which specifies how fishing mortality or catches could vary as a function of stock biomass in order to achieve yields close to MSY.

4.4.1 Determination of Precautionary Thresholds

The precautionary threshold is the biomass level at which point the harvest rate will be reduced to help the stock return to the MSY level (see Section 4.5.1 "Default Precautionary and Interim Rebuilding OY Calculation"). The precautionary biomass threshold is in addition to the overfishing and overfished/rebuilding thresholds required under ths Magnuson-Stevens Act (MFMT and MSST). The precautionary biomass threshold is higher than the overfished biomass (MSST). Because BMSY is a long term average, biomass will by definition be below BMSY in some years and above BMSY in other years. Thus, even in the absence of overfishing, biomass may decline to levels below BMSY due to natural fluctuation. By decreasing harvest rates when biomass is below BMSY but maintaining MSY control rule (or proxy control rule) harvest rates for biomass levels above MSY, the precautionary threshold and accompanying response effectively constitute a control rule that manages for harvests lower than MSY and an average biomass above MSY.

The precautionary threshold is established only for category 1 species. The precautionary threshold will be the BMSY level, if known. The default precautionary threshold will be 40% of the estimated unfished biomass level. The Council may recommend different precautionary thresholds for any species or species group based on the best scientific information about that species or group. It is expected the threshold will be between 25% and 50% of the estimated unfished biomass level.

4.4.2 Determination of Overfishing Threshold

In this FMP, for Category 1 species, the term "overfishing" is used to denote situations where catch exceeds or is expected to exceed the established ABC or MSY proxy ($F_{x\%}$). This can also be expressed as where catch exceeds or is expected to exceed the MFMT. The term "overfished" describes a stock whose abundance is below its overfished/rebuilding threshold, or MSST. Overfished/rebuilding thresholds, in general, are linked to the same productivity assumptions that determine the ABC levels. The default value of this threshold is 25% of the estimated unfished biomass level or 50% of B_{MSY}, if known. The MFMT is simply the value(s) of fishing mortality in the MSY control rule. Technically, exceeding FMSY constitutes overfishing.

For Category 2 species, the following may be evaluated as potential indicators of overfishing:

- catch per effort from logbooks
- catch area from logbooks
- index of stock abundance from surveys
- stock distribution from surveys
- mean size of landed fish

If declining trends persist for more than three years, then a focused evaluation of the status of the stock, its ABC, and overfishing threshold will be quantified. If data are available, such an evaluation should be conducted at approximately five year intervals even when negative trends are not apparent. In fact, many stocks are in need of re-evaluation to establish a baseline for monitoring of future trends. Whenever an evaluation indicates the stock may be declining and approaching an overfished state, the Council should:

1. Improve data collection for this species so it can be moved to Category 1.

2. Determine the rebuilding rate that would allow the stock to return to MSY in no longer than ten years.

Information from fishery independent surveys is often lacking for Category 3 species because of their low abundance or because they are not vulnerable to survey sampling gear. Until sufficient data become available from the at-sea observer program, the risk of overfishing these species cannot be fully evaluated.

4.4.3 Determination of Overfished/Rebuilding Thresholds

The MSST (overfished/rebuilding threshold) is the default value of 25% of the estimated unfished biomass level or 50% of B_{MSY}, if known. The overfished/rebuilding threshold (also referred to as $B_{rebuild}$), is generally in the range of 25% to 40% of $B_{unfished}$, and may also be written as

$B_{rebuild}$ = x% * mean R * SPR(F=0)

The default overfished/rebuilding threshold for category 1 groundfish is $0.25B_{unfished}$. The Council may establish different thresholds for any species based on information provided in stock assessments, the SAFE document, or other scientific or groundfish management-related report. For example, if B_{MSY} is known, the overfished threshold may be set equal to 50% of that amount. The Council may also specify a lower level of abundance where catch or fishing effort is reduced to zero. This minimum abundance threshold (B_{MIN}) would correspond to an abundance that severely jeopardizes the stock's ability to recover to B_{MSY} in a reasonable length of time.

[Amended: 11, 12, 16-1]

4.5 Ending Overfishing and Rebuilding

4.5.1 Default Precautionary and Interim Rebuilding OY Calculation

The precautionary threshold, defined in Section 4.4.1, is used to trigger a precautionary management approach. If biomass declines to a level that requires rebuilding (below the MSST), the precautionary management approach also provides an interim rebuilding harvest control policy to guide ~~the~~ setting the OY until the Council sets a new rebuilding policy specific to the conditions of the stock and fishery. The default OY/rebuilding policy can be described as an "ICES-type catch-based approach" that consists of a modification of the catch policy, where catch (C) declines from $C(F_{MSY})$ at the precautionary threshold in a straight line to F=0 at the minimum abundance threshold of ten percent of the estimated mean unfished biomass (sometimes called pristine or virgin biomass or reproductive potential). This approach could also be described as an OY based on a variable FSPR that is progressively more conservative at low biomass levels. The abbreviated name for this is the "40-10" default adjustment. In most cases, there is inadequate information to estimate FMSY; in such cases, the best proxy for F_{MSY} will be used. The default proxy values will be $F_{40\%}$ for flatfish and whiting, $F_{50\%}$ for rockfish in the Sebastes complex and $F_{45\%}$ for other species such as sablefish and lingcod. The Council anticipates scientific information about the population dynamics of the various stocks will improve over time and that this information will result in improved estimates of appropriate harvest rates and MSY proxies. Thus, these initial default proxy values will be replaced from time to time. Such changes will not require amendment to the FMP, but the scientific basis for new values must be documented.

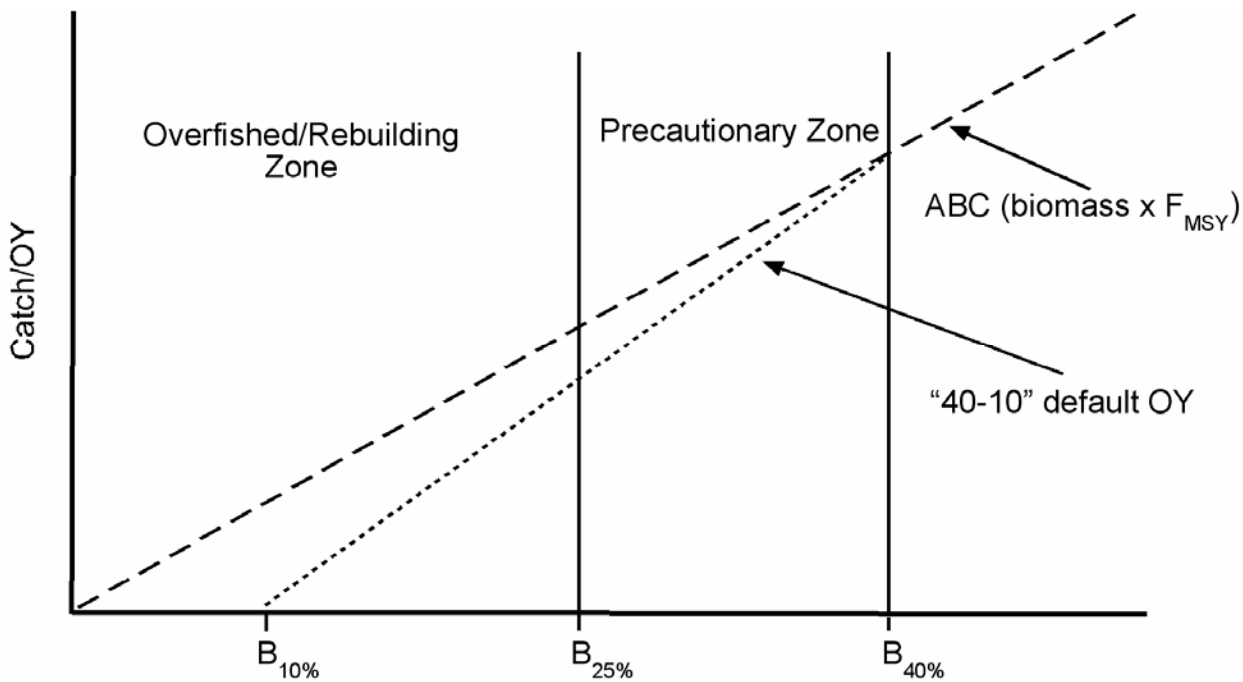


FIGURE 4-1. Illustration of default OY rule compared to ABC.

The greater amount of catch reduction applied below the precautionary threshold will foster quicker return to the MSY level. If a stock falls below its overfished/rebuilding threshold, this line would be used as the interim rebuilding plan during the year until the Council develops a formal rebuilding plan. The point at which the line intersects the horizontal axis does not necessarily imply zero catch would be allowed, but rather is for determining the slope of the line.

In order to apply this default approach, a minimal amount of information is necessary; only stocks in Category 1 can be managed in this way. For stocks with inadequate information to apply this approach, the Council will consider other methods of ensuring that overfishing will be avoided. The Council will consider the approaches discussed in the National Standard Guidelines in developing such recommendations for stocks in Categories 2 and 3.

4.5.2 Procedures For Calculating Rebuilding Parameters

The Magnuson-Stevens Act and National Standard Guidelines provide a descriptive framework for developing strategies to rebuild overfished stocks. This framework identifies three parameters: a minimum time in which an overfished stock ~~may~~ can rebuild to its target biomass (denoted T_{MIN}), a maximum permissible time period for rebuilding the stock to its target biomass (T_{MAX}), and a target year, falling within the time period ~~represented~~ between T_{MIN} and T_{MAX} and representing the ~~best of estimate of~~ the year by which the stock ~~will~~ can be rebuilt, as soon possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem (T_{TARGET}).

T_{MIN}, the lower limit of the specified time period for rebuilding, will be determined by the status and biology of the stock or stock complex and its interactions with other components of the marine ecosystem or environmental conditions, and is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely.

If ~~the lower limit~~ T_{MIN} is less than ten years, then the specified time period for rebuilding may be adjusted upward so that the rebuilding period is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem, ~~to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participates,~~ except that no such upward adjustment may result in the specified time period exceeding ten years (which would then constitute T_{MAX}), unless management measures under an international agreement in which the United States participates dictate otherwise.

If the ~~lower limit~~ T_{MIN} is ten years or greater, then the specified time period for rebuilding may be adjusted upward so that the rebuilding period is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem, ~~to the extent warranted by the needs of fishing communities and recommendations by international organizations in which the United States participate~~s, except that no such upward adjustment can exceed the rebuilding period calculated in the absence of fishing mortality, plus one mean generation time or equivalent period based on the species' life-history characteristics. For example, if a stock could be rebuilt within 12 years in the absence of any fishing mortality, and has a mean generation time of eight years, the maximum allowable time to rebuild would be ~~the rebuilding period could be as long as~~ 20 years, which is T_{MAX}.

The Council may consider a number of factors in determining the time period for rebuilding, including:

1. The status and biology of the stock or stock complex.

2. Interactions between the stock or stock complex and other components of the marine ecosystem or environmental conditions.

3. The needs of fishing communities.

4. Recommendations by international organizations in which the United States participates.

5. Management measures under an international agreement in which the United States participates.

Calculating Rebuilding Probabilities

Stock assessment results form the basis of a rebuilding analysis, which in turn is used to develop rebuilding policies and choose the rebuilding parameters identified in each rebuilding plan. The elements of rebuilding analyses are described in the SSC Terms of Reference for Rebuilding Analyses (SSC 2001). This guidance has been incorporated into a computer program (Punt 2002). In the analysis the probability that the overfished stock will reach its target biomass is determined with respect to T_{MIN}, T_{MAX}, and T_{TARGET}. The methods for calculating the values of these parameters are described below. This is a simplified explanation of the current methodology; for example, equations and technical specifications are omitted. The SSC may revise their terms of reference in the future and the computer program undergoes continued refinement and elaboration.

The rebuilding analysis program uses "Monte Carlo simulation" to derive a probability estimate for a given rebuilding strategy. This method projects population growth many times in separate simulations. It accounts for possible variability by randomly choosing the value of a key variable—in this case total recruitment or recruits per spawner—from a range of values. These values can be specified empirically, by listing some set of historical values, or by a relationship based on a model. The SSC recommends that the rebuilding analyses use historical values. Because of this variability in a key input value, each simulation will show a different pattern of population growth. As a result, a modeled population may reach the target biomass that defines a rebuilt stock (B_{MSY}) in a different year in each of the simulations.

This technique ~~can be used~~ ~~is~~ first used to calculate T_{MIN} in probabilistic terms, which is defined as the time needed to reach the target biomass in the absence of fishing with a 50% probability. In other words, in half the simulations the target biomass was reached in some year up to and including the computed T_{MIN}. Given T_{MIN}, T_{MAX} is computed as 10 years or by adding the value of one mean generation time to T_{MIN}, if T_{MIN} is greater than or equal to 10 years.

~~After determining T_{MAX}, multiple Monte Carlo simulations are conducted, varying the fishing mortality rate. This determines the relationship between F and the probability of the stock being rebuilt by T_{MAX} (denoted P_{MAX}). Since a higher P_{MAX} probability must be achieved by lowering the fishing mortality rate (other things being equal) there is a tradeoff between fishery harvests and rebuilding speed in probabilistic terms. As fishing mortality is reduced, the likelihood that the stock will recover in this maximum time period increases.~~

A target year, T_{TARGET}, is ~~then computed as the median rebuilding year for each related F and P_{MAX}. The median year is simply the year by which half of all cases have already rebuilt, and is unique for a given F and P_{MAX}.~~ set as a year that at T_{MIN} or greater, yet which does not exceed T_{MAX} ,and which is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem. Prior to Amendment 16-4, the Council set T_{TARGET} in part by considering the probability of rebuilding the stock by T_{MAX}. The Council may continue to review the probability of rebuilding the stock by T_{MAX} given differing F rates, a reference parameter known as "P_{MAX}." The Magnuson-Stevens Act, however, simply requires that rebuilding periods be as short as possible, taking into account:

- the status and biology of any overfished stocks of fish;
- the needs of fishing communities;

- recommendations by international organizations in which the United States participates;
- the interaction of the overfished stock of fish within the marine ecosystem. (§304(e)(4)(A)(i))

It is important to recognize that some of the terms introduced and described above represent policy decisions at the national level and the Council **does not have a choice** in setting their values. The dates for T_{MIN} and T_{MAX} are determined based on guidelines established at the national level. Mean generation time is a biological characteristic that cannot be chosen by policymakers. Thus, the Council cannot choose these values and then use them as a basis for management. Defined in national guidelines, T_{MIN} is a consequence of the productivity of the fish stock and is calculated by fishery biologists based on information they get from a particular stock. Similarly, T_{MAX}, which is calculated from T_{MIN}, does not represent a Council choice.

Policy flexibility comes into play in determining T_{TARGET}, or the time by which the stock is projected to rebuild. As explained earlier, the time to rebuild must be as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem. ~~Fundamentally,~~ W~~w~~hen developing a management strategy, the Council **can** choose a fishing mortality rate and corresponding annual level of fishing. However, when rebuilding overfished species, the choice of F ~~can be~~ is based on ~~either~~ the value of T_{TARGET} ~~or P_{MAX}~~, keeping in mind that these ~~three~~ values cannot be chosen independently of one another. In other words, the Council may choose one ~~of these~~ value~~s~~ and derive the other ~~two~~ from it, but they cannot choose these values ~~for two of these terms~~ independently of ~~the third~~ each other.

4.5.3 Stock Rebuilding Plans

As required by the Magnuson-Stevens Act, within one year of being notified by the Secretary that a stock is overfished or approaching a condition of being overfished, the Council will prepare a recommendation to end the overfished condition and rebuild the stock(s) or to prevent the overfished condition from occurring. For a stock that is overfished, the rebuilding plan will specify a time period for ending the overfished condition and rebuilding the stock. Overfishing restrictions and recovery benefits should be fairly and equitably allocated among sectors of the fishery.

Certain elements of a rebuilding plan developed by the Council, as specified in Section 4.5.3.2 (Contents of Rebuilding Plans), will be submitted to the Secretary as an FMP amendment and implementing regulations. Changes to key rebuilding plan elements will be accomplished through full (notice and comment) rulemaking. Once approved by the Secretary, a rebuilding plan will remain in effect for the specified duration of the rebuilding program, or until modified. The Council will make all approved rebuilding plans available in the annual SAFE document or by other means. The Council may recommend that the Secretary implement interim measures to reduce overfishing until the Council's program has been developed and implemented.

The Council intends its stock rebuilding plans to provide targets, checkpoints, and guidance for rebuilding overfished stocks to healthy and productive levels. They should provide a clear vision of the intended results and the means to achieve those results. They will provide the strategies and objectives that regulations are intended to achieve, and proposed regulations and results will be measured against the rebuilding plans. It is likely that rebuilding plans will be revised over time to respond to new information, changing conditions, and success or lack of success in achieving the rebuilding schedule and other goals. If, in response to these revisions, the Council recommends changes to the management target for a particular stock, such changes will be published through full (notice and comment) rulemaking as described in Section 6.2 of this FMP. As with all Council activities, public participation is critical to the development, implementation and success of management programs.

4.5.3.1 Goals and Objectives of Rebuilding Plans

The overall goals of rebuilding programs are to (1) achieve the population size and structure that will support the maximum sustainable yield within a ~~the~~ specified time period that is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem; (2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on fishing communities; (3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors; (4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and (5) promote widespread public awareness, understanding and support for the rebuilding program. More specific goals and objectives may be developed in the rebuilding plan for each overfished species.

To achieve the rebuilding goals, the Council will strive to (1) explain the status of the overfished stock, pointing out where lack of information and uncertainty may require that conservative assumptions be made in order to maintain a risk-averse management approach; (2) identify present and historical harvesters of the stock; (3) where adequate harvest sharing plans are not already in place, develop harvest sharing plans for the rebuilding period and for when rebuilding is completed; (4) set harvest levels that will achieve the specified rebuilding schedule; (5) implement any necessary measures to allocate the resource in accordance with harvest sharing plans; (6) promote innovative methods to reduce bycatch and bycatch mortality of the overfished stock; (7) monitor fishing mortality and use available stock assessment information to evaluate the condition of the stock; (8) identify any critical or important habitat areas and implement measures to ensure their protection; and (9) promote public education regarding these goals, objectives, and the measures intended to achieve them.

4.5.3.2 Contents of Rebuilding Plans

Generally, rebuilding plans will contain:

1. A description of the biology and status of the overfished stock and fisheries affected by stock rebuilding measures.

2. A description of how rebuilding parameters for the overfished stock were determined (including any calculations that demonstrate the scientific validity of parameters).

3. Estimates of rebuilding parameters ($B_{UNFISHED}$, B_{MSY}, T_{MIN}, T_{MAX}, ~~and the probability of reaching target biomass by this date~~, and T_{TARGET}) at the time of rebuilding plan adoption.

4. A description of the fishing communities' needs that were considered at the time of adoption of the plan.

~~4.~~ 5. The process, and any applicable standards, that will be used during periodic review to evaluate progress in rebuilding the stock to the target biomass (see Section 4.5.3.5).

~~5.~~ 6. Any management measures the Council may wish to specifically describe in the FMP, which facilitate stock rebuilding in the specified period. (These measures would be in addition to any existing measures typically implemented through annual or biennial management. See Section

4.5.3.4 for more information.)

~~6.~~ 7. Any goals and objectives in addition to or different from those listed in the preceding section.

~~7.~~ 8. Potential or likely allocations among sectors.

~~8.~~ 9. For fisheries managed under international agreement, a discussion of how the rebuilding plan will reflect traditional participation in the fishery, relative to other nations, by fishermen of the United States.

~~9.~~ 10. Any other information that may be useful to achieve the rebuilding plan's goals and objectives.

The following questions also serve as a guide in developing rebuilding plans:

1. What is the apparent cause of the current condition (historical fishing patterns, a declining abundance or recruitment trend, a change in assessment methodology, or other factors)?

2. Is there a downward trend in recruitment that may indicate insufficient compensation in the spawner-recruitment relationship?

3. Based on ~~an~~ a comparison of historical harvest levels (including discards) relative to recommended ABC levels, has there been chronic over-harvest?

4. Is human-induced environmental degradation implicated in the current stock condition? Have natural environmental changes been observed that may be affecting growth, reproduction, and/or survival?

5. Would reduction in fishing mortality be likely to improve the condition of the stock?

6. What types of fishing communities rely on catch of this particular stock, or on catch of stocks that co-occur with this stock?

~~6.~~ 7. Is the particular species caught incidentally with other species? Is it a major or minor component in a mixed-stock complex?

~~7.~~ 8. What types of management measures are anticipated and/or appropriate to achieve the biological, social, economic, and community goals and objectives of the rebuilding plan?

Rebuilding plan documents are distinct from the analytical documents required by the National Environmental Policy Act and other legal mandates, although they will reflect the contents of those analyses in a much briefer form. Rebuilding plan elements incorporated into the FMP (in Section 4.5.4) summarize the contents enumerated in this section. Rebuilding plans as a whole will be published in the next annual SAFE document after their approval.

Any new rebuilding program will commence as soon as the first measures to rebuild the stock or stock complex are implemented.

4.5.3.3 Process for Development and Approval of Rebuilding Plans

Upon receiving notification that a stock is overfished, the Council will identify one or more individuals to draft the rebuilding plan. A draft of the plan will be reviewed and preliminary action taken (tentative adoption or identification of preferred alternatives), followed by final adoption at a subsequent meeting. The tentative plan or alternatives will be made available to the public and considered by the Council at a minimum of two meetings, unless stock conditions suggest more immediate action is warranted. Upon completing its final recommendations, the Council will submit the proposed rebuilding plan or revision to an existing plan to NMFS for concurrence. A rebuilding plan will be developed following the standard procedures for considering and implementing an FMP amendment under the Magnuson-Stevens Act and other applicable law.

The following elements in each rebuilding plan will be incorporated into the FMP in Section 4.5.4:

1. A brief description of the status of the stock and fisheries affected by stock rebuilding measures at the time the rebuilding plan was prepared.

2. The methods used to calculate stock rebuilding parameters, if substantially different from those described in Section 4.5.2.

3. An estimate at the time the rebuilding plan was prepared of:
   - unfished biomass (Bunfished) and target biomass (BMSY);
   - the year the stock would be rebuilt in the absence of fishing (T_{MIN});
   - T_{MIN} plus one mean generation time (T_{MAX}); and
   - ~~the year the stock would be rebuilt if the maximum time period permissible under National Standard Guidelines were applied (T_{MAX}) and the estimated probability that the stock would be rebuilt by this date based on the application of stock rebuilding measures; and~~
   - the year in which the stock would be rebuilt based on the application of stock rebuilding measures that achieve rebuilding as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the overfished stock within the marine ecosystem (T_{TARGET}).

4. A description of the harvest control rule (e.g., constant catch or harvest rate) and the specification of this parameter. The types of management measures that will be used to constrain harvests to the level required ~~implied~~ by the control rule will also be described (see also Section 4.5.3.4). These two elements, the harvest control rule and a description of management measures, represents the rebuilding strategy intended to rebuild the stock by the target year.

It is likely that over time the parameters listed above will change. It must be emphasized that the values enumerated in the FMP represent estimates at the time the rebuilding plan is prepared. Therefore, the FMP need not be amended if new estimates of these values are calculated. The values for these parameters found in the FMP are for reference, so that managers and the public may track changes in the strategy used to rebuild an overfished stock. However, any new estimates of the parameters listed above will be published in the SAFE documents as they become available.

4.5.3.4 Updating Key Rebuilding Parameters

In addition to an initial specification in the FMP, the target year (T_{TARGET}) and the harvest control rule (type and numerical value) will also be specified in regulations. If new information indicates a need to change the value of either of these two parameters, such a change will be accomplished through full (notice and comment) rulemaking as described in Section 6.2 of this FMP. The target year is the year by which the stock would be rebuilt to its target biomass. Therefore, if a subsequent analysis identifies an earlier target year for the current fishing mortality rate (based on the harvest control rule), there is no obligation to change in regulations either the target year (to the computed earlier year) or the harvest control rule (to delay rebuilding to the original target year). Stock assessments for overfished species are typically conducted every two years. Stock assessments and rebuilding analyses use mathematical models to predict a stock's current abundance, as well as project future abundance and recruitment. In any mathematical model that uses a variety of data sources, as the stock assessments do, model results tend to vary from one assessment to the next within some range of values. This expected variation means that, when the Council and SSC review a new overfished species stock assessment and rebuilding model, they must also consider whether the result of that model or models show a rebuilding trajectory that varies from the previously-predicted trajectory to a significant degree. If the variation between the stock assessments and rebuilding analyses for a particular species do not show significant differences in the rebuilding trajectory for that species, they are mathematically considered to be essentially the same. In that circumstance, the Council will likely not need to revise the T_{TARGET} or harvest control rule for that species. Since the target year is ~~a~~ the key rebuilding parameter, it should only be changed after careful deliberation. For example, the Council might recommend that the target year be changed if, based on new information about the status and/or biology of the stock, they determine that the existing target year is later than the recomputed maximum rebuilding time (T_{MAX}) or if a recomputed harvest control rule would result in such a low optimum yield as to cause substantial socioeconomic impacts. These examples are not definitive: the Council may elect to change the target year because of other circumstances. However, any change to the target year or harvest control rule must be supported by commensurate analysis that demonstrates that the new target year is a target to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock within the marine ecosystem.

4.5.3.5 Implementation of Actions Required Under the Rebuilding Plan

NMFS will implement or adjust, with the adoption of the rebuilding plan, any management measures not already in effect that are necessary to implement the rebuilding plan. Many necessary measures may already be in place through the standard management process. Because of the complex nature of the fishery and the interaction of various stocks, regulations will need to be adjusted over the periods of the rebuilding plans. Management measures will be adjusted, or new measures will be developed and implemented in the future, in order to best implement each rebuilding plan throughout the life of that plan.

Once a rebuilding plan is adopted, certain measures required in the rebuilding plan may need to be implemented through authorities and processes already described in the FMP. Management actions to achieve OY harvest, and objectives related to rebuilding requirements of the Magnuson-Stevens Act and goals and objectives of the FMP (each of which may require a slightly different process) include: automatic actions, notices, abbreviated rulemaking actions, and full rulemaking actions. (These actions are detailed in Section 4.6, Chapter 5, and Section 6.2.) Allocation proposals require consideration as specified in the allocation framework (see Section 6.2.3.1). Any proposed regulations to implement the rebuilding plan will be developed in accordance with the framework procedures of this FMP.

Any rebuilding management measures that are not already authorized under the framework of the existing FMP, or specified in the FMP consequent of rebuilding plan adoption, will be implemented by further FMP amendments. These plan amendments may establish the needed measures or expand the framework to allow the implementation of the needed measures under framework procedures.

The Council may designate a state or states to take the lead in working with its citizens to develop management proposals to achieve stock rebuilding.

4.5.3.6 Periodic Review of Rebuilding Plans

Rebuilding plans will be reviewed periodically, but at least every two years, although the Council may propose revisions to an adopted rebuilding plan at any time. These reviews will take into account the goals and objectives listed in Section 4.5.3.1, recognizing that progress towards the first goal, to achieve the population size and structure that will support MSY within the specified time period, will only be evaluated on receipt of new information from the most recent stock assessment. ~~In evaluating progress towards achieving target biomass, the Council will use the standard identified in the rebuilding plan. When drafting a rebuilding plan one of the following standards, or a standard similar in kind to the following, may be chosen:~~

- ~~If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below 50% (the required minimum value), then progress will be considered inadequate.~~

- ~~If the probability of achieving the target biomass within the maximum permissible time period (T_{MAX}) falls below the value identified in the rebuilding plan, then progress will be considered inadequate.~~

The Council, in consultation with the SSC and GMT, will determine on a case-by-case basis whether there has been a significant change in a parameter such that the chosen management target must be revised. If, based on this review, the Council decides that the harvest control rule or target year must be changed, the procedures outlined in Section 4.5.3.3 will be followed. Regardless of the Council's schedule for reviewing overfished species rebuilding plans, the Secretary of Commerce, through NMFS, is required to review the progress of overfished species rebuilding plans toward rebuilding goals every two years, per Magnuson-Stevens Act at 16 U.S.C. §304(e)(7).

4.5.3.7 Precedence of a Recovery Plan or "No Jeopardy" Standard Issued Pursuant to the Endangered Species Act

Like rebuilding plans pursuant to National Standard 1 in the Magnuson-Stevens Act, a recovery plan pursuant to the Endangered Species Act outlines measures for the conservation and survival of the designated species. Under Section 7 of the Endangered Species Act an agency must consult NMFS when any activity permitted, funded, or conducted by that agency may affect a listed marine species or its designated critical habitat. (In the case of fishery management actions, NMFS is both the action and consulting agency.) As part of these consultations, a biological opinion is produced describing standards that must be met when permitting or implementing the action to ensure that the action is not likely to jeopardize the continued existence of the listed species; these are referred to as "no jeopardy" standards.

Measures under a recovery plan or "no jeopardy" standards in a biological opinion will supercede rebuilding plan measures and targets if they will result in the stock rebuilding to its target biomass by an earlier date than the target year identified in the current rebuilding plan. (If expressed probabilistically, any ESA standard expressed as a combination of date and probability that constitutes a higher standard will take precedence over the equivalent target and probability in the rebuilding plan. For example, an ESA standard requiring recovery by the rebuilding plan target year, but with a higher probability, would take precedence over the rebuilding plan.) If a stock is de-listed before reaching its target biomass, the rebuilding plan will come back into effect until such time as the stock is fully rebuilt.

4.5.4 Summary of Rebuilding Plan Contents

[April 2006 Note: draft FMP amendatory language for species-specific rebuilding plans in 4.5.4.1 through 4.5.4.8 will be available at the Council's June 2006 meeting, based in part on Council decisions made at the April 2006 meeting.]

As noted in Section 4.5.3.3, this section summarizes the contents of rebuilding plans, including the values for rebuilding parameters, at the time of their adoption. The specified numerical values for these parameters are likely to change over time. This section will not be amended to incorporate any revised values. As described in Section 4.5.3.4, if the numerical specification of the harvest control rule or target year for a given overfished species is changed, the new value will be published in federal groundfish regulations. In addition, subsequent SAFE documents may include updated values for the parameters listed in Section 4.5.3.3 and Table 4-1.

In 1999, NMFS notified the Council that the coastwide lingcod stock was considered overfished. Amendment 16-2 to the FMP included a rebuilding plan for lingcod that set a T_{TARGET} rebuilding date of 2009. However, the lingcod stock rebuilt faster than the Council had initially anticipated. The 2005 lingcod stock assessment showed that the coastwide stock had rebuilt to a level exceeding statutory requirements, B_{MSY} or B_{40}. Amendment 16-4, therefore, removed the lingcod rebuilding plan from the FMP.

4.5.4.1 Darkblotched Rockfish

Status of the Darkblotched Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of the Council's Rebuilding Plan Adoption (June 2003)

Historically, darkblotched rockfish were managed as part of a coastwide Sebastes complex, which was later segregated into north and south management units divided at 40°30' N latitude. As a result, fishery-dependent data from this period are generally unavailable. The first darkblotched rockfish stock assessment estimated the proxy MSY harvest rate and overfishing rate for the stock (Lenarz 1993).

Rogers et al. (2000) assessed darkblotched stock status in 2000 and determined the stock was at 14% to 31% of its unfished level. This range in biomass estimates encompasses the MSST threshold of 25%; uncertainty in past catches by foreign vessels, which targeted Pacific ocean perch and also caught darkblotched rockfish, was the most important contributor to this wide range for the biomass estimate. A larger unfished biomass (B_0) is computed using larger historic catch estimates. Since the MSST is expressed as a percent of unfished biomass, a larger B_0 increases the absolute value of this threshold, making an overfished determination more likely. Without definitive information on foreign catches, managers assumed darkblotched comprised 10% of this catch, leading to the conclusion that the spawning stock biomass was 22% of its unfished level. Because this is below the MSST, the stock was declared overfished in 2000.

The Council adopted a rebuilding plan for darkblotched rockfish at its June 2003 meeting, as described by the parameter values listed in Table 4-1. These values are based on a rebuilding analysis conducted by Methot and Rogers (2001).

Darkblotched rockfish occur on the outer continental shelf and continental slope, mainly north of Point Reyes. Because of this distribution they are caught exclusively by commercial vessels. Most landings have been made by bottom trawl vessels targeting flatfish on the continental shelf, rockfish on the continental slope, and the Dover sole–thornyhead–sablefish complex, also on the slope.

Methods Used to Calculate Stock Rebuilding Parameters

The methods used by Methot and Rogers in their rebuilding analysis do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (Methot and Rogers 2001). The Council chose a value of 80% for P_{MAX}, based on a harvest control rule of F = 0.027. This results in a target year of 2030.

Darkblotched Rockfish Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for darkblotched rockfish was a fishing mortality rate of 0.027. Based on the 2001 rebuilding analysis, this harvest rate is likely to rebuild the stock by the target year of 2030. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2003, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002 time/area closures, referred to as Groundfish Conservation Areas (GCAs), came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from log books and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

To limit darkblotched rockfish bycatch, an outer boundary of the GCA was set to move fishing activity into deeper water, away from the depth range of higher abundance for this species. In 2003 this outer boundary was modified during the winter months to allow targeting of petrale sole and other flatfish in shallower depths while still minimizing bycatch. The cumulative trip limits for minor slope rockfish north of Cape Mendocino, the species complex that darkblotched rockfish are managed under, and for splitnose rockfish, a co-occurring target species, were also lowered. Trip limits for other target species also may be adjusted to reduce darkblotched rockfish bycatch.

4.5.4.2 Pacific Ocean Perch

Status of the Pacific Ocean Perch Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of the Council's Rebuilding Plan Adoption (June 2003)

Pacific Ocean Perch (POP) were targeted by Soviet and Japanese factory trawlers between 1965 and 1975. Their large catches during this period substantially contributed to a decline in the West Coast stock. In 1981, just before this FMP was implemented, the Council declared the POP stock depleted and recommended conservative harvest policies. Although management measures discouraged targeting POP while allowing continued fishing on other species, the stock did not recover and the Council recommended still more restrictive measures. A 1998 stock assessment (Ianelli and Zimmerman 1998) estimated POP biomass was 13% of the unfished level, leading NMFS to declare the stock overfished in 1999.

The Council adopted a rebuilding plan for POP at its June 2003 meeting, as described by the parameter values listed in Table 4-1. These values are based on a 2000 stock assessment (Ianelli, *et al.* 2000) and subsequent rebuilding analysis (Punt and Ianelli 2001). A retrospective analysis of foreign fleet catches, underway at the time of rebuilding plan adoption, may change the rebuilding period estimates on which the rebuilding plan is based.

POP tend to occur at similar depths as darkblotched rockfish, although they have a more northerly geographic distribution. As a result, POP are caught in similar fisheries as darkblotched rockfish, but only north of Cape Mendocino. At the time the rebuilding plan was adopted, limited entry trawl vessels targeting flatfish, including petrale sole and arrowtooth flounder, accounted for more than 90% of all POP landings. POP are not an important component of the recreational fishery.

Methods Used to Calculate Stock Rebuilding Parameters

The methods used in the rebuilding analysis used to develop the rebuilding plan (Punt and Ianelli 2001) do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (Punt and Ianelli 2001). The Council chose a value of 70% for P_{MAX}, based on a harvest control rule of F = 0.0082. This results in a target year of 2027.

Pacific Ocean Perch Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for POP was a fishing mortality rate of 0.0082. Based on the 2001 POP rebuilding analysis (Punt and Ianelli 2001), this harvest rate is likely to rebuild the stock by the target year of 2027. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2003, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002 time/area closures, referred to as Groundfish Conservation Areas (GCAs), came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from log books and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

Because POP tend to co-occur with darkblotched rockfish, management measures applicable to that species also serve to constrain catches of POP. These measures include configuring the outer boundary of the GCA so that vessels fish in deeper water, where POP are less abundant. A cumulative trip limit, which represents the maximum amount of an identified species or species group that may be landed within the cumulative limit period (in 2003, two months) is also established for this species. Trip limits for overfished species are intended to discourage targeting on them while permitting any incidental catch to be landed. (Bycatch discarded at sea is more difficult to monitor.) As with darkblotched rockfish, trip limits for target species also may be adjusted in order to minimize bycatch of overfished species.

4.5.4.3 Canary Rockfish

<u>Status of the Canary Rockfish Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of the Council's Rebuilding Plan Adoption (June 2003)</u>

Canary rockfish exploitation began in the early 1940s when World War II increased demand for protein (Alverson, *et al.* 1964; Browning 1980). Through this decade the trawl fishery expanded in Oregon and Washington, accounting for most of the canary rockfish catch; in California longlines were mainly used to target rockfish during this period. Other gear historically used to catch canary rockfish include hook-and-line (primarily vertical longline), shrimp trawls, and pots and traps. From 1966 until 1976 foreign trawlers were responsible for most of the harvest. After passage of the Magnuson Act in 1977 domestic vessels became the dominant harvesters of this species. In recent years canary rockfish have become an important recreational target north of Cape Mendocino.

Overfishing, or exceeding the MFMT, was detected by a 1994 stock assessments and subsequent update (Sampson 1996; Sampson and Stewart 1994). In both cases the harvest rate exceeded the F20% threshold. In 1999 two age-based stock assessments showed that the stock was overfished in a northern area comprising the Columbia and U.S. Vancouver management zones (Crone, *et al.* 1999) and in a southern area comprising Conception, Monterey, and Eureka management zones (Williams, *et al.* 1999). Based on these assessments, the stock was declared overfished in January 2000.

The first rebuilding analysis (Methot 2000a) used results from the northern area assessment to project rates of potential stock recovery. The stock was found to have extremely low productivity, defined as production of recruits in excess of the level necessary to maintain the stock at its current low level.

According to the anlaysis, rates of recovery are highly dependent on the level of recent recruitment, which could not be estimated with high certainty.

A subsequent assessment (Methot and Piner 2002c) treated the stock as a single coastwide unit (covering the area from the Monterey zone through the U.S. Vancouver zone). This differed from past assessments, where northern and southern areas were treated separately. The lack of older, mature females in surveys and other assessment indices was another consideration in this assessment. Older females may simply have a higher natural mortality rate, or survey and fishing gear may be less effective at catching them. If these fish are in fact un-sampled, productivity estimates should be higher because older, larger fish are more fecund. Methot and Piner (2002c) combined these two hypotheses in a single age-structured version of the SSC-endorsed stock synthesis assessment model (Methot 2000b). They estimated the 2002 abundance of canary rockfish coastwide was about 8% of B_0.

The Canary rockfish rebuilding plan was adopted by the Council at its June 2003 meeting and is based on a 2002 rebuilding analysis (Methot and Piner 2002a). The 2002 rebuilding analysis updated the first rebuilding analysis for canary rockfish, completed in 2000, using information from the aforementioned stock assessment. The Council's rebuilding strategy, when combined with the results of this rebuilding analysis, required a substantial reduction in the OY for 2003. As a result, fisheries must be managed for canary rockfish bycatch, often limiting the amount of target species that may be harvested.

Canary rockfish are encountered in a relatively wide variety of both commercial and recreational fisheries. However, limited entry trawlers targeting flatfish and arrowtooth flounder account for a large proportion of the landed catch, mainly north of Cape Mendocino. Much smaller amounts are caught in the whiting and DTS limited entry trawl fisheries, and by fixed gear vessels targeting groundfish on the continental shelf. Charter vessels account for most of recreationally-caught canary rockfish, mainly off of Northern California and Oregon.

Methods Used to Calculate Stock Rebuilding Parameters

The methods used in the rebuilding analysis used to develop the rebuilding plan (Methot and Piner 2002a) do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (Methot and Piner 2002a). The Council chose a value of 60% for P_{MAX}, based on a harvest control rule of $F = 0.022$. This results in a target year of 2074.

Canary Rockfish Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for canary rockfish was a fishing mortality rate of 0.022. Based on the 2002 canary rockfish rebuilding analysis (Methot and Piner 2002a), this harvest rate is likely to rebuild the stock by the target year of 2074. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2003, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002 time/area closures, referred to as Groundfish Conservation Areas (GCAs), came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from log books and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

Canary rockfish prefer rocky areas on the continental shelf so management measures in use at the time of rebuilding plan adoption were intended to discourage fishing in these areas. Under the regulations in place during 2003, bottom trawling is prohibited in the GCA, which encompasses depth ranges where canary rockfish are most frequently caught. In addition, the aforementioned restrictions on the use of trawl nets equipped with large footropes discourage fishing in the rocky habitat preferred by this species. In areas shoreward of the GCA large footrope gear is prohibited, preventing trawlers from assessing rocky habitat in these shallower depths. In areas deeper than the GCA, either small or large footrope gear may be used, although large footrope gear is the preferred type in these depths. In addition, cumulative trip limits are structured to encourage vessels to fish exclusively in deep water where canary rockfish (as well as some other overfished species) are not encountered. Vessels are allowed to use all gear configurations during any given cumulative limit period (currently two months). However, vessels which use the small footrope configuration are restricted to lower cumulative trip limits than vessels using large footrope configurations. Since the large footrope configuration may only be used offshore of the GCA, these measures encourage fishing exclusively in deeper water to take advantage of the higher limits afforded this gear type.

Recreational fisheries are managed mainly through bag limits, size limits, and fishing seasons established for each West Coast state. Bag and size limits have been established for canary rockfish. In addition, managers have the option of closing areas to recreational fishing if needed to prevent the canary rockfish OY from being exceeded.

~~4.5.4.4 Lingcod~~

~~Status of the Lingcod Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of the Council's Rebuilding Plan Adoption (June 2003)~~

~~A 1997 stock assessment concluded that the lingcod stock in the Columbia and Vancouver zones (including the Canadian portion of the Vancouver management zone) was less than 10% of B_0, below the B25% MSST (Jagielo, *et al*. 1997). The Council responded by imposing substantial harvest reductions coastwide, reducing the harvest targets for the Eureka, Monterey, and Conception areas by the same percentage as in the north. In 1999, scientists assessed the southern portion of the stock and concluded the condition of the southern stock was similar to the northern stock, thus confirming the Council had taken appropriate action to reduce harvest coastwide (Adams, *et al*. 1999). Based on these assessments, the lingcod stock was declared overfished in 1999.~~

~~Subsequently, Jagielo (2000) conducted a coastwide lingcod assessment, which showed substantial increase in stock size and suggested that the stock was younger and more productive than previously thought. A revised rebuilding analysis of coastwide lingcod (Jagielo and Hastie 2001) was adopted by the Council in September 2001. It confirmed the major conclusions of the 2000 assessment and rebuilding analysis, but slightly modified recruitment projections to stay on the rebuilding trajectory that reaches target biomass in 2009. The rebuilding plan adopted by the Council at is June 2003 meeting is based on this 2001 update of the original rebuilding analysis produced by the same author. Because the minimum time period within which lingcod could be rebuilt is less than 10 years, the maximum allowable rebuilding period (T_{MAX}) is 10 years. The Council chose a target year equal to T_{MAX}, with the stock expected to rebuild by 2009.~~

~~Lingcod are encountered in a diverse array of commercial fisheries. Historically, limited entry trawl and limited entry fixed gear vessels accounted for the majority of lingcod landings. The open access sector, comprising many different gear types and fishing strategies, also lands a significant amount coastwide in nearshore and continental shelf areas. Lingcod are an important species in recreational fisheries, which account for an increasing portion of overall lingcod mortality as commercial landings declined drammatically beginning in 1998. Although recreational lingcod catches are reported coastwide, most of the recreational catch occurs off central and Northern California, with private boats making most of this catch.~~

~~Methods Used to Calculate Stock Rebuilding Parameters~~

~~The methods used in the rebuilding analysis used to develop the rebuilding plan (Jagielo and Hastie 2001) do not differ substantially from the approach described in Section 4.5.2.~~

~~Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption~~

~~Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (Jagielo and Hastie 2001). The Council chose a value of 60% for P_{MAX}, based on a harvest control rule of $F = 0.0531$ for the northern portion of the stock and $F = 0.061$ for the southern portion of the stock. This results in a target year of 2009.~~

~~Lingcod Rebuilding Strategy~~

~~As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for canary rockfish was a fishing mortality rate of 0.0531 for the northern portion of the stock and 0.061 for the southern portion of the stock. Based on the 2001 lingcod rebuilding analysis (Jagielo and Hastie 2001), this harvest rate is likely to rebuild the stock by the target year of 2009. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.~~

~~Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2003, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species~~

~~during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)~~

~~Beginning in 2002 time/area closures, referred to as Groundfish Conservation Areas (GCAs), came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from log books and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.~~

~~In addition to the more general measures described above, which are intended to reduce bycatch of all overfished species, lingcod landings by the limited entry fixed gear and open access sectors were prohibited during the winter months in 2003. Lingcod are more vulnerable in shallow depths (where vessels in these sectors are more likely to fish) during the winter because of their spawning behavior. For the same reason, retention of lingcod by recreational fishermen during winter months was prohibited in Washington and California during 2003. Recreational bag and size limits are also used to manage total lingcod fishing mortality.~~

4.5.4.~~5~~ 4 Bocaccio Rockfish

Status of the Bocaccio Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of Rebuilding Plan Adoption (April 2004)

Assessment scientists and managers have treated West Coast bocaccio as independent stocks north and south of Cape Mendocino. The southern stock, which has been declared overfished, occurs south of Cape Mendocino and the northern stock north of 48° N latitude in northern Washington (off Cape Flattery). The overfished southern bocaccio rockfish stock occurs in Central and Southern California waters, on the continental shelf and in nearshore areas, often in rocky habitat. They are caught in both commercial and recreational fisheries in approximately equal amounts. Commercial catches mainly occur in limited entry trawl fisheries.

Bocaccio have long been an important component of California rockfish fisheries. Catches increased to high levels in the 1970s and early 1980s as relatively strong year-classes recruited to the stock. The Council began to recommend increasingly restrictive regulations after an assessment of the southern stock in 1990 (Bence and Hightower 1990) indicated that fishing rates were too high. The southern stock has been assessed six times (Bence and Hightower 1990; Bence and Rogers 1992; MacCall 2002; MacCall 2003b; MacCall, *et al.* 1999; Ralston, *et al.* 1996) and has suffered poor recruitment during the warm water conditions that have prevailed off Southern California since the late 1980s. The 1996 assessment (Ralston, *et al.* 1996) indicated the stock was in severe decline. NMFS formally declared the stock overfished in March 1999 after the groundfish FMP was amended to incorporate the tenets of the Sustainable Fisheries Act. MacCall et al. (1999) confirmed the overfished status of bocaccio and estimated spawning output of the southern stock to be 2.1% of its unfished biomass and 5.1% of the maximum sustainable yield (MSY) level. The northern stock of bocaccio has not been assessed.

While previous assessments only used data from Central and Northern California, an assessment in 2002 (MacCall and He 2002) also included data for southern California. While relative abundance increased slightly from the last assessment (4.8% of unfished biomass), potential productivity appears lower than previously thought, making for a more pessimistic outlook. The Council assumed a medium recruitment scenario for the 1999 year class, which was not assessed (MacCall, *et al.* 1999). The 2002 assessment revealed the 1999 year class experienced relatively lower recruitment. Therefore, although the 1999 year class contributed a substantial quantity of fish to the population, it did not contribute as much to rebuilding as was previously thought.

The 2003 bocaccio assessment differs greatly from the 2002 assessment. It is driven by the strength of the incoming 1999 year class that had not recruited into the indices used for the 2002 assessment and by a revised lower estimate of natural mortality (MacCall 2003b). In addition to the 2001 Triennial Survey data, the 2003 assessment used larval abundance data from recent CalCOFI surveys as well as length and catch per unit effort (CPUE) data from recreational fisheries. In calculating the recreational CPUE information, a new method was used that identifies relevant fishing trips by species composition and adjusts the catch history for regulatory changes that affect the level of discard and avoidance. The results of these calculations suggest that recreational CPUE has increased dramatically in recent years and is at a record high level in Central California north of Pt. Conception. The STAR Panel recommended the use of two assessment models as a means of bracketing uncertainty from the very different signals between the Triennial Survey and the recreational CPUE data. Following the Stock Assessment Review (STAR) Panel meeting, MacCall presented a third "hybrid" model that incorporated the data from all of the indices. The Scientific and Statistical Committee (SSC) recommended, and the Council approved, the use of this third modeling approach. This resulted in modest improvement in estimated stock size, but significantly affected the estimated productivity of the stock. These results had substantial effects on the rebuilding outlook for bocaccio which, under the 2002 assessment, was not expected to rebuild within T_{MAX} even with no fishing related mortality. Total mortality in 2003 fisheries was restricted to less than 20 mt as a means of conserving the stock while minimizing adverse socioeconomic impacts to communities. The current rebuilding analysis (MacCall 2003a), using the "hybrid" model, suggests the stock could rebuild to BMSY within 25 years while sustaining an optimum yield (OY) of approximately 300 mt in 2004.

The Council adopted a rebuilding plan for bocaccio rockfish at its April 2004 meeting, as described by the parameter values listed in Table 4-1. These values are based on a rebuilding analysis conducted by MacCall (2003b).

Fisheries in central and southern California are affected by the bocaccio rebuilding plan because the overfished population occurs in these waters. Recreational and limited entry trawl fisheries in this region have accounted for the bulk of landings in recent years.

Methods Used to Calculate Stock Rebuilding Parameters

The methods used by MacCall in his rebuilding analysis (MacCall 2003a) do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (MacCall 2003a). Using the STATc base model from the most recent stock assessment (MacCall 2003b), the Council chose a value of 70% for P_{MAX}, based on a harvest control rule of F = 0.0498. This results in a target year of 2023.

Bocaccio Rockfish Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for bocaccio rockfish was a fishing mortality rate of 0.0498. Based on the 2003 rebuilding analysis, this harvest rate is likely to rebuild the stock by the target year of 2023. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2004, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002, time/area closures known as GCAs came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from logbooks and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

As noted, a large proportion of bocaccio catch occurs in recreational fisheries in Central and Southern California. Recreational depth closures, restricting fishing to shallow waters, bag limits, and seasonal closures have been used to reduce recreational bocaccio catches.

4.5.4.~~6~~5 Cowcod

Status of the Cowcod and Fisheries Affected by Stock Rebuilding Measures at the Time of Rebuilding Plan Adoption (April 2004)

Relatively little is known about cowcod, a species of large rockfish that ranges from Ranger Bank and Guadalupe Island in central Baja California to Usal, Mendocino County, California (Miller and Lea 1972), and may infrequently occur as far north as Newport, Oregon. Cowcod have been assessed only once (Butler, *et al.* 1999). Adult cowcod are primarily found over high relief rocky areas (Allen 1982). They are generally solitary, but occasionally aggregate (Love, *et al.* 1990).

While cowcod are not a major component of the groundfish fishery, they are highly desired by both recreational and commercial fishers because of their bright color and large size. In recent years small amounts have been caught by limited entry trawl vessels and recreational anglers in Southern California. The cowcod stock south of Cape Mendocino has experienced a long-term decline. The cowcod stock in the Conception area was assessed in 1998 (Butler, *et al.* 1999). Abundance indices decreased approximately tenfold between the 1960s and the 1990s, based on commercial passenger fishing vessel (CPFV) logs (Butler, *et al.* 1999). Recreational and commercial catch also declined substantially from peaks in the 1970s and 1980s, respectively.

B_0 was estimated to be 3,370 mt, and 1998 spawning biomass was estimated at 7% of B_0, well below the

25% overfishing threshold. As a result, NMFS declared cowcod in the Conception and Monterey management areas overfished in January 2000. Large areas off Southern California (the Cowcod Conservation Areas [CCAs]) have been closed to fishing for cowcod. The stock's low productivity and declined spawning biomass also necessitates an extended rebuilding period, estimated at 62 years with no fishing-related mortality (T_{MIN}), to achieve a 1,350 mt BMSY for the Conception management area.

There is relatively little information about the cowcod stock, and there are major uncertainties in the one assessment that has been conducted. The assessment authors needed to make estimates of early landings based on more recent data and reported total landings of rockfish. Age and size composition of catches are poorly sampled, population structure is unknown, and the assessment was restricted to Southern California waters.

A cowcod rebuilding review was completed in 2003, which validated the assumption that non-retention regulations and area closures have been effective in constraining cowcod fishing mortality (Butler, *et al.* 2003). These results, although encouraging, are based on cowcod fishery-related removals from CPFV observations and angler reported discards. Non-retention regulations and limited observation data have increased the need for fishery independent population indices.

The Council adopted a rebuilding plan for cowcod at its April 2004 meeting, as described by the parameter values listed in Table 4-1. These values are based on a rebuilding analysis conducted by Butler and Barnes (2000).

Methods Used to Calculate Stock Rebuilding Parameters

The Cowcod rebuilding analysis (Butler and Barnes 2000) was completed before the SSC default rebuilding analysis methodology (Punt 2002), described in Section 4.5.2 , had been developed. Instead, it uses a surplus production model using a log-normal distribution fitted to recruitment during 1951-1998. At the time of rebuilding plan adoption (2004) a new cowcod stock assessment and rebuilding analysis had not been completed. In April 2004 the SSC recommended that future cowcod stock assessments use a model whose output can be used in the default rebuilding analysis methodology.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET} and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis (Butler and Barnes 2000) used in formulating the rebuilding plan. The Council chose a value of 60% for P_{MAX}, based on a harvest control rule of F = 0.009. This results in a target year of 2090.

Cowcod Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for cowcod was a fishing mortality rate of 0.009. Based on the 2000 cowcod rebuilding analysis (Butler and Barnes 2000), this harvest rate is likely to rebuild the stock by the target year of 2090. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2004, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002, time/area closures known as GCAs came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from logbooks and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

Because cowcod is a fairly sedentary species, establishment of a marine protected area, considered one of the GCAs, is the key strategy for limiting cowcod fishing mortality. The CCAs in the Southern California Bight encompasses two areas of greatest cowcod density, as estimated in 2000, based on historical cowcod catch and catch rates in commercial and recreational fisheries. To aid in enforcement, the CCAs are bounded by straight lines enclosing simple polygons. Butler, et al. (2003) concluded that the CCAs have been effective in reducing bycatch to levels projected to allow stock rebuilding. Estimated fishery removals have been at levels sufficient to rebuild the stock, since the CCAs were implemented, except in 2001 when 5.6 mt was caught in the Conception management area. Most of this catch occurred in the spot prawn trawl fishery, which subsequently has been phased out.

Given the particular life history characteristics of cowcod, the Council will continue to use species-specific area closures to protect cowcod. As new information becomes available on cowcod behavior and fisheries interactions with cowcod, the boundaries or related regulations concerning the current CCAs may change, and additional CCAs may be established by regulation.

4.5.4.~~7~~ 6 Widow Rockfish

Status of the Widow Rockfish Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of Rebuilding Plan Adoption (April 2004)

Widow rockfish are an important commercial species from British Columbia to central California, particularly since 1979, when an Oregon trawl fisherman demonstrated the ability to make large catches at night using midwater trawl gear. Since that time, many more participants entered the fishery and landings of widow rockfish increased rapidly (Love, *et al.* 2002). Because widow rockfish are commonly distributed in the mesopelagic (midwater) zone they are most commonly caught in with midwater trawl gear, which sweeps this zone (in contrast to bottom trawl gear used to target most groundfish species). Historically, widow rockfish were a major target species. Landings peaked at 12,473 mt in 1989 and as recently as 2000 stood at 3,866 mt (PFMC 2002). Target fisheries were eliminated after widow rockfish were declared overfished in 2001. Currently, the Pacific whiting fishery accounts for about three-quarters of widow rockfish catches; a small directed fishery for yellowtail rockfish, prosecuted by Washington treaty Indian Tribes, and the limited entry fixed gear sector account for almost all of the remaining incidental catches. Most catches occur in the U.S.-Vancouver, Columbia, and Eureka management areas.

Williams, et al. (2000) assessed the widow rockfish in 2000. The spawning output level (8,223 mt), based on that assessment and a revised rebuilding analysis (Punt and MacCall 2002) adopted by the Council in June 2001, was at 23.6% of the unfished level (33,490 mt) in 1999. This result was computed using the average recruitment from 1968 to 1979 multiplied by the spawning output-per-recruit at F = 0. The analysis concluded the rebuilding period in the absence of fishing is 22 years, and with a mean generation time of 16 years, the maximum allowable time to rebuild (T_{MAX}) is 38 years. Widow rockfish were declared overfished in 2001 based on these analyses.

The most recent assessment (He, *et al.* 2003b) concluded that the widow rockfish stock size is 22.4% of the unfished biomass, but indicates stock productivity is considerably lower than previously thought. Data sparseness was a significant problem in this widow rockfish assessment (Conser, *et al.* 2003; He, *et al.* 2003b). Limited logbook data prior to 1990 is available from bottom trawl fisheries, a questionable data source for a midwater species. The NMFS laboratory at Santa Cruz conducts a midwater trawl survey from which a juvenile index is derived. This index has been highly variable in its ability to predict recruitment, in part, due to the survey's limited geographical area relative to the overall distribution of widow rockfish. The widow rockfish rebuilding analysis considered a wide range of model formulations that investigated different hypothesis on natural mortality, stock-recruitment variability, and the use of a power coefficient to reduce variability of the Santa Cruz midwater juvenile survey. The SSC recommended model formulations that pre-specify the recruitment for 2003-2005, do not use a stock-recruitment relationship (recruits per spawner ratios were used instead to project future recruitment), and vary the power coefficient between two and four in the Santa Cruz midwater juvenile survey. The SSC did not recommend a power coefficient higher than four because the relationship between the Santa Cruz midwater survey recruitment index and other recruitment indices changed dramatically with higher powers. The previous rebuilding analysis (Punt and MacCall 2002) had used a power coefficient of 10 that dampened the estimate of recruitment variability and suggested much higher stock productivity.

Many of the rebuilding parameters for widow rockfish did not change dramatically with the new rebuilding analysis. The rebuilding period in the absence of fishing increased to 25 years and, with a mean generation time of 16 years; the maximum allowable time to rebuild (T_{MAX}) is 41 years. However, the harvest rate associated with different rebuilding strategies dropped significantly in response to the new understanding of decreased stock productivity. Thus, the interim rebuilding OY for 2003 using the 2000 rebuilding analysis was 832 mt, while in 2004, using the 2003 rebuilding analysis (He, *et al.* 2003a), the OY was 284 mt (using the base model, Model 8, which uses a power coefficient of three).

The Council adopted a rebuilding plan for widow rockfish at its April 2004 meeting, as described by the parameter values listed in Table 4-1. These values are based on a rebuilding analysis conducted by He, et al. (He, *et al.* 2003a).

<u>Methods Used to Calculate Stock Rebuilding Parameters</u>

The methods used in the rebuilding analysis He, et al. (He, *et al.* 2003a) used to develop the rebuilding plan do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET}, and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (He, *et al.* 2003a). Using Model 8, the base model from the 2003 stock assessment (He, *et al.* 2003b), the Council chose a value of 60% for P_{MAX}, based on a harvest control rule of F = 0.0093. This results in a target year of 2038.

Widow Rockfish Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for canary rockfish was a fishing mortality rate of 0.0093. Based on the 2003 widow rockfish rebuilding analysis (He, et al. 2003a), this harvest rate is likely to rebuild the stock by the target year of 2038. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2004, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. Because widow rockfish are mainly caught in the water column, bottom trawl gear restrictions have little effect on widow rockfish catch rates.

Beginning in 2002, time/area closures known as GCAs came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from logbooks and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

Because widow rockfish occur in midwater and aggregate at night, elimination of target fishery opportunities is a relatively easy way of reducing widow rockfish bycatch. The Council has taken a policy approach of establishing management measures to reduce incidental catch in the Pacific whiting fishery sufficient to constrain total mortality below harvest levels (OYs) needed to rebuild the stock. At the time of rebuilding plan adoption, catch in other fisheries is sufficiently small so that rebuilding targets can be met without applying any special measures, beyond those needed to discourage targeting, to reduce widow rockfish fishing mortality in these fishery sectors.

Widow rockfish catches in recreational fisheries are relatively modest. Catches in this sector are managed mainly through bag limits, size limits, and fishing seasons established for each West Coast state. No recreational bag and size limits have been established for widow rockfish. However, general bag limits for rockfish may have some constraining effect on widow recreational catches.

4.5.4.~~8~~ 7 Yelloweye Rockfish

Status of the Yelloweye Rockfish Stock and Fisheries Affected by Stock Rebuilding Measures at the Time of Rebuilding Plan Adoption (April 2004)

Yelloweye rockfish are common from Central California northward to the Gulf of Alaska. They are bottom-dwelling, generally solitary, rocky reef fish, found either on or just over reefs (Eschmeyer, *et al.* 1983; Love 1991; Miller and Lea 1972; O'Connell and Funk 1986). Boulder areas in deep water (>180 m) are the most densely populated habitat type, and juveniles prefer shallow-zone broken-rock habitat

(O'Connell and Carlile 1993). They also reportedly occur around steep cliffs and offshore pinnacles (Rosenthal, *et al.* 1982). The presence of refuge spaces is an important factor affecting their occurrence (O'Connell and Carlile 1993). Yelloweye rockfish are potentially caught in a range of both commercial and recreational fisheries. Because of their preference for rocky habitat, they are more vulnerable to hook and line gear.

The first ever yelloweye rockfish stock assessment was conducted in 2001 (Wallace 2002). This assessment incorporated two area assessments: one from Northern California using CPUE indices constructed from Marine Recreational Fisheries Statistical Survey (MRFSS) sample data and California Department of Fish and Game (CDFG) data collected on board commercial passenger fishing vessels, and the other from Oregon using Oregon Department of Fish and Wildlife (ODFW) sampling data. The assessment concluded current yelloweye rockfish stock biomass is about 7% of unexploited biomass in Northern California and 13% of unexploited biomass in Oregon. The assessment revealed a thirty-year declining biomass trend in both areas with the last above average recruitment occurring in the late 1980s. The assessment’s conclusion that yelloweye rockfish biomass was well below the 25% of unexploited biomass threshold for overfished stocks led to this stock being separated from the rockfish complexes in which it was previously listed. Until 2002, when yelloweye rockfish were declared overfished, they were listed in the “remaining rockfish” complex on the shelf in the Vancouver, Columbia, and Eureka management areas and the “other rockfish” complex on the shelf in the Monterey and Conception areas. As with the other overfished stocks, yelloweye rockfish harvest is now tracked separately.

In June 2002 the SSC recommended that managers should conduct a new assessment incorporating Washington catch and age data. This recommendation was based on evidence that the biomass distribution of yelloweye rockfish on the West Coast was centered in waters off Washington and that useable data from Washington were available. Based on that testimony, the Council recommended completing a new assessment in the summer of 2002, before a final decision was made on 2003 management measures. Methot et al. (2002b) did the assessment, which was reviewed by a STAR Panel in August 2002. The assessment result was much more optimistic than the one prepared by Wallace (2002), largely due to the incorporation of Washington fishery data. While the overfished status of the stock was confirmed (24% of unfished biomass), Methot et al. (2002b) provided evidence of higher stock productivity than originally assumed. The assessment also treated the stock as a coastwide assemblage. This assessment was reviewed and approved by the SSC and the Council at the September 2002 Council meeting. Methot and Piner (2002) prepared a rebuilding analysis based on this assessment.

The Council adopted a rebuilding plan for yelloweye rockfish at its April 2004 meeting, as described by the parameter values listed in Table 4-1. These values are based on a rebuilding analysis conducted by Methot and Piner (2002a).

Because yelloweye rockfish prefer rocky reef habitat on the continental shelf, they are most vulnerable to recreational and commercial fixed gear fisheries. In the past, the groundfish trawl sector has accounted for a large proportion of the catch: from 1990 to 1997 trawlers took an average of 46% of the catch coastwide (although most catches occur in Washington and Oregon waters). (This discussion is based on data in the table on page 3 of Methot, *et al.* 2003.) Trip limit reductions after 1997 and the imposition of restrictions on large footrope trawl gear in 2000 have substantially diminished the amount of yelloweye rockfish caught by the trawl sector. (Large footrope gear had made it possible for trawlers to access the rocky habitat where yelloweye live.) Trawl vessels accounted for only 14% of the catch on average from 1998 to 2001. Commercial fixed gear catches have also taken a significant share of the catch, 38% in the years 1990-1997. However, the implementation of the nontrawl RCA, which encloses much yelloweye habitat, has resulted in their share falling also. Open access directed groundfish fisheries and the Pacific halibut longline fleet also catch small amounts of yelloweye rockfish. Recreational catches have become more significant with the reduction in commercial catches. Comparing the 1990-1997 and 1998-2001 periods, their share of the total coastwide catch almost doubled to 30%, although actual average catches declined slightly. Most recreational catches occur in Washington State waters.

Methods Used to Calculate Stock Rebuilding Parameters

The methods used in the rebuilding analysis (Methot and Piner 2002a) used to develop the rebuilding plan do not differ substantially from the approach described in Section 4.5.2.

Rebuilding Parameter Values at the Time of Rebuilding Plan Adoption

Table 4-1 lists the numerical values for B_0, B_{MSY}, T_{MIN}, T_{MAX}, P_{MAX}, T_{TARGET}, and F. The values of B_0, B_{MSY}, T_{MIN}, and T_{MAX} are derived from the rebuilding analysis used in formulating the rebuilding plan (Methot and Piner 2002a). The Council chose a value of 80% for P_{MAX}, based on a harvest control rule of F = 0.0153. This results in a target year of 2058.

Yelloweye Rockfish Rebuilding Strategy

As shown in Table 4-1, at the inception of the rebuilding plan the harvest control rule for canary rockfish was a fishing mortality rate of 0.0153. Based on the 2002 rebuilding analysis (Methot and Piner 2002), this harvest rate is likely to rebuild the stock by the target year of 2058. This value is likely to change over time as stock size and structure changes. Any updated value will be published in federal groundfish regulations. The fishing mortality rate is applied to the exploitable biomass estimate to determine the OY for a given fishing period.

Management measures are implemented through the biennial harvest specification and management process described in Chapter 5. The types of management measures that may be implemented through this process are described in Chapter 6. In 2004, at the time of rebuilding plan adoption, measures intended to limit bycatch of overfished species included prohibiting retention of certain overfished species during some parts of the year, reducing landing limits (cumulative trip limits) on co-occurring species, establishing extensive time/area closures, and restricting the use of trawl nets equipped with large footropes. (By using large footropes with heavy roller gear, bottom trawlers can access rocky habitat on the continental shelf. This is the preferred habitat for some overfished species.)

Beginning in 2002, time/area closures known as GCAs came into use as a way of decreasing bycatch of overfished species. GCAs enclose depth ranges where bycatch of overfished species is most likely to occur, based on information retrieved from logbooks and the at-sea observer program. The boundaries vary by season and fishery sector, and may be modified in response to new information about the geographic and seasonal distribution of bycatch.

In addition to the more general measures described above, which are intended to reduce bycatch of all overfished species, the Yelloweye Rockfish Conservation Area (YRCA), a C-shaped closed area off the Washington coast, near Cape Flattery, prevents recreational groundfish and halibut anglers from targeting this species in an area where they are concentrated. Recreational bag and size limits are also used to manage total yelloweye rockfish fishing mortality.

Given the particular life history characteristics of yelloweye rockfish, the Council will continue to use a species-specific area closure or closures to protect yelloweye rockfish. As new information becomes available on yelloweye rockfish behavior and fisheries interactions with yelloweye rockfish, the boundaries or related regulations concerning the current YRCA may change, and additional YRCAs may be established by regulation.

TABLE 4-1. Specified rebuilding plan parameters at the time of plan adoption. (Page 1 of 1).

Species	Year Stock Declared Overfished	Year Rebuilding Plan Adopted	B_0	B_{MSY}	T_{MIN}	T_{MAX}	P_{MAX}	T_{TARGET}	Harvest Control Rule
Darkblotched Rockfish	2000	2003	29,044 mt	11,618 mt	2014	2047	80%	2030	F = 0.027
Pacific Ocean Perch	1999	2003	60,212 units of spawning output	24,084 units of spawning output	2012	2042	70%	2027	F = 0.0082
Canary Rockfish	2000	2003	31,550 mt	12,620 mt	2057	2076	60%	2074	F = 0.022
~~Lingcod~~	~~1999~~	~~2003~~	~~28,882 mt N; 20,971 mt S~~	~~9,153 mt N; 8,389 mt S~~	~~2007~~	~~2009~~	~~60%~~	~~2009~~	~~F = 0.0531 N; F = 0.061 S~~
Bocaccio*	1999	2004	13,387 B eggs in 2003	5,355 B eggs	2018	2032	70%	2023	F = 0.0498
Cowcod	2000	2004	3,367 mt	1,350 mt	2062	2099	60%	2090	F = 0.009
Widow Rockfish**	2001	2004	43,580 M eggs	17,432 M eggs	2026	2042	60%	2038	F= 0.0093
Yelloweye Rockfish	2002	2004	3,875 mt	1,550 mt	2027	2071	80%	2058	F= 0.0153

***Based on the STATc base model in MacCall (2003b).**

****Based on the Model 8 base model in He, *et al.* (He*, et al.* 2003b).**

[Amended: 11, 12, 16-1, 16-2, 16-3]

4.6 Determination of OY

Optimum yield (OY) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as the amount of fish which will provide the greatest overall benefit to the Nation. The Magnuson-Stevens Act also specifies that OY is based on maximum sustainable yield (MSY), and may be equal to or less than MSY. The fishery management plan (FMP) authorizes establishment of a numerical or non-numerical OY for any groundfish species or species group and lays out the procedures the Council will follow in determining appropriate numerical OY values. An OY may be specified for the fishery management area as a whole or for specific subareas. Numerical one-year OYs will be specified biennially, based on acceptable biological catches (ABCs) for major species or species groups, which are in turn based on quantitative or qualitative stock assessments. “Control rules” for determining the numerical values of OYs ensure they will not exceed the ABCs except under tightly limited conditions.

Most of the 80-plus species managed by the FMP have never been assessed in either a quantitative or qualitative manner. In some cases even basic catch statistics are unavailable, because many species (rockfish, for example) are not sorted unless specifically required by regulation. Species of this type have generally not been subject to numerical harvest limits, but rather harvest is limited by gear restrictions and market demand. Other management measures which determine the total amount of harvest each year include trip landing and frequency limits. Those species without a specified OY and not included in a multi-species OY will be included in a non-numerical OY, which is defined as all the fish that can be taken under the regulations, specifications, and management measures authorized by the FMP and promulgated by the U.S. Secretary of Commerce. This non-numerical OY is not a predetermined numerical value, but rather the harvest that results from regulations, specifications, and management measures as they are changed in response to changes in the resource and the fishery. In many cases, the absence of a numerical specification reflects the absence of basic management information, such as abundance estimates and catch statistics. The non-numerical OY concept allows for a variable amount of groundfish to be harvested annually, limited by such constraints as gear restrictions, management measures for other species, and/or absence of consumer acceptance or demand.

The close spatial relationship of many groundfish species throughout the management area results in commercial and recreational catches often consisting of mixtures of several species. This is especially the case in the trawl fishery where fishermen may target on one species, but unavoidably harvest several other species. In such cases, the optimum harvest strategy often is to target on a group (complex or assemblage) of groundfish species.

The Council will avoid allowing overfishing individual stocks and control harvest mortality to allow overfished stocks to rebuild to the MSY level. In the event the Council determines that greater long-term benefits will be gained from the groundfish fishery by overfishing individual stocks or by preventing a stock from recovering to its MSY level, it will justify the action in writing in accordance with the procedures and standards identified in this section and the National Standard Guidelines (50 CFR 600.310(d)). Conversely, the Council may determine that greater benefits will accrue from protecting an individual stock by constraining the multiple species complex or specific components of that complex.

Prior to implementation of the FMP in 1982, the states of Washington, Oregon, and California managed the groundfish fishery without the use of quotas. State regulations since the mid-1940s took the form of area closures (such as San Francisco Bay), legal gear definitions, minimum codend mesh regulations, size limits, bag limits, and other nonquota management measures. Implementation of the FMP built upon those historical management practices by increasing the level of catch monitoring, improving the assessment of stock conditions, and establishing other mechanisms for responding to management needs. It provides for continuation of the historical fishery on traditionally harvested groundfish species while allowing for the development of new fisheries for underutilized species. The FMP, as amended, provides for the establishment of resource conservation measures such as harvest guidelines or quotas through the annual specification procedure and annual and inseason management measures through the "points of concern" and socioeconomic framework mechanisms.

Reduction in catches or fishing rates for either precautionary or rebuilding purposes is an important component of converting values of ABC to values of OY. This relationship is specified by the harvest control rule. All OYs will remain in effect until revised, and, whether revised or not, will be announced at the beginning of the fishing period along with other specifications (see Chapter 5).

Groundfish stock assessments generally provide the following information to aid in determination of ABC and OY.

1. Current biomass (and reproductive potential) estimate.

2. FMSY or proxy, translated into exploitation rate.

3. Estimate of MSY biomass (BMSY), or proxy, unfished biomass (based on average recruitment), precautionary threshold, and/or overfished/rebuilding threshold.

4. Precision estimate (e.g., confidence interval) for current biomass estimate.

4.6.1 Determination of Numerical OYs If Stock Assessment Information Is Available (Category 1)

The Council will follow these steps in determining numerical OYs. The recommended numerical OY values will include any necessary adjustments to harvest mortality needed to rebuild any stock determined to be below its overfished/rebuilding threshold and may include adjustments to address uncertainty in the status of the stock.

1. ABC: Multiply the current fishable biomass estimate times the FMSY exploitation rate or its proxy to get ABC.

2. Precautionary adjustment: If the abundance is above the specified precautionary threshold, OY may be equal to or less than ABC. If current biomass estimate is less than the precautionary threshold (Section 4.4.1), the harvest rate will be reduced according to the harvest control rule specified in Section 4.5.1 in order to accelerate a return of abundance to optimal levels. If the abundance falls below the overfished/rebuilding threshold (Section 4.4.2), the harvest control rule will generally specify a greater reduction in exploitation as an interim management response toward rebuilding the stock while a formal rebuilding plan is being developed. The rebuilding plan will include a specific harvest control rule designed to rebuild the stock, and that control rule will be used in this stage of the determination of OY.

3. Uncertainty adjustments: In cases where there is a high degree of uncertainty about the biomass estimate and other parameters, OY may be further reduced accordingly.

4. Other adjustments to OY: Adjustments to OY for other social, economic, or ecological

considerations may be made. OY will be reduced for anticipated bycatch mortality (i.e. mortality of discarded fish). Amounts of fish harvested as compensation for private vessels participating in NMFS resource survey activities will also be deducted from ABC prior to setting OY.

5. OY recommendations will be consistent with established rebuilding plans and achievement of their goals and objectives.
   (a) In cases where overfishing is occurring, Council action will be sufficient to end overfishing.
   (b) In cases where a stock or stock complex is overfished, Council action will specify OY in a manner that complies with rebuilding plans developed in accordance with Section 4.5.2.
   (c) For fisheries managed under an international agreement, Council action must reflect traditional participation in the fishery, relative to other nations, by fishermen of the United States.
   (d) For any stock that has been declared overfished, the open access/limited entry allocation shares may be temporarily revised for the duration of the rebuilding period by amendment to the regulations in accordance with the normal allocation process described in this FMP. However, the Council may at any time recommend the shares specified in chapter 12 of this FMP be reinstated without requiring further analysis. Once reinstated, any change may be made only through the allocation process.
   (e) For any stock that has been declared overfished, any vessel with a limited entry permit may be prohibited from operating in the open access fishery when the limited entry fishery has been closed.

6. Adjustments to OY could include increasing OY above the default value up to the overfishing level as long as the management still allows achievement of established rebuilding goals and objectives. In limited circumstances, these adjustments could include increasing OY above the overfishing level as long as the harvest meets the standards of the mixed stock exception in the National Standard Guidelines:
   (a) The Council demonstrates by analysis that such action will result in long-term net benefits to the Nation.
   (b) The Council demonstrates by analysis that mitigating measures have been considered and that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/ configuration, or other technical characteristic in a manner such that no overfishing would occur.
   (c) The resulting rate or level of fishing mortality will not cause any species or evolutionarily significant unit thereof to require protection under the Endangered Species Act.

7. For species complexes (such as Sebastes complex), the OY will generally be set equal to the sum of the individual component ABCs, HGs, and/or OYs, as appropriate.

4.6.2 Determination of a Numerical OY If ABC Is Based on Nonquantitative Assessment (Category 2)

1. ABC may be based on average of past landings, previous nonquantitative assessment, or other qualitative information.

2. Precautionary adjustments, if any, would be based on relevant information. In general, the Council will follow a risk-averse approach and may recommend an OY below ABC if there is a perception the stock is below its MSY biomass level. If a declining trend persists for more than

three years, then a focused evaluation of the status of the stock, its ABC, and the overfishing parameters will be quantified. If data are available, such an evaluation should be conducted at approximately five-year intervals even when negative trends are not apparent. In fact, many stocks are in need of re-evaluation to establish a baseline for monitoring of future trends. Whenever an evaluation indicates the stock may be declining and approaching an overfished state, then the Council should:

a. Recommend improved data collection for this species.

b. Determine the rebuilding rate that would increase the multispecies value of the fishery.

3. Uncertainty adjustment: In cases where there is a high degree of uncertainty about the condition of the stock or stocks, OY may be reduced accordingly.

4. Amounts of fish harvested as compensation for industry research activities will also be deducted.

5. These adjustments could include increasing OY above the default value as indicated for Category 1 stocks, items 5 and 6 above.

4.6.3 Non-numerical OY for Stocks with No ABC Values (Category 3)

Fish of these species are incidentally landed and usually are not listed separately in fish landing receipts. Information from fishery-independent surveys are often lacking for these stocks, because of their low abundance or they are not vulnerable to survey sampling gear. Until sufficient quantities of at-sea observer program data are available or surveys of other fish habitats are conducted and/or requirements that landings of all species be recorded separately, it is unlikely that there will be to sufficient data to upgrade the assessment capabilities or to evaluate the overfishing potential of these stocks.

These species typically may be included in a non-numerical OY that is defined as all the fish that can be taken under the regulations, specifications, and management measures authorized by the FMP and promulgated by the Secretary. Such an OY may not be a predetermined numerical value, but rather that harvest that results from regulations, specifications, and management measures as they are changed in response to changes in the resource and the fishery. Nothing in this FMP prevents inclusion of these species in a numerical OY if the Council believes that is more appropriate.

[Amended: 11, 16-1, 17]

5.0 PERIODIC SPECIFICATION AND APPORTIONMENT OF HARVEST LEVELS
6.0 MANAGEMENT MEASURES
7.0 ESSENTIAL FISH HABITAT
8.0 EXPERIMENTAL FISHERIES
9.0 SCIENTIFIC RESEARCH
10.0 PROCEDURE FOR REVIEWING STATE REGULATIONS
11.0 GROUNDFISH LIMITED ENTRY

Draft Amendment 16-4 proposes no changes to the remaining chapters of the FMP (Chapters 5-11,) except, when referring to the number of overfished species, to refer to there being seven, not eight, overfished groundfish species. For example, a sentence that reads "Six of the eight overfished species are continental shelf species…," would be revised to read "Five of the seven overfished species are continental shelf species…" This change is proposed in light of the 2005 recovery of the coastwide lingcod stock to above B_{40}.

REFERENCES

[**N.B. In the last published version of the FMP Chapter 13.0 was originally identified as References.** Chapter 11.0 was originally identified as Appendices. This material has been moved to two un-numbered sections at the end of the document and the remaining chapters after Chapter 10.0 have been re-numbered. Works cited in the Appendices are listed there.]

Adams, P. B., E. H. Williams, K. R. Silberberg, and T. E. Laidig. 1999. Southern lingcod stock assessment in 1999. *in* Appendix to Status of the Pacific Coast groundfish fishery through 1999 and recommended acceptable biological catches for 2000 (SAFE Report). Pacific Fishery Management Council, Portland.

Allen, M. J. 1982. Functional structure of soft-bottom fish communities of the southern California shelf. Ph.D Dissertation. University of California, San Diego, California.

Alverson, D. L., A. T. Pruter, and L. L. Ronholt. 1964. A study of demersal fishes and fisheries of the Northeastern Pacific Ocean. Institute of Fisheries, University of British Columbia, Vancouver, British Columbia.

Bence, J. R. and J. E. Hightower. 1990. Status of bocaccio in the Conception/Monterey/Eureka INPFC areas in 1990. *in* Appendix to Status of the Pacific Coast groundfish fishery through 1990 and recommended acceptable biological catches for 1991 (SAFE Report). Pacific Fishery Management Council, Portland.

Bence, J. R. and J. B. Rogers. 1992. Status of bocaccio in the Conception/Monterey/Eureka INPFC areas in 1992. *in* Appendix to Status of the Pacific Coast groundfish fishery through 1992 and recommended acceptable biological catches for 1993 (SAFE Report). Pacific Fishery Management Council, Portland, OR.

Browning, R. J. 1980. Fisheries of the North Pacific: history, species, gear, & processes. Alaska Northwest Publishing Company, Anchorage, Alaska.

Butler, J. and T. Barnes. 2000. Cowcod rebuilding. Pacific Fishery Management Council, Portland, OR, Unpublished report.

Butler, J. L., T. Barnes, P. Crone, and R. Conser. 2003. Cowcod rebuilding review. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Butler, J. L., L. D. Jacobson, J. T. Barnes, H. G. Moser, and R. Collins. 1999. Stock assessment of cowcod. *in* Appendix to Status of the Pacific Coast groundfish fishery through 1998 and recommended acceptable biological catches for 1999 (SAFE Report).

Clark, W. G. 1993. The effect of recruitment variability on the choice of a target level of spawning biomass per recruit. Pages 233-246 *in* G. Kruse, R. J. Marasco, C. Pautzke, and T.J. Quinn II, editors. Proceedings of the International Symposium on Management Strategies for Exploited Fish Populations. Alaska Sea Grant College Program Report No.93-02, University of Alaska Fairbanks.

Conser, R., J. J. Maguire, R. Methot, P. Spencer, R. Moore, and M. Saelens. 2003. Widow rockfish STAR Panel meeting report. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Crone, P. R., R. D. Methot, R. J. Conser, and T. L. Builder. 1999. Status of the canary rockfish resource off Oregon and Washington in 1999. *in* Status of the Pacific Coast groundfish fishery through 1998 and recommended acceptable biological catches for 1999 (SAFE Report). Pacific Fishery Management Council, Portland, OR.

Eschmeyer, W. N., E. S. Herald, and H. Hammon. 1983. A Field Guide to Pacific Coast Fishes of North America. Houghton Mifflin, Boston.

He, X., A. Punt, A. D. MacCall, and S. V. Ralston. 2003a. Rebuilding analysis for widow rockfish in 2003. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

He, X., S. V. Ralston, A. D. MacCall, D. E. Pearson, and E. J. Dick. 2003b. Status of the widow rockfish resource in 2003. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Ianelli, J. and J. Heifetz. 1995. Decision analysis of alternative harvest policies for the Gulf of Alaska Pacific ocean perch fishery. Fisheries Research 24:35-63.

Ianelli, J. and M. Zimmerman. 1998. Status and future prospects for the Pacific ocean perch resource in waters off Washington and Oregon as assessed in 1998. Pacific Fishery Management Council, Portland, OR.

Ianelli, J. N., M. Wilkins, and S. Harley. 2000. Status and future prospects for the Pacific ocean perch resource in waters off Washington and Oregon as assessed in 2000. *in* Appendix to Status of the Pacific coast groundfish fishery through 2000 and recommended Acceptable Biological Catches for 2001 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Jagielo, T., P. Adams, M. Peoples, S. Rosenfield, K. R. Silberberg, and T. E. Laidig. 1997. Assessment of lingcod in 1997. Pacific Fishery Management Council, Portland, OR.

Jagielo, T. and J. Hastie. 2001. Updated rebuilding analysis for lingcod. Unpublished report prepared for the Pacific Fishery Management Council, Portland, OR.

Jagielo, T., D. Wilson-Vandenberg, J. Sneva, S. Rosenfield, and F. Wallace. 2000. Assessment of lingcod (*Ophiodon elongatus*) for the Pacific Fishery Management Council in 2000. *in* Appendix to Status of the Pacific coast groundfish fishery through 2000 and recommended acceptable biological catches for 2001 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Lenarz, W. H. 1993. An initial examination of the status of the darkblotched rockfish fishery off the coasts of California, Oregon, and Washington. *in* Appendix C in Appendices to the status of the Pacific Coast groundfish through 1993 and recommended acceptable biological catches for 1994.

Love, M. S. 1991. Probably more than you want to know about the fishes of the Pacific coast. Really Big Press, Santa Barbara, California.

Love, M. S., P. Morris, M. McCrae, and R. Collins. 1990. Life history aspects of 19 rockfish species (Scorpaenidae: *Sebastes*) from the southern California bight, NOAA, NMFS Tech. Rep. 87.

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

MacCall, A. D. 2002. Status of bocaccio off California in 2002. *in* Volume 1 Status of the Pacific Coast groundfish fishery through 2002 and recommended acceptable biological catches for 2003 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

MacCall, A. D. 2003a. Bocaccio rebuilding analysis for 2003. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

MacCall, A. D. 2003b. Status of bocaccio off California in 2003. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation), Portland, OR.

MacCall, A. D. and X. He. 2002. Bocaccio rebuilding analysis for 2002. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2002 and recommended acceptable biological catches for 2003 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

MacCall, A. D., S. Ralston, D. Pearson, and E. Williams. 1999. Status of bocaccio off California in 1999 and outlook for the next millennium. *in* Appendix to Status of the Pacific Coast groundfish fishery through 1999 and recommended acceptable biological catches for 2000 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Mace, P. M. 1994. Relationships between common biological reference points used as thresholds and targets of fisheries management strategies. Canadian Journal of Fisheries and Aquatic Sciences 51:110-122.

Methot, R. and K. Piner. 2002a. Rebuilding analysis for canary rockfish update to incorporate results of coastwide assessment in 2002. *in* In Volume 1 Status of the Pacific Coast groundfish fishery through 2002 and recommended acceptable biological catches for 2003 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Methot, R. and K. Piner. 2002b. Rebuilding analysis for yelloweye rockfish: update to incorporate results of coastwide assessment in 2002. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Methot, R. and K. Piner. 2002c. Status of the canary rockfish resource off California, Oregon and

Washington in 2001. *in* Volume 1 Status of the Pacific Coast groundfish fishery through 2002 and recommended acceptable biological catches for 2003 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Methot, R. and J. Rogers. 2001. Rebuilding analysis for darkblotched rockfish. Unpublished report prepared for the Pacific Fishery Management Council, Portland, OR.

Methot, R., F. Wallace, and K. Piner. 2003. Status of yelloweye rockfish off the U.S. West Coast in 2002. *in* Volume 1: Status of the Pacific Coast groundfish fishery through 2003 and recommended acceptable biological catches for 2004 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Methot, R. D. 2000a. Rebuilding analysis for canary rockfish. Unpublished report prepared for the Pacific Fishery Management Council, Portland, OR.

Methot, R. D. 2000b. Technical description of the stock synthesis assessment program, NOAA Technical Memorandum NMFS-NWFSC-43.

Miller, D. J. and R. N. Lea. 1972. Guide to the Coastal Marine Fishes of California. California Department of Fish and Game, CDFG Fish Bulletin 157.

Myers, R. A., N. J. Barrowman, and R. Hilborn. 2000. The Meta-analysis of the maximum reproductive rate for fish populations to estimate harvest policy; a review. Unpublished report distributed at the March 20-23, 2000, West Coast Groundfish Harvest Rate Policy Workshop sponsored by the Scientific and Statistical Committee of the Pacific Fishery Management Council.

O'Connell, V. M. and D. W. Carlile. 1993. Habitat-specific density of adult yelloweye rockfish *Sebastes ruberrimus* in the eastern Gulf of Alaska. Fish. Bull. 91:304-309.

O'Connell, V. M. and F. C. Funk. 1986. Age and growth of yelloweye rockfish (*Sebastes ruberrimus*) landed in southeastern Alaska. Pages 171-185 *in* Proc. Int. Rockfish Symposium, volume 87-2. Alaska Sea Grant College Program, Anchorage, Alaska.

PFMC. 2002. Status of the Pacific coast groundfish fishery through 2001 and recommended acceptable biological catches for 2002. Stock Assessment and fishery evaluation. Pacific Fishery Management Council, Portland, OR.

Punt, A. E. 2002. SSC default rebuilding analysis: Technical specifications and user manual. Pacific Fishery Management Council, Portland, OR.

Punt, A. E. and J. N. Ianelli. 2001. Revised rebuilding analysis for Pacific ocean perch. Unpublished report to the Pacific Fishery Management Council, Portland, OR.

Punt, A. E. and A. D. MacCall. 2002. Revised rebuilding analysis for widow rockfish for 2002. Unpublished report to the Pacific Fishery management Council, Portland, OR.

Ralston, S., J. N. Ianelli, D. E. Pearson, M. E. Wilkins, R. A. Miller, and D. Thomas. 1996. Status of bocaccio in the Conception/Monterey/Eureka INPFC areas in 1996 and recommendations for management in 1997. *in* Appendix Vol. 1: Status of the Pacific Coast groundfish fishery through

1996 and recommended acceptable biological catches for 1997 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Rogers, J. B., R. D. Methot, T. L. Builder, K. Piner, and M. Wilkins. 2000. Status of the darkblotched rockfish (*Sebastes crameri*) resource in 2000. *in* Appendix to Status of the Pacific coast groundfish fishery through 2000 and recommended acceptable biological catches for 2001 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Rosenthal, R. J., L. Haldorson, L. J. Field, V. Moran-O'Connell, M. G. LaRiviere, J. Underwood, and coauthors. 1982. Inshore and shallow offshore bottomfish resources in the southeastern Gulf of Alaska (1981-1982). Alaska Dept. Fish and Game, Juneau, Alaska.

Sampson, D. B. 1996. Appendix C: Stock status of canary rockfish off Oregon and Washington in 1996. *in* Pacific Fishery Management Council, editor. Status of the Pacific coast groundfish fishery through 1996 and recommended acceptable biological catches for 1997: stock assessment and fishery evaluation. Pacific Fishery Management Council, Portland, OR.

Sampson, D. B. and E. M. Stewart. 1994. Appendix G: Status of the canary rockfish resource off Oregon and Washington in 1994. *in* Status of the Pacific coast groundfish fishery through 1994 and recommended acceptable biological catches for 1995: stock assessment and fishery evaluation. Pacific Fishery Management Council, Portland, OR.

SSC (Science and Statistical Committee). 2001. SSC terms of reference for groundfish rebuilding analyses. Pacific Fishery Management Council, Portland, April 2001, Briefing Book Exhibit F.7.

Wallace, F. R. 2002. Status of the yelloweye rockfish resource in 2001 for northern California and Oregon waters. *in* Appendix to the Status of the Pacific Coast Groundfish Fishery Through 2001 and Acceptable Biological Catches for 2002 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Williams, E. H., A. D. MacCall, S. Ralston, and D. E. Pearson. 2000. Status of the widow rockfish resource in Y2K. *in* Appendix to Status of the Pacific coast groundfish fishery through 2000 and recommended acceptable biological catches for 2001 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

Williams, E. H., S. Ralston, A. D. MacCall, D. Woodbury, and D. E. Pearson. 1999. Stock assessment of the canary rockfish resource in the waters off southern Oregon and California in 1999. *in* Status of the Pacific coast groundfish fishery through 1999 and recommended acceptable biological catches for 2000 (Stock Assessment and Fishery Evaluation). Pacific Fishery Management Council, Portland, OR.

APPENDICES CONTENTS

N.B. In the last published version of the FMP (July 1993) the Appendices appeared as Chapter 11.0, and have not been revised or updated since that time. This original material provides descriptive information on the following topics:

- Biological and Environmental Characteristics of the Resource
- Description of the Fishery
- Social and Economic Characteristics of the Fishery
- History of Management
- History of Research
- Weather-Related Vessel Safety
- Relationship of this FMP to Existing Laws and Policies
- Management and Enforcement Costs
- Groundfish Landings Data, 1981 - 1988 from PacFIN

References cited in the July 1993 version of Chapter 11.0 appear in Chapter 13.0 of that version of the FMP, which is entitled "References" and has not been revised or updated since that time.

A portion of Amendment 11 (1998) addressing Essential Fish Habitat added numbered Section 11.10 to the Appendices chapter of the FMP.

More detailed species accounts of groundfish EFH are compiled in the West Coast Groundfish Essential Fish Habitat Appendix, which is available on the NMFS Northwest Region website.1/

In summary, the FMP Appendices consist of the following material: Chapter 11.0 of the July 1993 version of the FMP, Section 11.10 added by FMP Amendment 11, the West Coast Essential Fish Habitat Appendix, and Chapter 13.0 of the July 1993 version. These materials are available under separate cover.

[1/]http://www.nwr.noaa.gov/1sustfsh/efhappendix/page1.html

1. **Summary of literature review**
2. **Methodology for determining dependence**
3. **Methodology for determining resilience**
4. **Identifying "vulnerable areas"**
5. **Scale**

Our purpose is to present information to help the Council to develop rebuilding plans for overfished groundfish species. The Magnuson Stevens Act requires among other things that time period for rebuilding an overfished species "be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem;…"

Looking for concepts and methodological approaches, we have reviewed available literature that points towards using sets of indicators to characterize communities as "dependent", "resilient", vulnerable", or "engaged" which all may be components of assessing the "needs of fishing communities." Our ability to apply suggested approaches is limited by available data and the context of our fisheries. For example, few, if any of these studies, specifically address fishing communities that depend on recreational fishing as a source of income, jobs, or social "well being."

Below is a review of such literature, and our thoughts on the types of indicators that we are initially considering for presenting to the Council to review.

1. Summary of literature review

Types of literature reviewed

Several sources of literature were reviewed to collect information on methodologies used in other regions and industries to assess community dependence on natural resources (fisheries and forestry) and community adaptability to change. Effort was made to review all relevant literature. Over thirty-two studies were reviewed. These have been summarized and can be found in Appendix X. Most of these studies have been included in summaries contained in Tables 1 -5. The literature reviewed typically fell into one or more of the following categories:

- Studies offering general guidance in choosing indicators and indices
- Studies identifying key indicators potentially useful for tracking community dependence, resilience and resident well-being (see Table 1)
- Studies determining dependence and/or resilience (see Tables 2 and 3)
- Studies identifying "communities of concern" or "areas of vulnerability" (see Tables 2,3, and 4)

In general, most studies used the term "dependence" to mean use of a particular resource, sometimes above a threshold level. The term "resilience" usually implied a community's adaptability to change.

Use of indicators and indices to help determine "dependence" and "resiliency"

Because there is no one agreed upon method for measuring dependence and resilience as defined above, research attempting to characterize dependence and/or resilience use various types of data as proxies. Literature sources summarized in Table 1 describe several indicators and indices potentially useful in tracking dependence, resilience and sustainability of communities.

Table 1. Socio-Economic and Cultural Indicators

Author(s)	Key Indicators	Comments
Langdon-Pollock-PSMFC (forthcoming)	• Marine education programs • Number of crew members and processor employees residing in a fishing community • Reliance on other natural resources • Changes in ownership over time • Descriptions of support industries • Commercially landed pounds and revenue • Recreationally landed pounds and revenue • Fishing related social groups and organizations • Subsistence fisheries • Number of vessel owners that reside in the community • Number of vessel owners that land fish but do not reside in the community • Adaption strategies • Industry structure • Training institutions • Perceptions and descriptions of tourism • Women's role in the fishing industries • Processors and fishery support industries • History of fishing industries	
General Fisheries Commission for the Mediterranean (2001)	National Indicators • Gross consumption of fishing products per inhabitant • Fish export/import commercial balance • Fish employment ratios • Fish coverage rates of national consumption • Extraversion rate • Fish contribution to the GNP • Ratio harvesting value	Of a larger group of potential indicators, an advisory group determined that adequate information existed for only sixteen variables that were used to construct the indicators shown. These results would be

	• Ratio harvesting rate Local Operating Unit Indicators • Vessel physical productivity • Capacity physical productivity • Power physical productivity • Per vessel hour physical productivity • Capacity productivity • Vessel productivity • Power productivity • Per vessel hour productivity • Man physical productivity • Man productivity • Average wage • Landing prices • Invested capital • Salary cost • Opportunity cost • Gross estimated profit • Profit rate • Gross added value	tracked over time to develop a better understanding of main socioeconomic trends within the Alboran Sea Mediterranean fisheries management unit.
Kusel, Fortmann (1991)	• Economic well-being (poverty, average income, income inequality) • Health (work injuries) • Social Pathology (rate of burglary) • Capacity • Economic importance of forestry sector • Amount of public land • Concentration of private timber land • Economic importance of tourism • Immigration	Well-being is reformulated in terms of Sen's concepts of capabilities (opportunities an individual has to choose from) and functioning (what (s)he succeeds in doing with the commodities at her command) coupled with an expanded conception of community which is used to explore the question of how communities develop and maintain the capacity to enhance their well-being and to defend their interests against outsiders. *Study 1:* statistical analyses between indicators of well-being and measures of forest and use *Study 2:* rapid rural appraisal of 7 forest communities to determine issues of local importance and to assess capacity to undertake action to address them *Study 3 (v2):* evaluates the well-being of 3 forest communities in CA.
Northeast Fisheries Management Council (2003)	• *Size and demographic characteristics of the fishery workforce in the community* • *Cultural issues*	This SIA was framed by the following questions: - Will standards, style, or

	- attitudes, beliefs, values of fishermen, their families, and their communities • *Social structure and organization* - the ability of communities to provide necessary social support and services to families • *Non-economic social aspects* - lifestyle, health, and safety issues • *Historical dependence on fishery* - reflected in the structure of fishing practices and income distribution	pace of living change? - Will cooperation and interaction patterns change? - Will change be sudden or gradual? - How does the proposed action fit with historical trends and participation in the fishery? - Does the change fit with cultural or normative expectations of behavior in the fishery or community? - How do fishermen and the community members view the alternatives?
Pollnac (2006)	o *Occupational attributes:* o Annual rounds o Fishing units and gears o Cost of entry o Crew structure o Occupational mobility o Productivity o Absenteeism o Turnover o Safety o Flexibility o *Individual attributes* o Mental health (anxiety, low self-esteem, worry, tension) o Psychosomatic illness o Heart disease o Longevity o Education and training o Flexibility o Resilience o *Social structure:* o Occupation structure o Community solidarity o Power structure o Social stratification o Family relationships o Flexibility o Resilience o Robustness o *Social problems:* o Conflict o Non-compliance o Unemployment o Impaired inter-personal relationships o Family violence o Unemployment	
Pollnac and Poggie (1988)	• *Job satisfaction* • Individual longevity • Mental health	

	• Family violence • Worker productivity	
Smith et al. (2003)	*Mental health* • Anxiety • Stress • Mastery • self-esteem • industry changes • depression • employment • spirituality	

Dependence

Dependence was often described for the purpose of identifying communities that could potentially be impacted by a particular change in management regulations. Descriptions of dependence used one or more indicators that served as proxies of dependence. Table 2 provides a summary of the literature review conducted on studies assessing resource (fishing and forestry) dependence. The analyses reviewed usually used at least one, and usually more than one, of the following indicators as proxies for dependence:

- Employment in fishing as a percentage of total employment in the area under analysis
- Income from fishing as a percentage of total income in the area under analysis
- Number of fishing vessels in the area under analysis
- Number of fishing permits in the area under analysis
- Number of processors/buyers in the area under analysis
- Fish landings to the area under analysis

While other indicators (see Hall-Arber et al., 2001) were sometimes used to describe dependence, these were the indicators used most often.

Typically, one of two approaches, or a variation thereof, was used for describing a community's dependence on a resource (see Table 2 for more detail on individual studies and Table 2a for a summary of various methodological approaches).

- Communities are ranked based on indicator values for each indicator category for each community. Those communities with the highest indicator values are assumed to more "more dependent" on the resource than those communities with lower indicator values.
- Communities are ranked from highest to lowest by indicator value for each indicator category for each community. Communities with indicator values above chosen thresholds are labeled "dependent".

Table 2. Determining Dependence

Author(s)	Primary variables considered	Thresholds
Dyer and Griffith (1996)	• Repair/supply facilities • Fish dealers/processors • Religious art/architecture dedicated to fishing • Secular art/architecture dedicated to fishing • Number of Multispecies Groundfish (MGF)	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.

	permits • Number of MGF vessels	Factors were scored in two ways: nominally (as either present or absent) and ordinally (ranked from 5-highest to 1-lowest). Higher scores indicate greater dependence. Scores for each factor are added together to rank the relative dependence of ports.
Jacob et al. (2002)	• Fishing employment (directly and indirectly derived from the fishing sector with the use of regional economic multipliers) as a percentage of total employment	Dependence was defined as at least 15% of total employment (chosen based on ERS calculations – see below)
Hall-Arber et al. (2001)	• Employment in fishing as a percentage of the labor force in all occupations • Employment in fishing as a percentage of employment in related occupations within the Bureau of Labor Statistics category of fisheries/forestry/farming • Summary measure of a series of dependency ratios that explore the number of fishermen per hundred to various alternative occupational roles that fishermen could enter with their particular skill profiles	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.
European Commission (2000)	• Share of fisheries activity in value added • Share of fisheries employment as a percentage of total regional employment • Share of catch as a proportion of total catch	No specific thresholds. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.
USDA Economic Research Service	• Average annual labor over two years as a percentage of total labor • Proprietors' earnings over two years as a percentage of total earnings	Farming – 15%[1] or more of average annual labor and proprietor's earnings derived from farming during 1998-2000 OR 15% or more of employed residents worked in farm occupations in 2000[2]. Mining – 15% or more of average annual labor and proprietors' earnings derived from mining during 1998-2000 Manufacturing – 25% or more of average annual labor and proprietors' earnings derived from manufacturing during 1998-2000 Federal/state government –

[1] In general, the ERS used one standard deviation from the mean labor and proprietor income for each economic type to help determine the cutoff. The cutoff was then rounded to the nearest 5% (ERS, 2005).
[2] Farming was based on two thresholds. The farming occupation option was adopted to allow counties into the farming-dependent group that had highly farming-oriented economies but did not meet the earnings threshold, most often due to negative farm earnings estimates for some or all of the analyzed years.

		15% or more of average annual labor and proprietors' earnings derived from Federal and State government during 1998-2000 Services – 45% or more of average annual labor and proprietors' earnings derived from services during 1998-2000
Forest Service (1987) as referenced by Donoghue and Haynes (2002)	• A community's employment in the forest products industry as a percentage of total employment	Dependence was defined as at least 10% of total employment
Kenneth and Beale (2002)	A weighted average of : • Wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment reported in the Census Bureau's County Business Patterns for 1999 • Percentage of total personal income reported for the same categories by the Bureau of Economic Analysis • Percentage of housing units intended for seasonal or occasional use reported in the 2000 Census • Per capita receipts from motels and hotels as reported in the 1997 Census of Business.	This study analyzes community dependence on recreational industries. The industry categories were chosen after reviewing data for a sample of counties of well-known, undisputed high recreational dependence. The variables were converted into z-scores and combined into a weighted index to reflect recreational activity (0.3 employment + 0.3 income + 0.4 seasonal homes). Counties with index scores of 0.67 or higher were regarded as potential recreation counties. Other counties were also considered if they had a score greater than the mean of the index and one of the following conditions was met: 1) the county had at least $400 per capita of hotel-motel receipts or 2) at least 25% of the housing in the county was seasonal. In this way, counties with a high volume of recreational activity but large urban centers that dilute their scores can be included.
Norman et al. (forthcoming)	• Value of fish landed in the community • Metric tons of fish landed in the community • Permit holders residing in the community • Vessel owners residing in the community • Number of vessels delivering fish to the community	All variables were outputs generated by a Data Envelopment Analysis (DEA) Model, where inputs were community populations. The model thereby compared all communities to one another in terms of fishing outputs per capita, and generated a list of communities in rank order by

		level of dependence on fishing. Communities were analyzed as dependent upon fishing in general, or engaged in a specific fishery, relative to one another and then rank ordered according to the relative importance of their dependence or engagement score. No specific threshold was identified. However, once assembled in a rank ordering, communities which scored at least one standard deviation above the mean on either the dependence or engagement scale were selected for detailed profiling.
Sepez et al. (2005)	• Metric tons of fish landed in the community • Number of processors in the community • Number of vessels delivering fish to that community • Number of vessels homeported in the community • Number of vessel owners residing in the community • Number of crew licenses in the community • Ratio of state-issued fishing permits to population • Ratio of state-issued setnet fishing permits to population • Ratio of federally issued vessel permits to population • Aggregate of all indicators described above per capita	If any one of these indicators for a particular Alaskan community exceeded the threshold of 0.15, which in most cases was determined as a ratio to community population, it was determined to be significantly linked to fishing and selected for profiling.
Langdon-Pollack (2004)	• Population • Poverty • Unemployment • Per capita income • Year that houses were built • Percent of vacant houses • Number of industries outside fishing • Number of berths • Percent that a harbor is filled with commercial and/or rec vessels • Landings data and number of suppliers • Processors • Community fishing organizations • Community fishing events	The author suggests the use of these indicators in a dependency index. However, after collecting this data for the Pacific coast region, it was determined that creating a dependency index was impractical given the available information.
Daniels (2004)	• The amount of forest land per county as a percentage of total county land	The ranked list of counties and their values were divided into three equal parts. The top third was labeled with a “high” dependence, the second third

		with a "medium" dependence and the lowest third was labeled with "low" forest dependence.

Table 2a. Methodologies Used in Past Research to Identify Dependence

Method	Sources that use this method	Threshold identified? How?	Primary variables	Notes
Dependence threshold using indicators as proxies for dependence	Forest Service (1987), USDA ERS, Jacob et al. (2002)	The threshold was identified by estimating one standard deviation from the mean for each variable to help determine the cutoff. The cutoff was then rounded to the nearest 5%.	• Industry employment as a percentage of total area employment (using multipliers or input-output model) • Industry earnings as a percentage of total area earnings	
Dependence threshold using an index as a proxy for dependence	Kenneth and Beale (2002)	The variables were converted into z-scores and combined into a weighted index to reflect recreational activity (0.3 employment + 0.3 income + 0.4 seasonal homes). Counties with index scores of 0.67 or higher were regarded as potential recreation counties. Other counties were also considered if they had a score greater than the mean of the index and one of the following conditions was met: 1) the county had at least $400 per capita of hotel-motel receipts or 2) at least 25% of the housing in the county was seasonal. In this way, counties with a high volume of recreational activity but large urban centers that dilute their scores can be included.	• Wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment • Percentage of total personal income • Percentage of housing units intended for seasonal or occasional use reported • Per capita receipts from motels and hotels	Used to determine recreational dependence
Relative dependence of communities using indicators as proxies for dependence	Daniels (2004), Hall-Arber et al. (2001), European Commission (2000)	No threshold identified. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.	• Employment in fishing as a percentage of the labor force in all occupations • Employment in fishing as a percentage of employment in related occupations within the Bureau of Labor Statistics category of fisheries/forestry/farming • Summary measure of a series of dependency ratios that explore the number of fishermen per hundred to various alternative occupational roles that fishermen could enter with their particular skill profiles • Share of fisheries activity in value added • Share of catch as a proportion of total	Daniels (2004) used this method to help identify "areas of concern". The ranked list of counties and their values were divided into three equal parts. The top third was labeled with a "high" dependence, the second third with a "medium" dependence and the lowest third was labeled with "low" forest dependence.

			catch • The amount of forest land per county as a percentage of total county land	
Relative dependence of communities using as index as a proxy for dependence	Dyer and Griffith (1996)	No threshold identified. Consideration of the suggested variables can give an indication with regard to the relative degree of dependence.	• Infrastructure - Repair/supply facilities, fish dealers/processors • Art/architecture dedicated to fishing • Number of permits • Number of vessels	
Relative dependence on fishing and engagement in specific fisheries using indicators as proxies for dependence and engagement	Norman, et al. (forthcoming)	Communities were analyzed as dependent upon fishing in general, or engaged in a specific fishery, relative to one another and then rank ordered according to the relative importance of their dependence or engagement score. No specific threshold was identified. However, once assembled in a rank ordering, communities which scored at least one standard deviation above the mean on either the dependence or engagement scale were selected for detailed profiling.	• Value of fish landed in the community • Metric tons of fish landed in the community • Permit holders residing in the community • Vessel owners residing in the community • Number of vessels delivering fish to the community	Engagement analysis focused on the value of fish landed, permit holders, and fishery-specific vessels owned by community members. Each of these categories was broken down by each North Pacific and Pacific fishery management group.

Resilience

Once dependence is described in the reviewed literature, resilience is often assessed for the areas under analysis. Resilience is described in order to assess the potential impact the change in management regulations will have on the areas under analysis. It is typically assumed that the greater socio-economic and cultural diversity and infrastructure an area has, the more resilient an area will be if a management regulation negatively affects the area. Indices, or aggregations of indicator values are often used as a proxy for resilience. These indices include a greater variety of indicators than the list of indicators used as proxies for dependence (see Table 3). Resiliency indices in the studies reviewed sometimes included some of the following indicators:

- Employment in various industries
- Unemployment
- Income
- Mobility
- Education, skills and training
- Population density (as a proxy for community infrastructure)
- Community isolation
- Fisheries specific infrastructure

Several of the studies reviewed use indices of community well-being as a guide in developing resiliency indicators.

Table 3. Determining Resilience

Author(s)	**Variables incorporated into resilience indicator**	**Comments**
Hall-Arber et al. (2001)	• Infrastructure o Icehouse o NMFS extension office o Dockside diesel fuel o International fish brokers o Boat insurance o Local trucking o Fish processor o Fishing monument o Boat welders o Fishermen supply house o Vessel haul out facility o Bait house o 3+ fishing associations o Marine supply house o Local net maker o Fish retail store o 2 or fewer association	Surveys of 25 local communities and principal components analysis was used to rank the infrastructure factors and aggregate these into a score for each community to show relative resilience.
Charles et al. (2001)	• Debt levels among fishermen • Reported bankruptcies • Bankruptcy liabilities • Distribution of landed value across species • Proportion of fishers with multiple licenses • Age distribution of fishers • Diversification of employment sources	The authors suggest use of these indicators to proxy resilience.
Pollard (2004)	• Isolation	This report identifies “vulnerable”

	• Deprivation index o Income o Employment o Health deprivation and disability o Education skills and training, o Housing o Geographical access to services	areas based on their location (as categorized by Travel to Work Areas – an indication of their rural status and remoteness), deprivation, and regional policy.
Daniels, JW (2004); Horne and Haynes (1999)	• *Lifestyle diversity* Mobility Ethnicity Degree of urbanness Race Income Education • *Economic diversity* employment in county *i* in industry *j*, *Ei* = total employment in county *i*, *Ej* = total employment in industry *j* in all counties, and *E* = total employment in all industries across all counties. • *Population density* (proxy for civic infrastructure) Greater population density is assumed to lead to a more developed county infrastructure and so increases socioeconomic resiliency.	Each county received an overall socioeconomic resiliency rating corresponding to an unweighted average of its ranks for lifestyle diversity, economic resiliency, and population density. These values were then sorted from highest to lowest value and divided into thirds. Counties in the top third had the highest socioeconomic resilience and so were given a rating of "high." Counties in the middle third were given a "medium," and counties in the last third were given a "low" socioeconomic resiliency rating.
Sommers (2001)	• Demographics • Employment • Government revenues • Facilities and infrastructure • Social services burden • Federal assistance • Business trends • Taxes	
Wilson and McCay (1998)	• Existence of alternative activities, both fishing and non-fishing (the more alternatives available to someone who must change their behavior because of a regulation, the better that person is able to deal with the change) • Economic vulnerability (amount and sources of pressure and competition faced in running fishing operators and selling their products. The more vulnerable the fish-related operation is, the greater the impact's regulation. • Community support (communities differ in the degree to which social capital is available to people and fishing operations affected by regulation. The more community support, the better the communities can absorb the regulation's impact.	While this study does not call itself a resiliency report, it offers "3 characteristics of communities influencing the magnitude and importance of the impact" which is a measure of resiliency

Communities of concern or areas of vulnerability

In the reviewed literature, the purpose of identifying "communities of concern" or "areas of vulnerability" is to alert decision-makers to areas that may require particular focus and/or mitigation efforts. Most of the studies reviewed that attempted to measure dependence *and* resilience, used these two measurements to identify the areas that had both relatively high dependence and relatively low resilience levels. These areas are then labeled as "communities of concern" or "areas of vulnerability" (see Table 4). The states of Washington, Oregon and California have their own definitions of "distressed", "disadvantaged" or "high unemployment" areas (see Table 5). Washington and California rely upon unemployment rates while Oregon uses indices averaging employment change, average wage change, annual employment rate relative to the state level, and per capita personal income relative to state[3].

Scale

Almost all of the literature reviewed cautioned against the use of the dependence and resiliency indicators and indices as the primary guidance for making fishery management decisions due to the scale of analysis. Most of the studies used data on the county level which was admittedly too large a scale to accurately measure community dependence and resilience. However, in almost all cases, data on a smaller scale was not available.

Table 4. Linking dependency and resilience to identify vulnerable areas or areas of concern.

Author (s)	**Definition of "communities of concern" or "vulnerable areas"**	**Comments**
Crone and Haynes (2001)	Wood products counties of concern – a minimum 10% employment in SIC category 24 and contained two or more communities with medium to very high wood products specialization rating Range counties of concern – 12% or more of agricultural sales derived from sheep or cattle produced from federal forage, harvest levels, animal unit months	Community ranking - Communities were ranked that contained two or more isolated communities that had a medium to very high wood products or agricultural specialization and for which at least 33% of the land in a 20 mile radius circle is FSBLM land (wrt wood products). The counties were ranked from 1 to 3 based on how high a concern the area was. Finding the preferred alternative - Rankings were aggregated and the lowest aggregate level indicated the preferred alternative.
Daniels (2004)	Areas with "low" socioeconomic resilience and "high" forest dependence (see Tables 2 and 3 for definitions)	
Pollard (2004)	Areas with overlap of high dependence, remoteness, and a high deprivation index score	See Table 3 for more details on indicators used.

[3] To determine whether an incorporated city or sub-city area in a non-distressed county is distressed, four factors were used including: poverty rate, per capita personal income, percent of population aged 25+ with college education, and unemployment rate.

Table 5. Distressed Communities

State	Definition of "distressed"	Communities
Washington	Counties having three year average unemployment rate greater than or equal to 120% of the state average (Jan 2002-Dec 2004)	Adams, Clark, Columbia, Cowlitz, Ferry, Grant, Grays Harbor, Klickitat, Lewis, Okanogan, Pacific, Pend Oreille, Skamania, Stevens, Wahkiakum, Yakima[4]
Oregon	To determine whether a county is distressed or not, four factors were used to create an index for the county. These factors are: • Employment change (ever the most recent period for which data is available); • Average wage change (over the most recent period for which data is available); • Annual employment rate relative to state (latest year for which data is available); and • Per capita personal income relative to state (latest year for which data is available.[5] To determine whether an incorporated city or sub-city area in a non-distressed county is distressed, four factors were used: • Poverty rate (i.e. percent of the population in poverty) • Per capita personal income • Percent of population aged 25+ with college education • Unemployment rate[6]	Severely distressed counties – Baker, Columbia, Coos, Crook, Douglas, Grant, Harney, Klamath, Lake, Linn, Malheur, Sherman, Umatilla, Wallowa, Wasco, Wheeler Distressed counties – Curry, Gilliam, Hood River, Jefferson, Josephine, Lincoln, Marion, Morrow, Union Severely distressed city/area – Monroe, Butte Falls, Eagle Point, Talent, Phoenix, Gold Hill, Oakridge, Creswell, Lowell, Cottage Grove, Springfield, Florence, Lents area of Portland, North/NE Portland, Rockwood area of Portland, Falls City, Independence, Garibaldi, Gaston, Dayton, Sheridan, Lafayette, McMinnville Distressed city/area – Johnson City, Estacada, Warrenton, Seaside, Astoria, Rogue River, Veneta, Westfir, Fairview, Wood Village, Dallas, Monmouth, Tillamook, Bay City, Cornelius, Forest Grove, Amity, Newberg, Willamina[7]
California	There are several measures used to qualify communities for specific programs in California. Some examples are: 1) A county is labeled "distressed" if it has an unemployment rate exceeding 125% of the statewide average. 2) The Employment Training Administration of the Federal Department of Labor designates Labor Surplus Areas for Workforce Development and defines them as	1) Del Norte, Alpine, Monterey, San Joaquin, Modoc, Lake, Madera, Stanislaus, Glenn, Siskiyou, Plumas, San Benito, Yuba, Kern, Sierra, Fresno, Sutter, Trinity, Merced, Kings, Tulare, Colusa, Imperial[8] 2) Alpine, Colusa, Del Norte, Glenn, Imperial, Kern, Kings, Lasses,

[4] Assessed by the Washington State Employment Security Department. Distressed Areas List for 2005. www.workforceexplorer.com/article.asp?ARTICLEID=5010

[5] The index is a composite of these four factors. A county is distressed if its index is less than 1.0 and non-distressed otherwise. If a county is distressed, all of its parts are considered to be distressed. An index less than one shows that, on average, economic conditions worsened for a county relative to the state over the period under consideration.

[6] If three or more of these factors were worse than a threshold value, then that place was identified as distressed. The threshold value is a representative value for each of the four factors in distressed counties.

[7] Assessed by the Oregon Economic and Community Development Department for 2005. www.econ.state.or.us/distMethods.htm

[8] "Economically distressed counties" are defined in a 1999 state statute and the counties qualifying are based on 2004 data. Information in the above table came from the California Economic Development Department (http://www.edd.ca.gov/).

	areas that have had unemployment rates of 120% of the national average for two fiscal years. 3) To qualify for the Federal Foreign Investor Visa Program, a county must be a high unemployment area with an unemployment rate of 150% above the national average).	Madera, Merced, Modoc, Monterey, Plumas, San Benito, San Joaquin, Santa Clara, Shasta, Sierra, Siskiyou, Stanislaus, Sutter, Tehama, Trinity, Tulare, Yuba 3) Kern, Imperial, Fresno, Kings, Madera, Merced, Stanislaus, San Benito, San Joaquin, Tulare, Sutter, Yuba

2. Methodology for determining dependence

Characterization of dependence will involve consideration of dependence on the total fish resource and dependence on the groundfish resource specifically. The following six indicators are being considered as proxies for overall community dependence on the Pacific coast fishery resources:

- Number of federal and state fishing permits
- Number of commercial fishing vessels
- Revenue from fishing as a share of total revenue from fishing
- Income from fishing as a share of total personal income
- Employment in fishing as a percentage of total employment
- Number of processors/buyers

The following six indicators will be used as proxies for community dependence on the Pacific coast groundfish fishery specifically:

- Number of groundfish permits
- Number of commercial fishing vessels using groundfish gear (non-whiting)
- Groundfish revenue as a percentage of total fisheries revenue
- Groundfish revenue as a percentage of total groundfish revenue
- Groundfish income as a percentage of total fisheries income
- Groundfish employment as a percentage of total employment in fishing

These sets of indicators were chosen based on: 1) the kind indicators seen in the literature and 2) data availability. The top set of indicators are proxies for commercial fishing dependence and engagement. The second set of indicators are a mix of: 1) proxies for both community dependence on groundfish compared to other communities (first four indicators) and 2) proxies for community dependence on groundfish compared to other fish harvested (last four indicators).

To describe the relative dependence of communities on the Pacific fishery resource, first, each area will be assigned a value for each indicator listed above for both overall community dependence on the fish resource and for community dependence on the groundfish fishery. Second, the communities will be ranked from highest value to lowest value for each indicator. Third, the top one-third of communities for each indicator will be listed in a table and deemed "high dependency".

3. Methodology for determining resilience

The methodology for characterizing resilience is simply a presentation of socioeconomic resiliency indicators in three categories:

- Population characteristics diversity
  - Average age of population
  - Average of highest education degree obtained
- Economic diversity
  - Average income
  - Total employment rate
  - Isolated counties
- Infrastructure
  - Population density
  - Fishing and community infrastructure
  - Number of permits owned

The theoretical basis for socioeconomic resiliency rests on the concept of social well-being, which is sometimes defined as a composite of four factors: economic resiliency, social and cultural diversity (population size, mix of skills), civic infrastructure (leadership, preparedness for change), and amenity infrastructure (attractiveness of the area) (McCool and others 1997).

In some papers, the authors assume that the relation between diversity and resiliency in social and economic systems is similar to that in the ecological literature. That is, a system with higher diversity is less affected by change than a system with lower diversity and the former therefore has higher resiliency. Socioeconomic systems with higher resiliency are defined here as those that adapt quickly as indicated by rebounding measures of socioeconomic well-being. People living in areas of high resiliency have a wide range of skills and access to diverse employment opportunities. Thus, if specific firms or business sectors experience downturns, unemployment rates rise only briefly until displaced people find other employment. Systems with low resiliency have more lingering negative impacts, such as unemployment or out-migration rates that remain high for several years.

4. Identifying "vulnerable areas"

Vulnerable areas will be identified as those communities that have both "high dependency" and "low resiliency". The method for doing this has not yet been defined.

5. Scale

Data availability largely influences the scale of the analysis regarding dependency and resilience. Measuring dependence and resilience requires use of indicators that are available for all areas analyzed. Therefore, data from central sources (2001 Census, PacFIN, RecFIN) were relied upon primarily, and data available for some areas, but not others, will be included as supplemental information in the text. For this reason, the scale of analysis was largely limited to port group and county.

However, there are some serious drawbacks to the use of port group and county to describe community dependence and resilience. Port group and county level analysis will likely dilute community fishery dependence values when a county/port group analyzed has communities (other than fishing communities) with high employment levels in non-fishing industries. To mitigate for this, other indicators are relied upon (number of vessels, number of permits, income, etc).

Another drawback to the use of port group and county in the analysis is that it will likely bias community fishery resilience values when a county/port group analyzed has communities (other than fishing communities) with employment diversity, high population density, and other indicators values that differ from the fishing communities within the area.

6. Dependency Indicator Results

Overall Community Dependence on Commercial Fishing

Number of federal and state fishing permits

Table 6. Ports with the highest number of fishing permits, 2005.

City	Permit Count
ASTORIA	258
NEWPORT	169
WESTPORT	137
PORT ORFORD	124
BELLINGHAM	119
SEATTLE	109
BROOKINGS	101
COOS BAY	99
ABERDEEN	87
ANACORTES	81
WARRENTON	79
CHARLESTON	67
CRESCENT CITY	59
BANDON	45
GARIBALDI	45
PORTLAND	44
FLORENCE	42
FORT BRAGG	40
PACIFIC CITY	40
BLAINE	40
GOLD BEACH	38
TOLEDO	37
CHINOOK	36
ILWACO	36

HARBOR	35
REEDSPORT	35
CATHLAMET	35
CLATSKANIE	34
SILETZ	34
NORTH BEND	33
SOUTH BEACH	33
FERNDALE	31
SALEM	29
TOKELAND	29
LONGVIEW	28
LONG BEACH	27
TACOMA	27
GRAYLAND	26
SOUTH BEND	26
GIG HARBOR	24
HAMMOND	23
DEPOE BAY	21
OCEAN PARK	21
PORT ANGELES	20
FRIDAY HARBOR	20
TILLAMOOK	20
CLACKAMAS	19
GEARHART	19
EUREKA	19
SEQUIM	18
HOQUIAM	17
NASELLE	17
RAYMOND	17
OLYMPIA	16
EUGENE	15
COQUILLE	14
WINCHESTER BAY	14
CHEHALIS	14
EDMONDS	14
OREGON CITY	13
WALDPORT	13
BOW	13
CLOVERDALE	13
WESTLAKE	13
CASCADE LOCKS	12
SAN FRANCISCO	12
ROCKAWAY	12
SEAVIEW	12
LAKE FOREST PARK	11
LAKE FOREST	11
EVERETT	11
BAY CITY	11
BEAVERTON	11
VANCOUVER	10

SEASIDE	10
OAK HARBOR	10
PORT TOWNSEND	10
CENTRALIA	10
MILWAUKIE	9
NEAH BAY	9
ROSEBURG	9
CLINTON	9
SHELTON	9
BAY CENTER	9
DALLAS	9
HALF MOON BAY	9
SCAPPOOSE	8
SIXES	8
OCEAN SHORES	8
COSTA MESA	8
ATASCADERO	8
ARLINGTON	8
CAMANO ISLAND	8
LOGSDEN	7
MARYSVILLE	7
BODEGA BAY	7
LOPEZ ISLAND	7
MT VERNON	7
SEDRO WOOLLEY	7
RAINIER	6
KELSO	6
BRINNON	6
RENTON	6
BREMERTON	6
MONTEREY	6
MORRO BAY	6
EL GRANADA	6
BURLINGTON	6
SNOHOMISH	6
SEBASTOPOL	6
NEHALEM	6
ROCKAWAY BEACH	6
TIGARD	6
LYNDEN	6
CURTIS	6
LUMMI IS	6
CORVALLIS	5
COSMOPOLIS	5
LANGLEY	5
BELLEVUE	5
SHORELINE	5
VASHON	5
PORT ORCHARD	5
KLAMATH FALLS	5

SPRINGFIELD	5
VENETA	5
LINCOLN CITY	5
FOX ISLAND	5
LOS OSOS	5
SAN JOSE	5
SANTA CRUZ	5
OXNARD	5
CUSTER	5
BAINBRIDGE ISLAND	5
MCMINNVILLE	5
CHELAN	4
CANBY	4
LAKE OSWEGO	4
LA PUSH	4
CASTLE ROCK	4
GASQUET	4
BEND	4
EPHRATA	4
ARCATA	4
MCKINLEYVILLE	4
GRANTS PASS	4
FEDERAL WAY	4
WOODINVILLE	4
SALKUM	4
SILVER SPRINGS	4
ALBION	4
SALINAS	4
VAUGHN	4
EL CAJON	4
MOUNT VERNON	4
LYNNWOOD	4
SANTA ROSA	4
HERMISTON	4
ROSBURG	4
FOREST GROVE	4
HILLSBORO	4
PETERSBURG	4
BEAVER	4
FT BRAGG	4
NAHCOTTA	4
PITTSBURG	4
WEDDERBURN	4
ANCHORAGE	3
FORKS	3
BRUSH PRAIRIE	3
RIDGEFIELD	3
WASHOUGAL	3
CANNON BEACH	3
LAKESIDE	3

Table 7. Counties with the highest number of fishing permits, 2005.

County	Permit Count
Clatsop County	393
Lincoln County	328
Curry County	313
Grays Harbor County	281
Coos County	267
Pacific County	218
Whatcom County	205
King County	178
Tillamook County	135
Skagit County	105
Lane County	75
Pierce County	73
Douglas County	71
Del Norte County	63
Clackamas County	61
Snohomish County	61
Clallam County	54
Columbia County	52
Mendocino County	49
Multnomah County	47
Wahkiakum County	43
Humboldt County	42
Cowlitz County	40
Marion County	38
Washington County	32
Island County	30
Lewis County	28
Orange County	27
Jefferson County	25
Clark County	24
San Juan County	21
San Luis Obispo County	21
San Mateo County	21
Thurston County	20

Table 8. Port Groups with the highest number of fishing permits, 2005.

Number of commercial fishing vessels

Table 9. Ports with the highest number of fishing vessels, 2005.

Port	Number of fishing vessels	Number of vessels as a percentage of total coastwide number of vessels
Newport	902	6.9%
Coos Bay	784	6.0%

San Francisco	564	4.3%
Westport	538	4.1%
Astoria	538	4.1%
Fort Bragg	514	4.0%
Bodega Bay	468	3.6%
Bellingham	464	3.6%
Moss Landing	440	3.4%
Princeton/	436	3.4%
Pseudo port code	380	2.9%
Ilwaco/Chinook	338	2.6%
Tillamook	332	2.6%
Santa Barbara	306	2.4%
Crescent City	268	2.1%
Santa Cruz	240	1.8%
Terminal Island	232	1.8%
San Pedro	232	1.8%
Seattle	228	1.8%
Morro Bay	222	1.7%
Anacortes	214	1.6%
Willapa Bay	208	1.6%
Brookings	204	1.6%
Eureka	202	1.6%
Blaine	202	1.6%
Oxnard	178	1.4%
Port Angeles	164	1.3%
Port Orford	160	1.2%
Other Orange/LA	156	1.2%
Monterey	156	1.2%

Table 10. Counties with the highest number of fishing vessels, 2005.

County	Number of fishing vessels	Number of vessels as a percentage of total coastwide number of vessels
SFBay/SanMateo	966	8.5%
Lincoln	928	8.1%
Clatsop	912	8.0%
Coos	798	7.0%
Mont/StaCruz	730	6.4%
Whatcom	606	5.3%
Marin/Sonoma	596	5.2%
Orange/LA	580	5.1%
GraysHrbr	560	4.9%
Mendocino	550	4.8%

Table 11. Port Groups with the higest number of fishing vessels, 2005.

Revenue from fishing as a share of total revenue from fishing

Table 12. Ports with the highest revenue from commercial fish landings as a percentage of revenue from total commercial fish landings coastwide, 2005.

Port	Port fish revenue/Coastwide fish revenue
WESTPORT	13.3%
ASTORIA	11.4%
NEWPORT	9.4%
COOS BAY	6.6%
BELLINGHAM BAY	6.0%
ILWACO/CHINOOK	4.2%
CRESCENT CITY	2.4%
PORT HUENEME	2.2%
SAN PEDRO	2.0%
SEATTLE	2.0%
EUREKA	1.9%
FORT BRAGG	1.9%
TERMINAL ISLAND	1.8%
VENTURA	1.8%
BLAINE	1.7%
SAN FRANCISCO	1.7%
NEAH BAY	1.6%
SANTA BARBARA	1.6%
MOSS LANDING	1.6%
WILLAPA BAY	1.5%
PRINCETON / HALF MOON BAY	1.4%
TILLAMOOK/GARIBALDI	1.3%
BROOKINGS	1.3%
ANACORTES	1.2%
OTH SOUTH PUGET SOUND PORTS	1.1%
OTH WA COASTAL PORTS	1.1%
LA PUSH	1.0%
PORT ORFORD	1.0%
TACOMA	0.9%
SHELTON	0.9%
PORT TOWNSEND	0.9%
BODEGA BAY	0.9%

Source: PacFIN, 2005.

Table 13. Counties with the highest revenue from commercial fish landings as a percentage of revenue from total commercial fish landings coastwide, 2005.

County	County fish revenue/Coastwide fish revenue
GRAYS HARBOR COUNTY	13.8%
CLATSOP COUNTY	11.8%
LINCOLN COUNTY	9.8%
WHATCOM COUNTY	8.0%
COOS COUNTY	6.9%
VENTURA/STA BARBARA COUNTIES	6.6%
PACIFIC COUNTY	6.0%
ORANGE/LA COUNTIES	5.0%
CLALLAM COUNTY	4.1%
SF BAY/SAN MATEO COUNTIES	3.3%

Source: PacFIN, 2005.

Table 14. Port Groups with the highest revenue from commercial fish landings as a share of revenue from total commercial fish landings coastwide, 2005.

Income from fishing activity as a share of total personal income

Commercial fishery-related income is estimated through use of the FEAM model by port group area. The information included below taken from Table 8-8.a in Appendix A of the 2005-06 Pacific Coast Groundfish Final Environmental Impact Statement (2004).

Table 15. Port Group Areas with the highest level of income from commercial fishing activities, 2001.

Port Group Area	Fishery-related income as a share of total personal income
South WA Coast	4.78%
Newport	4.27%
Crescent City	3.9%
Astoria/Tillamook	3.29%
Central WA Coast	2.03%
Brookings	1.77%

Employment in fishing as a share of total employment

Table 16. Port Group Areas with the highest level of employment from commercial fishing activities, 2001.

Port Group Area	Fishery-related employment as a share of total employment
South WA Coast	14.24%
Newport	10.76%
Crescent City	9.43%
Astoria/Tillamook	7.72%
Brookings	5.76%
Central WA Coast	4.26%

Number of processors/buyers

Table 17. Ports with the highest number of buyers/processors, 2005.

Port	Number of buyers/processors
Princeton/Half Moon Bay	142
Newport	138
Bodega Bay	106
Santa Barbara	102
San Francisco	96
Oxnard	94
Westport	90
Morro Bay	88
Fort Bragg	84
Coos Bay	80
Santa Cruz	74
San Pedro	74
Moss Landing	74
Bellingham Bay	68
Terminal Island	68

Other Orange/LA		68
Other San Diego		64
Ventura		58
San Diego		56
Tillamook		54
Astoria		52
Pseudo port code-		48
Dana Point		48
Winchester Bay		46
Seattle		44
Eureka		42
Crescent City		40
Brookings		40
Berkeley		40
Anacortes		38
Other SF Bay/San		34

Table 18. Counties with the highest number of buyers/processors, 2005.

Table 19. Port Groups with the highest number of buyers/processors, 2005.

Community Dependence on Commercial Groundfish Fishing

Number of groundfish permits

Table 20. Ports with the highest number of groundfish permits, 2005.

Table 21. Counties with the highest number of groundfish permits, 2005.

Table 22. Port Groups with the highest number of groundfish permits, 2005.

Groundfish revenue as a percentage of total groundfish revenue

Table 23. Ports with the highest revenue from commercial groundfish landings as a percentage of revenue from total commercial groundfish landings coastwide, 2005.

Port	Port groundfish revenue/Coastwide groundfish revenue
ASTORIA	18.0%
NEWPORT	16.4%
WESTPORT	11.6%
COOS BAY	8.1%
BELLINGHAM BAY	6.9%
EUREKA	5.1%
NEAH BAY	4.4%
FORT BRAGG	4.0%
ILWACO/CHINOOK	3.0%
CRESCENT CITY	2.3%
PORT ORFORD	2.0%
BROOKINGS	1.8%
MORRO BAY	1.7%

MOSS LANDING	1.7%
BLAINE	1.5%
PORT ANGELES	1.4%
SAN FRANCISCO	1.4%
OTH WA COASTAL PORTS	1.2%
LA PUSH	0.9%
OTH LA/ORANGE CTY PORTS	0.9%
AVILA	0.8%
PRINCETON / HALF MOON BAY	0.7%
OXNARD	0.5%
GOLD BEACH	0.5%
OTH SAN DIEGO CTY PORTS	0.4%
OCEANSIDE	0.4%
MONTEREY	0.3%
EVERETT	0.3%
TERMINAL ISLAND	0.3%
NEWPORT BEACH	0.2%
SANTA BARBARA	0.2%

Source: PacFIN, 2005.

Table 24. Counties with the highest revenue from commercial groundfish landings as a percentage of revenue from total commercial groundfish landings coastwide, 2005.

County	County groundfish revenue/Coastwide groundfish revenue
CLATSOP COUNTY	18.2%
LINCOLN COUNTY	16.7%
GRAYS HARBOR COUNTY	11.8%
WHATCOM COUNTY	8.5%
COOS COUNTY	8.2%
CLALLAM COUNTY	6.8%
HUMBOLDT COUNTY	5.2%
CURRY COUNTY	4.3%
MENDOCINO COUNTY	4.2%
PACIFIC COUNTY	3.0%

Source: PacFIN, 2005.

Table 25. Port Groups with the highest revenue from commercial groundfish landings as a percentage of revenue from total commercial groundfish landings coastwide, 2005.

Groundfish employment as a share of total fisheries employment

Table 26. Port Group Areas with the highest level of groundfish employment from commercial fishing activities, 2001.

Port Group Area	Groundfish-related employment as a share of total fisheries employment
Puget Sound	60.6%
Astoria/Tillamook	52.0%
Eureka	50.9%
Newport	48.4%
Coos Bay	39.5%

Central WA Coast	24.9%

Groundfish income as a share of total fisheries income

Table 27. Port Group Areas with the highest level of groundfish income from commercial fishing activities, 2001.

Port Group Area	**Groundfish-related income as a share of total fishery income**
Puget Sound	60.6%
North WA Coast	58.9%
Astoria/Tillamook	52.0%
Eureka	50.9%
Newport	48.4%
Brookings	42.7%

Groundfish revenue as a share of total fisheries revenue

Table 28. Ports with the highest revenue from commercial groundfish landings as a percentage of total port fish revenue from commercial landings, 2005.

Port	**Port groundfish revenue/Port fish revenue**
OTHER STA CRUZ/MONTEREY CTY PORTS	100.0%
GOLD BEACH	73.7%
AVILA	67.7%
WILLMINGTON	57.0%
NEAH BAY	53.5%
OTH LA/ORANGE CTY PORTS	52.6%
EUREKA	51.2%
MORRO BAY	47.3%
PACIFIC CITY	45.0%
FORT BRAGG	40.4%
PORT ORFORD	40.4%
NEWPORT BEACH	39.5%
PORT ANGELES	35.6%
NEWPORT	34.0%
ASTORIA	30.6%
ALBION	28.7%
BROOKINGS	27.6%
COOS BAY	23.8%
BELLINGHAM BAY	22.5%
OCEANSIDE	22.2%
OTH WA COASTAL PORTS	21.9%
MOSS LANDING	21.0%
CRESCENT CITY	18.5%
LA PUSH	18.0%
POINT ARENA	17.9%
BERKELEY	17.6%
WESTPORT	16.9%
BLAINE	16.8%
OTH SAN DIEGO CTY PORTS	16.7%

EVERETT	16.5%
MONTEREY	16.1%

Source: PacFIN, 2005.

Table 29. Counties with the highest revenue from commercial groundfish landings as a percentage of total county fish revenue from commercial landings, 2005.

County	County groundfish revenue/County fish revenue
SAN LUIS OBISPO COUNTY	51.7%
HUMBOLDT COUNTY	42.6%
MENDOCINO COUNTY	38.9%
CURRY COUNTY	35.3%
LINCOLN COUNTY	33.7%
CLALLAM COUNTY	33.3%
CLATSOP COUNTY	30.5%
COOS COUNTY	23.8%
WHATCOM COUNTY	21.2%
DEL NORTE COUNTY	18.5%

Source: PacFIN, 2005.

Table 30. Port Groups with the highest revenue from commercial groundfish landings as a percentage of total county fish revenue from commercial landings, 2005.

Number of commercial vessels using groundfish gear

Table 31. Ports with the highest number of vessels using non-whiting groundfish gear, 2004.

Port	Number of fishing vessels using non-whiting groundfish gear	Number of fishing vessels using non-whiting groundfish gear as a percentage of the total number of fishing vessels using groundfish gear coastwide
EUREKA	144	10.8%
BODEGA BAY	109	8.1%
PORT ORFORD	104	7.8%
MORRO BAY	64	4.8%
AVILA	64	4.8%
NEWPORT	60	4.5%
MOSS LANDING	59	4.4%
ASTORIA	56	4.2%
SANTA BARBARA	55	4.1%
WESTPORT	44	3.3%
PORT ANGELES	44	3.3%
BELLINGHAM BAY	40	3.0%
OXNARD	32	2.4%
SAN FRANCISCO	31	2.3%
PRINCETON / HALF MOON BAY	31	2.3%
DEPOE BAY	29	2.2%
OTH SAN DIEGO CNTY PORTS	29	2.2%

Table 32. Counties with the highest number of vessels using non-whiting groundfish gear, 2004.

Table 33. Port Groups with the highest number of vessels using non-whiting groundfish gear, 2004.

Overall Community Dependence on Recreational Fishing

Community Dependence on Recreational Groundfish Fishing

7. Resiliency Results

8. Vulnerable Areas Results

Appendix X

Literature Review

Summaries of literature addressing natural resource community dependence, resilience and vulnerability

Jacob, Steve, Michael Jepson, Carlton Pomeroy, David Mulkey, Chuck Adams, and Suzanna Smith. 2002. Identifying Fishing-Dependent Communities: Development and Confirmation of a Protocol. A MARFIN Project and Report to the NMFS Southeast Fisheries Science Center.

Background
The purpose of this research was to develop a definition of fishing dependent communities and a protocol for identifying such places. Five commercially dependent communities in the state of Florida were chosen based on 1996 data.

Summary of Methodology
Dependence was defined as at least 15% of employment derived from the fishing sector. This level of dependence is consistent with research by USDA ERS on other forms of natural resource dependence. Employment data was based on estimates of the number of jobs directly and indirectly related to fishing in each community with the use of regional economic multipliers. Data was utilized at the zipcode level[9]. A long list of potentially dependent fishing communities were identified by an advisory panel and by ranking zipcode communities according to landings and population divided by the number of commercial fishing permits. Telephone surveys and other surveys were conducted to ground truth the results.

Note: Seven communities were also identified as recreationally fishing dependent. However, the researchers did not have complete confidence in the recreational indicators and did not recommend that they be used for anything other than a demonstration of the protocol if better data were available.

Key Socioeconomic Indicators

Number of jobs directly and indirectly related to fishing in each community with the use of regional economic multipliers.

---

[9] Zipcodes were aggregated to form "zipcode communities" in the following way:

> *First, the highest-population zip code in the state was taken as the center of a central place, and zip codes within ten miles of its center were assigned to that community. Zipcode boundary files used for this research included a population variable with census estimates from 1996. Each aggregated zipcode community was then placed under a single heading and zipcode (e.g., Miami, 33180) to be used for future aggregation and identification. The zipcode with the next largest population that remained in the database was the identifies and all zipcodes within a 10-mile radius of it were selected and again removed from the database (Hawley 1950). This process was repeated until all zipcodes had been removed from the database file and were grouped under a single zipcode for each new community boundary. The zipcode database software used for this analysis contained 1882 zipcodes for Florida. The aggregation produced 213 zipcode communities, 81 of which were coastal communities and potential fishing dependent communities.*

Hall-Arber, Madaleine, Chris Dyer, John Poggie, James McNally, and Renee Gagne. 2001. New England's Fishing Communities. Revised version of the final report for Northeast MARFIN grant #NA87FF0547.

Background

There were two objectives identified for this report: 1) to identify fishing communities in the New England region and 2) to assess the fishing dependency of these communities.

Summary of Methodology

Three methods were used in this study. One method involved a regional consideration of fishing-related employment that measures dependence. Another method formulated the approaches that measure the complexity of the fishing infrastructure and the degree of gentrification of specific communities. The third method is a port profile approach that provides a detailed consideration of individual ports, "revealing patterns of contacts, characteristics of the community's culture and institutions, and some perspective on local resident's views about their way of life and about fisheries management".

New England was divided into eleven distinct sub-regions, "centered on major ports or clusters of fishing or fishing-related industry".

Data was utilized on the county level. Sub-regions are aggregations of counties.

Key Socioeconomic Indicators

Regional method to determine dependence

The three indices used to indicate dependence were: 1) the labor force in fishing as a percentage of the labor force in all occupations[10]; 2) the labor force in fishing as a percentage of labor force in related occupations within the Bureau of Labor Statistics category of fisheries/forestry/farming[11]; and 3) a summary measure of a series of dependency ratios that explore the number of fishermen per hundred to various alternative occupational roles that fishermen could enter with their particular skill profiles[12].

---

[10] $\sum fishermen / \sum all\ \ occupations$

[11] $\sum fishermen / \sum BLS\ \_category(I)$

[12] The authors explain the calculation of the Occupational Alternative Ratio Summary (OARs) index as requiring a series of steps. The OAR measures represent a standard set of alternative occupations that are compatible with the basic skills and training that are part of the fishing occupation. According to the authors, "it is assumed that a fisherman could take up any one of these occupations but chooses not to, due to satisfaction with their current position as a fisherman" (p. 30). The authors identify 13 occupations: 1) security guard, 2) food service/janitor, 3) trees and farming, 4) mechanics, 5) skilled construction, 6) machine operators, 7) manufacturing, 8) hand workers, 9) truck drivers, 10) marine related, 11) laborers & helpers, 12) manufacturing/other, and 13) unemployed. The OAR measures are calculated using the standard formula for a dependency ration:
$(\sum fishermen / alternative\_occupation(i)) * 100$ where (i) is the total number of individuals engaged in the *i*th alternative occupation.
Next, the OAR measures are summed into a single measure of the total impact of fishing on an economic region.

Indicators used to Assess Vulnerability, Infrastructure and Gentrification among Fishing Dependent Communities

Infrastructure – surveys of 35 local communities and principal components analysis was used to rank the infrastructure factors and calculate a score for each community.

1) Icehouse
2) NMFS extension office
3) Dockside diesel fuel
4) International fish brokers
5) Boat insurance
6) Local trucking
7) Fish processor
8) Fishing monument
9) Boat welders
10) Fishermen supply house
11) Vessel haul out facility
12) Bait house
13) More than 2 fishing associations
14) Marine supply house
15) Local net maker
16) Fish retail store
17) Two or fewer associations

Gentrification – surveys of 35 local communities and principal components analysis was used to rank the gentrification factors and calculate a score for each community.

1) Visitors bureau
2) Marinas
3) Upscale condominium
4) Recreational bait shop
5) Fish retailer
6) Recreational tackle
7) Fishing excursion vessels
8) Trendy retail shops
9) Recreational boat tours
10) Seaside restaurants
11) Whale watching tours
12) Recreational boat dealers
13) Hotels/inns dockside

OARs = $(\sum_{n}^{1} OAR)/N$ where N=13 in this instance.

"The OARs measure provides two valuable insights into the importance of the fishing industry. First, it tells us the relative competitiveness of the fishing industry within a specific Natural Resource Region. The higher the OARs score the more important fishing is as an economic occupation within the NRR compared to the alternative occupation set" (p.31).

14) Maritime museum
15) Lobster retailers

Charles, Anthony, Heather Boyd, Amanda Lavers, and Cheryl Benjamin. 2001. A Preliminary Set of Ecological, Socioeconomic and Institutional Indicators for Nova Scotia's Fisheries and Marine Environment. GPI Atlantic report.

Background

The goal of this report was to produce a set of indicators that would help to better assess the well-being of the fishing industry and the marine environment. The indicators are tools to help managers, scientists, fishery participants, other ocean users and the public visualize the state of the marine environment and fishery, and discuss issues of common interest and concern. Indicators enable the tracking of the fishery over time. The socioeconomic indicators focus on measuring how well we are maintaining or enhancing overall long-term socioeconomic welfare, based on a blend of relevant economic and social indicators. These indicators deal with such aspects as generation of sustainable net benefits, reasonable distribution of those benefits, and maintenance of the system's overall viability within local and global economies. Community indicators revolve around the desirability of sustaining communities, both for their contribution to sustainability in the marine environment and the fishery system, and as valuable in their own right, as more that simple collections of individuals. Hence indicators in this grouping focus on the maintenance or enhancement of the economic and sociocultural well-being of coastal and fishery-dependent human communities, as well as their overall cohesiveness and long-term health. Institutional indicators measure how well we maintain suitable financial, administrative and organizational capability over the long-term, as a prerequisite for the above components of well-being and sustainability. Ideally, indicators here would measure the manageability and enforceability of resource use regulations, and of the organizations that implement management approaches – the bodies and agencies that manage the fishery and protect the marine environment.

Summary of Methodology

In selection of indicators, the indicators had to be:

a) based on scientifically valid data
b) available on a broad geographic scale and for a sufficient time series
c) accessible, easy to understand and relevant to those involved in the fishing industry
d) practical in terms of monitoring

Key Socioeconomic/Community Indicators

Economic Valuation of Fishery Resources and the Marine Environment

1) Total landed value
2) Fishery Gross Domestic Product (GDP)
3) Value of fishery exports
4) Employment per unit of landed weight
5) Employment per unit of landed value
6) Market price
7) Natural capital (fish stock value)
8) Annual depreciation (or appreciation) in natural capital
9) Value of marine ecosystem services

Distributional Indicators

1) Distribution of access and catch among fishers within a fleet sector
2) Distribution of catch among fishers within a fishery
3) Distribution of landed value by vessel length

Resilience

1) Debt levels among fishers
2) Reported bankruptcies
3) Bankruptcy liabilities
4) Distribution of landed value across species
5) Proportion of fishers with multiple licenses
6) Age distribution of fishers
7) Diversification of employment sources

Aquaculture

1) Value of aquaculture production
2) Employment in the aquaculture sector

Workplace Safety

1) Accident claims registered per 1000 fishers
2) Accident claims compensated per 1000 fishers

Cobb, Clifford W. and Craig Rixford. 1998. Lessons Learned from the History of Social Indicators. Report produced by Redefining Progress.

This report provides a history of the use of social, economic and environmental indicators and provides guidance for practitioners today. They emphasize that while indicators are important in developing creative solutions to social problems, they can and often have been misinterpreted, misused, and viewed as an end in themselves. By understanding how these mistakes have been made in the past, the authors hope that the newly emerging indicator movement will avoid them in the future. The report provides the following guidance or lessons:

1) *Having a number does not necessarily mean that you have a good indicator.*
2) *Effective indicators require a clear conceptual basis.*
3) *There's no such thing as a value-free indicator.*

   …All indicators are laden with values or carry implicit messages. Consideration of the values or concept underlying each indicator can lead to a more balanced presentation.

4) *Comprehensiveness may be the enemy of effectiveness.*

   …A narrow range of indicators is more powerful than a laundry list.

5) *The symbolic value of an indicator may outweigh its value as a literal measure.*

   …For example GDP may be an appropriate measure in some contexts, such as when the Federal Reserve is trying to estimate the growth of the money supply in relation to market production. As a technical tool, GDP has its place. However, when GDP is used as a metaphor of well-being it fails utterly. It does not distinguish between constructive expenditures and those that merely reflect spending to avoid the damage caused elsewhere in the economy.

6) *Don't conflate indicators with reality.*

   …Every indicator is a flawed representative of a complex set of events. Confusing the statistic with the reality is all too common, but it should be avoided by those who care about creating high-quality indicators. Even the best indicator is only a fractional measurement of the underlying reality. One of the best ways to guard against this solidification of ideas is to try to develop multiple indicators for the same phenomenon. In this way, it is possible to remain constantly clear that no single indicator completely represents reality.

7) *A democratic indicators program requires more than good public participation processes.*

   …widespread participation may not be the best "indicator" of whether an indicator project is really democratic.

8) *Measurement does not necessarily induce appropriate action.*

…Indicators make sense as a tool only to the extent that they are part of a larger plan of action. It is possible that new information contained in indicators may change perceptions, but the connections to actions are not automatic.

9) *Better information may lead to better decisions and improved outcomes, but not as easily as it might seem.*

…To change behavior, information needs to affect motives or perceptions of how the world works. Indicators, which are one form of information, can only be a piece in a larger puzzle.

10) *Challenging prevailing wisdom about what causes a problem is often the first step to fixing it.*

...The greatest power on public policy debates lies in being able to change the definition of a problem. This is the first step in changing a policy and perhaps one of the most effective uses of indicators work.

11) *To take action, look for indicators that reveal causes, not symptoms.*

…Indicators that focus only on symptoms can rarely solve the actual problem. In order to alter a symptom, it is necessary to have a theory about what is causing it and to test that theory repeatedly.

12) *You are more likely to move from indicators to outcomes if you have control over resources.*

…Indicators are not an end in themselves. Their purpose is to alert the public and policymakers about the existence and cause of problems so that they might be solved. This is only possible when the groups responsible for indicator development have a connection to those with the power to make substantive changes. Otherwise, indicators may not influence outcomes at all.

The European Commission. 2000. Regional Socioeconomic Studies on employment and the levels of dependency on fishing.

Background

The objectives of this study were to: a) quantify and describe the socio-economic importance of fishing and aquaculture in Europe, b) determine the level of dependency on fisheries of these areas, in terms of jobs and incomes, c) examine the trends in evolution in employment since the 1991 socioeconomic studies and d) examine the extent to which the socio-economic measures currently in place have been implemented, and the potential in the coastal areas for conversion and diversification of employment.

Summary of Methodology

Twenty-two separate fisheries regions were considered. In each region, four tasks were completed.

Task 1: Provide an overview of the whole fishing industry in each region. Focus on data relating to employment and value added.

Task 2: Measure three indicators of dependency (listed below under "Key Socioeconomic Indicators"). Use employment multipliers where feasible with local input-output models created from national input-output tables. Case studies within each region.

Task 3: Examine changes over time in socio-economic parameters and levels of dependency since previous study conducted in 1991.

Task 4: Identify and comment on the types of socio-economic support measures available to the fishery sector in each region

Key Socioeconomic Indicators

1) Share of fisheries activity in value added
2) Share of fisheries employment as a percentage of total regional employment
3) Share of catch as a proportion of total catch

***Bunce L., P. Townsley, R. Pomeroy, R. Pollnac. 2000. *Socioeconomic manual for coral reef management.* National Ocean Service, NOAA, Silver Spring, MD.**

This is a manual designed to demonstrate methods to assess how people who use and affect coral reefs. Its intention is to show how people interact with coral reefs and improved management of their activities to ensure that these marvelous ecosystems will continue to provide sustainable services for communities into the future.

Coral reef managers have to balance sustainable use and reef conservation; therefore the relations between human behavior and reef ecosystems are critical. Reef health is affected by human activities, but also the livelihoods and prosperity of people living in coastal tropical areas depend on the condition of the marine resources. Therefore, coral reef uses, reef management and reef ecology cannot be considered in isolation.
There is a close link between how people use coral reefs and their socioeconomic background. Understanding the socioeconomic context of reef stakeholders is essential for assessing, predicting and managing reef use. To balance sustainable use and reef protection, the reef manager needs to know: 1)the status of the reef and changes in the health of coral and fishes etc; and 2) the people that use and affect the reef, including their use patterns, perceptions of reef management and characteristics.

Socioeconomic parameters:
1. Resource use patterns
2. Stakeholder characteristics
3. Gender issues
4. Stakeholder perceptions
5. Organization and resource governance
6. Traditional knowledge
7. Community services and facilities
8. Market attributes for extractive uses of coral reefs
9. Market attributes for non-extractive uses of coral reefs
10. Non-market and non-use values

General Fisheries Commission for the Mediterranean. 2001. Feasibility Assessment or a Database on Socioeconomic Indicators for Mediterranean Fisheries. Studies and Reviews, No. 17.

This report provides an overview of a pilot study carried out for the Alboran Sea, a General Fisheries Commission for the Mediterranean management unit. The goal of the project was to build an understanding of main socioeconomic trends within the Alboran Sea Mediterranean fisheries management unit. It was hoped that the results would be applicable to the rest of the management area. To achieve this end, a set of 16 variables were used to devise various indicators that would be tracked over time.

Summary of Methodology

Literature reviews and recommendations of an advisory group were taken into consideration to help select indicators. The advisory group determined that adequate information existed for only 16 variables that could be used to construct indicators.

National Indicators

1) Apparent consumption – gross consumption of fishing products per inhabitant
2) Fish commercial balance – shows whether exports or imports of fishing products are higher in a given country
3) Ratio fish employment
4) Fish coverage rate – rate of consumption covered by national production
5) Extraversion rate – shows to what extent the fishing sector depends on foreign trade (imports and exports)
6) Fish contribution to the GNP
7) Ratio harvesting value – shows the importance of fishing in comparison to aquaculture in terms of income
8) Ration harvesting rate – shows the importance of fishing in comparison to aquaculture in terms of production weight

Local Operating Unit Indicators

1) Vessel physical productivity – based on weight of landings
2) Capacity physical productivity – weight of landings for each capacity unit of the vessels
3) Power physical productivity – weight of landings per unit of horsepower
4) Per vessel hour physical productivity – average production in weight of landings for each full fishing hour
5) Capacity productivity – average production in market value in the first sale for each capacity unit installed in the vessel
6) Vessel productivity – average production in terms of market value at first sale for each vessel
7) Power productivity – average production in terms of market value at first sale for each unit of horsepower

8) Per vessel hour productivity – average production in terms of market value at first sale for each fishing hour
9) Man physical productivity – average production in terms of weight of landings for each man employed
10) Man productivity – average production in terms of value at first sale for each man used
11) Average wage
12) Landing prices
13) Invested capital – current value of all vessels
14) Salary cost – fisher's income
15) Opportunity cost – shows the yield that the owner could obtain if he invested his money in National Debt instead of investing in his business
16) Gross estimated profit – total profits obtained by all vessel owners in the management unit once operating costs have been deducted
17) Net estimated profit – total earnings obtained by all owners once the depreciation cost has been deducted from the gross estimated profit (assuming the service life of the vessel is 10 years)
18) Profit rate – indicates the percent ratio of yearly net profits plus the opportunity cost in relation with the investment (does not include wages from an owner working as an employee)
19) Gross added value – added value that the management unit contributes to the national economy (includes salary, profits, opportunity cost and depreciations)

Sutinen, Jon G., Patricia Clay, Christopher L. Dyer, Steven F. Edwards, John Gates, Tom A. Grigalunas, Timothy Hennessey, Lawrence Juda, Andrew W. Kitts, Philip N. Logan, John J. Poggie, Jr., Barbara Pollard Rountree, Scott R. Steinbeck, Eric M. Thunberg, Harold F. Upton, and John B. Walden. 2005. "A Framework for Monitoring and Assessing Socioeconomics and Governance of Large Marine Ecosystems". Chapter 3 in Sustaining Large Marine Ecosystems. Edited by Timothy Hennessey and Jon Sutinen.

Summary

This paper outlines an approach for monitoring and assessing socioeconomic trends based on the Large Marine Ecosystems (LMEs) method of dividing the oceans. The approach is presented with 12 steps for monitoring and assessment:

1) Identify principal uses of LME resources
2) Identify LME resource users and their activities
3) Identify governance mechanisms influencing LME resource use
4) Assess the level of LME-related activities
5) Assess interactions between LME-related activities and LME resources
6) Assess impacts of LME-related activities on other users
7) Assess the interactions between governance mechanisms and resource use
8) Assess the socioeconomic importance of LME-related activities and economic and sociocultural value of key uses and LME resources
9) Identify the public's priorities and willingness to make tradeoffs to protect and restore natural resources
10) Assess the cost of options to protect and restore key resources
11) Compare the benefits with the costs of protection and restoration options
12) Identify financing alternatives for the preferred options for protecting and restoring key LME resources

Steps 8 and 9 address how the authors think socioeconomic value should be identified and prioritized. The authors suggest the use of socioeconomic indicators like unemployment rates. They also suggest that surveys be conducted of the public to identify priorities. These results would be used to aid in decision-making.

Step 8 details: Resource valuation methods should be used to assign value to direct and indirect services of an LME. They list four types of value associated with resource services: use value, passive use value, total value (use and passive use), and option value. They suggest the use of sociocultural analysis to assess value to social and cultural factors. They suggest the use of Natural Resource Communities (NRCs) defined as populations whose sustainability depends upon the utilization of renewable natural resources. They suggest broadening this definition to include those dependent on the non-renewable aspects of the marine environment. Natural Resource Regions (NRRs) are defined as the interface between a regional system of extractive NRCs, their service flows and the associated LME. LME dependent communities are defined as aggregations of NRRs where NRRs include social, cultural, human, economic and biophysical capital and their interactions within networks of LME-dependent communities. The authors summarize work by Dyer and Griffith (1996) to isolate five variables that help identify fishing community dependence on an LME. Some of the following variable overlap and must be considered together:

1) *Relative isolation or integration of LME resource users into alternative economic sectors – To what extent have users (e.g., fishermen, processors) segmented themselves from other parts of the political economy or other fisheries?*
2) *User types and strategies of users within a port of access to LME resources – What impact does the mix of types (e.g., fixed fishing gear – weirs, fish corrals – versus mobile fishing gear) across ports and States have on the long-term sustainability of LME resource stocks.*
3) *Degree of regional specialization – To what extent have users from related areas and use sectors moved into the region? Clearly, those users who would have difficulty moving into alternative use-sectors are more dependent on LME resources than those who have histories of moving among several sectors in an opportunistic fashion.*
4) *Percentage of population involved in LME resource-related industries – Those communities where between five and ten percent of the population are directly employed in LME resource-related industries are more dependent on the LME than those where fewer than five percent are so employed.*
5) *Competition and conflict within the port, between different components of use sectors – Competition between smaller scale and industrial scale users can create conflict between users within the same port – as well as between different actors in a use-sector (such as boat owners, captains and processors). Dependence may have a strong perceptual dimension, with users perceiving the resources they are extracting to be scarce and that one user group's gains (e.g. industrial trawling, purse seining) is another user group's loss (e.g. gill netting).*

The paper also provides examples of how to use the monitoring and assessment framework. This is followed by a discussion of the potential benefit of the use of property rights entitlements in an LME.

Charles, Anthony. 2001. Sustainable Fishery Systems. Fish and Aquatic Resource Series 5, Blackwell Science.

Summary

This book provides an illustration of a systems approach to sustainability where the system involves interacting ecological, biophysical, economic, social and cultural components. The discussion refers to an ecological system, a socioeconomic system and an institutional system. Sustainability is discussed with references to the categories of ecological, socioeconomic, community, and institutional sustainability. Of particular interest is Chapter 10 which examines the nature of sustainability and resilience, and the methodologies of sustainability assessment and sustainability indicators.

Chapter 10

This chapter discusses what is meant by sustainability and presents a framework for sustainability assessment in fishery systems. The approach involves four steps:

1) *Deciding on a set of relevant sustainability components for the fishery system, which together reflect the overall idea of 'fishery sustainability'.*
2) *Developing a concrete set of criteria that must be evaluated in assessing each component of sustainability (sustainability checklist).*
3) *Determining a corresponding set of quantifiable sustainability indicators, reflecting the measurable status of each of the criteria, and allowing comparisons between criteria.*
4) *Formulating suitable means to aggregate the indicators into indices of sustainability, perhaps one for each component of sustainability (if the indicators within a given sustainability component are at least somewhat comparable), or to otherwise facilitate comparison across indicators, recognizing that comparisons of fundamentally non-commensurable indicators should be left to policy makers as a 'political' task.*

Components of sustainability

The author describes the process of sustainable development as the simultaneous achievement of four fundamental components of sustainability: ecological[13] (avoid foreclosinf future options), socioeconomic[14] (sustainable and equitable economic and social benefits), community[15] (valuing

[13] "Ecological sustainability incorporates (a) the long-standing concern for ensuring that harvests are sustainable, in the sense of avoiding depletion of the fish stocks, (b) the broader concern of maintaining the resource base and related species at levels that do not foreclose future options, and (c) the fundamental task of maintaining or enhancing the resilience and overall health of the ecosystem."

[14] "Socioeconomic sustainability focuses on the 'macro level', i.e. on maintaining or enhancing overall long-term socioeconomic welfare. This socioeconomic welfare is based on a blend of relevant economic and social indicators, focusing essentially on the generation of sustainable net benefits (including resource rents), a reasonable distribution of those benefits amongst the fishery participants, and maintenance of the system's overall viability within local and global economies. Each indicator in this grouping is typically measured at the level of individuals, and aggregated across the given fishery system."

community as more than a collection of individuals) and institutional[16] (long-term capabilities/resource system manageability) sustainability. Charles asserts that simultaneous achievement of all four components is required to achieve to obtain overall sustainability.

Sustainability checklist

Charles suggests development of a 'checklist' of criteria for ecological, socioeconomic, community and institutional sustainability which requires a determination of what sustainability criteria are required in order to assess a fishery system. Charles provides an example of a sustainability checklist for all four components. Those related to socioeconomic and community sustainability are included below:

Socioeconomic sustainability
1) *Will the activity increase the aggregate long-term rate of employment?*
2) *Will the project enhance economic viability in the local and regional system?*
3) *Are possible impacts on input and output prices understood?*
4) *Is resource depreciation, and changes in natural capital more generally, incorporated into national accounting practices?*
5) *Are the current and projected levels of distributional equity in the system sufficient?*
6) *Will long-term food security and livelihood security be maintained or increased, as measured in both average and minimal terms?*

Community sustainability
1) *Is the project likely to maintain or increase the long-term stability of affected communities?*
2) *Does the local population have access to the resource base?*
3) *Is the local population integrated into resource management and development practices, with traditional management approaches utilized to the extent possible?*
4) *Are traditional value systems of importance to the community maintained?*
5) *Are local sociocultural factors (such as tradition, community decision-making structure, etc.) incorporated?*
6) *Are traditional resource and environmental management methods utilized to the extent possible?*

---

[15] Community sustainability emphasizes the 'micro' level, i.e. focusing on the desirability of sustaining communities as valuable human systems in their own right, and more than simple collections of individuals. Hence, emphasis is on maintaining or enhancing the 'group' welfare of human communities in the fishery system by maintaining or enhancing, in each community, its economic and sociocultural well-being, its overall cohesiveness, and the long-term health of the relevant human systems.

[16] "Institutional sustainability involves maintaining suitable financial, administrative and organizational capability over the long term, as a prerequisite for these three components of sustainability (ecological, socioeconomic, community). Institutional sustainability refers in particular to the sets of management rules by which the fishery is governed, and the organizations that implement those rules: the bodies and agencies that manage the fishery, whether at the governmental, fisher or community level, and whether formally (e.g. the legal system and governmental agencies) or informally (e.g. fisher associations and non-governmental organizations). A key requirement in the pursuit of institutional sustainability is likely to be the manageability and enforceability of resource-use regulations."

7) *Are there adverse impacts, at any level or in any component of the system, that unduly affect particular components of the community (e.g. youth, particular religious groups, etc.; gender-related impacts)?*

Charles writes that the checklist is meant to provide a framework by which to highlight 'trouble spots' in fishery systems.

Sustainability indicators

Charles suggests that the set of criteria chosen (such as those included as an example above) can be used to develop a set of quantitative indicators. He writes, "In such an approach, each relevant sustainability criterion is quantified appropriately, whether through and objective variable, which is in some sense observable or measurable (such as a human population of biomass level, or through a subjective measure which is amenable to evaluation (perhaps on a scale from 1 to 10)".

Charles provides several examples of sustainability indicators by criteria (see excerpts in table below). He also provides examples ranges for the indicators and identifies when the indicator is at a minimum.

Sustainability criteria	**Indicator**	**Range**	**Indicator at minimum if**
Community resiliency	Index of diversity in employment	0 to 1	Lack of livelihood alternatives (low diversity in employment)
Community independence	Percentage of economic activity based locally	0 to 1	High dependence on external economic forces
Human carrying capacity (livelihood)	Current (or potential) sustainable employment (relative to population)	0 to infinity	Sustainable economic or employment base is substantially below current (or predicted) population
Equity	Ratio of historical to current Gini coefficients of income and/or food distribution	0 to infinity	Dispersion in income and/or food supply is substantially above traditional norms
Sustainable fleet capacity	Ratio of capacity for harvesting at MSY to current capacity	0 to infinity	Current capacity exceeds that required to harvest at MSY

Indices of sustainability

Because a system may seem sustainable from the perspective of one indicator but not another, it is sometime helpful to combine the set of available indicators to get an indication of aggregate sustainability. This may seem most logical to do when there are several indicators for a particular component of sustainability. To do this, typically one of two approaches is taken: 1) each indicator value is given a certain weight and these two values are multiplied together to get a weighted indicators value and then the weighted indicator values are added together and averaged or 2) a geometric average is calculated of the weighted or unweighted indicator values. The first option has the potential for a low value to be compensated for by an equivalently high value. The second option has the property than an extreme value will have a greater influence on the overall level of sustainability.

Challenges in applying sustainability assessment

In this section, Charles discusses a real world application of his methodology to the Nova Scotia groundfish fishery system. Although the sustainability assessment focused on the indicators provided in his book (some of which are included in the table above), for various reasons it was not possible to implement many of the indicators due to a (1) requirement for the assessment to be applied to the province in its entirety (this resulted in a lack of data availability) and (2) a limited time frame as a consequent need to rely on secondary data. The first constraint resulted in the inability to assess community sustainability while the second constraint resulted in a limited quantitative assessment of ecological and socioeconomic sustainability and largely qualitative assessment of institutional sustainability. As a result, the indicators used were quite different from those listed above and in the book. The socioeconomic indicators used in the assessment of the Nova Scotia fishery were:

- *Level of employment relative to that calculated from 'safe' harvests (based on historical information)*
- *Landed value of fish caught (for comparison with resource depreciation (declines in the monetary value of the resource)*
- *Level of exports*
- *Resilience (age structure of fishers, extent of licensing for multiple species)*
- *Concentration of access and wealth (across fleet groups and ports)*
- *Level of debt and bankruptcies among fishers*
- *Safety at sea (measured by rate of injury and death)*

Charles writes, "It is notable that while several resource collapses occurred within this fishery system over the course of the late twentieth century, the indicators in the sustainability assessment were not all negative. Some (such as resource depreciation and size of fish) were indeed negative, but others (e.g. some aspects of toxic contamination) were positive, and still others (such as socioeconomic resilience) were neutral. This reinforces the key point that rather than seeking an overall aggregation of the results, it is preferable to display the various results and let policy makers and the public determine the balance among indicators, and the consequent actions required".

Trade-offs between ecological, socioeconomic, community and institutional sustainability

Charles also writes that "If, as seems to be the case, ecological, socioeconomic, community and institutional sustainability are fundamentally non-commensurable, then the inescapable tradeoffs between them should be a strictly *political* task, beyond the scope of quantitative analysis. Sustainability assessment does, however, provide a means to examine the implications of such trade-offs".

Validation of sustainability indicators

Charles also writes,

To what extent is a set a quantitative sustainability indicators useful in practice? This question relates to the task of validation. Unfortunately, it is not possible, given the nature of sustainability, to prove a prior that a given set of indicators will properly predict whether or not a given system will be sustainable. The best we can hope for is that the set of indicators being used has proved itself in the past. This implies the need to analyze the performance of the set of indicators across a number of case studies, with suitable contrasts across biophysical, ecological and human dimensions.

The idea is to determine systematically why some systems were sustainable while others were not. There is an intrinsic difficulty with this, however, since non-sustainable systems do not persist. There may well be a lack of suitable time-series data on such systems, thus preventing their full evaluation in an historical analysis. This is comparable to the assessment of species extinction rates, which is confounded by the fact that many species became extinct before ever being studied. The best hope may be to study currently problematic fisheries, where at least one component of sustainability has declined within recent history and to incorporate temporal information (time-series) where possible, so that a comparison of adjustment dynamics can take place. In any case, it should be noted that there will always be some uncertainty about the utility of sets of indicators, since quantification of sustainability inherently requires projections into the future.

Langdon-Pollock, Jennifer. DRAFT. West Coast Marine Fishing Community Descriptions. Pacific States Marine Fisheries Commission. Economic Fisheries Information Network.

This report provides a description of fishing communities in Washington, Oregon and California and provides a discussion of dependence and provides county level data. This document also provides a good discussion on the limitations of identifying communities and characterizing dependence. U.S. Census data was used to describe communities on a county level. The information was mapped using GIS analysis and seventeen isolated communities were identified[17]. PacFIN Landings data was also used to describe communities (landings, revenue, processors and vessel count by state and county and species).

This document discusses dependency and engagement and discusses how attempts were made to create a dependency index. The index

…could be created from several attributes of fishing communities that would indicate how dependent or substantially engaged a community was in the fishing industry. Data elements thought to provide information on the dependence and engagement in fishing included: population, poverty, unemployment, per capita income, the year a house was built, the percent of vacant houses in a given location, number of industries outside of fishing, number of berths in a marina, the percent a harbor or port is filled with commercial and/or recreational boats/vessels, landings data and the number of suppliers, processors, community fishing organizations and community fishing events in a community. Upon collecting this data, it was determined that creating a dependency index was impractical given the available information.

Although this information was not aggregated into an index, the information was published in the report to physically describe fishing communities by county.

The report provides a list of social indicators that could supplement economic analyses in the future:

- *Marine education programs*
- *Number of crew members and processor employees residing in a fishing community*
- *Reliance on other natural resources*
- *Changes in ownership over time*
- *Descriptions of support industries*
- *Commercially landed pounds and revenue*
- *Recreationally landed pounds and revenue*
- *Fishing related social groups and organizations*
- *Subsistence fisheries*
- *Number of vessel owners that reside in the community*
- *Number of vessel owners that land fish but do not reside in the community*
- *Adaptation strategies*
- *Industry structure*
- *Training institutions*

---

[17] A community was considered isolated if it had less than 1,900 people, was not near a major highway, and was 35 miles away from a city with a population greater than 20,000 people.

- *Perceptions and descriptions of tourism*
- *Women's role in the fishing industries*
- *Processors and fishery support industries*
- *History of fishing industries*

Crone, Lisa K., Richard W. Haynes. 2001. "Socioeconomic evaluation of broad-scale land management strategies". Forest Ecology and Management 153: 147-160.

This paper describes the potential social and economic impacts of several land management alternatives under evaluation. The alternatives promote support and collaboration with communities and tribal governments, particularly those that are isolated and economically specialized. Hence, the analysis requires identification of forest-dependent communities and of their level of resiliency[18].

Methodology

In this report, simple rules are used to identify counties that may be the most affected by the alternatives. To identify wood products counties of concern, a minimum 10% employment in SIC category 24 and contained two or more communities with medium to very high wood products specialization rating (defined by Reyna, 1998). To identify range counties of concern, a range reliance calculation was used (Home and Haynes, 1999). This included counties in which 12% or more of agricultural sales in the county were derived from cattle or sheep produced from federal forage. Counties were also ranked depending on their harvest levels and animal unit months (AUM) levels. Community effects were evaluated by ranking counties that contain two or more isolated communities that have a medium to very wood products specialization and for which at least 33% of the land in a 20 mile radius circle of the community is FSBLM managed land. The same ranking methodology was carried out for land with medium to very high agricultural specialization ratings. For all sets of data, the counties were ranked from 1 to 3 based on how high a concern the area was (3 was the highest level of concern). The rankings were aggregated and the lowest aggregate level indicated the preferred alternative.

Sixty-five tribal communities were also identified based on their proximity to reservations and medium to very high specialization ratings in agriculture and wood products.

With regard to environmental justice, the alternatives were evaluated using the most impacted counties identified from the previous analysis and examining them in terms of three economic variables: average unemployment rate (1970-97), average per capita income index (1970-97), and estimated poverty ranking (1995). Counties from the list of counties of concern with an average unemployment rate of 10% or more, an average per capita income index of 0.85 or less, and a poverty ranking of 20 are focused upon. Again, the rankings were aggregated to determine a preferred alternative.

---

[18] Resiliency is defined as adaptability to change. Crone and Haynes write, "Social or economic systems with high resiliency would be those capable of absorbing external shocks, such as a recession, and rebounding as demonstrated in terms of system indicators, such as total employment and per capita income. Resiliency is influenced by more than just the economic structure of a community. It also depends on community leadership; activities like planning for the future, the presence and management of amenities that might attract and keep people in the area; and physical infrastructure (roads, sewers, and water)".

Crone and Haynes summarize a process developed by Home and Haynes (1999) for measuring socioeconomic resiliency in Columbia basin counties. Three factors were used: economic diversity, population density, and lifestyle diversity.

With regard to determining socioeconomic resiliency, a list of counties was made that included the “counties of concern” identified with the methodologies outlines above which had low socioeconomic resiliency ratings (as defined by Home and Haynes, 1999). Recreation counties were also included (defined by Johnson and Beale, 1995). Next, the authors estimated the predicted direction of change in timber outputs and federal grazing levels. Lastly, the authors developed an ordinal measure to examine the relative differences in alternatives. To do this, they multiplied each county’s proportion of the total population (of the 28 counties examined) by the direction of the change (-1, 0, or 1) for that county for each alternative. These numbers were then summed across counties to get an aggregate score for each alternative.

Home, A.L., Haynes, R.W. 1999. Developing measures of socioeconomic resiliency in the interior Columbia River Basin. General Technical Report PNW-GTR-453. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR, p. 41.

Johnson, K.M. and Beale, C.L. 1995. Nonmetropolitan recreational counties: identification and fiscal concerns. Working Paper No. 6 Demographic Change and Fiscal Stress Project. Loyola University Chicago, Chicago, IL, p. 14.

Reyna, N., 1998. Economic and social conditions of communities: economic and social characteristics of interior Columbia basin communities and an estimation of effects on communities from the alternatives of the eastside and upper Columbia River basin draft environmental impact statements, Part 1, BLM/OR/WA/

Horne, Amy L. and Richard W. Haynes. 1999. Developing Measures of Socioeconomic Resiliency in the Interior Columbia Basin. USDA General Technical Report PNW-GTR-453.

This report develops measures for socioeconomic resiliency for counties for the Interior Columbia Basin Ecosystem Management Project. The definition of socioeconomic resiliency used is defined as the ability of human institutions to adapt to change. The Interior Columbia Basin Ecosystem Management Project (ICBEMP) is the most ambitious attempt to date to assess economic and social conditions at a community level for a large portion of the Northwest (Sommers 2001). As is the case with other impact studies, there is no explicit model or framework linking economic changes to social impacts. However, the report does provide a qualitative assessment of probable impacts of various management alternatives being considered by federal government agencies for the lands under their jurisdiction in this region. For example, the report discusses possible impacts of grazing alternatives on agriculturally-dependent communities, and the possible impacts of alternative timber management policies on timber-dependent communities. Combined with lists of communities with these types of economic specializations or "dependencies," the report provides a guide to the geographic distribution of possible impacts of the various land management alternatives under review.

This study develops measures of socioeconomic resiliency. The theoretical basis for socioeconomic resiliency rests on the concept of social well-being, which was defined as a composite of four factors: economic resiliency, social and cultural diversity (population size, mix of skills), civic infrastructure (leadership, preparedness for change), and amenity infrastructure (attractiveness of the area) (McCool and others 1997). These authors note that communities are constantly exposed to change in their economic environment and that it is therefore interesting to consider factors that make communities resilient or able to adapt to changes. They are specifically interested in measures of resiliency that would aid federal land management agencies in understanding potential impacts of policy changes.

Findings: This study found that most of the basin's residents (67 percent) live in counties with a high degree of socioeconomic resiliency; however, these counties represent only 20 percent of the land base. These findings allow land managers to better gauge the impacts of land management actions and to focus social and economic mitigation strategies on places of greatest need.

"Complicating the search for a measure of socioeconomic resiliency are two factors. First, because social indicators are often just proxies for some unmeasurable concept, findings derived from proxies should be related back to that concept. Second, the use of social indicators assumes that, for some measures at least, it is appropriate to express them on some ordered scale (Carley, 1981)."

"We assume in this paper that the relation between diversity and resiliency in social and economic systems is similar to that in the ecological literature…that is, a system with higher diversity is less affected by change than a system with lower diversity and the former therefore has higher resiliency. Socioeconomic systems with higher resiliency are defined as those that adapt quickly as indicated by rebounding measures of socioeconomic well-being. People living in areas of high resiliency have a wide range of skills and access to diverse employment opportunities. Thus, if specific firms or business sectors experience downturns, unemployment rates rise only briefly until displaced people find other employment. Systems with low resiliency have more lingering negative impacts, such as unemployment or out-migration rates that remain high for several years…"

"Note that having greater diversity (and higher resiliency) does not eliminate the possibility of wide fluctuations for single economic entities or sectors. This concept differs from many discussions of ecosystem management where the focus is on the goals of economic sustainability and community stability…"

<u>Methodology</u>

The authors state that the concept of socioeconomic resiliency is based on the concept of social well-being which they define as a composite of four factors: economic resiliency, social and cultural diversity (population size, mix of skills), civic infrastructure (leadership, preparedness for change), and amenity infrastructure (attractiveness of the area). They provide the following explanation for development of a socioeconomic resiliency index:

Our approach follows the spirit of the definition of social well-being. An index of economic resiliency can be developed directly from measures of diversity in employment or income among economic sectors. Social and cultural diversity can be measured by using data on lifestyle diversity. Because there was no direct way to measure civic infrastructure, we used population density as a proxy, following the work of Barkley and others (1996). There was no easy way to index amenity infrastructure. The Socioeconomic resiliency index we developed was thus a composite of three factors: economic resiliency, population density, and lifestyle diversity.

Economic resilience
Economic resiliency was defined as diversity of employment. Ratings were assigned based on how the counties compare to all U.S. counties. All U.S. counties were then divided into three equally numbered groups with the top third labeled as having "high" economic diversity, the middle third as having a "medium" economic resilience and the bottom third as having a "low" economic resilience. The Basin counties were then labeled according to this method.

Population density
Population density of each county was calculated by dividing the total population by the number of square miles in the county. With this information, the following rating system was used:

> *A rating of 3 was assigned to counties with population densities equal to or greater than 33 people per square mile. A rating of 2 was given to counties having population densities between the basin average (11 people per square mile) and 33 people per square mile. A rating of 1 was given to counties having population densities less than the basin average (11 people per square mile) but not less than six people per square mile. The rating of 0 was given to "new frontier" counties, those having population densities of less than six people per square mile.*

Lifestyle diversity
Lifestyle diversity calculations used a database (PRIZM) that identified 62 lifestyle groups in the U.S. through a method called cluster analysis on census data (education, affluence, family life cycle, mobility, race, ethnicity, and degree of urbanization). By considering the proportion of households in each lifestyle group for each county, a lifestyle index was able to be calculated. The counties in the top third received a rating of 3, the middle third received a rating of 2, etc.

Socioeconomic resiliency
The above factors were added together for each county to estimate a socioeconomic resiliency rating. All three factors were equally weighted. The highest rating possible was a 9. Counties receiving a composite score greater than 6 were categorized as having a high socioeconomic resilience, a medium socioeconomic resilience if the score was a five or six and a low rating if the score was four or less.

Findings
The remainder of the report focuses on describing the results of the analysis. The results indicated that the counties with high socioeconomic resiliency were those with high population densities, high to medium economic resiliency, and high to medium life style diversity. However, some counties were rated with high socioeconomic resilience even though they had low population densities due to their high rankings in the other two factors. Consistent with the findings of other studies, high resiliency counties tend to lie along transportation corridors and/or often are counties with high scenic amenities and quality of life. Counties with low socioeconomic resiliency were often located in arid parts of the study area or are located in rugged and isolated areas.

The three factors used in the socioeconomic resiliency index were highly correlated. The specific correlations suggested that the mixture of people in a county may be more important to providing human systems with resiliency than the sheer numbers of people.

The authors also discuss the use of counties as the unit for socioeconomic resilience. They note that, “two-thirds of the people live in counties with a high degree of socioeconomic resilience; however, these counties represent only 20 percent of the land base. Although 68 percent of the basin is categorized as having a low socioeconomic resiliency, only 18 percent of the people live in these areas.

The effect of scale on the analysis is also discussed through comparison of larger areas that are comprised of several counties. The findings indicate that larger areas have higher economic resilience than smaller areas. The highest economic resiliency ratings are for areas containing metropolitan counties. Comparing these results to counties leads the authors to conclude that counties are too small to represent economies and that the well-being of people is connected with larger areas than the county they live in. For example, people often extend job searches beyond the county they live in and the authors note that in 1990, one in six workers in the average basin county worked outside the county they lived in.

Future trends in socioeconomic resiliency are predicted using future population projections. These predictions are incorporated into the composite rate. Several counties increase their socioeconomic resilience rating as a result.

Sommers. 2001. USGS Forest and Rangeland Ecosystem Science Center, Monitoring Socio-Economic Trends in the Northern Spotted Owl Region: Framework, Trends Update, and Community-Level Monitoring Recommendations. Cascadia Field Station. College of Forest Resources. University of Washington.

This study uses eight Indicators (and specific indicators for each of these 8) to determine the social and economic status of communities in the affected region:

1. Demographics
2. Employment
3. Government revenues
4. Facilities and infrastructure
5. Social services burden
6. Federal assistance
7. Business trends
8. Taxes

On page 15, there is a diagram illustrating flows within the community to evaluate the effects of federal laws on socioeconomic variables.

Economic Research Service website. 2006. http://www.ers.usda.gov/Briefing/Rurality/Typology/

The Economic Research Service provides various measures of industry dependence at the county and sometimes city level. The categories, definitions, and analytical results are posted on their website at the above address. The following categories are defined:

Farming-dependent (440 total, 403 nonmetro) counties—either 15 percent or more of average annual labor and proprietors' earnings derived from farming during 1998-2000 or 15 percent or more of employed residents worked in farm occupations in 2000. Note that a few counties have changed farm dependency status from the preliminary group posted in May 2004. See methods, data sources, and documentation for an explanation of these changes.

> **Farming** dependence was based on two thresholds—farm earnings accounting for an annual average of 15 percent or more of total county earnings during 1998-2000 or farm occupations accounting for 15 percent or more of all occupations of employed county residents in 2000. The farming occupation option was adopted to allow counties into the farming-dependent group that had highly farming-oriented economies but did not meet the earnings threshold, most often due to negative farm earnings estimates for some or all of the analyzed years. Farming dependence was determined first and takes precedence over all the other economic dependence types.

Mining-dependent (128 total, 113 nonmetro) counties—15 percent or more of average annual labor and proprietors' earnings derived from mining during 1998-2000.

Manufacturing-dependent (905 total, 585 nonmetro) counties—25 percent or more of average annual labor and proprietors' earnings derived from manufacturing during 1998-2000.

Federal/State government-dependent (381 total, 222 nonmetro) counties—15 percent or more of average annual labor and proprietors' earnings derived from Federal and State government during 1998-2000.

Services-dependent (340 total, 114 nonmetro) counties—45 percent or more of average annual labor and proprietors' earnings derived from services (SIC categories of retail trade; finance, insurance, and real estate; and services) during 1998-2000.

Nonspecialized (948 total, 615 nonmetro) counties—did not meet the dependence threshold for any one of the above industries.

Housing stress (537 total, 302 nonmetro) counties—30 percent or more of households had one or more of these housing conditions in 2000: lacked complete plumbing, lacked complete kitchen, paid 30 percent or more of income for owner costs or rent, or had more than 1 person per room. See methods for more details.

Low-education (622 total, 499 nonmetro) counties—25 percent or more of residents 25-64 years old had neither a high school diploma nor GED in 2000.

Low-employment (460 total, 396 nonmetro) counties—less than 65 percent of residents 21-64 years old were employed in 2000.

Persistent poverty (386 total, 340 nonmetro) counties—20 percent or more of residents were poor as measured by each of the last 4 censuses, 1970, 1980, 1990, and 2000.

Population loss (601 total, 532 nonmetro) counties—number of residents declined both between the 1980 and 1990 censuses and between the 1990 and 2000 censuses.

Nonmetro recreation (334 designated nonmetro in either 1993 or 2003, 34 were designated metro in 2003) counties—classified using a combination of factors, including share of employment or share of earnings in recreation-related industries in 1999, share of seasonal or occasional use housing units in 2000, and per capita receipts from motels and hotels in 1997. See methods for more details.

> **nonmetro recreation:** This classification was originally completed in 2002 and results were published in *Rural America*. Only counties that were classified as nonmetro by the 1990 census were classified. The classification was updated for this typology by coding the metro counties in 1990 that changed to nonmetro status in 2000. While this is the only typology code that does not apply to all U.S. counties, it can be used to look at nonmetro counties using either the 1993 or 2003 definition of nonmetro.
>
> Data used to create the nonmetro recreation classification were:
>
> 1. wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment reported in the Census Bureau's County Business Patterns for 1999;
> 2. percentage of total personal income reported for these same categories by the Bureau of Economic Analysis;
> 3. percentage of housing units intended for seasonal or occasional use reported in the 2000 Census; and
> 4. per capita receipts from motels and hotels as reported in the 1997 Census of Business.
>
> The three variables measuring employment, income, and seasonal housing were converted to z-scores and combined into a weighted index (weights of 0.3 were assigned to income and employment and 0.4 to seasonal housing) to reflect recreational activity. Counties with index scores of 0.67 or higher were regarded as potential recreation counties.
>
> Additional counties were considered to be recreation counties if their value was greater than 0 (the mean of the index) and they had at least $400 per capita of hotel-motel receipts. Inclusion of such counties to the list added some comparatively large counties with a high volume of recreation activity but with urban centers big enough to dilute the

percentage of direct recreational income and employment or the proportion of second homes.

Counties were also accepted if at least 25 percent of their housing was seasonal, so long as the index exceeded the mean. Each potential candidate was individually appraised from printed and/or Internet sources and personal knowledge to determine or verify the nature of their recreational function. Fourteen counties that ostensibly qualified, but lacked any known recreational function, were deleted from the list either because they were very small in population with inadequate and misleading County Business Patterns coverage or because they reflected high travel activity without recreational purpose, i.e., overnight motel and eating place clusters on major highways.

Retirement destination (440 total, 277 nonmetro) counties—number of residents 60 and older grew by 15 percent or more between 1990 and 2000 due to inmigration.

**** In general, the Economic Research Service used one standard deviation from the mean labor and proprietor income for each economic type to help determine the cutoff. The cutoff was then rounded to the nearest 5 percent. The farming typology cutoff was determined using labor and proprietor income as well as the number of worked employed in farm occupations from the 2000 Census. This was because county-level farm income estimates are very unreliable and often underestimated the impact of farming (Personal communication, February 2006).**

Johnson, Kenneth M. and Calvin L. Beale. 2002. Nonmetro Recreation Counties: Their Identification and Rapid Growth. Rural America. 17(4): 12-18.

This article outlines a method to identify nonmetro counties with high recreation development. The article also looks at the linkages between recreational concentrations and population changes and discusses the implications for these counties.

Of all U.S. counties, 329 were classified as recreational based on a classification method where the relative amount of recreation-linked employment, income and housing is high.

Methodology
First, nonmetro counties were identified based on individual metro areas as defined by OMB. The authors note that metro and nonmetro boundaries based on the 2000 Census was scheduled to become available in 2003.

Second, several measures were chosen to characterize the recreational activity: 1) wage and salary employment in entertainment and recreation, accommodations, eating and drinking places, and real estate as a percentage of all employment reported in the Census Bureau's County Business Patterns fro 1999; 2) percentage of total personal income reported for the same categories by the Bureau of Economic Analysis; 3) percentage of housing units intended for seasonal or occasional use reported in the 1000 Census; and 4) per capita receipts from motels and hotels as reported in the 1997 Census of Business. The industry categories were chosen after reviewing data for a sample of counties of well-known, undisputed high recreational dependence.

Third, the variables were converted into z-scores and combined into a weighted index to reflect recreational activity (0.3 employment + 0.3 income + 0.4 seasonal homes). Counties with index scores of 0.67 or higher were regarded as potential recreation counties. Other counties were also considered if they had a score greater than the mean of the index and one of the following conditions was met: 1) the county had at least $400 per capita of hotel-motel receipts or 2) at least 25% of the housing in the county was seasonal. In this way, counties with a high volume of recreational activity but large urban centers that dilute their scores can be included.

Daniels, Jean M. 2004. Assessing Socioeconomic Resiliency in Washington Counties. USDA. Forest Service. Pacific Northwest Research Station. General Technical Report PNW-GTR-607.

This report presents a methodology for identifying forest dependency and socioeconomic resiliency as well as results for the state of Washington. This study combines measures of forest dependency with socioeconomic resiliency measures to assess how a county may respond to external shocks. This study calculates social and cultural diversity as represented by the diversity of lifestyles in each county. Economic diversity is measured by using an index of regional specialization. Civic infrastructure is measured by using population density as a proxy. Findings are then compared against traditional approaches used by the state of Washington to identify areas experiencing economic distress and areas considered dependent on public timber.

The authors state that this research can help identify communities (counties) of concern that may experience difficulty adapting to changes in Department of Natural Resources forest management policies.

<u>Methodology</u>
The steps used are: 1) each county is assigned a socioeconomic resiliency rating by combining lifestyle diversity, economic resiliency, and population density indices; 2) forest dependence is determines by rating all counties based on the proportion of forest land per county; and 3) counties of concern are identified based on high forest dependence and low socioeconomic resiliency. Methods are also outlined for focus on specific geographical areas.

Socioeconomic resiliency
Socioeconomic resiliency was assessed using methods described by Horne and Haynes (1999) (see above). However, the specific indices of lifestyle diversity, economic diversity, and population density) are calculated differently.

Lifestyle diversity index
While it cannot be directly measured, proxy measures are developed for the lifestyle diversity index using demographic data contained in the 2000 Census. The following indicators were used in calculation of the lifestyle diversity index:

- Mobility - proportion of people who changed their residence between 1995 and 2000 compared to those who did not
- Ethnicity – data from Census data on whether residents were born in the U.S. and whether they were born in the state
- Degree of urbaness - degree of urban and rural categorized as urban and inside urbanized areas, urban and inside urban clusters, rural farm, and rural nonfarm
- Race – proportion of citizens identifying themselves as various race categories
- Income – Proportion of people in 16 income categories
- Education – proportion of people over age 25 in 6 categories

The authors used the Shannon-Weiner diversity index[19] to make calculations for each indicator. The resulting values were added together for each variable and divided by 6 to get an overall diversity rating for each county.

Economic diversity
To calculate economic diversity, employment by SIC code for 2001 was used from the Labor Market and Economic Analysis Branch of Washington Department of Employment Security Web site. The regional specialization index[20] was then used to determine if a county is more or less specialized than the state. Once these values were calculated, the counties were ranked from lowest to highest, divided into four groups based on 25th, 50th and 75th statistical quartiles, and rated from 1 to 4 with low specialization indicating high economic diversity.

Population density
This measure was used as a proxy for civic infrastructure. The authors explain that it is assumed that greater population leads to a more developed county infrastructure and therefore increases socioeconomic resiliency. Data was from 2000 Census was used. State agencies provided the number of square miles in each county. Each county was given a rating from 0 to 4 depending on population density[21].

Overall socioeconomic resiliency rating
To estimate an overall socioeconomic resiliency rating, first, an unweighted average of the three indices was calculated. Next, the counties were sorted from highest to lowest and divided in thirds. The highest third were given a rating of "high" socioeconomic resilience. The middle third were labeled with a "medium" rating and the lowest third was given a "low" rating. The authors state that although other methods could have been used, dividing the counties into three equal parts resulted in the best agreement between counties with "low" ratings and those listed on the 2003 distressed county list published by the state.

Forest dependence

---

[19] $D = -\sum p_i \ln(p_i)/\ln(s)$ where D = diversity measure ranging from 0 to 1, s = total number of subcategories for each of the six indicator variables, and p = proportion of people in each subcategory for each variable. Therefore, a relatively low value indicates uneven distribution of people across the indicator. "For example, because 95 percent of King County is concentrated in urban centers, King County would receive a relatively low diversity rating for the indicator of urbaness" (p. 10-11).

[20] $R_i = \sum \left| \left(E_{ij}/E_i\right) - \left(E_j/E\right) \right|$ where E_{ij} = employment in county i in industry j, E_i = total employment in county *i*, E_j = total employment in industry j in all counties, and E = total employment in all industries across all counties. Values close to zero indicate the county has about the same proportion of people employed in each industry as the state while values closer to 1 indicate that employment is more specialized in the county than in the state. The assumption is made that the higher the index value, the more vulnerable the county is if negative impacts occur because the county is less economically diverse and less able to adapt to change.

[21]

Population density of county	Rating
>816	4
237 to 816	3
33 to 236	2
11 to 32	1
<11	0

The proportion of forest land in each county was used as a proxy for forest dependence. The list of counties and their values were divided into three equal parts. The top third was labeled with a "high" dependence, the second third with a "medium" dependence and the lowest third was labeled with "low" forest dependence.

Identifying counties of concern
Counties of concern were classified as those having a "low" socioeconomic resiliency rating and "high" forest dependence.

The results indicated that high socioeconomic resiliency ratings were found in counties close to urban areas. They also contained a diversified industry mix with service and manufacturing sectors. Counties that were remote, isolated, and had poor transportation networks had "low" resilience rankings.

Six counties of 39 were classified as "counties of concern". All of these were also classified as "distressed" by the state in 2002 and 5 in 2003.

Lucas, Linda. 2001. Fishery Management and Local Communities: The Case of Madeira Beach, Florida. ***Marine Fisheries Review*****. 63(4): 32-42.**

This article describes an empirical analysis conducted of the impacts to Madeira Beach, Florida from a 1 and 2 month closure of the grouper fishery. The analysis uses an input-output simulation model and uses income and employment to describe dependency.

The article begins by providing a literature review of sociological and anthropological studies that identify resource related communities and methods to assess alterations to the relationships within the communities that might result from regulations.

Sepez, J.A., B.D. Tilt, C.L. Package, H.M. Lazrus, and I. Vaccaro. 2005. Community Profiles for North Pacific Fisheries – Alaska. NOAA Technical Memorandum NMFS-AFSC-160.

This document profiles 136 fishing communities in Alaska with basic information on social and economic characteristics. Various federal statutes, including the Magnuson-Stevens Fishery Conservation and Management Act and the National Environmental Policy Act, among others, require agencies to examine the social and economic impacts of policies and regulations. These profiles can serve as a consolidated source of baseline information for assessing community impacts in Alaska.

The profiles are given in a narrative format that includes three sections: People and Place, Infrastructure, and Involvement in North Pacific Fisheries. People and Place includes information on location, demographics (including age and gender structure of the population, racial and ethnic make up), education, housing, and local history. Community Infrastructure covers current economic activity, governance (including city classification, taxation, Native organizations, and proximity to fisheries management and immigration offices) and facilities (transportation options and connectivity, water, waste, electricity, schools, police, and public accommodations). Involvement in North Pacific Fisheries details community activities in commercial fishing (processing, permit holdings, and aid receipts), recreational fishing, and subsistence fishing.

To define communities, we relied on Census place-level geographies where possible, grouping communities only when constrained by fisheries data, yielding 128 individual profiles. Regional characteristics and issues are briefly described in regional introductions. The communities were selected by a process which assessed involvement in commercial fisheries using quantitative data from the year 2000, in order to coordinate with 2000 Census data. The quantitative indicators looked at communities that have commercial fisheries landings (indicators: landings, number of processors, number of vessels delivering to a community), communities that are the registered homeports of vessels participating in the fisheries, and communities that are home to documented participants in the fisheries (indicators: crew license holders, state and federal permit holders, and vessel owners). Where appropriate, the indicators were assessed as a ratio to the community's population. Selection of a community was triggered by its surpassing a certain threshold in any one of the indicator categories, or in an aggregated category made up of the individual indicators.

The Alaska communities selected and profiled in this document are: Adak, Akhiok, Akiachak, Akutan, Aleknagik, Alitak Bay, Anchor Point, Anchorage/Chugiak/Eagle River/Girdwood, Angoon, Atka, Bethel, Chefornak, Chignik (Bay), Chignik Lagoon, Chignik Lake, Clam Gulch, Clark's Point, Cordova, Craig, Dillingham, Edna Bay, Eek, Egegik, Ekuk, Ekwok, Elfin Cove, Elim, Emmonak, Excursion Inlet, Fairbanks, False Pass, Fritz Creek, Galena, Goodnews Bay, Gustavus, Haines, Halibut Cove, Hobart Bay, Homer, Hoonah, Hooper Bay, Hydaburg, Igiugig, Iliamna, Ivanof Bay, Juneau/Douglas/Auke Bay, Kake, Karluk, Kasilof, Kenai, Ketchikan/Ward Cove, King Cove, King Salmon, Kipnuk, Klawock, Kodiak, Kokhanok, Koliganek, Kongiganak, Kotlik, Kwillingok, Larsen Bay, Levelock, Manokotak, Marshall, Mekoryuk, Metlakatla, Meyers Chuck, Naknek, Napakiak, Nelson Lagoon, New Stuyahok, Newhalen, Newtok, Nightmute, Nikiski, Nikolaevsk, Ninilchik, Nome, Old Harbor, Ouzinkie, Palmer, Pedro Bay, Pelican, Perryville, Petersburg, Pilot Point, Pilot Station, Platinum, Point Baker, Port Alexander, Port Alsworth, Port Graham, Port Heiden, Port Lions, Port Moller, Port Protection, Portage Creek, Prudhoe Bay, Quinhagak, Saint George, Saint Mary's, Saint Paul, Sand Point, Scammon Bay, Seldovia, Seward, Shaktoolik, Sitka, Skwentna, Soldotna, South Naknek, Sterling, Tenakee Springs, Thorne Bay, Togiak, Toksook Bay, Tuntutuliak, Tununak, Twin Hills, Ugashik, Unalakleet, Unalaska/Dutch Harbor, Valdez, Wasilla, Whale Pass, Whittier, Willow, Wrangell, and Yakutat.

Pollard, Vicky. 2004. Fishing Communities and Regional Development. UK Prime Minister's Strategy Unit.

The main objectives of this report were to 1) analyze the current situation and problems with the UK fishing industry; 2) analyze the future options available to it and the range of inherent and potential risks the industry faces; and 3) devise a practical strategy which will help bring about a sustainable future for the fishing industry, associated communities and the marine environment.

The report measures dependency by the amount of local employment as a percentage of total employment. Employment is categorized in three categories – fish catching (direct catching dependency employment), processing sector (dependent processing employment), and the supply of goods and services through the supply chain to the fish catching industry (indirect catching dependent employment). Overall dependency is a total of the three categories.

The report also assesses the impact of fleet restructuring on communities using fleet modeling tools. The assessment indicates the change in vessel numbers by segment required over the next 10 years to bring about a profitable industry. In this assessment, the authors identify the potential impacts from employment decreases (accounting for the portfolio of fisheries a vessel participates in, the importance of fishing employment to total employment in a community, and the proportion of supply chain jobs to fish catching jobs), and the types of communities most likely to be negatively affected by changes in the industry (considering remoteness, dependence and port size[22]).

The report than assesses a community's vulnerability to change based on geographical remoteness and deprivation ranking (an index that combines income, employment, health deprivation and disability, education skills and training, housing and geographical access to services) to look for areas of overlap with dependency.

The authors use this research to help identify policy options which include: 1) Government has the option of modulating fisheries policy to minimize the social impacts of moving to a sustainable future for the industry, 2) Government should introduce a clear social element to fisheries policy, 3) Government intervention should focus on communities that are both fisheries dependent and vulnerable, 4) The UK should have a positive policy towards community quota schemes for the most vulnerable communities, if this can be done within EU law, 5) Government needs to consider the full range of options for community quota (hold-back, buyback), in order to try to overcome legal problems with existing schemes, 6) It is important to have clearly stated objectives including social objectives, to inform the management of the inshore sector, and 7) A process is needed under which inshore managers can involve stakeholders in agreeing on explicit objectives.

---

[22] The report surmises that "The communities likely to be most negatively affected by changes in the industry, without further government intervention, are: 1) small, remote communities, which are highly dependent on fishing because fishing jobs are among just a few employment opportunities available in the area. These areas are also expected to be highly vulnerable to change because of the limited range of economics opportunities, and 2) medium-dependency communities, where ports are not well enough equipped to develop as fishing centers as the sector concentrates and the number of vessels declines. High dependency communities with larger ports can be expected to suffer less from re-structuring. Larger ports are expected to be better able to attract vessels as fleet segments concentrate by providing more and better services."

Options are presented for limiting concentration of the fleet and quota to support vulnerable fishing communities including government control over quota, restrictions on the number of vessels owned by one person, limiting eligibility to "fishermen" with a majority of their income from fishing, limiting movement of vessels between segments of the fishery, community quota.

Norman, Karma, Jennifer Sepez, Heather Lazrus, Nicole Milne, Christina Package, Suzanne Russell, Kevin Grant, Robin Petersen, John Primo, Megan Styles, Bryan Tilt, Ismael Vaccaro. Forthcoming. Community Profiles for West Coast and North Pacific Fisheries – Washington, Oregon, California, and other U.S. States. Socioeconomics Program, Northwest Fisheries Science Center. Economics and Social Sciences Research Program, Alaska Fisheries Science Center.

This document profiles 124 fishing communities in Washington, Oregon, California, and other U.S. states, with basic information on social and economic characteristics. Various federal statutes, including the Magnuson-Stevens Fishery Conservation and Management Act and the National Environmental Policy Act, among others, require federal agencies to examine the social and economic impacts of policies and regulations. These profiles can serve as a consolidated source of baseline information for assessing community impacts in these states.

The profiles are given in a narrative format that includes four sections: People and Place, Infrastructure, Involvement in West Coast Fisheries, and Involvement in North Pacific Fisheries. People and Place includes information on location, demographics (including age and gender structure of the population, racial and ethnic make up), education, housing, and local history. Infrastructure covers current economic activity, governance (including city classification, taxation, and proximity to fisheries management and immigration offices) and facilities (transportation options and connectivity, water, waste, electricity, schools, police, public accommodations, and ports). Involvement in West Coast Fisheries and Involvement in North Pacific Fisheries detail community activities in commercial fishing (processing, permit holdings, and aid receipts), recreational fishing, and subsistence fishing. To define communities, we relied on Census place-level geographies where possible, yielding 124 individual profiles.

The communities were selected by a process that assessed involvement in commercial fisheries using quantitative data from the year 2000, in order to coordinate with 2000 U.S. Census data. The quantitative indicators reflected communities that have commercial fisheries landings (indicators: weight and value of landings, number of unique vessels delivering fish to a community) and communities that are home to documented participants in the fisheries (indicators: state and federal permit holders and vessel owners). Indicators were assessed in two ways, once as a ratio to the community's population, and in another approach, as a ratio of involvement within a particular fishery. The ranked lists generated by these two processes were combined and communities with scores one standard deviation above the mean were selected for profiling.

The communities selected and profiled in this document are, in Washington: Aberdeen, Anacortes, Bay Center, Bellingham, Blaine, Bothell, Cathlamet, Chinook, Edmonds, Everett, Ferndale, Fox Island, Friday Harbor, Gig Harbor, Grayland, Ilwaco, La Conner, La Push, Lakewood, Long Beach, Lopez, Mount Vernon, Naselle, Neah Bay, Olympia, Port Angeles, Port Townsend, Raymond, Seattle, Seaview, Sedro-Woolley, Sequim, Shelton, Silvana, South Bend, Stanwood, Tacoma, Tokeland, Westport, and Woodinville; in Oregon: Astoria, Bandon, Beaver, Brookings, Charleston, Clatskanie, Cloverdale, Coos Bay, Depoe Bay, Florence, Garibaldi, Gold Beach, Hammond, Harbor, Logsdon, Monument, Newport, North Bend, Pacific City, Port Orford, Reedsport, Rockaway Beach, Roseburg, Seaside, Siletz, South Beach, Tillamook, Toledo, Warrenton, and Winchester Bay; and in California: Albion, Arroyo Grande, Atascadero, Avila Beach, Bodega Bay, Corte Madera, Costa Mesa, Crescent City, Culver City, Dana Point, Dillon Beach, El Granada, El Sobrante, Eureka, Fields Landing, Fort Bragg, Half Moon Bay, Kneeland, Lafayette, Long Beach, Los Angeles, Los Osos, Marina, McKinleyville, Monterey, Morro Bay, Moss Landing, Novato, Oxnard, Pebble Beach, Point Arena, Port Hueneme, Princeton, San Diego, San Francisco, San Jose, San Pedro, Santa Ana, Santa Barbara, Santa Cruz, Santa Rosa, Sausalito, Seaside, Sebastopol, Sunset Beach, Tarzana, Terminal Island, Torrence, Trinidad, Ukiah, Valley Ford, and Ventura. Two selected communities were located in other states: Pleasantville, New Jersey, and Seaford, Virginia.

Bunce L., P. Townsley, R. Pomeroy, R. Pollnac. 2000. *Socioeconomic manual for coral reef management.* National Ocean Service, NOAA, Silver Spring, MD.

This is a manual designed to demonstrate methods to assess how people who use and affect coral reefs. It's intention is to show how people interact with coral reefs and improved management of their activities to ensure that these marvelous ecosystems will continue to provide sustainable services for communities into the future. There is a close link between how people use coral reefs and their socioeconomic background. Understanding the socioeconomic context of reef stakeholders is essential for assessing, predicting and managing reef use. To balance sustainable use and reef protection, the reef manager needs to know: 1. The status of the reef and changes in the health of coral and fishes etc; and 2. The people that use and affect the reef, including their use patterns, perceptions of reef management and characteristics.

Socioeconomic parameters:
1. Resource use patterns
2. Stakeholder characteristics
3. Gender issues
4. Stakeholder perceptions
5. Organisation and resource governance
6. Traditional knowledge
7. Community services and facilities
8. Market attributes for extractive uses of coral reefs
9. Market attributes for non-extractive uses of coral reefs
10. Non-market and non-use values

Scholz, A et al. 2004. Participatory socioeconomic analysis: drawing on fishermen's knowledge for marine protected area planning in California. *Marine Policy*. 28(4): 335-349.

The purpose of this pilot study was to test the utility of geospatial analysis tools for eliciting and integrating fishermen's(1) knowledge into marine protected area (MPA) planning processes in California, United States. A participatory design yielded 30 local knowledge interviews that were coded for socioeconomic and biodiversity information. The resulting information is useful in understanding past conflicts around MPA siting proposals and for identifying likely sources of agreement and disagreement. Products include a protocol for rapid socioeconomic assessment a database of fishermen's knowledge and information; and a geographic information system for further use in California's MPA planning process.

Gatewood, J.B. and B. McCay. 1990. Comparison of job satisfaction in six New Jersey fisheries. *Human Organization.* 49(1):14-25.

This study presents a survey of several hundred fishermen with respect to 33 components of job satisfaction. (note: they didn't use consensus analysis) found:

1. Fishermen's job satisfaction is an important 'human benefit' to consider when formulating fisheries management plans.
2. The specific nature of fishermen's job satisfaction varies significantly from one fishery to another and across different statuses on board.
3. Since there are many ways to regulate fishing effort, managers should, other things being equal, select those tactics that preserve as much as possible what fishermen like about their work. These factors will vary from one fishery to the next.

Griffith, D. and C.L. Dyer. 1996. An Appraisal of the Social and Cultural Aspects of the Multispecies Groundfish Fishery in the New England and the Mid-Atlantic Regions. Prepared under Contract Number 50-DGNF-5-00008 between The National Oceanographic and Atmospheric Administration and Aguirre International.

In response to regulatory changes, this study finds that most fishers have suffered a "social and economic crisis" that they dealt with by:

1. experimented with new fisheries or aquaculture (preferred response but not possible with those with large capital investments; also dealing with territorial exclusion from already established fishing groups)
2. rotating or laying off crew (keeping individual shares stable)
3. supplementing incomes with casual shore employment or with the labor of their spouses, or curtailing consumption practices.
4. leaving fisheries for shore-based jobs
5. moving to other states with more relaxed regulations

Johnson, J.C., M.K. Orbach. 1990. A fishery in transition: The impact of urbanization on Florida's spiny lobster fishery. *City and Society.* 4(1):88-104.

Our task in the larger study described below was to construct a sociocultural profile of industry participants and to use this profile to assess the impact of various policy and management options for the fishery. In the course of this study, we discovered that, aside from the potential impact of future fisheries management actions, there are several other factors that will affect spiny lobster fishermen and their communities in the next few years, perhaps even more than the management regulations. In general, these factors taken together constitute a trend toward urbanization of the Florida Keys.

Kusel, J., L. Fortmann. 1991. Well-being in forest-dependent communities, vol. 1. Sacramento, CA: California Department of Forestry and Fire Protection, Forest and Rangeland Resources Assessment Program; report; contract 8CA85064. 245 p.
This study departs from standard approaches, casting well-being in forest dependent communities in terms of community stability (confines well-being to stable timber employment). Well-being is reformulated in terms of Sen's concepts of capabilities (opportunities an individual has to choose from) and functioning (what (s)he succeeds in doing with the commodities at her command) coupled with an expanded conception of community which is used to explore the question of how communities develop and maintain the capacity to enhance their well-being and to defend their interests against outsiders. This study looks at "community capacity" (ability of a community to address local problems and respond to external threats) and "commitments" (actions which improve the community and community capacity), taking a "social indicators approach to well-being"

Study 1: statistical analyses between indicators of well-being and measures of forest and use
Study 2: rapid rural appraisal of 7 forest communities to determine issues of local importance and to assess capacity to undertake action to address them
Study 3 (v2): evaluates the well-being of 3 forest communities in CA.

Dependent variables (well-being): economic well-being (poverty, avg income, income inequality), health (work injuries), social pathology (rate of burglary), capacity
Independent variables (nature and use of forest): economic importance of forestry sector, amt of public land, concentration of private timber land, economic importance of tourism, immigration.

Mederer H. 1996. Surviving the Changes: Families Respond to Fishery Management. *Nor'easter*. 8(2): 12-33.

A 2-year study of a small group of fishing families in New England. She makes the case that for full time fishermen, fishing is an identity. With employment change, role shifting between men and women occur and that some families are more able to adapt than others. Husbands that had roles other than breadwinning - however brief and episodic - are better equipped to change. The families in the study that are coping well are the families that "made room" for the absent member when he came home, and that are willing to be flexible in how they think about work and family roles. However, changing these established patterns of family life and family roles is difficult. The results of this study suggest that when fishing families are not flexible in roles, the ease of their transition out of fishing may depend on what occupation they are adopting. Jobs that allow families to maintain their "family strategy" of separate lives may be more compatible with families that are comfortable with separate spheres of work and family.

Northeast Fisheries Management Council. 2003. Northeast Multispecies Amendment 13 SEIS. Social Impact Assessment
http://www.nefmc.org/nemulti/planamen/final_amend13_dec03_section_24.pdf

This SIA was framed by the following questions:
- Will standards, style, or pace of living change?
- Will cooperation and interaction patterns change?
- Will change be sudden or gradual?
- How does the proposed action fit with historical trends and participation in the fishery?
- Does the change fit with cultural or normative expectations of behavior in the fishery or community?
- How do fishermen and the community members view the alternatives?

Social Impacts Assessment factors:
1. *Size and demographic characteristics of the fishery workforce in the community* –changes in these factors reflect demographic, income, and employment impacts in relation to the community's available fishery workforce
2. *Cultural issues* – attitudes, beliefs, values of fishermen, their families, and their communities
3. *Social structure and organization* – the ability of communities to provide necessary social support and services to families
4. *Non-economic social aspects* – lifestyle, health, and safety issues
5. *Historical dependence on fishery* – reflected in the structure of fishing practices and income distribution

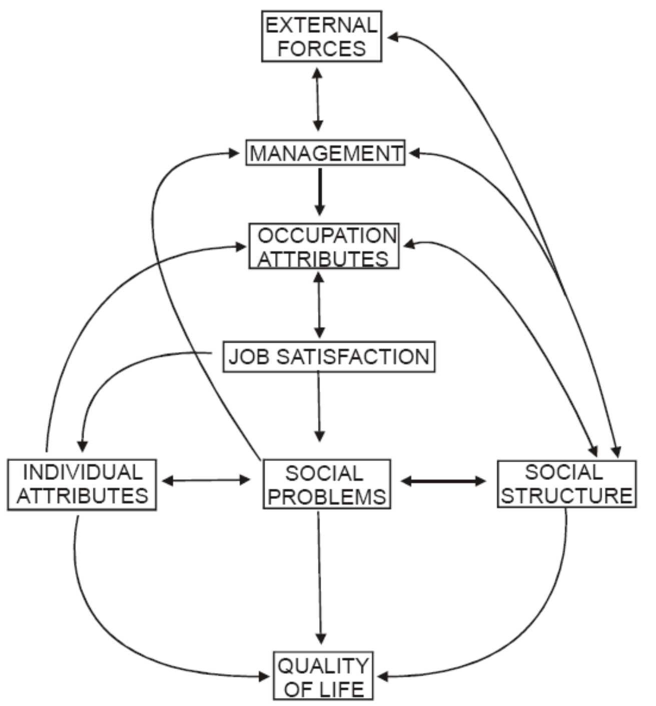
Social impacts can be defined as the changes that a fisheries management action may create in people's way of life (how they live, work, play, and interact), people's cultural traditions (shared beliefs, customs, and values), and people's community (population structure, cohesion, stability, and character). As such, social impacts may result from changes in flexibility, opportunity, stability, certainty, safety, and other factors that are not specific to any community, but oftentimes to any individual or entity experiencing changes resulting from a fishing regulation.

Pollnac, R.B. and J.J. Poggie. 1988. The structure of job satisfaction among New England fishermen and its application to fisheries management policy. *American Anthropologist*. 90:888-901.

Fisheries management can affect changes that affect the structure of a person's work, which has important psychological, social and economic roles in the well-being of the individual. Job satisfaction is related to individual longevity, mental health, family violence, worker productivity so has societal repercussions (the repercussions are dependent on the society, but they don't thoroughly analyze this topic). They have a survey with job satisfaction variables.

Pollnac, R. The preliminary model for fisheries social impact assessment. Draft. Accessed 2.1.2006. Access online at:
http://www.st.nmfs.gov/st5/workshop/2004/documents/Pollnac_paper.pdf

Figure 1. Simplified fisheries SIA model.



Indicators to measure "quality of life"

Occupational attributes:
Annual rounds
Fishing units and gears
Cost of entry
Crew structure
Occupational mobility
Productivity
Absenteeism
Turnover
Safety
Flexibility

Individual attributes:
Mental health (anxiety, low self-esteem, worry, tension)
Psychosomatic illness
Heart disease
Longevity
Education and training

Flexibility
Resilience

Social structure:
Occupation structure
Community solidarity
Power structure
Social stratification
Family relationships
Flexibility
Resilience
Robustness

Social problems:
Conflict
Non-compliance
Unemployment
impaired inter-personal relationships
family violence
unemployment

Smith, S., S. Jacob, M. Jepson, and G. Israel 2003 After the Florida net ban: The impacts on commercial fishing families. ***Society and Natural Resources*** **16:39-59.**

The results focus on the stress and coping processes families used to adjust to the net ban and the gender differences in the stress process and stress outcomes. Those affected were given surveys and asked to respond to the following categories: anxiety, stress, mastery, self-esteem, industry changes, depression, employment, spirituality. Findings indicate that both husbands and wives experience mental health impacts of changes in the industry and that these outcomes manifest in different ways by gender. Financial difficulties brought stress to the families. Individual coping strategies mitigated resilience.

Wilson, Douglas and Bonnie J. McCay. 1998 Social and Cultural Impact Assessment of the Highly Migratory Species Management Plan and the Amendment to the Atlantic Billfish Management Plan. Prepared for the Highly Migratory Species Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, July 1998. New Brunswick, NJ: The Ecopolicy Center. Available online at: http://www.st.nmfs.gov/st1/econ/cia/hms.pdf

Variables:
1) Distributional impacts, non-quantifiable considerations such as expectations and perceptions of the alternative actions, and the potential impacts of the alternatives on both small economic entities and broader communities.
2) Descriptions of the ethnic character, family structure, and community organization of affected communities.
3) Descriptions of the demographic characteristics of the fisheries.
4) Descriptions of important organizations and businesses associated with the fisheries.
5) Identification of possible mitigating measures to reduce negative impacts of management actions on communities.

3 categories of fishing regulation impacts:

1. The *volume* of money that is going through the community. In commercial operations this is a function of the amount and price of fish. In recreational operations this is a function of the amount people are willing to pay for a fishing experience.
2. The *flexibility* of fishing operations. This is the ability of the operation to change in response to changes in the resource, the market, or their customer base.
3. Can impose *direct costs* on fishing operations by requiring them to buy something or to pay someone to do something. These impacts on operations, in turn, create impacts in the broader community.

3 characteristics of communities influencing the magnitude and importance of the impact:
1. Existence of alternative activities, both fishing and non-fishing. The more alternatives available to someone who must change their behavior because of a regulation, the better that person is able to deal with the change.
2. Economic vulnerability. This is the amount and sources of pressure and competition those in fishing related businesses face in getting the things they need to run their operations and in selling their products. The more vulnerable the fish-related operation is, the greater the impact of a regulation on the lives of the people related to that operation. 3. Community support. Communities differ in the degree to which social capital, i.e., networks of people able to lend aid, is available to people and fishing operations affected by regulations. The more community support, the better the communities can absorb the impact of the regulation.

Impacts on employment and overall wealth are very important, as are changes in a community's identity as a fishing community, and its perspective on the future of fishing-related activities. Social relationships such as the role of kinship and the aggressiveness of competition also affect the quality of life in the community.

Key idea: Social and cultural realities do not react to changes in such predictable ways. The people that are using the resource in specific ways now may have to change how they use the resource because of the management plan. There is no way of knowing if these will be the same people who will benefit from any recovered fish stock. Social and cultural impact statements focus on the here and now - what is going to happen to these people in this place if this regulation is promulgated. We cannot predict, for good or for ill, what might happen ten years down the road because the communities are going to be different places. This means that social and cultural impact assessments have an inherent underappreciation of conservation. More value is placed on what exists right now than what might be in the future because we are looking at what people are using, talking about, and giving meaning to in the present.

Amendment 16-4 Groundfish Rebuilding Plans

Rebuilding Plan Alternatives and Analysis of Effects

Magnuson-Stevens Act Guidance on Rebuilding Depleted Species

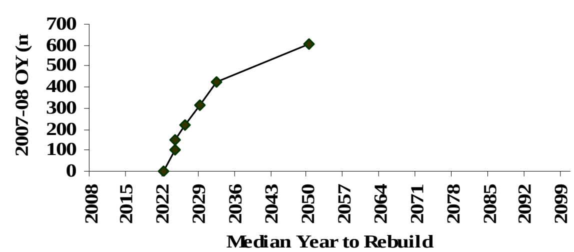
- Rebuild depleted stocks in as short a time as possible
- Consider the stock's status and biology
- Consider the socioeconomic needs of fishing communities
- Consider the interaction of depleted stocks in the marine ecosystem

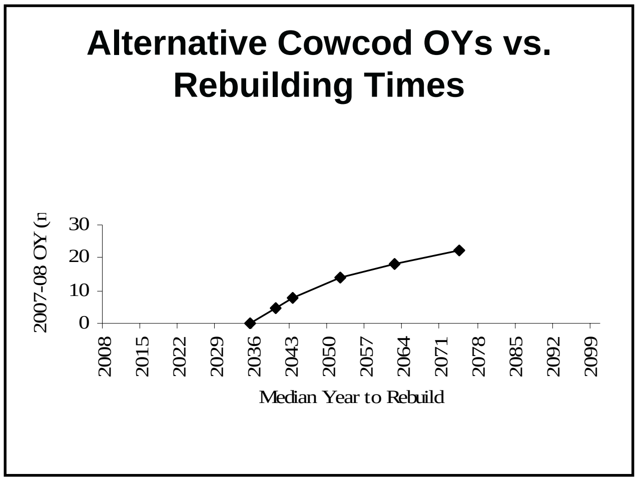
Optimum Yield Alternatives for Depleted Species

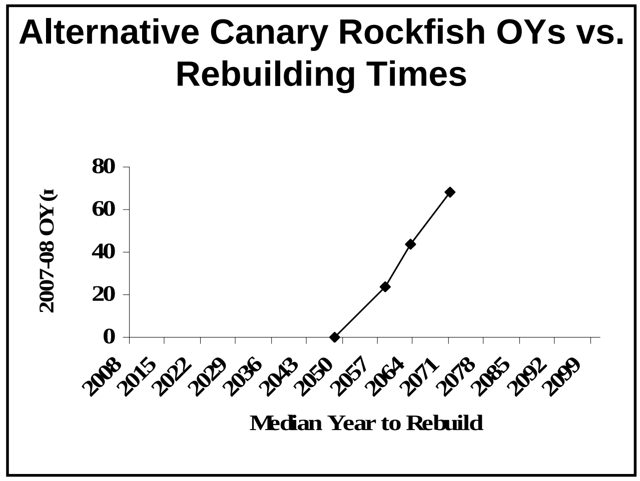
		2007-2008 OYs (mt)					
Stock	Association	OY Alt. 1	OY Alt. 2	OY Alt. 3	OY Alt. 4	OY Alt. 5	OY Alt. 6
Yelloweye	Northern Shelf	0	12	17	21	24	27
Canary		0	24	44	68		
Cowcod a/	Southern Shelf	0	8	14	18	22	
Bocaccio		0	149	218	315	424	
Darkblotched	Northern Slope	0	130	229	330	472	
POP		0	87	405	514	749	
Widow	Midwater	0	329	456	917	1,369	

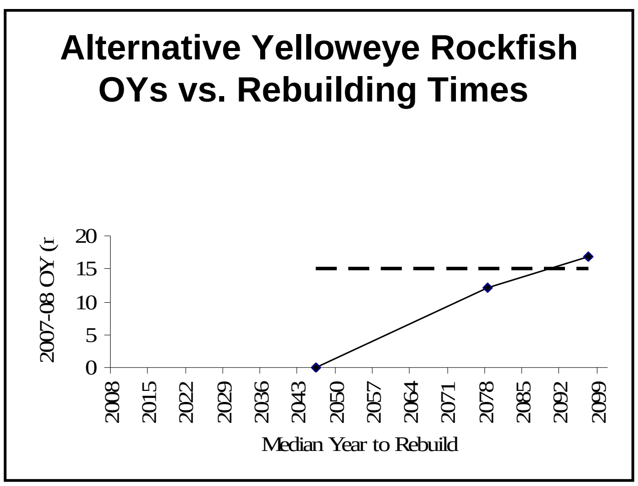
a/ OY alternatives for Conception and Monterey areas combined.

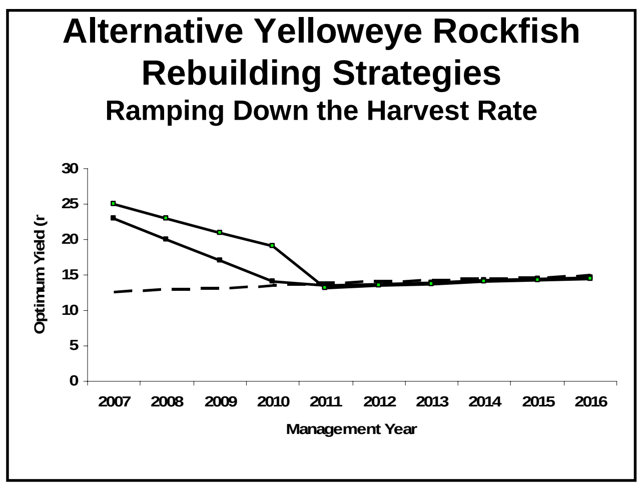
Alternative Bocaccio OYs vs. Rebuilding Times



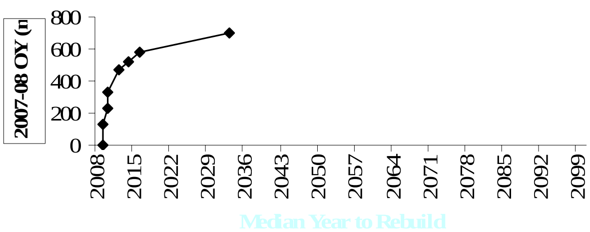

Alternative Cowcod OYs vs. Rebuilding Times
2007-08 OY (n
30
20
10
0
2008
2015
2022
2029
2036
2043
2050
2057
2064
2071
2078
2085
2092
2099
Median Year to Rebuild


Alternative Canary Rockfish OYs vs. Rebuilding Times
2007-08 OY (n
80
60
40
20
0
2008
2015
2022
2029
2036
2043
2050
2057
2064
2071
2078
2085
2092
2099
Median Year to Rebuild

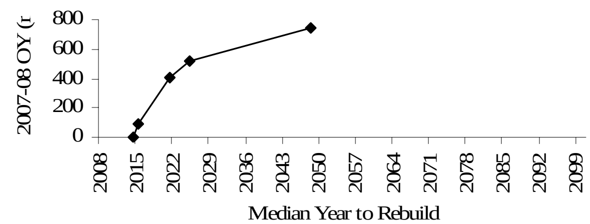

Alternative Yelloweye Rockfish OYs vs. Rebuilding Times
2007-08 OY (r
20
15
10
5
0
2008
2015
2022
2029
2036
2043
2050
2057
2064
2071
2078
2085
2092
2099
Median Year to Rebuild


Alternative Yelloweye Rockfish Rebuilding Strategies
Ramping Down the Harvest Rate
Optimum Yield (r
30
25
20
15
10
5
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Management Year

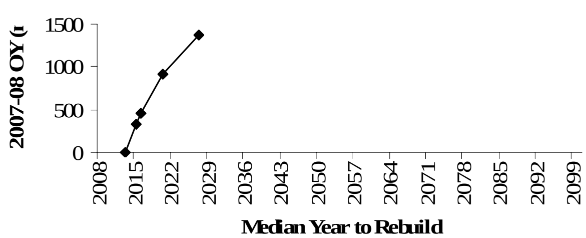
Alternative Darkblotched Rockfish OYs vs. Rebuilding Times



Alternative Pacific Ocean Perch OYs vs. Rebuilding Times



Alternative Widow Rockfish OYs vs. Rebuilding Times



Limited Entry Trawl Constraints in OR and WA

			Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Shelf Strategy	Nearshore P. cod							
		Nearshore flatfish							
		Arrowtooth flounder							
		Spiny dogfish							
		Shelf Dover							
		Shelf Petrale							
	Deep Shelf/Slope	Winter Petrale							
		DTS							
	Midwater	Hake							
OR	Shelf Strategy	Nearshore flatfish							
		Arrowtooth flounder							
		Shelf Dover							
		Shelf Petrale							
	Deep Shelf/Slope	DTS							
		Winter Petrale							
	Midwater	Hake							

Limited Entry Trawl Constraints in CA

			Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
CA	Shelf Strategy	Nearshore flatfish							
		Shelf Petrale							
		Shelf Dover							
	Deep Shelf/Slope	Winter Petrale							
		DTS							
		Slope rockfish							
	Midwater	Hake							
		Chilipepper							

Limited Entry Fixed Gear Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Spiny dogfish							
	Sablefish (primary)							
OR	Sablefish (primary)							
	Nearshore rockfish							
CA	Nearshore rockfish							
	Nearshore flatfish							
	Slope rockfish							
	Chilipepper							

Open Access Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Spiny dogfish							
	Sablefish DTL							
OR	Sablefish DTL							
	Nearshore rockfish							
CA	Nearshore rockfish							
	Nearshore flatfish							
	Sablefish DTL							
	Slope rockfish							
	Chilipepper							

Potential Tribal Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
Trawl	Nearshore P. cod							
	Nearshore/shelf flatfish							
	Midwater yellowtail							
	DTS/deepwater							
	Whiting							
FG	Pacific halibut							
	Sablefish							

Recreational Groundfish Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Groundfish							
	Pacific halibut							
OR	Groundfish							
	Pacific halibut							
CA	Groundfish							

Rebuilding Alternatives

Stock	Association	"Status Quo" Reb. Alt.	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
Yelloweye	Northern	27	21	17	21	12	12
Canary	Shelf	44	24	44	68	24	24
Cowcod	Southern	5	8	18	22	14	3
Bocaccio	Shelf	149	149	218	424	315	40
Darkblotched	Northern	229	330	229	472	472	130
POP	Slope	87	405	87	749	405	44
Widow	Midwater	329	456	329	917	329	120

Status Quo Rebuilding Alternative

Yelloweye	Northern Shelf	27
Canary		44
Cowcod	Southern Shelf	5
Bocaccio		149
Darkblotched	Northern Slope	229
POP		87
Widow	Midwater	329

- Best prediction of impacts with status quo management measures
- Potentially each stock equally constraining
- No management flexibility to react to changes in fleet behavior or recruitment variability

Rebuilding Alternative 1

Yelloweye	Northern Shelf	21
Canary		24
Cowcod	Southern Shelf	8
Bocaccio		149
Darkblotched	Northern Slope	330
POP		405
Widow	Midwater	456

- Increased slope and midwater trawl opportunities
- Decrease in coastwide shelf fishing opportunities

Rebuilding Alternative 2

Yelloweye	Northern Shelf	17
Canary		44
Cowcod	Southern Shelf	18
Bocaccio		218
Darkblotched	Northern Slope	229
POP		87
Widow	Midwater	329

- Close to status quo slope and midwater trawl opportunities
- Increased southern shelf fishing opportunities
- Decreased northern shelf fishing opportunities for recreational and fixed gears

Rebuilding Alternative 3

Yelloweye	Northern Shelf	21
Canary		68
Cowcod	Southern Shelf	22
Bocaccio		424
Darkblotched	Northern Slope	472
POP		749
Widow	Midwater	917

- Increased slope and midwater trawl opportunities
- Increased coastwide shelf fishing opportunities

Rebuilding Alternative 4

Yelloweye	Northern Shelf	12
Canary		24
Cowcod	Southern Shelf	14
Bocaccio		315
Darkblotched	Northern Slope	472
POP		405
Widow	Midwater	329

- Increased slope and midwater trawl opportunities
- Dramatically decreased northern shelf fishing opportunities
- Decreased southern shelf fishing opportunities north of Pt. Conception
- Increased shelf fishing opportunities south of Pt. Conception

Rebuilding Alternative 5

Yelloweye	Northern Shelf	12
Canary		24
Cowcod	Southern Shelf	3
Bocaccio		40
Darkblotched	Northern Slope	130
POP		44
Widow	Midwater	120

- Dramatically decreased slope and midwater trawl opportunities
- Dramatically decreased coastwide shelf fishing opportunities

Rebuilding OY Implications

- Under a constant harvest rate strategy, an OY decision for 2007-2008 sets the harvest rate and the target year to rebuild (defined as median year to rebuild under that harvest rate)
- If a different strategy is decided (i.e., a harvest rate ramp-down strategy for yelloweye), the Council should clearly state the rationale for this decision and the target rebuilding year

Rebuilding OY Considerations

- Key Considerations
  - Recruitment variability
  - Uncertainty in catch monitoring systems
  - Stock status uncertainty
- Possible Remedies
  - Strategy where OYs are managed in a longer term than annually?
  - Establish an OY buffer?

Needs of Communities Project Context

- "These actions must also conform to a recent court ruling in the Ninth Circuit Court of Appeals, which interpreted the rebuilding requirements of the MSA as: 1) the rebuilding periods must be as short as possible; 2) **short-term <u>needs</u> of <u>fishing communities</u>** may be taken into account in setting rebuilding periods; 3) **to avoid <u>disastrous</u> short-term consequences**, NMFS may set limited quotas that allow for some fishing of plentiful species, despite the inevitability of bycatch."

What is a Fishing Community?

- Although from a distance the "fishing community" may seem like a single group of like-minded people, it actually consists of many communities based on gear type, fishery, geography, and values. Social scientists spend a lot of time trying to define "community" so that communities can be studied and compared. The Magnuson-Stevens Act (MSA) defines a fishing community as:
- "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."
- In interpreting this definition, the National Marine Fisheries Service has stated that "A fishing community is a social or economic group whose members reside in a specific location..." This "official" interpretation means that a fishing community exists in a specific place like Astoria, San Pedro, or Seattle. However, other types of communities exist. For example, an "occuptional community" is a group of people involved in the same occupation, like the coastwide community of trawlers who engage in similar activities. A "community of interest" is made up of people who share similar interests - for example, people who are concerned about making the fishing industry safer. One town or city might include many different occupational communities and communities of interest.

Overall FMP Goals and Objectives

- The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a stable planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. In developing allocation and harvesting systems, the Council will give consideration to maximizing economic benefits to the United States, consistent with resource stewardship responsibilities for the continuing welfare of the living marine resources. Thus, management must be flexible enough to meet changing social and economic needs of the fishery as well as to address fluctuations in the marine resources supporting the fishery.

Economic Objectives

Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.

Social Objectives

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 14. Minimize gear conflicts among resource users.

Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

Objective 16. Avoid unnecessary adverse impacts on small entities.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on **fishing communities** to the extent practicable

Rebuilding Objectives-General

1) achieve the population size and structure that will support the maximum sustainable yield within the specified time period;
2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on **fishing communities**;
3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors;
4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and
5) promote widespread public awareness, understanding and support for the rebuilding program. More specific goals and objectives may be developed in the rebuilding plan for each overfished species.

Rebuilding Objectives-Specific

The Council may consider a number of factors in determining the time period for rebuilding, including:

1. The status and biology of the stock or stock complex.
2. Interactions between the stock or stock complex and other components of the marine ecosystem or environmental conditions.
3. The **needs of fishing communities**.
4. Recommendations by international organizations in which the United States participates.
5. Management measures under an international agreement in which the United States participates.

Neither MSA or FMP Defines "Needs"

- FMP Indirect inferences—"importance" "avoid adverse impacts" "equitable allocation among sectors" "year round fishery" "sustained participation" "Net economic benefit" "fair and equitable distribution of burden and benefit among sectors" "stable fishery"
- UK Fisheries
  - Fishing Communities need a sustainable fishery that is safe, well managed, and profitable, that provides jobs and incomes, that contributes to the local social fabric, culture, and image of the community, and helps market the community and its services and products.

Hello, Steve-

We are currently converting all of our community profiles to pdfs for web viewing. The profiles will go here eventually:

http://www.nwfsc.noaa.gov/research/divisions/sd/communityprofiles/index.cfm

Although none are up on the web yet, this address is what you and Kate may include in any Council related/GMT materials.

KarmaCommunity Profiles

The DRAFT Supplemental Community Profiling Document includes an introduction and details on the methods used in compiling the social and economic information on these communities involved in West Coast and North Pacific fisheries.

These community profiles are given in narrative format and include four sections: *People and Place*, *Infrastructure*, *Involvement in West Coast Fisheries*, and *Involvement in North Pacific Fisheries*.

Washington	**Oregon**	**California**	**Other**
Aberdeen	Astoria	Alibion	Pleasantville, New Jersey
Anacortes	Bandon	Arroyo Grande	Seaford, Virginia
Bay Center	Beaver	Atascadero	
Bellingham	Brookings	Avila Beach	
Blaine	Charleston	Bodega Bay	
Bothell	Clatskanie	Corte Madera	
Cathlamet	Cloverdale	Costa Mesa	
Chinook	Coos Bay	Crescent City	
Edmonds	Depoe Bay	Culver City	
Everett	Florence	Dana Point	
Ferndale	Garibaldi	Dillon Beach	
Fox Island	Gold Beach	El Granada	
Friday Harbor	Hammond	El Sobrante	
Gig Harbor	Harbor	Eureka	
Grayland	Logsden	Fields Landing	
Ilwaco	Monument	Fort Bragg	
La conner	Newport	Half Moon Bay	
La Push	North Bend	Kneeland	
Lakewood	Pacific City	Lafayette	
Long Beach	Port Orford	Los Angeles	
Lopez Island	Reedsport	Los Osos	
Mount Vernon	Rockaway Beach	Marina	
Naselle	Rosebury	Mckinleyville	
Neah Bay	Seaside	Monterey	
Olympia	Siletz	Morro Bay	

2004 Sheet Sheet Showing Commercial, Recreational, and Overfished Species Information by RecFIN District

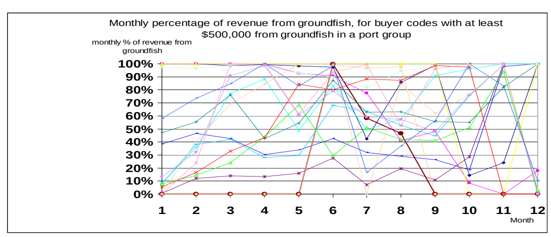
COMMERCIAL RecFIN District	**Total Groundfish Revenues**	**Total Non-groundfish Revenues**	**Total Revenues**	**Total Groundfish**	**Whiting L. Entry Trawl**	**Non-Whiting Trawl**	**L. Entry Line Gear**	**L. Entry Pot Gear**	**Directed OA Dead**	**Directed OA Live**	**Incidental OA**	**Non-Groundfish Fisheries**
				% Total Revenues								
Puget Sound	3,495,460	3,198,200	6,693,659	**52%**	0%	19%	33%	0%	0%	1%	0%	48%
North Wa Coast	1,365,514	949,865	2,315,379	**59%**	0%	22%	29%	0%	0%	7%	0%	41%
Central Wa Coast	2,954,020	14,791,169	17,745,189	**17%**	10%	2%	3%	0%	0%	2%	0%	83%
South Wa Coast	384,147	11,763,738	12,147,885	**3%**	2%	0%	0%	0%	0%	0%	2%	97%
North Oregon Coast	8,421,914	15,710,340	24,132,254	**35%**	5%	23%	2%	2%	0%	3%	0%	65%
Central Oregon Coast	15,741,111	38,843,488	54,584,600	**29%**	8%	15%	2%	2%	0%	2%	0%	71%
South Oregon Coast	5,524,740	34,810,788	40,335,528	**14%**	1%	8%	2%	1%	2%	1%	0%	86%
Redwood California	3,775,824	32,351,745	36,127,568	**10%**	2%	7%	1%	0%	1%	1%	0%	90%
Wine Coast	2,547,220	11,487,199	14,034,419	**18%**	0%	10%	2%	1%	3%	3%	0%	82%
SF Bay	1,704,508	17,752,790	19,457,297	**9%**	0%	5%	2%	0%	0%	1%	1%	91%
California Central	3632357.02	9530287.55	13,162,645	**28%**	0%	13%	3%	0%	8%	3%	1%	72%
California Channel	297,702	17,686,648	17,984,350	**2%**	0%	0%	0%	0%	1%	0%	11%	98%
South CA	1,411,496	18,804,719	20,216,215	**7%**	0%	0%	5%	0%	1%	1%	5%	93%
Totals	51,256,014	227,680,975	278,936,989	**18%**	3%	9%	3%	1%	1%	1%	1%	82%

Impact Areas-All Coastal Counties and Whatcom County Washington

Recreational RecFIN District	**Groundfish Trips**	**Non-Groundfish Trips**	**Total**	**Groundfish**	**HMS/ Tuna**	**Salmon**	**Combos including Salmon**	**Halibut**	**Sturgeon**	**Misc and No target**	**Non-Groundfish Fisheries**
				% Total Trips							
North Wa Coast	8,334	43,721	52,055	**16%**	0%	60%	2%	23%	0	0%	84%
Central Wa Coast	12,505	45,108	57,613	**22%**	2%	69%	0%	7%	0%	0%	78%
South Wa Coast	1,090	86,865	87,955	**1%**	1%	85%	0%	0%	13%	0%	99%
North Oregon Coast	7,185	50,966	58,151	**12%**	1%	75%	7%	5%	0%	0%	88%
Central Oregon Coast	22,139	53,682	75,821	**29%**	3%	49%	7%	12%	0%	0%	71%
South Oregon Coast	23,334	59,548	82,882	**28%**	2%	61%	5%	3%	0%	0%	72%
Redwood California/North Coast	34,807	13,193	48,000	**73%**	2%	25%	0%	0%	0%	0%	27%
Wine Coast/North-Central Coast	33,360	18,837	52,197	**64%**	2%	34%	0%	0%	0%	1%	36%
SF Bay/North-Central Coast	53,630	55,029	108,659	**49%**	1%	48%	0%	0%	0%	1%	51%
Califonia Central/South Central Coast	85,884	34,946	120,830	**71%**	1%	25%	0%	0%	0%	2%	29%
California Channel/South Coast	39,072	69,032	108,104	**36%**	1%	2%	0%	0%	0%	61%	64%
South CA/South Coast	107,879	678,710	786,589	**14%**	8%	0%	0%	0%	0%	78%	86%
Total	429,219	1,209,637	1,638,856	**26%**	5%	24%	1%	2%	1%	42%	74%

Impact Areas-All Coastal Counties

Bycatch District	County Impact Area	Bocaccio	Canary	Cowcod	Darkblotched	POP	Widow	Yelloweye
Puget Sound	Puget Sound Counties		v		v	v		v
North Wa Coast	Jefferson to Clallam		v		v	v		v
Central Wa Coast	Grays Harbor		v					v
South Wa Coast	Pacific		v		v	v	v	v
North Oregon Coast	Tillamook to Clatsop		v		v	v	v	v
Central Oregon Coast	Lane to Lincoln		v		v	v	v	v
South Oregon Coast	Curry to Douglas		v		v	v	v	v
Redwood California	Humboldt to Del Norte		v		v	v	v	v
Wine	Sonoma to Mendocino	v	v		v			
SF Bay	Marin to San Mateo	v	v	v				
Califonia Central	S Louis Obispo to S Cruz	v	v	v				
California Channel	Ventura to S Barbara	v		v				
South CA	S Diego to Los Angeles	v		v				



Avoid “Disastrous” Consequences

- In determining “fishery resource disasters” and “commercial fishery failures” MSA nor the Interjurisdictional Fishery Act provides quantitative measures. NOAA has no specific guidelines but like many agencies has processes and every determination is done on a case-by-case basis.

EDA Disaster Criteria

Plant Closings or Industry restructuring: For areas over 100,000 population, the actual or threatened dislocation is 500 jobs, or **1 percent of the civilian labor force (CLF), whichever is less**. For areas up to 100,000 population, the actual or threatened dislocation is 200 jobs, or 1 percent of the CLF, whichever is less

Natural or other major disasters or emergencies, including terrorists attacks. If an area that has received one of the following disaster declarations is eligible to apply for EDA assistance for a period of 18 months after the date of declaration. (See Previous Slide)

Extraordinary depletion of natural resources. EDA presently recognizes the following conditions of extraordinary natural resource depletion: 1. Fisheries. 2. Coal. 3. Timber.

SBA Disaster Declaration

- SBA will make a physical disaster declaration when:At least 25 homes (primary residences) and/or businesses in a county have **uninsured losses of 40%** or more of their estimated fair replacement value (Secondary homes, condominium units, cabins, camps, lake homes, etc., used for recreational purposes are not included in the count.)

  or At least three (3) businesses have **uninsured loss of 40%** or more of their estimated fair replacement value and, as a direct result of the damages, **25% of the work force** in the community would be unemployed for at least 90 days.• SBA will make an economic injury disaster declaration when:A Governor certifies that at least 5 small businesses in a disaster area **have suffered substantial economic injury** as a result of the disaster and are in need of financial assistance not otherwise available on reasonable terms,

  orThe Secretary of Agriculture designates an area as an agricultural disaster area. SBA may make Economic Injury Disaster Loans to small business concerns and small agricultural cooperatives in the designated counties without credit available elsewhere,

  or The Secretary of Commerce makes a commercial fishery failure or fishery resource disaster under Section 308(b) of the Interjurisdictional Fisheries Act of 1986.

USDA

- Severe production losses within a county are those in which
  - A reduction countywide of at **least 30 percent** of the normal year’s dollar value of all crops and crops could not be replanted or replaced with a substitute crop
  - Examples of Assistance Assistance Eligibility Requirements: Crop Disaster Assistance-farmers with crop losses of greater than **35% of historical average** yield for county; Livestock Assistance-farmers with grazing losses of **40% or greater than normal** during 3 consecutive months during disaster

A Groundfish Disaster was Declared in January 2000

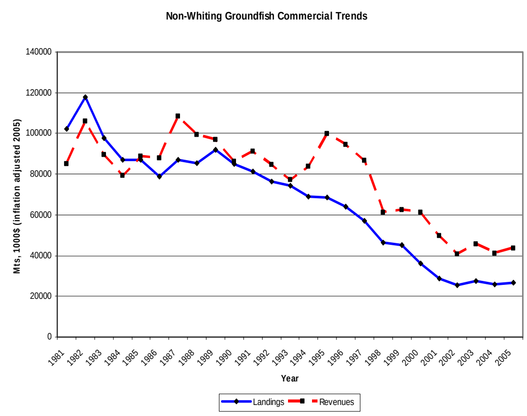
- <u>Fishery resource failure:</u> poor rockfish recruitment due to unknown but probably natural causes based on review of possible factors such as Ocean Regime Shift, changes in the California current, El Nino's, the Councils harvest policies, and lack of positive response despite increasing severity in harvest restrictions.

Groundfish Disaster a Multi-Year Concept

- Based on review of the trends in commercial non-whiting groundfish harvests—there was uncertainty about the beginning of the disaster—1998?1999? Earlier?
- Because current and future species rebuilding plans involve long-lived rockfish that take decades to recover-it was recognized that disaster would continue for a number of years

Commercial Fishery Failure

- Used 1999 as benchmark to forecast 2000 impacts
- Forecasted 25% reduction in landings and Revenues



Economic Revenue and Distributional Impacts Associated with Overfished Species Management in West Coast Commercial Groundfish Fisheries

Overview of presentation

1. Examples of potential fishing communities
2. Tradeoffs between exvessel revenue and overfished species mortality by commercial groundfish sector
3. Sectors and ports likely to be affected if the Council wishes to lower the catch of overfished species
   - Port and sector listed by likelihood of being affected relative to each overfished species
   - Likelihood of ports and sectors being affected is categorized by latitudinal management area
4. Summary

What is a "fishing community"?

Social scientists and economists have discussed several potential examples including:

1. A collective fishing sector such as the "west coast bottom trawl community"
2. A geographic port such as "the community of Astoria, Oregon"
3. A neighborhood within a large city such as the "Ballard fishing community" of Seattle, Washington
4. A combination of the above examples

This presentation provides information on fishing sectors and ports with the intention that it can be used to "take into account…the needs of fishing communities" and the "fair and equitable distribution of overfishing restrictions and recovery benefits"

Background

Due to the mixed-stock nature of groundfish fisheries, overfished species operate as a constraint upon the catch of target species

- Available OYs of many target species are often not realized (yellowtail, chilipepper, shelf rockfish, etc)

Certain overfished species affect some sectors and regions more than others

- Yelloweye largely constrains hook and line sectors, Darkblotched largely constrains bottom trawl sectors
- Pacific Ocean Perch constrains northern fisheries, Bocaccio constrains southern fisheries

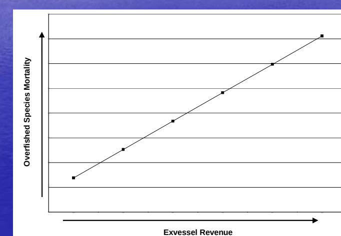
Concepts shown in these analyses

1. As the mortality of overfished species is reduced, revenues are also reduced
   A. In single target fisheries, changes in revenue and mortality of overfished species are proportional
   B. In multiple target fisheries, changes in revenue and mortality are not constantly proportional, and decreases in overfished species mortality become increasingly more costly
2. Different overfished species have different levels of implied value (value of catch associated with overfished species A is different from that of overfished species B)
3. Different overfished species affect different entities
   A. Different overfished species may affect different sectors, ports, and regions
   B. Some overfished species may affect relatively more (or fewer) sectors ports or regions

Revenue tradeoffs in a single target sector

As exvessel revenue and target catch are increased, the mortality of overfished species increases in proportion

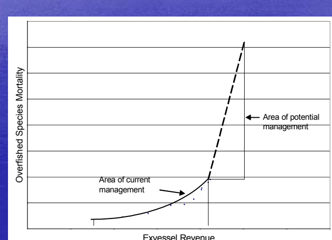
Through the use of RCA's and sector caps, the FG sablefish and whiting sectors have been able to attain their OYs



Revenue tradeoffs in a multiple target sector

Decreases in overfished species mortality become increasingly more costly.

Revenues in multiple target sectors are potentially higher, but we've eliminated targeting on species with high overfished species co-occurrence.

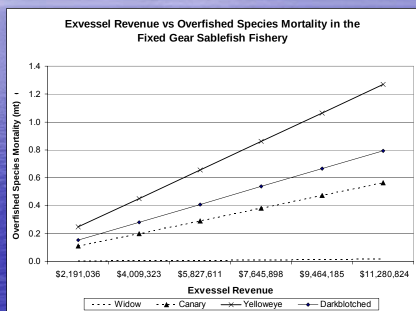


Example Revenue/Overfished Species tradeoff analyses

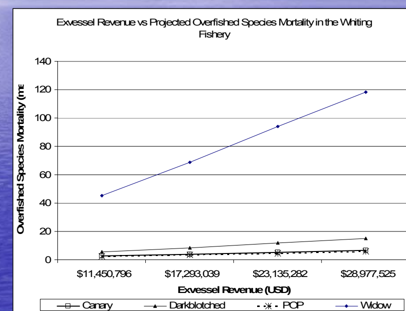
Analyses are presented showing the tradeoffs of revenue and overfished species impacts for the following sectors:

- Fixed Gear Sablefish
- LE whiting trawl
- Nearshore open access
- LE bottom trawl

Revenue – Overfished Species Tradeoffs in FG Sablefish Fishery



Revenue – Overfished Species Tradeoffs in the Whiting Fishery

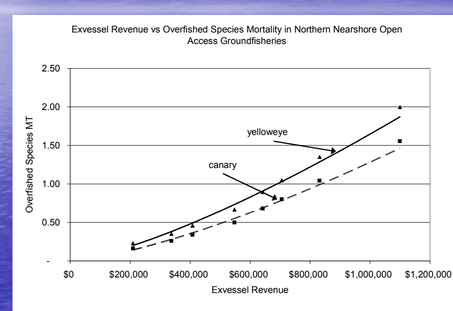


Revenue – Overfished species tradeoffs in the LE bottom trawl and nearshore open access fisheries

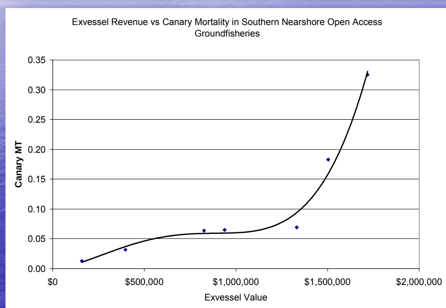
Multiple target sectors have more dynamic tradeoffs than single target sectors.

- Analyses shown here strategize toward maintaining highest possible coastwide revenue
  - Decrease catch of least valuable species first

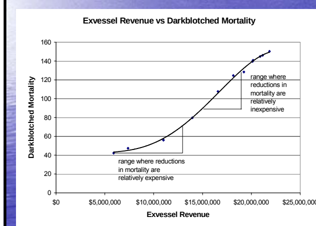
Revenue – Overfished Species Tradeoffs in northern nearshore open access fisheries

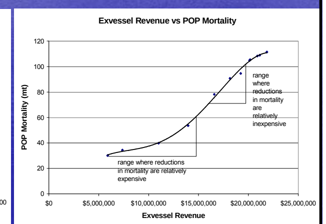


Revenue – Overfished Species Tradeoffs in southern nearshore open access fisheries

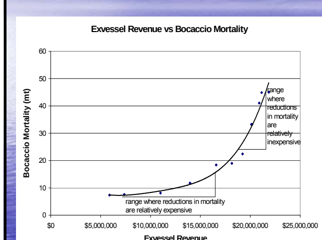


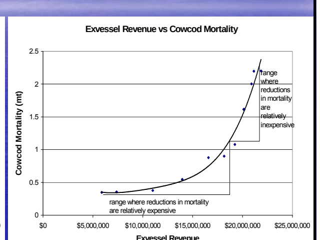
Exvessel Revenue vs Darkblotched and POP mortality in the LE bottom trawl sector



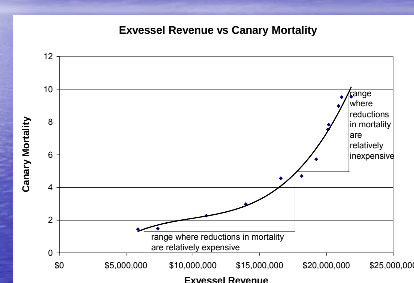


Exvessel Revenue vs Bocaccio and Cowcod Mortality in the LE bottom trawl sector

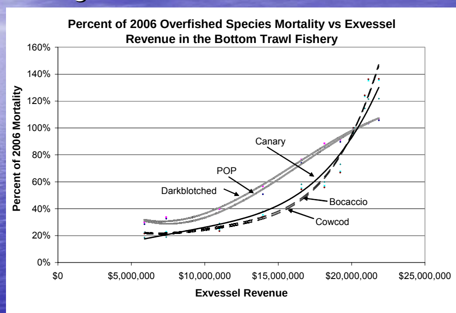




Exvessel Revenue vs Canary Mortality in the LE bottom trawl sector



Exvessel Revenue vs All Overfished Species Caught in LE Bottom Trawl Sector



Level of Overfished Species Impact by Region and Groundfish Sector

		OVERFISHED SPECIES						
AREA	SECTOR	BCCCIO	CANARY	COWCD	D'BLTCH	POP	WIDOW	Y'EYE
N 40 10	LE FG-DOGFISH		ML					MH
	LE FG-NEARSHORE		ML					MH
	LE FG-SABLEFISH		ML					MH
	LE B-TRAWL-DEEP		ML		HIGH	HIGH		
	LE B-TRAWL-SHELF		HIGH					
	LE MW-TRAWL-WHITING		HIGH		ML	ML	HIGH	
	OA FG-DOGFISH		ML					MH
	OA FG-NEARSHORE		MH					MH
	OA FG-SABLEFISH		ML					MH
38 - 40 10	LE FG-NEARSHORE	ML	ML					
	LE FG-SABLEFISH	ML	ML					
	LE B-TRAWL-DEEP	ML	ML		MH			
	LE B-TRAWL-SHELF	HIGH	MH					
	OA FG-NEARSHORE	ML	ML					
	OA FG-SABLEFISH	ML	ML					
36 - 38	LE FG-NEARSHORE	ML	ML	ML				
	LE FG-SABLEFISH	ML	ML	ML				
	LE B-TRAWL-DEEP	ML	ML					
	LE B-TRAWL-SHELF	HIGH	ML	MH				
	OA FG-NEARSHORE	ML	ML	ML				
	OA FG-SABLEFISH	ML	ML	ML				
S 36	LE FG-NEARSHORE	ML		ML				
	LE FG-SABLEFISH	ML		ML				
	LE B-TRAWL-DEEP	ML						
	LE B-TRAWL-SHELF	HIGH		MH				
	OA FG-NEARSHORE	ML		ML				
	OA FG-SABLEFISH	ML		ML				

note: ML = medium low; MH = medium high

The previous two slides have shown that

1. Overfished species are found at different latitudes
2. Different sectors have different relative amounts of overfished species impacts

By identifying sectors and the principal port for each sector, we can associate ports with each overfished species

- If we take the past approach of restricting those sectors with highest overfished species impact first, we can identify which ports are most likely to be impacted by reductions in overfished species OYs

Range Where Overfished Species are Found in the Commercial Fishery

	OVERFISHED SPECIES						
AREA	BCACCIO	CNARY	CWCOD	DRKBLTCHED	POP	WIDOW	YLLWEYE
N 40 10		√		√	√	√	√
38 – 40 10	√	√	X	√	X	√	X
36 - 38	√	√	√	√	?	√	X
S 36	√	X	√	X	?	X	?

Notes:1) although some of the species listed are caught outside the areas check-marked above, the check-mark only applies to the boundary where there is an ABC for these species

2) in some areas only minimal amounts of overfished species have historically been caught. These areas are checked-marked

note: a √ indicates areas where overfished species are currently caught.

3) X indicates where overfished species are potentially caught based on past landings.

4) ? Indicates that there is evidence species exist in the area

source: PacFIN 2006. Personal Communication; Love et al. 2002. The Rockfishes of the Northeast Pacific

Ports Potentially Impacted by Reductions in Overfished Species Catch North of 40 10 Lat

		OVERFISHED SPECIES						
AREA	PORT	BCACCIO	CANARY	COWCOD	DRKBLTCH	POP	WIDOW	Y'EYE
N 40 10	ABERDEEN		√					√
	ASTORIA		√		√	√	√	√
	BANDON		√					√
	BELLINGHAM BAY		√		√	√		√
	BLAINE		√		√	√		√
	BROOKINGS		√		√	√		√
	CATHLAMET		√					√
	COOS BAY		√		√	√	√	√
	CHINOOK		√					√
	CRESCENT CITY		√		√	√	√	√
	DEPOE BAY		√					√
	EUREKA		√		√	√	√	√
	EVERETT		√					√
	FIELDS LANDING		√					√
	FLORENCE		√					√
	GARIBALDI (TILLAMOOK)		√					√
	GOLD BEACH		√					√
	ILWACO		√		√	√	√	√
	LAPUSH		√					√
	MILL CREEK		√					√
	NEAH BAY		√		√	√		√
	NEWPORT		√		√	√	√	√
	PACIFIC CITY		√					√
	PORT ANGELES		√					√
	PORT ORFORD		√					√
	PORT TOWNSEND		√					√
	SEATTLE		√				√	√
	TOKELAND		√					√
	TRINIDAD		√					√
	WESTPORT		√		√	√	√	√
	WINCHESTER BAY		√					√

Ports Potentially Impacted by Reductions in Overfished Species Catch South of 40 10 Lat

		OVERFISHED SPECIES						
AREA	PORT	BCACCIO	CANARY	COWCOD	DRKBLTCH	POP	WIDOW	Y'EYE
38 – 40 10	ALBION	√	√					
	BODEGA BAY	√	√					
	FORT BRAGG	√	√		√			
	POINT ARENA	√	√					
	POINT REYES	√	√					
	SHELTER COVE	√	√					
36 - 38	BIG CREEK	√	√	√				
	BODEGA BAY	√	√	√				
	ELK	√	√	√				
	MONTEREY	√	√	√				
	MOSS LANDING	√	√	√				
	PRINCETON / HALF MOON BAY	√	√	√				
	SAN FRANCISCO	√	√	√				
	SANTA CRUZ	√	√	√				
	SANTA CRUZ	√	√	√				
S 36	AVILA	√		√				
	BERKELEY	√		√				
	DANA POINT	√		√				
	LONG BEACH	√		√				
	MISSION BAY	√		√				
	MORRO BAY	√		√				
	NEWPORT BEACH	√		√				
	OCEANSIDE	√		√				
	OXNARD	√		√				
	PLAYA DEL REY	√		√				
	POINT LOMA	√		√				
	SAN DIEGO	√		√				
	SAN PEDRO	√		√				
	SAN SIMEON	√		√				
	SANTA BARBARA	√		√				
	TERMINAL ISLAND	√		√				
	VENTURA	√		√				
	WILMINGTON	√		√				

Summary

This presentation can be divided in two parts:

1. The relationship between exvessel revenue and overfished species mortality
2. The relationship between sectors, ports, regions and overfished species

Each section has an implied management strategy

1. Implies that reductions in the incidental catch of overfished species is achieved by reducing low valued target species first
2. Implies that sectors with the highest impact on overfished species are restricted first

Summary (con't)

The two approaches shown in this presentation are different but complimentary

1. Reducing the catch of low-valued target species is used to reduce overfished species mortality in a sector
   - If a multi-target sector is to reduce it's catch of overfished species, it makes the most sense to achieve this reduction while allowing vessels to target high valued target species.
2. Restricting sectors with the highest impact first is used to reduce coastwide mortality of overfished species
   - If a coastwide reduction in the catch of overfished species is necessary, it makes sense for this reduction to come from sectors that have the highest impact. Taking this reduction out of sectors with a low impact may require a complete closure of that sector

Summary (con't)

In examining both approaches we find that:

- Different overfished species have different relative values (some are inherently more valuable that others)
- Different overfished species have a different distribution of impacts (some affect different sectors, ports, and regions than others)

While there is apparently no clear objective in which consideration to follow when "taking into account the needs of communities" it may be reasonable to consider some combination of both in addition to potential others not described here.

Preliminary Economic Analysis of Draft Groundfish Rebuilding Alternatives

April 2006 PFMC Meeting
Sacramento, CA

List of Port Groups and PCIDs in Washington

State	Port Group Area	County	PCID	Name
Washington	**Puget Sound**	Whatcom	BLN	Blaine
		Whatcom	BLL	Bellingham Bay
		San Juan	FRI	Friday Harbor
		Skagit	ANA	Anacortes
		Skagit	LAC	La Conner
		Snohomish	ONP	Other North Puget Sound Ports
		Snohomish	EVR	Everett
		King	SEA	Seattle
		Pierce	TAC	Tacoma
		Thurston	OLY	Olympia
		Mason	SHL	Shelton
		Unknown	OSP	Other South Puget Sound Ports
	North Washington Coast	Jefferson	TNS	Port Townsend
		Clallam	SEQ	Sequim
		Clallam	PAG	Port Angeles
		Clallam	NEA	Neah Bay
		Clallam	LAP	La Push
	South & Central WA Coast	Grays Harbor	CPL	Copalis Beach
		Grays Harbor	GRH	Grays Harbor
		Grays Harbor	WPT	Westport
		Pacific	WLB	Willapa Bay
		Pacific	LWC	Ilwaco/chinook
		Klickitat	OCR	Other Columbia River Ports

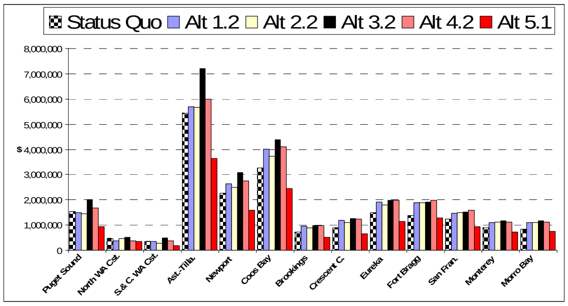
List of Port Groups and PCIDs in Oregon

State	Port Group Area	County	PCID	Name
Oregon	**Astoria-Tillamook**	Multnomah	CRV	Psuedo Port Code for Columbia R.
		Clatsop	AST	Astoria
		Clatsop	GSS	Gearhart - Seaside
		Clatsop	CNB	Cannon Beach
		Unknown	WAL	Landed in WA; Transp. to OR
		Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
	Newport	Lincoln	SRV	Salmon River
		Lincoln	SLZ	Siletz Bay
		Lincoln	DPO	Depoe Bay
		Lincoln	NEW	Newport
		Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
	Coos Bay	Lane	FLR	Florence
		Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Brookings	Curry	ORF	Port Orford
		Curry	GLD	Gold Beach
		Curry	BRK	Brookings

List of Port Groups and PCIDs in California

State	Port Group Area	County	PCID	Name
California	**Crescent City**	Del Norte	CRS	Crescent City
		Del Norte	ODN	Other Del Norte County Ports
	Eureka	Humboldt	ERK	Eureka (Includes Fields Landing)
		Humboldt	FLN	Fields Landing
		Humboldt	TRN	Trinidad
		Humboldt	OHB	Other Humboldt County Ports
	Fort Bragg	Mendocino	BRG	Fort Bragg
		Mendocino	ALB	Albion
		Mendocino	ARE	Arena
		Mendocino	OMD	Other Mendocino County Ports
	Bodega Bay	Sonoma	BDG	Bodega Bay
		Marin	TML	Tomales Bay
		Marin	RYS	Point Reyes
		Marin	OSM	Other Son. and Mar. Co. Outer Coast Ports
		Marin	SLT	Sausalito
	San Francisco	Alameda	OAK	Oakland
		Alameda	ALM	Alameda
		Alameda	BKL	Berkely
		Contra Costa	RCH	Richmond
		San Francisco	SF	San Francisco
		San Mateo	PRN	Princeton
		San Francisco	SFA	San Francisco Ara
		San Francisco	OSF	Other S.F. Bay and S.M. Co. Ports
	Monterey	Santa Cruz	CRZ	Santa Cruz
		Monterey	MOS	Moss Landing
		Monterey	MNT	Monterey
		Monterey	OCM	Other S.C. and Mon. Co. Ports
	Morro Bay	San Luis Obispo	MRO	Morro Bay
		San Luis Obispo	AVL	Avila
		San Luis Obispo	OSL	Other S.L..O. Co. Ports

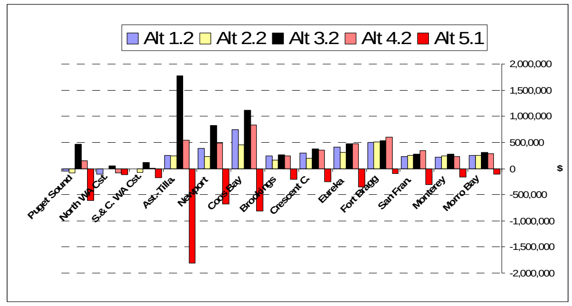
Non-whiting Trawl Ex-vessel Revenue under DRAFT Rebuilding Alternatives (with High Target Species OYs)



Note: The bycatch model shows that high target spp OYs are not attainable under Rebuilding Alternative 5.

April 2006 5

Change in Non-whiting Trawl Exvessel Revenue (from 2006) under DRAFT Rebuilding Alternatives (with High Target Species OYs)



Note: The bycatch model shows that high target spp OYs are not attainable under Rebuilding Alternative 5.

April 2006 6

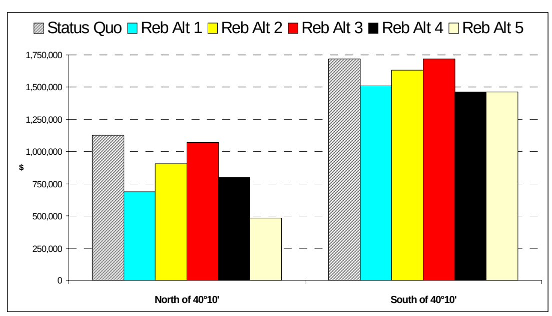
Ex-vessel Revenue Impacts to the LE and OA FG Sablefish Fishery under DRAFT Rebuilding Alternatives (with High Target Species OYs)

	100 fm North: 150 fm South[1]		100 fm North: 150 fm South[1] (SF Alt 2)	150 fm North: 150 fm South[2] (SF Alt 4)
	2005 Estimate	2006 Preseason Estimate (Status Ouo)	Rebld Alts 1, 3 and 4	Rebld Alts 2 and 5
Total catch OY (mt)	7,486	7,363	5,723	5,723
OA Allocation (mt)	627	613	474	474
LE FG Allocation (mt)	2,538	2,482	1,920	1,920
Landed catch (LC) target (mt)	3,050	2,982	2,307	2,307
Total potential ex-vessel value of LC target ($,000)[3]	$14,388	$14,068	$10,884	$10,884
Difference from Status Quo ($,000)			- $3,185	- $3,185
% change from 2006			-22.6%	-22.6%

[1]Seaward boundary of RCA at 100 fm North of 40°10' and at 150 fm South of 40°10'
[2]Seaward boundary of RCA at 150 fm North of 40°10' and at 150 fm South of 40°10'
[3]Only revenue from sablefish included. Assumed sablefish price per lb: $2.14

April 2006 7

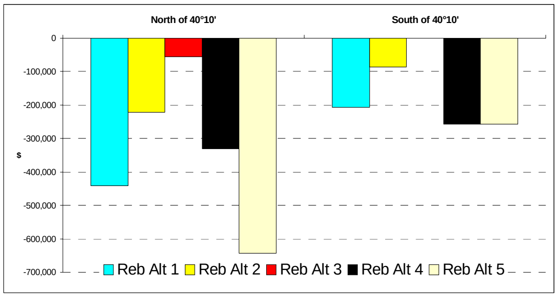
Non-sablefish Directed Open Access Ex-vessel Revenue under DRAFT Rebuilding Alternatives



Rebuild Alts:	Status Quo	Reb Alt 1	Reb Alt 2	Reb Alt 3	Reb Alt 4	Reb Alt 5
OA Alts:	Status Quo	Alt 2	Alt 1	Alt 4	Alt 5a	Alt 3

April 2006 8

Change in Non-sablefish Directed Open Access Ex-vessel Revenue under DRAFT Rebuilding Alternatives



Rebuild Alts:	Status Quo	Reb Alt 1	Reb Alt 2	Reb Alt 3	Reb Alt 4	Reb Alt 5
OA Alts:	Status Quo	Alt 2	Alt 1	Alt 4	Alt 5a	Alt 3

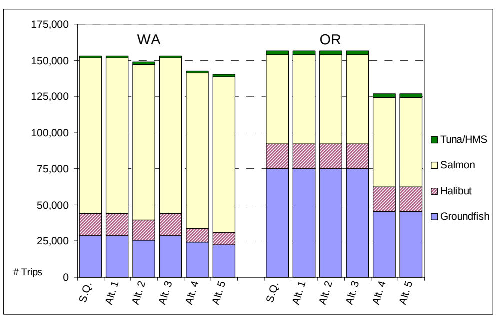
April 2006 9

Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives

	Status Quo	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
Washington						
WDFW Option:	2005 Season	2006 Season	Opt 1	2006 Season	Opt 2	Opt 3
Bottomfish	28,671	28,671	25,491	28,671	24,407	22,520
Halibut	15,383	15,383	14,109	15,383	9,375	8,692
Salmon	107,568	107,568	107,568	107,568	107,406	107,568
Tuna	1,515	1,515	1,515	1,515	1,515	1,515
Salm + Hlbt	905	905	410	905	817	562
Oregon						
ODFW Option:	Opt 1	Opt 2	Opt 3	Opt 2	Opt 4	Opt 5
Groundfish	75,337	75,337	75,337	75,337	45,521	45,521
Halibut	16,871	16,871	16,871	16,871	16,871	16,871
Salmon	61,853	61,853	61,853	61,853	61,853	61,853
Tuna	2,653	2,653	2,653	2,653	2,653	2,653
Combo[1]	10,964	10,964	10,964	10,964	10,964	10,964
[1](Salmon + at least one other target group)						
California						
CDFG Option:	Opt D	Opt B	Opt E	Opt F	Opt C	Opt A
Groundfish	383,758	314,400	403,372	415,948	345,022	254,634
Salmon	31,971	31,971	31,971	31,971	31,971	31,971
HMS	42,571	42,571	42,571	42,571	42,571	42,571
Misc	392,523	392,523	392,523	392,523	392,523	392,523

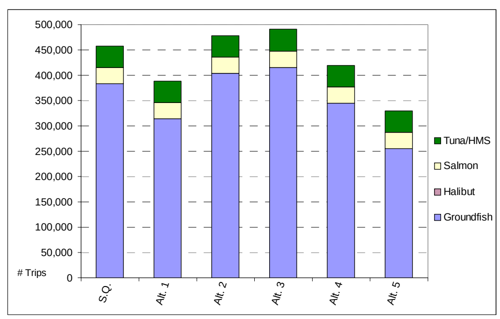
April 2006 10

Washington and Oregon Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives



April 2006 11

California Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives



April 2006 12

The Use of Socioeconomic Indicators to Describe Fishing Dependence, Community Resilience, and Areas of Vulnerability

General Concept

- "Dependence" – use of a particular resource
- "Resiliency" – a community's adaptability to change

Literature Review

- There are no standard methods for assessing "needs of fishing communities"
- Socioeconomic indicator data is provided to decision-makers to help better inform them on fishing dependence, community resilience, and vulnerable areas
- There are a range of methods used to describe dependence, resilience, vulnerable areas

Identifying Communities

- All ports, cities, counties, and port group areas considered as "communities" and included.

Scale

- Some data available by port (revenue, number of vessels, buyers, permits)
- Some data available by county only (education, age, poverty rate, unemployment rate)
- Some data available by port group only (projected fishing employment, projected fishing income)

…In general, smallest scale possible was used.

Main Objective

- Identify communities (cities, counties, port groups) that are relatively most fishing dependent, relatively least resilient in order to provide some sense of which areas will likely be most impacted by change from the status quo.

Describing Fishing Dependence

- Indicators chosen based on lit review and data availability
  - Overall community fishing dependence
    - Number of federal and state commercial fishing permits (P,C,PG)
    - Number of commercial fishing vessels (P,C,PG)
    - Revenue from commercial fishing as a share of aggregate revenue from commercial fishing coastwide (P,C,PG)
    - Angler trips (P, CG)
    - Income from commercial and recreational fishing as a share of total personal income (PG)
    - Employment in commercial fishing as a share of total employment (PG)
    - Number of processors/buyers (P,C,PG)

P=Port C=County CG=County Group PG=Port Group

Describing Fishing Dependence (cont'd)

- Indicators chosen based on lit review and data availability
  - Groundfish community fishing dependence
    - Number of commercial groundfish permits (P,C,PG)
    - Number of commercial fishing vessels using groundfish gear (P,C,PG)
    - Commercial groundfish revenue as a percentage of total commercial fisheries revenue (P,C,PG)
    - Commercial groundfish revenue as a share of total commercial groundfish revenue (P,C,PG)
    - Commercial groundfish income as a share of total commercial fisheries income (PG)
    - Commercial groundfish employment as a share of total commercial fisheries employment (PG)

P=Port C=County CG=County Group PG=Port Group

Describing Community Resilience

- Indicators chosen based on literature review and data availability
  - Population characteristics diversity
    - Average age of population (C)
    - Average of highest education degree obtained (C)
  - Economic diversity
    - Average income (C)
    - Income from fishing activity as a share of total personal income (PG)
    - Total employment rate (C)
    - Unemployment rate (C)
    - Poverty rate (C)
    - Isolated areas (P)
  - Infrastructure
    - Population density (P,C)
    - Fishing infrastructure from community profiles (P,C)
    - Number of permits owned (P,C,PG)

P=Port C=County CG=County Group PG=Port Group

Describing Community Dependence and Resilience

- Method

Step 1. Rank indicators from most dependent to least dependent and least resilient to most resilient by port/county/port group

Step 2. List top third of ports/counties/port group

Describing Community Dependence and Resilience

- Results
  - Ports/cities that rank at least 2 times
  - Counties that rank at least 2 times
  - Port Groups that rank at least 2 times

Identifying Vulnerable Areas

- Indicators
  - Dependency results
  - Resiliency results
- Method
  - Look for areas (ports/counties/port groups) with high dependency and low resilience
    - If the area ranks twice in dependency tables and twice in resiliency tables, then it is listed as a vulnerable area

Results – Relative Dependence (Cities)

Port	Indicator "Hits"	Port	Indicator "Hits"
WESTPORT	5	MONTEREY	3
PORT ORFORD	5	ILWACO/CHINOOK	3
NEWPORT	5	BODEGA BAY	3
ASTORIA	5	NEAH BAY	3
MOSS LANDING	5	AVILA	3
BELLINGHAM BAY	5	OXNARD	3
EUREKA	5	OTH WA COASTAL PORTS	3
SANTA BARBARA	4	WILLAPA BAY	2
SAN FRANCISCO	4	TILLAMOOK/GARIBALDI	2
BROOKINGS	4	OTH SAN DIEGO CTY PORTS	2
COOS BAY	4	SEATTLE	2
CRESCENT CITY	4	OTH LA/ORANGE CTY PORTS	2
PRINCETON / HALF MOON BAY	4	OTHER STA CRUZ/MONTEREY CTY PORTS	2
BLAINE	4	OCEANSIDE	2
PORT ANGELES	4	NEWPORT BEACH	2
FORT BRAGG	4	SAN PEDRO	2
MORRO BAY	4	GOLD BEACH	2
TERMINAL ISLAND	3	EVERETT	2
LA PUSH	3	ANACORTES	2

Current Dependence Indicators Used (Ports) – 3 overall, 3 groundfish

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue
- Number of fishing vessels using groundfish gear (non-whiting)

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total: 4 overall, 5 groundfish, 1 rec)

Results – Relative Dependence (Counties)

County	Indicator "Hits"
LINCOLN COUNTY	5
WHATCOM COUNTY	4
CLATSOP COUNTY	4
COOS COUNTY	4
MENDOCINO COUNTY	4
GRAYS HARBOR COUNTY	4
SF BAY/SAN MATEO COUNTIES	3
ORANGE/LA COUNTIES	3
CLALLAM COUNTY	3
CURRY COUNTY	2
VENTURA/STA BARBARA COUNTIES	2
MONTEREY/SANTA CRUZ	2
MARIN/SONOMA	2
PACIFIC COUNTY	2
HUMBOLDT COUNTY	2
SAN LUIS OBISPO COUNTY	2

Current Dependence Indicators Used (Counties) – 3 overall, 2 groundfish

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total : 4 overall, 4 groundfish, 1 rec)

Results – Relative Dependence (Port Group Area)

Port Group Area	Indicator "Hits"
ASTORIA	7
BROOKINGS	6
CRESCENT CITY	6
EUREKA	6
COOS BAY	5
NEWPORT	5
PUGET SOUND	4
BODEGA BAY	3
CENTRAL WA COAST	3
SOUTH & CENTRAL WA COAST	3
LOS ANGELES	2
NORTH WASHINGTON COAST	2

Current Dependence Indicators Used (Port Groups) – 5 overall, 4 groundfish

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue
- Fishery-related income as a share of total personal income
- Fishery-related employment as a share of total employment
- Groundfish-related income as a share of total fishery income
- Groundfish-related employment as a share of total employment

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total: 6 overall, 6 groundfish, 1 rec)

Key Points

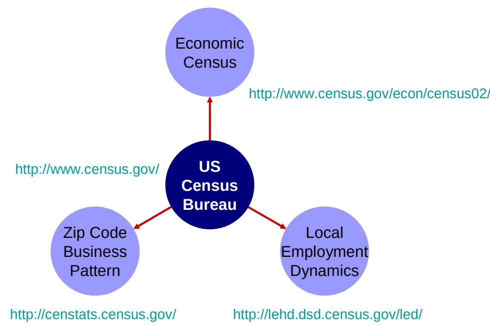
- Most useful piece of info from results – identification of "vulnerable areas"
- Usefulness of this data is very limited due to scale and use of proxies for things we have no accurate measurement of.

Trends in fishing and seafood processing related establishments and employment in West Coast fishing communities (1997-2003)

Using Census Bureau data to understand the impacts of fishing policies and management

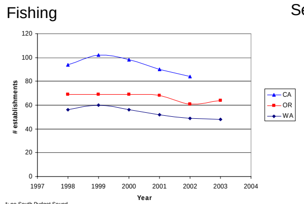
By: Eduardo Espinoza
Sustainable Fisheries Division
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115

Data sources

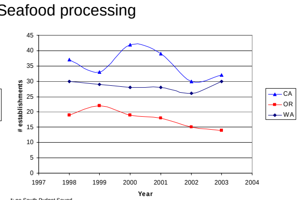


California, Oregon and Washington's fishing and seafood processing related establishments (1998-2003)

Fishing



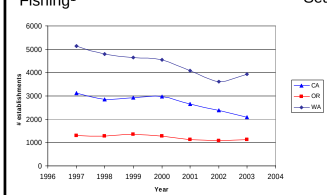
Seafood processing



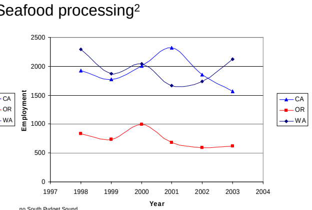
Source: Zip Code Business Patterns

California, Oregon and Washington's fishing and seafood processing related employment (1997-2003)

Fishing[1]



Seafood processing[2]

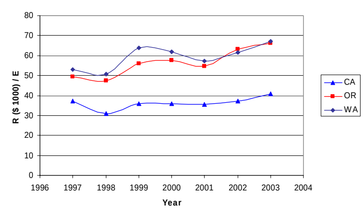


Sources: [1]: Economic Census (Nonemployer data)
[2]: Zip Code Business Patterns

Agenda Item F.1.a, Supplemental Attachment 7
Page 28 of 29

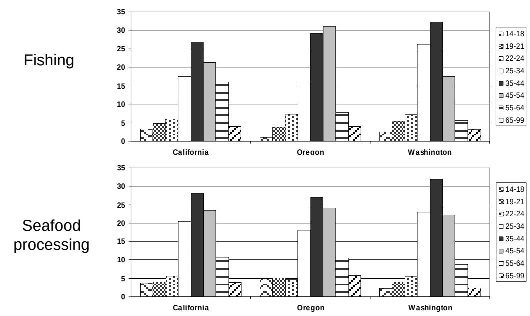
California, Oregon and Washington's counties fishing-related receipts (R) per establishments (E) (1997-2003)

Fishing



Source: Economic Census (Nonemployer data)

Average age distribution (%) in fishing and seafood processing related employment by state (2003)



Source: Based on the Quarterly Workforce Indicators data (Local Employment Dynamics)

Census data available to describe community resilience

- Population characteristics diversity
  - Age
  - Education
- Economic diversity
  - Income
  - Total employment by industry
  - Unemployment
  - Poverty level
- Population density
- Fishing dependency
- Household characteristics

Future steps

- We are currently processing more information at the county and community levels, however the data does not always have the same level of resolution that is required. Some socio-economic indicators only reach the county level, leaving cities without a closer look.
- Others sources of data are being explored at the states, counties and local levels.

Agenda Item F.1.a
Supplemental Attachment 8
April 2006

TRENDS IN FISHING AND SEAFOOD PROCESSING RELATED ESTABLISHMENTS AND EMPLOYMENT IN WEST COAST FISHING COMMUNITIES (1997-2005)

Eduardo J. Espinoza
Sustainable Fisheries Division
National Marine Fisheries Service
7600 Sand Point Way NE, Seattle WA 98115

Based on US-Census Bureau[1] data, trends in the number of fishing and seafood processing related establishments and employment (estimated) were determined for fishing communities in the states of California, Oregon and Washington. Using the ZIP Code Business Patterns[2] (CPB) data on the total number of establishments and employment, we will be able to provide information on the number of establishments per nine employment-size categories by industry category between 1997 and 2005.

At the same time we used the Economic Census[3] to take into account the Nonemployer Statistics which provide U.S. and subnational economic data by industry for businesses that have no paid employees and are subject to federal income tax. This series is useful for studying the economic activity of small businesses at various geographic levels.

The classification for fishing and seafood processing related activities, used by the CPB, is based on the North American Industry Classification System (NAICS) which assigns the industry code 1141--- for Fishing, and 3117--- for Seafood Product Preparation and Packaging. For the latter we will include Seafood Canning and Fresh and Frozen Seafood Processing together.

Regarding the reliability of the CPB data, it is important to state, that according to the Census Bureau, "all data are tabulated from universe files and are not subject to sampling errors. However, the data are subject to nonsampling errors. Nonsampling errors can be attributed to many sources: inability to identify all cases in the universe; definition and classification difficulties; differences in interpretation of questions; errors in recording or coding the data obtained; and estimation of employers who reported too late to be included in the tabulations and for records with missing or misreported data. The accuracy of the data is determined by the joint effects of the various nonsampling errors. No direct measurement of these effects has been obtained; however, precautionary steps were taken in all phases of collection, processing, and tabulation to minimize the effects of nonsampling errors."

---

[1] : http://www.census.gov/
[2] : http://censtats.census.gov/
[3] : http://www.census.gov/econ/census02/

At the end of this report, a preliminary overview of quarterly trends in employment and salaries is addressed using Census Bureau's Local Employment Dynamics[4] data starting in 2001. This data also included age and gender distribution among the employees population, among other Quarterly Workforce Indicators (QWI).

[4] : http://lehd.dsd.census.gov/led/

The data presented in this paper is still under analysis at the city and county level, therefore we are only able to present it at the state level.

1. Establishments

The Census Bureau defines Establishment as “a business or industrial unit at a single location that distributes goods or performs services.” It is not necessarily identical with a company, firm or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity and all data are included in that classification.

In the case of the Nonemployer Statistics it counts each distinct business income tax return filed by a nonemployer business as an establishment. Nonemployer businesses may operate from a home address or a separate physical location. Therefore, special note must be taken since most geography codes are derived from the business owner's mailing address, which may not be the same as the physical location of the business.

2. Employment estimation

Based on the number of establishments per employment-size category we established the minimum and maximum number of employees per category, and calculated an average to provide an estimation of total employment. For example, in Table I the total average number for the 114111 industry would be 54.5, which is the results of estimating an average from a total minimum number of employees of 26 (16 + 10) and total maximum of 83 (64 + 19).

Table I
Example of table provided the Zip Code Business Patterns data

Industry Code	Industry Code Description	Total Est.	Number of Establishments by Employment-size class								
			1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000 or more
114111	Finfish Fishing	17	16	0	1	0	0	0	0	0	0
311712	Fresh and Frozen Seafood Processing	3	0	0	2	0	1	0	0	0	0

3. Results

These preliminary results will include the trends observed for each state and a list of the communities and/or counties included in the total estimations. The listed communities are those that have Census data for fishing and seafood processing related activities. At this time, Nonemployer Statistics are only available for the fishing-related activities.

3.1. Fishing (BCP)

According to NAICS, this industry comprises establishments primarily engaged in the commercial catching or taking of finfish, shellfish, or miscellaneous marine products from a natural habitat, such as the catching of bluefish, eels, salmon, tuna, clams, crabs, lobsters, mussels, oysters, shrimp, frogs, sea urchins, and turtles. For the purpose of this study we are only including establishments primarily engaged in the commercial catching or taking of finfish (e.g., bluefish, salmon, trout, tuna) from their natural habitat.

The list of communities that take at least one finfish included:

California: Bodega Bay, Crescent City, Dana Point (Capistrano Beach), Eureka, Fort Bragg, Los Angeles, Monterey, Morro Bay, Oakland, Oceanside, Oxnard, Port Hueneme, Richmond, San Diego, San Francisco, Santa Barbara, Trinidad, and Ventura.

Oregon: Astoria, Brookings, Cannon Beach, Coos Bay, Florence, Garibaldi, Seaside, Hood River, Newport, Port Orford, Portland, Siletz, Waldport, Warrenton, and Reedsport (Winchester Bay).

Washington: Anacortes, Bellingham, Blaine Chinook, Everett, Friday Harbor, Ilwaco, La Conner, Port Angeles, Port Townsend, Sequim, and Westport. In order to avoid inflating the data with the Alaska fisheries, the ports of Olympia, Seattle and Tacoma were not included in this study.

For the three states comparison we use CA data with the info of metro communities (Los Angeles – Long Beach, Oakland, San Diego, San Francisco and Ventura) that probably were misrepresented by the data collected by zip-code only.

Based on the trends observed in figures 1 and 2, it could be inferred that after year 2000 there is a slight reduction in the number of establishments for California and Washington. Although no statistical analysis has been performed yet for this study, Oregon data seems to be no significant.

In the case of employment, the pattern seems to be the same for all these states.

Figure 1
California, Oregon and Washington's fishing-related establishments (1998-2003)

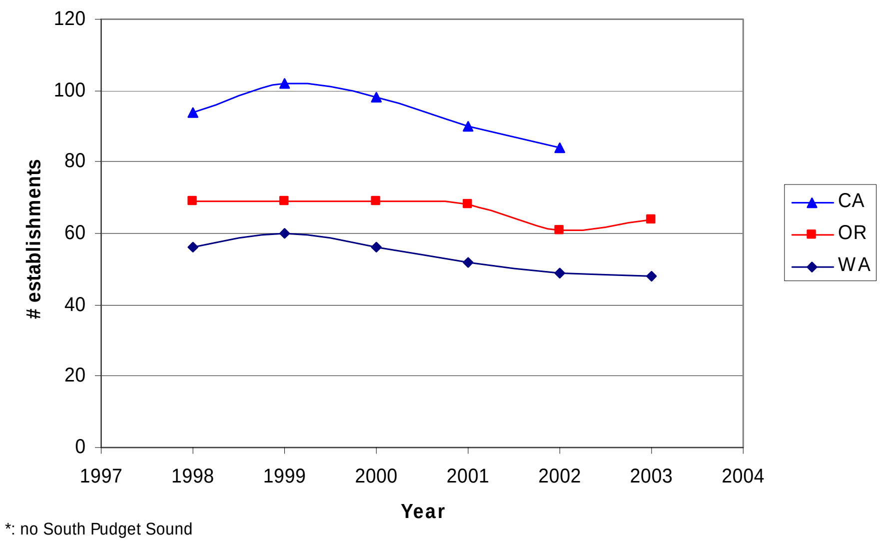
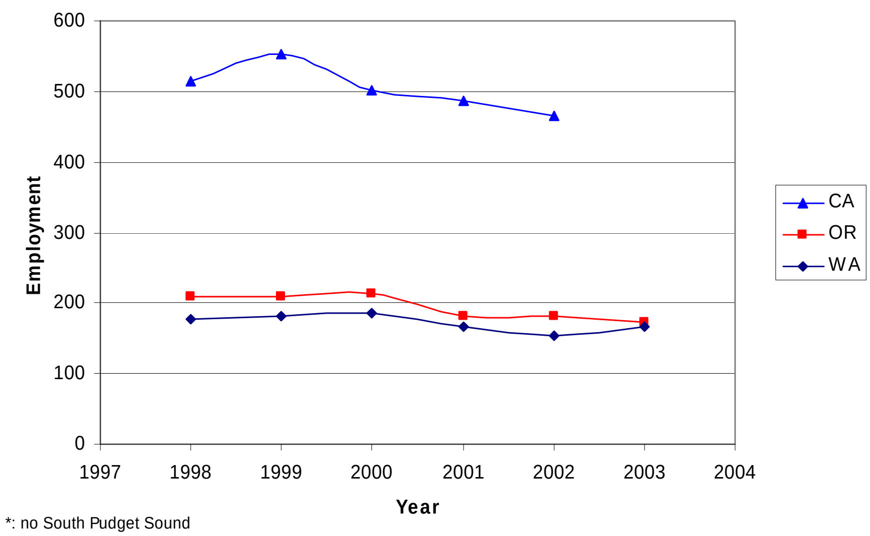


Figure 2
California, Oregon and Washington's fishing-related employment (1998-2003)



3.2. Fishing (Nonemployer statistics)

Besides the number of the establishments, the Nonemployer statistics include the receipts, which are the gross receipts, sales, commissions, and income from trades and businesses, as reported on annual business income tax returns. Business income consists of all payments for services rendered by nonemployer businesses, such as payments received as independent agents and contractors.

The list of counties that take at least one finfish included:

California: Alameda, Contra Costa, Del Norte, Humboldt, Los Angeles, Marin, Mendocino, Monterey, Orange, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Solano, Sonoma, and Ventura.

Oregon: Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Lane, Lincoln, Multnomah, and Tillamook.

Washington: Clallam, Clark, Cowiltz, Clark, Cowlitz, Grays Harbor, Island, Jefferson, Kitsap, Lewis, Pacific, Sam Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum, and Whatcom.

With this data, we observe that despite of a decline in the number of establishments (Figure 3) the gross receipts are increasing (Figure 4). From this result it could be implied that less people are getting more profits from this activity (Figure 5).

Figure 3
California, Oregon and Washington's Nonemployer fishing-related establishments (1997-2003)

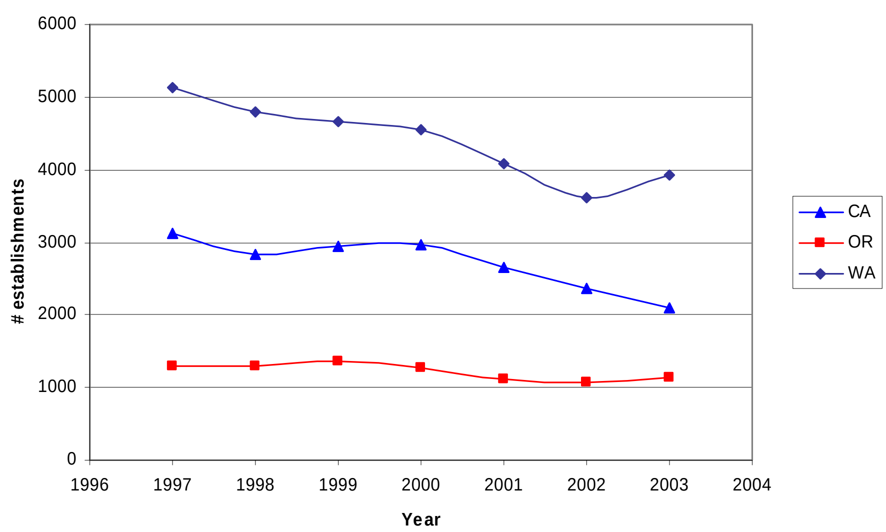


Figure 4
California, Oregon and Washington's Nonemployer fishing-related receipts (1997-2003)

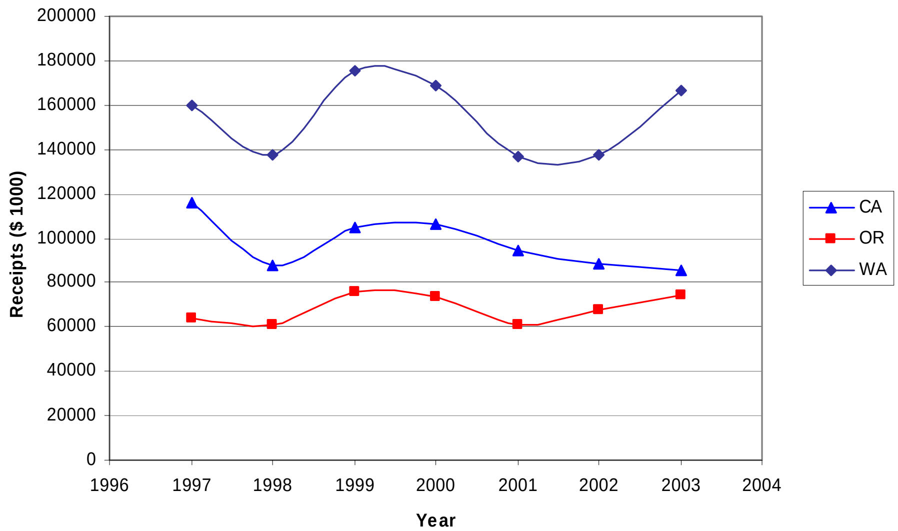
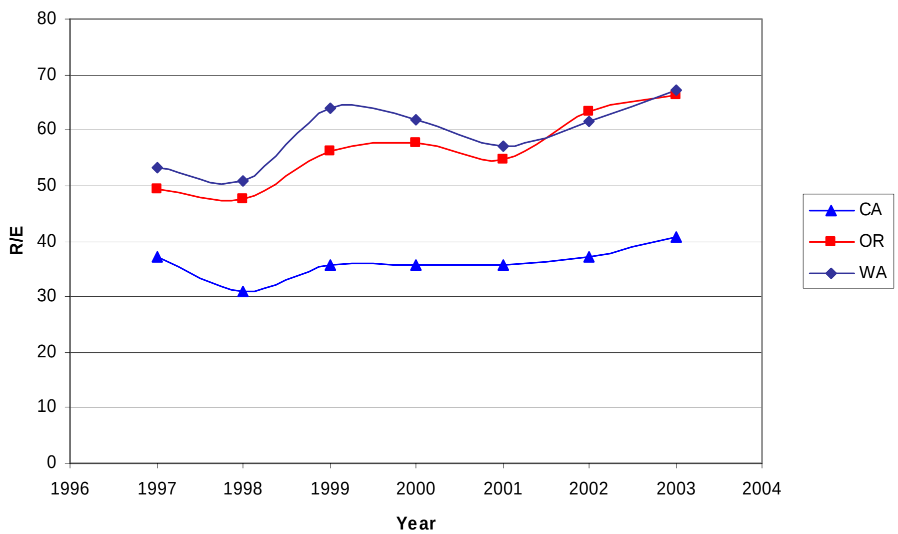


Figure 5
California, Oregon and Washington's Nonemployer fishing-related Receipts ($1000) per Establishment (1997-2003)



3.3. Seafood Product Preparation and Packaging

According to the NAICS, this industry comprises establishments primarily engaged in one or more of the following: (1) canning seafood (including soup); (2) smoking, salting, and drying seafood; (3) eviscerating fresh fish by removing heads, fins, scales, bones, and entrails; (4) shucking and packing fresh shellfish; (5) processing marine fats and oils; and (6) freezing seafood. Establishments known as "floating factory ships" that are engaged in the gathering and processing of seafood into canned seafood products are included in this industry.

The list of communities that have at least on establishment:

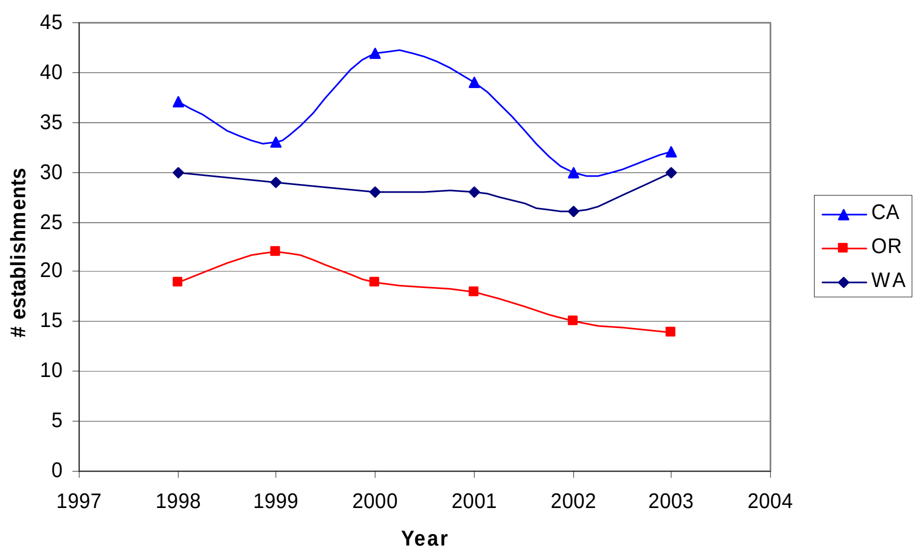
California: Crescent City, Eureka, Fort Bragg, Long Beach, Los Angeles, Monterey, Oxnard, Port Hueneme, Richmond, San Diego, San Francisco, Santa Barbara, and Ventura.

Oregon: Astoria, Brookings, Coos Bay, Florence, Garibaldi, Newport, Port Orford, Portland, Warrenton, and Reedsport (Winchester Bay).

Washington: Anacortes, Bellingham, Blaine Chinook, Everett, Friday Harbor, Ilwaco, La Conner, Neah Bay, Port Angeles, Sequim, and Westport. In order to avoid inflating the data with the Alaska fisheries, the ports of Olympia, Seattle and Tacoma were not included in this study.

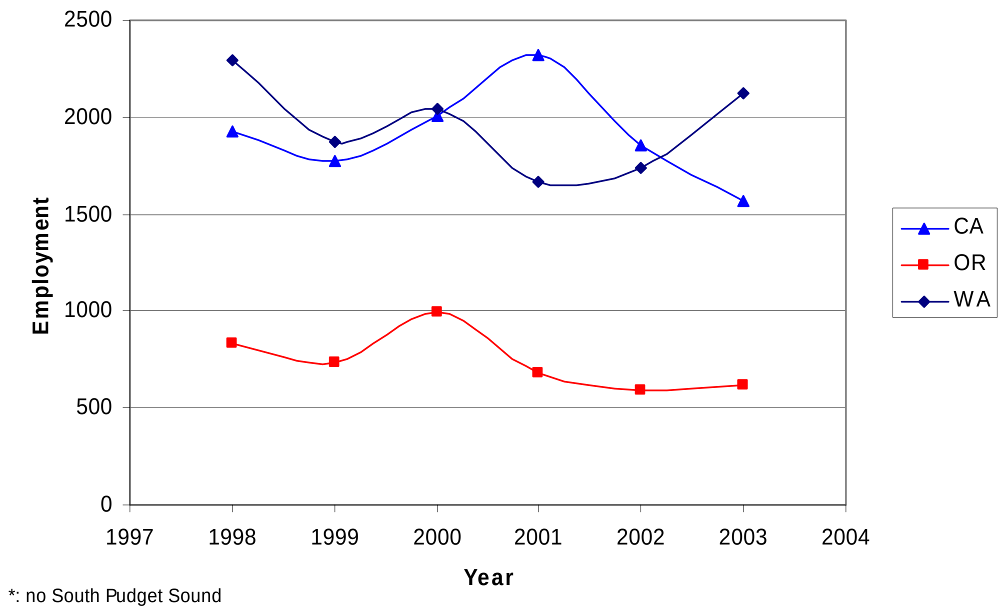
With this data, we observe that the trends in number of establishment and employment are very similar within each state (Figures 6 and 7).

Figure 6
California, Oregon and Washington's Seafood processing-related establishments (1998-2003)



*: no South Pudget Sound

Figure 7
California, Oregon and Washington's Seafood processing-related employment (1998-2003)



3.3. Local Employment Dynamics (LED)

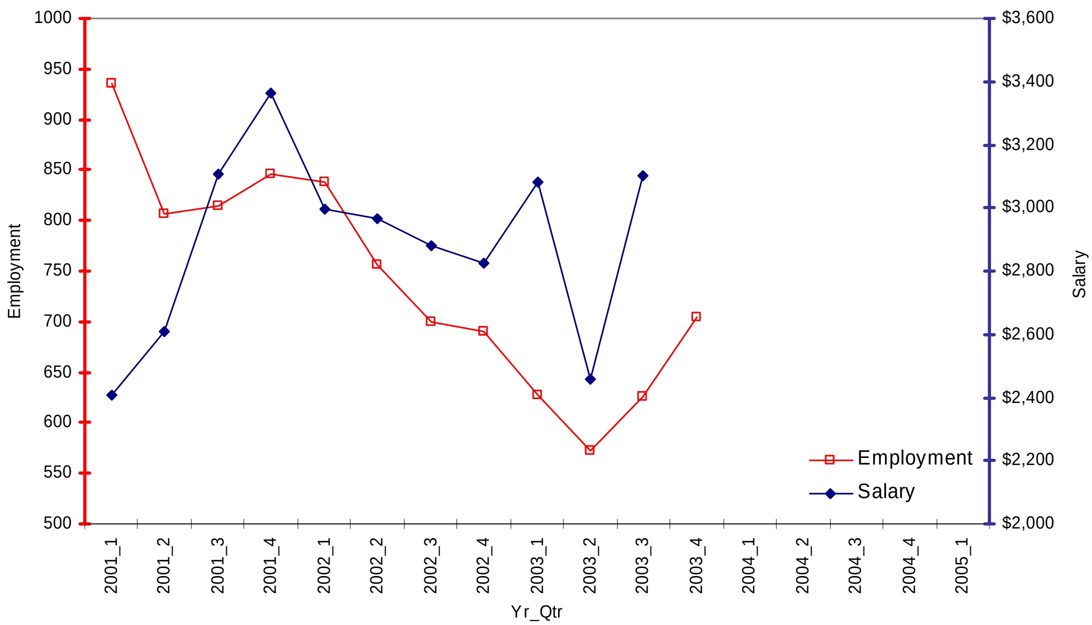
The Census Bureau publishes 8 (out of 29) labor force indicators in its Quarterly Workforce Indicators (QWI) online. The eight indicators include total employment measures of change such as job flow, new hires, separations, and average earnings. In this preliminary report we take into consideration two of them: total employment and average earnings.

In Figure 8 (a, b, c), we present the quarterly trends in employment and salary in the fishing industry for the three states between 2001 and 2004 (actual years varies according the data availability for each state). For California and Oregon it could be noted that there was a decreasing trend in employment more noticeable in the former until the second quarter of 2003 (Fig. 8a). At the same time, the state of Oregon (Figure 8.b) presents a seasonal trend in which the third quarter of each year shows a peak in high salaries. This trend could be based on the small nature of the industry for Oregon if it were compared with the one of Washington in which a high amount of fishing comes from Alaska waters and does not necessarily reflect a seasonal pattern.

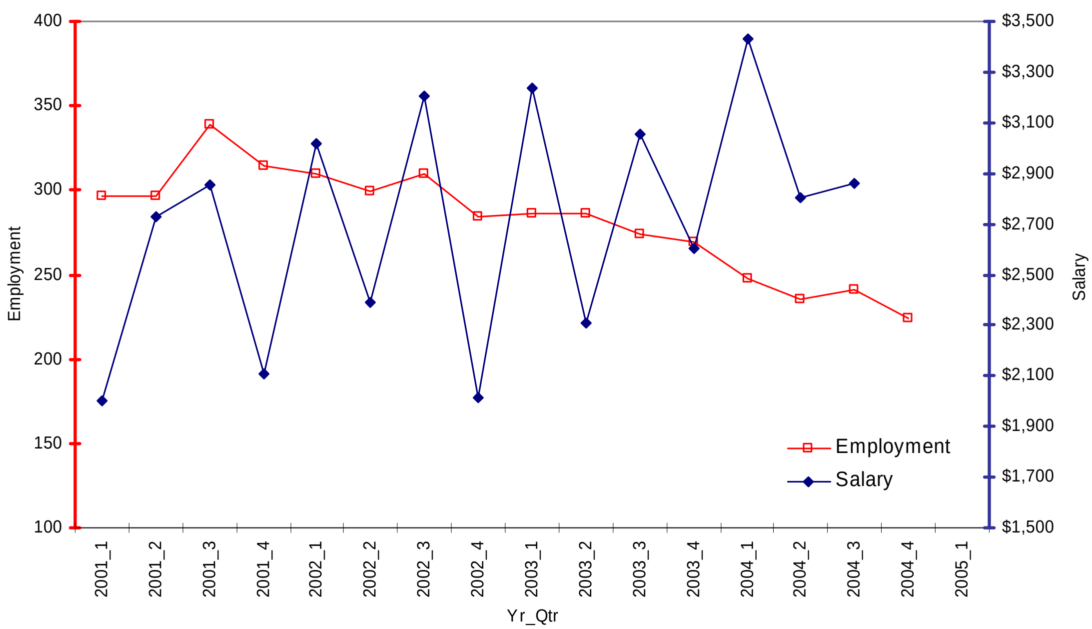
The same observation is applicable to the seafood processing industry in which Oregon shows the same patterns in employment and salaries (Figure 9b), while the other two states do not. In the case of California, there are high levels of imports that do not necessarily reflect the seafood processing of local fisheries catches.

Figure 8
Quarterly fishing related employment and salaries by state (2001-2005)

a) California



b) Oregon



c) Washington

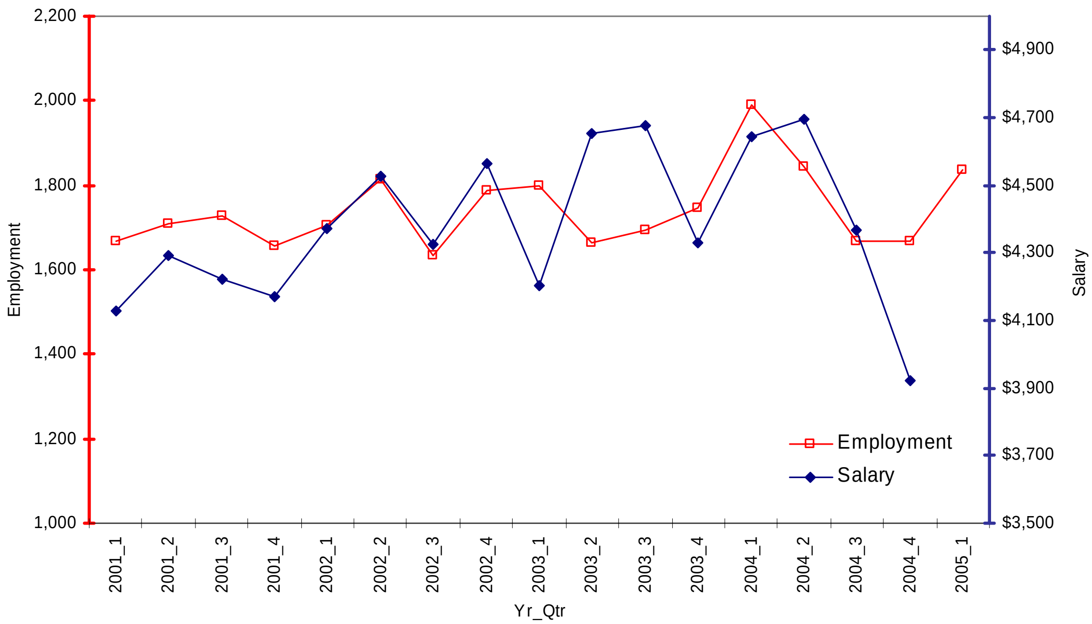
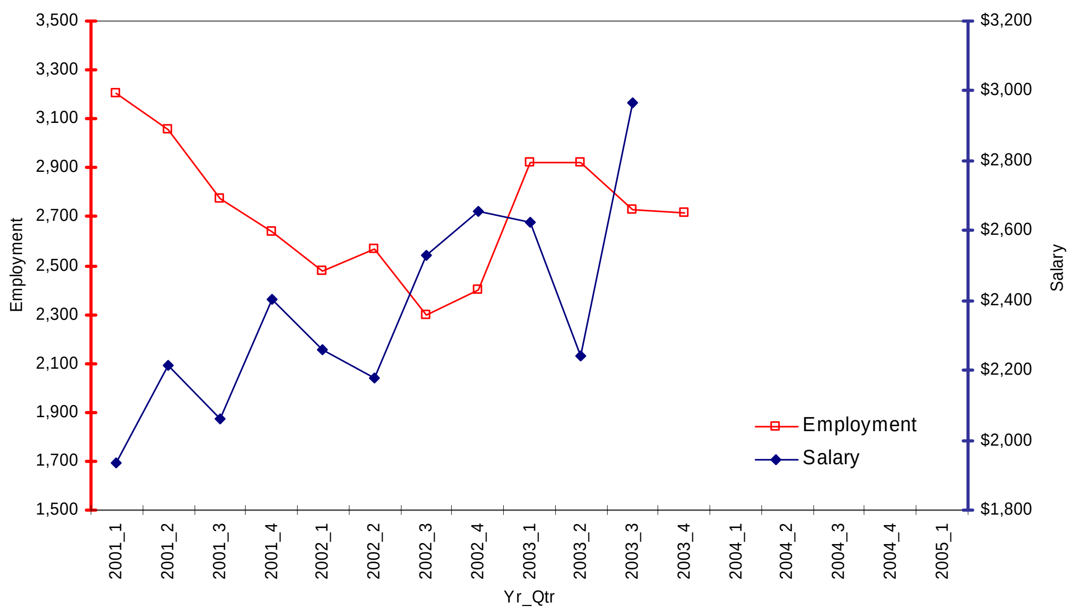
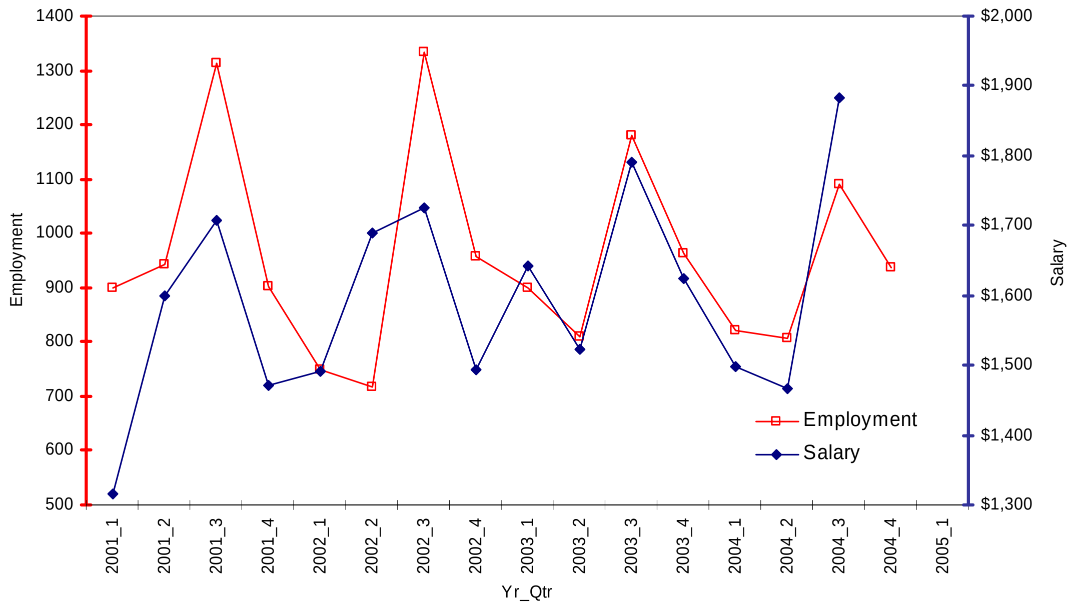


Figure 9
Quarterly seafood processing employment and salaries by state (2001-2005)

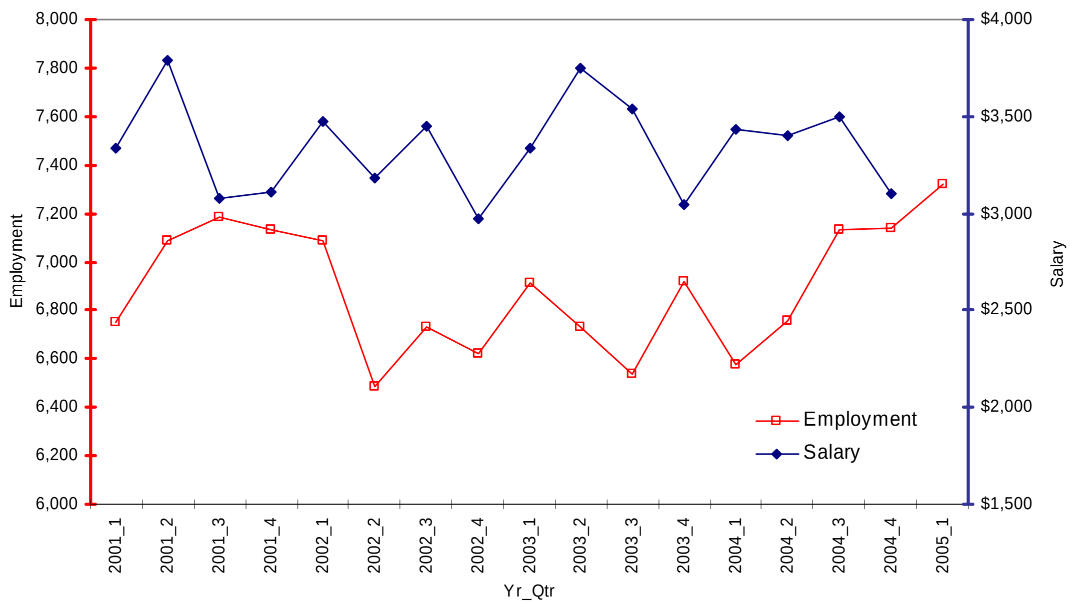
a) California



b) Oregon



c) Washington



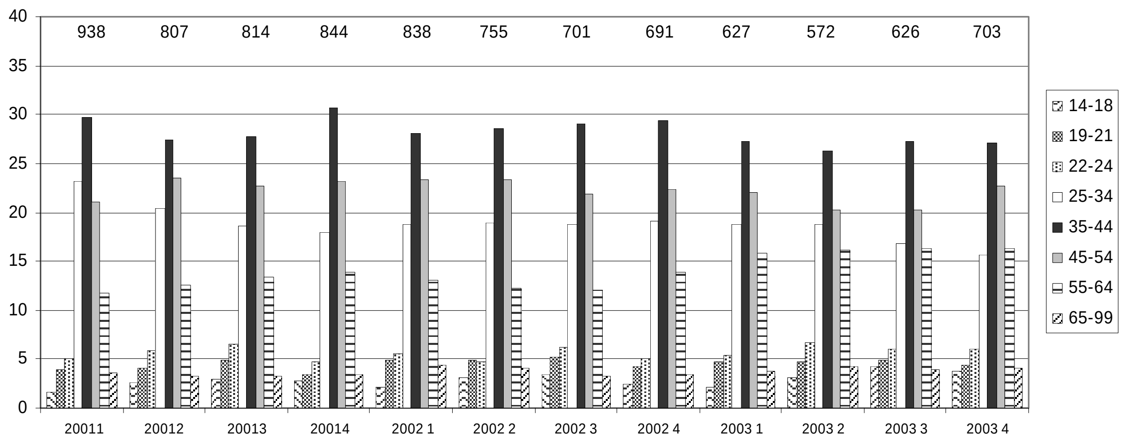
3.3.1. Age distribution among employees.

For both industries, the 35-44 age group is the predominant workforce in all three states with a 30-35 % (Figures 10 and 11). It is followed by the 45-54 age group with the exception of the state of Washington where the 24-25 group is the second highest.

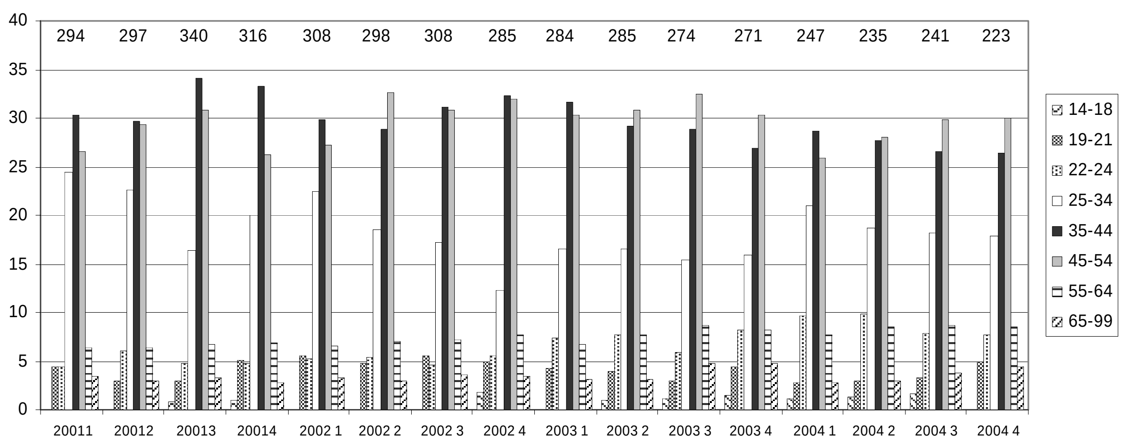
Figure 10

Age distribution (%) among employees in the fishing related industry (2001-2005)

a) California



b) Oregon



c) Washington

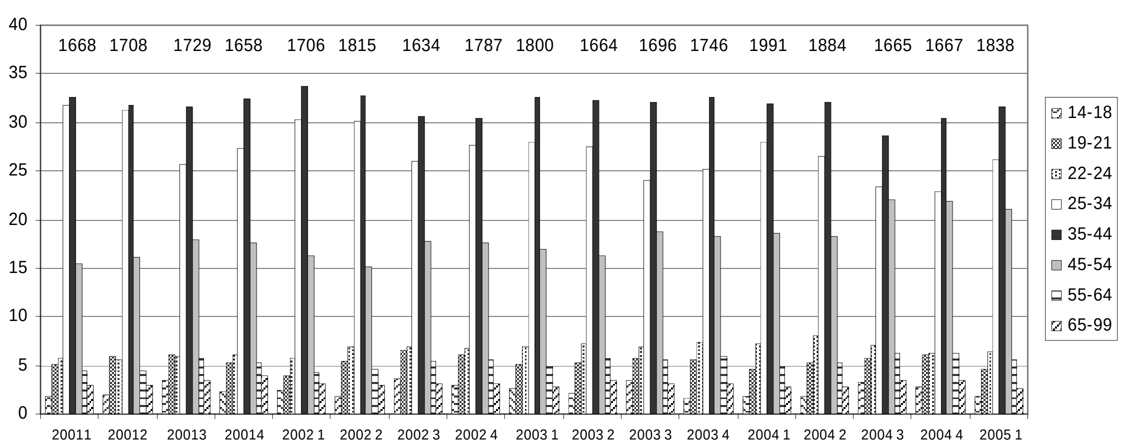
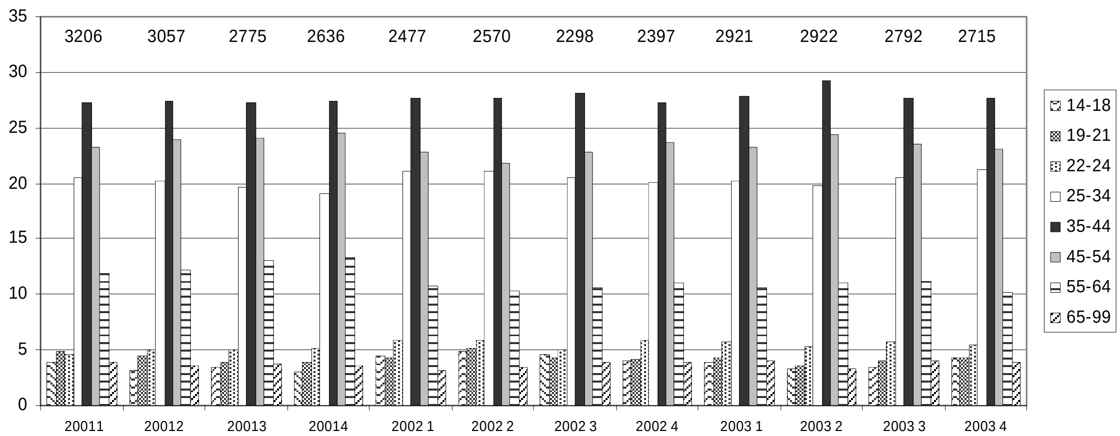


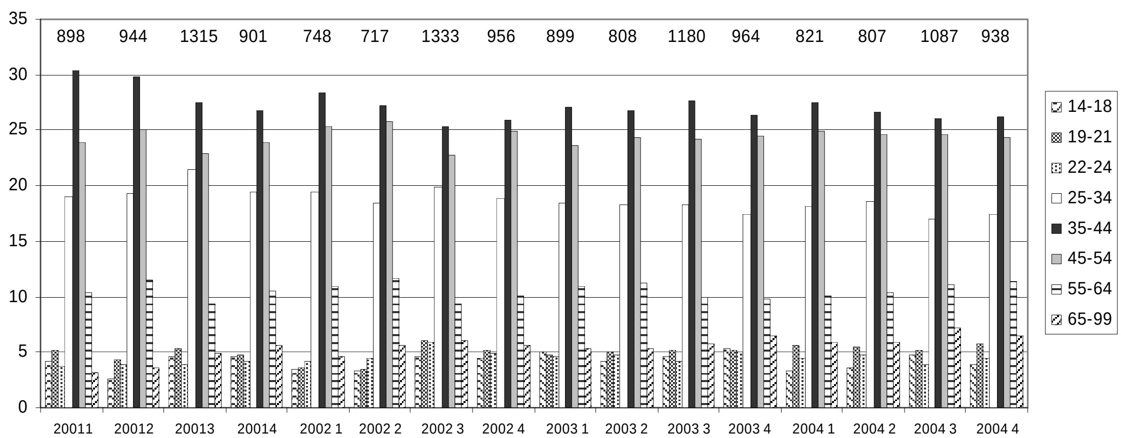
Figure 11

Age distribution (%) among employees in the seafood processing related industry (2001-2005)

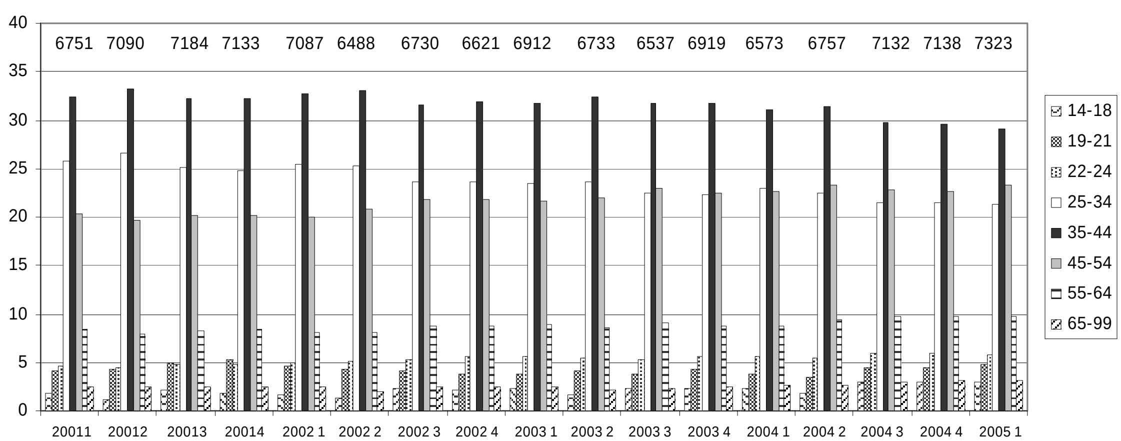
a) California



b) Oregon



c) Washington



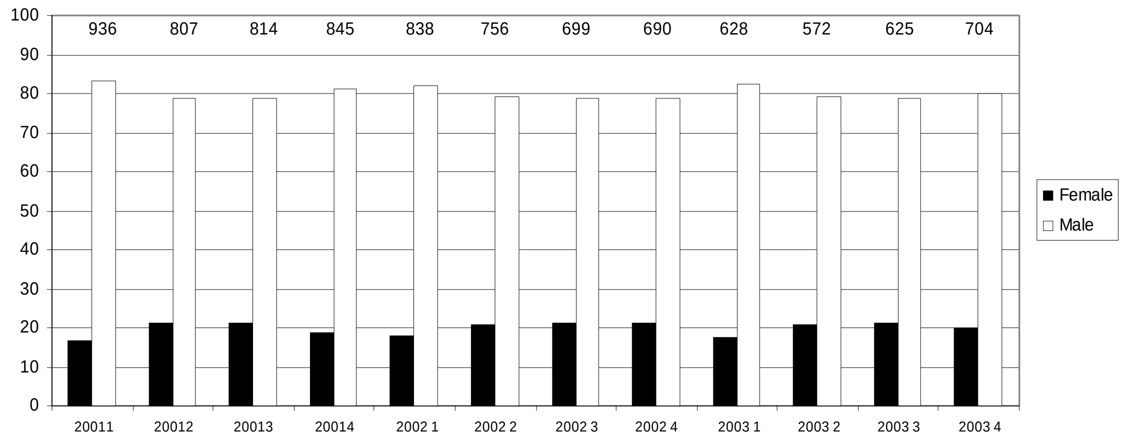
3.3.2. Gender distribution

Male employees accounts for about 80 % of the workforce in the fishing industry for all three states (Figure 12). California is the only state with quarters in which the female population overpasses the 20 % mark without an apparent discrimination between high or low employment periods.

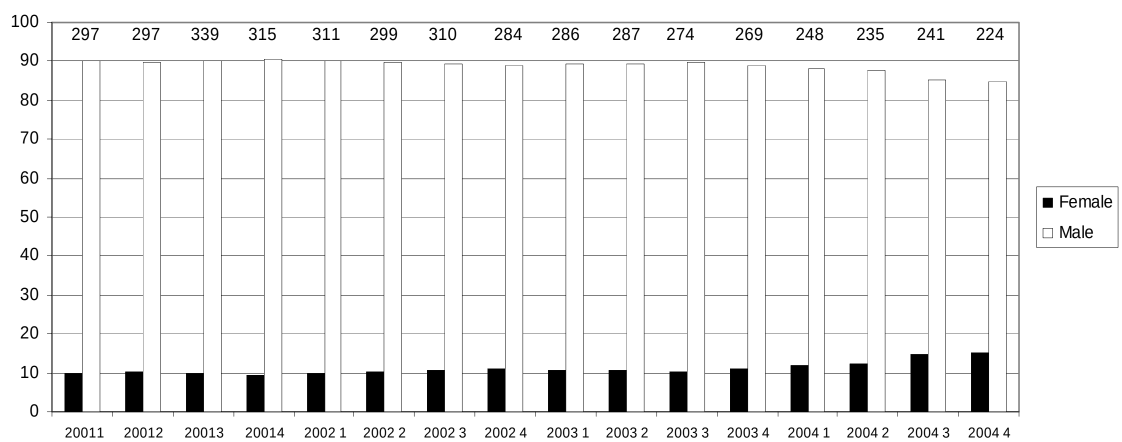
In the case of the seafood processing sector the distribution varies according to the state. In California there are more female workers in an almost a 50-50 distribution (Figure 13a). Nevertheless, in Oregon and Washington the majority corresponds to male workers (60 and 70 % respectively).

Figure 12
Gender distribution (%) among employees in the fishing related industry (2001-2005)

a) California



b) Oregon



c) Washington

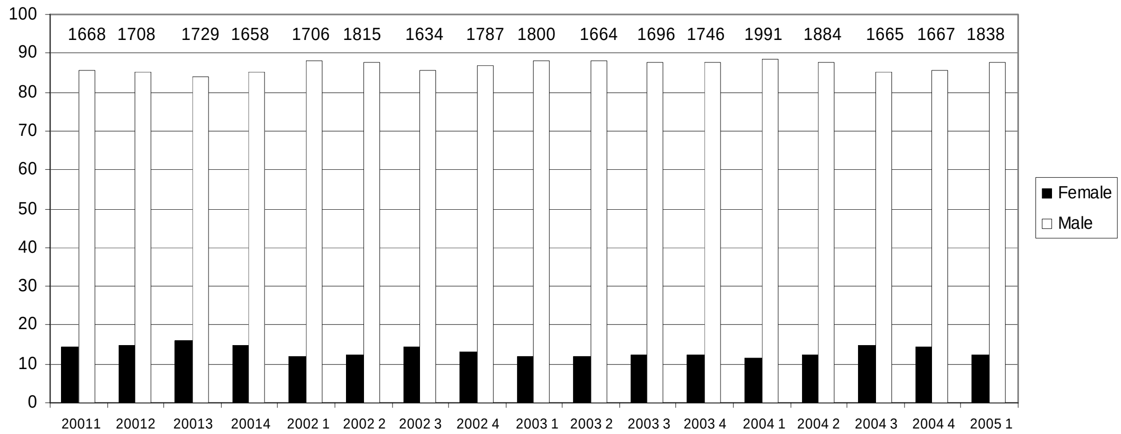
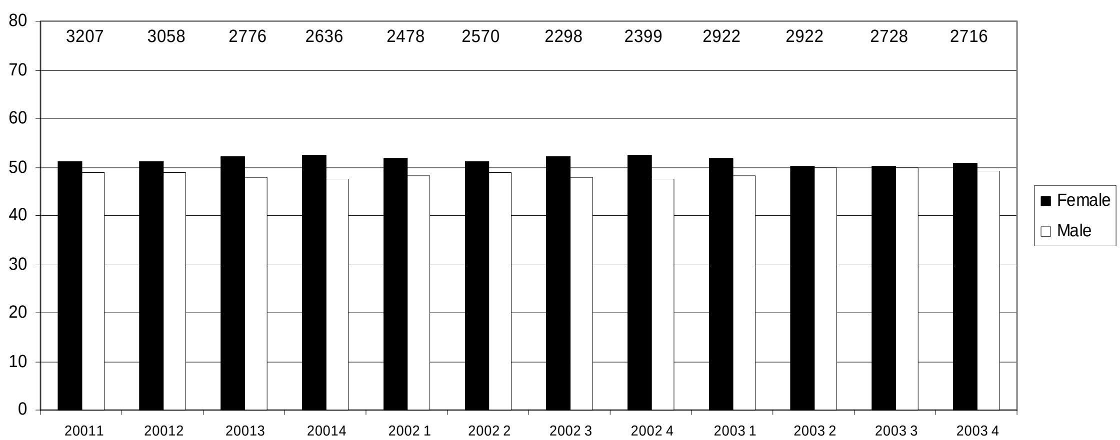
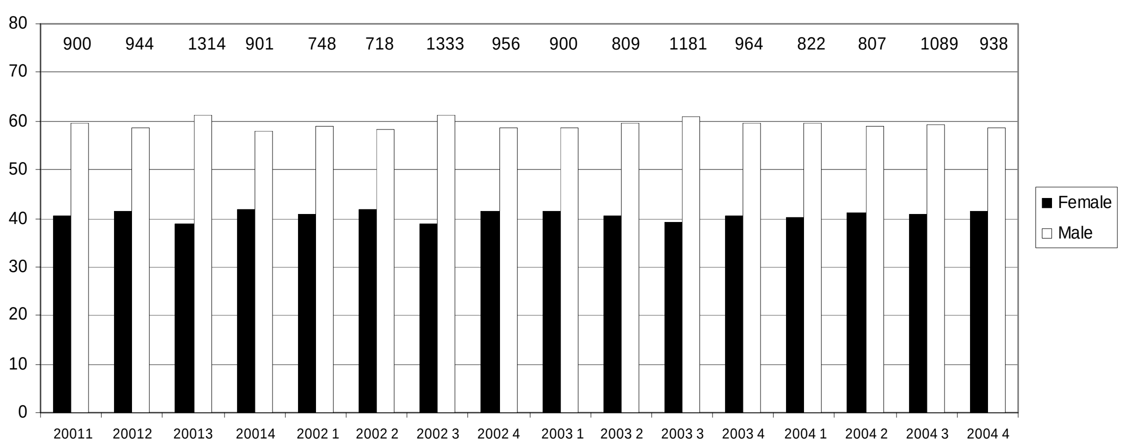


Figure 12
Gender distribution (%) among employees in the seafood processing related industry (2001-2005)

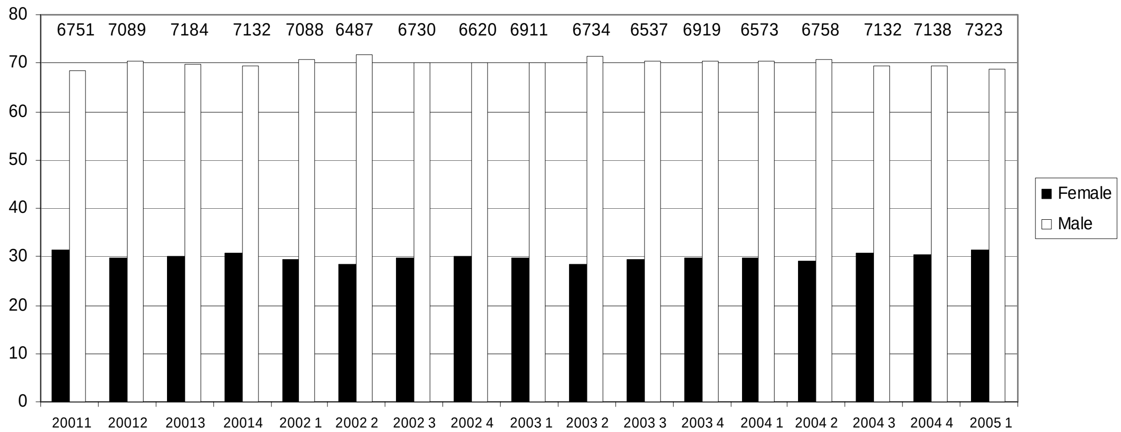
a) California



b) Oregon



c) Washington



4. Future steps

The information presented in this report is not intended to produce any major conclusions. It is more an illustration of the steps that we are following to address the socio-economic issues involving fishing communities in the west coast. We are currently processing more information at the county and community level; however the data does not always have the same level of resolution that is required. Sometimes socio-economics indicators only reach the county level, leaving communities without a closer look.

At the same time the information gathered on employment combined with other demographic, social and economic data will allow us to develop the dependency analysis on fishing related industries by the communities, as well as to evaluate their resiliency.

ZIONTZ, CHESTNUT, VARNELL, BERLEY & SLONIM
ATTORNEYS AT LAW

STEVEN H. CHESTNUT
JAMES L. VARNELL
RICHARD M. BERLEY
MARC D. SLONIM
JOHN B. ARUM
BRIAN W. CHESTNUT
BRIAN C. GRUBER

2101 FOURTH AVENUE, SUITE 1230
SEATTLE, WASHINGTON 98121-2331
TELEPHONE 206 448 1230
FACSIMILE 206 448 0962

Via Telefax and First Class Mail

March 31, 2006

Bob Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115-0070

Re: Treaty Indian Groundfish Fisheries in 2007 and 2008

Dear Mr. Lohn:

We have been asked to write to you on behalf of the Makah Indian Tribe. We understand that at its upcoming meeting the Pacific Fishery Management Council may consider reducing the allowable harvest of certain groundfish species, which include rockfish taken by tribal fisheries, under the Magnuson Act rebuilding plans applicable to each over fished stock. Because Council action to reduce impacts to these species has the potential to affect tribal fisheries, the Tribe requests, pursuant to 50 C.F.R. § 660.324(d), that the agency discuss with the Tribe an allocation of such species, a treaty regulation specific to the Makah Tribe or other measures to address the impacts to these species after the Council's meeting.

Very truly yours,

ZIONTZ, CHESTNUT, VARNELL,
BERLEY & SLONIM

Brian C. Gruber

Brian C. Gruber

cc (via fax):

Eileen Cooney
Russ Svec
Steve Joner

kw:o:wp12:mydocs:0050:
Lohn-Bob.ltr-3-31-06

Supplemental CDFG Report on Background Information for Selection of 2007/2008 Gopher Rockfish, California Scorpionfish, Lingcod and Minor Nearshore Rockfish Yields (OY)

Following the newly adopted 2005 assessments for gopher rockfish, California scorpionfish, and lingcod CDFG evaluated the OY alternatives for each species and possible impacts to management.

Gopher Rockfish Because gopher rockfish cannot be managed separately from other nearshore rockfish species without significantly increasing bycatch and because of uncertainty over the assessment surrounding data quality, gopher rockfish is recommended to not be removed from the southern minor nearshore rockfish species OY, but instead have a point of concern set at a level determined appropriate to the adopted OY.

Table 1. Gopher Rockfish OY Alternative Pros and Cons

OY Alternative	PROS	CONS
Status Quo (49 mt/yr)	• Provides the least risk to the gopher rockfish stock by continuing to manage this species at 50% of recent landings • Results in no additional risk of increased catches for the other unassessed species in the minor nearshore rockfish south group	• Provides no additional fishing opportunities • Does not incorporate the results of the gopher rockfish stock assessment into management
50% of ABC (151 mt/yr)	• Allows some increased fishing opportunities for anglers and commercial fishermen targeting shallow nearshore rockfish in waters off central CA • Includes a contribution of gopher rockfish to the minor nearshore rockfish south group that is lower than the 212 mt landings observed in 1992, but slightly higher than the historical average • Of the three non-status quo alternatives, results in the	• Results in an increased risk of impacting gopher rockfish stock, particularly if recruitment continues to be sporadic (assessment relied on one major recruitment event from 2000) • Increased fishing opportunities may result in increased take of other unassessed species rather than gopher rockfish

	least risk of increased catches for other unassessed species in this group	• May also result in increased take of all nearshore species in the south below the assessed region; including unassessed species
75% of ABC (227 mt/yr)	• Affords additional fishing opportunities for anglers and commercial fishermen • Includes a contribution of gopher rockfish to the minor nearshore rockfish south that is slightly higher than the highest observed landings	• Greater risk of impacting gopher rockfish stock • Greater risk of increased catches for the other unassessed species in this group
100% Of ABC (302 mt/yr)	• Provides the greatest amount of additional fishing opportunities for anglers and commercial fishermen	• Allowable take is well above the historic landings • Greatest risk of impacting gopher rockfish stock • Greatest risk of increased catches for the other unassessed species in this group

Historic combined recreational and commercial landings show landings relative to the proposed OYs (Figure 1.) For the graphic below, note that the highest landings of gopher rockfish (212 mt) occurred in 1992. The average take for the period from 1983 – 1999 was 127 mt (and for 1990-1993, the average was 131 mt). The 2006 expected take (48.5 mt) is the same as the 2007-2008 Option 1 (status quo).

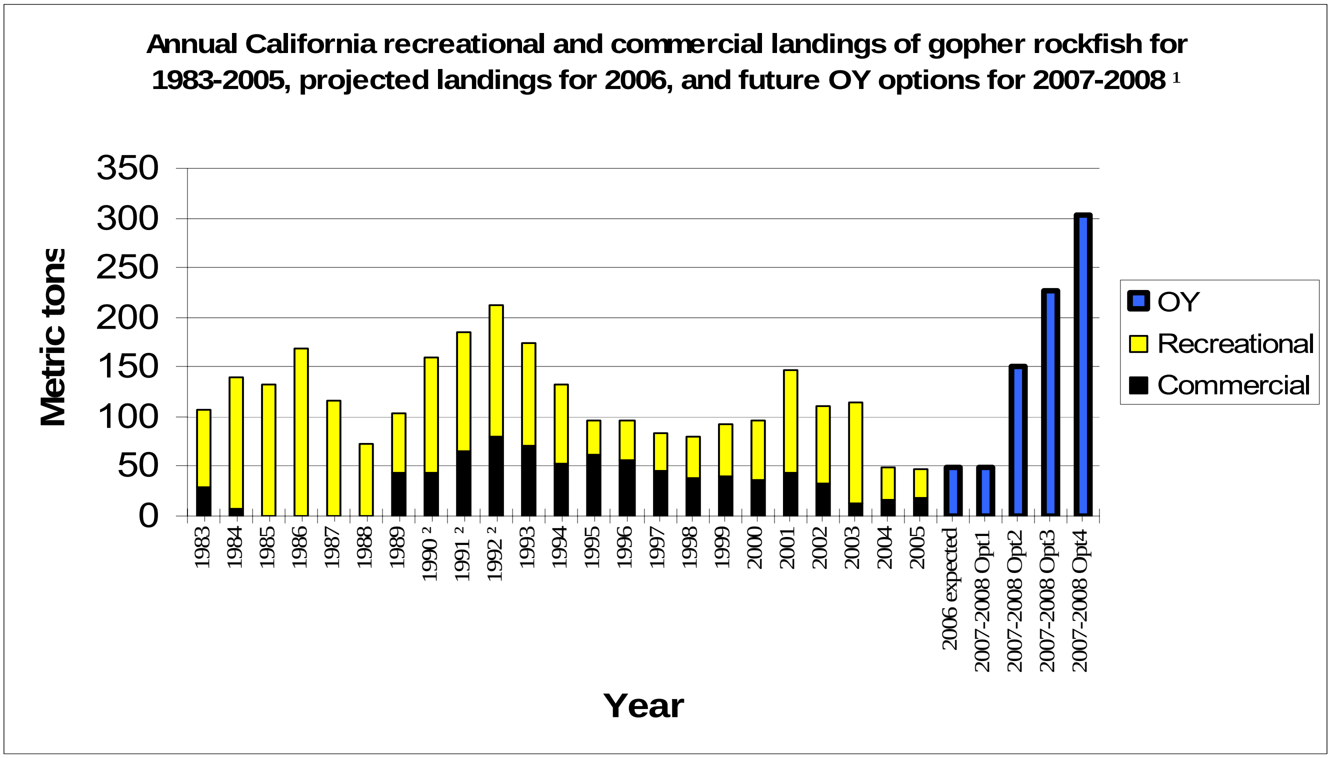


Figure 1. Combined landings of gopher rockfish and future OY options.

[1] 2007-2008 OY options are for the area from Cape Mendocino (40°10') to the CA-Mexico border and will be part of the "Minor Nearshore Rockfish South OY"; gopher rockfish landings from the Oregon border to Cape Mendocino (Humbolt County) have historically comprised less than 1% of the statewide total.

[2] Statewide recreational data from 1983–1989 and 1993–2003 from Marine Recreational Fisheries Statistical Survey (MRFSS); 1990-1992 recreational data from gopher stock assessment 2005 (no MRFSS sampling); 2004-2005 recreational data from California Recreational Fisheries Survey (CRFS); commercial data from 1983–2005 from CalCOM.

Gopher rockfish occurs throughout California but primarily within central California. The gopher rockfish stock assessment only covered the central portion of the stock - from the California/Oregon border (Del Norte County) to Point Conception (Santa Barbara County). Most gopher are taken in the central coast region. This is illustrated in Figure 2 which shows the regional distribution of gopher rockfish catches from 2004 and 2005 were compared by region. The central region contributed at least 95 percent of both the recreational and commercial landings. The North region from the California-Oregon border to Cape Mendocino has a negligible amount of landings in each sector and the Southern region, from Point Conception to the U.S. Mexico border, also contributes a minimal amount of landings to the total. When landings were compared by region for the years 1994 - 1999, before more restrictive groundfish regulations altered landings, and in 2002, prior to the recent decrease in deep water opportunities, the percentages were very similar, so the graphic below only shows the results of 2004-2005.

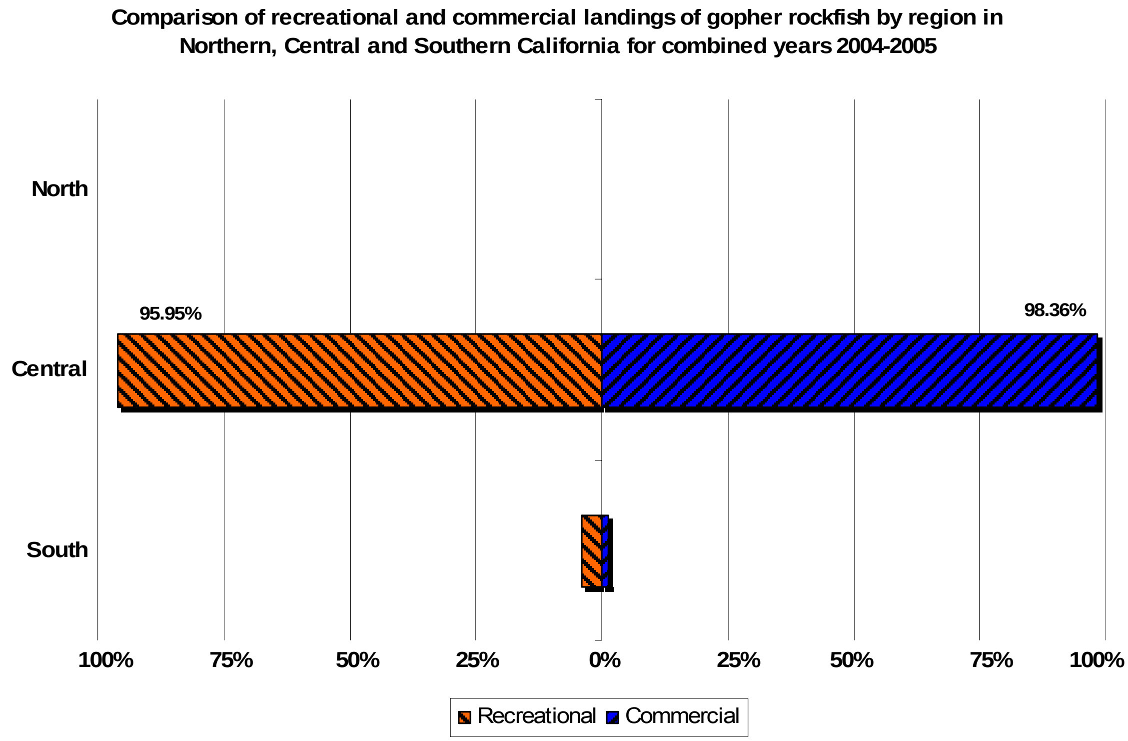
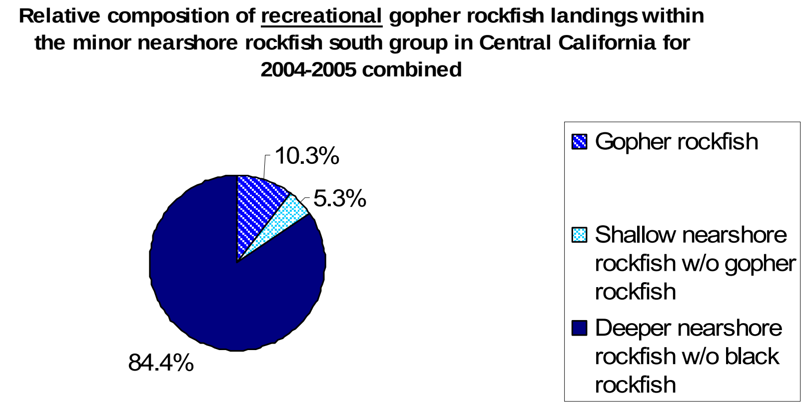
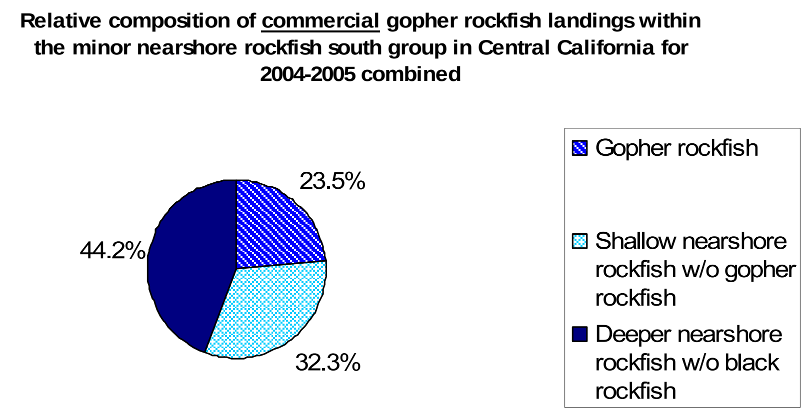


Figure 2. Relative Composition of Gopher Rockfish Within the Minor Nearshore Rockfish South Group* (*California scorpionfish removed)

The following three pie charts (Figure 3) show the contribution of gopher rockfish in 2004-2005 to the minor nearshore rockfish group, with the first two charts showing the contribution for the recreational and commercial sectors within the central part of the state, and the last chart showing the combined recreational and commercial for the area south of Cape Mendocino. This last chart can be used as a representation of what the expected contribution of gopher would be to the minor nearshore rockfish south group under the status quo alternative.

Gopher rockfish are caught in depths that cover the range of both other shallow nearshore species as well as depths where deeper nearshore species are caught. As a result, there is a concern that raising the gopher rockfish portion of the minor nearshore south OY too high will result in additional harvests of the other data poor stocks rather than harvests of gopher rockfish.





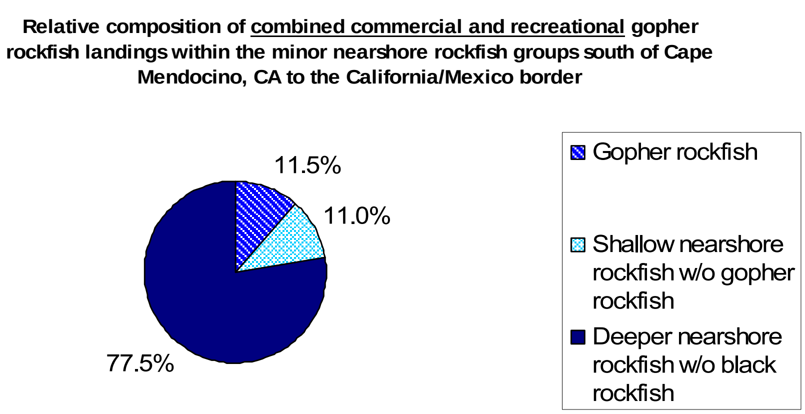
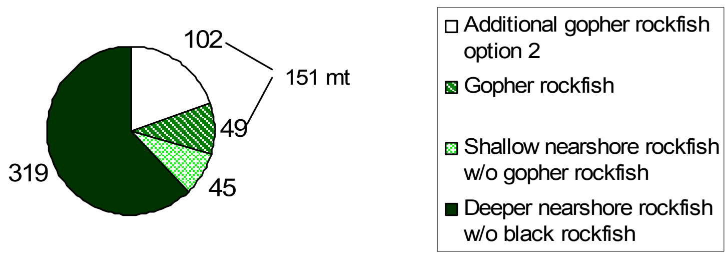


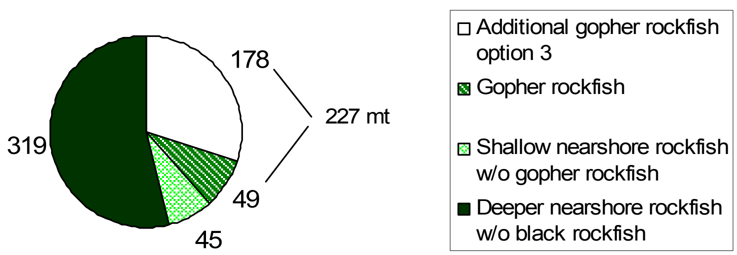
Figure 3. Relative composition of minor nearshore rockfish (w/o California scorpionfish).

The next three pie charts (Figure 4) provide a graphic picture of how much the additional gopher catch would impact the overall take of the deeper and shallow (without gopher) nearshore rockfish groups within the minor nearshore rockfish south OY. As the slice of the pie that represents the additional gopher grows larger, the risks of this catch being taken as other unassessed nearshore species also increases.

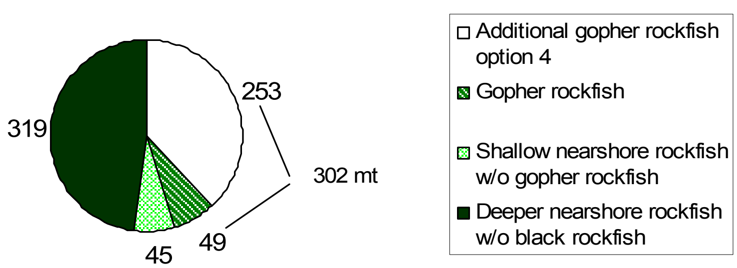
Combined commercial and recreational estimated landings for 2007-2008, in metric tons, of minor nearshore rockfish south group (Cape Mendocino, California to the California/Mexico border) for OY option 2



Combined commercial and recreational landings estimate for 2007-2008, in metric tons, of minor nearshore rockfish south group for OY option 3



Combined commercial and recreational estimated landings for 2007-2008, in metric tons, of minor nearshore rockfish south group for OY option 4

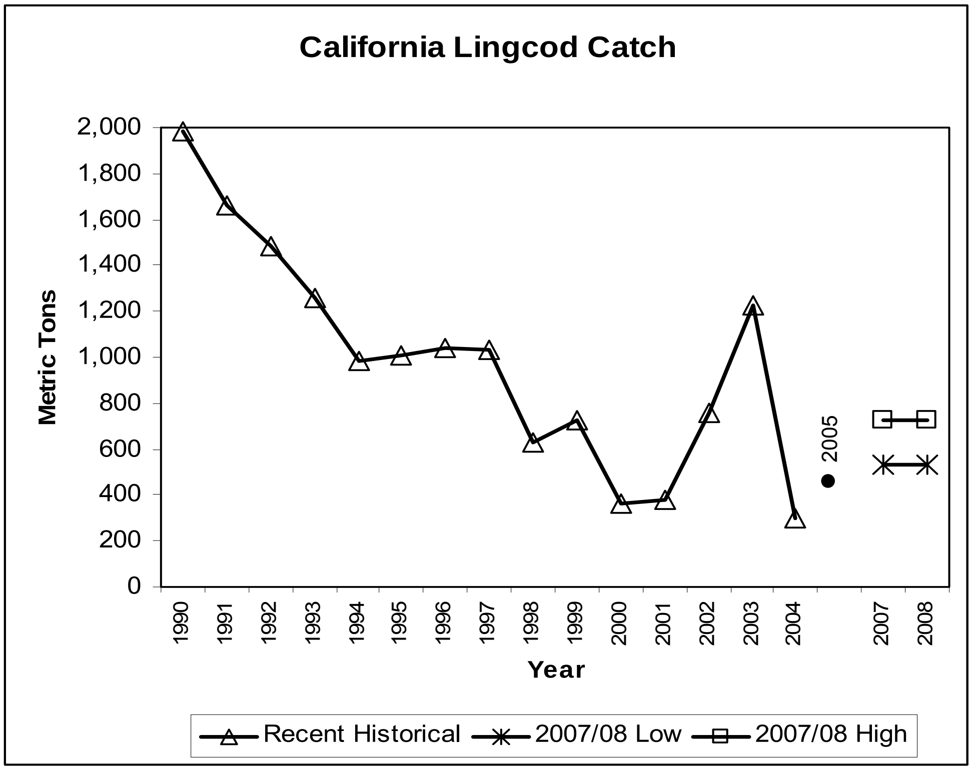


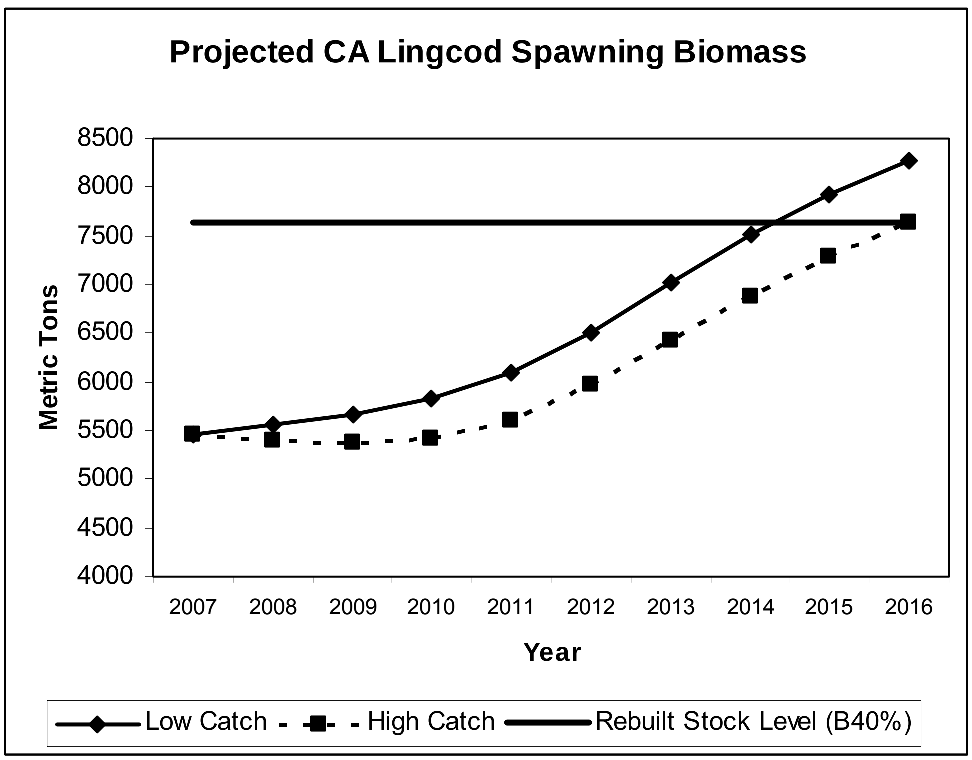
*Minor Nearshore Rockfish South = South of Cape Mendocino to the California/Mexico border

Figure 4. Impact of Adding Increased Gopher Rockfish Catch to the Minor Nearshore Rockfish South* OY (Note: Gopher rockfish comprises 12% of the OY under the Status quo option)

Background Information for Selection of 2007/2008
California Lingcod Optimum Yield (OY)

OY Alternative	PROS	CONS
Low catch scenario (532 mt/yr)	• Accounts for the "depressed" (locally depleted) condition of the California portion of the lingcod population [precedent setting approach] • Encourages faster recovery of that portion of the stock found in California waters	• Results in a catch reduction of approximately 13 percent from current OY levels • Economic cost of lower lingcod catches difficult to absorb under generally reduced groundfish fishing opportunities • Only rebuilds faster by two years under this approach
High catch scenario (746 mt/yr)	• Affords some increased fishing opportunities • Recognizes the coastwide (WA, OR, CA) recovery of lingcod • Provides some increased commercial income and/or recreational angling opportunities and associated industry-related income for a highly desirable species	• Does not consider the "depressed" condition of the California portion of the population and delays any projected recovery by four to five years • Increased lingcod fishing opportunity may result in increased bycatch of overfished rockfish species • Greater risk of further declines in CA abundance due to unforeseen recruitment failures • Greater uncertainty about the status of CA portion of the stock makes this a more risk prone strategy
Status Quo Alternative	• Considers the need for precaution since the southern portion of the stock is still depressed while other portions are recovered • Consistent with current management • "rebuilds" faster than w/o 40_10 adjustment	•


California Lingcod Catch
Metric Tons
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2005
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2007
2008
Year
Recent Historical
2007/08 Low
2007/08 High


Projected CA Lingcod Spawning Biomass
Metric Tons
8500
8000
7500
7000
6500
6000
5500
5000
4500
4000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year
Low Catch
High Catch
Rebuilt Stock Level (B40%)

Background Information for Selection of 2007/2008 California Scorpionfish Optimum Yield (OY)

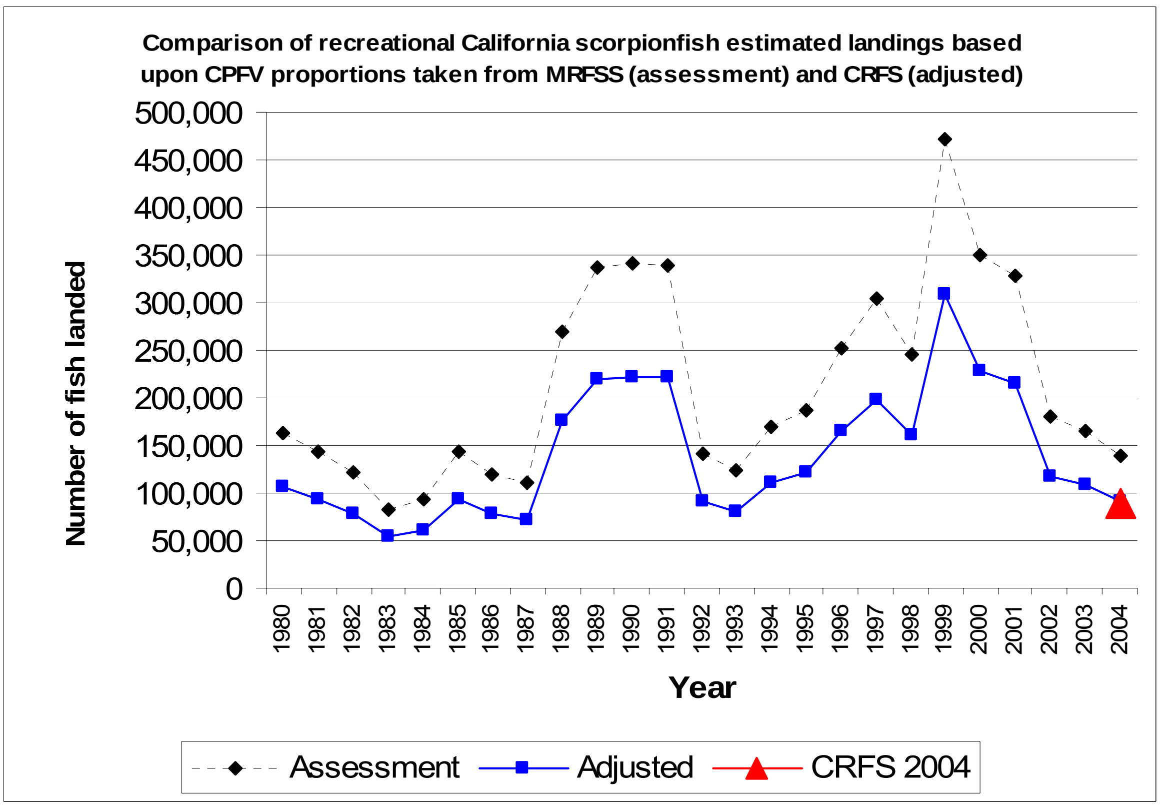
The California scorpionfish assessment used a recreational catch data stream based upon Commercial Passenger Fishing Vessel (CPFV) logbook data expanded to total recreational catch using a proportion of CPFV to total recreational catch (based upon Marine Recreational Fisheries Statistics Survey catch history). The Council's Scientific and Statistical Committee approved this assessment, with the caveat that the ABC/OY from this assessment could only be related to recreational catch calculated in the same manner as this catch stream. CPFV logbook data, while valuable for stock assessment analyses, are not collected in as timely a manner as needed for inseason monitoring. Consequently, a method was derived with the assistance of the primary stock assessment author, Mark Maunder, to modify the ABC/OY from the assessment so that it could be tracked using California Recreational Fisheries Survey (CRFS) catch estimates. This method takes the recreational portion of the stock assessment ABC/OY, multiplies it by the CPFV proportion calculated from the MRFSS data, and then divides it using the proportion of CPFV catch observed in the 2004 CRFS data.

Both the original stock assessment ABC/OY and the modified stock assessment ABC/OY are provided as alternatives for California scorpionfish. Both alternatives are based upon the assessment model that includes sanitation district data. The first alternative provides the modified ABC/OY. The second alternative provides an ABC/OY of 219 mt based on an average of the 2007 and 2008 ABC/OYs from the stock assessment (2007 = 236 mt, 2008 = 202 mt).

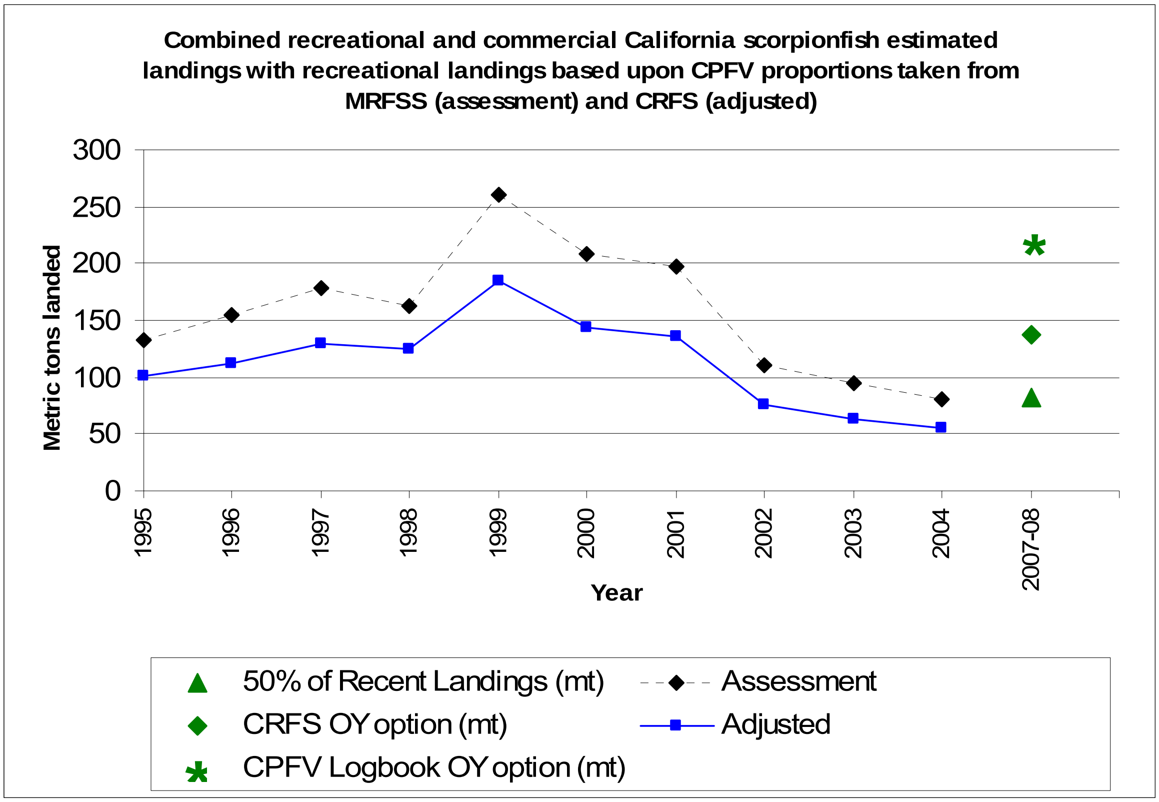
OY Alternative	PROS	CONS
Catch scenario based on California Recreational Fisheries Survey (CRFS) estimates (137 mt/yr)	• Allows for inseason monitoring of this species using the CRFS program • By incorporating the ability to make inseason adjustments, results in reduced risk of either not achieving or overshooting the OY	• Can result in mid-year changes to regulations
Catch scenario based on an expansion of Commercial Passenger Fishing Vessel (CPFV) logbooks (219 mt/yr)	• Simplifies management and regulation process	• Does not allow for inseason monitoring of this species; catches can only be evaluated on an annual basis • Results in increased risk of either not achieving or overshooting the OY

When examining the take of CA scorpionfish for the years used to calculate the 2003 minor nearshore rockfish south OY (based on 50% of recent landings), the recreational sector took about 75% of the fish while the commercial took around 25%. In more recent years (2000-2004), with both sectors being regulated to some extent, the recreational sector has taken a higher percent, ranging between 87.7% and 94.3%, with 93.7% of the 2004 take attributed to recreational anglers.

The graph below only shows the recreational take (in numbers), with one set of catch taken directly from the stock assessment (based on the historic proportion of CPFV to total catch observed in the MRFSS data) and the other adjusted to use the proportion of CPFV to total catch that was observed in the 2004 CRFS data. In addition, the 2004 CRFS estimate (in numbers) is provided as well.



The following graphic shows the combined recreational and commercial take in metric tons with recreational take calculated with the CPFV proportion from MRFSS (assessment) and from CRFS (adjusted). The two OY alternatives plus the status quo (50% of recent landings) are also provided. As can be seen from the graph, the lower OY is more in line with the catch history that uses the CRFS proportion.


Combined recreational and commercial California scorpionfish estimated landings with recreational landings based upon CPFV proportions taken from MRFSS (assessment) and CRFS (adjusted)
Metric tons landed
300
250
200
150
100
50
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2007-08
Year
50% of Recent Landings (mt)
CRFS OY option (mt)
CPFV Logbook OY option (mt)
Assessment
Adjusted

GROUNDFISH ADVISORY SUBPANEL COMMENTS ON MANAGEMENT SPECIFICATIONS FOR 2007-2008 FISHERIES

The Groundfish Advisory Subpanel (GAP) considered options for acceptable biological catches (ABCs) and corresponding optimum yields (OYs) for the 2007-2008 management cycle. There are three parts to this statement: the first contains general comments on the economic conditions in the groundfish fishery; the second covers OY recommendations for overfished species and includes detailed rationale; and the third section presents OY recommendations for non-overfished species.

General Economic Conditions

Members of the GAP representing all sectors of the industry continue to voice their desires to be allowed to fish over the long-term. While present fishing opportunities are important to the GAP, the GAP is very aware that present management measures must be conservative enough to sustain and rebuild stocks in order to sustain and increase the future health of the fishery and dependent fishing communities. At the same time, taking into consideration the needs of fishing communities is critical. If communities and fisheries sectors cannot survive short-term restrictions, longer-term efforts at sustainability apply only to the biology of fish – not to sustainable communities. The GAP believes the relationship between sustainable fishing communities and stable fisheries stocks is intrinsic, and preserving both for the long-term is not only worthwhile but a necessity. With this in mind, the GAP notes the following with respect to the level of distress in the current fishery.

Generally from 1981 through 1997 the exvessel value of the commercial non-whiting groundfish fishery ranged from $80 to $100 million. In 1998, the first year of the groundfish disaster, the value of the entire non-whiting groundfish fishery was $61 million. The disaster was officially declared in 2000, and from 2002 through 2005 exvessel value of the fishery ranged from approximately $40 to $45 million.

During this time of reductions many fishing businesses and several seafood processors have gone out of business. Secondary and tertiary businesses associated with the fishing industry have also suffered. The additional hardship of increased fuel costs has only made it more difficult to maintain business plans.

Reductions in the salmon fishery will also affect fishing communities and some of the same vessels affected by groundfish reductions. For 2006, these reductions may potentially reduce exvessel revenue south of Cape Falcon to near zero, about $20 million less than in 2005, and reduce recreational angler days by about 220 thousand. The combined effects on communities may be about $56 million in income impacts. These values are based on Option III of the Preseason Salmon Report II.

Taking into consideration the needs of fishing communities goes beyond simple economics. Socioeconomic effects are also a major part of the discussion. It is a fact that unemployment rates are higher for older individuals who have a more difficult time transitioning to new employment opportunities. This type of information is difficult to quantify, but we know there are detrimental social consequences when businesses are suffering financially and closing their doors altogether.

Incentives for improved science, management, and fishing practices should always be encouraged and explored. However, the one control the Council has for decision-making today on rebuilding plans is controlling fishing effort.

On the basis of the current distress in the fishery, the array of tradeoffs between present and future production, and the levels of economic activities that each of these OYs affords, the GAP has the following specific recommendations.

GAP Recommendations for OYs for Overfished Species

The following is a summary of the GAP recommendations:

Species	2007 OY	2008 OY
Yelloweye Rockfish	23 mt	20 mt
Canary Rockfish	44 mt	44 mt
Cowcod	8 mt	8 mt
Bocaccio	315 mt	315 mt
Darkblotched Rockfish	330 mt	330 mt
Pacific Ocean Perch	405 mt	405 mt
Widow Rockfish	456 mt	456 mt

References in the following sections to specific page numbers refer to Agenda Item F.1.a., Attachment 4.

YELLOWEYE ROCKFISH

Recommendation

The GAP supports a ramp-down approach for yelloweye rockfish which results in the following OYs:

- 2007 OY, 23 mt
- 2008 OY, 20 mt
- 2009 OY, 17 mt
- 2010 OY, 15 mt

Impacts of OY recommendation

This "ramp-down" approach incorporates a reduced OY on a yearly basis; however the proposal from the GAP would set 15 mt as the lower bound on the OY. The GAP notes that under the first year of this ramp-down approach the OY would be 23 mt, 51% below the sustainable ABC of 47 mt. The 2007 OY also represents a 15% reduction from 2006. Under a ramp-down to 13.5 mt, it is estimated that rebuilding times could increase by approximately 7 months. The rebuilding delay for the 15 mt minimum harvest recommended here has not been calculated.

The GAP believes the yelloweye stock will be rebuilding under this scenario in the shortest time possible while taking into consideration the biology of the stock and the needs of the fishing communities. However, the GAP recognizes that anything lower then a 15 mt OY is tantamount to a zero fishery. The GAP encourages the Council to consider what level of OY is really too low to successfully prosecute a fishery.

Impacts of Lower OY recommendations
If the yelloweye rockfish OY is set at zero there will be catastrophic short and long-term effects on the fishing industry and the fishing communities of the West Coast. Yelloweye rockfish are currently caught in several fisheries including:

- Research Fisheries
- Limited Entry Trawl – Non Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Groundfish Fisheries
    - Pink shrimp
    - Salmon troll
- Washington Recreational Fisheries
- Oregon Recreational Fisheries
- California Recreational Fisheries

With a zero harvest for yelloweye rockfish all of these fisheries would be severely restricted or completely eliminated.

Anything less then a ramp-down approach will result in disastrous short- and long-term results to the fishing industry and fishing communities on the West Coast. For example, if the OY is set at 12 mt (as specified under OY Alternative 2) impacts occur in the following fisheries:

- Commercial
    - Fixed Gear Sablefish Fisheries- Yelloweye is the largest component of overfished species mortality in this sector, and a reduction of approximately 0.2 mt of yelloweye rockfish would correspond to a reduction of approximately $1.8 million in exvessel revenues (holding area closures constant). (Page 5)
    - Northern open access will lose almost $1 million in exvessel revenues when reducing available catch from 3.2 mt to 0.05 mt of yelloweye. In the northern area, there are many small ports that rely on open access boats to support their infrastructure – they will suffer economic losses at an accelerated rate when compared with larger ports.
    - The limited entry trawl fishery in Washington expects further restrictions to their remaining summer flatfish fisheries, arrowtooth and beach fisheries.

- Recreational
    - Oregon recreational fisheries would only be open for 2 months out of the year and would be constrained to within 20 fathoms. Immediate losses to the industry include a minimum of $6.6 million annually which may result in total collapse of a $30 million charter industry.

- The Oregon charter industry accounts for 70% of the recreational catch of groundfish in Oregon – they rely predominantly on groundfish fisheries and would not be able to maintain their businesses at all without it.
- Support industries for private recreational fisheries would also suffer economic losses.
- Washington and Oregon estimate a loss of their entire halibut fishery (estimated to be at least 16,000 fish). With a catch per unit of effort of nearly 1 fish per angler and an estimated impact of $200 per angler day, the resulting direct losses for this fishery alone could be $3.2 million.

- Research
  - All research opportunities (fishery dependent and fishery independent) will be completely eliminated

Justification for Recommendation
The ramp-down OY method for yelloweye rockfish allows the fishing industry and managers a period of time to adjust to the rebuilding OY and to consider additional management measures to help mitigate yelloweye catch and/or interaction with other fisheries. Without the ramp-down approach, all opportunities for additional research will be eliminated or require costly reductions in the fisheries. Finally, the data stream for future stock assessments is truncated and no new information will be available to update assessments.

CANARY ROCKFISH
Recommendation
The GAP recommends an OY of 44 mt for 2007-2008.

Impacts of Recommendation
A 44 mt OY is equal to approximately 25% of the Council's preferred ABC for 2007 (172 mt) and represents a 6% decrease in OY from 2006. This OY results in the stock being rebuilt in 2063, 15 years longer than T_{min}.

Canary rockfish has constrained fisheries severely prior to now and these constraints will continue into the future with a 44 mt OY in place for 2007-2008. The current total annual catch of canary rockfish reflects approximately 1% of the peak catches seen in the early 1980s.

- All shelf opportunities have been constrained and or closed prematurely
- The trawl yellowtail fishery has been essentially eliminated
- All inshore trawl opportunities have been eliminated
- The mid-water trawl rockfish fishery was eliminated due to canary bycatch
- The trawl arrowtooth fishery has all but been eliminated
- Fixed gear fisheries have had the Rockfish Conservation Area (RCA) north of 40:10 reinforced at 100 fathoms
- Fixed gear fisheries have had the RCA south of 40:10 reinforced at 150 fathoms

Impacts of Lower OY Recommendations

If the canary rockfish OY is set at zero there will be catastrophic short- and long-term effects on the fishing industry and the fishing communities of the West Coast. Canary rockfish are caught in essentially all of the major fishery sectors including:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Directed Incidental Groundfish Fisheries
    - California Halibut
    - Pink Shrimp
    - Salmon Troll
- Washington Recreational Fisheries
- Oregon Recreational Fisheries
- California Recreational Fisheries

These fisheries would have to be eliminated in their entirety to achieve zero take of canary rockfish. Furthermore, zero take of canary rockfish eliminates research efforts and sharply curtails the data stream necessary for updating the stock assessment.

If the canary rockfish OY is set at 24 mt there will be disastrous short- and long-term effects on the fishing industry and the fishing communities of the West Coast. This level represents approximately half of what is currently available to the fisheries.

- Commercial Impacts
    - Trawl fisheries inside of 150 fathoms would not exist, 4 tons available (1/2 of current catch) result in a $4,000,000 reduction. (Figure 6, Page 9).
    - Open Access fisheries would be forced inside of 20 fathoms with reductions between 20%-30% of current catch in minor nearshore species. A reduction in the catch of canary rockfish from 0.33 mt to 0.07 mt would cost approximately $400,000 (holding area closure constant). (Page 6, Anecdotal Industry Information).
    - Whiting Fishery – A 50% reduction in the current amount of canary available to the fishery (50% of 4.7 mt = 2.3 mt) could result in a loss of over $8 million. (Figure 2, Page 5).
- Recreational Impacts
    - Oregon fisheries will be constrained to inside of 20 fathoms year-round
    - Halibut fisheries off of Oregon will be constrained
    - Possible early closure for Oregon black rockfish will occur with increased pressure inside
    - California fisheries north of 40°10' will be reduced to 3 months from 6 months and be forced inside of 20 fathoms.
    - North central California fisheries will lose October resulting in almost $2 million dollars of direct loss to the industry. This number could double if you include Santa Cruz, Moss Landing, and Monterey. These numbers are estimates of fares only, no wages, fuel, bait, secondary and tertiary businesses, etc.

A 24 mt OY for canary puts the entire coast at jeopardy. Any one fishery could pre-empt the rest of the fisheries and shut down seasonal opportunities for all sectors.

Justification for Recommendation
The most recent canary stock assessment reports that the biomass has been increasing since 2000. As the canary stock continues to rebuild the interaction with canary rockfish during fishing operations will continue to grow. Cooperative research currently being conducted indicates that some of the assumptions in the stock assessment surrounding older female fish are inaccurate and that inclusion of the new information would show the stock is actually at larger levels than currently believed.

COWCOD
Recommendation
The GAP recommends an OY of 8 mt for cowcod in 2007-2008.

Impacts of Recommendation
An 8 mt OY is 47% of the Council's preferred sustainable ABC (17 mt) and will rebuild the stock in 37 years versus the 29 years it would take to rebuild with a zero harvest.

Impacts of Lower OY Recommendations
If the cowcod OY is set at zero there will be catastrophic short- and long-term effects on the fishing industry and the fishing communities of the West Coast. Cowcod are caught in the following fisheries:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed Groundfish Fisheries
- California Recreational Fisheries

Presumably under a zero harvest of cowcod all of these fisheries would be severely restricted or eliminated. California recreational fisheries would be pushed into 30 fathoms from 34°27' to the U.S./Mexican Border resulting in a $10-15 million dollar direct loss.

Any OY set at less then 8 mt will result in potential closures as current fisheries run into the OY.

Justification for Recommendation
The ABC for cowcod more than tripled with the new assessment, from 5 mt to 17 mt. The OY for 2006 was 2.1 mt, 58% below the ABC. With a 17 mt ABC, the status quo rebuilding policy would result in an OY of 5 mt, 71% below the ABC. An OY of 8 mt would be 53% below the ABC, relatively more aggressive rebuilding relative to the 2006 fishery.

An 8 mt OY for Cowcod represents an 80% probability of rebuilding. As this stock continues to rebuild there will presumably be higher incidence of interactions with this stock.

BOCACCIO
Recommendation
The GAP recommends a 315 mt OY for 2007-2008.

Impacts of Recommendation
An OY of 315 mt is 52% of the Council's preferred sustainable ABC of 602 mt in 2007. An OY of 315 mt reflects a probability of rebuilding of around 65% and results in the bocaccio stock being rebuilt in 2029, eleven years longer than T_{min}.

Furthermore this fishery has constrained or eliminated other fisheries, for example, the spot and ridgeback prawn trawl fisheries, the California halibut fishery, sea cucumber fishery, overall open access California groundfish fisheries, and all of California groundfish recreational fisheries.

Impacts of Lower OY Recommendations
If the bocaccio OY is set at zero there will be catastrophic short- and long-term effects on the fishing industry and the fishing communities of the West Coast. Bocaccio are caught in the following fisheries occurring south of 40° 10'.

- Research Fisheries
- Limited Entry Trawl Non-whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Fisheries
  - California halibut
  - California gillnet
  - CPS wetfish
  - Pink shrimp
  - Ridgeback prawn
  - Salmon troll
- California Recreational Fisheries

Presumably under a zero harvest of bocaccio all of these fisheries would be severely restricted or eliminated.

Setting an OY less then 315 mt will constrain or close fisheries as they run into the lower OY.

Justification for Recommendation
The bocaccio biomass is increasing at an accelerated rate. Interactions with bocaccio will continue to increase as the stock continues to rebuild. Dr. Alec McCall reports that there is strong evidence that two strong year classes are moving into the fishery.

DARKBLOTCHED ROCKFISH
Recommendation
The GAP recommends an OY of 330 mt for 2007-2008.

Impacts of Recommendation

An OY of 330 mt is 72% of the Council's preferred sustainable ABC of 457 mt. A harvest guideline of 229 mt is 50% of the ABC. The 330 mt OY results in a rebuilt stock by 2010.5, a 1 year increase from T_{min}. Fisheries that have already been constrained by reductions in available darkblotched include:

- Trawl Slope Rockfish Fisheries
- Petrale Sole Winter Fishery
- Whiting Fishery

Impacts of Lower OY Recommendations

Darkblotched rockfish is currently taken in several West Coast fisheries including:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed-gear Fisheries
- Open Access Directed Groundfish Fisheries

A zero harvest for darkblotched rockfish would eliminate or severely restrict all of these fisheries as well as fisheries dependent and fisheries independent data for stock assessments.

Setting OYs less then 330 mt will constrain or close fisheries as they run into the lower OYs.

Justification for Recommendation

As the darkblotched rockfish stock rebuilds, the interactions with these fish will continue to increase. The current 200 mt OY was imposed as an interim OY pending the development of a rebuilding plan; it was not intended to be a rebuilding OY.

PACIFIC OCEAN PERCH

Recommendation

The GAP recommends a 405 mt OY for 2007-2008.

Impacts of Recommendation

A 405 mt OY is equal to 45% of the Council's preferred sustainable ABC of 900 mt in 2007. This OY corresponds to a rebuilding plan which has the stock rebuilt in 2021, 7 years longer than a zero harvest alternative.

Impacts of Lower OY Recommendations

Pacific Ocean perch is currently taken in several West Coast fisheries including:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed-Gear Fisheries
- Open Access Directed Groundfish Fisheries

A zero harvest for Pacific Ocean perch would eliminate all of these fisheries as well as fisheries dependent and fisheries independent data for stock assessments.

Justification for Recommendation
As Pacific Ocean perch continues to rebuild, interactions with the stock will continue to increase. There are significant problems associated with attempting to rebuild a stock which is occurring on the extreme southern fringe of its geographic range. This stock has been under rebuilding scenarios of one kind or another for about thirty years. The GAP encourages the Council to consider whether we are attempting to manage to incorrect levels by not considering the biomass of the stock over a larger portion of its range.

WIDOW ROCKFISH
Recommendation
The GAP recommends a 456 mt OY for 2007-2008.

Impacts of Recommendation
A 456 mt OY is equal to 8% of the Council's preferred sustainable ABC of 5,334 mt in 2007. This OY corresponds to a rebuilding plan which results in the stock being rebuilt by 2016, 3 years longer than zero harvest.

Impacts of Lower OY Recommendations
Widow rockfish are currently taken in several West Coast fisheries including:

- Research Fisheries
- Limited Entry Trawl Non-Whiting Fisheries
- Limited Entry Trawl Whiting Fisheries
- Limited Entry Fixed Gear Fisheries
- Open Access Directed Groundfish Fisheries
- Open Access Incidental Groundfish Fisheries
    - Pink shrimp
    - Salmon troll
- Oregon Recreational Fisheries
- California Recreational Fisheries

A zero harvest of widow rockfish would eliminate all of these fisheries and discontinue current research efforts resulting in no new information for stock assessments.

Widow rockfish OYs set lower then 456 mt could constrain or close fisheries if they bump up against the OY.

Justification for Recommendation
The most recent stock assessment revealed that widow rockfish was never overfished and is rebuilding rapidly. Finally, interactions with widow rockfish will continue to increase as the stock continues to grow.

GAP Recommendations for OYs for Non-Overfished Species

Species	GAP Recommended OY
Lingcod coastwide	6,280 mt
Pacific cod	1,600 mt
Sablefish Coastwide	5,934 mt
N of 36°	5,723 mt
S of 36°	210 mt
Shortbelly	13,900 mt
Chilipepper	2,700 mt
Splitnose	461 mt
Yellowtail	4,548 mt
Short Spine	
N of 34°	1,634 mt
S of 34°	421 mt
Long spine coastwide	3,930 mt
N of 34°	2,989 mt
S of 34°	941 mt
Nearshore Species	
Black Rock (WA)	540 mt
Black Rock (OR & CA)	722 mt
Minor Rockfish North	2,290 mt
Nearshore Species	162 mt
Shelf Species	968 mt
Slope Species	1160 mt
Remaining Rockfish North	1,216 mt
Bocaccio	
Chilipepper – Eureka	
Redstripe	432 mt
Sharpchin	230 mt
Silvergrey	29 mt
Splitnose	182 mt
Yellowmouth	74 mt
Other rockfish North	1034 mt
Minor rockfish South	2,006 mt
Nearshore	666 mt
Shelf species	714 mt
Slope species	626 mt
California scorpionfish	219 mt
Cabezon (off CA only)	69 mt
Dover sole	28,482 mt
English sole	6,237 mt
Petrale sole coastwide	2,883 mt
Columbia and US vanc.	1347 mt
Eureka, Montery & conc	1536 mt
N of 40°	1752 mt
S of 40°	1,131 mt
Arrowtooth flounder	5,800 mt
Starry flounder	1,186 mt
Other flatfish	4,884 mt
Other fish	7,300 mt

CONCLUSION

The GAP wishes to remind the Council that simply maintaining current levels of fishing is not adequate to preserve the long-term viability of the fishing industry and the communities which rely heavily on fisheries. Presumably science is always improving and changing rapidly from year to year. We are considering dramatic short-term fishery modifications based on rebuilding plans that stretch many years into the future. The possibility that the stock assessments will report varyingly different results between now and then is likely. Rebuilding stocks is critical to the long-term health of fisheries and communities, but only if we can preserve the harvesters, processors, recreational businesses, and larger communities as well.

PFMC
04/04/06

Agenda Item F.1.c
Supplemental GMT Report
April 2006

GROUNDFISH MANAGEMENT TEAM REPORT ON
MANAGEMENT SPECIFICATIONS FOR 2007-2008 FISHERIES

The Groundfish Management Team (GMT) reviewed the materials found in Agenda Item F.1 of the April Council briefing book keeping in mind the Council's direction to 'rebuild as quickly as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction within the marine ecosystem'. This material shows that the seven overfished species have varying levels of depletion, rebuilding times that have varying degrees of sensitivity to changes in the Optimum Yield (OY), and varying impacts to fishing communities.

As Quickly As Possible

For each of the overfished species, Table 2-1 in Agenda Item F.1.a, Attachment 3, shows Alternative 1 Optimum Yields (OYs) as zero harvest. The zero harvest levels for overfished species are intended to provide an alternative for analysis that considers the effects of rebuilding overfished stocks within $T_{F=ZERO}$, which is the time to rebuild if fishing were to cease beginning 2007. Having no harvest of overfished species at all does not take into account the needs of fishing communities; however, the $T_{F=ZERO}$ rebuilding times provide the Council with a reference for "as quickly as possible." Table 3 of this statement also provides $T_{F=ZERO}$ for each overfished species and comparative rebuilding periods under different potential harvest scenarios.

Taking into Account the Status and Biology of the Stock

Depletion. Based on the most recent round of assessments, each overfished species is estimated to be at a different level of depletion relative to its unfished stock biomass. The relative level of depletion, combined with other biological characteristics of the stock, influences the sensitivity of a stock's rebuilding time to changes in OYs.

Sensitivity. The overfished species also have varying degrees of sensitivity to changes in the OYs (in cases where the OY is tied to a constant harvest rate). This means that estimated times to rebuild change to varying degrees as overfished species OYs change. Table 1 ranks the overfished species by sensitivity, with a rank of 1 for the most sensitivity and a rank of 4 for least sensitive to changes in OY. If the Council uses the sensitivity of rebuilding times to changes in the OY to determine which species should have the most focused protection, then cowcod, yelloweye, and canary should be afforded the most protection.

Research. Research projects are typically proposed after the beginning of the fishing year. The anticipated harvest of overfished rockfish that would occur from these research projects must be accounted for within the OY. The past practice of the Council has been to deduct anticipated research catches from Council-adopted OYs; therefore, the GMT has included the anticipated catches in the bycatch scorecard. For the past few years, the amount of overfished species taken in research has been in the 1.0-3.0 mt range for each species (with the exception of cowcod, which has had 0.1 mt of research catch). Therefore, the GMT recommends that overfished species OYs include small amounts (2.0-3.0 mt) to accommodate research on overfished and co-occurring species, and that those amounts be set aside through the end of the fishing year. The GMT believes that rebuilding stocks while taking into account the status and biology of overfished stocks requires continued research that improves scientific information on those stocks.

Taking into Account the Needs of Fishing Communities

Vulnerability and Resilience. The socioeconomic analysis provided under agenda item F.1 (F.1.a., Attachment 4) shows that overfished species have different impacts on different sectors, communities, and regions. Different communities are more or less resilient to changes in available harvest levels and are more or less dependent on fishing. Each of the rebuilding alternatives has a different distributional impact on ports and communities. Table 1 ranks overfished species according to their breadth of effects on communities, with a rank of 1 indicating effects on the greatest number of sectors and communities, and a rank of 4 indicating effects on the fewest number of sectors and communities.

Table 1 Summarized Comparison of Biological and Socioeconomic Information under Agenda Item F.1 in Briefing Book

Species	Depletion	Year stock is rebuilt with no fishing	Sensitivity of rebuilding year to changes in a constant harvest rate OY (rank)	Impact to Communities of changing OY (rank)
Bocaccio rockfish	0.11	2022	3	2
Canary rockfish	0.09	2048	2	1
Cowcod	0.17	2035	1	2
Darkblotched rockfish	0.17	2009.5	4	3
Pacific Ocean perch	0.23	2014	3	3
Widow rockfish	0.31	2013	3	4
Yelloweye rockfish	0.17	2050	1	2

Recent Harvest Levels. The GMT has provided Table 3, below, so that the Council may compare recent overfished species harvest levels against their OYs. We do not believe that recent harvest levels meet the needs of fishing communities. Table 3 also provides rebuilding period comparisons between the durations of rebuilding periods under zero harvest scenarios and recent harvest scenarios.

Uncertainty and Management Flexibility. For the past several years, the GMT has used an overfished species bycatch scorecard to project pre-season, and then track inseason, the amounts of different overfished species taken in a wide variety of fisheries. As we have stated in the past, information available on the different fisheries varies in both its quality and abundance – both pre-season, and as we proceed through the seasons.

There is some uncertainty in each pre-season projection of overfished species mortality, and in recent years, some projections have proven to be underestimates while other projections have proven to be overestimates. When overfished species estimates of catch have been exceeded in the past for constraining species, there has been enough flexibility in the management system to allow the fishery to move to areas where other, less constraining overfished species are found. The GMT believes that the groundfish management system must include some management flexibility in order to account for interactions between the different overfished species and between the fisheries that target the more healthy stocks that co-occur with overfished species. Setting overfished species' OYs so that they allow some management flexibility would take into account the needs of fishing communities by providing the opportunity for more management stability inseason.

The GMT recommends that management measures buffer for uncertainty by providing some room between the pre-season projection of what the fisheries are likely to take of a particular species and that species' OY. This means that not every last tenth of a metric ton of overfished species OY will be accounted for in the bycatch scorecard's estimated fisheries' harvest levels. We anticipate that this approach would allow us to use new and developing information that we receive inseason in 2007 and 2008 to improve our ability to protect overfished species' OYs from being exceeded. Properly addressing uncertainty as a part of an overfished species OY aids in addressing both the status and biology of the stock and the needs of fishing communities. Therefore, species-specific recommendations on uncertainty are provided the next section on integrating these two concepts.

Interactions within the Marine Ecosystem: Integrating the Status and Biology of the Stock with the Needs of Fishing Communities

For 2007-2008, the Council is integrating the different overfished species OYs to ensure that management reflects the links between those species and the fisheries that affect them. As shown in Table 1, above, the rebuilding times for cowcod, yelloweye, and canary are generally the most sensitive to shifts in their OY levels. The species with the largest impact to communities have been canary, yelloweye, bocaccio, and cowcod. Thus, the stocks that appear to need the most protection from a biological perspective also appear to have the broadest distribution in their effects on fishing communities.

In some instances, the impact to one overfished species can be traded against an impact to another overfished species without changing total economic impacts to any large degree. The Council could, for example, target a reduction in the catch of canary rockfish (a species with a rebuilding time that is relatively sensitive to changes in OYs) in the trawl sector by crafting management measures that move the trawl fishery offshore and increase the catch of darkblotched rockfish (a species with a rebuilding time that is relatively insensitive to changes in OYs). This could be an effective way of reducing the OY of sensitive overfished species, while mitigating against potential economic losses as a result of decreasing that OY. However, there are likely to be distributional impacts across communities and sectors from using this approach. Given the relative sensitivity of rebuilding times for each overfished species to changes in the OY, the GMT believes that those species that are relatively less sensitive could have higher OYs (be made less constraining) than the more sensitive overfished species. Relatively higher OYs for less sensitive species will have a relatively minor impact on the time to rebuild while providing for management flexibility and practicability for management agencies.

Integrating Uncertainty Issues for Particular Overfished Species The GMT recommends that the Council include a portion of the OY to address uncertainty in stock assessments, catch projections, and catch estimates. The GMT notes that the stock assessments for cowcod and yelloweye are the least informed by data. For example, neither of these assessments contain data from fishery independent surveys. Other factors to consider could include the degrees to which the GMT's preseason catch projections differ from the actual post-season catch estimates, the robustness of observer data available to estimate discards by sector, and the precision of the states' recreational catch estimation methods.

Bocaccio. The bocaccio stock assessment demonstrates that recruitment is highly variable; anecdotal evidence suggests there may be a strong incoming year-class. Should this strong year-class become evident, past experience indicates that young bocaccio are difficult to avoid for most fisheries and, consequently, encounter rates would be expected to increase. Additionally, the commercial trawl bycatch rates for bocaccio were lower than expected by a significant amount (100-200%) in recent years, and fixed gear West Coast Groundfish Observer Program (WCGOP) data, especially for the area south of 40°10'N. lat., is fairly sparse. Also, a new catch sampling program for the California recreational fishery (i.e., California Recreational Fishery Survey, or CRFS) was recently introduced. Therefore, the Council may wish to consider a relatively high amount of yield (e.g., around 15-20 mt) to address uncertainty for bocaccio; the GMT estimates that this would add approximately 2-3 months to the median time to rebuild.

Canary. For canary, the commercial trawl bycatch rates were lower than expected by a factor of 75-100% in recent years, and WCGOP data for fixed gear is fairly sparse. The state recreational fishery estimates, in general, have been more precise for Oregon and Washington; however, the CRFS program in California was recently implemented and precision has not been evaluated. Therefore, the Council may wish to consider including a small to amount of OY (e.g., 2-3 mt) to cover this uncertainty; however, given the sensitivity of canary to changing OYs, adding 2 mt would increase the median time to rebuild by 2 years.

Cowcod. While the cowcod stock assessment is very data poor, the GMT believes that the use of the Cowcod Conservation Areas appropriately keeps the catches of cowcod to an acceptable level, and the GMT-recommended cowcod OY would already account for uncertainty in catch estimates.

Darkblotched. For darkblotched, the commercial trawl preseason bycatch rate projections were lower than expected by as much as 250% as compared to post-season catch estimates in recent years. However, the GMT has significantly increased the precision in its catch estimation methodology over the past year, especially for darkblotched. This species is not subject to catch by fixed gear and recreational fisheries, simplifying catch estimates. The GMT notes that this species that is nearing its rebuilt level, so there would likely be increased encounter rates for darkblotched in 2007 and 2008. Therefore, the Council may wish to consider including a relatively high amount of OY (e.g., around 20 mt) to cover this uncertainty; the GMT estimates that this would add less than a month to the median time to rebuild.

Pacific Ocean Perch. The commercial trawl preseason bycatch rate projections for Pacific Ocean perch (POP) were lower than expected by as much as 100% as compared to post-season catch estimates in recent years. However, the GMT has significantly increased the precision in its catch estimation methodology over the past year, especially for trawl and, like darkblotched, POP is not subject to catch by fixed gear and recreational fisheries. On the other hand, POP is also nearing its rebuilt level, so there would likely be increased encounter rates for POP in 2007 and 2008. Therefore, the Council may wish to consider including a relatively high amount of OY (e.g., around 20 mt) to cover this uncertainty; the GMT estimates that this would add about three months to the median time to rebuild.

Widow. For widow, the commercial trawl preseason bycatch rate projections were lower than expected by as much as 100% as compared to post-season catch estimates in recent years. However, the GMT has significantly increased the precision in its catch estimation methodology over the past year, especially for trawl, and catches of widow are small in fixed gear and recreational fisheries. On the other hand, this is another species that is also nearing its rebuilt level, so there would likely be increased encounter rates for widow in 2007 and 2008. Therefore, the Council may wish to consider including a relatively high amount of OY (e.g., around 20 mt) to cover this uncertainty; the GMT estimates that this would add about two months to the median time to rebuild.

Yelloweye. The yelloweye assessment data are sparse and there seem to be no further avenues to improve that situation in the historical series. The assessment is tuned to recreational CPUE data with a decreasing period of coverage from south to north, and size and age composition information and fishery independent data are particularly lacking. However, given that the GMT-recommended phase-in approach produces OYs that are already higher than what is suggested under the current rebuilding schedule, the GMT has no recommendation to increase the OY to account for this uncertainty.

GMT Recommendations for Overfished Species

For all overfished species except yelloweye rockfish and cowcod, the GMT recommends that the Council set preferred OYs that include amounts of these species that accommodate projected annual total catch levels (including research,) and account for uncertainty as described above. The GMT requests that the Council give the team latitude –if necessary - to analyze additional alternatives in case analysis shows the preferred OYs result in unexpected changes in rebuilding times, OYs that don't work in concert with one another across fisheries, or dramatic and unintended implications to fishing communities. These additional alternatives would be consistent with the spirit of the Council's preferred suite of OY's adopted at this meeting.

For yelloweye rockfish, the GMT continues to recommend that the Council adopt a phase-in approach whereby the OYs for the next few years be set at incrementally lower levels. This would provide time for: 1) additional data to be collected (through additional research, such as the enhanced International Pacific Halibut Commission (IPHC) survey planned for this year) and used to inform subsequent stock assessments; 2) fishermen, such as fixed gear participants, and processors who will potentially be affected by the yelloweye rebuilding plan to make decisions that could affect their future businesses; and 3) the Council, its advisory bodies, and the states to identify, explore, and develop management tools to manage to the lower OYs that are anticipated over the next few years. During this time, the Council could also move forward on developing a limited entry program for the directed groundfish open access fishery to provide effort control. With regard to the yelloweye phase-in amounts, the GMT explored using linear phase-in values between the current OY (27 mt) and a 2011 OY of 13.5 mt, which would produce an overall OY in 2007 of 23 mt. So, the Council may wish to consider a total catch OY that is less than this amount (e.g., 20-21 mt).

For cowcod, the shortest time to rebuild if fishing were to cease in 2007 would be 2035. The GMT recommends the status quo OY, 4.2 mt, which would increase rebuilding time over $T_{F=ZERO}$ by 5 years. While the current OY is set at a very low level, recent catches for 2005 and projections for 2006 have been below the OY. The GMT feels that a status quo OY accounts for research needs and incidental cowcod catch.

Table 2 provides an example of how the Council might wish to construct overfished species OYs for species other than yelloweye rockfish and cowcod if it were to use the GMT's recommended approach on research catch and uncertainty allowances coupled with projected 2006 total catch levels:

Table 2: Sample Calculation of 2007-2008 OYs for Overfished Species

Species Name	2006 projected total catch (not including research)	Research catch	Uncertainty allowance	2007-2008 OYs	Median Time to Rebuild
Pacific ocean perch	77 mt	2-3 mt	20 mt	99-100 mt	2015
Widow rockfish	258 mt	2-3 mt	20 mt	280-281 mt	2015
Bocaccio	173 mt	2-3 mt	15-20 mt	190-196 mt	2024
Canary rockfish	44 mt	2-3 mt	2 mt	48-49 mt	2068
Darkblotched rockfish	182 mt	2-3 mt	20 mt	204-205 mt	2010

Table 3: Comparison of Rebuilding Results Portraying Recent Catches as OY (2005, 05-06 avg, 2006)

	Bocaccio			Canary			Cowcod			Darkblotched			POP			Widow			Yelloweye[e]		
$T_{F=0}$ [a]	2022			2048			2035			2009.5			2014			2013			2050		
Year [b]	2005	AVE	2006	2005	AVE	2006	2005	AVE	2006	2005	AVE	2006	2005	AVE	2006	2005	AVE	2006	2005	AVE	2006
Actual/Anticipated Catch (= $OY_{actual/anticipated}$)[c]	111	142	173	34	39	44	3.4	3.4	3.4	156	169	182	69	73	77	204	231	258	20	21	22
Median Time to Rebuild if OY = Recent Catch[d]	2023	2024	2024	2060	2062	2064	2043	2043	2043	2010	2010	2010	2014.7	2014.7	2014.8	2014	2015	2015	2120	2127	2134
Time Difference (yrs beyond $T_{F=0}$)	1.1	1.5	2	12	14	16	8	8	8	0.5	0.5	0.5	0.7	0.7	0.8	1.3	1.5	1.7	70	77	84
50% Recent Catch (Reduced OY)	55	71	86	17	20	22	1.5	1.7	1.7	78	84	91	34	37	39	102	116	129	10	10	11
Median Time to Rebuild if OY = 50% Recent Catch	2023	2023	2023	2054	2055	2056	2038	2038	2038	2009.7	2009.7	2009.8	2014.4	2014.4	2014.4	2014	2014	2014	2070	2072	2074
Time Difference (yrs beyond $T_{F=0}$)	0.9	0.9	0.9	6	7	8	5	5	5	0.2	0.2	0.3	0.4	0.4	0.4	0.7	0.8	0.9	20	22	24
Time Difference (yrs earlier than time to rebuild under $Oy_{actual/anticipated}$)	0.2	0.6	1.1	6	7	8	3	3	3	0.3	0.3	0.2	0.3	0.3	0.4	0.6	0.7	0.8	50	55	60

a/ $T_{F=0}$ represents the estimated year that the stock would be rebuilt if there were no fishing beginning in 2007.

b/ The catches shown for 2005 represent the best estimated total catch for all fisheries for 2005. The catches shown for 2006 represent the projected catch for all fisheries for 2006. The "AVE" catches are calculated as an average between the actual catches in 2005 and the anticipated catches for 2006.

c/ The OY alternatives shown in this table are for discussion purposes only, and are not recommendations from the GMT. $OY_{actual/anticipated}$ portrays an OY level that is equal to the actual/anticipated catches shown in the table.

d/ Values in whole numbers are rounded to the nearest whole number, values to a tenth of a year are rounded to within a tenth of a year. Values not taken directly from rebuilding runs are interpolated, and subject to modest uncertainty.

e/ Note that the yelloweye numbers reflected here do not represent the actual expected rebuilding times, as they assume constant catch rates rather than the phase in approach. The phase in approach would extend the median time to rebuild by approximately 7 months beyond the base case.

Healthy and Precautionary Zone Species (Species not managed under rebuilding plans)

The FMP provides the Council's guidance and philosophy on setting harvest specifications for groundfish at a variety of stock status levels. Species at lower levels of abundance, particularly those below the proxy B_{MSY} level, B_{40}, are required to be managed with more precautionary harvest rates than those above B_{40}. Species for which there is less or incomplete information are required to be managed with more precautionary harvest rates than those for which information is more complete. In November 2005, the Council reviewed the groundfish stocks that need species or species group harvest levels set for 2007-2008, and provided a single ABC/OY combination for each species or species group that: a) had no new information on its status as of the 2005 stock assessments, and/or b) fell clearly into one of the fishery management plans (FMP's) management categories with already-articulated harvest strategy guidance.

The GMT recommends that, for the following species, the Council adopt a single ABC/OY alternative for the 2007-2008 management cycle, based on amounts provided in Table 2-1 of Agenda Item F.1.a, Attachment 3 (pages 3-4):

Species	**Harvest Policy**
Pacific cod	As in 2005-2006, the Pacific cod ABC of 3200 mt is based on historic landings levels, with the 1600 mt OY representing the Council's precautionary 50% adjustment for unassessed species.
Shortbelly rockfish	Shortbelly rockfish is unexploited, except as infrequent incidental catch. The 13,900 ABC/OY is a continuation of a conservative Council policy for this species based on its last assessment in 1989. Since that assessment, the peak one-year shortbelly landings have been <100 mt.
Splitnose rockfish (south)	As in 2005-2006, the ABC of 615 mt is reduced to an OY of 461 mt, based on the Council's policy of making a 25% precautionary adjustment for species with less rigorous stock assessments.
Yellowtail rockfish (north)	Yellowtail rockfish is a healthy rockfish stock that had a new stock assessment in 2005. Following the Council's policy on using an F50% harvest rate for rockfish, the 2007 ABC for this species is 4,585 mt and the 2008 ABC is 4,510 mt. The OYs were set equal to ABC because the stock is above B40%, and then averaged to provide OYs for each year of 4,548 mt. The GMT notes that the fisheries have not been attaining yellowtail rockfish harvest levels in recent years because its harvest has been constrained to protect co-occurring overfished species.
Black rockfish	Black rockfish is a healthy rockfish stock that has not been assessed since the prior management cycle, so harvest levels are set applying the Council's policies to the 2003 assessment. Management is divided at the Washington/Oregon border. The OYs for 2007 and 2008 are set equal to the ABCs off Washington because the stock is above B40%, and then averaged to provide OYs for each year of 540 mt, which is 88% of the northern ABC for the assessed stock

	north of Cape Falcon. The ABC off Oregon/California is 725 mt in 2007 and 719 mt in 2008, with the OYs for both years first set equal to ABCs because the stock is above B40%, and then averaged over the two years to get OYs for each year of 722 mt.
Cabezon (South of 42 deg. N. lat.)	The ABC of 94 mt for both 2007 and 2008 is based on the sum of average 2007-2008 ABCs for the northern and southern substocks derived from the 2005 stock assessment. The 2005-2006 precautionary OY of 69 mt was based on a constant harvest level and is carried over to 2007-2008 management. This OY provides for stable management and is consistent with results of the 2005 stock assessment.
English sole	English sole is a healthy stock that had a new stock assessment in 2005. Following the Council's policy on using an F40% harvest rate for flatfish, the 2007 ABC for this species is 6,773 mt and the 2008 ABC is 5,701 mt. The OYs are first set equal to ABCs the stock is above B40%, and then averaged over the two years to get OYs for each year of 6,237 mt.
Arrowtooth flounder	Arrowtooth flounder is a healthy stock that has not been assessed since the prior management cycle, so harvest levels are set applying the Council's policies to the prior assessment. The ABC/OY for 2007 and 2008 is 5,800 mt
Other flatfish	"Other flatfish" includes: butter sole, curlfin sole, flathead sole, Pacific sandddab, rex sole, rock sole, and sand sole. The combined 2007 and 2008 ABCs for these species results in an Other Flatfish ABC of 6,731 mt. The 2007 and 2008 OYs are set at 4,884 mt. To derive OYs, the ABCs for sanddabs and rex sole are reduced by a 25% precautionary adjustment for less rigorously assessed stocks, and the ABCs for the remaining species are reduced by a 50% precautionary adjustment for unassessed stocks. Starry flounder has been removed from this complex because it has anew assessment and a recommendation of a species-specific ABC/OY.
Other fish*	The Other Fish complex includes big skate, California skate, leopard shark, longnose skate, soupfin shark, spiny dogfish, finescale codling, Pacific rattail, ratfish, cabezon north of the Oregon/California border, and kelp greenling. Harvest levels for this species group are set in 2007 and 2008 at a 14,600 mt ABC and a 7,300 mt OY, representing the 50% precautionary adjustment for unassessed stocks.

*The adopted kelp greenling assessment is geographically confined to Oregon. Due to the considerable uncertainty within the kelp greenling assessment, the Council elected to not set an independent ABC/OY, keeping kelp greenling within the "other fish" category, retaining the status quo value assigned to the species within that ABC/OY. The state of Oregon manages kelp greenling using state harvest caps, catch limits, and length restrictions for both the recreational and commercial fisheries. Current Oregon catch levels fall below the OY suggested by the assessment, and the state does not anticipate considering any expansion beyond current catch levels. The two alternatives adopted by the Council at its November 2005 meeting are either not adopting a federal harvest guideline, with the state retaining management authority of the species, or adopting a federal harvest guideline that is equal to the state harvest cap. The stock assessment indicates that the state is managing at an acceptable level, and at a lower level than is deemed sustainable. Therefore, the GMT recommends *not* adopting a federal harvest guideline for kelp greenling for the 2007-2008 management cycle, with the state of Oregon retaining management authority of this species.

Table 2-1 of Agenda Item F.1.a. Attachment 3 also provides alternative harvest levels for the Council to consider on several additional healthy or precautionary zone species. The GMT recommends that the Council adopt preferred harvest alternatives for these species, in order to better guide GMT and GAP efforts to develop management measures. A description of the OY alternatives are contained in Sections 2.1.2 and 2.1.3, Agenda Item F.1.a, Attachment 3, (pages 12-19).

Species	**Harvest Level Issues**
Lingcod	The lingcod harvest alternatives include coastwide ABC and OY options, with OYs derived from two stock assessment areas (north and south of the Eureka/Columbia line). The GMT also stratified the OYs to align with the CA/OR border to provide for state-based management. The GMT recommends again specifying separate OYs north and south of the CA/OR border at 42º N latitude. Lingcod is currently estimated to be above 40% of unfished biomass on a coastwide basis; however, the southern portion of the stock is estimated to be just below 25%. Alternative 1 does not apply the 40-10 adjustment for the California portion of the coastwide OY and Alternative 2 does apply the 40-10 adjustment. The GMT also received a proposal from CDFG to maintain the current status quo OY of 612 mt, which is an intermediary value between Alternatives 1 and 2.
Pacific whiting	In anticipation of the ratification of the U.S.-Canada agreement, annual stock assessments are available early each year, and given the small amount of whiting that is typically landed under trip limits prior to the April 1 start of the primary season, the GMT recommends that the Council delay the adoption of final ABC and OY until the March 2007 and 2008 meetings. The ABC range for 2007 and 2008, is 188,682 mt - 350,409 mt, with an OY range of 188,348 mt -349,790 mt, which is ±30% of the 2005 specifications.
Sablefish	All OY alternatives break out the coastwide OY north and south of 36° N latitude using status quo proportions. Alternative methods for apportioning the OY were not considered because the STAR Panel recommended calculating coastwide biomass without including Conception area survey data. The Alternative 1 OY applies the 40-10 adjustment using the low stock/production model (h=0.26, Q=0.37) and the Alternative 2 OY applies

	the 40-10 adjustment using the base model (h=0.34, Q=0.33). The GMT recommends that the Council adopt the Alternative 2 OY.
Chilipepper rockfish	The Alternative 1 OY is the status quo OY, which is reduced from the ABC determined in the 1998 assessment. The OY is less than the ABC, despite the stock's healthy status, to reduce mortality on co-occurring bocaccio. The Alternative 2 OY equals the status quo ABC, since the current Rockfish Conservation Areas may provide adequate bocaccio protection.
Shortspine thornyhead	The two shortspine thornyhead OY alternatives provide for a coastwide ABC with area-specific OYs north and south of Pt. Conception to distribute harvest opportunities proportional to the relative abundance of the resource. The GMT notes that the precautionary OYs specified in Alternative 1 are not constraining relative to recent catches. In light of the data-poor nature of this assessment, the GMT recommends Alternative 1.
Longspine thornyhead	The two longspine thornyhead OY alternatives provide for a coastwide ABC with area-specific OYs north and south of Pt. Conception to distribute harvest opportunities proportional to the relative abundance of the resource. The GMT notes that the precautionary OYs specified in Alternative 1 are not constraining relative to recent catches. In light of the data-poor nature of this assessment, the GMT recommends Alternative 1.
Minor rockfish north	<u>Minor Nearshore Rockfish North:</u> When black rockfish was originally removed from the northern minor nearshore rockfish OY, a ratio of black to blue rockfish catch was used to determine what proportion of that OY was attributable to black rockfish. However, due to the variability of blue rockfish catches, there is some concern that this ratio (92%:8% black to blue rockfish) under represents blue rockfish catch and therefore the resulting OY (without black rockfish). To account for the uncertainty in the proportion of blue rockfish within the blue:black ratio, the Council adopted three OY alternatives for Minor Rockfish North. The GMT recommends OY alternative 2, resulting in an OY of 142 mt (status quo OY + 20 mt). The GMT feels that this alternative sufficiently accounts for the variability in blue rockfish catch and provides for stability in the fisheries, while minimizing additional impacts to the other rockfish species that comprise this category. <u>Minor Rockfish North:</u> The GMT recommends increasing the OY for the minor rockfish north to accommodate an increase in the Nearshore Rockfish.
Minor rockfish south	In 2005 the Council approved new assessments for two species managed within the minor rockfish south complex. The GMT recommends that California scorpionfish be removed from this complex and be managed with a separate OY, while gopher rockfish remain within the complex and the OY be adjusted to reflect new information from this stock assessment. Gopher rockfish are part of the Minor Nearshore Rockfish South portion of

	this complex. Gopher rockfish co-occur with both shallow and deeper nearshore species and cannot be cleanly targeted. As a result, raising the gopher rockfish portion of the minor nearshore rockfish south OY to the level derived from the stock assessment could result in additional harvest of other data-poor stocks within the complex rather than just harvests of gopher rockfish. While the stock assessment determined the stock to be healthy, the gopher rockfish portion of the OY alternatives provide for the uncertainty around the assessment by including options that take proportional reductions from the ABC/OY of 302 mt. The GMT reviewed options analyzed in Agenda Item F.1.b Supplemental CDFG Report, and recommends a 50% contribution of gopher rockfish to the complex, which relates to Alternative 2 in the ABC/OY options table. Selection of this alternative will result in the overall Minor Nearshore Rockfish South OY of 515 mt. (Alt. 2). When combined with the corresponding shelf and slope OYs of 714 and 626 respectively, the GMT recommends the Minor Rockfish South OY alternative 2 of 1855 mt.
California scorpionfish	The GMT recommends OY Alternative 1 (137 mt) a modified ABC/OY. This approach utilizes the full recreational data in determining the OY and allows California to track catches inseason with the CRFS program. By incorporating the ability to make inseason adjustments, the risk of either not achieving or overshooting the OY is reduced. The GMT refers the Council to "CDFG Draft Report on Background Information for Selection of 2007/2008 OYs for Gopher Rockfish, California Scorpionfish and Minor Nearshore Rockfish" for further explanation of the calculation of this OY Alternative.
Dover sole	The GMT recommends OY Alternative 1, which was derived from the equilibrium MSY at F40% in the base model.
Petrale sole	The GMT notes that the recent assessment shows that both the northern and southern portions of the stock are below $B_{40\%}$ and increasing. If the Council wishes to consider regional management, the GMT notes that management measures designed to achieve the OY specification stratifying the OY north and south of 40º10' N latitude would result in a decrease in bottom trawl exvessel revenues of over $3 million, and that this amount could be higher or lower depending on the alternative chosen. However, the GMT does not necessarily endorse regional management of petrale sole.
Starry flounder	Starry flounder was assessed for the first time in 2005 and was approved for management decision-making by the SSC. The GMT initially forwarded a recommended ABC and a range of OYs for 2007 and 2008. The ABCs and OYs were calculated by combining the northern and southern base models using the preferred high catch scenario with a 40-10 adjustment for the OY since this stock is near or below $B_{40\%}$. Because this assessment is considered data-poor, the GMT provided an alternative OY that was reduced 25% from the base OY. The GMT continues to support the base model ABCs for 2007 and 2008 and the Alternative 2 OY.

PFMC
04/05/06

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON MANAGEMENT SPECIFICATIONS OF 2007-2008 FISHERIES

Under this agenda item, the Scientific and Statistical Committee (SSC) was briefed by (1) Mr. John DeVore (Council Staff) on the final groundfish acceptable biological catches (ABCs) and optimum yields (OYs) for 2007-2008 and on the preliminary revised rebuilding plans; and (2) Dr. Steve Freese (NMFS) and Mr. Merrick Burden (NMFS) on the socioeconomic analysis review. These topics were discussed separately.

(1) Final ABCs and OYs for 2007-2008 and Preliminary Revised Rebuilding Plans

Whenever a "ramp-down" strategy is used for setting the OYs in a rebuilding plan (e.g. yelloweye rockfish), care should be taken to ensure that the resulting annual Fs during the ramp-down period are maintained at or below the F_{MSY} overfishing threshold. Tables showing the rebuilding alternatives for each stock (such as those found in Agenda Item F.1.a, Attachment 3) should be amended to display the respective Fs and spawning biomass per recruits (SPRs). Also of interest but of lesser importance, the F or catch associated with the 40-10 rule could be added as well. Beyond the criterion of maintaining $F < F_{MSY}$, the SSC views the ramp-down strategy as a Council policy call that entails some increased, but unquantified level of risk.

(2) Socioeconomic Analysis Review

An earlier version of this analysis was reviewed by the SSC in June 2005. Typically, catch reductions are needed in order to rebuild overfished stocks. Rather than simply reducing tonnage proportionally among commercial fishery sectors, the socioeconomic analysis evaluates the trade-off between forgone ex-vessel revenue and reduced bycatch of each overfished stock for various commercial fishery sectors. In addition to this trade-off analysis, the authors provide additional analyses pertaining to the relative impacts of each region and fishing sector on overfished stocks and the relative impacts of restrictions on bycatch of overfished stocks on each port within each region. Given the flexibility of the analysis, it should prove quite useful in the Council's deliberative processes. The SSC suggests, however, that future work include recreational fisheries data to the extent possible and that if practical, other measure of fishery effects (e.g. personal income impacts) be incorporated into the trade-off analysis.

For an overfished stock, time-to-recovery appears to be the major focus of the fishery management plan amendment. As such, it would be useful to have time-to-recovery as the response variable rather than – or in addition to – overfished species catch, e.g. as in Figures 1-10 in Agenda Item F.1.a, Attachment 4. Further, operationally linking the projection model (used for rebuilding analysis) and the bycatch model would help to better gauge the long-term vs. short-term trade-offs associated with the various management alternatives.

Finally, it was noted that the database used for the socioeconomic analysis reflects catch ratios for various sectors of the fishery that were more or less constant for many years, e.g. the ratio of catch from the open-access vs. limited-entry commercial sectors. However, alternatives in rebuilding plans do not need be constrained to the same ratios. Care should be taken to ensure that the ratios used in rebuilding plans are similar to those used in the socioeconomic analyses.

PFMC
04/04/06

F.1.d

NRDC

THE EARTH'S BEST DEFENSE

The Ocean Conservancy

OCEANA

March 30, 2006

Chairman Don Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Yelloweye Rockfish Specifications

Dear Chair Hansen and PFMC Members:

We are writing to comment on the 2007-08 specifications proposed for yelloweye rockfish in response to the fact that yelloweye are "lagging behind the current Council-adopted schedule"[1] for rebuilding. In particular, we take issue with the Groundfish Management Team's (GMT's) proposal to increase the OY above that identified by the Scientific and Statistical Committee (SSC) as consistent with current Council rebuilding parameters for yelloweye. This letter explains our reasons for supporting a lower OY and suggests steps the Council can take to improve our information on yelloweye and take the needs of fishing communities into account.

The Council must rebuild yelloweye as quickly as possible

First, the OY proposed by the GMT conflicts with the recent decision by the Ninth Circuit Court of Appeals invalidating an analogous decision regarding the 2002 OY for darkblotched rockfish.[2] As the SSC has recognized, the Magnuson-Stevens Act and the recent Ninth Circuit opinion require that OYs be set at a level that will make "the rebuilding period as short as possible."[3] Instead, the GMT's recommendation is *double* the level that would result from applying the current yelloweye rebuilding parameters to the revised estimate of maximum time to rebuild. The GMT's proposal is not tenable under this unambiguous precedent.

Second, doubling the OY relative to the level called for in the current rebuilding plan is inconsistent with the recommendation of your scientific advisors on the SSC. The SSC notes that if the Council follows its current rebuilding policy with a new, lengthened T_{max}

---

[1] SSC Report on Yelloweye Stock Assessment, March 2006, Agenda Item F.3.b.
[2] Natural Resources Defense Council v. National Marine Fisheries Council, 421 F.3d 872, 881 (9th Cir. 2005).
[3] id

of 2096, the 2007 OY using the coast-wide model would be 12.6 metric tons, not 25 mt as recommended by the GMT.[4]

Third, we are concerned that the GMT proposal would create a strong risk of serial depletion of yelloweye. Stock assessment data clearly reveal significant differences in the status of yelloweye among the states. State-based or regional OYs would be a logical way to avoid putting more pressure on yelloweye than the population in certain regions can withstand. If the Council and NMFS cannot take that approach yet because the Washington model still needs improvement, it should take into account the extra risk of local depletions that a coast-wide OY could produce, especially at the higher level proposed by the GMT, if effort is heavier in some areas than others.

Fourth, uncertainty levels are very high for this species. The record is longer and the information better for yelloweye in California than for Oregon, and better for Oregon than for Washington. The depletion level of yelloweye is also greater for California than for Oregon, and greater for Oregon than for Washington. In other words, the more we know about yelloweye in a particular region, the worse off the population in that region appears to be. Likewise, as more data sources have been added to the stock assessment, the picture given by the assessment has worsened. We point this out not to suggest that correlations are causal relationships, but to note that lack of information has consistently been associated with too rosy a picture of yelloweye. That could change, but there are clearly good reasons to be cautious in the face of the uncertainty surrounding yelloweye.

In their consideration of similar "phased" fishing mortality reductions, the New England Groundfish Science Peer Review Panel confirmed the need for a risk-averse approach to rebuilding. That panel concluded that "if such a [rebuilding] strategy stages the F reductions so that the initial drop is small, then the prevailing risk to the stock will likely be higher than a strategy where all the 'pain' is taken at the start of the rebuilding period."[5] We hope the Pacific Council does not plan to start following the lead of the New England Council, whose refusal to end overfishing has put both the cod and the region's fishermen in jeopardy.

Solutions

The Council and NMFS should develop a systematic approach for identifying the shortest time period possible for rebuilding overfished species, consistent with the court's recent decision. The time to do that is now, before the next round of revisions to existing rebuilding plans.

The Council and NMFS should identify and pursue tangible steps that can be taken next year or earlier to reduce yelloweye effort and catch, similar to those taken to reduce cowcod effort quickly in 2003. Like cowcod, adult yelloweye have high site fidelity and can benefit substantially from marine protected areas or closed areas in yelloweye

---

[4] Furthermore, as the SSC notes, the PFMC's approach to determining rebuilding periods by using the maximum, not the minimum, possible time period has been deemed inappropriate by a Ninth Circuit Court of Appeals decision.

[5] Report on the Groundfish Science Peer Review Meeting, 20 (AR Doc. 2612, D-03-472).

hotspots. Such measures are already in place; we urge the Council to expand their use with help from information on hot spots derived from observer and/or fishing data and other relevant sources.

Regional management appears to be a must for this species; because depletion levels vary significantly by state, a single coast-wide OY can pose significant risks if greater effort occurs in areas where yelloweye are most vulnerable. Completion of the Washington sub-population model and other steps needed to lay the foundation for regional management should be a high priority. Likewise, we hope the Council and NMFS pursue recommendations made by the SSC as far back as 2002 for a joint assessment with Canada.

Finally, the sparseness of data is a significant problem in this fishery. Available data should be augmented through increased observer coverage on the commercial halibut fleet and funding for fishery-independent surveys done with submersibles, ROVs or other underwater vehicles equipped with quantification tools.

Taking the needs of fishing communities into account

The GMT seeks to justify delaying adoption of a 12.6 metric ton OY by arguing that several years are needed to develop tools to achieve the lower OY with lower fishing impacts. Bycatch problems for yelloweye and other species have been known for years now. The question that logically arises is: why not take those steps on a faster schedule? California has used landings data to identify canary hotspots: why not compile spatial data to identify additional hot spots that could be closed to deliver a big bang for the buck in reducing yelloweye bycatch? Can observer data be mined to help fine tune spatial management tools? The more quickly such action is taken to rebuild populations like yelloweye, the faster fishing communities will reap the benefits of healthier stocks.

A modeling run conducted by the GMT suggests that the rebuilding periods resulting from two distinct strategies for rebuilding yelloweye over many decades (beginning with an OY of 12.6 mt vs. 25 mt) differ by only six months. But that analysis does not adequately take into account the importance of big old fish, the sporadic nature of recruitment, or the likelihood of serial depletion in some parts of the yelloweye range under the higher OY. We believe the GMT's OY could result in significantly longer rebuilding periods and more persistent restrictions on fishing due to any of these factors.

A recent study of the economic implications of rebuilding depleted fish populations found that the catch of overfished Pacific groundfish is worth three times as much (net present value) once they are rebuilt as in their current depleted state. The results were similar for depleted species from around the country, and the report's estimates of benefits are highly conservative. These findings underscore the economic benefits of staying the course of rebuilding and of tools like protected areas that can help avoid overfishing in the first place.[6]

---

[6] Sumaila, Ussif Rashid and Elizabeth Suatoni, 2005. Fish Economics; the Benefits of Rebuilding U.S. Ocean Fish Populations, Fisheries Economics Research Unit

We appreciate the opportunity to comment on this important subject. We look forward to working with the Council to develop an approach that will rebuild yelloweye as quickly as possible and improve our understanding in the future.

Sincerely

Karen B Garrison

Karen Garrison
Co-Director of Ocean Initiative, NRDC

David Newman
Legal Fellow, NRDC

Meghan Jeans
Pacific Fish Conservation Manager, The Ocean Conservancy

Jim Ayers
Vice President, Oceana

Cc: Frank Lockhart, NMFS
Dr. Don McIsaac, PFMC Executive Director
GMT
SSC

F.1.d

SOCIO-ECONOMICS OF THE MOSS LANDING COMMERCIAL FISHING INDUSTRY

Executive Summary

Caroline Pomeroy and Michael Dalton
June 2003

Moss Landing Harbor (MLH) is among the most important commercial fishing ports in California. It recently ranked third in the state in terms of pounds landed and fourth in ex-vessel revenues. The Moss Landing community relies on commercial fishing as a major source of income. Over the past several years, the commercial fishing industry and community at MLH have undergone important changes. In response, the Monterey County Office of Economic Development (OED) contracted us to conduct a study of the socio-economics of the commercial fishing industry at MLH. The over-arching goal of the study was to document its social and economic value and the issues, needs and concerns of its participants to better inform County decision-making about infrastructure investments and other efforts to enhance the industry's economic vitality.

The study was guided by four objectives: 1) to assess recent and current trends in fishing activity associated with MLH, 2) to estimate the direct economic value of the commercial fishing industry at MLH, 3) to identify opportunities and constraints to the MLH commercial fishing industry, and 4) to compare MLH to other working harbors in the region.

The research focused on four groups most directly associated with the MLH commercial fishing industry: fishermen, resident fish buyers and fishery-support businesses, and the Harbor. (Study of non-resident fish buyers and fishery-support businesses was beyond the scope of this project, but will be done in subsequent projects.) We surveyed 38 commercial fishermen, 4 resident fish buyers, 3 resident fishery-support business owners, and Harbor management, collected additional field data through ethnographic observation and interviews, and used archival data sources including landings data from the Pacific Fisheries Information Network database. This executive summary highlights the study's key findings.

Socio-Economic Profile and Estimated Direct Economic Value of the Moss Landing Commercial Fishing Industry

The commercial fishing industry at Moss Landing includes about 125 resident and 175 non-resident fishing operations, 7 resident and dozens of non-resident fish buyers, and 9 local businesses and many more located outside Moss Landing that provide goods and services to the industry.

Total employment for the operations surveyed was:

- 88 skippers and crew,
- 307 full-time and 825 part-time fish receiving and processing employees,
- 9 full-time and 3 part-time fishery-support business employees, and
- 10 Harbor employees.

All of these jobs, except for those in receiving and processing, are at Moss Landing. Most of the receiving and processing jobs are located at fish buyers' processing facilities elsewhere within and outside the County.

The direct economic value of commercial fishing at MLH is estimated to be between $18 million and $25 million per year (real values in year 2000 dollars), based on the following values, by fishery-related sector:

- Fishing operations: $6.7 million
- Fish buyers: $7.5 million
- Fishery-support businesses: $0.2 million
- Moss Landing Harbor: $10.1 million

Commercial Fishermen and Fishing Operations

Among the Moss Landing commercial fishermen surveyed, about 80% reside in Monterey County, 16% reside elsewhere in California, and 5% reside in Oregon. Over 80% of those surveyed reported Moss Landing as their homeport. Surveyed skippers' fishing experience averaged 28 years overall and 18 years at Moss Landing. Many fish at multiple locations along the California coast, with some fishing as far north as Alaska (for salmon) and as far west as the Western Pacific (for highly migratory species such as albacore tuna). Most fish multiple fisheries as part of their annual round and to adapt to environmental, economic and regulatory variability and uncertainty. Common combinations are salmon and albacore troll (perhaps with crab trap), hook-and-line for diverse groundfish (flatfish, roundfish and rockfish) species, coastal pelagic species (CPS, i.e., anchovy, sardine and squid) purse seine perhaps complemented by San Francisco Bay herring gillnet and Alaska salmon gillnet, and longline or gillnet for multiple species.

Moss Landing commercial fishing operations vary considerably in terms of vessel characteristics, equipment, gear, permits and personnel. Together, these features affect the seaworthiness, earning capacity, adaptability and economic viability of the fishing operation, the skipper and the crew.

More than half (58%) of the skippers surveyed reported family currently involved in fishing with them or involved in some other aspect of the business. Just over a third characterized their fishing operation as a family business. Surveyed skippers reported an annual average of $60,000 to $76,000 gross revenues from fishing from 1999 through 2001. On average, they depend on fishing income for 80% of their household income.

Moss Landing fishing operations represent considerable financial investments. Average vessel purchase price (over the past several decades, unadjusted for inflation) was $119,217, while replacement costs averaged $382,095. Re-sale values averaged only $162,455, however, reflecting concerns about current economic and regulatory conditions in some fisheries. Replacement costs for equipment and gear averaged about $42,000 and $26,000, respectively.

Moss Landing fishermen incur significant operating costs that contribute to the economies of Moss Landing, the County, and the many other places they purchase goods and services. A subsample of 18 skippers, primarily representing smaller, less labor- and capital intensive operations, provided data on annual expenditures for 1999 through 2001. Conservatively estimated, that group's average annual expenditures were more than $720,000.

Fish Buyers

Moss Landing's resident fish buyers, who have 11 to 60 years of experience in the fishing industry, have carved out distinct niches in species received, products produced and markets served. They include one live fish buyer, three CPS receiver/processors, and three multi-species buyers. Three are based at Moss Landing; four are based elsewhere in Monterey County.

Although fish receiving is their primary activity at Moss Landing, many are vertically integrated, and are engaged in processing, wholesale, distribution and/or retail operations as well. Most of these other activities occur elsewhere in Monterey and Santa Cruz Counties where necessary space and infrastructure are available.

Fish receiving operations at Moss Landing are undergoing substantial change, especially with the opening of the Santa Cruz Cannery Building, the renovation of K-dock, and the planned opening of a restaurant and fish market at North Harbor in Fall 2003.

Three of the four surveyed fish buyers provided expenditure data for 1999 through 2001. Their annual average expenditures were nearly $1.5 million at Moss Landing and $11.3 million overall.

Fishery-Support Businesses

Nine locally based fishery-support businesses provide a diversity of goods and services to the commercial fishing industry at Moss Landing. These businesses include a fuel dock/small marine supply store, a boatyard, a marine covers shop, electrical, diesel, hydraulic, metalwork and other service providers, and a dry storage facility. Other businesses in the Monterey Bay area also support and depend on the Moss Landing commercial fishing industry.

The three businesses surveyed have operated at Moss Landing for between 28 and 50 years. They depend on the commercial fishing industry for 18 to 75% of their business. Together, their annual expenditures averaged nearly $650,000 for 1999 through 2001.

The Harbor

Moss Landing Harbor is an important provider of goods and services to the commercial fishing industry, and the research and tourism communities. It provides berthing and other amenities, and essential services such as dredging. The Harbor has a limited revenue base and aging infrastructure, but is developing strategies and seeking funding for long-term maintenance dredging and dock replacement. It recently completed renovation of the Santa Cruz Cannery Building and adjacent K-dock to support the commercial fishing industry.

The Harbor's average annual expenditures for 1999 through 2001 were about $10 million. Because of the public goods nature of the Harbor's goods and services, it is difficult to separate expenditures related to the commercial fishing industry from those for other Harbor users.

Trends in the Major Moss Landing Area Fisheries

Over the long term (1981-2001), the most important fisheries at Moss Landing in terms of ex-vessel revenues have been salmon, groundfish, and highly migratory species (HMS), each with average revenues around $1.5 million per year.

More recently (1999-2001), salmon revenues have slumped at Moss Landing (and statewide), while revenues for coastal pelagic species (CPS) reached almost $2.5 million per year. The number of vessels that land salmon at Moss Landing has actually increased, while the number statewide has decreased.

The CPS fishery has exhibited dramatic boom and bust cycles recently for squid, and historically for sardine. Sardine landings have increased recently with corresponding increases in ex-vessel revenues, and have driven the recent boom in the CPS fishery at Moss Landing.

The West Coast groundfish fishery is experiencing severe regulatory constraints that have resulted in recent declines in vessels, landings, and ex-vessel revenues. Although ex-vessel revenues at Moss Landing have been relatively stable recently, 2003 management actions are likely to result in reduced revenues.

The open access rockfish (OAR) fishery has experienced a steady decline in vessels, pounds landed and ex-vessel revenues recently, while ex-vessel prices have been relatively stable. Concerns about the condition of some OAR species, however, have prompted management measures that are likely to further constrain the fishery.

The HMS fishery experienced a major boom during the 1980s that was followed by sharp declines in landings and ex-vessel prices in the 1990s, although the number of vessels landing HMS species has been relatively stable at Moss Landing.

Major Issues and Needs of the Moss Landing Commercial Fishing Industry

The economic vitality of the commercial fishing industry at Moss Landing depends on several factors including a healthy marine environment and fish stocks, fishery and environmental management that protects those resources while allowing for their use, and infrastructure that enables and promotes safe, cost-effective and productive operations. The major issues and needs of the Moss Landing commercial fishing industry fall into three inter-related categories: 1) regulatory constraints, 2) short- and long-term economic challenges, and 3) infrastructure and maintenance needs.

Regulatory constraints

Regulatory constraints pertain to both fishing and land-based aspects of commercial fishing, support business and Harbor operations. Primary fishery management issues are recent cuts in allowable groundfish catches, the Rockfish Conservation Area closure, and state and federal initiatives to establish networks of marine reserves along the California coast. Fishermen and others want to know more about the science, assist in its design and evaluation, and contribute their own local ecological knowledge to the management process. There is growing interest among fishermen, scientists and managers in collaborative and cooperative research to address these issues and fishery management information needs.

Coastal management actions also pose challenges to the industry, support businesses and the Harbor. Multiple and sometimes conflicting regulations and permitting procedures delay and increase the cost of essential functions including dredging, bulkhead maintenance and repair, erosion control, dock repair and replacement, and boatyard and fuel dock operations.

Short- and long-term economic challenges

Moss Landing's commercial fishing industry and support businesses face considerable short- and long-term economic challenges. In general, revenues are not keeping pace with increasing operating costs. Decreases in allowable catches for some species coupled with stagnant or declining prices have made it difficult for some fishermen to pay their slip fees and do basic vessel maintenance. The resulting reduced revenues limit the ability of support businesses and the Harbor to support themselves, and to provide goods and services to the larger community, as well as the industry. Reduced landings limit fish buyers' ability to provide a dependable supply of fish to their markets, and can result in loss of those markets to other sources.

In an attempt to interrupt this negative chain of events, federal funds were made available to groundfish fishery participants following the Federal Groundfish Disaster declaration in 2000. The California Groundfish Disaster Stipend (GDS) Program, however, was not well adapted to the particular needs and interests of commercial fishery participants, and has been accessed by few Moss Landing fishermen.

Longer-term economic challenges follow from the persistence of the short-term conditions noted above and include access to fishery resources, adequate and diversified sources of revenue to the Harbor to support dock repair or replacement, maintenance dredging and other activities to update and support its infrastructure and operations. The commercial fishery-related sectors considered here have developed strategies to adapt to most short-term environmental, economic and regulatory challenges. Adapting to long-term challenges and their cumulative effects, however, will likely require external support.

Infrastructure and maintenance needs

Infrastructure maintenance and development issues are critical at Moss Landing. The most pressing needs are dock maintenance and improvement; maintenance and catastrophic event dredging; and South Harbor bulkhead repair. All of these are essential to safe and efficient navigation and use of the harbor, but are costly in terms of financial, time and personnel resources required to deal with complex and expensive permitting procedures, as well as actual construction and operation. Failure to address these needs jeopardizes the viability of the commercial industry and the Harbor.

Additional infrastructure developments could enhance the economic viability of the commercial fishing industry by limiting the leakage of economic resources outside Moss Landing. However, these developments also require financial and other resources that are not readily available, and it is not clear that current fishing activity in the region and at Moss Landing could support new businesses. Moreover, Moss Landing lacks the industrial infrastructure, available land, and zoning needed for new fish processing and fishery-support businesses.

Recommendations

The following recommendations are offered to the County and its Office of Economic Development for ways it could assist the commercial fishing industry at Moss Landing to help insure its viability and foster its vitality.

Regulatory Constraints

- Support the industry, related businesses and the Harbor in local, state and federal policy-making arenas.

- Develop an ombudsman program or other mechanism to coordinate the County's environmental initiatives and regulations that affect the industry and the Harbor, to eliminate redundancy, resolve conflicting mandates, and increase efficiency of permitting and related processes.

- Establish a centralized, well-publicized and accessible information clearinghouse for relevant county, state and federal regulations.

- Disseminate information on grant and loan programs to the Harbor directly, and to the fishing industry and related businesses through their social networks and communication channels.

- Provide funds for collaborative and cooperative research that involves fishermen (and their knowledge, skills, expertise and fishing vessels) and local scientists to augment and improve information on local fisheries and marine ecosystems.

Short- and Long-Term Economic Challenges

- Provide or facilitate low-interest loans or lines of credit to the fishing industry to offset costs such as slip fees during the off-season or when severe restrictions on allowable catches are imposed.

- Provide or facilitate the establishment of an insurance pool for commercial fishermen to help reduce their insurance costs and better insure their vessels.

- Adjust or develop re-training programs to better meet fishery participants' background, skills, resources and needs.

- Provide low-interest loans or grants to the commercial fishing industry, fishery-support businesses and the Harbor to address infrastructure needs to insure safe, efficient and economically productive operations.

Infrastructure and Maintenance Needs

- Work with the Harbor to identify and secure loans or grants to support dock replacement and, in the interim, dock maintenance and repair.

- Provide low-interest loans or grants to support maintenance dredging.

- Support Harbor efforts to gain Army Corps of Engineers, California Coastal Commission and other relevant agency support for dredging, bulkhead repair and other projects essential to safe navigation and efficient commerce at Moss Landing.

- Provide low-interest loans or grants to support the development of a centralized fish market where fishermen can sell their catch directly to the public.

- Provide assistance with permitting, locating a site for, and establishing such a market.

- Work with the fishing community and associated businesses to further explore the need for and constraints to additional businesses to support the commercial fishing industry, determine the economic implications of such growth for both existing and prospective businesses, and develop incentives to retain existing

SOCIO-ECONOMICS OF THE MOSS LANDING COMMERCIAL FISHING INDUSTRY

Report to the Monterey County Office of Economic Development

Caroline Pomeroy, Ph.D.[1]

and

Michael Dalton, Ph.D.[2]

June 2003

[1] Institute of Marine Sciences, Earth & Marine Sciences Bldg A316, UC Santa Cruz
Santa Cruz, CA 95064; phone: 831 459-5614; fax: 831 459-4882; e-mail: cpomeroy@ucsc.edu
[2] Institute for Earth Systems Science & Policy, California State University, Monterey Bay, 100 Campus Center, Seaside CA, 93955-8001; phone: 831-582-3024; fax: 831-582-4688; e-mail: Michael_Dalton@csumb.edu

Moore/ ~~[illegible]~~ Warrens
who seconded the motion

Motion #13 1:58pm 04/05

ask Rod for his rationale statement for his motion. (he was reading from something)

MOTION #1 BY ROD MOORE - AGENDA ITEM F.1

1. Move that the Council adopt 2007 - 2008 ABCs for overfished species as shown on Table 2.1 of Agenda Item F.1.a, Attachment 3, as follows:

Pacific Ocean Perch:	900 mt and 911 mt
Widow Rockfish:	5,334 mt and 5,144 mt
Canary Rockfish:	172 mt and 179 mt
Bocaccio:	602 mt and 618 mt
Cowcod S. Of 36°:	17 mt for both years
Cowcod - Monterey:	19 mt for both years
Darkblotched:	456 mt and 487 mt

2. Move that the Council adopt rebuilding OYs for overfished species as follows:

Pacific Ocean Perch:	405 mt
Widow Rockfish:	456 mt
Canary Rockfish:	44 mt
Bocaccio:	218 mt
Cowcod (combined):	8 mt
Darkblotched:	229 mt

2:09 pm - see "CD" for rationale

substitute motion for #13

#14 - Anderson Cedergreen

anderson rationale - sig implications in the study

Rod - ~~didn't~~ agreed w/ most, need to be responsible to everyone; include communities

POP - maybe,

window ROCK - the high end, the GMT shows median rebuild time of 25Ø. does not think one year makes a major difference, but does for the impacts on the communities. He would oppose it.

moore friendly amendment to change to 368. orig was → ?

M.V, 2:19

JD → ask median? coursed for all areas (yes P.A)

Frank Lockhart F.H.
canary - 44 is SQ 24 is well below SQ.

can we add something in between these, ~~4~~ is it too large?
or add something or request GMT to analyze in between #

Frank/Darrel - have GMT analzye something in between.

but PA said we have already narrowed down these options and understand canary has a "flat line", trails out; rather keep it 2 options to analyze the decision in June. other alternative is to have GMT look at it; 24 already in option 4; just needs further fleshing out.

FL asked for 32 and 44 mt <anderson/cedergreen ok>.

Curt asked for range of contingencies? yes - P.A. said he wanted to narrow the options down to 2 alternatives to formulate mngmnt measures. would we still be in same predicament of trying to reallocate impacts between different sectors. This would give us better insight. PA said the focus would be the impacts to communities.

JD asked if GMT could add addl analysis of rebuilding alternatives <consider the best new alternative in the mix>. PA said yes, but trying to keep it so we can manage a fairly definitive set of analysis. JD said just 1 more rebuilding alt.

motion 14 passed

Agenda Item F.1.e
Supplemental Motion in Writing 2
April 2006

#15 Moore/Warrens
tabled for a few minutes

MOTION #2 BY ROD MOORE

Move that the Council adopt the preliminary revised rebuilding plans under proposed FMP amendment 16-4 as show in Agenda Item F.1.a, Attachment 5 with the following change:

on page 27, add to the end of the last full paragraph in Section 4.0 -

"As provided by Section 303(b)(11) of the Magnuson-Stevens Fishery Conservation and Management Act, the Council may establish a research reserve for any stock, including an overfished stock, that is within the ABC but above and separate from the OY for that stock."

on page ~~35~~ 38, at the end of Section 4.5.2, add the following paragraph -

"Fishing communities need a sustainable fishery that is safe, well-managed, and profitable; that provides jobs and incomes; that contributes to the local social fabric, culture, and image of the community; and that helps market the community and its services and products."

Moore said - these goals taken from a study done in UK - from Steve's slides, - it goes

#16 PA/Bob Alverson
F.1.a. Attach 3, page 3, 2007/008 OY alternatives listed, adopt all ~~[illegible]~~ as listed.
Moore asked whiting friendly amendment:
ABC - 2006 244425 - 733,275
OY - 134,534 to 403,604 (2006)
this is for U.S. Clarified Reed. PA/BA okay.
182,098 coastwide

OVER

#16

M.V. Lingcod → all US? PA said the value is
55/58 N' not address S'; ask for CA's help.

M.V (on SST) → coastwide alt. 1 OY? what about request from
GAP? P.A answered, he did not intend — it was meant to
be divided N/S - friendly A, DeVore asked LST? separate OY's
yes said PA.
M.V. Lingcod - 8' of 42' - ~~[illegible]~~ asked for 612 mt for OY
PA said 40'10 policy

M.V said it is status quo,
PA accept BA accept.
motion 16 passed

M.V motion #17 reconsider #1/6
OY's minor south second is Ticehurst
nearshore species passed

#18 OY → M.V./D.T. passed
for OY minor south — 1,904
nearshore species — 564
mr. moore said gopher is in remaining; you are making a correction?
J.D - mv's motion consistent w/ intent

NATIONAL MARINE FISHERIES SERVICE REPORT ON GROUNDFISH MANAGEMENT

NMFS Northwest Fisheries Science Center will briefly report on groundfish-related science and research activities.

Council Task:

Discussion.

Reference Materials:

None.

Agenda Order:

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

PFMC
03/16/06

STOCK ASSESSMENT PLANNING FOR THE 2009-2010 FISHING SEASON

In March the Council adopted for public review a list of groundfish stocks to be assessed next year (Agenda Item F.3.b, Attachment 1), which will be used to decide the harvest specifications and management measures for 2009 and 2010 groundfish fisheries. As part of that decision, the Council announced that the yelloweye rockfish assessment, which is tentatively scheduled to be an updated assessment, may ultimately be scheduled as a full assessment. At this meeting, the Council should consider advice from the NMFS science centers, advisory bodies, and the public before deciding the list of groundfish stock assessments to be assessed next year.

Dr. Elizabeth Clarke, Division Director at the NMFS Northwest Fisheries Science Center (NWFSC), proposed a schedule of 2007 Stock Assessment Review (STAR) panels (Agenda Item F.3.b, Attachment 2) in her briefing to the Council. The Council is tasked to give guidance to the NWFSC on the proposed 2007 STAR Panel schedule after receiving advice from NMFS science centers, advisory bodies, and the public.

The Council also adopted for public review a draft stock assessment Terms of Reference (Agenda Item F.3.c, Attachment 1) with a request for focused input from the public and council advisory bodies on the concept of a more formal role for representatives from the Groundfish Management Team (GMT) and Groundfish Advisory Subpanel (GAP) at future STAR Panels. Dr. Martin Dorn, the SSC's Groundfish Subcommittee chair, is scheduled to report on the draft Stock Assessment Terms of Reference and may provide a new revised Terms of Reference as a supplemental attachment.

The Council is tasked at this meeting with final adoption of a list of groundfish stocks to be assessed next year, including full and updated assessments; a schedule of STAR Panels to review new full assessments (the Scientific and Statistical Committee will review updated assessments); and a Stock Assessment and Review Process Terms of Reference for 2007-2008.

Council Action:

1. **Adopt a Final List of Stocks To Be Assessed in 2007.**
2. **Adopt or Provide Guidance on a Final 2007 Stock Assessment Review Schedule.**
3. **Adopt a Final Terms of Reference for the Groundfish Stock Assessment and Review Process for 2007-2008.**

Reference Materials:

1. Agenda Item F.3.b, Attachment 1: Possible schedule for West Coast groundfish assessments in 2007 and beyond.
2. Agenda Item F.3.b, Attachment 2: Proposed 2007 STAR Panel Schedule.
3. Agenda Item F.3.c, Attachment 1: Draft Terms of Reference for the Groundfish Stock Assessment and Review Process for 2007-2008.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Stock Assessment Option Update — Elizabeth Clarke
c. Final Stock Assessment Terms of Reference — Martin Dorn
d. Reports and Comments of Advisory Bodies
e. Public Comment
f. **Council Action**: Adopt Final Terms of Reference, List of Stocks to be Assessed, and Stock Assessment Review Schedule

PFMC
03/17/06

Agenda Item F.3.b
Attachment 2
April 2006

Proposed 2007 STAR Panel Schedule.

	Species	Location	Dates
Panel #1	2 Benchmark Species?	Seattle, Washington	Spring
Panel #2	2	California	Spring
Panel #3	2	Newport, Oregon	Summer
Panel #4	2	California	Summer
Panel #5	2	Seattle, Washington	Summer
Sweep up	?	Portland, Oregon or Seattle, WA	Fall

Revised according to SSC recommendations and advice from CDFG

Possible schedule for west coast groundfish assessments in 2007 and beyond

Species	2005 Assessment		Assessment cycle							3-cycle total
			2007			2009		2011		
	Full / Update	Model	Full	Update	Lead	Full	Update	Full	Update	
Number of assessments			9	6		8	10	9	9	
P. hake (Whiting)	2006 Full	SS2	Subject to international treaty process							
Bocaccio rockfish	Update	SS1	X		SWC		X		X	3
Canary rockfish	Full	SS2	X		NWC		X	X		3
Chilipepper rockfish	* 1998	SS1	X		SWC				X	2
Cowcod	Full	SS2		X	SWC		X	X		3
Widow rockfish	Full	ADMB		X	SWC	X			X	3
Yelloweye rockfish	Full (2006)	SS2		X	NWC		X		X	3
Yellowtail rockfish	Update	ADMB				X				1
Lingcod	Full	SS2				X				1
Arrowtooth	* 1993	other	X		NWC				X	2
English sole	Full	SS2		X	NWC					1
Petrale sole	Full	SS2				X		X		2
Starry flounder	Full	SS2					X	X		2
Pacific ocean perch	Update	ADMB		X	NWC	X			X	3
Darkblotched rockfish	Full	SS2	X		NWC		X		X	3
Blackgill rockfish	Full	SS2		X	NWC			X		2
Shortspine thornyhead	Full	SS2					X	X		2
Longspine thornyhead	Full	SS2					X	X		2
Sablefish	Full	SS2	X		NWC		X		X	3
Dover sole	Full	SS2				X				1
Black rockfish	* 2003/1999	SS1	X		ODFW / WDFW				X	2
Cabezon	Full	SS2				X				1
Cal. Scorpionfish	Full	SS2						X		1
Gopher rockfish	Full	SS2					X	X		2
Kelp greenling	Full	SS2				X				1
Longnose skate	Unassessed		X		NWC					1
Dogfish	Unassessed		X		WDFW					1
Blue rockfish	Unassessed					?		?		0
Vermilion						?		?		
Sanddabs						?		?		
Splitnose						?		?		

Highlighted cells indicate species with assessments that 1) are outdated, 2) have not been updated to SS2, and/or 3) require inclusion of NWFSC shelf-slope survey data from shelf depths for there to be new abundance indices beyond 2004.

Agenda Item F.3.c
Attachment 1
April 2006

GROUNDFISH STOCK ASSESSMENT AND REVIEW PROCESS FOR 200~~5~~7-200~~6~~8

Introduction

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

STAR Goals and Objectives

The goals and objectives for the groundfish assessment and review process[1] are:

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

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

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

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

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

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

g) Use assessment and review resources effectively and efficiently.

Shared Responsibilities

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

The review of current stock assessments requires a routine, dedicated effort that simultaneously meets the needs of NMFS, the Council, and others. Leadership, in the context of the stock assessment review process for groundfish, means consulting with all interested parties to plan, prepare terms of reference, and develop a calendar of events and

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

a list of deliverables. Coordination means organizing and carrying out review meetings, distributing documents in a timely fashion, and making sure that assessments and reviews are completed according to plan. Leadership and coordination involve costs, both monetary and time, which have not been calculated, but are likely substantial.

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

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

NMFS Responsibilities

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

The SSC will appoint STAR Panel chairpersons. The NMFS Stock Assessment Coordinator will identify and select other STAR panelists following criteria for reviewer qualifications, nomination, and selection that are developed in consultation with the SSC. ~~The SSC will appoint STAR Panel chairpersons, although the NMFS Stock Assessment cCoordinator will identify and select other STAR panelists following criteria for reviewer qualifications, nomination, and selection.~~ The public is welcome to nominate qualified reviewers. Following any modifications to the stock assessments resulting from STAR panel reviews and prior to SSC review~~distribution of the stock assessment documents and STAR panel reports to GMT~~, the ~~c~~Stock Assessment Coordinator will review the Executive Summary ~~stock assessments and panel reports~~ for consistency with the T~~t~~erms of ~~r~~Reference~~, especially completeness of the stock assessment Executive Summary~~. Inconsistencies will be identified and the authors requested to make appropriate revisions in time for the ~~GMT~~ SSC meeting at which an assessment is reviewed~~ABC and OY recommendations are developed~~.

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

STAT Team Responsibilities

The STAT, consisting of one or more stock assessment scientists from NMFS, state agencies or academia, is responsible for conducting a complete and technically sound stock assessment that conforms to accepted standards of quality. The STAT will conduct its work and activities in accordance with the Terms of Reference for Groundfish STAT Teams. The final product of the STAT will be a stock assessment document that follows the outline specified in Appendix B: Outline for Groundfish Stock Assessment Documents.

GMT Responsibilities

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

GAP Responsibilities

The chair of the GAP will appoint a representative to track each stock assessment and attend the STAR Panel meeting. The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor. It is especially important that the GAP representative be included in a discussion and review of all the data sources being used in the assessment, prior to development of the stock assessment model. It is the responsibility of the GAP representative to insure that industry concerns about the adequacy of data being used by the STAT team are expressed at an early stage in the process.

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

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

SSC Responsibilities

The Scientific and Statistical Committee (SSC) will participate in the stock assessment review process and will provide the ~~GMT and~~ Council and its advisory bodies with technical advice related to the stock assessments and the review process. The SSC will assign one of its members to act as chairman of each STAR Panel. The STAR Panel chair will review the stock assessments and panel reports for consistency with the Terms of Reference. ~~This member is not only expected to attend the assigned STAR Panel meeting, but also the GMT meeting at which ABC recommendations are made (should the need arise), and Council meetings when groundfish stock assessment agenda items are discussed (see calendar in Appendix A). Specifically, if requested t~~The SSC representative will present the STAR Panel report to the GMT if it requires assistance in interpreting the results of a stock assessment. In addition, the SSC representative on a STAR panel will present the Panel's report at SSC and Council meetings. However, to insure independence in the SSC's review of stock assessments and STAR Panel proceedings, members of the SSC, who are unaffiliated with the STAR Panel, whether as a member of a STAT team or as a panelist, will be assigned the roles of discussion lead and rapporteur.

The SSC representative will ~~also~~ communicate SSC comments or questions to the GMT and other Council advisory bodies. It is the SSC's responsibility to review and endorse any additional analytical work requested by the GMT after the stock assessments have been reviewed by the STAR Panels. In addition, the SSC will review and advise the GMT and Council on projected ABCs and OYs and, in addition, ~~.~~

~~The SSC, during their normally scheduled meetings,~~ will serve as arbitrator to resolve disagreements between the

STAT Team, STAR Panel, or GMT. ~~The STAT Team and the STAR Panel may disagree on technical issues regarding an assessment. In this case, a complete stock assessment must include a point-by-point response by the STAT Team to each of the STAR Panel recommendations.~~

Council Staff Responsibilities

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

Stock Assessment Priorities

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

In establishing stock assessment priorities a~~n~~ number of factors are considered, including:

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

2. Overfished stocks that are under rebuilding plans should be evaluated to ensure that progress towards achieving stock recovery is adequate. Guidelines for assessing adequacy of progress in rebuilding of overfished stocks are currently being developed through a Council-based process, which when complete, will result in a revision to the SSC's Terms of Reference for Groundfish Rebuilding Analyses.~~[2]~~

3. In general no more than ~~2~~ 3 full assessments (preferably 2) will be reviewed by a STAR Panel. ~~, although~~ ~~i~~In exceptional circumstances this number may be exceeded, if ~~in consultation~~ the SSC and NMFS ~~s~~Stock ~~a~~Assessment ~~c~~Coordinator conclude that it is advisable and/or necessary to do so.

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

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

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

Terms of Reference for STAR Panels and Their Meetings

The principal responsibilit~~y~~ies of the STAR Panel ~~is~~ are to ~~carry out these terms of reference according to the calendar for groundfish assessments~~ review stock assessment documents, data inputs, analytical models, and to provide complete STAR Panel reports for all reviewed species. Most groundfish stocks are assessed infrequently and each assessment and review should result in useful advice to the Council. The STAR Panel's work includes:

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

STAR Panels ~~normally~~ include a chairman, at least one "external" member (i.e., outside of the Council family and

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

not involved in management or assessment of West Coast groundfish), and one SSC member. The total number of STAR members (including the chair and external reviewer) should be at least "n+1" where n is the number of stock assessments. In addition to Panel members, STAR meetings will include GMT and GAP advisory representatives with responsibilities ~~laid out~~ described in their terms of reference. *(Formalize the role of the GMT and GAP here?)* STAR Panels normally meet for one week.

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

The STAR Panel is responsible for determining if a stock assessment document is sufficiently complete according to Appendix B: Outline for Groundfish Stock Assessments. It is the Panel's responsibility to identify assessments that cannot be reviewed or completed for any reason. The Panel's decision that an assessment is complete should be made by consensus. If a Panel cannot reach agreement, then the nature of the disagreement must be described in the Panel's report. Moreover, if a full stock assessment is deemed to have become routine and/or has stabilized its approach to data analysis and modeling, the STAR panel should ~~certify~~make a recommendation that the assessment is eligible to be considered as an update (see below) during the next stock assessment cycle.

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

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

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

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

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

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

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

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

Suggested Template for STAR Panel Report

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

Terms of Reference for Groundfish STAT Teams

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

~~Each STAT Team will appoint a representative who will attend any data and modeling~~ All relevant stock assessment workshops should be attended by all STAT team members. The STAT Team is obliged to keep the STAR Panel GAP representative informed of the specific data being used in the stock assessment and to be prepared to respond to concerns about the data that might be raised. STAT Teams are encouraged to also organize independent meetings with industry and interested parties to discuss issues, questions, and data.

Each STAT Team will appoint a representative to coordinate work with the STAR Panel. ~~and~~ Barring exceptional circumstances, all STAT team members should attend the STAR Panel meeting.

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

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

The STAT Team is responsible for bringing computerized data and working assessment models to the review meeting in a form that can be analyzed on site. STAT Teams should take the initiative in building and selecting candidate models and should have several complete models ready to present to the STAR Panel and be prepared to discuss the merits of each. The STAT should not expect the STAR Panel to develop a new Base model during a STAR Panel meeting.

In most cases, the ~~The~~ STAT Team ~~is responsible for producing a~~ should produce a complete draft of the assessment ~~by~~ within three weeks of the end of the STAR Panel meeting, including any internal agency review. In ~~the~~ any event, ~~that a~~ the STAT Team must finalize the assessment document ~~complete draft is not completed, the Team is responsible for completing the work to the satisfaction of the STAR Panel as soon as possible, but within at least one week~~ before the ~~GMT~~ briefing book deadline for the Council meeting at which ~~meets to discuss the results of~~ the assessment is scheduled for review.

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

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

Electronic versions of final assessment documents, rebuilding analyses, parameter files, data files, and key output files will be sent by the STAT Teams to the Stock Assessment Coordinator for inclusion in a stock assessment archive. Any tabular data that are inserted into the final documents in and object format should also be submitted in alternative forms (e.g., spreadsheets), which allow selection of individual data elements.

Terms of Reference for Stock Assessment Updates

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

Qualification

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

Composition of the Review Panel

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

Review Format

All stock assessment updates will be reviewed during a single meeting of the SSC Groundfish Subcommittee scheduled early in the assessment cycle. This meeting may precede or follow a normally scheduled SSC meeting. The review process will be as follows. The STAT team preparing the update will distribute the updated stock assessment to the review panelists at least two prior to the review meeting. In addition, Council staff will provide panelists with a copy of the last stock assessment reviewed under the full STAR process, as well as the previous STAR panel report. Notice of the meeting will be published in the *Federal Register* (generally, 23 days in advance of the meeting) and a Meeting Notice will be distributed (generally, 14 days in advance). Review of stock assessment updates is not expected to require analytical requests or model runs during the meeting, although large or unexpected changes in model results may necessitate some model exploration. The review will focus on two crucial questions: (1) has the assessment complied with the terms of reference 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.

STAT Team Deliverables

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

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

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

Review Panel Report

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

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

Appendix A: 200~~5~~7-200~~6~~8 Stock Assessment Review Calendar

TO BE DETERMINED

Include drop dead dates for inclusion of all significant data elements

Include a post-STAR debriefing where STAT teams present their findings to GMT, GAP, and the Council – how is this meeting organized?

When do STAT Teams provide GAP representatives with stock assessment data?

~~July 26-30, 2004 Data Workshop (AFSC, Seattle)~~

~~Oct. 25-29, 2004 Modeling Workshop (NWFSC, Seattle)~~

~~Nov. 1-5, 2004 PFMC adoption of Stock Assessment Terms of Reference (Portland)~~

~~Feb. 1-3, 2005 STAR Panel #1: Pacific whiting~~

~~April 18-22, 2005 STAR Panel #2: English sole, petrale sole, starry flounder~~

~~May 9-13, 2005 STAR Panel #3: California scorpionfish, gopher rockfish, vermilion rockfish, cowcod~~

~~May 16-20, 2005 STAR Panel #4: Pacific ocean perch, darkblotched rockfish, cabezon~~

~~June 20-24, 2005 STAR Panel #5: sablefish, Dover sole, longspine thornyhead, shortspine thornyhead~~

~~Aug. 1-5, 2005 STAR Panel #6: widow rockfish, bocaccio, blackgill rockfish, kelp greenling~~

~~Aug. 15-19, 2005 STAR Panel #7: lingcod, canary rockfish, yelloweye rockfish, yellowtail rockfish~~

~~Sept.-Oct., 2005 Mop-up STAR Panel (if needed)~~

~~Sept., 2005 GMT meeting~~

~~Sept. 18-23, 2005 PFMC preliminary adoption of ABCs and OYs (Portland)~~

~~Nov. 1-4, 2005 PFMC continued adoption of ABCs and OYs (San Diego)~~

~~April 3-7, 2006 PFMC preliminary adoption of management measures for 2007-2008 (California)~~

~~June 12-16, 2006 PFMC final adoption of management measures for 2007-2008 (????)~~

Appendix B: Outline for Groundfish Stock Assessment Documents

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

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

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

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

~~B.~~ D. Assessment
   ~~14.~~ 1. Data
      a. Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g.; growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.
      b. Sample size information for length and age composition data by area, year, gear, market category, etc., including both the number of trips and fish sampled.
   ~~15.~~ 2. History of modeling approaches used for this stock – changes between current and previous assessment models
      a. Response to STAR Panel recommendations from the most recent previous assessment.
   ~~16.~~ 3. Model description
      ~~a.~~ a. Complete description of any new modeling approaches.
      ~~b.~~ b. Definitions of fleets and areas.
      c. Assessment program with last revision date (i.e., date executable program file was compiled).
      d. List and description of all likelihood components in the model.
      e. Constraints on parameters, selectivity assumptions, natural mortality, assumed level of age reader agreement or assumed ageing error (if applicable), and other assumed parameters.
      f. Description of stock-recruitment constraints or components.
      g. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0, stable age structure, etc.).
      h. Critical assumptions and consequences of assumption failures.
   ~~17.~~ 4. Model selection and evaluation
      ~~a.~~ a. Evidence of search for balance between model realism and parsimony.
      b. Use nested models where possible (e.g.; asymptotic vs. domed selectivities, constant vs. ~~-~~time ~~-~~varying ~~-~~selectivities).
      ~~c.~~ c. ~~Do parameter estimates make sense, are they credible?~~Summary of alternate model configurations that were tried but rejected.
      d. Likelihood profile for the base-run configuration over one or more key parameters (e.g., M, h, Q) to show consistency among input data sources.

e. Residual analysis (e.g.; residual plots, time series plots of observed and predicted values, or other approach).

~~e.~~ f. Convergence status and convergence criteria for the base-run model.

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

h. Evaluation of model parameters. Do they make sense? Are they credible?

i. Are model results consistent with assessments of the same species in Canada and Alaska? Are parameter estimates (e.g., survey catchability) consistent with estimates for related stocks?

5. Point-by-point response to the STAR Panel recommendations.

~~18.~~ 6. Base-run(s) results

a. Table listing all explicit parameters in the stock assessment model used for base runs, their purpose (e.g.; recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.

~~b.~~ b. Population numbers at age × sex (where M is sex-specific) × year.

c. Time-series of total and spawning biomass, depletion relative to B_0, recruitment and fishing mortality or exploitation rate estimates (table and figures).

~~d.~~ d. Selectivity estimates (if not included elsewhere).

~~e.~~ e. Stock-recruitment relationship.

7. Uncertainty and sensitivity analyses. The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation. Important factors to consider include:

a. Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles of important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs by an appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, or MCMC).

b. Sensitivity to data set choice and weighting schemes (e.g., emphasis or λ factors), which may also include a consideration of recent patterns in recruitment.

~~c.~~ c. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.

d. Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.

~~e.~~ e. Historical analysis (plot of actual estimates from current and previous assessments).

~~f.Decision table analysis.~~

~~g.~~ f. Subjective appraisal of the magnitude and sources of uncertainty.

g. If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each.

h. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

i. Risk plots (Mohn suggestion)

~~C.~~ E. Rebuilding parameters –

1. Determine B_o as the product of spawningers per recruit (SPR) in unfished state multiplied by the average recruitment expected while the stock is unfished. This typically is estimated as the average recruitment during early years of fishery. ~~According to the 1999 SAFE report (PFMC 1999, p. 24)~~[3]~~, t~~The values for spawners are preferably measured as total population egg production, but female spawning biomass is a common proxy.

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

~~15.~~ 2. $B_{msy} = 0.4\ B_o$;
~~16.~~ 3. Mean generation time; and
4. Forward projection using a Monte Carlo re-sampling of recruitments expected to occur as the stock rebuilds, where future recruitments typically are taken from the recent time series of estimated recruitments or recruits per spawner. Alternatively, if a credible stock-recruitment relationship can be estimated, it could be used to project population growth. Either approach can be conducted using the Punt rebuilding software (see above).

~~D.~~ F. Reference Points (biomass and exploitation rate)

~~E.~~G. Harvest projections and decision tables

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

H. Research needs (prioritized).

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

J. Literature cited.

K. An appendix with the c~~C~~omplete parameter and data in the native code of the stock assessment program.

Appendix C: Template for Executive Summary Prepared by STAT Teams

Stock: species/area, including an evaluation of any potential biological basis for regional management

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

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

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

Reference points: management targets and definition of overfishing

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

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

Exploitation status: exploitation rates (i.e., total catch divided by exploitable biomass) – include a table with the last 10 years of data and a graph showing the trend in fishing mortality relative to the target (y-axis) plotted against the trend in biomass relative to the target (x-axis).

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

Forecasts: ten-year forecasts of catch, summary biomass, spawning biomass, and depletion

Decision table: projected yields (ABC and OY), spawning biomass, and stock depletion levels for each year

Research and data needs: identify information gaps that seriously impede the stock assessment

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

Summary Table: as detailed in the attached spreadsheet

Appendix D: Example a Complete Stock Assessment Executive Summary

Will update with the Executive Summary from the latest round of assessments (Stacey Miller to provide)

~~Executive Summary~~

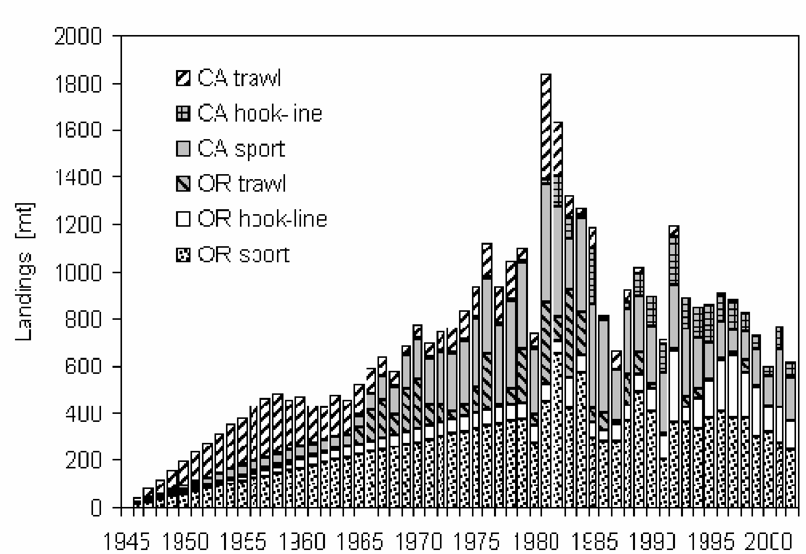
Stock: ~~This assessment pertains to the black rockfish (*Sebastes melanops*) population resident in waters located off northern California and Oregon, including the region between Cape Falcon and the Columbia River. Genetic information is presented that indicates black rockfish within that area represent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

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

~~Recent black rockfish catch statistics [mt] by fishery~~

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

Data and Assessment: ~~A variety of data sources was used in this assessment including: (1) recreational landings, age, and size composition data from the Oregon Department of Fish and Wildlife (ODF&W), (2)~~



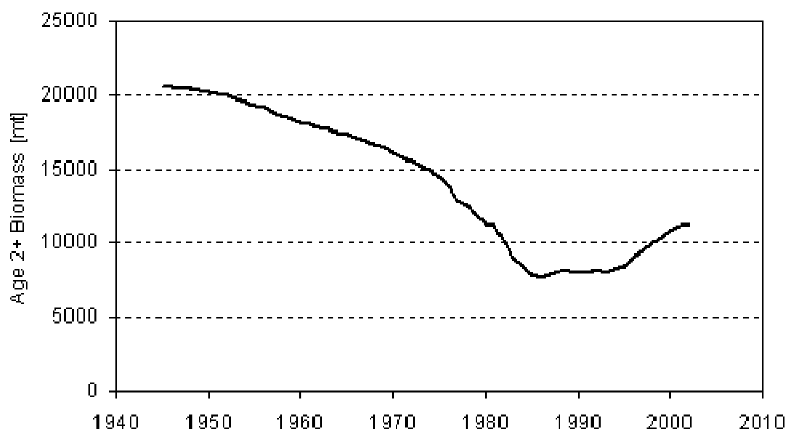
~~recreational landings (all California and Oregon shore-based modes) from the RECFIN data base, (3) Oregon commercial landings (trawl and hook-and-line) from the PACFIN data base, (4) size compositions for the commercial fisheries in Oregon from ODF&W, (5) California commercial landings and length compositions from~~

~~the CALCOM database, (6) a recreational catch-per-unit-effort (CPUE) statistic developed from information provided by ODF&W, (7) recreational CPUE statistics for each State derived from the RECFIN data base, and (8) a recreational CPUE statistic developed from the CDF&G central California CPFV data base. These multiple data sources were combined in a maximum likelihood statistical setting using the length-based version of the Stock Synthesis Model (Methot 1990, 2000).~~

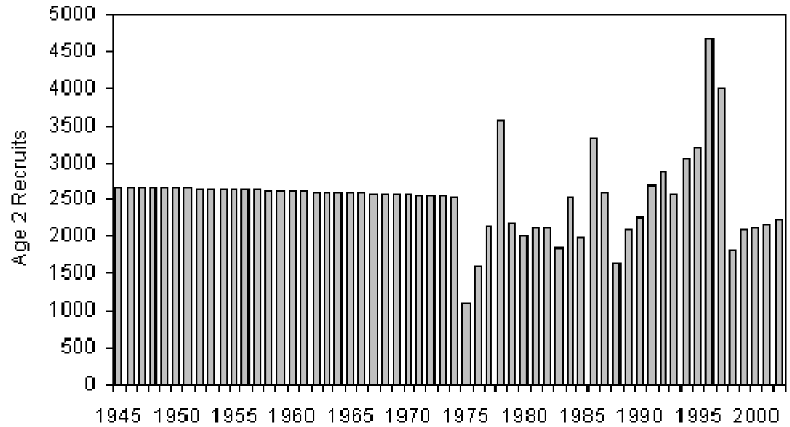
~~Unresolved Problems and Major Uncertainties: The major sources of uncertainty in this stock assessment include: (1) the amount of historical landings that occurred prior to the 1978, (2) the assumed natural mortality rate, and (3) the steepness of the spawner-recruit curve.~~

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

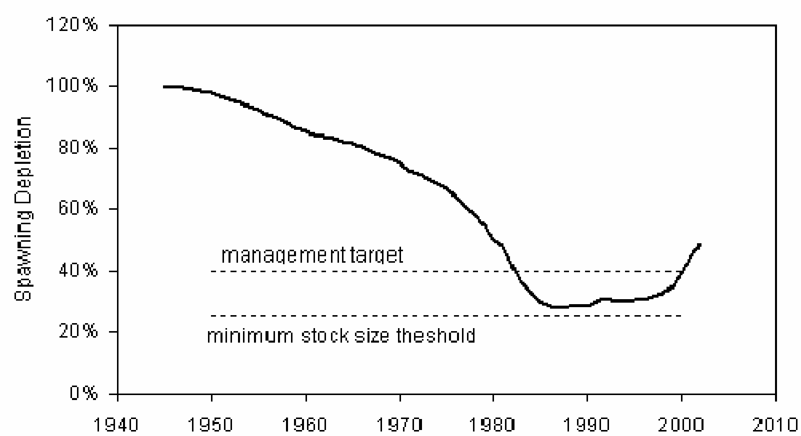
~~Stock Biomass: The biomass of age 2+ black rockfish underwent a significant decline from a high of 20,510 mt in 1945 to a low of 7,702 mt in 1986, representing a 62% decline. Since that time, however, the stock has increased and is currently estimated to be 11,232 mt. Most of the population's growth occurred after 1995, due to several large recruitment events, including especially the 1994 and 1995 year-classes.~~

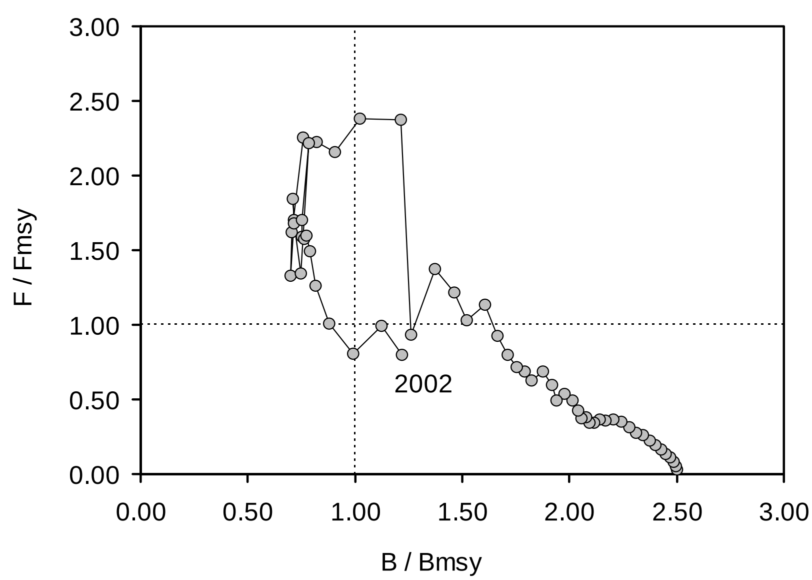


~~Recruitment: In the assessment recruitment was treated as a blend of deterministic values (i.e., 1945-1974 & 1999-2002) and stochastic values (i.e., 1975-1998). The Beverton-Holt steepness parameter (***h***) was fixed at a value of 0.65, based upon on a profile of goodness-of-fit and results from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



~~Exploitation Status: The northern California-Oregon stock of black rockfish is healthy, with 2002 spawning output estimated to be 49% of the unexploited spawning level. This places the stock well above the management target level of $B_{40\%}$. Likewise, age 2+ biomass in 2002 is estimated to be 11,232 mt, which is 55% of that expected in the absence of fishing. In addition, since 1998 the fishing mortality rate has declined to the point where it is now less than the F_{msy} proxy in 2002 (i.e., $F_{50\%}$).~~





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

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

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

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

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

~~Research and Data Needs: The black rockfish review panel identified certain gaps in the available information that hindered the stock assessment. These were: (1) a fishery-independent survey should be developed to monitor~~

~~changes in black rockfish population abundance, (2) the California CPFV data set should be more thoroughly investigated to ascertain whether or not serial depletion of fishing sites has artificially kept catch rates high [see Appendix 1], (3) a standard approach to historical catch reconstructions should be developed, (4) the possibility of time-varying growth should be investigated, and (5) the calculation of the RECFIN catch-per-unit-effort statistic should be more thoroughly analyzed and verified.~~

Appendix E: History of STAR process

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

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

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

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

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

At the end of 1997, participants met to discuss events and make recommendations for 1998.[4] Participants concluded

---

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

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

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

[4]Jacobson, L.D. (ed.). 1997. Comments, issues and suggestions arising from the groundfish stock assessment

that objectives were, to varying degrees, achieved during 1997. A notable shortfall was in “increasing acceptance and understanding by all members of the Council family.” The most significant issues seemed to be the nature of the STAR Panels’ responsibilities, communicating uncertainty to decision makers, workload, and inexperience in conducting the review process.

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

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

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

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

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

Requirements for stock rebuilding analyses and monitoring of rebuilding progress and their relationship to the STAR process were also discussed. The group agreed that the terms of reference should be modified to require additional values (e.g., B_{msy}) be tabulated and included in STAT Team report related to an overfished species. There was general agreement that the STAR process should be used to review assessments of overfished species, which are still likely to be on a 3-year cycle. However, the STAR process is not the appropriate process for the "monitoring" reports (required every 2 years), when they are out of phase with the assessment cycle.

---

and review process during 1997. Report to the Pacific Fishery Management Council (Revised Supplemental Attachment B.9.b, November 1997).

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

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

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

~~Appendix F: Terms of Reference for Expedited Stock Assessment Updates~~

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

~~Qualification~~

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

~~Composition of the Review Panel~~

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

~~Review Format~~

~~Typically, a physical meeting will not be required to complete an expedited review of an updated stock assessment, but usually one would be the most efficient way to conduct the review. Rather, if a meeting is not held, materials can be distributed electronically. STAT and panel representatives will~~

~~largely be expected to interact by email and telephone. A conference call will be held to facilitate public participation in the review.~~

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

~~STAT Team Deliverables~~

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

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

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

~~Review Panel Report~~

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

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

Agenda Item F.3.c
Supplemental Attachment 2
April 2006

GROUNDFISH STOCK ASSESSMENT AND REVIEW PROCESS FOR 200~~5~~7-200~~6~~8

Introduction

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

STAR Goals and Objectives

The goals and objectives for the groundfish assessment and review process[1] are to:

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

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

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

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

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

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

g) Use assessment and review resources effectively and efficiently.

Shared Responsibilities

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

The review of current stock assessments requires a routine, dedicated effort that simultaneously meets the needs of NMFS, the Council, and others. Leadership, in the context of the stock assessment review process for groundfish, means consulting with all interested parties to plan, prepare terms of reference, and develop a calendar of events and

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

a list of deliverables. Coordination means organizing and carrying out review meetings, distributing documents in a timely fashion, and making sure that assessments and reviews are completed according to plan. Leadership and coordination involve costs, both monetary and time, which have not been calculated, but are likely substantial.

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

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

NMFS Responsibilities

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

The SSC will appoint STAR Panel chair~~person~~s from among its membership. The NMFS Stock Assessment Coordinator will identify and select other STAR panelists following criteria for reviewer qualifications~~, nomination, and selection that are~~ developed in consultation with the SSC. ~~The SSC will appoint STAR Panel chairpersons, although the NMFS Stock Assessment cCoordinator will identify and select other STAR panelists following criteria for reviewer qualifications, nomination, and selection.~~ The public is welcome to nominate qualified reviewers. Selection of STAR panelists should aim for balance between outside expertise and in-depth knowledge of West Coast fisheries, data sets available for those fisheries, and modeling approaches applied to West Coast groundfish species. All panelists should be experienced stock assessment scientists, i.e., individuals who have done actual stock assessments using current methods. Panelists should be knowledgeable about the specific modeling approaches being reviewed, which in most cases will be statistical age- and/or length-structured assessment models. It is recognized that the pool of qualified reviewers is limited, and that staffing of STAR panels is subject to constraints that may make it difficult to achieve these objectives.

Following any modifications to the stock assessments resulting from STAR panel reviews and prior to SSC review~~distribution of the stock assessment documents and STAR panel reports to GMT~~, the ~~c~~Stock Assessment Coordinator will review the Executive Summary ~~stock assessments and panel reports~~ for consistency with the T~~t~~erms of ~~r~~Reference~~, especially completeness of the stock assessment Executive Summary~~. Inconsistencies will be identified and the authors requested to make appropriate revisions in time for the ~~GMT~~ SSC meeting at which an assessment is reviewed~~ABC and OY recommendations are developed~~.

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

STAT Team Responsibilities

The STAT, consisting of one or more stock assessment scientists from NMFS, state agencies or academia, is responsible for conducting a complete and technically sound stock assessment that conforms to accepted standards of quality. The STAT will conduct its work and activities in accordance with the Terms of Reference for Groundfish STAT Teams. The final product of the STAT will be a stock assessment document that follows the outline specified in Appendix B~~: Outline for Groundfish Stock Assessment Documents~~.

GMT Responsibilities

The GMT is responsible for identifying and evaluating potential management actions based on the best available scientific information. In particular, the GMT makes ABC and OY recommendations to the Council based on estimated stock status, uncertainty about stock status, and socioeconomic and ecological factors. The GMT will use stock assessments, STAR Panel reports, and other information in making their recommendations. The GMT's preliminary ABC recommendation will be developed at a meeting that includes representatives from the SSC, STAT Teams, STAR Panels, and GAP. A GMT representative(s) will be appointed by the chair of the GMT to track each stock assessment, and will serve as advisor to the STAT Team and STAR Panel. ~~A representative(s) of t~~The GMT representative ~~will serve as a liaison to each STAR Panel,~~ will participate in review discussions, but will not serve as a member of the Panel. The GMT representative should be prepared to advise the STAT Team and STAR Panel on changes in fishing regulations that may influence data used in the assessment and nature of the fishery in the future.

The GMT will not seek revision or additional review of the stock assessments after they have been reviewed by the STAR Panel. The GMT chair will communicate any unresolved issues to the SSC for consideration. Successful separation of scientific (i.e., STAT Team and STAR Panels) from management (i.e., GMT) work depends on stock assessment documents and STAR reviews being completed by the time the GMT meets to discuss preliminary ABC and OY levels. However, the GMT can request additional model projections, based on reviewed model scenarios, in order to develop a full evaluation of potential management actions.

GAP Responsibilities

The chair of the GAP will appoint a representative to track each stock assessment and attend the STAR Panel meeting. The GAP representative will serve as advisor to the STAT Team and STAR Panel. ~~The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor.~~ It is especially important that the GAP representative be included in the STAT team's~~a~~ discussion and review of all the data sources being used in the assessment, prior to development of the stock assessment model. It is the responsibility of the GAP representative to insure that industry concerns about the adequacy of data being used by the STAT T~~t~~eam are expressed at an early stage in the process. The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor.

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

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

SSC Responsibilities

The Scientific and Statistical Committee (SSC) will participate in the stock assessment review process and will provide the ~~GMT and~~ Council and its advisory bodies with technical advice related to the stock assessments and the review process. The SSC will assign one of its members to act as chair~~man~~ of each STAR Panel. Following the Panel meeting, t~~T~~he STAR Panel chair will review the revised stock assessment~~s~~ and STAR P~~p~~anel report~~s~~ for consistency with the Terms of Reference. This member is not only expected to attend the assigned STAR Panel meeting, but also the GMT meeting at which ABC recommendations are made (should the need arise), and Council meetings when groundfish stock assessment agenda items are discussed (see calendar in Appendix A). Specifically, if requested t~~T~~he ~~SSC representative~~STAR Panel chair will present the STAR Panel report to the GMT if it requires assistance in interpreting the results of a stock assessment. In addition, the ~~SSC representative on a STAR panel~~chair will present the Panel's report at SSC and Council meetings. However, to insure independence in the SSC's review of stock assessments and STAR Panel proceedings, SSC members who served on a STAT Team or STAR Panel for a particular stock assessment are required to recuse themselves when that stock assessment is reviewed by the SSC, except to answer questions or present factual information. Other SSC members ~~members of the SSC who are unaffiliated with the STAR Panel, whether as a member of a STAT team or as a panelist,~~ will be assigned the roles of discussion lead and rapporteur. The SSC's review constitutes a final independent check of the stock assessment that takes into consideration both the stock assessment and the STAR Panel report.

~~The SSC representative will also communicate SSC comments or questions to the GMT and other Council advisory bodies.~~ It is the SSC's responsibility to review and endorse any additional analytical work requested by the GMT after the stock assessment~~s~~ has~~have~~ been reviewed by the STAR Panels. In addition, the SSC will review and advise the GMT and Council on projected ABCs and OYs and, in addition, ~~.~~

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

Council Staff Responsibilities

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

Stock Assessment Priorities

Stock assessments for West Coast groundfish are conducted periodically to assess abundance, trends, and appropriate harvest levels for these species. Assessments use statistical population models to analyze and integrate a variety of survey, fishery and biological data. Due to the large number of groundfish species that have never been assessed, it is the goal of the Council to increase substantially the number of assessed stocks. A constraint on reaching that objective, however, is that a multi-year management regime has recently been adopted, which limits assessment activities to odd years only (e.g., ~~2005~~2007). ~~Nonetheless, for the upcoming assessment cycle an ambitious list of 23 stocks will be evaluated, including at least five species that have never been assessed.~~

In establishing stock assessment priorities a~~n~~ number of factors are considered, including:

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

2. Overfished stocks that are under rebuilding plans should be evaluated to ensure that progress towards achieving stock recovery is adequate. Guidelines for assessing adequacy of progress in rebuilding of overfished stocks are currently being developed through a Council-based process, which when complete, will result in a revision to the SSC's Terms of Reference for Groundfish Rebuilding Analyses.~~[2]~~

3. In general no more than ~~2~~ 3 full assessments (preferably 2) will be reviewed by a STAR Panel. ~~, although~~ ~~i~~In exceptional circumstances this number may be exceeded, if ~~in consultation~~ the SSC and NMFS ~~s~~Stock ~~a~~Assessment ~~c~~Coordinator conclude that it is advisable and/or necessary to do so.

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

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

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

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

Terms of Reference for STAR Panels and Their Meetings

The principal responsibilit~~y~~ies of the STAR Panel ~~is~~ are to ~~carry out these terms of reference according to the calendar for groundfish assessments~~ review stock assessment documents, data inputs, analytical models, and to provide complete STAR Panel reports for all reviewed species. Most groundfish stocks are assessed infrequently and each assessment and review should result in useful advice to the Council. The STAR Panel's work includes:

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

STAR Panels include a chairman appointed from the SSC, at least one external member (i.e., outside the Council family and not involved in management or assessment of west coast groundfish), and at least two other members with experience gained from having conducted stock assessments on the U. S. west coast or elsewhere. The total number of STAR Panel members (including the chair and external reviewer) should be at least "N+2" where N is the number of stock assessments reviewed.~~STAR Panels normally include a chairman, at least one "external" member (i.e., outside of the Council family and not involved in management or assessment of West Coast groundfish), and one SSC member. The total number of STAR members (including the chair and external reviewer) should be at least "n+1" where n is the number of stock assessments.~~ In addition to Panel members, STAR meetings will include GMT and GAP ~~advisory representatives~~advisors with responsibilities ~~laid out~~ described in their terms of reference. ~~*(Formalize the role of the GMT and GAP here?)*~~ STAR Panels normally meet for one week.

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

The STAR Panel is responsible for determining if a stock assessment document is sufficiently complete according to Appendix B~~: Outline for Groundfish Stock Assessments~~. It is the Panel's responsibility to identify assessments that cannot be reviewed or completed for any reason. The Panel's decision that an assessment is complete should be made by consensus. If a Panel cannot reach agreement, then the nature of the disagreement must be described in the Panel's report. Moreover, if a ~~full~~ stock assessment is deemed to be stable in ~~deemed to have become routine and/or has stabilized~~ its approach~~-~~ to data analysis and modeling, the STAR panel should ~~certify~~~~make a~~ recommendation that the assessment ~~is eligible to~~ be considered as an update ~~(see below)~~ during the next stock assessment cycle.

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

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

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

The primary goal of the STAR Panel is to complete a detailed evaluation of the results of a stock assessment, which puts the Panel in a good position to advance the best available scientific information to the Council. Under ideal circumstances, the STAT Team and STAR Panel should strive to reach a mutual consensus on a single base model, but it is essential that uncertainty in the analysis be captured and transmitted to managers. A useful way of accomplishing this objective is to bracket the base model along what is deemed to be the dominant dimension of uncertainty (e.g., spawner-recruit steepness or R_0, natural mortality rate, survey catchability, recent year-class strength, weights on conflicting CPUE series, etc.). Alternative models should show contrast in their management implications, which in practical terms means that that they should result in different estimates of current stock size, stock depletion, and ABC.

Once a base model has been bracketed on either side by alternative model scenarios, which capture the overall degree of uncertainty in the assessment, a 2-way decision table analysis (states-of-nature versus management action) is the preferred way to present the repercussions of uncertainty to management. An attempt should be made to develop alternative model scenarios such that the base model is considered twice as likely as the alternative models, i.e., the ratio of probabilities should be 25:50:25 for the low stock size alternative, the base model, and the high stock size alternative (Fig. 1). Potential methods for assigning probabilities include using the statistical variance of the model estimates of stock size, posterior Monte Carlo simulation, or expert judgment, but other approaches are encouraged as long as they are fully documented. Bracketing of assessment results could be accomplished in a variety of ways, ~~including ambiguity in the data, statistical precision, or model specification uncertainty,~~ but as a matter of practice the STAR Panel should strive to identify a single preferred base model when possible, so that averaging of extremes doesn't become the *de facto* choice of management.

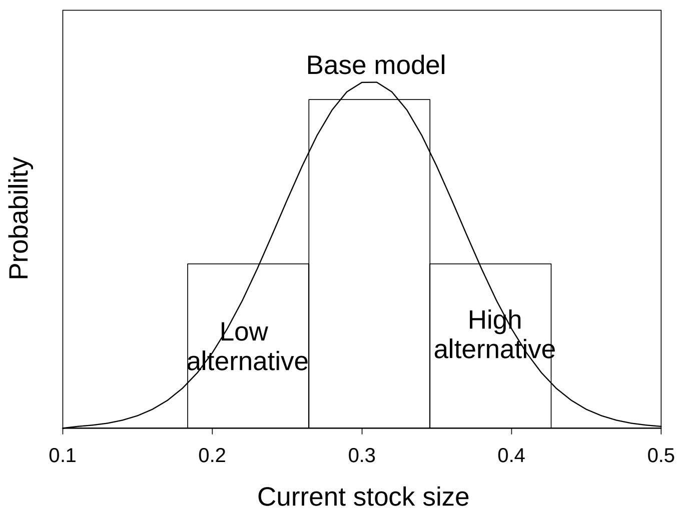


Figure 1. Example of assigning probabilities to alternative models using uncertainty in the estimate of current stock size.

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

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

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

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

Suggested Template for STAR Panel Report

1. Minutes of the STAR Panel meeting containing
   A. Name and affiliation of STAR Panel members; and
   B. List of analyses requested by the STAR Panel, the rationale for each request, and brief summary of the STAT response to the request.
   C. Description of base model and alternative models used to bracket uncertainty.
2. Comments on the technical merits and/or deficiencies in the assessment and recommendations for remedies.
3. Explanation of areas of disagreement regarding STAR Panel recommendations:
   A. A~~a~~mong STAR Panel members (majority and minority reports), and
   B. B~~b~~etween the STAR Panel and STAT Team
4. Unresolved problems and major uncertainties, e.g.; any special issues that complicate scientific assessment, questions about the best model scenario.
5. Prioritized recommendations for future research and data collection

Terms of Reference for Groundfish STAT Teams

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

~~Each STAT Team will appoint a representative who will attend any data and modeling~~ All relevant stock assessment workshops should be attended by all STAT team members. The STAT Team is obliged to keep the ~~STAR Panel~~ GAP representative informed of the specific data being used in the stock assessment. The STAT team is expected to initiate contact with the GAP representative at an early stage in the -process, and to be prepared to respond to concerns about the data that might be raised. The STAT Team should also contact the GMT representative for information about changes in fishing regulations that may influence data used in the assessment. STAT Teams are encouraged to also organize independent meetings with industry and interested parties to discuss issues, questions, and data.

Each STAT Team will appoint a representative to coordinate work with the STAR Panel. ~~and~~ Barring exceptional circumstances, all STAT team members should attend the STAR Panel meeting.

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

The STAT Team is responsible for preparing three versions of the stock assessment document: 1) a complete "draft" including an executive summary (except for decision tables) for discussion at the stock assessment review meeting; 2) a ~~revised~~ "revised~~complete~~ draft" for distribution to the ~~GMT, SSC, GAP, and~~ Council and advisory bodies for discussions about preliminary ABC and OY levels; 3) a "final" version to be published in the SAFE report. Other than changes authorized ~~changes~~by the SSC, only editorial and other minor ~~changes~~ alterations should be made between the "~~complete~~ revised draft" and "final" versions. The STAT Team will provide ~~distribute~~ "draft" assessment documents to the Stock Assessment Coordinator, who will distribute them to the STAR Panel, Council, and GMT and GAP representatives at least two weeks prior to the STAR Panel meeting.

The STAT Team is responsible for bringing computerized data and working assessment models to the review meeting in a form that can be analyzed on site. STAT Teams should take the initiative in building and selecting candidate models and should have several complete models ready to present to the STAR Panel and be prepared to discuss the merits of each. The STAT team should identify a candidate base model, fully documented in the draft assessment, for STAR panel consideration.~~should not expect the STAR Panel to develop a new Base model during a STAR Panel meeting.~~

In most cases, the ~~The~~ STAT Team ~~is responsible for producing a~~ should produce a complete draft of the assessment ~~by~~ within three weeks of the end of the STAR Panel meeting, including any internal agency review. In ~~the~~ any event, ~~that a~~ the STAT Team must finalize the assessment document ~~complete draft is not completed, the Team is responsible for completing the work to the satisfaction of the STAR Panel as soon as possible, but within at least one week~~ before the ~~GMT~~ briefing book deadline for the Council meeting at which ~~meets to discuss the results of~~ the assessment is scheduled for review.

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

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

Electronic versions of final assessment documents, rebuilding analyses, parameter files, data files, and key output files will be sent by the STAT Teams to the Stock Assessment Coordinator for inclusion in a stock assessment archive. Any tabular data that are inserted into the final documents in and object format should also be submitted in alternative forms (e.g., spreadsheets), which allow selection of individual data elements.

Terms of Reference for Stock Assessment Updates

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

Qualification

The Scientific and Statistical Committee (SSC) will determine whether a stock assessment qualifies as an update under these terms of reference. ~~Certification~~Recommendation by a STAR Panel or the SSC that a full assessment is suitable for an~~eligible to become an~~ update will be a principal criterion in this determination. To qualify, a stock assessment must carry forward its fundamental structure from a model that was previously reviewed and endorsed by a ~~full~~ STAR panel. In practice this means similarity in: (a) the particular sources of data used, (b) the analytical methods used to summarize data prior to input to the model, (c) the software used in programming the assessment, (d) the assumptions and structure of the population dynamics model underlying the stock assessment, (e) the statistical framework for fitting the model to the data and determining goodness of fit, (f) the procedure for weighting of the various data components, and (g) the analytical treatment of model outputs in determining management reference points, including F_{msy}, B_{msy}, and B_0. A stock assessment update is appropriate in situations where no significant change in these seven~~7~~ factors has occurred, other than extending time series of data elements within particular data components used by the model, e.g., adding information from a recently completed survey and an update of landings. Extending CPUE time series based on fitted models (i.e., GLM models) will require refitting the model and updating all values in the time series. Assessments using updated CPUE time series qualify as updates if the CPUE standardization models follow applicable criteria for assessment models described above. In practice there will always be valid reasons for altering a model, as defined in this broad context, although, in the interests of stability, such changes should be resisted as much as possible. Instead, significant alterations should be addressed in the next subsequent full assessment and review.
~~In principle, an update is reserved for stock assessments that maintain fidelity to an accepted modeling framework, but the SSC does not wish to prescribe in advance what particular changes may or may not be implemented. Such a determination will need to be made on a case by case basis.~~

Composition of the Review Panel

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

Review Format

All stock assessment updates will be reviewed during a single meeting of the SSC Groundfish Subcommittee scheduled early in the assessment cycle. This meeting may precede or follow a normally scheduled SSC meeting. The review process will be as follows. The STAT team preparing the update will distribute the updated stock assessment to the review panelists at least two weeks prior to the review meeting. In addition, Council staff will provide panelists with a copy of the last stock assessment reviewed under the full STAR process, as well as the previous STAR panel report. ~~Notice of the meeting will be published in the *Federal Register* (generally, 23 days in advance of the meeting) and a Meeting Notice will be distributed (generally, 14 days in advance).~~ Review of stock assessment updates is not expected to require analytical requests or model runs during the meeting, although large or unexpected changes in model results may necessitate some model exploration. The review will focus on two crucial questions: (1) has the assessment complied with the terms of reference 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. If either of these criteria is not met, then a full stock assessment will be required.

STAT Team Deliverables

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

In addition to documenting changes in the performance of the model, the STAT T~~t~~eam will be required to present key assessment outputs in tabular form. Specifically, the STAT T~~t~~eam's final update document should include the following:

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

Review Panel Report

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

- Name and affiliation of panelists
- Comments on the technical merits and/or deficiencies of the update
- Explanation of areas of disagreement among panelists and between the panel and STAT team

- Recommendation regarding the adequacy of the updated assessment for use in management

Appendix A: 200~~5~~7-200~~6~~8 Stock Assessment Review Calendar

TO BE DETERMINED

Include deadlines ~~drop dead dates~~ for inclusion of all significant data elements.

Include a post-STAR ~~de~~briefing where STAT teams present their findings to GMT, GAP, and the Council. ~~– how is this meeting organized?~~

Include dates w~~W~~hen ~~do~~ STAT Teams provide GAP and GMT representatives with stock assessment data.~~?~~

~~July 26-30, 2004 Data Workshop (AFSC, Seattle)~~

~~Oct. 25-29, 2004 Modeling Workshop (NWFSC, Seattle)~~

~~Nov. 1-5, 2004 PFMC adoption of Stock Assessment Terms of Reference (Portland)~~

~~Feb. 1-3, 2005 STAR Panel #1: Pacific whiting~~

~~April 18-22, 2005 STAR Panel #2: English sole, petrale sole, starry flounder~~

~~May 9-13, 2005 STAR Panel #3: California scorpionfish, gopher rockfish, vermilion rockfish, cowcod~~

~~May 16-20, 2005 STAR Panel #4: Pacific ocean perch, darkblotched rockfish, cabezon~~

~~June 20-24, 2005 STAR Panel #5: sablefish, Dover sole, longspine thornyhead, shortspine thornyhead~~

~~Aug. 1-5, 2005 STAR Panel #6: widow rockfish, bocaccio, blackgill rockfish, kelp greenling~~

~~Aug. 15-19, 2005 STAR Panel #7: lingcod, canary rockfish, yelloweye rockfish, yellowtail rockfish~~

~~Sept.-Oct., 2005 Mop-up STAR Panel (if needed)~~

~~Sept., 2005 GMT meeting~~

~~Sept. 18-23, 2005 PFMC preliminary adoption of ABCs and OYs (Portland)~~

~~Nov. 1-4, 2005 PFMC continued adoption of ABCs and OYs (San Diego)~~

~~April 3-7, 2006 PFMC preliminary adoption of management measures for 2007-2008 (California)~~

~~June 12-16, 2006 PFMC final adoption of management measures for 2007-2008 (????)~~

Appendix B: Outline for Groundfish Stock Assessment Documents

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

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

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

C. Introduction

1. Scientific name, distribution, the basis for the choice of stock structure, including regional differences in life history or other biological characteristics that should form the basis of management units.
2. A map depicting the scope of the assessment and identifying boundaries for fisheries or data collection strata.
3. Description of fisheries for this species off Canada or Alaska, including references to any recent assessments of those stocks.
~~2.~~4. Important features of life history that affect management (e.g., migration, sexual dimorphism, bathymetric demography)
~~3.~~5. Important features of current fishery and relevant history of fishery
~~4.~~6. Management history (e.g., changes in mesh sizes, trip limits, optimum yields)
~~5.~~7. Management performance – a table or tables comparing acceptable biological catches, optimum yields, landings, and catch (i.e., landings plus discard) for each area and year

~~B.~~ D. Assessment

~~14.~~ 1. Data

a. Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g.; growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.

b. Sample size information for length and age composition data by area, year, gear, market category, etc., including both the number of trips and fish sampled.

~~15.~~ 2. History of modeling approaches used for this stock – changes between current and previous assessment models

a. Response to STAR Panel recommendations from the most recent previous assessment.

~~16.~~ 3. Model description

~~a.~~ a. Complete description of any new modeling approaches.

~~b.~~ b. Definitions of fleets and areas.

c. Assessment program with last revision date (i.e., date executable program file was compiled).

d. List and description of all likelihood components in the model.

e. Constraints on parameters, selectivity assumptions, natural mortality, assumed level of age reader agreement or assumed ageing error (if applicable), and other assumed parameters.

f. Description of stock-recruitment constraints or components.

g. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0, stable age structure, etc.).

h. Critical assumptions and consequences of assumption failures.

~~17.~~ 4. Model selection and evaluation

~~a.~~ a. Evidence of search for balance between model realism and parsimony.

b. Comparison of key model assumptions, include comparisons based on ~~Use~~ nested models ~~where possible~~ (e.g.; asymptotic vs. domed selectivities, constant vs. time varying ~~-~~selectivities).

~~c.~~ c. ~~Do parameter estimates make sense, are they credible?~~Summary of alternate model configurations that were tried but rejected.

d. Likelihood profile for the base-run configuration over one or more key parameters (e.g., M, h, Q) to show consistency among input data sources.

e. Residual analysis (e.g.; residual plots, time series plots of observed and predicted values, or other ~~approach~~approaches).

~~e.~~ f. Convergence status and convergence criteria for the base-run model.

~~f.~~ g.

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

h. Evaluation of model parameters. Do they make sense? Are they credible?

i. Are model results consistent with assessments of the same species in Canada and Alaska? Are parameter estimates (e.g., survey catchability) consistent with estimates for related stocks?

5. Point-by-point response to the STAR Panel recommendations.

~~18.~~ 6. Base-run(s) results

a. Table listing all explicit parameters in the stock assessment model used for base runs, their purpose (e.g.; recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.

~~b.~~ b. Population numbers at age × year × sex (~~where~~ if sex-specific M, growth, or selectivity ~~is sex-specific~~) ~~× year.~~

c. Time-series of total, summary, and spawning biomass, depletion relative to B_0, recruitment and fishing mortality or exploitation rate estimates (table and figures).

~~d.~~ d. Selectivity estimates (if not included elsewhere).

~~e.~~ e. Stock-recruitment relationship.

7. Uncertainty and sensitivity analyses. The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation. Important factors to consider include:

a. Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles of important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs by an appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, or MCMC).

b. Sensitivity to data set choice and weighting schemes (e.g., emphasis or λ factors), which may also include a consideration of recent patterns in recruitment.

~~c.~~ c. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.

d. Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.

~~e.~~ e. Historical analysis (plot of actual estimates from current and previous assessments).

~~f. Decision table analysis.~~

~~g.~~ f. Subjective appraisal of the magnitude and sources of uncertainty.

g. If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each.

h. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

~~i. Risk plots (Mohn suggestion)~~

~~C.~~ E. Rebuilding ~~parameters~~ analyses –

1. Determine B_o . ~~as the product of spawningers per recruit (SPR) in unfished state multiplied by the average recruitment expected while the stock is unfished. This typically is estimated as the average recruitment during early years of fishery. According to the 1999 SAFE report (PFMC 1999, p. 24)[3], t~~The values for spawners are preferably measured as total population egg production, but female spawning biomass is a common proxy.

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

~~15.~~ 2. $B_{msy} = 0.4\ B_o$;
~~16.~~ 3. Mean generation time; and
4. Forward projection using a Monte Carlo re-sampling of recruitments expected to occur as the stock rebuilds, where future recruitments typically are taken from the recent time series of estimated recruitments or recruits per spawner. Alternatively, if a credible stock-recruitment relationship can be estimated, it could be used to project population growth. Either approach can be conducted using the Punt rebuilding software (see above).

~~D.~~ F. Reference ~~p~~Points (biomass and exploitation rate).
1. Unfished spawning stock biomass, summary age biomass, and recruitment.
2. Spawning stock biomass that produces MSY, and the basis for the estimate (SR curve or proxy).
3. SPR_{msy} or F_{msy} (specify which), and the basis for the estimate (SR curve or proxy).
4. Exploitation Rate corresponding to SPR_{msy} or F_{msy} (if available).
5. Estimate of MSY and the basis for the estimate (SR curve or proxy).

G.

~~E.~~Harvest projections and decision tables

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

H. Regional management considerations.

1. Discuss whether a regional management approach make sense for the species from a biological perspective.
2. If there are insufficient data to analyze a regional management approach, what are the research and data needs to answer this question?

I~~H~~. Research needs (prioritized).

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

~~J.~~K Literature cited.

L. An appendix with the c~~C~~omplete parameter and data in the native code of the stock assessment program.

Appendix C: Template for Executive Summary Prepared by STAT Teams

Stock: species/area, including an evaluation of any potential biological basis for regional management

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

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

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

Reference points: management targets and definition of overfishing

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

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

Exploitation status: exploitation rates (i.e., total catch divided by exploitable biomass) – include a table with the last 10 years of data and a graph showing the trend in fishing mortality relative to the target (y-axis) plotted against the trend in biomass relative to the target (x-axis).

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

Forecasts: ten-year forecasts of catch, summary biomass, spawning biomass, and depletion

Decision table: projected yields (ABC and OY), spawning biomass, and stock depletion levels for each year

Research and data needs: identify information gaps that seriously impede the stock assessment

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

Summary Table: as detailed in the attached spreadsheet

EXECUTIVE SUMMARY

Stock

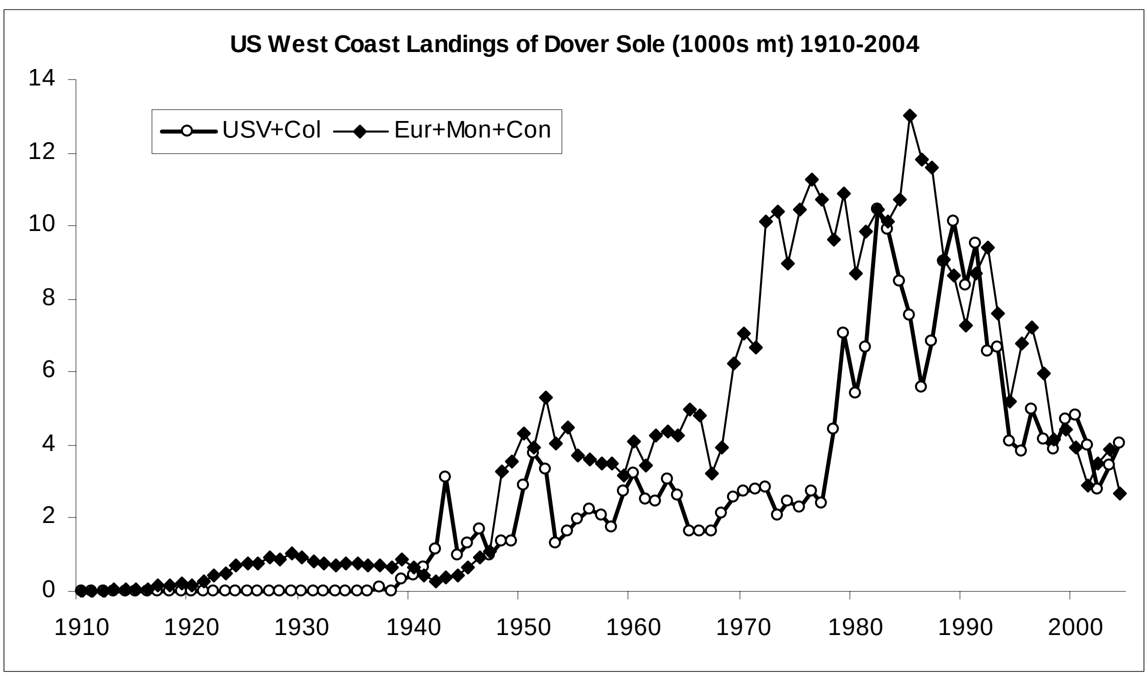
This assessment applies to the Dover sole (*Microstomus pacificus*) that reside in the waters off California, Oregon and Washington in the region bounded by the U.S. borders with Canada and Mexico. This assessment treats these fish as a unit stock. Dover sole are also harvested from the waters off British Columbia and in the Gulf of Alaska.

Catches

Dover sole have been the target of trawl operations along the west coast of North America since World War II and were almost certainly caught prior to the war as incidental take in directed fisheries for English sole and petrale sole. Almost all of the harvests have been taken by groundfish trawl. Annual landings from U.S. waters averaged 6,708 mt during the 1960s, 12,792 mt during the 1970s, 18,383 mt during the 1980s, 12,350 mt during the 1990s, and 7,213 mt since 2000. Discarding of small, unmarketable fish is an important, but poorly documented feature of the fishery.

Recent landings (mt) of Dover sole from Pacific Council waters.

INPFC Region	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
US Vancouver	1179.4	1459.3	995.8	897.5	1107.4	1261.4	1455.4	765.7	838.4	979.3
Columbia	2626.7	3514.7	3157.9	2976.0	3611.2	3553.1	2519.1	2030.6	2626.9	3079.3
Eureka	2404.9	2648.4	2113.3	2289.0	2225.9	2003.2	1498.9	1497.0	1955.4	1125.7
Monterey	3252.1	3242.0	2748.8	1276.5	1749.6	1703.7	1294.5	1719.4	1599.3	1245.8
Conception	1101.9	1322.2	1108.6	571.5	443.3	238.5	121.2	288.3	352.2	312.5
US Total	10565.1	12186.5	10124.3	8010.4	9137.4	8759.9	6889.2	6301.1	7372.2	6742.6



Data and Assessment

The U.S. west coast stock of Dover sole was last assessed in 2001. The current assessment used the new version of the Stock Synthesis program (SS2 version 1.19) and separated the length and age composition data into two fisheries: a northern fishery operating in the US Vancouver and Columbia INPFC regions and a southern fishery operating in the Eureka, Monterey and Conception regions. The period modeled in the assessment extended from 1910 to 2004 with fishing beginning in 1911. Data in the assessment model included fishery length composition data from 1966 to 2004, fishery age composition data from 1981 to 2004, a biomass index derived from trawl logbook catch rates (1978 to 1995), and biomass estimates and length and age composition data from bottom trawl research surveys of the shelf (1980 to 2004) and slope (1992 to 2004). As in previous assessments of Dover sole, retention and discarding were modeled using logistic functions of length.

Unresolved Problems and Major Uncertainties

Just before the STAR Panel review, when working up results from the preliminary base model runs with randomized starting parameter values, it became apparent that the likelihood surface was very irregular and that the model often converged to parameter estimates that were not the globally best estimates. During development of the model, while exploring alternative model configurations and fixed parameter values, problems with model convergence lead to the conclusion that small lambda values were needed on the likelihood components for the age composition and mean length-at-age observations. It appears that there are fundamental tensions among some of the different data sources that can be resolved in multiple ways, leading to numerous local extrema on the likelihood surface. After the STAR Panel review experiments were conducted using different sequences of phases in the SS2 control file and some phasing sequences produced much better model convergence. However, none of the sequences that were tried fully solved the problem of convergence to local minima on the negative log-likelihood surface.

The size and sex distributions of Dover sole are highly variable by depth and between INPFC areas and have changed over time. It is difficult to determine whether these variations are due to differences in size-related discarding or to differences in selection, related either to gear or to depth of fishing. The size-discards and size-selection effects are confounded in the fishery size-composition data. Only a few observations are available for the size-distributions of discarded fish.

The West Coast Groundfish Observer Program data indicate considerable latitudinal differences in the pattern of discarding of Dover sole caught in deep water (> 300 fa). In the south (Eureka to Conception) the discarded fish are slightly heavier on average than the retained fish, possibly due to discarding of large "jellied" fish, whereas in the north (US Vancouver and Columbia) the discarded fish are lighter. The pattern in the north is consistent with the assumption that smaller fish are discarded. The current version of Stock Synthesis cannot generate discarded fish that are heavier than the retained fish as was observed in the south.

The available Dover sole age composition data do not appear to be very informative. Plots of the age composition data do not show any obvious evidence of strong or weak year classes. This could be due to age-reading error or because Dover sole exhibit considerable variation in length-at-age with depth. In future assessments it might be worthwhile compiling the data into separate fisheries by depth (as attempted in the 2001 assessment), but this approach will be problematic because fishing trips can cover multiple depths and depth data are not always available for Dover sole market samples.

Differences in length-at-age, especially for old fish, were evident in the observed data from the AFSC versus the NWFSC slope surveys. The two surveys used different vessels and tow durations that may have resulted in differing trawl selection characteristics. It is plausible that the shorter NWFSC survey tows (15 versus 30 minutes) resulted in greater escapement of larger fish. Differences in mean length-at-age between the two surveys seemed to be a major source of the tension in the data and almost certainly contributed to the model convergence problem.

The current version of Synthesis does not have any options for selection curves in which peak selection occurs at different lengths for females versus males, and yet this seems to be a distinct feature in the Dover sole length composition data from the trawl surveys and the fisheries.

None of the numerous model configurations that were explored were able to resolve the conflicting signals that were evident in the Dover sole length composition data versus the age composition data versus the mean length-at-age data.

None of the numerous model configurations that were explored were able to fit the unusual bimodal length compositions that were observed in the female Dover sole collected during both slope surveys.

Reference Points

In June 2000 the Pacific Fishery Management Council (PFMC) endorsed the recommendation of the West Coast Groundfish Harvest Policy Workshop that F40% be used as the default target rate of fishing mortality for Council-managed flatfish species. The current assessment uses the F40% default to make harvest projections for Dover sole. Based on the Council's default harvest control rule for groundfish, the stock of Dover sole would be considered to be "overfished" whenever the spawning stock biomass (SB) was less than 25% of the unexploited level, SB(0).

The current assessment estimates that the Dover sole stock can support a maximum sustainable yield (MSY) of about 16,500 tons per year, which is considerably larger than the current OY and coastwide catches in any recent years.

Reference Points	Value	Units
Unfished Stock		
Spawning Biomass, SB(0)	299,054	mt
Spawning Biomass / Recruit	2.15	kg / fish
Annual Recruitment	138,970	1000s fish
F40% Proxy for MSY *		
Spawning Biomass / Recruit	0.926	kg / fish
Exploitation Rate	6.72%	
MSY	16,505	mt
SB(MSY)	117,281	mt
SB(MSY) / SB(0)	39.2%	

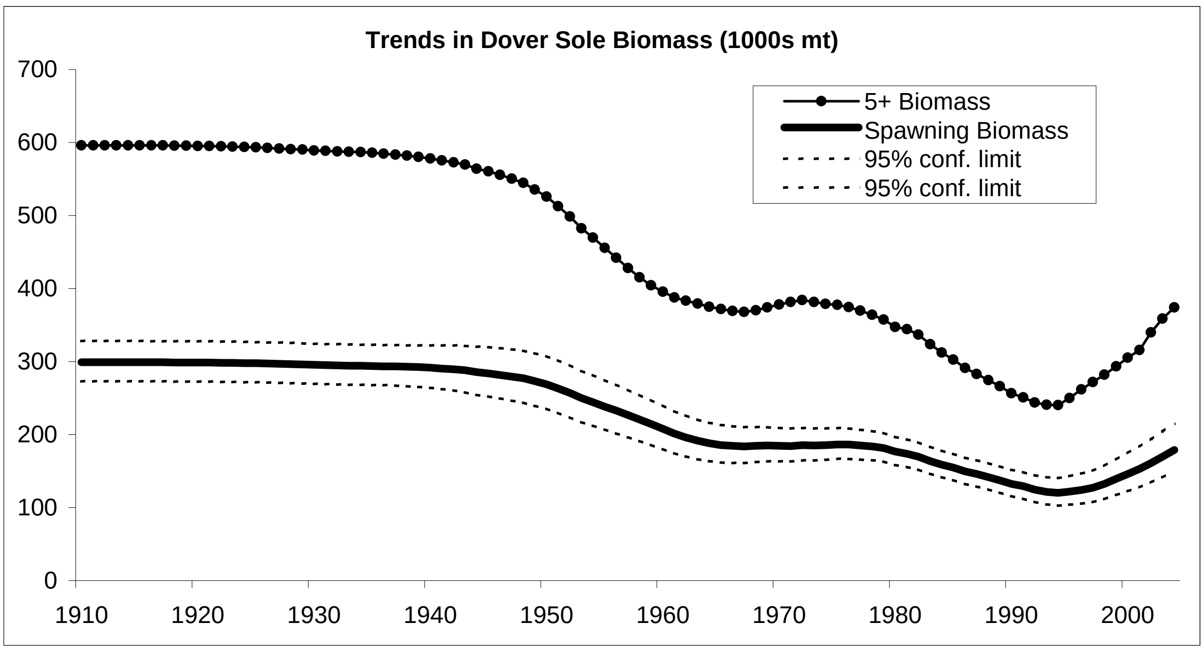
* Based on the current maturity schedule, which differs from the historic schedule.

Stock Biomass

The final base model estimated the unexploited spawning stock biomass to be slightly less than 300,000 mt and spawning biomass at the start of 2005 was estimated to be about 189,000 mt, equivalent to 63% of the unexploited level. Spawning biomass and age 5+ biomass (roughly corresponding to the exploitable biomass) were estimated to have reached their lowest points in the mid-1990s and have been rising steadily since.

Recent trends in Dover sole spawning biomass and depletion.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Spawning Biomass (1000s mt)	121.8	124.3	127.1	132.3	139.4	146.1	153.1	161.0	169.8	178.8
% of Virgin	40.7%	41.5%	42.5%	44.2%	46.6%	48.9%	51.2%	53.8%	56.8%	59.8%
Age 5+ Biomass (1000s mt)	250.1	262.0	272.1	282.0	293.2	305.1	316.0	339.8	358.9	374.2

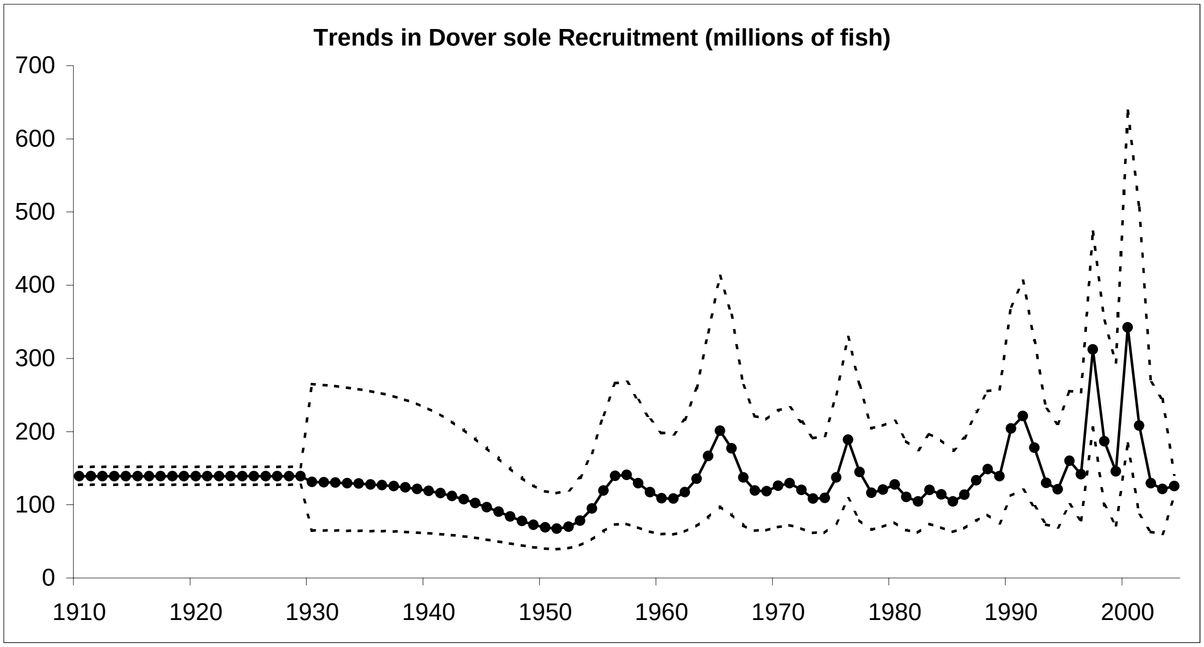


Recruitment

The estimated increases in biomass since the mid-1990s are due primarily to strong year classes in 1990 and 1991, and exceptionally strong year classes in 1997 and 2000.

Recent trends in Dover sole recruitment.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Recruits (millions)	159.9	141.6	312.0	186.6	145.6	342.5	208.1	129.4	121.4	125.4

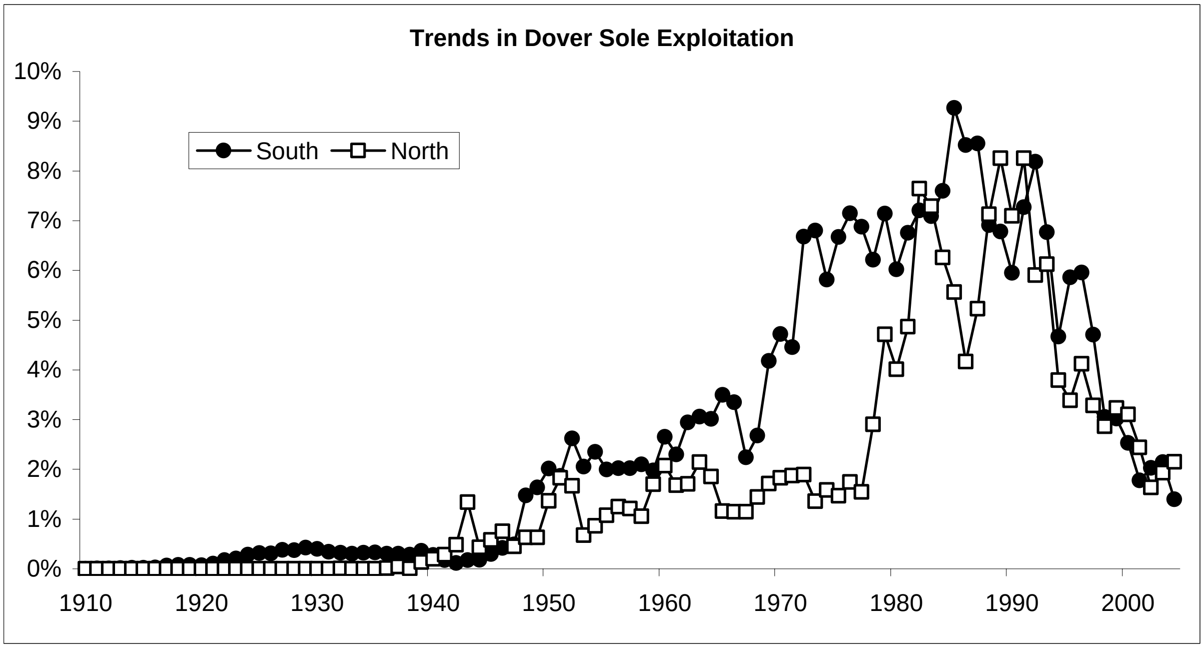


Exploitation Status

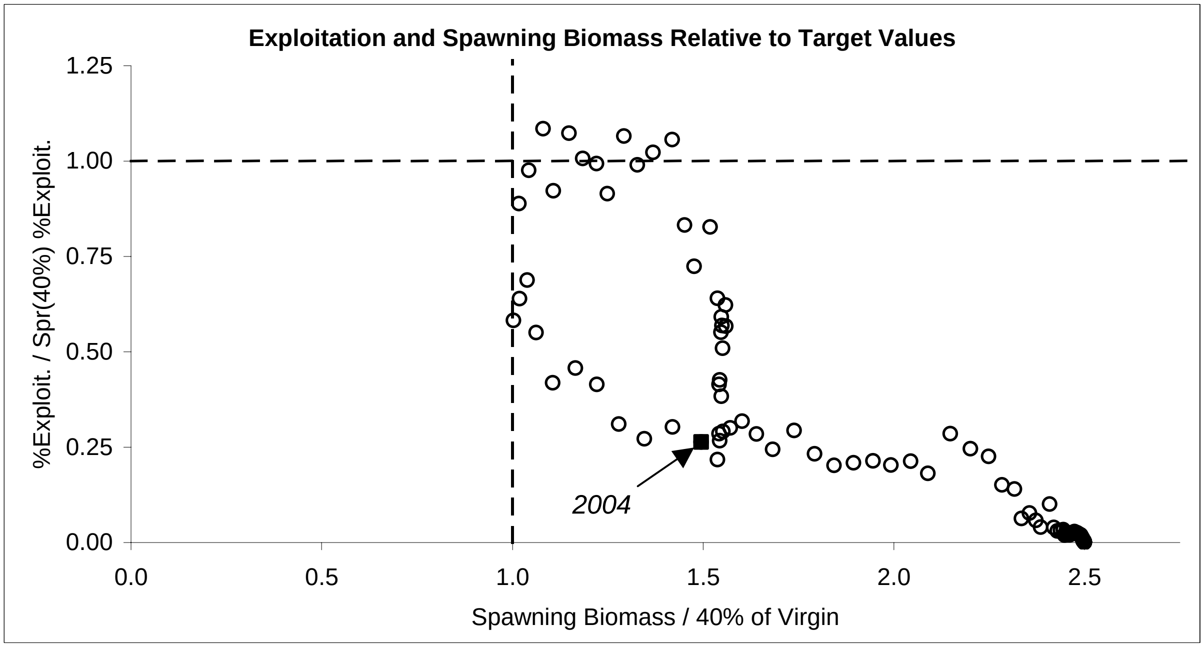
Exploitation of Dover sole was estimated to have reached a peak of 9.3% in 1985 in the southern fishery and a peak of 8.3% in 1991 in the northern fishery. In general, the exploitation rate has been relatively low.

Recent trends in Dover sole exploitation.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
South	5.86%	5.95%	4.71%	3.05%	3.02%	2.53%	1.78%	2.03%	2.15%	1.40%
North	3.39%	4.12%	3.28%	2.86%	3.23%	3.11%	2.44%	1.64%	1.93%	2.15%



Over the stock's history the exploitation rate has been smaller than the F40% target exploitation rate during all but six years and the spawning biomass has been well above 40% of the unexploited level, except during a few years when it approached the 40% level.



Management Performance

Based on the Dover sole landings statistics and the base model's estimates of discards, the coastwide catch of Dover sole was greater than the Acceptable Biological Catch (ABC) or Optimum Yield (OY) limits for three of ten years since 1995.

Management performance: ABCs versus landings and catch (mt).	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ABC (mt)										
US Vancouver	2400	1192 [a]	1195 [b]	8373	8373	8373				
Columbia	3000	3000	3000							
Eureka	2900	2900	2900							
Monterey	5000	3764 [c]	3764 [c]							
Conception	1000	1000	1000	1053	1053	1053				
Coastwide	14300	11855	11859	9426	9426	9426	8510	8510	8510	8510
Coastwide OY							7440	7440	7440	7440
Landings										
US Vancouver	1179	1459	996	897	1107	1261	1455	766	838	979
Columbia	2627	3515	3158	2976	3611	3553	2519	2031	2627	3079
Eureka	2405	2648	2113	2289	2226	2003	1499	1497	1955	1126
Monterey	3252	3242	2749	1276	1750	1704	1295	1719	1599	1246
Conception	1102	1322	1109	571	443	239	121	288	352	312
Coastwide	10565	12186	10124	8010	9137	8760	6889	6301	7372	6743
Catch, including estimated discards										
Coastwide	11744	13043	10861	8575	9738	9295	7292	6675	7815	7145

[a] The ABC was specified as a range of values, 818-1565 mt.
[b] The ABC was specified as a range of values, 820-1570 mt.
[c] The ABC was specified as a range of values, 3164-4363 mt.

Forecasts

Projections of future catches were made based on an F40% rate of fishing mortality and the following assumptions: total catches during 2005 and 2006 would be at the OY levels specified by the Council (total catch each year of 7440 mt); the selection and retention curves operating in the southern and northern fisheries would continue unchanged from the curves estimated for 2004; and the proportion of the catch taken each year by the southern fishery would be 47.2%. Because the projected spawning biomass was greater than 40% of SB(0), no there were no 40:10 harvest control rule adjustments and the OY values were all equivalent to the ABC values.

Forecasts of Optimum Yield catches, biomass, and depletion.	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Catch (mt)	7440	7440	30146	29960	29453	28582	27433	26159	24903	23757
Spawning Biomass (1000s mt)	189.0	199.9	211.4	211.4	210.0	206.8	202.2	196.5	190.4	184.2
% of Virgin	63.2%	66.8%	70.7%	70.7%	70.2%	69.2%	67.6%	65.7%	63.7%	61.6%

Decision Table

The decision table was developed using a format specified by the STAR Panel. Three alternative states of nature were defined in terms of the natural mortality coefficient: M = 0.07 $^{-yr}$ for the pessimistic alternative state of nature and M = 0.11 $^{-yr}$ for the optimistic alternative state of nature, with the base model (M = 0.09 $^{-yr}$) as the intermediate alternative state of nature. Three alternative management actions were defined in terms of the stream of catches: a low catch series based on the recent average catches, a high catch series based on the projected F40% ABC values derived from the base model, and an intermediate catch series based on twice the recent average catches. The projections in the decision table were made using the same set of assumptions that were used in the harvest forecasts (above).

Decision Table for Dover sole

Management Action	Year	Landings (mt) South (47.2%)	Landings (mt) North (52.8%)	M = 0.07, Less likely, Low Stock Size: Sp. Bio. (1000s mt)	M = 0.07: %Virgin	M = 0.09, More likely, Base Model: Sp. Bio. (1000s mt)	M = 0.09: %Virgin	M = 0.11, Less likely, High Stock Size: Sp. Bio. (1000s mt)	M = 0.11: %Virgin
	2005	3298	3718	152.2	50.2%	189.0	63.2%	252.0	75.8%
	2006	3301	3719	161.7	53.4%	199.9	66.8%	264.9	79.7%
	2007	3402	3811	171.7	56.7%	211.4	70.7%	278.3	83.7%
	2008	3402	3811	181.6	59.9%	222.7	74.5%	291.5	87.7%
Low Catch	2009	3402	3811	190.7	62.9%	233.0	77.9%	303.4	91.3%
2000-2004	2010	3402	3811	198.7	65.6%	241.8	80.9%	313.2	94.2%
Average	2011	3402	3811	205.4	67.8%	248.8	83.2%	320.5	96.4%
	2012	3402	3811	210.6	69.5%	254.0	84.9%	325.5	97.9%
	2013	3402	3811	214.7	70.9%	257.7	86.2%	328.6	98.8%
	2014	3402	3811	217.9	71.9%	260.2	87.0%	330.2	99.3%
	2015	3402	3811	220.2	72.7%	261.8	87.5%	330.8	99.5%
	2016	3402	3811	222.0	73.3%	262.7	87.8%	330.5	99.4%
	2005	3298	3718	152.2	50.2%	189.0	63.2%	252.0	75.8%
	2006	3301	3719	161.7	53.4%	199.9	66.8%	264.9	79.7%
	2007	6803	7623	171.7	56.7%	211.4	70.7%	278.3	83.7%
	2008	6803	7623	177.7	58.6%	218.8	73.2%	287.8	86.5%
Medium Catch	2009	6803	7623	182.7	60.3%	225.2	75.3%	295.8	88.9%
Double the	2010	6803	7623	186.4	61.5%	229.9	76.9%	301.6	90.7%
2000-2004	2011	6803	7623	188.6	62.2%	232.7	77.8%	305.0	91.7%
Average	2012	6803	7623	189.4	62.5%	233.8	78.2%	306.2	92.1%
	2013	6803	7623	189.1	62.4%	233.5	78.1%	305.7	91.9%
	2014	6803	7623	187.9	62.0%	232.2	77.7%	303.9	91.4%
	2015	6803	7623	186.2	61.4%	230.2	77.0%	301.3	90.6%
	2016	6803	7623	184.0	60.7%	227.7	76.1%	298.2	89.7%
	2005	3298	3718	152.2	50.2%	189.0	63.2%	252.0	75.8%
	2006	3301	3719	161.7	53.4%	199.9	66.8%	264.9	79.7%
	2007	13572	14950	171.7	56.7%	211.4	70.7%	278.3	83.7%
	2008	13529	14913	170.1	56.1%	211.4	70.7%	280.4	84.3%
High Catch	2009	13353	14716	167.1	55.2%	210.0	70.2%	280.8	84.5%
OY for F40%	2010	13009	14318	162.6	53.7%	206.8	69.2%	279.2	84.0%
Including	2011	12523	13759	156.8	51.7%	202.2	67.6%	275.7	82.9%
any 40:10	2012	11959	13120	150.1	49.5%	196.5	65.7%	270.7	81.4%
Adjustment	2013	11384	12482	143.1	47.2%	190.4	63.7%	265.0	79.7%
	2014	10847	11899	136.2	44.9%	184.2	61.6%	259.1	77.9%
	2015	10372	11394	129.6	42.8%	178.3	59.6%	253.3	76.2%
	2016	9968	10970	123.3	40.7%	172.8	57.8%	248.0	74.6%

Research and Data Needs

- The problem of model convergence to local extrema created major difficulties in this assessment because small changes in parameter values did not always produce coherent changes in the model results. Strategies are needed that will help analysts navigate irregular likelihood surfaces. Modification to the phasing used in SS2 seemed to offer a possible solution, but currently there is no theory and little experience to provide guidance on how to set the phasing.
- Data are needed on the length compositions of discarded Dover sole so that the retention function can be estimated more accurately and to help disentangle changes in selection from changes in retention.
- The West Coast Groundfish Observer Program data seemed to indicate large differences in discarding practices between northern and southern fishers, particularly regarding the mean weight of discarded fish compared to the weight of retained fish. These inconsistencies need to be more fully explored so that they can be plausibly modeled.
- In all of the slope surveys the female Dover sole in the Monterey region had a bimodal distribution in length with large numbers of big fish in deep water (500-699 fa). This unusual feature should be more fully explored so that it can be plausibly modeled. Genetic studies or chemical analysis of otoliths might indicate the source of the unusual abundance of these large females, which currently are a source of spawning biomass that is not adequately accounted for by the stock assessment model.
- For Dover sole the CV of length-at-age is not a linear function of length (Fig. 7) but is approximately a linear function of age. The SS2 software should be modified to allow the CV of length-at-age to be interpolated as a function of age instead of length.
- For Dover sole the two sexes seem to have different lengths for peak selection. The SS2 software should be modified to allow greater flexibility in modeling sex differences in selection.

Rebuilding Projections

The stock of Dover sole is estimated to be well above the overfished level. No rebuilding is required.

Regional Management Concerns

There is no genetic evidence to suggest that there are separate biological stocks of Dover sole off the US West Coast. Nor are there any important latitudinal differences in growth or maturity that could result in regional differences in productivity. Further, the current assessment results show that the northern and southern fisheries have similar patterns of selection and have produced very similar rates of exploitation. While there may be legitimate economic and equity reasons for regional apportionments of the Dover sole harvest, there does not appear to be any biological basis for such an apportionment.

Summary Tables for Dover Sole.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Catch (mt)	11744	13043	10861	8575	9738	9295	7292	6675	7815	7145	
Discards (model predicted)	1179	857	737	564	600	535	402	374	443	403	
Landings	10565	12186	10124	8010	9137	8760	6889	6301	7372	6743	
ABC	14300	11855	11859	9426	9426	9426	8510	8510	8510	8510	8510
OY							7440	7440	7440	7440	7440
SPR	49.7%	47.1%	54.3%	62.9%	61.3%	64.1%	71.3%	74.5%	72.2%	75.1%	
Exploitation Rate	4.30%	4.62%	3.70%	2.81%	3.07%	2.79%	2.09%	1.83%	2.04%	1.77%	
Age-5+ Biomass (mt)	250105	261989	272062	282032	293224	305080	315954	339828	358927	374206	402584
Spawning Biomass (mt)	121839	124256	127093	132275	139363	146141	153056	161014	169794	178801	188987
Lower 95% Conf. Limit	103763	105427	107295	111280	117005	122359	127818	134265	141438	148717	157020
Upper 95% Conf. Limit	143063	146447	150545	157232	165994	174545	183277	193092	203835	214970	227462
% of Virgin SB	40.7%	41.5%	42.5%	44.2%	46.6%	48.9%	51.2%	53.8%	56.8%	59.8%	63.2%
Recruitment (1000s fish)	159880	141640	312010	186630	145560	342480	208060	129370	121410	125400	126120
Lower 95% Conf. Limit	100168	79032	205696	99057	71950	183761	85596	62767	60266	111330	62220
Upper 95% Conf. Limit	255188	253845	473272	351624	294478	638288	505735	266645	244588	141249	255643

		95% Conf. Limits	
	Estimate	Lower	Upper
Unfished Spawning Biomass	299054	272724	327926
Unfished Age-5+ Biomass	596145		
Unfished Recruitment	138970	127149	151890
Spawning Biomass at MSY *	117281		
Basis for SB(MSY)	F(40%)		
SPR(MSY)	40%		
Exploitation for SPR(MSY) *	6.72%		
MSY *	16504.9		

* Based on the current maturity schedule, which differs from the historic schedule.

~~Will update with the Executive Summary from the latest round of assessments (Stacey Miller to provide)~~

~~Executive Summary~~

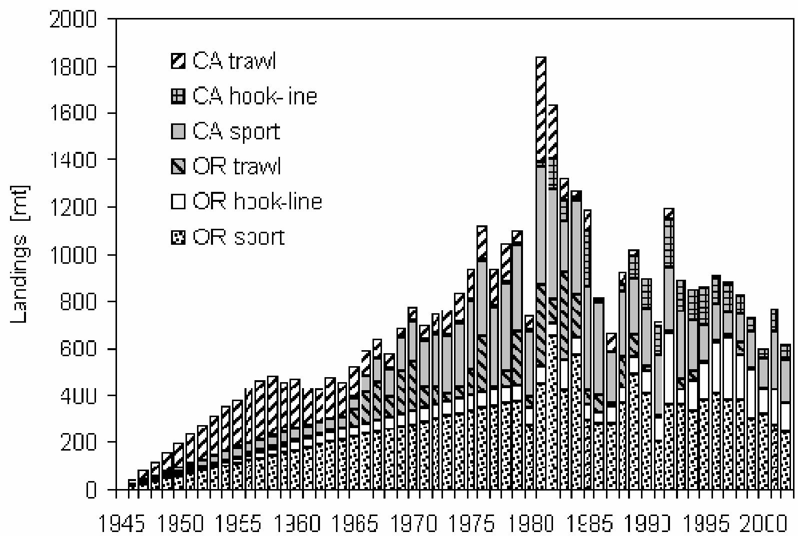
~~Stock: This assessment pertains to the black rockfish (*Sebastes melanops*) population resident in waters located off northern California and Oregon, including the region between Cape Falcon and the Columbia River. Genetic information is presented that indicates black rockfish within that area represent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

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

~~Recent black rockfish catch statistics [mt] by fishery~~

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

~~Data and Assessment: A variety of data sources was used in this assessment including: (1) recreational landings, age, and size composition data from the Oregon Department of Fish and Wildlife (ODF&W), (2) recreational landings (all California and Oregon shore-based modes) from the RECFIN data base, (3) Oregon commercial landings (trawl and hook-and-line) from the PACFIN data base, (4) size compositions for the~~



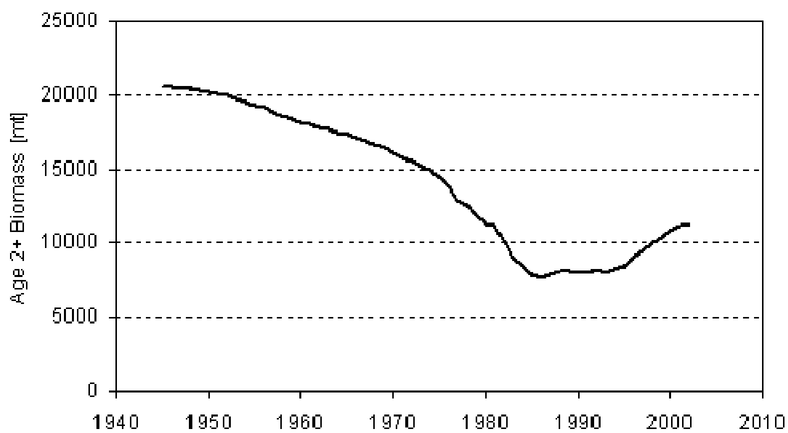
~~commercial fisheries in Oregon from ODF&W, (5) California commercial landings and length compositions from~~

~~the CALCOM database, (6) a recreational catch-per-unit-effort (CPUE) statistic developed from information provided by ODF&W, (7) recreational CPUE statistics for each State derived from the RECFIN data base, and (8) a recreational CPUE statistic developed from the CDF&G central California CPFV data base. These multiple data sources were combined in a maximum likelihood statistical setting using the length-based version of the Stock Synthesis Model (Methot 1990, 2000).~~

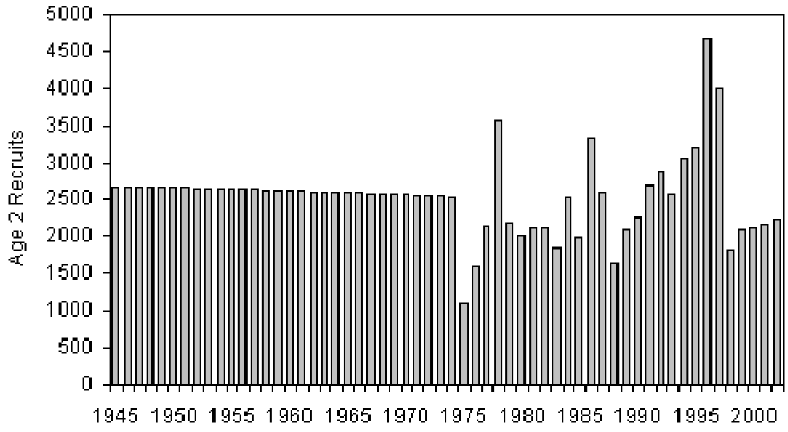
~~Unresolved Problems and Major Uncertainties: The major sources of uncertainty in this stock assessment include: (1) the amount of historical landings that occurred prior to the 1978, (2) the assumed natural mortality rate, and (3) the steepness of the spawner-recruit curve.~~

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

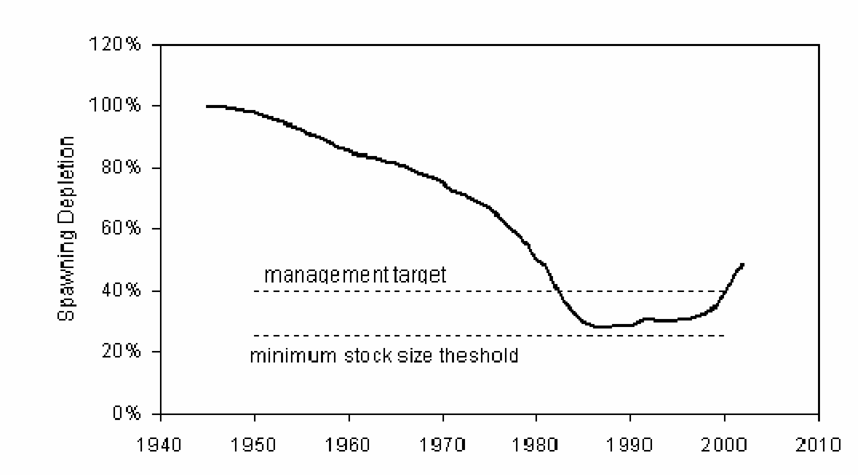
~~Stock Biomass: The biomass of age 2+ black rockfish underwent a significant decline from a high of 20,510 mt in 1945 to a low of 7,702 mt in 1986, representing a 62% decline. Since that time, however, the stock has increased and is currently estimated to be 11,232 mt. Most of the population's growth occurred after 1995, due to several large recruitment events, including especially the 1994 and 1995 year-classes.~~

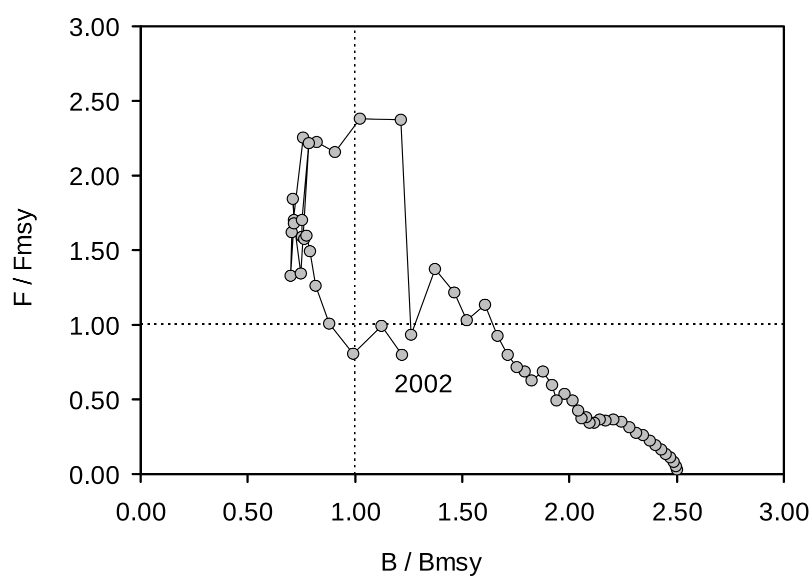


~~Recruitment: In the assessment recruitment was treated as a blend of deterministic values (i.e., 1945-1974 & 1999-2002) and stochastic values (i.e., 1975-1998). The Beverton-Holt steepness parameter (***h***) was fixed at a value of 0.65, based upon on a profile of goodness-of-fit and results from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



~~Exploitation Status: The northern California-Oregon stock of black rockfish is healthy, with 2002 spawning output estimated to be 49% of the unexploited spawning level. This places the stock well above the management target level of $B_{40\%}$. Likewise, age 2+ biomass in 2002 is estimated to be 11,232 mt, which is 55% of that expected in the absence of fishing. In addition, since 1998 the fishing mortality rate has declined to the point where it is now less than the F_{msy} proxy in 2002 (i.e., $F_{50\%}$).~~





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

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

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

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

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

~~Research and Data Needs: The black rockfish review panel identified certain gaps in the available information that hindered the stock assessment. These were: (1) a fishery-independent survey should be developed to monitor~~

~~changes in black rockfish population abundance, (2) the California CPFV data set should be more thoroughly investigated to ascertain whether or not serial depletion of fishing sites has artificially kept catch rates high [see Appendix 1], (3) a standard approach to historical catch reconstructions should be developed, (4) the possibility of time-varying growth should be investigated, and (5) the calculation of the RECFIN catch-per-unit-effort statistic should be more thoroughly analyzed and verified.~~

Appendix E: History of STAR process

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

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

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

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

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

At the end of 1997, participants met to discuss events and make recommendations for 1998.[4] Participants concluded

---

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

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

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

[4]Jacobson, L.D. (ed.). 1997. Comments, issues and suggestions arising from the groundfish stock assessment

that objectives were, to varying degrees, achieved during 1997. A notable shortfall was in "increasing acceptance and understanding by all members of the Council family." The most significant issues seemed to be the nature of the STAR Panels' responsibilities, communicating uncertainty to decision makers, workload, and inexperience in conducting the review process.

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

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

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

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

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

Requirements for stock rebuilding analyses and monitoring of rebuilding progress and their relationship to the STAR process were also discussed. The group agreed that the terms of reference should be modified to require additional values (e.g., B_{msy}) be tabulated and included in STAT Team report related to an overfished species. There was general agreement that the STAR process should be used to review assessments of overfished species, which are still likely to be on a 3-year cycle. However, the STAR process is not the appropriate process for the "monitoring" reports (required every 2 years), when they are out of phase with the assessment cycle.

---

and review process during 1997. Report to the Pacific Fishery Management Council (Revised Supplemental Attachment B.9.b, November 1997).

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

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

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

~~Appendix F: Terms of Reference for Expedited Stock Assessment Updates~~

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

~~Qualification~~

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

~~Composition of the Review Panel~~

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

~~Review Format~~

~~Typically, a physical meeting will not be required to complete an expedited review of an updated stock assessment, but usually one would be the most efficient way to conduct the review. Rather, if a meeting is not held, materials can be distributed electronically. STAT and panel representatives will~~

~~largely be expected to interact by email and telephone. A conference call will be held to facilitate public participation in the review.~~

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

~~STAT Team Deliverables~~

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

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

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

~~Review Panel Report~~

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

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

GROUNDFISH ADVISORY SUBPANEL REPORT ON STOCK ASSESSMENT PLANNING FOR THE 2009-2010 FISHING SEASON

The Groundfish Advisory Subpanel (GAP) recommends that full assessments be conducted for cowcod and petrale rather than the updates currently planned. For cowcod there is now sufficient information to do assessments for the areas north and south of Point Conception. The new data include length composition and otolith age information. The petrale assessment should be redone because the Stock Assessment Review (STAR) Panel questioned the validity of the previous assessment and new data is now available. Assessments for longnose skate and blue rockfish are a lower priority and should be delayed to stay within the STAR Panel workload limits outlined in Agenda Item F.3.b, Attachment 2.

The GAP member delegated to participate in a STAR Panel should be included at the start of the stock assessment process, to help review the data used to develop the stock assessment. The industry will have useful knowledge of fishery indices that may have ramifications for data interpretation. The GAP feels that both the GAP and Groundfish Management Team should have full voting rights at the STAR Panel and that these voting rights constitute needed checks and balances. Without this, the GAP feels its participation would be marginalized. GAP participation at this level would help to initiate interaction between the scientific community and the industry and help promote better understanding of the process.

PFMC
04/05/06

Agenda Item F.3.d
Supplemental GMT Report
April 2006

GROUNDFISH MANAGEMENT TEAM REPORT ON STOCK ASSESSMENT PLANNING FOR THE 2009-2010 FISHING SEASON

Stock Assessment Priorities

The Groundfish Management Team (GMT) has discussed stock assessment priorities, based on the Northwest Fisheries Science Center (NWFSC) Report (Agenda Item F.3.b, Attachment 1), and supports the list of assessment priorities and species outlined here. This includes movement of Petrale sole to a full assessment in the 2009 assessment cycle and English sole to an update in the 2007 assessment cycle, as suggested in the Scientific and Statistical Committee (SSC) report.

With respect to stock assessment updates, the GMT recognizes that assessments slated for updates should remain updates under all but the most extenuating circumstances. However the GMT also recognizes that under some circumstances, assessment authors could make a convincing case to the SSC that corrections to previous errors, revisions to data sets, inferences from additional sources of data, or improvements in analyses may have a substantive impact to the perception of stock status or productivity, particularly for rebuilding species. The GMT suggests that the SSC have the latitude to authorize a full assessment review under such circumstances, if necessary in the "mop-up" panel. However, this should not preclude the obligation of assessment authors to arrive at the SSC review for updated assessments with updates that meet the Terms of Reference (TOR) for stock assessment updates.

As discussed in the March GMT report, the GMT continues to recommend that a more strategic planning for the assessment cycles that will follow 2007 be conducted before 2008, in order to more appropriately initiate data collection, port sampling, ageing and other biological studies. The GMT endorses the SSC proposal with respect to this issue.

Stock Assessment Review (STAR) Panel Terms of Reference

All GMT Comments on this issue refer to Agenda Item F.3.c, Supplemental Attachment 2.

National Marine Fisheries Service (NMFS) Responsibilities

The GMT noted that with respect to the timing of Stock Assessment Coordinator's review of the Executive Summary for consistency (under NMFS Responsibilities, page 3, paragraph 3, line reading "Inconsistencies will be identified and authors requested to make appropriate revisions in time for the GMT meeting at which an assessment is reviewed,") the reference to the GMT has been replaced with SSC in this sentence in the revised TOR. As the GMT often meets in the period between Council meetings to discuss assessment results, and their progress can be hindered by an incomplete Executive Summary, the GMT recommends that the review and correction of the Executive Summary occur prior to the SSC review or the GMT meeting at which management recommendations are developed, whichever comes first.

TOR for Groundfish Stock Assessment (STAT) Teams

The Groundfish Management Team (GMT) would also like to more appropriately formalize the obligation by STAT Teams to identify sources of data that were available for assessments. To do so, the GMT recommends inclusion of the following sentence on page 12, after the first sentence in the second paragraph: "The STAT Team shall include in both the STAR Panel draft and final assessment all data sources that include the species being assessed, identify which are used in the assessment, and provide the rationale for data sources that are excluded." An appropriate location for this information to be provided in the assessment would be a new subsection under D.1- Data (as described in Appendix B: Outline for Groundfish Stock Assessment Documents, page 14).

GMT and Groundfish Advisory Subpanel (GAP) Responsibilities

The GMT discussed the proposal to formalize the role of GMT and GAP representatives at STAR Panel meetings. Given that the primary focus of the STAR Panel is an independent peer review of the technical adequacy of the statistical assessment model, the GMT felt that the continued role of GMT and GAP representatives in an advisory capacity to the STAR Panel is appropriate. However, the GMT does believe that some measures could be taken to more formalize this advisory role, particularly with regard to data workshops that precede the assessment cycle.

Many STAR Panel members are drawn from other countries or other areas of the nation. While it is important that they are conversant with the techniques employed in modeling fish populations, they can't be expected to be familiar with the nuances in management, fishery data collection systems, and the dynamics of the West Coast fishing industry that might affect interpretation of data included in the model. This is the intended function of GMT and GAP advisors.

Currently, the formal members of the STAR Panel draft the STAR Panel report to the Council. While this process has typically served well to incorporate concerns or issues raised by the GMT or the GAP advisors during the STAR Panel meeting, there have also been instances where these concerns may have been somewhat obscure, or absent, in the final STAR Panel report. One available avenue to address this might be to include, within the Terms of Reference for STAR Panel reports, a section specifically addressing management, data, or fishery issues raised by GMT and GAP advisors during the STAR. This could serve to bring the sought after formality to their role, as well as more directly focusing the attention of the SSC and Council on issues they may have raised at the STAR Panel meetings.

<u>GMT Recommendations:</u>

<u>Approve the NWFSC list of candidate species for 2007, with the change to Petrale sole and English sole described above and in the SSC statement.</u>

<u>Provide the support and direction for the SSC's proposal with respect to more strategically considering future assessment priorities.</u>

<u>Recommend that the Council adopt GMT recommendations to the final STAR Panel TOR for the assessments to be conducted in 2007.</u>

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
STOCK ASSESSMENT PLANNING FOR THE 2009-2010 FISHING SEASON

The Scientific and Statistical Committee (SSC) met with Dr. Elizabeth Clarke of the National Marine Fisheries Service (NMFS), who briefed members on efforts to plan for a new set of groundfish stock assessments that are scheduled for completion and review next year (2007), which will form the basis of new groundfish management measures beginning January 1, 2009. Initial discussion focused on material presented in Agenda Item F.3.b, Attachment 1, "Possible schedule for West Coast groundfish assessments in 2007 and beyond." Early planning for this work is essential in order to insure that adequate reviews can be scheduled and completed next year, because it is generally acknowledged that conducting the reviews was the primary limiting factor in the Council's groundfish stock assessment process last year.

Dr. Clarke noted that at the March meeting, the Council decided to change sablefish from an update to a full assessment, requiring a STAR Panel review. To accommodate the decision on sablefish, and given the limited number of slots available at STAR Panels, petrale sole was "demoted" to an update. However, the SSC recommends that, given the problems encountered with petrale sole age data in 2005 and other issues, it is not worth doing a new assessment of the stock unless it is a full assessment. To allow for that possibility, within the context of the schedule laid out in Agenda Item F.3.b, Attachment 1, the SSC suggested moving English sole to the 2007 "update" slot currently occupied by petrale sole and moving petrale sole to the 2009 English sole "full" assessment slot.

The question of how and why stocks are selected to be assessed has been previously considered by the SSC and was again the subject of some discussion. To facilitate this process, the SSC recommends that a set of criteria be established, that may include such factors as: (1) economic importance, (2) overfished status, (3) demographic sensitivity, (4) time elapsed since the last assessment, etc. To initiate the development of such criteria, the SSC recommends that the groundfish subcommittee engage in preliminary discussions with the NMFS stock assessment coordinator, Council staff, the Groundfish Management Team (GMT), and the Groundfish Advisory Subpanel (GAP) to begin scoping the issue. As an example, the SSC questions the relative importance of requiring assessments to be no older than five years, if the requirement precludes working on stocks that have never been assessed.

The SSC discussed the increasing difficulty of meeting the competing demands facing the Council with respect to completing more and better assessments. The STAR process that is reserved for full assessments is a thorough independent peer review, but it is expensive in terms of people's time and money. Shifting fully developed, stable models to an update mode will relieve some of the strain on the system. There are, however, many stocks that are quite data poor, and which are unlikely to be suitable candidates for assessment using the sophisticated methods practiced by analysts supporting the Council. Given this conundrum, the SSC recommends that lower tier trend analyses be developed for use by the Council in managing data-poor West Coast groundfish stocks. To function effectively, harvest control rules for these stocks will need to be developed and adopted by the Council, as results from a trend analysis do not fit conveniently into the 40:10 harvest policy. Still, to solve what the SSC perceives as a growing problem in scheduling groundfish stock assessments and obtaining adequate review, developing some simpler approaches seems highly desirable.

The SSC also reviewed and made its final edits to the terms of reference for groundfish stock assessments and review process (Agenda Item F.3.c, Supplemental Attachment 2), all of which were relatively minor with the following exceptions. The SSC notes that an attempt has been made to strengthen the role of the GAP and GMT representatives on STAR Panels, but to maintain the separation between science and management with respect to panel membership. That has been accomplished by adding language to the Terms of Reference requiring that STAR Panel reports include a discussion of disagreements between the STAR Panel and the GAP and/or GMT representatives. Likewise, the Stock Assessment Team will be required to report in the assessment document the outcome of consultations with the GAP member regarding the use of various data sources in the stock assessment. In addition, the document was edited to explicitly state that only two full stock assessments should be reviewed at a STAR Panel.

PFMC
04/05/06

F3 - WRITTEN MOTION BY ROD MOORE

Move that the Council adopt the revised stock assessment schedule shown as Agenda Item F.3.b, Supplemental Revised Attachment 1, and that the Council adopt the revised STAR Panel Terms of Reference (Agenda Item F.3.c Supplemental Attachment 2) with the following changes:

adopt the recommendations on NMFS responsibilities, STAT Team identification of data sources, and GMT and GAP responsibilities as referenced in the Supplemental GMT Report (Agenda Item F.3.d);

on page 8, modify the Terms of Reference so that the number of reviewers on a STAR Panel will be set at 3, unless extenuating circumstances such as inclusion of a large number of assessments in a single STAR Panel session require more than 3 reviewers.

CONSIDERATION OF INSEASON ADJUSTMENTS

The Council set optimum yield (OY) levels and various management measures for the 2006 groundfish management season with the understanding these management measures will likely need to be adjusted periodically through the biennial management period with the goal of attaining, but not exceeding, the OYs. The Groundfish Management Team (GMT) and the Groundfish Advisory Subpanel (GAP) will begin meeting on Sunday, April 2, 2006 (see Ancillary A and Ancillary B agendas) to discuss and recommend inseason adjustments to ongoing 2006 groundfish fisheries.

Under this agenda item, the Council is to consider advisory body advice and public comment on the status of ongoing fisheries and recommended inseason adjustments prior to adopting final changes as necessary. The Council may provide guidance to the GMT and GAP prior to making final inseason adjustments under Agenda Item F.7 on Friday, April 7, 2006, or make final inseason adjustments under this agenda item. If the latter course is chosen, there will be opportunity to confirm or clarify the Council decision under Agenda Item F.7.

Council Action:

1. **Consider information on the status of ongoing fisheries.**
2. **Consider and adopt inseason adjustments as necessary.**

Reference Materials:

1. Agenda Item F.4.e, Public Comment.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Report of the Groundfish Management Team (GMT) — Susan Ashcraft
c. Agency and Tribal Comments
d. Reports and Comments of Advisory Bodies
e. Public Comment
f. **Council Action:** Adopt Preliminary or Final Recommendations for Adjustments to 2006 Fisheries

PFMC
03/20/06

Agenda Item F.4.b
Supplemental GMT Report
April 2006

GROUNDFISH MANAGEMENT TEAM REPORT ON
CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Management Team (GMT) reviewed several inseason management issues and have the following recommendations for consideration by the Council.

COMMERCIAL

Darkblotched Rockfish Bycatch Limits for the Whiting Fishery

In 2006, the shore-based whiting exempted fishing permit (EFP) includes a provision that allows NMFS to implement a 100-fm depth restriction mid-season for EFP participants, if the expected take of Chinook salmon is projected to reach 11,000 fish (for all whiting sectors combined). If the depth restriction is applied to the shore-based whiting fishery, the at-sea sectors would be asked to voluntarily fish deeper than the100-fm line as well. The at-sea fisheries have voluntarily abided by the depth restrictions in previous years and are expected to do so again if necessary in 2006. In 2005, the Makah took other salmon conservation measures, such using a salmon-excluder device, because much of the Makah usual and accustomed fishing area lies inshore of the 100-fm depth contour.

The GMT expressed concern that moving the whiting fishery to deeper water may increase encounters of darkblotched rockfish. Dark blotched rockfish has also become more abundant, because it is nearing the recovered stock level – this recovery results in increased likelihood of darkblotched rockfish interception in whiting and other fisheries. Therefore, at the Council's request, the GMT discussed whether to recommend a total catch limit for darkblotched rockfish for the whiting fishery, and identified the following issues:

1. Whether there should be bycatch limit in place for the commercial sectors;

2. If so, whether the bycatch limit should apply from the beginning of the season or if it should be implemented inseason if the incidental take of Chinook salmon is projected to reach 11,000 fish resulting in the fishery being moved outside the 100 fm line; and

3. If there is a bycatch limit, what is the appropriate amount for that limit.

With regard to adopting a bycatch limit, a bycatch limit based on the GMT's whiting bycatch model would result in a 16.2 mt of darkblotched rockfish; this would leave about 18.2 mt of darkblotched rockfish in the scorecard that is not projected to be taken. This residual amount could be used to cover uncertainty in our catch projections for other fisheries. Without a bycatch limit for the whiting fishery, the winter petrale fishery could be jeopardized if there are higher than anticipated darkblotched rockfish catches in the whiting and/or bottom trawl fishery.

With regard to the appropriate amount for a bycatch limit, if the limit is set too low there may not be an adequate incentive for vessels to fish deeper (>150 fm) so they avoid incidental catch of Chinook salmon and canary rockfish. On the other hand, if the bycatch limit is too high, the residual may not be enough to prevent exceeding the optimum yield (OY) if the other fisheries (e.g., bottom trawl) exceed their projected catch amounts. Another factor to consider is, if fishing occurs in the shallower area (<150 fm), the likelihood of encountering canary rockfish (for which there is a more constraining bycatch limit) could be increased. Having the whiting fishery operate in the area with higher canary distribution, even with a bycatch limit in place, could affect all other groundfish fisheries coastwide.

The GMT would like to highlight the demonstrated success of the whiting fishery to modify their fishing behavior to avoid bycatch. Discussions with whiting representatives (at-sea, mothership, and shoreside fishermen and processors) indicate a belief that they will be successful in balancing their avoidance of bycatch of all species of concern providing they have the flexibility to change fishing areas to avoid salmon and overfished rockfish.

The GMT would also like to point out that our level of certainty in the current bottom trawl management measures, for example, has increased (the Council may recall that the darkblotched rockfish OY had been exceeded in 2004, as a result of the combined effect of increasing slope rockfish limits and reducing the rockfish conservation area)—therefore, we do not believe that a cap is needed at this time.

Chilipepper Rockfish Limits for Trawl Gear South of 40°10'

The GMT discussed increasing chilipepper rockfish limits in the areas shoreward and seaward of the Rockfish Conservation Areas (RCAs).

Current Minor Shelf Rockfish, Chilipepper, Shortbelly, Widow, & Yelloweye Rockfish limits for trawl gear South of 40°10'				
	Jan-Feb	Mar-Apr	May-Aug	Sep-Dec
Large footrope or midwater trawl for chilipepper rockfish	1,000 lb/ month	2,000 lb/ 2 months	12,000 lb/ 2 months	8,000 lb/ 2 months
Small footrope trawl	300 lb/month			

In 2005, the Council considered raising the chilipepper rockfish limit for vessels using large footrope or midwater trawl gear in areas seaward of the RCAs to allow for targeted chilipepper rockfish fishing. However, because data were not available to fully analyze the impacts on co-occurring species, particularly bocaccio, a more conservative chilipepper rockfish limit was adopted than that requested by industry members. A large footrope/midwater trawl limit of 12,000 lb/2 months was adopted for the May–August period, and a limit of 8,000 lb/2 months was adopted for the September to December period. These same limits are currently in place for 2006. In 2005, the GMT did not believe that the limit should be raised above 12,000 lb/ 2months until West Coast Observer Program data were available and could be analyzed to better understand the impacts on co-occurring species. However, the GMT heard from some Groundfish Advisory Subpanel (GAP) members that the 12,000 lb limit has resulted in only a few vessels targeting chilipepper rockfish seaward of the RCAs. It is unknown at this time if observer data was collected from vessels targeting chilipepper rockfish seaward of the RCAs in 2005. No new data were available to the GMT. Therefore the GMT recommends that the chilipepper rockfish limit for large footrope or midwater trawl remain the same as in 2005.

To reduce discards of chilipepper rockfish in the flatfish fisheries, the GMT considered removing chilipepper rockfish from the overall 300 lb/month small footrope limit for minor shelf rockfish, chilipepper, shortbelly, widow and yelloweye rockfish and establishing a small footrope limit just for chilipepper rockfish that would be linked to a defined proportion of flatfish on board and in the landings. The GMT believed that a small footrope chilipepper rockfish limit should be linked to a flatfish ratio to accommodate bycatch occurring in the flatfish fishery. However, the GMT recognized that allowing an amount greater than this may result in targeted chilipepper rockfish fishing with increased catches of overfished species that co-occur with chilipepper rockfish.

West Coast Observer Program data from January 2004 to April 2005 were examined in an attempt to identify chilipepper rockfish/flatfish catch ratios and bycatch correlations. However, after considering the available data, the GMT determined that the data were inadequate to provide clear direction. As a result of concerns about potential targeting of chilipepper rockfish, that may occur with cumulative limits in excess of 1,000 lb/ 2months the GMT did not think an increase in the small footrope trawl limit for minor shelf, chilipepper, shortbelly, widow, & yelloweye rockfish limits for trawl gear south of 40°10' should be made at this time.

Open Access Daily Trip Limit (DTL) Sablefish Limits
The GMT considered reducing the DTL cumulative limit north of 36° N. lat. in anticipation of a large influx of fishing effort into the DTL as a result of salmon fishery closures.

Current Open Access Sablefish Limits	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months
40°10' - 36° N. lat.	

GMT members expressed concern over the increased number of requests from fishers who are interested in moving into the fishery. The minimal amount of fishing gear needed to participate in the DTL fishery may further this concern. The amount of effort that may shift into the fishery as a result of lost salmon fishing opportunity, or for other reasons, is unknown and cannot be well estimated at this time. Under the current limits, a large increase in the number of open access DTL participants could result in early attainment of the open access sablefish allocation. If the allocation were to be reached, the fishery would need to be closed, which could be as early as July-August. Though the DTL fishery could provide a fishing opportunity for displaced salmon fishers, it would likely have a large effect of fishers who have historically participated in the fishery. Reducing the open access cumulative limit for sablefish on May 1, 2006 would likely result in a longer season, which would most benefit fishers who have historically participated in the year-round fishery. The GMT considered the following adjustments to the current open access DTL sablefish limits:

Alternative Adjustments To The Open Access Sablefish Limits	
Alternative 1:	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 900 lb, not to exceed 3,000 lb/ 2 months
40°10' - 36° N. lat.	
Alternative 2:	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 600 lb, not to

40°10' - 36° N. lat.	exceed 2,500 lb/ 2 months
Alternative 3:	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 500 lb, not to
40°10' - 36° N. lat.	exceed 2,000 lb/ 2 months
Alternative 4: (leave current limits in place and close when allocation is reached)	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to
40°10' - 36° N. lat.	exceed 5,000 lb/ 2 months
Alternative 5: (GMT preferred)	
North of 40°10'	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to
40°10' - 36° N. lat.	exceed 3,000 lb/ 2 months

GMT discussed changes to the open access sablefish limits; however no new information were available on potential effort changes in the open access DTL fishery. To sustain the open access DTL fishery until the end of year, the GMT believes that the cumulative limits for sablefish should be reduced to 3,000 lb/ 2 months at this time. The GMT plans to analyze effort shifts into the open access DTL fishery at the Council's June meeting when new data are available from the fishery.

Open Access and Limited Entry Fixed Gear Limits for Flatfish South of 42º N. lat.
For consistency with recreational regulations, the GMT recommends revising the limited entry fixed gear and open access limits south of 42º N. lat. to allow vessels fishing for "other flatfish" with hook-and-line gear, with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, to use two one-pound weights rather than limiting them to one one-pound weight. The state recreational fishery regulations were modified to allow for the additional weight so the gear would fish more effectively on the bottom.

GMT RECOMMENDATIONS

1. That the Council not adopt a bycatch limit for darkblotched rockfish for the commercial whiting fishery.

2. The Council should not increase the large footrope and midwater trawl limit for chilipepper rockfish south of 40°10' at this time.

3. The Council should not increase the small footrope trawl limit for minor shelf, chilipepper, shortbelly, widow, & yelloweye rockfish limits for trawl gear south of 40°10' at this time.

4. The Council should reduce the cumulative limits for sablefish to 3,000 lb/ 2 months and task the GMT with evaluating effort shifts into the open access DTL fishery for potential inseason adjustments at the June meeting when data become available.

5. Adopt revisions to limited entry fixed gear and open access limits south of 42º N. lat. to allow vessels fishing for "other flatfish" with hook-and-line gear with number 2 hooks to use two one-pound weights rather than limiting them to one one-pound weight.

Table 4 (North) to Part 660, Subpart G -- 2006 Trip Limits for Limited Entry Fixed Gear North of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 122005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
	North of 46°16' N. lat.	shoreline - 100 fm					
	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish [2/] & Darkblotched rockfish**	4,000 lb/ 2 months					
2	**Pacific ocean perch**	1,800 lb/ 2 months					
3	**Sablefish**	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months					
4	**Longspine thornyhead**	10,000 lb/ 2 months					
5	**Shortspine thornyhead**	2,000 lb/ 2 months					
6	**Dover sole**	5,000 lb/ month South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) of weights per line are not subject to the RCAs.					
7	**Arrowtooth flounder**						
8	**Petrale sole**						
9	**English sole**						
10	**Other flatfish[1/]**						
11	**Whiting**	10,000 lb/ trip					
12	**Minor shelf rockfish[2/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
13	**Canary rockfish**	CLOSED					
14	**Yelloweye rockfish**	CLOSED					
15	**Minor nearshore rockfish & Black rockfish**						
16	North of 42° N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
17	42° - 40°10' N. lat.	6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
18	**Lingcod[4/]**	CLOSED		800 lb/ 2 months			CLOSED
19	**Pacific cod**	Not limited	1,000 lb/ 2 months				
20	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
21	**Other fish[5/]**	Not limited					

TABLE 4 (North)

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
2/ Bocaccio, chilipepper and cowcod are included in the trip limits for minor shelf rockfish and splitnose rockfish is included in the trip limits for minor slope rockfish.
3/ For black rockfish north of Cape Alava (48°09.50' N. lat.), and between Destruction Is. (47°40' N. lat.) and Leadbetter Pnt. (46°38.17' N. lat.), there is an additional limit of 100 lb or 30 percent by weight of all fish on board, whichever is greater, per vessel, per fishing trip.
4/ The minimum size limit for lingcod is 24 inches (61 cm) total length.
5/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling. Cabezon is included in the trip limits for "other fish."
6/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.
To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 4 (South) to Part 660, Subpart G -- 2006 Trip Limits for Limited Entry Fixed Gear South of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 122005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					

See § 660.370 and § 660.382 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).

State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
1	**Minor slope rockfish[2/] & Darkblotched rockfish**	40,000 lb/ 2 months					
2	**Splitnose**	40,000 lb/ 2 months					
3	**Sablefish**						
4	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 5,000 lb/ 2 months					
5	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
6	**Longspine thornyhead**	10,000 lb / 2 months					
7	**Shortspine thornyhead**	2,000 lb/ 2 months					
8	**Dover sole**	5,000 lb/ month When fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) of weights per line are not subject to the RCAs.					
9	**Arrowtooth flounder**						
10	**Petrale sole**						
11	**English sole**						
12	**Other flatfish[1/]**						
13	**Whiting**	10,000 lb/ trip					
14	**Minor shelf rockfish[2/], Shortbelly, & Widow rockfish**						
15	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
16	South of 34°27' N. lat.	3,000 lb/ 2 months					
17	**Chilipepper rockfish**	2,000 lb/ 2 months, this opportunity only available seaward of the nontrawl RCA					
18	**Canary rockfish**	CLOSED					
19	**Yelloweye rockfish**	CLOSED					
20	**Cowcod**	CLOSED					
21	**Bocaccio**						
22	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months	300 lb/ 2 months		
23	South of 34°27' N. lat.	300 lb/ 2 months		300 lb/ 2 months			
24	**Minor nearshore rockfish & Black rockfish**						
25	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
26	Deeper nearshore						
27	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
28	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
29	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months

TABLE 4 (South)

Table 4 (South). Continued

30	**Lingcod**[3/]	CLOSED		800 lb/ 2 months			CLOSED	
31	**Pacific cod**	Not limited	1,000 lb/ 2 months					
32	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months			
33	**Other fish**[4/] **& Cabezon**	Not limited						

1/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.

2/ POP is included in the trip limits for minor slope rockfish. Yellowtail is included in the trip limits for minor shelf rockfish.

3/ The minimum size limit for lingcod is 24 inches (61 cm) total length.

4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.

5/ The Rockfish Conservation Area is a gear and/or sector specific closed area generally described by depth contours but specifically defined by lat/long coordinates set out at § 660.390.

To convert pounds to kilograms, divide by 2.20462, the number of pounds in one kilogram.

Table 5 (North) to Part 660, Subpart G -- 2006 Trip Limits for Open Access Gears North of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 122005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[6/]:						
	North of 46°16' N. lat.	shoreline - 100 fm					
	46°16' N. lat. - 40°10' N. lat.	30 fm - 100 fm					
	See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions. See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).						
	State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.						
1	**Minor slope rockfish[1/] & Darkblotched rockfish**	Per trip, no more than 25% of weight of the sablefish landed					
2	**Pacific ocean perch**	100 lb/ month					
3	**Sablefish**	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 3,000 lb/ 2 months					
4	**Thornyheads**	CLOSED					
5	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. South of 42° N. lat., when fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb (0.45 kg) of weights per line are not subject to the RCAs.					
6	**Arrowtooth flounder**						
7	**Petrale sole**						
8	**English sole**						
9	**Other flatfish[2/]**						
10	**Whiting**	300 lb/ month					
11	**Minor shelf rockfish[1/], Shortbelly, Widow, & Yellowtail rockfish**	200 lb/ month					
12	**Canary rockfish**	CLOSED					
13	**Yelloweye rockfish**	CLOSED					
14	**Minor nearshore rockfish & Black rockfish**						
15	North of 42° N. lat.	5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
16	42° - 40°10' N. lat.	6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish [3/]					
17	**Lingcod[4/]**	CLOSED		300 lb/ month			CLOSED
18	**Pacific cod**	Not limited	1,000 lb/ 2 months				
19	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
20	**Other Fish[5/]**	Not limited					
21	**PINK SHRIMP NON-GROUNDFISH TRAWL** *(not subject to RCAs)*						
22	North	**Effective April 1 - October 31:** groundfish 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/month (minimum 24 inch size limit); sablefish 2,000 lb/month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.					
23	**SALMON TROLL**						
24	North	Salmon trollers may retain and land up to 1 lb of yellowtail rockfish for every 2 lbs of salmon landed, with a cumulative limit of 200 lb/month, both within and outside of the RCA. This limit is within the 200 lb per month combined limit for minor shelf rockfish, widow rockfish and yellowtail rockfish, and not in addition to that limit. All groundfish species are subject to the open access limits, seasons and RCA restrictions listed in the table above.					

TABLE 5 (North)

Table 5 (South) to Part 660, Subpart G -- 2006 Trip Limits for Open Access Gears South of 40°10' N. Lat.

Other Limits and Requirements Apply -- Read § 660.301 - § 660.390 before using this table 122005

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
	Rockfish Conservation Area (RCA)[5/]:						
	40°10' - 34°27' N. lat.	30 fm - 150 fm		20 fm - 150 fm		30 fm - 150 fm	
	South of 34°27' N. lat.	60 fm - 150 fm (also applies around islands)					

See § 660.370 and § 660.383 for Additional Gear, Trip Limit, and Conservation Area Requirements and Restrictions.
See §§ 660.390-660.394 for Conservation Area Descriptions and Coordinates (including RCAs, YRCA, CCAs, Farallon Islands, and Cordell Banks).

State trip limits may be more restrictive than federal trip limits, particularly in waters off Oregon and California.

		JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
1	**Minor slope rockfish[1/] & Darkblotched rockfish**						
2	40°10' - 38° N. lat.	Per trip, no more than 25% of weight of the sablefish landed					
3	South of 38° N. lat.	10,000 lb/ 2 months					
4	**Splitnose**	200 lb/ month					
5	**Sablefish**						
6	40°10' - 36° N. lat.	300 lb/ day, or 1 landing per week of up to 1,000 lb, not to exceed 3,000 lb/ 2 months					
7	South of 36° N. lat.	350 lb/ day, or 1 landing per week of up to 1,050 lb					
8	**Thornyheads**						
9	40°10' - 34°27' N. lat.	CLOSED					
10	South of 34°27' N. lat.	50 lb/ day, no more than 1,000 lb/ 2 months					
11	**Dover sole**	3,000 lb/month, no more than 300 lb of which may be species other than Pacific sanddabs. When fishing for "other flatfish," vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, which measure 11 mm (0.44 inches) point to shank, and up to two 1 lb of weights per line are not subject to the RCAs.					
12	**Arrowtooth flounder**						
13	**Petrale sole**						
14	**English sole**						
15	**Other flatfish[2/]**						
16	**Whiting**	300 lb/ month					
17	**Minor shelf rockfish[1/], Shortbelly, Widow & Chilipepper rockfish**						
18	40°10' - 34°27' N. lat.	300 lb/ 2 months	CLOSED	200 lb/ 2 months		300 lb/ 2 months	
19	South of 34°27' N. lat.	750 lb/ 2 months					
20	**Canary rockfish**	CLOSED					
21	**Yelloweye rockfish**	CLOSED					
22	**Cowcod**	CLOSED					
23	**Bocaccio**						
24	40°10' - 34°27' N. lat.	200 lb/ 2 months	CLOSED	100 lb/ 2 months		200 lb/ 2 months	
25	South of 34°27' N. lat.	100 lb/ 2 months		100 lb/ 2 months			
26	**Minor nearshore rockfish & Black rockfish**						
27	Shallow nearshore	300 lb/ 2 months	CLOSED	500 lb/ 2 months	600 lb/ 2 months	500 lb/ 2 months	300 lb/ 2 months
28	Deeper nearshore						
29	40°10' - 34°27' N. lat.	500 lb/ 2 months	CLOSED	500 lb/ 2 months		400 lb/ 2 months	500 lb/ 2 months
30	South of 34°27' N. lat.			600 lb/ 2 months			400 lb/ 2 months
31	California scorpionfish	300 lb/ 2 months	CLOSED	300 lb/ 2 months	400 lb/ 2 months		300 lb/ 2 months

TABLE 5 (South)

Table 5 (South). Continued

32	**Lingcod**[3/]	CLOSED		300 lb/ month, when nearshore open			CLOSED
33	**Pacific cod**	Not limited	1,000 lb/ 2 months				
34	**Spiny dogfish**	Not limited	200,000 lb/ 2 months	150,000 lb/ 2 months	100,000 lb/ 2 months		
35	**Other Fish**[4/] **& Cabezon**	Not limited					
36	**PINK SHRIMP NON-GROUNDFISH TRAWL GEAR** *(not subject to RCAs)*						
37	South	**Effective April 1 - October 31:** Groundfish 500 lb/day, multiplied by the number of days of the trip, not to exceed 1,500 lb/trip. The following sublimits also apply and are counted toward the overall 500 lb/day and 1,500 lb/trip groundfish limits: lingcod 300 lb/ month (minimum 24 inch size limit); sablefish 2,000 lb/ month; canary, thornyheads and yelloweye rockfish are PROHIBITED. All other groundfish species taken are managed under the overall 500 lb/day and 1,500 lb/trip groundfish limits. Landings of these species count toward the per day and per trip groundfish limits and do not have species-specific limits. The amount of groundfish landed may not exceed the amount of pink shrimp landed.					
38	**RIDGEBACK PRAWN AND, SOUTH OF 38°57.50' N. LAT., CA HALIBUT AND SEA CUCUMBER NON-GROUNDFISH TRAWL**						
39	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for CA Halibut and Sea Cucumber:**						
40	40°10' - 38° N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm	100 fm - 150 fm			75 fm - 150 fm
41	38° - 34°27' N. lat.	75 fm - 150 fm	100 fm - 150 fm				
42	South of 34°27' N. lat.	75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands				75 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands
43	**NON-GROUNDFISH TRAWL Rockfish Conservation Area (RCA) for Ridgeback Prawn:**						
44	40°10' - 38° N. lat.	75 fm - modified 200 fm [7/]	100 fm - 200 fm	100 fm - 150 fm			75 fm - 150 fm
45	38° - 34°27' N. lat.	75 fm - 150 fm	100 fm - 150 fm				
46	South of 34°27' N. lat.	100 fm - 150 fm along the mainland coast; shoreline - 150 fm around islands					
47		Groundfish 300 lb/trip. Trip limits in this table also apply and are counted toward the 300 lb groundfish per trip limit. The amount of groundfish landed may not exceed the amount of the target species landed, except that the amount of spiny dogfish landed may exceed the amount of target species landed. Spiny dogfish are limited by the 300 lb/trip overall groundfish limit. The daily trip limits for sablefish coastwide and thornyheads south of Pt. Conception and the overall groundfish "per trip" limit may not be multiplied by the number of days of the trip. Vessels participating in the California halibut fishery south of 38°57'30" N. lat. are allowed to (1) land up to 100 lb/day of groundfish without the ratio requirement, provided that at least one California halibut is landed and (2) land up to 3,000 lb/month of flatfish, no more than 300 lb of which may be species other than Pacific sanddabs, sand sole, starry flounder, rock sole, curlfin sole, or California scorpionfish (California scorpionfish is also subject to the trip limits and closures in line 31).					

TABLE 5 (South) con't

1/ Yellowtail rockfish is included in the trip limits for minor shelf rockfish and POP is included in the trip limits for minor slope rockfish.
2/ "Other flatfish" are defined at § 660.302 and include butter sole, curlfin sole, flathead sole, Pacific sanddab, rex sole, rock sole, sand sole, and starry flounder.
3/ The size limit for lingcod is 24 inches (61 cm) total length.
4/ "Other fish" are defined at § 660.302 and include sharks, skates, ratfish, morids, grenadiers, and kelp greenling.

Estimated Total Mortality Impacts Updated with 2006 OY levels - April 2006 Council Meeting

4/7/2006 11:18

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	47.4	7.8	**2.7**	160.3	63.3	1.0	0.3
Limited Entry Trawl- Whiting							
At-sea whiting motherships				4.7	1.0		0.0
At-sea whiting cat-proc		4.7		6.3	2.9	200.0	0.0
Shoreside whiting				5.2	1.8		0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		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
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	0.4	0.5	2.9
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	0.1	0.1	3.0
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		8.5					6.7
OR						1.4	
CA	**98.0**	9.3	0.4			**8.0**	3.7
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	3.0	0.1	3.8	3.6	0.9	**2.0**
Non-EFP Total	172.7	44.3	3.4	181.9	77.4	258.3	21.3
EFPs e/							
CA early season whiting S. of 40°10'	0.3	0.1	0.0	0.2	0.0	0.4	0.0
EFP Subtotal	0.3	0.1	0.0	0.2	0.0	0.4	0.0
TOTAL	173.0	44.4	3.4	182.1	77.4	258.7	21.3
2006 OY	**309**	**47.0**	**4.2**	**200**	**447**	**289**	**27**
Difference	136.0	2.6	0.8	18.0	369.6	30.3	5.7
Percent of OY	56.0%	94.4%	81.0%	91.0%	17.3%	89.5%	78.8%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was gr

d/ Values for yelloweye in California represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained early.

GROUNDFISH ADVISORY SUBPANEL REPORT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) recommends the following inseason adjustments:

Sablefish

Set the limits in the daily trip limit sablefish fishery to

- 300 pounds per day,
- 1,000 pounds per week, and
- 3,000 pounds per two-month period

Chilipepper Rockfish

South of 40°10' N. latitude, increase the small footrope chilipepper rockfish limit from 300 pounds to 5,000 pounds per period shoreward of the Rockfish Conservation Area, with no flatfish ratio.

The GAP recommends against establishing a cap on darkblotched rockfish in the whiting fishery.

For June, the GAP asks that the Groundfish Management Team consider a trip limit based on a ratio of flatfish to yellowtail rockfish.

PFMC
04/07/06

Agenda Item F.4.e
Public Comment
April 2006

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

RECEIVED
MAR 03 2006
PFMC

March 1, 2006

Attention: John DeVore

Dear John,

It has come to my attention that the Council has recently revised the weekly Daily Trip Limit quotas, and may in the near future consider further adjustments to the daily and bimonthly quotas.

I'm writing this letter in hopes that my input might reinforce our concerns over the increasing price of fuel. I have to fish beyond the 100 fathom line which is twenty miles offshore off La Push, WA . To Negate increasingly high fuel costs , I now have to consider going for the weekly one trip limit, and would have to ignore the poor safety aspects associated with cruising at night and/or staying out overnight in small one man boats, in order to maximize daylight fishing hours and decrease fuel consumption.

Please consider an increase in the daily quota for daily trip limit fisherman. If the bimonthly quota is not changed, this shouldn't be a conservation or allocation issue.

Sincerely,

Earl W. Pace Jr
"EXPRESSO"
32484 Hoffman Rd. NE
Kingston WA 98346 Home:(360)638-2618 Cell: (360)638-2618

PART I OF MANAGEMENT MEASURES FOR 2007-2008 FISHERIES

The Council is scheduled to adopt a refined range of 2007-2008 management measure alternatives and, if possible, a tentative preferred alternative for formal analysis and public review under this agenda item and Agenda Item F.6. Management measure alternatives are intended to meet, but not exceed the preferred optimum yields (OYs) adopted under Agenda Item F.1. The range of management measure alternatives should also attempt to explore the key management issues in 2007 and 2008 as described in section 1.3.4 of the preliminary Draft Environmental Impact Statement (DEIS) being developed to analyze 2007-2008 groundfish harvest specifications, management measures, and Amendment 16-4 rebuilding plans (see Agenda Item F.1.a, Attachment 1). A refined range of management measure alternatives should include catch sharing options for depleted groundfish species and any other constraining groundfish species without a fixed allocation, and include alternative strategies that meet the overarching objectives of providing fishing opportunities equitably across sectors while meeting the conservation needs of depleted and prohibited species (i.e., alternative seasons, size and bag limits, specific areas closed or open to fishing, trip limits, gear restrictions, and other management measures).

Proposed management measure alternatives for recreational and nearshore commercial fisheries in Washington (note: nearshore commercial fisheries are not allowed in Washington state waters), Oregon, and California are included in Agenda Item(s) F.5.b, WDFW Report, ODFW Report, CDFG Report, and CDFG Report 2. Alternative Cowcod Conservation Area boundaries, one of the key management issues described in Section 1.3.4 of the preliminary DEIS, are described in Agenda Item F.5.b, CDFG Report 3. Analysis of bycatch of canary rockfish, yelloweye rockfish, and lingcod in the northern salmon troll fishery, another key management issue described in Section 1.3.4, is included in Agenda Item F.5.b, WDFW Report 2. The Groundfish Management Team (GMT) also analyzed impacts of alternative limited entry trawl (bottom trawl and whiting fisheries) and limited entry and open access fixed gear management measures. These analyses are included in Agenda Item F.5.c, GMT Report.

The Council should consider these proposals and analyses, as well as advice from advisory bodies and the public before adopting a preliminary range of management measures for further analysis. The Council may want to request additional analysis by the GMT and Groundfish Advisory Subpanel (GAP) under this agenda item. Results for any requested analyses can be provided on Friday under Agenda Item F.6, when the Council is scheduled to adopt a final refined range of 2007-2008 management measure alternatives for analysis in the DEIS. If possible, the Council should adopt a tentative preferred alternative then as well, so as to allow intensified analysis between the April and June Council meetings. Final Council action on a preferred 2007-2008 management measure alternative is scheduled for June.

<u>Council Action:</u>

1. **Adopt a Preliminary Range of Refined Management Measures For 2007-2008.**
2. **Provide Guidance to the GMT and GAP for Further Analysis of Management Measure Alternatives (if Necessary).**

Reference Materials:

1. Agenda Item F.5.b, WDFW Report: Washington Department of Fish And Wildlife Report on Preliminary Management Measure Alternatives for 2007-08 Groundfish Fisheries.
2. Agenda Item F.5.b, WDFW Report 2: Estimation of Bycatch in the Northern Salmon Troll Fishery.
3. Agenda Item F.5.b, ODFW Report: Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery.
4. Agenda Item F.5.b, CDFG Report: Proposed Management Measures for the 2007-08 California Recreational Groundfish Fishery.
5. Agenda Item F.5.b, CDFG Report 2: Preliminary Practical Range of Management Specification Options for California's 2007-2008 Commercial and Recreational Groundfish Fisheries.
6. Agenda Item F.5.b, CDFG Report 3: Cowcod Conservation Area (CCA) Management Alternatives for 2007-2008 Groundfish Management.
7. Agenda Item F.5.c, GMT Report: Analysis of Preliminary Commercial Groundfish Management Measure Alternatives.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. State, Tribal, and Federal Agency Recommendations
c. Reports and Comments of Advisory Bodies
d. Public Comments
e. **Council Action**: Adopt a Preliminary Range of Refined Management Measures

PFMC
03/20/06

PROPOSED MANAGEMENT MEASURES FOR THE 2007-08 CALIFORNIA RECREATIONAL GROUNDFISH FISHERY

The California Department of Fish and Game (CDFG) developed recreational management options to accompany six vertically-integrated rebuilding alternatives that were developed by the Groundfish Management Team (GMT) and Groundfish Allocation Committee (GAC) at their February 2006 meeting ("status quo" harvest plus Rebuilding Alternatives 1-5). For reference, these are reproduced in Table 1, with shading to denote species of particular importance in the California recreational fishery.

In Table 2, the vertically integrated rebuilding alternatives are combined with options for commercial: recreational catch sharing for yelloweye rockfish and canary rockfish, which were provided to the GMT by the GAC for initial analysis, and provides the corresponding California recreational Harvest Guidelines (HGs) resulting from those catch sharing options. A list of the key constraints for available management options are provided for each alternative.

Table 3 rearranges the order of rebuilding alternatives according to relative impact, which the CDFG used to develop season options for 2007-08. The management option suites are ordered from lowest to highest opportunity relative to California recreational fisheries. Proposed season structures under Options A-F are summarized in Table 4, and provide associated impacts to key overfished species. Key differences between the management options consider changing allowable fishing depths (shallower or deeper) or closing or opening months. The projected impacts for canary and yelloweye rockfish may also inform the Council relative to which catch sharing options between the commercial and recreational fishing sector would best provide for the alternatives presented.

Table 1: Draft Amendment 16-4 Rebuilding Alternatives Developed by the Groundfish Management Team and the Groundfish Allocation Committee in February 2006

2007-2008 OYs (mt)

Stock	"SQ" Reb.Alt.	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5	SQ (2006)	CA REC	2005 CA rec take
Yelloweye	27	21	17	21	12	12	27	3.7	0.9
Canary	`	24	44	68	24	24	47	9.3	2
Cowcod a/	8	8	18	22	14	4	4	rec est.	0.2
Bocaccio	149	149	218	424	315	40	309	rec est.	37.3
Darkblotched	229	330	229	472	472	130			
POP	87	405	87	749	405	44			
Widow	329	456	329	917	329	120	289	rec est.	1.6

NOTE: Shaded cells denote species important to recreational fisheries in California

Table 2: Vertically Integrated Rebuilding Alternatives for 2007-2008 OY Options (in metric tons) and and Options for California Recreational Harvest Targets derived from Commercial:Recreational Catch Sharing Options for Yelloweye and Canary Rockfish

		Reb. Alt. "Status Quo" Harvest		Reb. Alt. 1		Reb. Alt. 2		Reb. Alt. 3		Reb. Alt. 4		Reb. Alt. 5		SQ OY (2006)	
Stock	**Options for Catch Sharing Ratios (Com:Rec)**	**OY**	**HG opts CA REC**	**OY**	**HG opts CA REC**	**OY**	**HG opts CA REC**	**OY**	**HG opts CA REC**	**OY**	**HG opts CA REC**	**OY**	**HG opts CA REC**	**OY**	**CA REC HG**
Yelloweye				21		17		21		12		12		27	
	60:40		3.8		3.0		2.4		3.0		1.7		1.7		
	(SQ) 50:50		4.8		3.7		3.0		3.7		2.1		2.1		3.7
	40:60		5.8		4.5		3.6		4.5		2.6		2.6		
Canary		44		24		44		68		24		24		47	
	(SQ) 60:40		9.0		5.0		9.0		14.0		5.0		5.0		9.3
	50:50		11.2		6.3		11.2		17.5		6.3		6.3		
	40:60		13.5		7.5		13.5		21.0		7.5		7.5		
Cowcod	N/A	8	rec est.	8	rec est.	18	rec est.	22	rec est.	14	rec est.	4	rec est.	4	rec est.
Bocaccio	N/A	149	rec est.	149	rec est.	218	rec est.	424	rec est.	315	rec est.	40	rec est.	309	rec est.
Widow	N/A	329	rec est.	456	rec est.	329	rec est.	917	rec est.	329	rec est.	120	rec est.	289	rec est.
Description of Alternative and Constraining OYs:		Scorecard B; SQ OYs YE,C,W		Lower C; Scorecard B		Lower YE; Lower B OY		Highest C,B		Lower YE,C; SQ OYs B, W		Lowest YE,C,B			
Constraints		Time: NS RF		Time: Canary		Time: NS RF		Time: NS RF		Time: Canary		Time: NS RF			
		Depth: Boc		Depth: Canary, Boc		Depth: Boc				Depth: YE, Canary					

Note: No recreational HG options are proposed for cowcod, bocaccio, or widow; therefore, projected recreational catch under the season option would be

Table 3: Rebuilding Alternatives Sorted from lowest opportunity to highest opportunity relative to California recreational fisheries and CDFG-assigned Option names described in attached documents.

Sorted Rebuilding Alternatives	Reb. Alt. 5	Reb. Alt. 1	Reb. Alt. 4	SQ Reb. Alt.	Reb. Alt. 2	Reb. Alt. 3
CFDG- assigned Season Options for Each Reb Alternative	Option A	Option B	Option C	Option D	Option E	Option F

Table 4: Summary of CDFG Recreational Season Options for California under Vertically Integrated Rebuilding Alternatives for 2007-08 Sorted from Most Constraining (Opt A) to Least Constraining (Opt F) for California Recreational Fisheries

PART 1: Reference Table of Current 2006 Season (Status Quo) expected for all Months and Depths in Five California Regions.
Options for 2007-08 contained in Part 1 are built from changes to the 2006 season.

2006 California Recreational Fishing Season Structure

Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
North region	---	---	---	---	> 30fm Closed							
North Central	---	---	---	---	---	---	> 20fm Closed					
South Central - Monterey	---	---	---	---	---	---	> 20fm Closed					
South Central - Morro Bay	---	---	---	---	> 40fm Closed					---	---	---
South Region	---	---	> 60fm Closed						>30 fm Closed		> 60fm Closed	
Total California												

PART 2: Options for California Recreational Fishing Seasons under 2007-08 Rebuilding Alternatives. Season options derived from changes to the months and/or depths in the 2006 expected season are specified within the table.

CA REC OPTION FOR 2007-08	Changes to the 2006 Expected Season (Status Quo)			Impact Estimates (mt)	
	Depths	**Months**	**Other**	**Yelloweye**	**Canary**
OPTION A (=Rebuilding Alt. 5)	North area - *all open months to 0-20fm* ; South area - *all open months 0-30fm*	North Central area - *Close October*		1.2	5.0
OPTION B (=Rebuilding Alt. 1)	North area - *all open months to 0-20 fm*	North Central area - *close October*		1.2	5.0
OPTION C (=Rebuilding Alt. 4)	South area - *0-60 fm in September-October*	No change	S of 40° 10' N. lat - *Bocaccio bag limit increase to 2 fish*	1.5	6.0
OPTION D (=Rebuilding Alt. "Status Quo")	North, North Central, and Monterey South Central areas - *open 0-40 fm*	No change; or, Consider one or more of following: North Central area - open June; Monterey South Central area - open June; Morro Bay South Central area - open April & October		1.2 - 1.3	7.6 - 9.0
OPTION E (=Rebuilding Alt. 2)	North - 0-40 fm; North Central area - 0-40 fm; Monterey South Central area - 0-40 fm; South area - 0-60 fm for September-October	No change; or, Consider one or more of following: North Central area - open June; Monterey South Central area - open June; Morro Bay South Central area - open April & October		1.2 - 1.3	7.6 - 9.0
OPTION F (=Rebuilding Alt. 3)	North, North Central, and Monterey South Central areas - 0-40 fm; Morro Bay South-Central area - 0-60 fm; South area - 0-60 fm for September-October	North Central area - open June; Monterey South Central area - open June; Morro Bay South Central area - open April & October	Bocaccio bag limit increase to 2 fish for south of 40° 10' N. lat	1.4 - 1.5	8.0 - 9.5

Preliminary Practical Range of Management Specification Options for California's 2007-2008 Commercial and Recreational Groundfish Fisheries

COMMERCIAL AND RECREATIONAL

Specific Fishing Area Prohibitions

Proposals for changing the Cowcod Conservation Areas boundaries and for incorporating hot spots into the management specifications are still being developed.

COMMERCIAL

Most commercial groundfish fishery options will be covered under the general range of federal commercial options. For the nearshore fishery and cabezon, greenling and sheephead, regional allocation or setting of regional TACs will not be considered for 2007-08. Commercial management options will implement regional needs where possible and include the following considerations:

Cabezon, Greenlings, and California Sheephead:

- Cabezon: Prioritize even distribution of trip limits throughout season.
- Greenling, and Sheephead: Status quo trip limits

Nearshore Rockfish and Lingcod:

Coastwide:

- Consider reduced RCA closure (i.e., allow access to deeper water) between OR/CA border and Pt. Conception (34°27' N latitude)
- Lingcod:
  - Status quo spawning closure is Nov-Apr.
  - Consider shortening duration of nesting closure when nearshore is open (i.e., allow lingcod retention in Nov, Dec, Jan or Feb)
  - Consider incidental take allowance during part or all of nesting closure (e.g., 100 lb/ 2 mo)

North of 40°10' N latitude:

Minor nearshore rockfish options:

- Near-status quo trip limit options
- Consider lower limits at late summer period (there are currently lower limits Mar-June; extend to July-Aug)
- Consider differential trip limits for federal LE vs OA vessels (lower OA limits due to higher OA effort)

South of 40°10' N latitude:

- Keep status quo 10-month season with Mar-Apr closure
- Shallow nearshore rockfish options:
  - Consider lowering highest limits to avoid early attainment (i.e., set trip limits between 300 lb and 500 lb per two months depending on seasonal priorities)

- Deeper nearshore rockfish options:
- Near-status quo options with different limits seasonally north and south of Pt. Conception (34°27' N latitude) due to regional preferences in seasonal opportunities.
- California scorpionfish:
  - Increase trip limits all open months due to higher OY in 2007-08
- Consider revising outer boundaries of the Cowcod Conservation Area to provide blackgill fishing opportunities

RECREATIONAL

The California Department of Fish and Game is proposing a range of options for structuring the 2007-2008 recreational groundfish fisheries with the intent of remaining within harvest guidelines (HGs), particularly for species under rebuilding plans. This range of options includes the following:

I. Continued non-retention of cowcod, canary and yelloweye rockfish statewide

II. Management specifications which are structured around constituent's preferred fishing season while still providing as much fishing opportunity as possible.

III. Alternatives that allow for more access to deeper waters paired with bycatch reduction tools (hot spots, gear restrictions)

IV. Use of closed seasons, depth restrictions, bag limits, and size limits in combination to manage recreational catch to specified harvest limits. Range of possible options listed below.

<u>Management Specifications to Consider Changing for 2007-2008</u>

Seasons and Depth Restrictions

North Coast Region
Seasons: 7 - 9 months open for groundfish fishing
Depth restrictions: 0-20 fm, 0-30 fm, or 0-40 fm
Status Quo: 8 months at 0-30 fm

North-Central Coast Region
Seasons: 5 - 7 months open for groundfish fishing
Depth restrictions: 0-20 fm, 0-30 fm, or 0-40 fm
Status Quo: for the area between 40° 10' N. lat. and 37° 11' N. lat., 6 months at 0-20 fm

Monterey South-Central Coast Region
Seasons: 5 - 7 months open for groundfish fishing
Depth restrictions: 0-20 fm, 0-30 fm, or 0-40 fm
Status Quo: for the area between 37° 11' N. lat. and 36° 00' N. lat., 6 months at 0-20 fm

Morro Bay South-Central Coast Region
Seasons: 5 - 7 months open for groundfish fishing
Depth restrictions: 0-30 fm, 0-40 fm, or 0-60 fm
Status Quo: for area between 36° 00' N. lat. and 34° 27' N. lat., 5 months at 0-40 fm; Scorpionfish retention during all months when rockfish open

South Coast Region

Seasons: 9-11 months open for groundfish fishing; status quo 10 months; 9-12 months open for CA scorpionfish
Depth restrictions: 0-30 fm and 0-60 fm; status quo 0-30 fm and 0-60 fm

Status Quo: 2 months at 0-30 fm and 8 months at 0-60 fm
In 2005, CA scorpionfish retention for 1 month at 30 fm and 2 months at 60 fm (not open for all months that rockfish open); in 2006, retention during months that rockfish open

North, Central and South RLMA
- Lingcod nesting closure: 3-4 months (for spawning period within January, February, March and December)

Bag limits
Within 20 finfish bag limit, the following ranges would be analyzed with the option for differential bag limits for boat and shore anglers (with diver limits set to those of shore anglers):
- Lingcod 2-3; status quo 2 fish
- Bocaccio south of 40° 10' N. lat. 1 – 2; status quo 1 fish

Size limits
Lingcod 22 -26 inches TL; status quo of 24 inches TL

Filet size limits
Lingcod filet size changed if size limit changed; status quo: 16 inches and must bear an intact 1 inch square patch of skin

<u>Management Specifications to Consider Keeping Status Quo for 2007-2008</u>
Bag limits
- RCG (all rockfish, cabezon, kelp greenling, and rock greenling) keep as 10 per bag with following sub-bag limits:
    - Bocaccio north of 40° 10' N. lat. status quo 2 fish
    - Cabezon status quo 1 fish
    - Greenlings (all species of the genus *Hexagrammos*) status quo 1 fish
    - Black Rockfish status quo 10 fish
    - Blue Rockfish status quo 10 fish

- Scorpionfish status quo 5 fish
- "Other flatfish" status quo: 20 fish except for Pacific sanddab and starry flounder which have no bag limit

Size limits
Bocaccio status quo: 10 inches TL
Cabezon status quo: 15 inches TL
Kelp greenling (and other species of the genus Hexagrammos) status quo: 12 inches TL
California scorpionfish status quo: 10 inches TL

Filet size limits
All others (except lingcod): status quo

Gear restrictions
Rockfish status quo: limit of 2 hooks and 1 line
Lingcod status quo: limit of 2 hooks and 1 line
“Other flatfish” status quo: limit of up to 12 hooks, “Number 2” or smaller, which measure no more than 11 mm point to shank, and up to 2 pounds of weight per line

Specific Fishing Area Prohibitions
Farallon Islands: Status Quo
Recreational fishing for groundfish prohibited between the shoreline and the 10-fm (18-m) depth contour around the Farallon Islands except that recreational fishing for “other flatfish” is permitted given the restrictions described above

Cordell Banks: Status Quo
Recreational fishing for groundfish prohibited in waters less than 100 fm (183 m) around the Cordell Banks as defined by specific latitude and longitude coordinates except that recreational fishing for “other flatfish” is permitted given the restrictions described above

Cowcod Conservation Area (CCA) Management Alternatives for 2007-2008 Groundfish Management

Options for Consideration

The California Department of Fish and Game (CDFG) has received requests from both commercial and recreational fishermen to modify the boundaries of the Cowcod Conservation Area (CCA) for 2007-2008. Commercial fishermen have requested access to deeper waters within the current CCA boundaries through modification of the outer perimeter coordinates of the CCA, and recreational fishermen have requested a modification to the inner perimeter to allow access to additional fishing areas in shallow water.

Background

The Cowcod Conservation Area (CCA) closures were established in 2001 in response to an overfished determination for the cowcod rockfish stock, and a federal requirement to restore the population to a healthy status. The intent of the CCAs is to reduce the cowcod catch so that the rebuilding Optimum Yield/Total Allowable Catch (OY/TAC) will not be exceeded. Rebuilding analyses suggest that recovery would be jeopardized if rebuilding OY/TACs are exceeded by any significant amount. The stock was reassessed in 2005, which indicates that cowcod biomass size is in slightly better shape than the last assessment (18% versus 7% of unfished biomass), although results of rebuilding analysis suggest that the previous analysis was not incorrect to suggest that rebuilding of cowcod may take several decades. A new series of annual rebuilding OY/TACs have been calculated for implementation beginning in 2007-2008.

The CCA closures are primarily located far offshore where cowcod catches and catch rates remained historically high, but where total groundfish effort has been much lower than for fishing grounds closer to the mainland shore. Therefore, the CCA closures were initially adopted because they were less disruptive to southern California fisheries than alternative measures that would have been applied across the board to all shelf fishing grounds.

When the CCAs were first established, enforcement concerns dictated the outer boundaries to be long, straight lines so that enforcement by aircraft could be effective. This resulted in inclusion of some deep water (slope) habitat in the closure, where cowcod are not found, and thus access to associated target species was prevented,. Since then, an electronic Vessel Monitoring System (VMS) has been adopted by the Pacific Fishery Management Council (PFMC) for commercial groundfish vessels, which is intended to provide effective enforcement without the need for long straight boundaries for offshore area closures.

Outer Perimeter Alternatives

For the 2007-2008 management cycle, alternative outer boundaries for the CCAs may be considered, that still preserve the original intent of maintaining cowcod fishing mortality levels within the rebuilding OY/TAC. Three alternatives are presented for consideration.

- Alternative 1. For all vessels except those carrying VMS, the current boundaries and restrictions for the CCAs would be maintained. For vessels that employ VMS, the CCA closure areas would be limited to the depth range that is utilized by cowcod, which would remove current bottom fishing restrictions from a large area of fishing grounds that are too deep to be considered cowcod habitat. Available information suggests that the normal depth limit for cowcod in the southern California Bight is within the range of 150-200+ fathoms. Alternative 1 redefines the outer perimeters as a series of waypoints that fall within (or beyond) that depth range, centering on the 175 fathom contour. Some additional considerations would be necessary to provide effective enforcement for this alternative:

  - Only vessels with VMS would be eligible to fish between the current CCA boundaries and the new outer perimeter lines.
  - CDFG enforcement of the new Alternative 1 waypoints would rely on timely access to VMS information, and the ability to use that information in state court to prosecute violations.
  - Vessels intending to fish using the new Alternative 1 boundaries would be required to declare their intent prior to departure from port for each trip.
  - End buoys for longline sets would be required to employ radar reflectors and strobe lights. Also, the practicality of employing transponders (or other technologies) similar to VMS for the end buoys would be considered as a regulatory requirement.

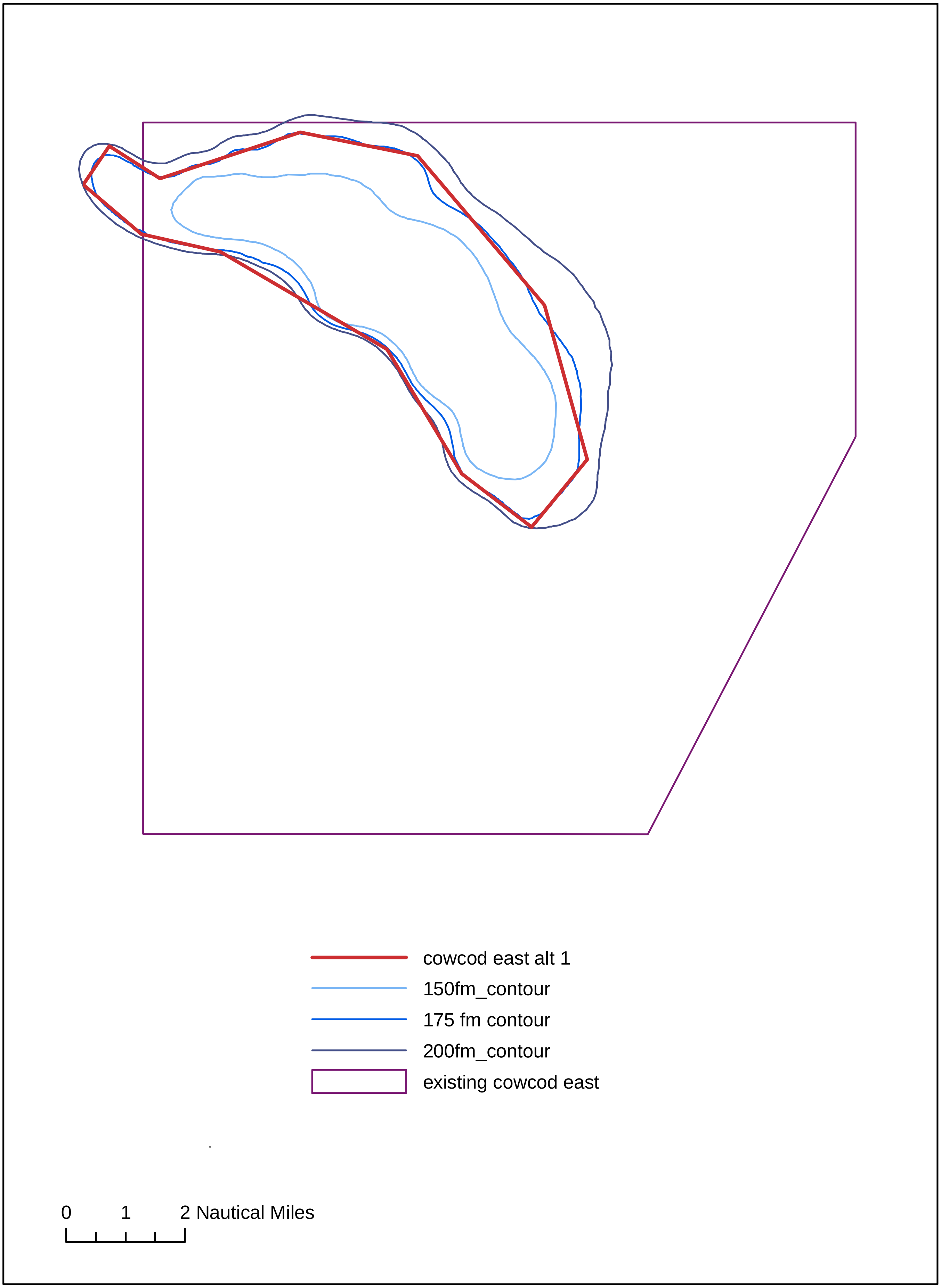
- Alternative 2. Eliminate the CCAs. This alternative would provide for management of the CCA areas as part of the routine groundfish management process. Any depth and area restrictions would be developed and adopted under the Rockfish Conservation Area (RCA) regulations.
- Alternative 3. Status quo (no action). Maintain the current boundaries and restrictions for the CCAs. This alternative provides boundaries that have been shown to be easily understandable to fishers and enforcement. Conservation for cowcod and other overfished groundfish that are found within the area is achieved. However, potential fishing opportunities for target slope species are not realized.

Inner Perimeter Alternatives

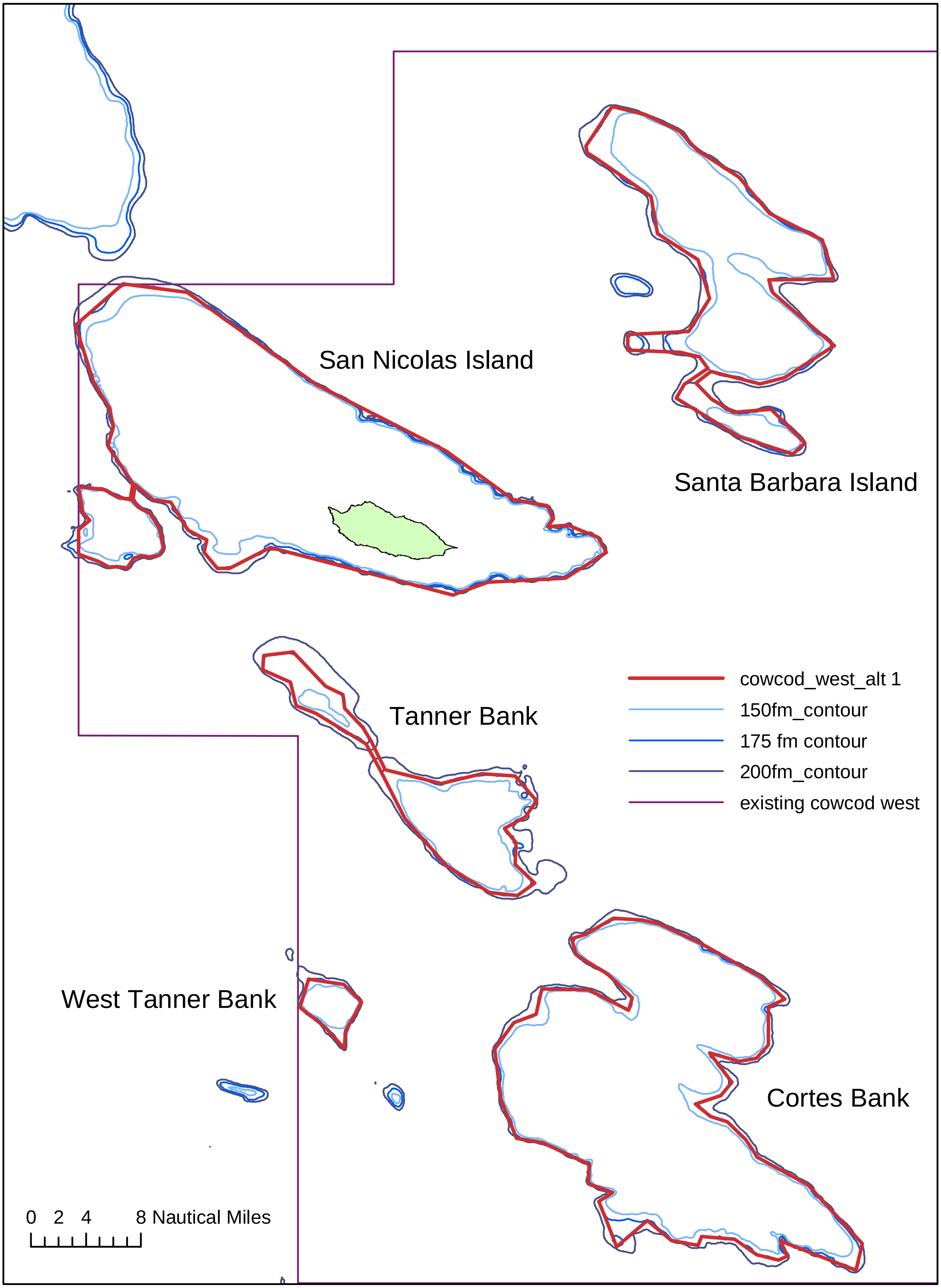
The current 0-20 fathom shallow fishing opportunity within the CCA is limited to nearshore species which are typically only found in the 0-20 fathom depth zone. This eliminates any incentive to fish deeper than in very shallow water, so that cowcod are not expected to be encountered. If a 0-30 fathom (or deeper) opportunity were to be allowed, the newly open area between 20-30 fathoms (or deeper) would be expected to encounter shelf species. Consequently, fishing in that depth zone would create significant discards if no provision was made to allow retention of shelf species. If such an allowance was made, it would be difficult to have confidence that some fishing was not occurring deeper than 30 fathoms by recreational vessels that do not carry VMS, thus posing a potential for increased take of cowcod and other overfished shelf groundfish.

The CDFG will be conducting analysis relative to potential impacts to cowcod resulting from the alternatives described in this report before final action is taken by the Council.

Cowcod East, Alternative 1, Maximum Waypoints



Cowcod West, Alternative 1, Maximum Waypoints



Agenda Item F.5.b
CDFG Report 4
April 2006

CALIFORNIA DEPARTMENT OF FISH AND GAME REPORT ON MANAGEMENT MEASURES FOR 2007-2008 FISHERIES

The current Cowcod Conservation Area (CCA) boundaries and restrictions will be maintained for all vessels not required to employ vessel monitoring systems (VMS) as part of their commercial fishery. Vessels employing VMS will be allowed access to the four new fishing areas within the existing CCA. Fishing in these areas will be restricted to depths greater than 175 fathoms to protect cowcod populations within the CCA. This alternative provides additional commercial fishing opportunity outside 175 fathoms within the CCA, while limiting potential impacts to cowcod outside the proposed new fishing areas.

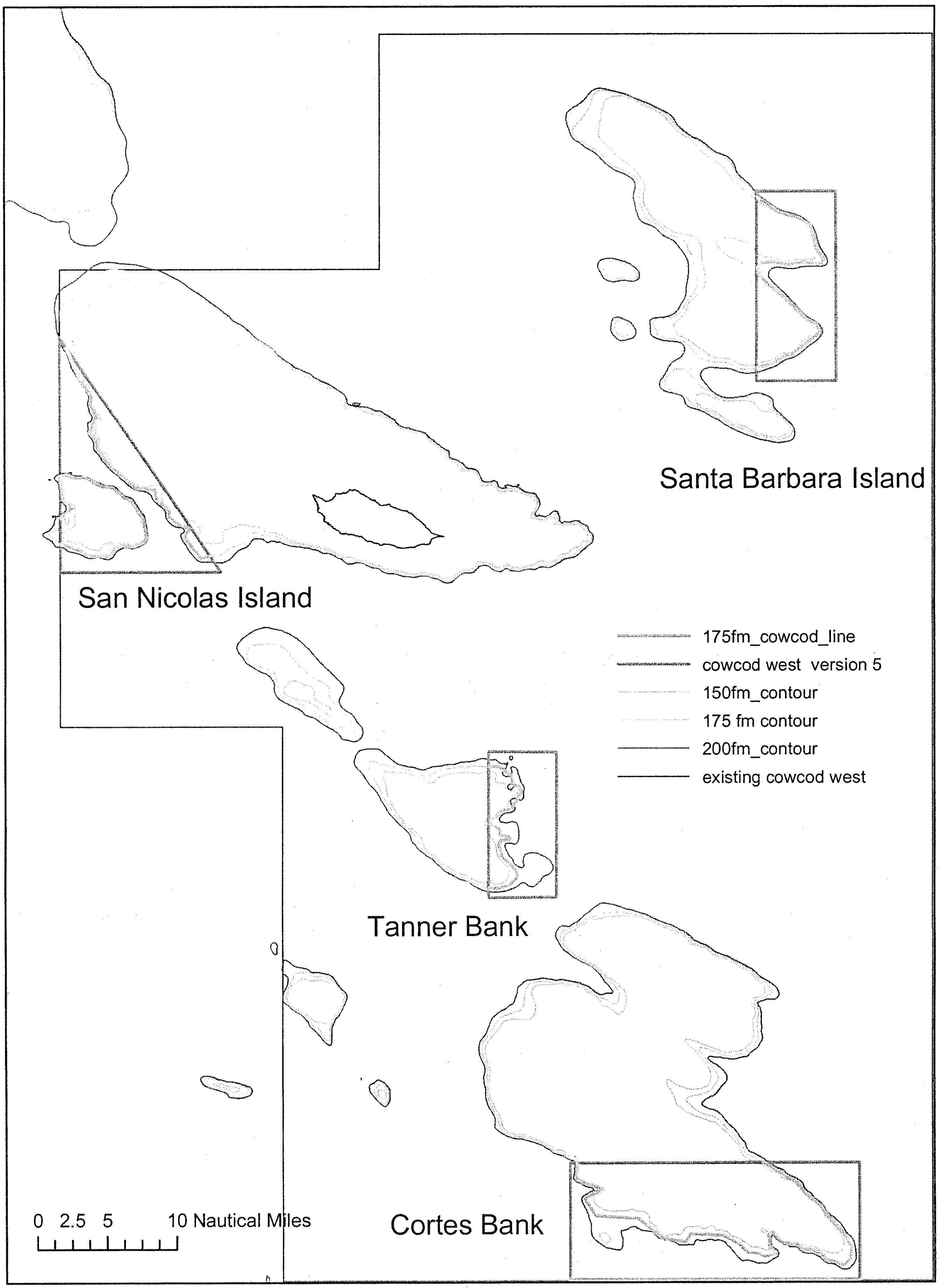
Fishing areas within the CCA will be defined by a series of three to four waypoints for each area. The 175 fathom line within each area will be defined by a series of waypoints that approximate the 175 fathom line.

Some additional considerations would be necessary to provide effective enforcement for this alterative.

- Only vessels with VMS would be eligible to fish in the new fishing areas within the CCA.
- Enforcement would rely on timely access to VMS information from NMFS for prosecution of violations.
- Defined fishing areas within the CCA help California Department of Fish and Game and U.S. Coast Guard locate vessels and direct resources in their direction.

PFMC
04/07/06

Cowcod West, Alternative 4, with 175 fm Fishing Areas



Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery

The Oregon Department of Fish and Wildlife proposes the following regulatory options be considered for its recreational fishery in 2007 and 2008. The options vary based on the allowable impact of overfished species. The season duration and expected impacts on yelloweye rockfish and canary rockfish, the two most constraining species, are detailed in Figure 1.

Option 1 – Status Quo

Season: Open all year at all-depths except open only shoreward of the 40-fathom line from June 1 through September 30. (New – Stonewall Bank RCA closed to retention of groundfish)

Daily Bag Limit:	**Minimum length limits:**
Marine fish*: 6	Lingcod: 24-inches
Lingcod: 2	Cabezon: 16-inches
Sanddab: 25	Greenling spp: 10-inches

Option 2

Season: Open all year but open only shoreward of 40-fathom line.

Daily Bag Limit:	**Minimum length limits:**
Marine fish (all flat fish species excluded)**: 5	Lingcod: 24-inches
Lingcod: 3	Cabezon: 16-inches
Flat fish spp: 25	Greenling spp: 10-inches

Option 3

Season: Open all year but open only shoreward of 40-fathom line January 1 through May 30 and Sept. 1 through December 31 and shoreward of 25-fathom line June 1 through August 31.

Daily Bag Limit:	**Minimum length limits:**
Marine fish*: 5	Lingcod: 24-inches
Lingcod: 3	Cabezon: 16-inches
Sanddab: 25	Greenling spp: 10-inches

Option 4

Season: Open all year but open only shoreward of 20-fathom line.

Daily Bag Limit:	**Minimum length limits:**
Marine fish*: 5	Lingcod: 24-inches
Lingcod: 3	Cabezon: 16-inches
Sanddab: 25	Greenling spp: 10-inches

Option 5

Season: Open July 1 though Labor Day but only shoreward of 20-fathom line. Stonewall Bank closure area expanded in Pacific halibut fishery.

Daily Bag Limit:	**Minimum length limits:**
Marine fish*: 10	Lingcod: 22-inches
Lingcod: 2	Cabezon: 16-inches
Sanddab: 25	Greenling spp: 10-inches

* marine bag includes rockfish, greenling, cabezon and other species excluding lingcod, sanddab, Pacific halibut, salmon species, perch species, sturgeon, striped bass, offshore pelagic species, and bait fish (herring, smelt anchovies and sardines). No retention of yelloweye rockfish and canary rockfish.

**marine bag includes rockfish, greenling, cabezon and other species excluding lingcod, flat fish, Pacific halibut, salmon species, perch species, sturgeon, striped bass, offshore pelagic species, and bait fish (herring, smelt anchovies and sardines). No retention of yelloweye rockfish and canary rockfish.

<u>Potential Inseason Changes</u>

The following are suggested management measures that could be implemented inseason if the 2007 (or 2008) fishery does not proceed as expected.

Reduce the duration of offshore closure periods if the total season length is reduced due to management of nearshore species. Impacts not to exceed harvest guidelines on overfished species.

Although retention of canary and yelloweye rockfishes in recreational fisheries is prohibited, bycatch mortality of released fish is still large enough to constrain the fishery for other groundfish species. The large offshore RCA closure is an example of how these recreational fisheries are affected by bycatch of overfished species, especially yelloweye and canary rockfish. To help alleviate this constraint without increasing bycatch mortality, perhaps the large offshore RCA closures can be modified to close areas of known canary rockfish and yelloweye concentrations OR open areas known to have no or low concentrations of canary rockfish and yelloweye rockfish. Identification of these potential areas depends on adequate information about the distribution and abundance of these species. Review of NOAA Fisheries historical triennial surveys, International Pacific Halibut Commission surveys, and other data sources may provide such information.

Similarly, other means to reduce bycatch mortality, especially of overfished species, may include gear restrictions and/or release techniques. For example, the Oregon Department of Fish & Wildlife is presently studying the effects of sub-surface release on survival of rockfish. If successful techniques are developed and accepted, their use may alleviate the current constraints from bycatch mortality on recreational fisheries. Other examples could include modifications of terminal gear, perhaps hook size or shape, to avoid or reduce capture of overfished species.

Management measures:

Oregon has a responsive port based monitoring program through their Ocean Sampling Recreational Boat Survey (ORBS) and regulatory processes in place to track harvest and take actions inseason if necessary. Inseason actions include changes to size limits, bag limits (including non retention), seasons, depths and area closures.

Depth management will be the main inseason tool for controlling canary rockfish and yelloweye rockfish harvest as retention is prohibited. Offshore closures may be implemented inseason at 30, 25, or 20 fathoms as the presence of these two species is reduced nearshore and release survival increases. Other options include area closures (for federally managed species they would be based on established management lines for salmon and Pacific halibut fisheries). Bag limit changes may be implemented to adjust expected catch to achieve season duration goals. Non-retention and size restrictions are the likely inseason tool to use for lingcod, cabezon and greenling as release survival is very high. They may also be used to reduce harvest on nearshore species, such as black rockfish. In addition to inseason options, total closure of the groundfish recreational fishery may be implemented to stay within harvest limits.

Figure 1. Season structure along with expected yelloweye rockfish and canary rockfish impacts for various 2007-08 Oregon recreational fishery options

Option	Month													Yelloweye EST OR Rec (mt)	Canary EST OR Rec (mt)
	J	F	M	A	M	J	J	A	LDay	S	O	N	D		
1	GF open all depth					GF open <40 fm					GF open all depth			4.3	5.5
2	GF open <40 fm													3.6	4.2
3	GF open <40 fm					GF open <25 fm			GF open <40 fm					3.2	3.8
4	GF open <20 fm													2.4	2.8
5	CLOSED						GF open <20 fm			CLOSED				1.9	1.7

Agenda Item F.5.b
Supplemental ODFW Report 2
April 2006

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT ON MANAGEMENT MEASURES FOR 2007-2008

The Oregon Department of Fish and Wildlife (ODFW) recommends a the range of management measures for public review that are contained in Agenda Item F.5.b, Supplemental ODFW Report (titled "Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery") contained in the briefing book materials, and include the adjustments contained in this report. These alternatives address management measures that affect the recreational groundfish fishery in waters off Oregon, and include bag limits (marine fish*, lingcod, sanddab, and flatfish), size limits (lingcod, cabezon, and kelp greenling), season adjustments/time closures, depth restrictions, and implementation of closures in areas of high groundfish concentration, primarily depleted species. ODFW believes that these alternatives form a rational range of management measures, given the reduced harvest levels that will be in place for yelloweye rockfish and black rockfish, and offers the following adjustments (adjustments highlighted) as described below.

* marine bag includes rockfish, greenling, cabezon and other species excluding lingcod, sanddab, Pacific halibut, salmon species, perch species, sturgeon, striped bass, offshore pelagic species, and bait fish (herring, smelt anchovies and sardines). No retention of yelloweye rockfish and canary rockfish.

Stonewall Banks

ODFW proposes implementation of a Yelloweye Rockfish Conservation Area (YRCA) specific to an area off the coast of Newport, Oregon, referred to as Stonewall Banks. The range for analysis is comprised of two options for analysis and public review.

Option A: There currently is a closure of the high relief areas of Stonewall Banks that is limited to the Pacific halibut fishery during the all-depth Pacific halibut season. Targeting and retention of Pacific halibut is prohibited in the area, and vessels that have retained Pacific halibut while fishing another area, are then prohibited from targeting any species within the closed area.

The coordinates for the current Stonewall Banks closure implemented in the Pacific halibut fishery, and proposed for analysis for application in the recreational groundfish fishery are as follows:

Current Stonewall Banks Closure

ID	Longitude		Latitude	
1	124	24.92	44	37.46
2	124	23.63	44	37.46
3	124	21.80	44	28.71
4	124	24.10	44	28.71
5	124	25.47	44	31.42

Returning to the first point

Option B: ODFW proposes an area surrounding Stonewall Banks for the purpose of developing and analyzing a more defined Stonewall Banks YRCA within that analysis area. The analysis area is larger than the anticipated closed area to provide a sufficient amount of coverage for analysis purposes only. Coordinates for the actual area to be implemented will be provided to the Council at its June meeting after the Oregon public comment and review process.

ODFW recommends the following coordinates for the proposed analysis area:

Proposed YRCA Analysis Area

ID	Longitude		Latitude	
1	124	29.99	44	41.71
2	124	21.60	44	41.68
3	124	17.01	44	27.66
4	124	17.01	44	25.22
5	124	30.11	44	25.27

Returning to the first point

Additional Area Closures

To address the range of optimum yield (OY) for yelloweye rockfish, ODFW anticipates the consideration of even more restrictive management measures for 2008. Therefore, ODFW would like the flexibility to implement additional YRCAs in 2008. These YRCAs will be identified absent specific coordinate at the June 2006 Council meeting. In the event that one or more of these areas will be closed to the retention of groundfish, ODFW will provide the Council with relevant coordinates and impact analysis as an inseason action. The proposed area, following Council approval, would be implemented through federal rule making procedures.

Lingcod

ODFW recommends the Council adopt an additional alternative for the minimum length limit for lingcod of 20 inches. This adjustment is included in the amended Option 2.

Amended Options

Amended options include Option 2 of the Agenda Item F.5.b, Supplemental ODFW Report (titled "Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery") contained in the briefing book. ODFW recommends replacing this option, with the amended option as follows:

Amended Option 2

Season: Open all year but open only shoreward of 40-fathom line. Additional area closures to be identified by name at the June Council meeting.

Daily Bag Limit:	**Minimum length limits:**
Marine fish (all flat fish species excluded)**: 5	Lingcod: 20-inches
Lingcod: 3	Cabezon: 16-inches
Flat fish spp: 25	Greenling spp: 10-inches

**marine bag includes rockfish, greenling, cabezon and other species excluding lingcod, flat fish, Pacific halibut, salmon species, perch species, sturgeon, striped bass, offshore pelagic species, and bait fish (herring, smelt anchovies and sardines). No retention of yelloweye rockfish and canary rockfish.

Additional Options

In response to the overfished species OYs that were selected by the Council on Wednesday of this week, ODFW recommends the following additional option for analysis:

Option 6

Season: Open April through September shoreward of the 20-fathom line

Daily Bag Limit:
- Marine fish*: 6
- Lingcod: 2
- Sanddab: 25

Minimum length limits:
- Lingcod: 24-inches
- Cabezon: 16-inches
- Greenling spp: 10-inches

Impacts associated with Option 6.

Option	Month													Yelloweye	Canary
	J	F	M	A	M	J	J	A	LDay	S	O	N	D	EST OR Rec (mt)	EST OR Rec (mt)
6	CLOSED			GF open <20 fm*							CLOSED			1.6	2.3

*This option has associated fishery impacts of a 14% decrease in groundfish effort and a 55% reduction in yelloweye rockfish impacts in the Pacific halibut fishery, resulting in lost opportunity, reducing either allowable Pacific halibut catch or time on the water.

Directed Yellowtail Rockfish and/or Sanddab (Flatfish) Fisheries

Directed yellowtail rockfish and/or sanddab (flatfish) fisheries may be implemented inseason, in the event of a closure of the recreational groundfish fishery due to attainment of target species harvest guidelines or state harvest caps, as were conducted in 2004. Fisheries will be monitored to ensure that impacts to yelloweye and canary rockfish are not in excess of the harvest guidelines.

ODFW Recommendations:

1. Adopt Oregon recreational management measure options 1, 3, 4, and 5 contained in the Agenda Item F.5.b, Supplemental ODFW Report (titled "Proposed Management Measures for the 2007-08 Oregon Recreational Groundfish Fishery") contained in the briefing book materials for public review.
2. Adopt amended Option 2 contained in this report for public review.
3. Adopt additional Option 6 contained in this report for public review.
4. Adopt the proposed coordinates for the Stonewall Banks YRCA Analysis Area.
5. Provide the flexibility needed to implement additional area closures in 2008.
6. Adopt the inseason flexibility to implement directed yellowtail rockfish and/or sanddab (flatfish) fisheries in the event of a recreational groundfish closure due to attainment of target species harvest guidelines.

PFMC
04/07/06

WASHINGTON AND OREGON DEPARTMENTS OF FISH AND WILDLIFE JOINT PROPOSAL ON MANAGEMENT MEASURES FOR 2007-2008 FISHERIES

The Washington and Oregon Departments of Fish and Wildlife will monitor inseason progress toward recreational harvest targets for canary and yelloweye rockfish. If inseason catch projections indicate that one or both of the state harvest targets may be exceeded, these Departments will consult with each other to share catch information. If the states determine that a management response is necessary to avoid exceeding the Oregon-Washington harvest guideline of canary or yelloweye rockfish, then the appropriate agency(ies) will implement inseason management actions to reduce catches, as necessary. Regulations will depend upon the timing of the determination for their need, and may include consideration of additional depth restrictions, time/area closures, and/or seasonal closures.

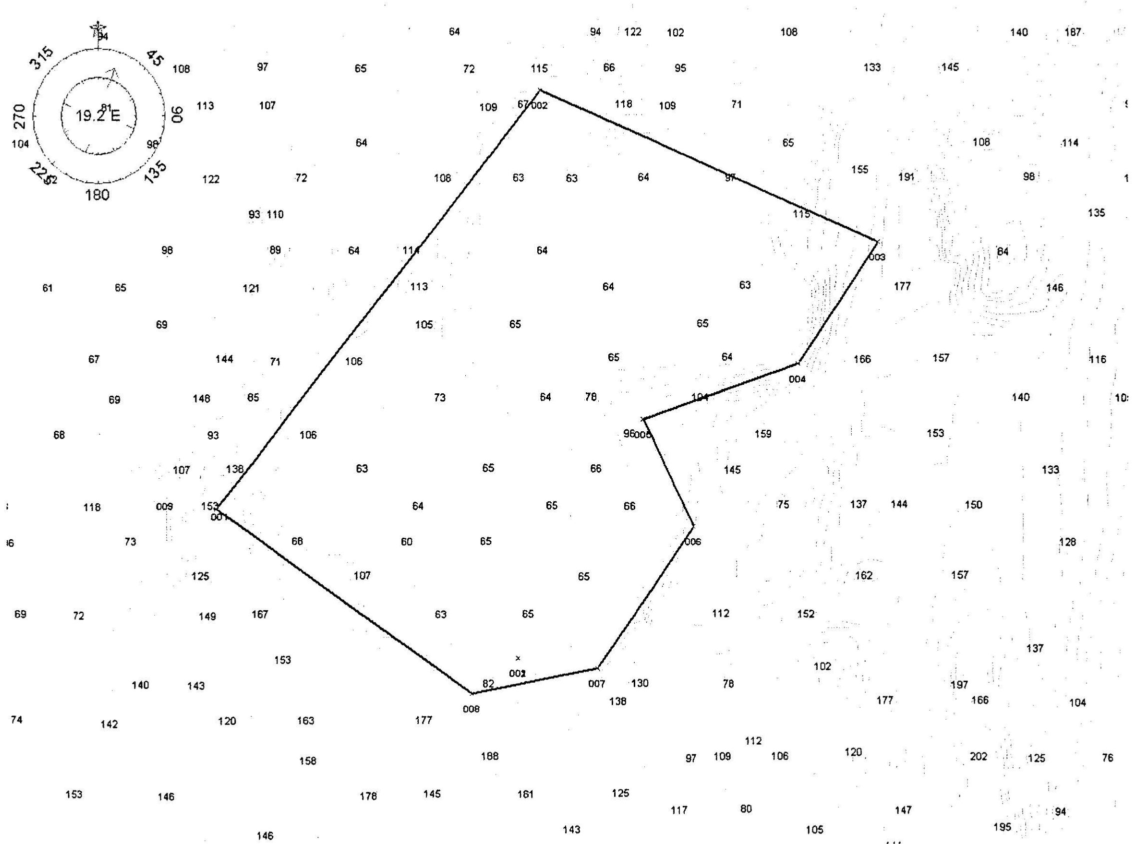
PFMC
04/07/06

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND FISHING VESSEL OWNERS' ASSOCIATION JOINT PROPOSAL FOR PRELIMINARY MANAGEMENT MEASURE ALTERNATIVES FOR 2007-08 GROUNDFISH FISHERIES

The Washington Department of Fish and Wildlife and the Fishing Vessel Owners' Association reviewed the management measure alternatives described in Agenda Item F.5.b, WDFW Report, and would like to replace Option 2 for the limited entry fixed gear and open access fisheries north of 40°10' N. lat. with the following:

<u>Option 2</u>
Add a yelloweye rockfish conservation area off the northern Washington coast, which would be closed to limited entry and open access fixed gear fisheries and the salmon troll fishery, as defined by the following coordinates:

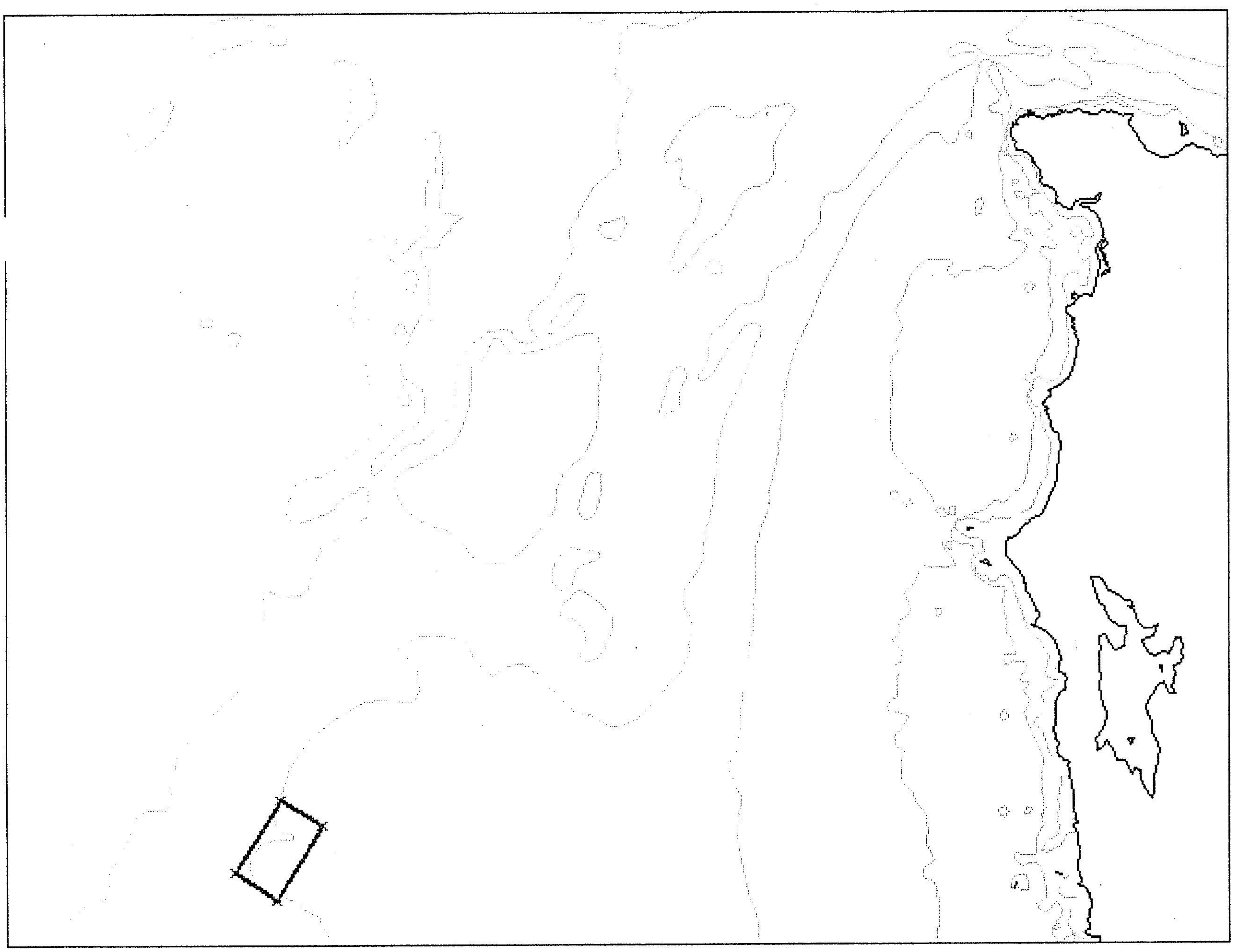
Beginning at 48° 11.77' N by 125° 13.03' W
Then to 48° 16.43' N by 125° 07.55' W
Then to 48° 14.72' N by 125° 01.84' W
Then to 48° 13.36' N by 125° 03.20' W
Then to 48° 12.74' N by 125° 05.83' W
Then to 48° 11.55' N by 125° 04.99' W
Then to 48° 09.96' N by 125° 06.63' W
Then to 48° 09.68' N by 125° 08.75' W, and back to the point of origin.



WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND
PROPOSAL FOR PRELIMINARY MANAGEMENT MEASURE ALTERNATIVES
FOR 2007-08 GROUNDFISH FISHERIES

The Washington Department of Fish and Wildlife has identified an alternative for a new area closure for the protection of primarily yelloweye (and potentially canary) rockfish off the north central coast that we support approving for public review. This area closure could apply to recreational and/or commercial fisheries that encounter rockfish (including, but not limited to, limited entry trawl and fixed gear, salmon troll, and open access directed groundfish fisheries), and is defined by the following coordinates:

Beginning at 48° 02.23' N by 125° 17.87' W
Then to 48° 01.42' N by 125° 15.89' W
Then to 47° 59.11' N by 125° 18.03' W
Then to 47° 59.97' N by 125° 19.92' W, and back to the point of origin.



Agenda Item F.5.b
WDFW Report
April 2006

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE REPORT ON PRELIMINARY MANAGEMENT MEASURE ALTERNATIVES FOR 2007-08 GROUNDFISH FISHERIES

The Washington Department of Fish and Wildlife (WDFW) supports the following preliminary management measure alternatives to be approved for public review at the Pacific Fishery Management Council's April meeting.

RECREATIONAL

WDFW held public meetings on December 8, 2005, January 11, 2006, and February 23, 2006, to develop and discuss recreational bottomfish proposals for 2007 and 2008. Based on the input provided, we are not proposing any changes to the bottomfish bag limit or lingcod season dates, which are listed below.

The intent of the proposed preliminary alternatives is to reduce incidental catch of overfished rockfish, primarily yelloweye, while anglers are targeting halibut and lingcod. Based on research by Albin and Karpov (1995), there is expected to be higher survivability of rockfish released from shallower depths (i.e., 20 fathoms or less). There is also expected to be a reduced encounter rate of yelloweye rockfish in shallower depths (i.e., 30 fathoms or less).

Bottomfish Bag Limits

All Areas: 15 bottomfish aggregate bag limit, which includes a sublimit of 10 rockfish, and 2 lingcod with a 24-inch minimum size limit, but does not include halibut (which has a daily bag limit of 1). Retention of canary and yelloweye rockfish is prohibited, regardless of area caught.

Lingcod Seasons

Marine Areas 1-3: Open the Saturday closest to March 15 (which is March 17 in 2007 and March 15 in 2008) through the Saturday closest to October 15 (which is October 13 in 2007 and October 18 in 2008).

Marine Area 4: Open April 16 through October 13 in 2007 and open April 16 through October 15 in 2008.

Area Closures

For all options, the "C-shaped" yelloweye rockfish conservation area in the north coast would remain in effect.

The proposed preliminary range of 2007-2008 management measure alternatives that WDFW supports for public review include:

Statewide – Lingcod Minimum Size Limit

Status quo (2006 season) – There is a minimum size limit of 24 inches for lingcod.

Option 1
Reduce the minimum size limit for lingcod to 20 inches in Marine Areas 1-4.

North Coast (Washington Marine Areas 3 and 4)

Status quo (2006 season) – Prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from May 22 through September 30, except on days that halibut fishing is open (e.g., June 22 and 24). The retention of canary and yelloweye rockfish is prohibited. It is prohibited to fish for, retain, or possess bottomfish and halibut in the "C-shaped" yelloweye rockfish conservation area.

Option 1
Prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from May 1 through June 30, except on days that halibut fishing is open, and from August 1 through September 30; prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the month of July.

Option 2
Prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the months of May and September; close the North Coast to halibut fishing, except in Area 4B; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from June 1 through August 31.

Option 3
Prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the months of May, August and September; close the North Coast to halibut fishing, except in Area 4B; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from June 1 through July 31.

Option 4
Add another yelloweye rockfish conservation area off the northern coast, which would be closed to recreational bottomfish and halibut fishing, as defined by the following coordinates:

Beginning at 48°11.7'N. lat., 125°13.03'W. long.,
Then to 48°16.43'N. lat., 125°07.55'W. long.,
Then to 48°14.72'N. lat., 125°01.84'W. long.,
Then to 48°09.07'N. lat., 125°07.51'W. long., then back to the point of origin.

Note: Options 2, 3, and 4 would require changes to the Pacific Halibut Catch Sharing Plan as well as the bottomfish regulations.

South Coast (Washington Marine Area 2)

Status quo (2006 season) – Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day (March 18 in 2006) through June 15. The retention of canary and yelloweye rockfish is prohibited.

Option 1
Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through July 31.

Option 2
Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through August 31.

Option 3
Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through July 31; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from August 1 through September 30.

Columbia Area (Washington Marine Area 1)

There is very little yelloweye and canary rockfish (0.03 mt and 0.02 mt, respectively, in 2005) caught in Marine Area 1; therefore, WDFW proposes to keep the status quo bottomfish fishing regulations in place through 2007 and 2008. These are: Prohibit retention of bottomfish, except sablefish and Pacific cod, with halibut onboard from May 1 through September 30. The retention of canary and yelloweye rockfish is prohibited.

COMMERCIAL

WDFW reviewed data available from the International Pacific Halibut Commission survey, the Washington submersible survey, a state charter boat ride along program, a state salmon troll observer program, and longline logbook data (provided voluntarily) to develop management tools to reduce the impacts to yelloweye from commercial fixed gear fisheries, and would support the following management measures for public review, as placeholders. We plan to solicit feedback from the Groundfish Advisory Subpanel and key constituents at the April meeting and between April and June.

Limited Entry and Open Access Fixed Gear – North of 40°10' N. lat.

Status quo – "C-shaped" yelloweye rockfish conservation area closed to recreational bottomfish and halibut fishing; portions of the area are closed via the federal non-trawl rockfish conservation area (RCA) boundaries; area seaward of the non-trawl RCA is a voluntary area to be avoided for limited entry and open access fixed gear; entire "C-shaped" area is a voluntary area to be avoided for other fisheries (e.g., salmon troll).

Option 1
Apply “C-shaped” yelloweye rockfish conservation area closure to all limited entry and open access fixed gear fisheries and the salmon troll fishery.

Option 2
Add another yelloweye rockfish conservation area off the northern Washington coast, which would be closed to limited entry and open access fixed gear fisheries and the salmon troll fishery, as defined by the following coordinates:

Beginning at 48°11.7’N. lat., 125°13.03’W. long.,
Then to 48°16.43’N. lat., 125°07.55’W. long.,
Then to 48°14.72’N. lat., 125°01.84’W. long.,
Then to 48°09.07’N. lat., 125°07.51’W. long., then back to the point of origin.

Note: Options 1 and 2 would require changes to the Pacific Halibut Catch Sharing Plan as well as the groundfish regulations.

Option 3
Consistent with the salmon troll regulations off Oregon, allow the retention of lingcod in the salmon troll fishery when fishing shoreward of a line approximating 30 fathoms north of 40°10’N. lat.

Option 4
Prohibit the retention of lingcod in the salmon troll fishery shoreward of the non-trawl RCA seaward boundary (i.e., shoreward of 100 fathoms north of 40°10’ N. lat. under status quo).

Preliminary WDFW Proposed Management Measure Alternatives
(Updated: 3/15/06)

BF = Bottomfish fishery; Hal = Halibut fishery; Non-hal = Fisheries other than halibut

North Coast	2006		2007-2008	
		Option 1	Option 2	Option 3
Jan	BF Open	Closed	Closed	Closed
Feb	BF Open	Closed	Closed	Closed
Mar	BF Open	BF Open	BF Open	BF Open
Apr	BF Open	BF Open	BF Open	BF Open
May	1-21: BF Open 22-31: Open < 20 fms	Hal days: BF Open Non-hal: Open < 20 fms	Closed	Closed
Jun	Hal days: BF Open Non-hal: Open < 20 fms	Hal days: BF Open Non-hal: Open < 20 fms	Open < 20 fms	Open < 20 fms
Jul	Open < 20 fms	Closed	Open < 20 fms	Open < 20 fms
Aug	Open < 20 fms	Open < 20 fms	Open < 20 fms	Closed
Sep	Open < 20 fms	Open < 20 fms	Closed	Closed
Oct-Dec	Closed	Closed	Closed	Closed

South Coast	2006		2007-2008	
		Option 1	Option 2	Option 3
Jan	BF Open	Closed	Closed	Closed
Feb	BF Open	Closed	Closed	Closed
Mar	1-17: BF Open 18-31: Open < 30 fms	1-15: BF Open 16-31: Open < 30 fms	1-15: BF Open 16-31: Open < 30 fms	1-15: BF Open 16-31: Open < 30 fms
Apr	Open < 30 fms	Open < 30 fms	Open < 30 fms	Open < 30 fms
May	Open < 30 fms	Open < 30 fms	Open < 30 fms	Open < 30 fms
Jun	1-15: Open < 30 fms 16-30: BF Open	Open < 30 fms	Open < 30 fms	Open < 30 fms
Jul	BF Open	Open < 30 fms	Open < 30 fms	Open < 30 fms
Aug	BF Open	BF Open	Open < 30 fms	Open < 20 fms
Sep	BF Open	BF Open	BF Open	Open < 20 fms
Oct-Dec	Closed	Closed	Closed	Closed

Columbia River	2006		2007-2008	
		Option 1	Option 2	Option 3
Jan	BF Open			
Feb	BF Open			
Mar	BF Open			
Apr	BF Open			
May	No bottomfish, except sablefish & P. cod w/halibut onboard; Otherwise, BF Open			
Jun				
Jul				
Aug	BF Open			
Sep	BF Open			
Oct-Dec	Closed			

Preliminary WDFW Proposed Management Measure Alternatives
Estimated Canary Rockfish Impacts
(Updated: 3/15/06)

Hal = Halibut trips; BFO = Bottomfish-only trips (no halibut and/or no salmon onboard)
(% reduction in discard mortality assumed as a result of depth restriction)
Assumes 100% discard mortality on halibut trips and a 66% mortality on non-halibut trips

North Coast	2006	2007-2008		
		Option 1	Option 2	Option 3
Jan	0	0	0	0
Feb	0	0	0	0
Mar	0	0	0	0
Apr	0.05	0.05	0.05	0.05
May	Hal: 0.22 BFO: 0.16 (25%)	Hal: 0.22 BFO: 0.11 (50%)	0	0
Jun	Hal: 0.10 BFO: 0.14 (50%)	Hal: 0.10 BFO: 0.14 (50%)	Hal: 0.17 (25%) BFO: 0.14 (50%)	0.38
Jul	0.16 (50%)	0	0.16 (50%)	0.16 (50%)
Aug	0.10 (50%)	0.10 (50%)	0.10 (50%)	0
Sep	0.03 (50%)	0.03 (50%)	0	0
Oct-Dec	0	0	0	0
Total	0.96	0.75	0.62	0.59

South Coast	2006	2007-2008		
		Option 1	Option 2	Option 3
Jan	0	0	0	0
Feb	0	0	0	0
Mar	0	0	0	0
Apr	0.01	0.01	0.01	0.01
May	0.11	0.11	0.11	0.11
Jun	0.03	0.03	0.03	0.03
Jul	0.06	0.06	0.06	0.06
Aug	0	0	0	0 (50%)
Sep	0.01	0.01	0.01	0.01 (50%)
Oct-Dec	0	0	0	0
Total	0.23	0.23	0.23	0.23

Cumulative Impacts

	2006	2007-2008		
		Option 1	Option 2	Option 3
North Coast	0.96	0.75	0.62	0.59
South Coast	0.23	0.23	0.23	0.23
Columbia	0.02	0.02	0.02	0.02
Total	1.21	1	0.87	0.84

Preliminary WDFW Proposed Management Measure Alternatives
Estimated Yelloweye Rockfish Impacts
(Updated: 3/15/06)

Hal = Halibut trips; BFO = Bottomfish-only trips (no halibut and/or no salmon onboard)
Assumes 100% discard mortality across all trip types > 20 fms
Open < 20 fms = 50% mortality and 25% lower encounter rate

North Coast	2006	2007-2008		
		Option 1	Option 2	Option 3
Jan	0	0	0	0
Feb	0	0	0	0
Mar	0	0	0	0
Apr	0.06	0.06	0.06	0.06
May	Hal: 0.85 BFO: 0.23	Hal: 0.85 BFO: 0.16	0	0
Jun	Hal: 0.51 BFO: 0.21	Hal: 0.51 BFO: 0.21	Hal: 0.38 BFO: 0.21	Hal: 0.38 BFO: 0.21
Jul	0.46	0	0.46	0.46
Aug	0.29	0.29	0.29	0
Sep	0.11	0.11	0	0
Oct-Dec	0	0	0	0
Total	2.72	2.19	1.4	1.11

South Coast	2006	2007-2008		
		Option 1	Option 2	Option 3
Jan	0	0	0	0
Feb	0	0	0	0
Mar	0.02	0.02	0.02	0.02
Apr	0.05	0.05	0.05	0.05
May	0.21	0.21	0.21	0.21
Jun	0.01	0.01	0.01	0.01
Jul	0.21	0.21	0.21	0.21
Aug	0.02	0.02	0.02	0.005
Sep	0.01	0.01	0.01	0.003
Oct-Dec	0	0	0	0
Total	0.52	0.52	0.52	0.51

Cumulative Impacts

	2006	2007-2008		
		Option 1	Option 2	Option 3
North Coast	2.72	2.19	1.4	1.11
South Coast	0.52	0.52	0.52	0.51
Columbia	0.03	0.03	0.03	0.03
Total	3.27	2.74	1.95	1.65

Estimation of Bycatch in the Northern Salmon Troll Fishery

Washington Department of Fish and Wildlife (WDFW) deployed observers on the commercial salmon troll fleet during the 2003, 2004 and 2005 seasons. This effort resulted in a total of 165 observed vessel days aboard 12 different vessels over the 3 seasons (Table 1). The observed troll effort occurred along the entire Washington coast.

Table 1. Troll vessel days observed

	May	June	July	August	September	Total
2003	15	6	21	13	2	57
2004	10	3	6	10	0	29
2005	39	8	16	16	0	79
Total	64	17	43	39	2	165

While the primary focus of this effort was to collect salmon genetic samples, determine mark rates, and measure legal to sub-legal salmon encounter rates; observers also documented encounters with all species. Therefore, these data are also informative with respect to the catch of groundfish species that might be expected from the salmon troll fishery. Total observed catch for selected species across all three years is listed in Table 2.

Table 2. 2003 through 2005 Observed Catch Summary

	2003	2004	2005	Total
Yelloweye rockfish	5	16	0	21
Canary rockfish	68	55	72	195
Yellowtail rockfish	299	219	280	798
All Rockfish	425	296	423	1,144
Lingcod	85	51	232	368
Chinook (retained)	2,072	735	1,724	4,531
Coho (retained)	341	72	44	457

These catch data can be used to infer catches incidental to the northern salmon troll fishery as a whole, given certain caveats and assumptions. First, is that there has been a adequate level of sampling and that catches observed off the Washington coast are sufficiently representative of the broader troll fishery across Washington and Oregon to enable such inferences. Also, there is an assumption that fishing practices are not influenced by the presence of an observer. However, even given these assumptions, it is useful to explore these data since current bycatch estimates for the salmon troll fishery are largely based upon the best professional judgment of the Groundfish Management Team and are supported by little empirical data.

One approach to estimating total incidental catch is to assume that the ratio of bycatch to retained Chinook salmon landings in the observed data remains constant for all landed Chinook. Estimates can then be based directly on salmon landings. Any groundfish targeting in the troll fishery could compromise this approach. Chinook salmon catches for the Washington and Oregon troll fisheries (excluding tribal catches) are presented in Table 3.

Table 3. Oregon and Washington Chinook Salmon Troll Catch*
(excluding treaty toll catch)

	OR	WA	TOTAL
1997	149,759	6,418	156,177
1998	124,211	5,929	130,140
1999	62,533	17,456	79,989
2000	135,903	10,269	146,172
2001	274,963	21,229	296,192
2002	304,189	53,819	358,008
2003	329,678	56,202	385,880
2004	252,709	35,372	288,081
2005	250,730	35,066	285,796
9-yr average	209,408	26,862	236,271

**Review of 2005 Salmon Fisheries - PFMC*

Applying the observed catch ratios of species of concern to retained Chinook across the 3 years of the study, and converting catch in numbers to total catch weight using information from the WDFW Biological Data System (BDS), produces the estimates listed in Table 4.

Table 4. Estimated Bycatch in the OR/WA Salmon Fishery Applying Observed 2003-05 Catch Ratios to Total Chinook Salmon Landings (mt)
(Numbers expanded to weight using the most recent 50 fish sampled in the WDFW BDS; Canary = 1.2 kg; Yelloweye = 2.6 kg, lingcod = 3.13 kg)

Year	Canary	Yelloweye	Lingcod	
1997	2.8	0.9	18.0	
1998	2.3	0.7	15.0	
1999	1.4	0.4	9.2	
2000	2.6	0.8	16.9	
2001	5.3	1.6	34.2	
2002	6.4	2.0	41.3	
2003	6.9	2.1	44.5	
2004	5.1	1.6	33.2	
2005	5.1	1.6	33.0	
9-yr average	4.2	1.3	27.2	
			1.4	5% Mortality

Although prohibited from retaining groundfish in the non-trawl Rockfish Conservation Area (RCA), salmon trollers are allowed to retain yellowtail rockfish taken incidentally while trolling for salmon. Landed yellowtail provide another comparison point with respect to observed co-occurring catch by species in the salmon troll fishery. The ratio of incidental canary rockfish to yellowtail rockfish was very consistent across the three years of the study. Applying this ratio to the landed troll yellowtail catch in Oregon and results in the estimated catch values listed in Table 5. Since canary and yellowtail rockfish are almost exactly of equal weight in the most recent WDFW BDS data, the canary/yellowtail ratio can be applied directly to the total weight of yellowtail landings. It should be noted, however, that some salmon trollers choose not to retain and land their yellowtail, which would make these values a minimal estimate. Additionally, yellowtail landings are constrained by a landing ratio (1 yellowtail for each 2 salmon).

Table 5. Canary Rockfish Landings (mt) in the Salmon Troll Fishery Esitmated by Applying the Observed Ratio of Canary to Landed Yellowtail Rockfish

	2003	2004	2005	3-yr Avg.
Canary	68	55	72	65
Yellowtail	299	219	280	266
Canary/Yellowtail	0.227	0.251	0.257	0.244
Total Troll Yellowtail	29.3	7.8	6.9	14.7
Estimated Canary	6.7	2.0	1.8	3.6

Additional at-sea observations of the salmon troll fishery across a broader area would be useful in refining estimates of bycatch. Further explorations of the existing data set with respect to time and area could also prove useful.

Agenda Item F.5.c
GMT Report
April 2006

Table 1. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries designed to accomplish a regional management strategy for targeting petrale sole.

RCA Boundaries and Trip Limits to accomplish Petrale Regional Management

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	200*	11,000	20,000	7,000	65,000	80,000	40,000	80,000	4,000
	2	75	200	11,000	20,000	7,000	65,000	80,000	15,000	80,000	4,000
	3	75	200	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	4	75	200	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	5	75	200	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	6	75	200*	11,000	20,000	7,000	65,000	80,000	40,000	80,000	4,000
N 40 10 SFFT	1	75	200*	5,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	2	75	200	7,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	3	75	200	11,000	3,000	3,000	22,000	60,000	15,000	50,000	4,000
	4	75	200	11,000	3,000	3,000	22,000	60,000	15,000	50,000	4,000
	5	75	200	7,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	6	75	200*	5,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
38 40 10	1	100	150	12,500	22,000	8,000	65,000	110,000	120,000	10,000	8,000
	2	100	150	12,500	22,000	8,000	65,000	110,000	42,000	10,000	8,000
	3	100	150	12,500	22,000	8,000	50,000	110,000	42,000	10,000	8,000
	4	100	150	12,500	22,000	8,000	50,000	110,000	42,000	10,000	8,000
	5	100	150	12,500	22,000	8,000	50,000	110,000	42,000	10,000	8,000
	6	100	150	12,500	22,000	8,000	65,000	110,000	120,000	10,000	8,000
S 38	1	100	150	12,500	22,000	8,000	75,000	130,000	120,000	10,000	40,000
	2	100	150	12,500	22,000	8,000	75,000	130,000	42,000	10,000	40,000
	3	100	150	12,500	22,000	8,000	75,000	130,000	42,000	10,000	40,000
	4	100	150	12,500	22,000	8,000	75,000	130,000	42,000	10,000	40,000
	5	100	150	12,500	22,000	8,000	75,000	130,000	42,000	10,000	40,000
	6	100	150	12,500	22,000	8,000	75,000	130,000	120,000	10,000	40,000

*includes petrale sole areas

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	3.6	3.2	6.8
	POP	104.1	0.0	104.1
	Darkblotched	182.8	42.3	225.1
	Widow	1.0	0.1	1.1
	Bocaccio	0.0	52.3	52.3
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	3.0	3.0
Target Species	Sablefish	1571.7	464.1	2035.9
	Longspine	308.4	584.5	892.9
	Shortspine	801.9	366.7	1168.6
	Dover	7709.8	2569.8	10279.6
	Arrowtooth	4765.6	51.3	4816.9
	Petrale	1601.9	397.4	1999.3
	Other Flat	447.9	702.7	1150.7
	Slope Rock	243.8	265.0	508.9

Table 2. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 1 and OY Alternative 1 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 1 & Target Species OY Alternative 1

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	150	11,000	20,000	7,000	65,000	110,000	60,000	100,000	8,000
	2	50	150	11,000	20,000	7,000	65,000	110,000	18,000	100,000	8,000
	3	50	150	13,000	24,000	7,000	50,000	110,000	18,000	100,000	8,000
	4	60	150	13,000	24,000	7,000	50,000	110,000	18,000	100,000	8,000
	5	50	150	13,000	24,000	7,000	50,000	110,000	18,000	100,000	8,000
	6	75	150	11,000	20,000	7,000	65,000	110,000	60,000	100,000	8,000
N 40 10 SFFT	1	75	150	5,000	3,000	3,000	20,000	60,000	16,000	50,000	8,000
	2	50	150	7,000	3,000	3,000	20,000	60,000	18,000	50,000	8,000
	3	50	150	11,000	3,000	3,000	20,000	60,000	18,000	50,000	8,000
	4	60	150	11,000	3,000	3,000	20,000	60,000	18,000	50,000	8,000
	5	50	150	7,000	3,000	3,000	20,000	60,000	18,000	50,000	8,000
	6	75	150	5,000	3,000	3,000	20,000	60,000	16,000	50,000	8,000
38 40 10	1	75	150	12,000	22,000	7,000	65,000	110,000	60,000	10,000	15,000
	2	60	150	12,000	22,000	7,000	65,000	110,000	18,000	10,000	15,000
	3	75	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	15,000
	4	100	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	15,000
	5	60	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	15,000
	6	75	150	12,000	22,000	7,000	65,000	110,000	60,000	10,000	15,000
S 38	1	75	150	12,000	22,000	7,000	65,000	110,000	60,000	10,000	40,000
	2	100	150	12,000	22,000	7,000	65,000	110,000	18,000	10,000	40,000
	3	100	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	40,000
	4	100	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	40,000
	5	100	150	12,000	22,000	7,000	50,000	110,000	18,000	10,000	40,000
	6	75	150	12,000	22,000	7,000	65,000	110,000	60,000	10,000	40,000

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	2.2	2.2	4.5
	POP	160.1	0.0	160.1
	Darkblotched	268.9	41.5	310.4
	Widow	1.9	0.1	2.0
	Bocaccio	0.0	28.3	28.3
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	1.2	1.2
Target Species	Sablefish	1598.3	437.1	2035.4
	Longspine	310.6	584.5	895.2
	Shortspine	847.9	320.8	1168.7
	Dover	8014.5	2366.1	10380.7
	Arrowtooth	3578.8	27.1	3605.9
	Petrale	1586.7	272.9	1859.6
	Other Flat	559.0	685.1	1244.1
	Slope Rock	501.7	350.7	852.4

Table 3. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 2 and OY Alternative 1 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 2 & Target Species OY Alternative 1

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	200*	11,000	20,000	7,000	65,000	80,000	40,000	80,000	4,000
	2	75	250	11,000	20,000	7,000	65,000	80,000	15,000	80,000	4,000
	3	75	250	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	4	100	200	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	5	75	250	14,000	24,000	7,000	50,000	80,000	15,000	80,000	4,000
	6	75	200*	11,000	20,000	7,000	65,000	80,000	40,000	80,000	4,000
N 40 10 SFFT	1	75	200*	5,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	2	75	250	7,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	3	75	250	11,000	3,000	3,000	22,000	60,000	15,000	50,000	4,000
	4	100	200	11,000	3,000	3,000	22,000	60,000	15,000	50,000	4,000
	5	75	250	7,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
	6	75	200*	5,000	3,000	3,000	20,000	60,000	15,000	50,000	4,000
38 40 10	1	100	150	12,500	22,000	8,000	65,000	110,000	40,000	10,000	8,000
	2	100	150	12,500	22,000	8,000	65,000	110,000	15,000	10,000	8,000
	3	100	150	12,500	22,000	8,000	50,000	110,000	15,000	10,000	8,000
	4	100	150	12,500	22,000	8,000	50,000	110,000	15,000	10,000	8,000
	5	100	150	12,500	22,000	8,000	50,000	110,000	15,000	10,000	8,000
	6	100	150	12,500	22,000	8,000	65,000	110,000	40,000	10,000	8,000
S 38	1	100	150	12,500	22,000	8,000	75,000	130,000	40,000	10,000	40,000
	2	100	150	12,500	22,000	8,000	75,000	130,000	15,000	10,000	40,000
	3	100	150	12,500	22,000	8,000	75,000	130,000	15,000	10,000	40,000
	4	100	150	12,500	22,000	8,000	75,000	130,000	15,000	10,000	40,000
	5	100	150	12,500	22,000	8,000	75,000	130,000	15,000	10,000	40,000
	6	100	150	12,500	22,000	8,000	75,000	130,000	40,000	10,000	40,000

*includes petrale sole areas

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	4.0	2.9	6.9
	POP	78.3	0.0	78.3
	Darkblotched	141.5	42.2	183.7
	Widow	0.9	0.1	1.0
	Bocaccio	0.0	48.2	48.2
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	2.8	2.8
Target Species	Sablefish	1510.6	464.1	1974.8
	Longspine	298.9	584.5	883.5
	Shortspine	761.0	366.7	1127.7
	Dover	7364.9	2569.8	9934.7
	Arrowtooth	4538.5	51.3	4589.8
	Petrale	1585.7	269.4	1855.1
	Other Flat	444.6	730.5	1175.2
	Slope Rock	185.8	265.0	450.9

Table 4. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 3 and OY Alternative 1 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 3 & Target Species OY Alternative 1

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	100	150	10,000	20,000	7,000	65,000	110,000	40,000	115,000	12,000
	2	100	150	10,000	20,000	7,000	65,000	110,000	13,000	115,000	12,000
	3	100	150	12,000	24,000	7,000	50,000	110,000	13,000	115,000	12,000
	4	100	150	12,000	24,000	7,000	50,000	110,000	13,000	115,000	12,000
	5	100	150	12,000	24,000	7,000	50,000	110,000	13,000	115,000	12,000
	6	100	150	10,000	20,000	7,000	65,000	110,000	40,000	115,000	12,000
N 40 10 SFFT	1	100	150	5,000	3,000	3,000	25,000	100,000	16,000	75,000	12,000
	2	100	150	7,000	3,000	3,000	25,000	100,000	13,000	75,000	12,000
	3	100	150	10,000	3,000	3,000	25,000	100,000	13,000	75,000	12,000
	4	100	150	10,000	3,000	3,000	25,000	100,000	13,000	75,000	12,000
	5	100	150	7,000	3,000	3,000	25,000	100,000	13,000	75,000	12,000
	6	100	150	5,000	3,000	3,000	25,000	100,000	16,000	75,000	12,000
38 40 10	1	100	150	11,000	22,000	7,000	65,000	110,000	40,000	10,000	20,000
	2	100	150	11,000	22,000	7,000	65,000	110,000	13,000	10,000	20,000
	3	100	150	11,000	22,000	7,000	50,000	110,000	13,000	10,000	20,000
	4	100	150	11,000	22,000	7,000	50,000	110,000	13,000	10,000	20,000
	5	100	150	11,000	22,000	7,000	50,000	110,000	13,000	10,000	20,000
	6	100	150	11,000	22,000	7,000	65,000	110,000	40,000	10,000	20,000
S 38	1	100	150	11,000	22,000	7,000	75,000	130,000	40,000	10,000	40,000
	2	100	150	11,000	22,000	7,000	75,000	130,000	13,000	10,000	40,000
	3	100	150	11,000	22,000	7,000	75,000	130,000	13,000	10,000	40,000
	4	100	150	11,000	22,000	7,000	75,000	130,000	13,000	10,000	40,000
	5	100	150	11,000	22,000	7,000	75,000	130,000	13,000	10,000	40,000
	6	100	150	11,000	22,000	7,000	75,000	130,000	40,000	10,000	40,000

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	9.1	2.9	12.0
	POP	145.1	0.0	145.1
	Darkblotched	242.5	43.4	286.0
	Widow	1.8	0.1	1.9
	Bocaccio	0.0	47.6	47.6
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	2.7	2.7
Target Species	Sablefish	1512.1	420.4	1932.5
	Longspine	304.8	584.5	889.3
	Shortspine	829.7	320.8	1150.5
	Dover	7866.3	2569.8	10436.2
	Arrowtooth	5571.6	51.3	5622.8
	Petrale	1600.6	255.3	1855.8
	Other Flat	647.2	732.5	1379.8
	Slope Rock	752.6	424.5	1177.1

<--- note for this alternative, consider a midwater yellowtail/widow fishery with the following impacts:

	mortality (mt)	retained	revenue	retained	revenue
Yellowtail	1000	904.2	$ 1,020,631	904.2	$ 1,020,631
Canary	9.6	6.1	$ 6,131	6.1	$ 6,131
Darkblotched	0.9	0.9	$ 868	0.9	$ 868
POP	0.0	0.0	$ 45	0.0	$ 45
Widow	146.1	83.9	$ 81,194	83.9	$ 81,194
			$ 1,108,869		$ 1,108,869

Table 5. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 4 and OY Alternative 1 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 4 & Target Species OY Alternative 1

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	0	150	11,000	20,000	7,000	65,000	130,000	70,000	130,000	12,000
	2	50	150	11,000	20,000	7,000	65,000	130,000	15,000	130,000	12,000
	3	60	150	13,000	24,000	7,000	65,000	130,000	15,000	130,000	12,000
	4	60	150	13,000	24,000	7,000	65,000	130,000	15,000	130,000	12,000
	5	50	150	13,000	24,000	7,000	65,000	130,000	15,000	130,000	12,000
	6	0	150	11,000	20,000	7,000	65,000	130,000	70,000	130,000	12,000
N 40 10	1	0	150	0	0	0	0	0	0	0	0
SFFT	2	50	150	7,000	3,000	3,000	20,000	40,000	15,000	20,000	12,000
	3	60	150	11,000	3,000	3,000	20,000	40,000	15,000	20,000	12,000
	4	60	150	11,000	3,000	3,000	20,000	40,000	15,000	20,000	12,000
	5	50	150	7,000	3,000	3,000	20,000	40,000	15,000	20,000	12,000
	6	0	150	0	0	0	0	0	0	0	0
38 40 10	1	75	150	12,000	22,000	7,000	65,000	130,000	70,000	10,000	20,000
	2	75	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	20,000
	3	75	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	20,000
	4	75	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	20,000
	5	75	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	20,000
	6	75	150	12,000	22,000	7,000	65,000	130,000	70,000	10,000	20,000
S 38	1	100	150	12,000	22,000	7,000	65,000	130,000	70,000	10,000	40,000
	2	100	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	40,000
	3	100	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	40,000
	4	100	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	40,000
	5	100	150	12,000	22,000	7,000	65,000	130,000	15,000	10,000	40,000
	6	100	150	12,000	22,000	7,000	65,000	130,000	70,000	10,000	40,000

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	1.9	2.4	4.3
	POP	177.4	0.0	177.4
	Darkblotched	304.2	48.5	352.7
	Widow	2.0	0.1	2.1
	Bocaccio	0.0	25.6	25.6
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	0.7	0.7
Target Species	Sablefish	1584.7	434.2	2018.9
	Longspine	310.2	584.5	894.7
	Shortspine	839.8	320.8	1160.6
	Dover	8980.6	2826.6	11807.1
	Arrowtooth	3617.5	26.6	3644.2
	Petrale	1555.8	258.7	1814.5
	Other Flat	618.2	819.9	1438.1
	Slope Rock	752.6	424.5	1177.1

Table 6. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 5 and OY Alternatives 1 and 2 for target species[1].

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 5 & Target Species OY Alternative 1 &2

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	200*	11,000	7,000	3,000	65,000	70,000	50,000	30,000	2,000
	2	50	250	11,000	7,000	3,000	20,000	30,000	15,000	30,000	2,000
	3	60	250	13,000	7,000	3,000	20,000	30,000	15,000	30,000	2,000
	4	60	250	13,000	7,000	3,000	20,000	30,000	15,000	30,000	2,000
	5	50	250	13,000	7,000	3,000	20,000	30,000	15,000	30,000	2,000
	6	75	200*	11,000	7,000	3,000	65,000	70,000	50,000	30,000	2,000
N 40 10	1	75	200*	7,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
SFFT	2	50	250	7,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
	3	60	250	11,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
	4	60	250	11,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
	5	50	250	7,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
	6	75	200*	7,000	3,000	3,000	20,000	30,000	15,000	30,000	2,000
38 40 10	1	75	150	12,000	22,000	7,000	20,000	70,000	50,000	10,000	4,000
	2	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	4,000
	3	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	4,000
	4	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	4,000
	5	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	4,000
	6	75	150	12,000	22,000	7,000	65,000	70,000	50,000	10,000	4,000
S 38	1	75	150	12,000	22,000	7,000	65,000	70,000	50,000	10,000	40,000
	2	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	40,000
	3	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	40,000
	4	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	40,000
	5	75	150	12,000	22,000	7,000	20,000	70,000	15,000	10,000	40,000
	6	75	150	12,000	22,000	7,000	65,000	70,000	50,000	10,000	40,000

*includes petrale sole areas

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	1.2	1.7	2.8
	POP	61.7	0.0	61.7
	Darkblotched	94.6	28.9	123.5
	Widow	0.8	0.0	0.8
	Bocaccio	0.0	16.2	16.2
	Yelloweye	0.1	0.1	0.1
	Cowcod	0.0	0.4	0.4
Target Species	Sablefish	1468.2	432.9	1901.0
	Longspine	177.3	584.5	761.8
	Shortspine	345.1	320.8	665.9
	Dover	4868.5	1395.9	6264.4
	Arrowtooth	2934.6	26.7	2961.2
	Petrale	1428.6	251.9	1680.4
	Other Flat	315.1	420.8	735.8
	Slope Rock	139.4	222.5	361.8

[1] None of the target species OYs under OY Alternative 2 and only some of the target species OYs under OY Alternative 1 could be attained under Rebuilding Alternative 5.

Table 7. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 1 and OY Alternative 2 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 1 & Target Species OY Alternative 2

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	0	200*	14,000	22,000	8,000	75,000	110,000	120,000	120,000	8,000
	2	50	180	14,000	22,000	8,000	75,000	110,000	35,000	120,000	8,000
	3	50	180	17,000	24,000	8,000	70,000	110,000	35,000	120,000	8,000
	4	60	180	17,000	24,000	8,000	70,000	110,000	35,000	120,000	8,000
	5	50	180	17,000	24,000	8,000	70,000	110,000	35,000	120,000	8,000
	6	0	200*	14,000	22,000	8,000	75,000	110,000	120,000	120,000	8,000
N 40 10	1	0	200*	0	0	0	0	0	0	0	0
SFFT	2	50	180	9,000	3,000	3,000	24,000	40,000	25,000	40,000	8,000
	3	50	180	11,000	3,000	3,000	24,000	40,000	25,000	40,000	8,000
	4	60	180	11,000	3,000	3,000	24,000	40,000	25,000	40,000	8,000
	5	50	180	9,000	3,000	3,000	24,000	40,000	25,000	40,000	8,000
	6	0	200*	0	0	0	0	0	0	0	0
38 40 10	1	75	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	15,000
	2	60	150	15,500	23,000	8,000	75,000	110,000	35,000	10,000	15,000
	3	75	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	15,000
	4	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	15,000
	5	60	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	15,000
	6	75	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	15,000
S 38	1	75	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	40,000
	2	100	150	15,500	23,000	8,000	75,000	110,000	35,000	10,000	40,000
	3	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	40,000
	4	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	40,000
	5	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	40,000
	6	75	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	40,000

*includes petrale sole areas

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding	Canary	1.4	2.4	3.8
Species	POP	146.7	0.0	146.7
	Darkblotched	268.8	50.9	319.8
	Widow	1.8	0.1	1.9
	Bocaccio	0.0	30.6	30.6
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	1.3	1.3
Target	Sablefish	2013.9	560.4	2574.3
Species	Longspine	324.4	611.1	935.5
	Shortspine	934.4	366.7	1301.1
	Dover	9961.9	3103.5	13065.4
	Arrowtooth	3278.4	27.1	3305.5
	Petrale	1765.8	337.6	2103.3
	Other Flat	503.0	672.9	1175.9
	Slope Rock	463.2	350.7	813.9

Table 8. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 2 and OY Alternative 2 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 2 & Target Species OY Alternative 2

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	200*	14,000	22,000	8,000	65,000	30,000	120,000	30,000	4,000
	2	75	250	14,000	22,000	8,000	65,000	30,000	35,000	30,000	4,000
	3	75	250	17,000	24,000	8,000	65,000	30,000	35,000	30,000	4,000
	4	100	200	17,000	24,000	8,000	65,000	30,000	35,000	30,000	4,000
	5	75	250	17,000	24,000	8,000	65,000	30,000	35,000	30,000	4,000
	6	75	200*	14,000	22,000	8,000	65,000	30,000	120,000	30,000	4,000
N 40 10	1	75	200*	5,000	3,000	3,000	20,000	60,000	16,000	40,000	4,000
SFFT	2	75	250	7,000	3,000	3,000	20,000	60,000	25,000	40,000	4,000
	3	75	250	11,000	3,000	3,000	22,000	60,000	25,000	40,000	4,000
	4	100	200	11,000	3,000	3,000	22,000	60,000	25,000	40,000	4,000
	5	75	250	7,000	3,000	3,000	20,000	60,000	25,000	40,000	4,000
	6	75	200*	5,000	3,000	3,000	20,000	60,000	16,000	40,000	4,000
38 40 10	1	100	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	8,000
	2	100	150	15,500	23,000	8,000	75,000	110,000	35,000	10,000	8,000
	3	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	8,000
	4	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	8,000
	5	100	150	15,500	23,000	8,000	70,000	110,000	35,000	10,000	8,000
	6	100	150	15,500	23,000	8,000	75,000	110,000	120,000	10,000	8,000
S 38	1	100	150	15,500	23,000	8,000	75,000	130,000	120,000	10,000	40,000
	2	100	150	15,500	23,000	8,000	75,000	130,000	35,000	10,000	40,000
	3	100	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	40,000
	4	100	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	40,000
	5	100	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	40,000
	6	100	150	15,500	23,000	8,000	75,000	130,000	120,000	10,000	40,000

*includes petrale sole areas

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding Species	Canary	4.1	3.2	7.2
	POP	78.2	0.0	78.2
	Darkblotched	147.9	49.9	197.9
	Widow	0.9	0.1	0.9
	Bocaccio	0.0	52.2	52.2
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	3.0	3.0
Target Species	Sablefish	1853.1	575.5	2428.7
	Longspine	313.2	611.1	924.3
	Shortspine	865.8	366.7	1232.5
	Dover	8268.1	2934.6	11202.7
	Arrowtooth	3912.6	51.3	3963.9
	Petrale	2087.3	380.9	2468.3
	Other Flat	166.8	707.9	874.7
	Slope Rock	185.8	265.0	450.9

Table 9. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 3 and OY Alternative 2 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 3 & Target Species OY Alternative 2

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	75	150	14,000	22,000	9,000	75,000	110,000	65,000	80,000	12,000
	2	100	150	14,000	22,000	9,000	75,000	110,000	26,000	80,000	12,000
	3	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	4	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	5	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	6	75	150	14,000	22,000	9,000	75,000	110,000	65,000	80,000	12,000
N 40 10	1	75	150	14,000	22,000	9,000	75,000	110,000	65,000	80,000	12,000
SFFT	2	100	150	14,000	22,000	9,000	75,000	110,000	26,000	80,000	12,000
	3	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	4	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	5	100	150	16,000	24,000	9,000	70,000	110,000	26,000	80,000	12,000
	6	75	150	14,000	22,000	9,000	75,000	110,000	65,000	80,000	12,000
38 40 10	1	100	150	15,000	23,000	9,000	75,000	110,000	65,000	10,000	20,000
	2	100	150	15,000	23,000	9,000	75,000	110,000	26,000	10,000	20,000
	3	100	150	15,000	23,000	9,000	70,000	110,000	26,000	10,000	20,000
	4	100	150	15,000	23,000	9,000	70,000	110,000	26,000	10,000	20,000
	5	100	150	15,000	23,000	9,000	70,000	110,000	26,000	10,000	20,000
	6	100	150	15,000	23,000	9,000	75,000	110,000	65,000	10,000	20,000
S 38	1	100	150	15,000	23,000	9,000	75,000	130,000	65,000	10,000	40,000
	2	100	150	15,000	23,000	9,000	75,000	130,000	26,000	10,000	40,000
	3	100	150	15,000	23,000	9,000	70,000	130,000	26,000	10,000	40,000
	4	100	150	15,000	23,000	9,000	70,000	130,000	26,000	10,000	40,000
	5	100	150	15,000	23,000	9,000	70,000	130,000	26,000	10,000	40,000
	6	100	150	15,000	23,000	9,000	75,000	130,000	65,000	10,000	40,000

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding	Canary	10.2	3.1	13.3
Species	POP	172.3	0.0	172.3
	Darkblotched	290.0	52.1	342.1
	Widow	2.1	0.1	2.2
	Bocaccio	0.0	51.0	51.0
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	2.9	2.9
Target	Sablefish	2026.3	557.0	2583.3
Species	Longspine	321.5	611.1	932.6
	Shortspine	1076.9	412.5	1489.4
	Dover	11117.9	2934.6	14052.5
	Arrowtooth	5686.5	51.3	5737.7
	Petrale	2133.7	343.9	2477.5
	Other Flat	643.0	717.0	1359.9
	Slope Rock	752.6	424.5	1177.1

<--- note for this alternative, consider a midwater yellowtail/widow fishery with the following impacts:

	mortality (mt)	retained	revenue
Yellowtail	1000	904.2	$ 1,020,631
Canary	9.6	6.1	$ 6,131
Darkblotched	0.9	0.9	$ 868
POP	0.0	0.0	$ 45
Widow	146.1	83.9	$ 81,194
			$ 1,108,869

Table 10. Management measures and predicted impacts for 2007-2008 limited entry bottom trawl fisheries under Rebuilding Alternative 4 and OY Alternative 2 for target species.

RCA Boundaries and Trip Limits to accomplish Rebuilding Species OY Alternative 4 & Target Species OY Alternative 2

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLE-FISH	LONG-SPINE	SHORT-SPINE	DOVER	OTHER FLAT	PETRALE	ARROW-TOOTH	SLOPE ROCK
N 40 10	1	0	150	14,000	22,000	8,000	75,000	130,000	140,000	120,000	12,000
	2	50	150	14,000	22,000	8,000	75,000	130,000	35,000	120,000	12,000
	3	60	150	17,000	24,000	8,000	70,000	130,000	35,000	120,000	12,000
	4	60	150	17,000	24,000	8,000	70,000	130,000	35,000	120,000	12,000
	5	50	150	17,000	24,000	8,000	70,000	130,000	35,000	120,000	12,000
	6	0	150	14,000	22,000	8,000	75,000	130,000	140,000	120,000	12,000
N 40 10	1	0	150	0	0	0	0	0	0	0	0
SFFT	2	50	150	9,000	3,000	3,000	24,000	40,000	30,000	40,000	12,000
	3	60	150	11,000	3,000	3,000	24,000	40,000	30,000	40,000	12,000
	4	60	150	11,000	3,000	3,000	24,000	40,000	30,000	40,000	12,000
	5	50	150	9,000	3,000	3,000	24,000	40,000	30,000	40,000	12,000
	6	0	150	0	0	0	0	0	0	0	0
38 40 10	1	75	150	15,500	23,000	8,000	75,000	130,000	140,000	10,000	20,000
	2	75	150	15,500	23,000	8,000	75,000	130,000	35,000	10,000	20,000
	3	75	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	20,000
	4	75	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	20,000
	5	75	150	15,500	23,000	8,000	70,000	130,000	35,000	10,000	20,000
	6	75	150	15,500	23,000	8,000	75,000	130,000	140,000	10,000	20,000
S 38	1	100	150	15,500	23,000	8,000	80,000	130,000	140,000	10,000	40,000
	2	100	150	15,500	23,000	8,000	80,000	130,000	35,000	10,000	40,000
	3	100	150	15,500	23,000	8,000	80,000	130,000	35,000	10,000	40,000
	4	100	150	15,500	23,000	8,000	80,000	130,000	35,000	10,000	40,000
	5	100	150	15,500	23,000	8,000	80,000	130,000	35,000	10,000	40,000
	6	100	150	15,500	23,000	8,000	80,000	130,000	140,000	10,000	40,000

Mortality of Rebuilding and Target Species in the LE Btwl Fishery (mt)

		North	South	Total
Rebuilding	Canary	2.1	2.6	4.7
Species	POP	194.3	0.0	194.3
	Darkblotched	331.5	53.2	384.7
	Widow	2.3	0.1	2.3
	Bocaccio	0.0	27.3	27.3
	Yelloweye	0.1	0.1	0.2
	Cowcod	0.0	0.8	0.8
Target	Sablefish	2060.5	556.7	2617.1
Species	Longspine	324.6	611.1	935.7
	Shortspine	964.2	366.7	1330.8
	Dover	10079.5	3255.6	13335.0
	Arrowtooth	3800.2	26.6	3826.9
	Petrale	1869.5	334.2	2203.8
	Other Flat	610.6	807.1	1417.7
	Slope Rock	752.6	424.5	1177.1

Table 11. Predicted impacts (mt) and exvessel revenues ($) for 2007-2008 limited entry whiting trawl fisheries by whiting trawl sector and a range of possible U.S. whiting OYs with no depth restrictions.

2007-2008 Pacific Whiting Alternatives

Estimated bycatch with no fm line restriction (mt)

U.S. Whiting OY (mt)	Sector	Allocations	Exvessel Rev	Canary	Darkblotched	POP	Widow	Yelloweye
349,790	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	75,070	8,771,497	4.5	6.3	1.3	38.8	0.0
	CP	106,349	12,426,287	1.0	8.4	4.0	67.4	0.0
	Shoreside	131,372	15,350,120	1.9	7.0	2.4	57.5	0.0
	Total	347,790	40,637,474	8.9	21.8	8.3	169.8	0.0
300,000	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	63,120	7,375,248	3.8	5.3	1.1	32.6	0.0
	CP	89,420	10,448,267	0.8	7.1	3.3	56.7	0.0
	Shoreside	110,460	12,906,683	1.6	5.9	2.0	48.3	0.0
	Total	298,000	34,819,768	7.8	18.3	7.1	143.7	0.0
250,000	Tribal	32,500	3,797,458	1.5	0.0	0.6	5.6	-
	Mothership	51,720	6,043,216	3.1	4.3	0.9	26.7	0.0
	CP	73,270	8,561,223	0.7	5.8	2.7	46.5	0.0
	Shoreside	90,510	10,575,628	1.3	4.8	1.6	39.6	0.0
	Total	248,000	28,977,525	6.5	15.0	5.9	118.4	0.0
200,000	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	40,920	4,781,292	2.5	3.4	0.7	21.2	0.0
	CP	57,970	6,773,497	0.5	4.6	2.2	36.8	0.0
	Shoreside	71,610	8,367,260	1.0	3.8	1.3	31.3	0.0
	Total	198,000	23,135,282	5.2	11.9	4.7	94.0	0.0
188,348	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	38,124	4,454,537	2.3	3.2	0.7	19.7	0.0
	CP	54,008	6,310,595	0.5	4.3	2.0	34.2	0.0
	Shoreside	66,716	7,795,440	0.9	3.6	1.2	29.2	0.0
	Total	186,348	21,773,806	5.0	11.1	4.4	87.9	0.0
120,000	Tribal	21,000	2,453,742	0.9	0.0	0.4	3.6	-
	Mothership	23,280	2,720,148	1.4	1.9	0.4	12.0	0.0
	CP	32,980	3,853,543	0.3	2.6	1.2	20.9	0.0
	Shoreside	40,740	4,760,260	0.6	2.2	0.7	17.8	0.0
	Total	118,000	13,787,693	3.2	6.8	2.8	54.4	0.0

Table 12. Predicted impacts (mt) and exvessel revenues ($) for 2007-2008 limited entry whiting trawl fisheries by whiting trawl sector and a range of possible U.S. whiting OYs with a 100 fm depth restriction.

2007-2008 Pacific Whiting Alternatives

Estimated bycatch with 100 fm line restriction (mt)

U.S. Whiting OY (mt)	Sector	Allocations	Exvessel Rev	Canary	Darkblotched	POP	Widow	Yelloweye
349,790	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	75,070	8,771,497	4.7	6.7	1.4	40.0	0.0
	CP	106,349	12,426,287	0.9	8.0	4.0	66.1	0.0
	Shoreside	131,372	15,350,120	3.4	11.8	4.9	95.5	0.0
	Total	347,790	40,637,474	10.6	26.6	10.9	207.6	0.0
300,000	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	63,120	7,375,248	4.0	5.7	1.2	33.6	0.0
	CP	89,420	10,448,267	0.8	6.7	3.3	55.6	0.0
	Shoreside	110,460	12,906,683	2.8	9.9	4.1	80.3	0.0
	Total	298,000	34,819,768	9.2	22.3	9.2	175.5	0.0
250,000	Tribal	32,500	3,797,458	1.5	0.0	0.6	5.6	-
	Mothership	51,720	6,043,216	3.3	4.6	0.9	27.5	0.0
	CP	73,270	8,561,223	0.6	5.5	2.7	45.5	0.0
	Shoreside	90,510	10,575,628	2.3	8.1	3.4	65.8	0.0
	Total	248,000	28,977,525	7.7	18.3	7.6	144.5	0.0
200,000	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	40,920	4,781,292	2.6	3.7	0.7	21.8	0.0
	CP	57,970	6,773,497	0.5	4.4	2.2	36.0	0.0
	Shoreside	71,610	8,367,260	1.8	6.4	2.7	52.1	0.0
	Total	198,000	23,135,282	6.1	14.5	6.1	114.6	0.0
188,348	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	38,124	4,454,537	2.4	3.4	0.7	20.3	0.0
	CP	54,008	6,310,595	0.5	4.1	2.0	33.6	0.0
	Shoreside	66,716	7,795,440	1.7	6.0	2.5	48.5	0.0
	Total	186,348	21,773,806	5.8	13.5	5.7	107.1	0.0
120,000	Tribal	21,000	2,453,742	0.9	0.0	0.4	3.6	-
	Mothership	23,280	2,720,148	1.5	2.1	0.4	12.4	0.0
	CP	32,980	3,853,543	0.3	2.5	1.2	20.5	0.0
	Shoreside	40,740	4,760,260	1.0	3.7	1.5	29.6	0.0
	Total	118,000	13,787,693	3.7	8.2	3.6	66.1	0.0

Table 13. Predicted impacts (mt) and exvessel revenues ($) for 2007-2008 limited entry whiting trawl fisheries by whiting trawl sector and a range of possible U.S. whiting OYs with a 125 fm depth restriction.

2007-2008 Pacific Whiting Alternatives

Estimated bycatch with 125 fm line restriction (mt)

U.S. Whiting OY (mt)	Sector	Allocations	Exvessel Rev	Canary	Darkblotched	POP	Widow	Yelloweye
349,790	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	75,070	8,771,497	6.1	5.5	1.6	35.5	0.0
	CP	106,349	12,426,287	0.7	7.2	2.4	67.6	0.0
	Shoreside	131,372	15,350,120	2.7	9.7	3.0	89.2	0.0
	Total	347,790	40,637,474	11.1	22.4	7.7	198.4	0.0
300,000	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	63,120	7,375,248	5.1	4.6	1.3	29.8	0.0
	CP	89,420	10,448,267	0.6	6.1	2.0	56.9	0.0
	Shoreside	110,460	12,906,683	2.3	8.1	2.5	75.0	0.0
	Total	298,000	34,819,768	9.6	18.9	6.5	167.8	0.0
250,000	Tribal	32,500	3,797,458	1.5	0.0	0.6	5.6	-
	Mothership	51,720	6,043,216	4.2	3.8	1.1	24.5	0.0
	CP	73,270	8,561,223	0.5	5.0	1.7	46.6	0.0
	Shoreside	90,510	10,575,628	1.9	6.7	2.1	61.5	0.0
	Total	248,000	28,977,525	8.0	15.5	5.4	138.1	0.0
200,000	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	40,920	4,781,292	3.3	3.0	0.9	19.3	0.0
	CP	57,970	6,773,497	0.4	3.9	1.3	36.9	0.0
	Shoreside	71,610	8,367,260	1.5	5.3	1.6	48.6	0.0
	Total	198,000	23,135,282	6.4	12.2	4.3	109.6	0.0
188,348	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	38,124	4,454,537	3.1	2.8	0.8	18.0	0.0
	CP	54,008	6,310,595	0.4	3.7	1.2	34.3	0.0
	Shoreside	66,716	7,795,440	1.4	4.9	1.5	45.3	0.0
	Total	186,348	21,773,806	6.1	11.4	4.1	102.4	0.0
120,000	Tribal	21,000	2,453,742	0.9	0.0	0.4	3.6	-
	Mothership	23,280	2,720,148	1.9	1.7	0.5	11.0	0.0
	CP	32,980	3,853,543	0.2	2.2	0.8	21.0	0.0
	Shoreside	40,740	4,760,260	0.8	3.0	0.9	27.7	0.0
	Total	118,000	13,787,693	3.9	7.0	2.6	63.3	0.0

Table 14. Predicted impacts (mt) and exvessel revenues ($) for 2007-2008 limited entry whiting trawl fisheries by whiting trawl sector and a range of possible U.S. whiting OYs with a 150 fm depth restriction.

2007-2008 Pacific Whiting Alternatives

Estimated bycatch with 150 fm line restriction (mt)

U.S. Whiting OY (mt)	Sector	Allocations	Exvessel Rev	Canary	Darkblotched	POP	Widow	Yelloweye
349,790	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	75,070	8,771,497	0.6	5.7	2.0	32.0	0.0
	CP	106,349	12,426,287	0.5	5.9	1.7	95.4	0.0
	Shoreside	131,372	15,350,120	0.6	9.9	3.5	57.5	0.0
	Total	347,790	40,637,474	3.4	21.5	7.9	190.9	0.0
300,000	Tribal	35,000	4,089,570	1.6	0.0	0.6	6.0	-
	Mothership	63,120	7,375,248	0.5	4.8	1.7	26.9	0.0
	CP	89,420	10,448,267	0.4	4.9	1.5	80.2	0.0
	Shoreside	110,460	12,906,683	0.5	8.4	2.9	48.3	0.0
	Total	298,000	34,819,768	3.1	18.1	6.7	161.5	0.0
250,000	Tribal	32,500	3,797,458	1.5	0.0	0.6	5.6	-
	Mothership	51,720	6,043,216	0.4	3.9	1.4	22.1	0.0
	CP	73,270	8,561,223	0.4	4.0	1.2	65.7	0.0
	Shoreside	90,510	10,575,628	0.4	6.8	2.4	39.6	0.0
	Total	248,000	28,977,525	2.7	14.8	5.6	133.0	0.0
200,000	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	40,920	4,781,292	0.3	3.1	1.1	17.5	0.0
	CP	57,970	6,773,497	0.3	3.2	0.9	52.0	0.0
	Shoreside	71,610	8,367,260	0.4	5.4	1.9	31.3	0.0
	Total	198,000	23,135,282	2.2	11.7	4.4	105.5	0.0
188,348	Tribal	27,500	3,213,234	1.2	0.0	0.5	4.8	-
	Mothership	38,124	4,454,537	0.3	2.9	1.0	16.3	0.0
	CP	54,008	6,310,595	0.3	3.0	0.9	48.4	0.0
	Shoreside	66,716	7,795,440	0.3	5.0	1.8	29.2	0.0
	Total	186,348	21,773,806	2.1	10.9	4.2	98.6	0.0
120,000	Tribal	21,000	2,453,742	0.9	0.0	0.4	3.6	-
	Mothership	23,280	2,720,148	0.2	1.8	0.6	9.9	0.0
	CP	32,980	3,853,543	0.2	1.8	0.5	29.6	0.0
	Shoreside	40,740	4,760,260	0.2	3.1	1.1	17.8	0.0
	Total	118,000	13,787,693	1.5	6.7	2.6	61.0	0.0

Table 15. Sablefish total catch (mt) allocations for 2007-2008 under sablefish OY Alternatives 1 and 2.

Overview of sablefish total catch allocations to fishery sectors for 2007 and 2008.

		N. of Conception OY Alt. 1 (mt)	N. of Conception OY Alt. 2 (mt)		
Total catch OY (mt)		4,411	5,723		
Tribal	Total catch allocated (mt)	441	572		
Compensation				These values were previously:	
research		48	86	53	53
Non-groundfish+rec		19	19		
Commercial total catch OY (mt)		3,903	5,046		

Commercial catch OY divided by gear

		OY Alt. 1	OY Alt. 2
OA	Total catch allocated (mt)	**367**	**474**
LE Trawl	Total catch allocated (mt)	2,051	2,651
	At-sea bycatch	53	53
	Shoreside total catch target	**1,998**	**2,598**
LE fixed-gear	Total catch allocated (mt)	**1,485**	**1,920**

Table 16. Sablefish primary fishery tier limits and projected bycatch of depleted species associated with all sablefish catch in the 2007-2008 limited entry fixed-gear and open access fisheries under draft Alternative 1 (sablefish OY Alternative 1 and status quo RCA).

Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'

LE FG	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch
Total catch allocated (mt)	**1,485**			
Observed sablefish discard rate	15.91%	14.89%	18.00%	
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%	
Assumed discard mortality (mt)	54			
Landed catch target (mt)	**1,431**			
Amount allocated to:				
DTL (mt)	215			
Primary fishery (mt)	**1,216**			
Primary fishery tier limits (lb)				
Tier 1	37,497	37,500		
Tier 2	17,044	17,000		
Tier 3	9,740	9,700		
Percent of total catch, by area	100%			
Percent of area catch, by gear		63.2%	36.9%	
Estimated distribution of total catch, by	1,485	938	547	
Bycatch ratios [2]				
Lingcod		0.368%	0.148%	
Widow rockfish		0.001%	0.000%	
Canary rockfish		0.036%	0.000%	
Yelloweye rockfish		0.081%	0.000%	
Bocaccio rockfish [4]		0.000%	0.000%	
Cowcod rockfish [4]		0.000%	0.000%	
Pacific ocean perch		0.018%	0.000%	
Darkblotched rockfish		0.045%	0.009%	
Projected bycatch impacts (mt)				
Lingcod		3.4	0.8	**4.3**
Widow rockfish		0.0	0.0	**0.0**
Canary rockfish		0.3	0.0	**0.3**
Yelloweye rockfish		0.8	0.0	**0.8**
Bocaccio rockfish [4]		0.0	0.0	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**
Pacific ocean perch		0.2	0.0	**0.2**
Darkblotched rockfish		0.4	0.0	**0.5**

Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'

OA	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch	
Total catch allocated (mt)	**367**				
Observed sablefish discard rate	15.91%	14.89%	18.00%		
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%		Total Landed Catch (mt)
Assumed discard mortality (mt)	13				
Landed catch target (mt)	**353**				**1,784**
Amount allocated to:					
DTL (mt)	53				
Percent of total catch, by area	100%				
Percent of area catch, by gear		63.2%	36.9%		
Estimated distribution of total catch, by	367	232	135		
Bycatch ratios [2]					
Lingcod		0.368%	0.148%		
Widow rockfish		0.001%	0.000%		
Canary rockfish		0.036%	0.000%		
Yelloweye rockfish		0.081%	0.000%		
Bocaccio rockfish [4]		0.000%	0.000%		
Cowcod rockfish [4]		0.000%	0.000%		
Pacific ocean perch		0.018%	0.000%		
Darkblotched rockfish		0.045%	0.009%		
					Total bycatch impacts (mt)
Projected bycatch impacts (mt)					
Lingcod		0.9	0.2	**1.1**	**5.3**
Widow rockfish		0.0	0.0	**0.0**	**0.0**
Canary rockfish		0.1	0.0	**0.1**	**0.4**
Yelloweye rockfish		0.2	0.0	**0.2**	**0.9**
Bocaccio rockfish [4]		0.0	0.0	**0.0**	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**	**0.0**
Pacific ocean perch		0.0	0.0	**0.0**	**0.2**
Darkblotched rockfish		0.1	0.0	**0.1**	**0.6**

[1] As in previous years, the rate of mortality for discarded sablefish in the fixed-gear fishery is assumed to be 20%.

[2] The bycatch ratios are calculated by dividing the total catch of each species by the total poundage of sablefish that was caught.

[4] Please note that the observer data on which these rates are based include no observations from south of Ft. Bragg, CA, so these are likely underestimates of true bycatch.

Table 17. Sablefish primary fishery tier limits and projected bycatch of depleted species associated with all sablefish catch in the 2007-2008 limited entry fixed-gear and open access fisheries under draft Alternative 2 (sablefish OY Alternative 2 and status quo RCA).

8,727,732 — Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'

LE FG	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch
Total catch allocated (mt)	**1,920**			
Observed sablefish discard rate	15.91%	14.89%	18.00%	
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%	
Assumed discard mortality (mt)	70			
Landed catch target (mt)	**1,850**			
Amount allocated to:				
DTL (mt)	277			
Primary fishery (mt)	**1,572**			
Primary fishery tier limits (lb)				
Tier 1	48,479	48,500		
Tier 2	22,036	22,000		
Tier 3	12,592	12,600		
Percent of total catch, by area	100%			
Percent of area catch, by gear		63.2%	36.9%	
Estimated distribution of total catch, by	1,920	1,212	708	
Bycatch ratios [2]				
Lingcod		0.368%	0.148%	
Widow rockfish		0.001%	0.000%	
Canary rockfish		0.036%	0.000%	
Yelloweye rockfish		0.081%	0.000%	
Bocaccio rockfish [4]		0.000%	0.000%	
Cowcod rockfish [4]		0.000%	0.000%	
Pacific ocean perch		0.018%	0.000%	
Darkblotched rockfish		0.045%	0.009%	
Projected bycatch impacts (mt)				
Lingcod		4.5	1.0	**5.5**
Widow rockfish		0.0	0.0	**0.0**
Canary rockfish		0.4	0.0	**0.4**
Yelloweye rockfish		1.0	0.0	**1.0**
Bocaccio rockfish [4]		0.0	0.0	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**
Pacific ocean perch		0.2	0.0	**0.2**
Darkblotched rockfish		0.6	0.1	**0.6**

2,156,015 — Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'

OA	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch	
Total catch allocated (mt)	**474**				
Observed sablefish discard rate	15.91%	14.89%	18.00%		
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%		Total Landed Catch (mt)
Assumed discard mortality (mt)	17				
Landed catch target (mt)	**457**				**2,307**
Amount allocated to:					
DTL (mt)	69				
Percent of total catch, by area	100%				
Percent of area catch, by gear		63.2%	36.9%		
Estimated distribution of total catch, by gea	474	300	175		
Bycatch ratios [2]					
Lingcod		0.368%	0.148%		
Widow rockfish		0.001%	0.000%		
Canary rockfish		0.036%	0.000%		
Yelloweye rockfish		0.081%	0.000%		
Bocaccio rockfish [4]		0.000%	0.000%		
Cowcod rockfish [4]		0.000%	0.000%		
Pacific ocean perch		0.018%	0.000%		
Darkblotched rockfish		0.045%	0.009%		
					Total bycatch impacts (mt)
Projected bycatch impacts (mt)					
Lingcod		1.1	0.3	**1.4**	**6.9**
Widow rockfish		0.0	0.0	**0.0**	**0.0**
Canary rockfish		0.1	0.0	**0.1**	**0.5**
Yelloweye rockfish		0.2	0.0	**0.2**	**1.2**
Bocaccio rockfish [4]		0.0	0.0	**0.0**	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**	**0.0**
Pacific ocean perch		0.1	0.0	**0.1**	**0.3**
Darkblotched rockfish		0.1	0.0	**0.2**	**0.8**

[1] As in previous years, the rate of mortality for discarded sablefish in the fixed-gear fishery is assumed to be 20%.

[2] The bycatch ratios are calculated by dividing the total catch of each species by the total poundage of sablefish that was caught.

[4] Please note that the observer data on which these rates are based include no observations from south of Ft. Bragg, CA, so these are likely underestimates of true bycatch.

Table 18. Sablefish primary fishery tier limits and projected bycatch of depleted species associated with all sablefish catch in the 2007-2008 limited entry fixed-gear and open access fisheries under draft Alternative 3 (sablefish OY Alternative 1 and the northern RCA seaward boundary extended to 150 fm).

LE FG	Seaward boundary of RCA at 150 fm North of 40o10' and at 150 fm South of 40°10'			
	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch
Total catch allocated (mt)	**1,485**			
Observed sablefish discard rate	15.91%	14.89%	18.00%	
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%	
Assumed discard mortality (mt)	54			
Landed catch target (mt)	**1,431**			
Amount allocated to:				
DTL (mt)	215			
Primary fishery (mt)	**1,216**			
Primary fishery tier limits (lb)				
Tier 1	37,497	37,500		
Tier 2	17,044	17,000		
Tier 3	9,740	9,700		
Percent of total catch, by area	100%			
Percent of area catch, by gear		63.2%	36.9%	
Estimated distribution of total catch, by	1,485	938	547	
Bycatch ratios [2]				
Lingcod		0.228%	0.272%	
Widow rockfish		0.000%	0.000%	
Canary rockfish		0.008%	0.000%	
Yelloweye rockfish		0.030%	0.000%	
Bocaccio rockfish [4]		0.000%	0.000%	
Cowcod rockfish [4]		0.000%	0.000%	
Pacific ocean perch		0.017%	0.000%	
Darkblotched rockfish		0.068%	0.018%	
Projected bycatch impacts (mt)				
Lingcod		2.1	1.5	**3.6**
Widow rockfish		0.0	0.0	**0.0**
Canary rockfish		0.1	0.0	**0.1**
Yelloweye rockfish		0.3	0.0	**0.3**
Bocaccio rockfish [4]		0.0	0.0	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**
Pacific ocean perch		0.2	0.0	**0.2**
Darkblotched rockfish		0.6	0.1	**0.7**

OA	Seaward boundary of RCA at 150 fm North of 40o10' and at 150 fm South of 40°10'				
	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch	
Total catch allocated (mt)	**367**				
Observed sablefish discard rate	15.91%	14.89%	18.00%		
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%		Total Landed Catch (mt)
Assumed discard mortality (mt)	13				
Landed catch target (mt)	**353**				**1,784**
Amount allocated to:					
DTL (mt)	53				
Percent of total catch, by area	100%				
Percent of area catch, by gear		63.2%	36.9%		
Estimated distribution of total catch, by g	367	232	135		
Bycatch ratios [2]					
Lingcod		0.228%	0.272%		
Widow rockfish		0.000%	0.000%		
Canary rockfish		0.008%	0.000%		
Yelloweye rockfish		0.030%	0.000%		
Bocaccio rockfish [4]		0.000%	0.000%		
Cowcod rockfish [4]		0.000%	0.000%		
Pacific ocean perch		0.017%	0.000%		
Darkblotched rockfish		0.068%	0.018%		
Projected bycatch impacts (mt)					Total bycatch impacts (mt)
Lingcod		0.5	0.4	**0.9**	**4.5**
Widow rockfish		0.0	0.0	**0.0**	**0.0**
Canary rockfish		0.0	0.0	**0.0**	**0.1**
Yelloweye rockfish		0.1	0.0	**0.1**	**0.3**
Bocaccio rockfish [4]		0.0	0.0	**0.0**	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**	**0.0**
Pacific ocean perch		0.0	0.0	**0.0**	**0.2**
Darkblotched rockfish		0.2	0.0	**0.2**	**0.9**

[1] As in previous years, the rate of mortality for discarded sablefish in the fixed-gear fishery is assumed to be 20%.

[2] The bycatch ratios are calculated by dividing the total catch of each species by the total poundage of sablefish that was caught.

[4] Please note that the observer data on which these rates are based include no observations from south of Ft. Bragg, CA, so these are likely underestimates of true bycatch.

Table 19. Sablefish primary fishery tier limits and projected bycatch of depleted species associated with all sablefish catch in the 2007-2008 limited entry fixed-gear and open access fisheries under draft Alternative 4 (sablefish OY Alternative 2 and the northern RCA seaward boundary extended to 150 fm).

8,727,732	Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'			
LE FG	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch
Total catch allocated (mt)	**1,920**			
Observed sablefish discard rate	15.91%	14.89%	18.00%	
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%	
Assumed discard mortality (mt)	70			
Landed catch target (mt)	**1,850**			
Amount allocated to:				
DTL (mt)	277			
Primary fishery (mt)	**1,572**			
Primary fishery tier limits (lb)				
Tier 1	48,479	48,500		
Tier 2	22,036	22,000		
Tier 3	12,592	12,600		
Percent of total catch, by area	100%			
Percent of area catch, by gear		63.2%	36.9%	
Estimated distribution of total catch, by	1,920	1,212	708	
Bycatch ratios [2]				
Lingcod		0.228%	0.272%	
Widow rockfish		0.000%	0.000%	
Canary rockfish		0.008%	0.000%	
Yelloweye rockfish		0.030%	0.000%	
Bocaccio rockfish [4]		0.000%	0.000%	
Cowcod rockfish [4]		0.000%	0.000%	
Pacific ocean perch		0.017%	0.000%	
Darkblotched rockfish		0.068%	0.018%	
Projected bycatch impacts (mt)				
Lingcod		2.8	1.9	**4.7**
Widow rockfish		0.0	0.0	**0.0**
Canary rockfish		0.1	0.0	**0.1**
Yelloweye rockfish		0.4	0.0	**0.4**
Bocaccio rockfish [4]		0.0	0.0	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**
Pacific ocean perch		0.2	0.0	**0.2**
Darkblotched rockfish		0.8	0.1	**0.9**

2,156,015	Seaward boundary of RCA at 100 fm North of 40o10' and at 150 fm South of 40°10'			
OA	Coastwide summary	Gear rates and bycatch Longline	Pot	Combined bycatch
Total catch allocated (mt)	**474**			
Observed sablefish discard rate	15.91%	14.89%	18.00%	
Discard mortality percentage of landed mt + discarded mt	3.65%	3.39%	4.207%	
Assumed discard mortality (mt)	17			
Landed catch target (mt)	**457**			
Amount allocated to:				
DTL (mt)	69			
Percent of total catch, by area	100%			
Percent of area catch, by gear		63.2%	36.9%	
Estimated distribution of total catch, by gea	474	300	175	
Bycatch ratios [2]				
Lingcod		0.228%	0.272%	
Widow rockfish		0.000%	0.000%	
Canary rockfish		0.008%	0.000%	
Yelloweye rockfish		0.030%	0.000%	
Bocaccio rockfish [4]		0.000%	0.000%	
Cowcod rockfish [4]		0.000%	0.000%	
Pacific ocean perch		0.017%	0.000%	
Darkblotched rockfish		0.068%	0.018%	
Projected bycatch impacts (mt)				
Lingcod		0.7	0.5	**1.2**
Widow rockfish		0.0	0.0	**0.0**
Canary rockfish		0.0	0.0	**0.0**
Yelloweye rockfish		0.1	0.0	**0.1**
Bocaccio rockfish [4]		0.0	0.0	**0.0**
Cowcod rockfish [4]		0.0	0.0	**0.0**
Pacific ocean perch		0.1	0.0	**0.1**
Darkblotched rockfish		0.2	0.0	**0.2**

	Total
Total Landed Catch (mt)	**2,307**
Total bycatch impacts (mt)	
Lingcod	**5.9**
Widow rockfish	**0.0**
Canary rockfish	**0.1**
Yelloweye rockfish	**0.4**
Bocaccio rockfish [4]	**0.0**
Cowcod rockfish [4]	**0.0**
Pacific ocean perch	**0.3**
Darkblotched rockfish	**1.2**

[1] As in previous years, the rate of mortality for discarded sablefish in the fixed-gear fishery is assumed to be 20%.

[2] The bycatch ratios are calculated by dividing the total catch of each species by the total poundage of sablefish that was caught.

[4] Please note that the observer data on which these rates are based include no observations from south of Ft. Bragg, CA, so these are likely underestimates of true bycatch.

Table 20. Summary of predicted impacts (mt) and sablefish exvessel revenues ($) for draft Alternatives 1-4 for the 2007-2008 primary sablefish fishery.

	Draft Alternative 1	Draft Alternative 2	Draft Alternative 3	Draft Alternative 4
	100 fm North: 150 fm South[1]		150 fm North: 150 fm South[2]	
Sablefish 2007 - 08	**OY Alt 1**	**OY Alt 2**	**OY Alt 1**	**OY Alt 2**
Total catch OY (mt)	4411	5723	4411	5723
Landed Catch (mt)	1784	2307	1784	2307
Exvessel Revenue (USD)[3]	$8,418,257	$10,883,747	$8,418,257	$10,883,747
Projected bycatch impacts (mt)	5.31	6.87	4.52	5.85
Lingcod	0.01	0.02	0.00	0.00
Widow rockfish	0.42	0.54	0.10	0.13
Canary rockfish	0.95	1.23	0.35	0.45
Yelloweye rockfish	0.00	0.00	0.00	0.00
Bocaccio rockfish	0.00	0.00	0.00	0.00
Cowcod rockfish	0.22	0.28	0.20	0.26
Pacific ocean perch	0.59	0.76	0.91	1.18
Darkblotched rockfish	0.00	0.00	0.00	0.00

[1]Seaward boundary of RCA at 100 fm North of 40°10' and at 150 fm South of 40°10'
[2]Seaward boundary of RCA at 150 fm North of 40°10' and at 150 fm South of 40°10'
[3]Only revenue from sablefish considered. Price per lb for sablefish assumed to be $2.14 .

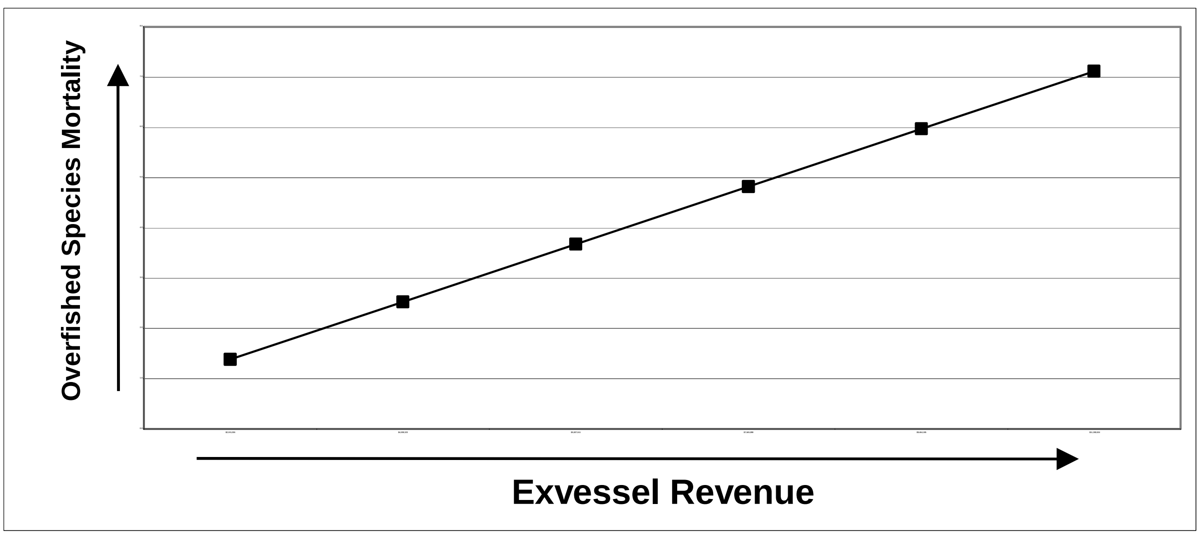


Table 21. Summary of predicted exvessel revenues (mt) from sablefish vs. depleted species impacts (mt) in the 2007-2008 primary sablefish fisheries.

Revenue	Lingcod 2/	Widow rockfish	Canary rockfish	Yelloweye rockfish	Bocaccio rockfish 4	Cowcod rockfish 4	Pacific ocean perch	Darkblotched rockfish
$ 8,727,732	5.51	0.01	0.44	0.98	0	0	0.224994803	0.613273169

Exvessel Revenue	Lingcod	Widow	Canary	Yelloweye	Bocaccio	Cowcod	Pacific Ocean Perch	Darkblotched
$ 2,191,036	1.4	0.003	0.110	0.247	0.000	0.000	0.000	0.154
$ 4,009,323	2.5	0.006	0.201	0.451	0.000	0.000	0.000	0.282
$ 5,827,611	3.7	0.008	0.292	0.656	0.000	0.000	0.000	0.409
$ 7,645,898	4.8	0.011	0.383	0.861	0.000	0.000	0.000	0.537
$ 9,464,185	6.0	0.013	0.474	1.065	0.000	0.000	0.000	0.665
$ 11,280,824	7.1	0.016	0.565	1.270	0.000	0.000	0.000	0.793

2/ Lingcod is no longer a depleted species.

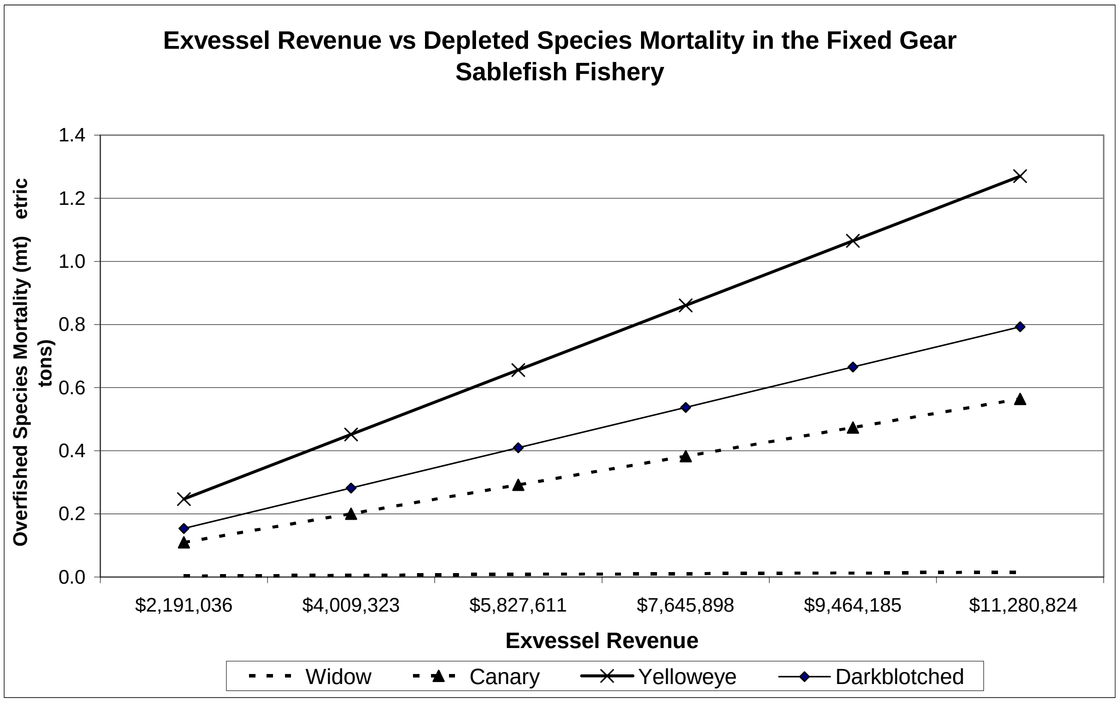


Table 22. The GMT model for estimating discard mortality in nearshore commercial fisheries.

Area	Species	All depths: landed mt	All depths: retention rate	All depths: catch mt	0 - 10 fm: % of total catch	0 - 10 fm: stratum catch mt	0 - 10 fm: gross discard %	0 - 10 fm: discard mortality %	0 - 10 fm: discard mortality mt	0 - 10 fm: stratum mortality mt	11 - 20 fm: % of total catch	11 - 20 fm: stratum catch mt	11 - 20 fm: gross discard %	11 - 20 fm: gross discard mt	11 - 20 fm: discard mortality %	11 - 20 fm: discard mortality mt	11 - 20 fm: stratum mortality mt
South																	
	Shallow nearshore species	**42.5**	71%	60	81%	49	24%	15%	1.8	39	18%	11	52%	6	45%	2.5	8
	Deeper nearshore species	**38.25**	84%	46	43%	20	17%	10%	0.3	17	53%	24	13%	3	40%	1.2	22
	Cabezon	**38.25**	70%	55	97%	53	29%	7%	1.1	39	2%	1	72%	1	7%	0.1	0
	Kelp Greenling	**2.55**	38%	7	98%	7	62%	7%	0.3	3	1%	0	87%	0	7%	0.0	0
	All nearshore groundfish	122	74%	165	78%	128	27%	10%	3.5	97	22%	36	27%	10	39%	3.8	30
North																	
	Black Rockfish	**75.25**	99%	76	47%	36	2%	10%	0.1	35	50%	38	1%	0	40%	0.2	38
	Blue Rockfish	**4.3**	86%	5	26%	1	16%	10%	0.0	1	69%	3	12%	0	40%	0.2	3
	Other minor nearshore rockfish	**4.3**	96%	4	55%	2	6%	20%	0.0	2	35%	2	5%	0	50%	0.0	2
	Cabezon	**12.9**	79%	16	36%	6	21%	7%	0.1	5	60%	10	21%	2	7%	0.1	8
	Kelp Greenling	**9.89**	80%	12	37%	5	23%	7%	0.1	4	59%	7	18%	1	7%	0.1	6
	All nearshore groundfish	106.64	94%	114	44%	50	7%	8%	0.3	47	53%	61	7%	4	14%	0.6	57

Area	Species	21 - 50 fm: % of total catch	21 - 50 fm: stratum catch mt	21 - 50 fm: gross discard %	21 - 50 fm: discard mortality %	21 - 50 fm: discard mortality mt	21 - 50 fm: stratum mortality mt	0 - 50 fm: mortality from: landing mt	0 - 50 fm: mortality from: discard mt	0 - 50 fm: mortality from: total mt	0 - 50 fm: discard as a percentage of mortality
South											
	Shallow nearshore species	1%	1	60%	100%	0.4	1	43	4.6	47.1	9.8%
	Deeper nearshore species	4%	2	60%	100%	1.1	2	38	2.7	40.9	6.5%
	Cabezon	0%	0	75%	7%	0.0	0	38	1.2	39.4	2.9%
	Kelp Greenling	1%	0	90%	7%	0.0	0	3	0.3	2.8	10.4%
	All nearshore groundfish	2%	3	61%	91%	1.5	2	122	8.7	130.3	6.7%
North											
	Black Rockfish	2%	2	0%	100%	0.0	2	75	0.2	75.5	0.3%
	Blue Rockfish	5%	0	14%	100%	0.0	0	4	0.2	4.5	4.9%
	Other minor nearshore rockfish	10%	0	2%	100%	0.0	0	4	0.1	4.4	1.8%
	Cabezon	4%	1	20%	7%	0.0	1	13	0.2	13.1	1.8%
	Kelp Greenling	3%	0	14%	7%	0.0	0	10	0.2	10.1	1.7%
	All nearshore groundfish	3%	4	7%	24%	0.1	3	107	0.9	107.6	0.9%

Table 23. Estimated bycatch (mt) of depleted groundfish species and lingcod associated with landed catch of nearshore commercial species.

	0 - 10 fm	11 - 20 fm	21 - 50 fm		Estimated bycatch 0 - 10 fm	11 - 20 fm	21 - 50 fm	0 - 50 fm
South								
Landed nearshore mt	94	27	1.0					
Rebuilding species		*Bycatch rates*						
Canary	0.01%	1.76%	1.76%		0.01	0.47	0.02	0.50
disc. mort. (%:mt)	10%	55%	100%		0.00	0.26	0.02	**0.28**
Lingcod								
catch (%:mt)	23.40%	33.77%	33.77%		21.96	9.00	0.34	31.30
landed (%:mt)	58%	44%	55%		12.74	3.96	0.19	16.88
discard (%:mt)	42%	56%	45%		9.22	5.04	0.16	14.42
disc. mort. (%:mt)	7%	7%	7%		0.65	0.35	0.01	1.01
total mortality					13.38	4.31	0.20	**17.89**
North								
Landed nearshore mt	47	56	3					
Rebuilding species		*Bycatch rates*						
Canary	0.41%	1.65%	5.34%		0.19	0.93	0.18	1.30
disc. mort. (%:mt)	10%	55%	100%		0.02	0.51	0.18	**0.71**
Widow	0.02%	0.02%	0.17%		0.01	0.01	0.01	**0.03**
Yelloweye	0.14%	1.11%	9.40%		0.07	0.62	0.31	1.01
disc. mort. (%:mt)	50%	90%	100%		0.03	0.56	0.31	**0.91**
Lingcod								
catch (%:mt)	27.59%	36.70%	73.09%		12.95	20.68	2.45	36.08
landed (%:mt)	57%	60%	85%		7.38	12.41	2.08	21.87
discard (%:mt)	43%	40%	15%		5.57	8.27	0.37	14.21
disc. mort. (%:mt)	7%	7%	7%		0.39	0.58	0.03	0.99
total mortality					7.77	12.99	2.10	**22.86**

Table 24. Predicted impacts (mt) of select groundfish species and exvessel revenues ($) by alternative depth restrictions and allocations in 2007-2008 nearshore commercial fisheries in Oregon and California.

Note that the 50 fm limit shown in this table is based on the WCGOP report, "Data Report and Summary Analyses of Open Access Fixed-Gear Fisheries in Waters Less than 50 Fathoms May 2005" (available online at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/nearshore/datareport_nearshore_may2005.cfm). South of 40o10', the nearshore fishery was restricted to shallower than 20-30 fm throughout the period in which data were collected.

	Total Mortality (mt) and Exvessel Value (USD)		Alternative 1, 0 - 50 Fathoms 5% S, 40% N Black Rockfish Only		Alternative 2, 0 - 50 Fathoms 12% S, 80% N Black Rockfish Only		Alternative 3, 0 - 50 Fathoms 15% S, 57% N Equal Across Sp	
South	Variable	Status Quo	mt or USD	% Reduction	mt or USD	% Reduction	mt or USD	% Reduction
	Shallow nearshore species	55	53	5%	49	12%	47	15%
	Deeper nearshore species	48	46	5%	42	12%	41	15%
	Cabezon	46	44	5%	41	12%	39	15%
	Kelp Greenling	3	3	5%	3	12%	3	15%
	Canary	0.33	0.31	5%	0.29	12%	0.28	15%
	Exvessel Value	1,718,545	1,632,618	5%	1,512,320	12%	1,460,764	15%
North								
	Black Rockfish	176	105	40%	35	80%	75	57%
	Blue Rockfish	11	11	0%	11	0%	5	57%
	Other minor nearshore rockfish	10	10	0%	10	0%	4	57%
	Cabezon	31	31	0%	31	0%	13	57%
	Kelp Greenling	23	23	0%	23	0%	10	57%
	Canary	1.65	1.22	26%	0.80	51%	0.71	57%
	Yelloweye	2.12	1.59	25%	1.05	50%	0.91	57%
	Widow	0.07	0.05	27%	0.03	54%	0.03	57%
	Exvessel Value	1,128,082	907,400	20%	686,717	39%	485,075	57%
Total	Canary	1.97	1.53	22%	1.09	45%	0.98	50%
	Yelloweye	2.12	1.59	25%	1.05	50%	0.91	57%
	Widow	0.07	0.05	27%	0.03	54%	0.03	57%
	Exvessel Value	2,846,627	2,540,018	11%	2,199,037	23%	1,945,839	32%

	Total Mortality (mt) and Exvessel Value (USD)		Alternative 4, 0 - 20 Fathoms 0% S, 10% N Black Rockfish Only		Alternative 5, 0 - 20 Fathoms 15% S, 60% N Black Rockfish Only		Alternative 5, 0 - 20 Fathoms 0% S, 100% N Black Rockfish Only	
South	Variable	Status Quo	mt or USD	% Reduction	mt or USD	% Reduction	mt or USD	% Reduction
	Shallow nearshore species	55	55	1%	47	16%	55	1%
	Deeper nearshore species	48	47	3%	40	17%	47	3%
	Cabezon	46	46	0%	39	15%	46	0%
	Kelp Greenling	3	3	0%	3	15%	3	0%
	Canary	0.33	0.30	7%	0.26	21%	0	7%
	Exvessel Value	1,718,545	1,718,545	0%	1,460,764	15%	1,718,545	0%
North								
	Black Rockfish	176	158	10%	70	60%	0	100%
	Blue Rockfish	11	10	1%	10	1%	10	1%
	Other minor nearshore rockfish	10	10	0%	10	0%	10	0%
	Cabezon	31	31	0%	31	0%	31	0%
	Kelp Greenling	23	23	0%	23	0%	23	0%
	Canary	1.65	1.17	29%	0.72	56%	0.37	78%
	Yelloweye	2.12	1.32	38%	0.81	62%	0.41	81%
	Widow	0.07	0.05	24%	0.03	53%	0.02	76%
	Exvessel Value	1,128,082	1,072,911	5%	797,058	29%	576,376	49%
Total	Canary	1.97	1.47	25%	0.98	50%	0.67	66%
	Yelloweye	2.12	1.32	38%	0.81	62%	0.41	81%
	Widow	0.07	0.05	24%	0.03	53%	0.02	76%
	Exvessel Value	2,846,627	2,791,457	2%	2,257,822	21%	2,294,921	19%

Extra percent reduction is from depth restriction.

Agenda Item F.5.c
Supplemental GAP Report
April 2006

GROUNDFISH ADIVSORY SUBPANEL COMMENTS ON
MANAGEMENT MEASURES FOR 2007-2008 FISHERIES

The Groundfish Advisory Subpanel (GAP) reviewed available portions of the Groundfish Management Team (GMT) report (scorecard, California recreational regulations, and Attachment 1) this morning (April 7, 2006) and does not object to using the GMT recommendations to create a range of options to be analyzed for the June 2006 meeting.

In general,

- for nontrawl and recreational gears north of 40º10' north latitude the most constraining species is yelloweye rockfish;
- for nontrawl and recreational gears south of 40º10' north latitude to 34º27' north latitude the most constraining species are canary rockfish and bocaccio; and
- South of 34º27' north latitude, bocaccio are constraining.

Limited Entry Trawl Whiting

The non-tribal whiting sectors discussed several management measures in an attempt to achieve the Council's proposed lower optimum yield (OY) values. It is a fact that over recent years the whiting fishery, through its own initiative and in cooperation with fishery managers, has developed rational methods to provide flexibility while prosecuting the fishery. This has resulted in a well-managed fishery, documented decreases in bycatch, and increased efficiency in production and marketing. Under the proposed lower OY values, all of these cooperative efforts and the worthwhile progress will be lost. Under the proposed higher OY values, whiting fishery sectors would likely be able to adapt and continue to operate as in past years.

To inform Council decision making regarding the proposed lower OY values, a variety of management measures were considered, including: equal season start date, depth-based management restrictions, sector specific bycatch caps, and a lottery. All measures except one were rejected for the following reasons.

Equal Start Date

An equal start date for all non-tribal sectors was suggested as a way to "level" the playing field. A tremendous race for fish would occur, negating progress the industry has made in reducing bycatch. Each sector currently has competing objectives for beginning their fishery at different times. Competitive behaviors as well as safety issues would be exacerbated with equal start seasons. A fair resolution to these competing objectives does not exist and the measure was rejected.

Depth-Based Restrictions

Consideration of depth-based restrictions such as a whiting conservation area were considered and rejected. This type of measure is extremely allocative and again removes flexibility to prosecute the fishery through the self-rationalization measures taken by the industry in recent years

Lottery

Discussion of a lottery system for the three sectors was considered. The lottery would allow each sector to fish one out of three years. This idea was rejected as not feasible based on potential for huge transfers of idle capacity to other sectors and fisheries and the volatility of the whiting markets.

Sector Specific Bycatch Caps

The only measure which seems remotely practicable is proportional reductions that are then divided between sectors based on their whiting allocation.

Allocated Caps

We then focused our discussion on three constraining species for the whiting fishery and proceeded as if the caps were allocated between sectors based on the whiting allocation. All of these species are continuing to rebuild. We are concerned that increases in biomasses of overfished species being rebuilt will result in increased incidental catch rates and more rapid achievement of the lower OY limits.

Canary Rockfish

An OY of 32 mt for canary rockfish results in 2.86 mt being available for the total non-tribal whiting fishery. Using the current sectoral whiting allocations this works out to:
0.69 mt for motherships, 1.2 mt for shoreside, and 0.97 mt for catcher processors. Under this scenario we estimate losses of up to 50% of the shoreside fishery. This is based on catches from 2005. This represents $5 million dollars ex-vessel revenue based on a $0.05 per pound price. Using the common multiplier effects this results in a loss of $12,500,000 to the community overall.

Widow Rockfish

An OY of 120 mt for widow rockfish results in approximately 55 mt available to the non-tribal whiting fishery. Based on 2005 catches, under any scenario the whiting fishery as a whole estimates seasons no longer then 7 to 10 days resulting in a loss of 80% of the overall fishery. This results in a $23 million dollar loss at the ex-vessel level.

Darkblotched Rockfish

An OY of 130 mt for darkblotched rockfish could result in approximately 10 mt being available to the entire non-tribal whiting fishery. With this level of darkblotched rockfish available, we estimate a 40% loss to the entire fishery – this equates to $11,600,000 lost at the ex-vessel level. These estimates are based on 2005 catch levels.

Limited Entry Trawl

The GAP worked with the GMT on the trawl limited entry trip limit tables and concurs with the recommended options in the GMT report.

Limited Entry Fixed Gear

Move the outside boundary of the Rockfish Conservation Area (RCA) to 150 fm for the primary and DTL fishery and move the inside line to 20 fm. The GAP concurs with analysis the range of options in the GMT report.

North 40º10' North Latitude Commercial Open Access

High OY: For open access for 2007-2008 we propose a status quo year-round fishery which would result in a total mortality of 2.12 metric tons of yelloweye rockfish, which coincides with the historic share from 2005, when 20 mt was taken coast wide.

Low OY: In the case of a 12 mt yellow rockfish OY, the northern open access year-round fishery could be moved into 20 fathoms with a 10% reduction of other minor nearshore rockfish resulting in an expected mortality of 1.27 mt.

Compounding Effects to Consider

The least economically damaging way to reduce impacts on yelloweye rockfish is to move the 30 fm line to 20 fm. This results in a greater than needed reduction (i.e. from 2.12 mt to 1.39 mt) due to reduced mortality rate. The target of open access under a 17 mt OY and proportion reductions across all sectors should be 1.78.

If limited entry blackcod fishery is moved out to 150 fm to protect yelloweye rockfish and the line for the open access DTL fishery is also moved to 150 fm, as would be expected, this would result in an 0.2 additional savings in yelloweye rockfish for the open access fishery. The result from these two actions would be an expected mortality of only 1.19, i.e. .59 mt more than would be necessary.

Washington Dogfish

Northern Washington fixed gear the management measure of 150 fathom RCA would eliminate the dogfish fishery and would have detrimental affects to the market and affect the Puget Sound dogfish fishery.

A management measure defining yelloweye rockfish hotspots, as an estimate, would reduce the dogfish fishery by 50%. The GMT might consider whether the compounding effects previously described that result in greater than needed savings would eliminate the need for such hotspot management.

North 40º10' North Latitude Recreational

Washington Recreational

Washington State proposal for recreational fishery for the **low OY** scenario, use the 2006 season specification, eliminate the halibut fishery and close offshore of 20 fathoms as an inseason action. For **high OY** option use the 2006 season specifications for status quo.

Oregon Recreational

Oregon recreational conceptually agrees with hotspot protection for yelloweye rockfish.

Northern California

For the low OY option analyze a 7 month fishery open to 20 fm.

40º10’ North Latitude to 34º 27’ North Latitude

Recreational

40º10’ North Latitude to 36º North Latitude

For the low OY option analyze a 6 month fishery open to 20 fm.

36º North Latitude to 34º27’ North Latitude

For the low OY option analyze a 6 month fishery open to 30 fm.

Commercial

High OY: Open access supports status quo, and status quo for directed and incidental groundfish mortality impacts for overfished species.

Low OY: Directed open access: Change the DTL from 5,000 bimonthly to 3,600 bimonthly. Leave the 300 lbs per day and 1,000 pound per week limits in place.

South of 34º27’ North Latitude Commercial and Recreational

High OY: Status Quo

Low OY: California south of 34º27’ north latitude (Conception), with a 40 ton bocaccio OY, the RCA would be moved from 60 fathoms to 20 fathoms to negate impacts to bocaccio and still ensure a year round fishery.

It would increase the impact to nearshore stocks, radically decrease the opportunity to catch valued shelf rockfish species such as vermilion which lead to passenger discontent due to limited access to shelf species, and they could not sell a ticket. With a 40 ton OY, Commercial impact would basically eliminate access to valued shelf rockfish species and force more focus on nearshore rockfish.

PFMC
04/07/06

Agenda Item F.5.c.
Supplemental GMT Report
April 2006

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON
2007-08 GROUNDFISH MANAGEMENT MEASURES

Under agenda item F.1., the Council adopted preferred ABCs and OYs for all non-overfished species, as well as high and low OY alternatives for overfished species. Since 2000, management measures for target groundfish fisheries have been shaped and constrained by the need to reduce incidental interception of overfished species. The GMT received guidance from the GAP on shaping season structure in the commercial and recreational fisheries under either the high or low overfished species OY alternatives.

Based on the range of ABCs and OYs that the Council adopted, and in collaboration with the GAP, the GMT drafted a suite of potential management measures to address the high and low overfished species OY alternatives. The GMT notes that, given the magnitude of the catch restrictions associated with the low overfished species OY alternative, there is no buffer for uncertainty included, which the GMT had identified as needed for 2007-08 management in its report under agenda item F.1. The low overfished species OY also does not allow any EFPs to be conducted in 2007-2008, and it reduces the amount of yelloweye rockfish available for research. The GMT also notes that the yelloweye rockfish OY ramp-down strategy will require management agencies to monitor 2007 fisheries to determine whether additional restrictive measures are needed for 2008 fisheries in order to constrain them within the lower 2008 OY.

The GMT discussed strategies for achieving annual reductions in the yelloweye OY that will result from the ramp-down strategy the Council selected as their preferred alternative. The GMT recognizes that this strategy relies on management tools that have not yet been developed, and that future research is necessary to develop tools that will achieve OY reductions without having dramatic economic consequences to fishing communities. GMT members have discussed a research approach for developing these tools and include ideas such as gear research, area-based research on yelloweye bycatch, area-based research on habitat areas where yelloweye may reside, and working with industry members to identify other possible methods for decreasing the catch of yelloweye rockfish. While it is unknown at this time which tools will achieve the necessary reductions in the OY, members of the GMT have pledged to work with state agencies, federal agencies, and industry members to develop the best suite of tools for achieving the OY reductions included in the Councils preferred alternative. The GMT notes that some of this work has already been initiated, for example, Oregon and Washington have proposed - and California is considering - new Yelloweye Rockfish Conservation Areas as part of the 2007-2008 proposed management specifications.

In drafting suites of potential management measures, the GMT assumed that the estimated overfished species catch amounts for the following fisheries would remain unchanged:

- tribal fisheries;
- incidental groundfish catch in these fisheries -- California halibut fisheries, California gillnet, California sheephead, coastal pelagics wetfish and squid, Dungeness crab, highly migratory species, pink shrimp, ridgeback prawn, salmon troll, sea cucumber trawl, spot prawn.

Pacific halibut fisheries are managed to keep overfished groundfish species bycatch as close to zero as possible, which requires a variety of management measures, particularly area closures.

Further details on the management measures proposed for analysis are also provided in tribal recommendations and state reports and briefing book attachments, and 5 attachments to this report.

Creation of New Management Lines, Conservation Areas, and Fishing Areas

To draft management measures for both of the Council's OY alternatives, the GMT plans to analyze several closures that would move fisheries shoreward of relatively shallow boundary lines (10-15-20-25 fm). At its May meeting, the GMT will discuss whether any of these lines need to be defined by coordinates in Federal regulations. The GMT also plans a general review of RCA boundary lines for mistakes in coordinates.

The States of Washington and Oregon are drafting potential new Yelloweye Rockfish Conservation Areas and plan to bring analysis on the effects of implementing those areas restrictions to the May GMT meeting. California is considering a Yelloweye Rockfish Conservation Area for the area north of 40°10' N. lat., a Darkblotched Rockfish Conservation Area for the area north of 38° N. lat., and potential Canary Rockfish Conservation Areas in Federal waters off California. California is also proposing to analyze modifications to the boundaries of the Cowcod Conservation Areas. CDFG plans to bring analyses of the effects of implementing these areas to the May GMT meeting.

Amendment 18 to the FMP introduced Groundfish Fishing Areas as a potential management tool. These would be bounded geographic areas where fishing for a particular species or species group could be concentrated because it is an area of high abundance for target species and low abundance for overfished species. California is drafting 3-4 potential new Groundfish fishing areas for flatfish, one area off northern California between Eureka and Crescent City, and three areas between Point Reyes and Santa Cruz. CDFG plans to bring analyses of the effects of implementing these areas to the May GMT meeting.

Gear Regulations

In addition to the measures discussed below, the GMT intends to review federal gear regulations and requirements at its May meeting to ensure that they are consistent with the intent of 2007-2008 management measures.

Scottish Seine Gear between 40°10' N. latitude and 34°27' N. latitude

Scottish seine gear is a legal type of small footrope trawl gear that employs a more passive strategy when compared to traditional trawl gear (Table 1).

These differences and associated lower impact to bottom habitat while trawling was cited as the reason this gear was granted an exemption from federal trawl closure areas adjacent to California that were adopted under Groundfish Essential Fish Habitat in 2005.

A Scottish seine vessel requested the opportunity to participate in an EFP in waters adjacent to San Francisco and Princeton Ports to demonstrate the gear's ability to target flatfish with minimal bycatch of overfished species. The vessel participated in three flatfish EFP studies conducted by CDFG (2002, 2003, and 2004), resulting in total bycatch estimates of no more then 0.0002 lb per target species lb for any one of the nine groundfish species declared overfished by NMFS, for both the modified and unmodified versions of this gear fished to over 100 fm. Current regulations require Scottish seine to adhere to trawl RCA closures. RCAs are in place to reduce bycatch of overfished species, and Scottish seine gear may present a reasonable alternative for successful avoidance of bycatch of overfished species. Therefore, an option to exempt Scottish seine gear from trawl RCA closures from 40°10' N. latitude to 34°27' N. latitude is requested for analysis for the 2007 to 2008 fishing season as follows:

- *Option 1*: Exempt Scottish seine gear from trawl RCA closures in all depths
- *Option 2*: Exempt Scottish seine gear from trawl RCA closures in waters less than 100 fm only
- *Option 3*: Exempt Scottish seine gear from trawl RCA closures when using gear modified according to selective flatfish trawl gear design specifications implemented north of 40°10' N. latitude, with modifications tested for this gear type in the 2003 and 2004 California EFPs.

Selective Flatfish Trawl Gear South of 40°10' N. latitude

The GMT recommends exploring an option to require use of selective flatfish trawl gear while fishing shoreward of the RCA in the area south of 40°10' N. latitude. Results from the California Selective Flatfish EFP conducted in 2003 and 2004 and reviewed by the

Table 1. Comparison of Scottish seine and bottom small footrope trawl gear attributes.

Gear Attribute	Scottish Seine	Bottom Trawl
door	None	Yes
footrope (leadline)	2" iron ringlets	8" rollers
headrope (floatline)	longer than footrope	shorter than footrope
warps	rope; length ~1 mile	steel; length ~ 150'
tow speed	½ knot/hour	~ 3.0 knot/hour
tow substrate	soft bottom: sand and mud	variable: sand, mud, and cobble

GMT suggested that use of these gear configurations result in lower bycatch of some overfished rockfish (particularly canary); however, due to difficulty in recruiting EFP participation, the EFP-based bycatch rates were derived from two vessels only, one of which was Scottish seine gear with only nominal bycatch rates for overfished species, and therefore may not be comprehensive enough to warrant implementation. This is particularly a concern due to uncertainty around its effectiveness in reduction of bocaccio rockfish bycatch rates. However, implementation of the gear in the area south of 40°10' N. latitude would provide fleetwide opportunities to collect bycatch rates from WCGOP sampling. If implemented, the GMT would evaluate what bycatch rates are appropriate for use in the limited entry bycatch model for management purposes. The GMT recommends that consideration be given to require Selective Flatfish Trawl gear when fishing shoreward of the trawl RCA south of 40°10' N. latitude in 2007 and 2008.

Catch Sharing and Harvest Guidelines

Based on the guidance provided by the Council and contained in the Allocation Committee report, the GMT has the following recommendations:

Black Rockfish Sharing Between Oregon and California

The black rockfish OY in the area south of 46°16' N. lat is subdivided with separate HGs being set for the area north of 42° N. lat (419 mt/58 percent) and for the area south of 42° N. lat. (303 mt/42 percent). For the area north of 42° N. lat. 318.4 (+/- 10%) mt is estimated to be taken in the recreational fishery, resulting in a commercial HG of 100.6 (+/- 10%) mt. Of the 303 mt of black rockfish attributed to the area south of 42° N. lat., a HG of 181.8 mt (60 percent) will be applied to the area north of 40°10 min N. lat. and a HG of 121.2 mt (40 percent) will be applied to the area south of 40°10 min N. lat. For the area between 42° N. lat. and 40°10' N. lat., 70.8 mt is estimated to be taken in the recreational fishery, resulting in a commercial HG of 111 mt. For the area south of 40°10 min N. lat., 97.2 mt is estimated to be taken in the recreational fishery, resulting in a commercial HG of 24 mt. Black rockfish was included in the minor rockfish north and other rockfish south categories until 2004.

Harvest Guidelines for Canary and Yelloweye Rockfish

The GMT recommends that the Council set separate harvest guidelines for canary and yelloweye rockfish for the recreational fisheries, which would be divided at the Oregon/California border (42 deg N. lat.). The harvest guidelines for the different OY alternatives are described in the attached table.

The understanding would be for the states to manage their respective recreational fisheries to stay within those harvest guidelines specified. The GMT requests guidance from the Council regarding the states' management responses, which will be taken when any of these recreational harvest guidelines are projected to be exceeded.

Action Between Council Meetings

For 2007-2008, the GMT plans to explore a monitoring and management trigger process that would work as follows:

- NMFS would monitor commercial catches and OY attainments throughout the year, as usual;

- The Council would make recommendations to NMFS on harvest triggers and recommended response actions to be taken between Council meetings (e.g. "If the petrale sole harvest is rapid enough such that the fishery would have to be shut down before the end of the year, NMFS will reduce trawl trip limits beginning September 1.")
- NMFS would finalize the Council recommendations through an inseason Federal Register notice.

State Nearshore Management

Oregon and Northern California

The GMT summarized at-sea observer data from the West Coast Groundfish Observer Program (WCGOP) to estimate 2006 bycatch of overfished species by depth zone, and region, for the nearshore hook and line fishery north of 40°10' N.lat. Although lingcod has been designated as rebuilt it was included as an important part of the analysis. Table 2 shows the estimated 2006 bycatch of yelloweye rockfish, canary rockfish, widow rockfish and lingcod by three depth zones (0-10 fm, 11-20 fm, and 21-30 fm), and two regions (Oregon and California north of 40°10' N. lat.)

Table 2 -- Estimated bycatch mortality of rebuilding species associated with landed catch of nearshore species in Oregon and California (Eureka area) in 2006 under status quo management measures.

Species / Area	Estimated Bycatch Mortality			
	0 - 10 fm	11 - 20 fm	21 - 30 fm	Total
Yelloweye Rockfish	0.08	1.28	0.94	2.31
Oregon	0.05	0.85	0.50	1.40
Calif - Eureka	0.03	0.43	0.44	0.90
Canary Rockfish	0.05	1.16	0.54	1.75
Oregon	0.03	0.77	0.29	1.09
Calif - Eureka	0.02	0.39	0.25	0.66
Widow Rockfish	0.03	0.03	0.01	0.06
Oregon	0.02	0.02	0.00	0.03
Calif - Eureka	0.01	0.01	0.01	0.03
Lingcod	18.99	29.64	6.30	54.93
Oregon	11.42	19.67	3.37	34.46
Calif - Eureka	7.57	9.97	2.93	20.47

For the development of 2007-2008 management options the GMT assumed: (1) a status quo fishery during 2007 or 2008 would produce a very similar distribution of bycatch impacts, and (2) a reduced OY for yelloweye rockfish (or other overfished stocks that are encountered in the nearshore fishery) might result in the need to constrain the nearshore hook and line fishery to shallower depths to reduce bycatch impacts.

Four possible depth restriction actions were examined (25, 20, 15 and 10 fm), and two assumptions of effort redistribution were included (no effort shift or some effort shift). This resulted in six options:

- *Option 1:* Status Quo
- *Option 2*: Restrict the fishery to inside 25 fm (assume no effort shift, assume impact on overfished species reduced by 50% in the 21-30 fm bin)
- *Option 3a*: Restrict the fishery to inside 20 fm (assume no effort shift)
- *Option 3b:* Restrict the fishery to inside 20 fm (assume 50% effort shift from 21-30 fm bin)
- *Option 4a:* Restrict the fishery to inside 15 fm (assume no effort shift, assume impact on overfished species reduced by 50% in the 11-20 fm bin)
- *Option 4b:* Restrict the fishery to inside 15 fm (assume 50% effort shift from 16-30 fm bin)
- *Option 5a :* Restrict the fishery to inside 10 fm (assume no effort shift)
- *Option 5b:* Restrict the fishery to inside 10 fm (assume 50% effort shift from 11-20 fm bin)

Table 3 shows the expected bycatch and reduction from status quo. The GMT notes that this analysis is highly subjective relative to the decisions individual fisherman might make when faced with shallower depth restrictions. Options with and without effort shift were presented to provide a range of the potential angler behaviors (to fish or not fish.) The GMT has not had time to evaluate the feasibility of some of these options relative to safety and fleet conflict issues. If adopted, most (if not all) of the depth restriction waypoints will need to be adopted via state rulemaking.

Table 3. -- Estimated annual bycatch mortality (mt) and reduction from status quo (mt) for overfished
species encountered in the nearshore hook & line fishery in Oregon and California (Eureka area), under various 2007-2008 management measures.

	Option							
Option	1	2	3a	3b	4a	4b	5a	5b
Yelloweye Rockfish Impacts	2.31	1.84	1.36	2.08	0.72	1.19	0.08	1.37
Impact Reduction	0.00	0.47	0.95	0.24	1.59	1.12	2.23	0.94
Canary Rockfish Impacts	1.75	1.48	1.21	1.62	0.63	0.90	0.05	1.21
Impact Reduction	0.00	0.27	0.54	0.14	1.12	0.85	1.70	0.54
Widow Rockfish Impacts	0.06	0.06	0.05	0.06	0.04	0.05	0.03	0.05
Impact Reduction	0.00	0.00	0.01	0.00	0.02	0.01	0.03	0.01
Lingcod Catch	54.93	51.78	48.55	53.36	33.81	36.96	18.99	48.63
Catch Reduction	0.00	3.15	6.38	1.58	21.12	17.97	35.94	6.30

In addition to depth restrictions, the GMT will analyze reduced season length and reduced target species trip limits as a mechanism for lowering the impact on overfished species.

Central and Southern California

The California Department of Fish and Game (CDFG) will continue with the nearshore management strategies previously established for black rockfish, blue rockfish, nearshore rockfish (other north, minor south), California scorpionfish, cabezon and greenling for 2007 and 2008. To implement regional needs where possible, CDFG has proposed that commercial nearshore management options and approaches contained in Agenda Item F.5.b CDFG Report 2 be adopted for analysis. These include options relative to modifying the current lingcod spawning closure duration to allow lingcod retention during a month that was closed in 2005 and 2006. The nesting closure in place for 2005 and 2006 is December through March in the recreational fishery and December through April in the commercial nearshore fishery.

In light of the suite of low OY options adopted for overfished species, CDFG believes the following additional options need to be analyzed:

- Option 1: Maintain the current near-year-round fishery and reduce trip limits to stay within harvest targets;
- Option 2: Consider reducing the season length to less than 12 months north of 40°10' N. latitude and/or less than the status quo ten-month season south of 40°10' N. latitude in order to retain more economically-viable trip limits.

Option 3: Expand the non-trawl RCA (shoreward and/or seaward) to reduce encounters with overfished species.

Tribal Fisheries

The coastal treaty tribes plan to provide the Council with recommendations for 2007-2008 tribal fisheries management measures consistent with the Council guidance provided for 2007-08 harvest specifications.

Commercial Management Measures

Limited Entry Trawl

The GMT recommends that the commercial trawl trip limits described in Attachment 1 be approved for review. The GMT will explore setting trip limits that would accommodate incidental catch levels without encouraging unintended targeted fisheries in an effort to reduce bycatch while meeting rebuilding needs.

The commercial (non-tribal) whiting fishery is managed separately from the trawl trip limit fisheries. Historically, the whiting fishery has been managed with sector-specific whiting allocations and seasons, observation coverage appropriate to the particular whiting sector, and in more recent years, overfished species bycatch limits. In past seasons, fishery participants have balanced bycatch concerns for Chinook salmon, and darkblotched, widow, and canary rockfish by moving their fishing operations to areas where bycatch species can be avoided. Because these species are found in different areas at different times of year, and because their distribution varies from year to year, whiting fishery participants have relied on flexibility of movement to constrain their bycatch of all species of concern.

The GMT proposes to analyze the following management measure suites for the two overfished species OY alternatives:

- For the high overfished species OY alternative, the whiting fishery would continue to be managed under its current management regime, with the additionl of a Chinook salmon conservation area triggered inseason, and which closes the area inshore of the 100 fm line when the 11,000 fish threshold is projected to be reached.
- Under the low overfished species OY, if the whiting fishery were moved offshore of 150 fm to keep to the low canary rockfish OY, the U.S. whiting OY could be as high as 213,000 mt without risking the low darkblotched rockfish OY. Without moving the fishery offshore, the whiting OY would have to be constrained to 154,000 mt to meet all of the low overfished species OY constraints. The GMT proposes to analyze these two potential management scenarios for managing the whiting fishery under the low overfished species OY alternative.

Limited Entry Fixed Gear and Open Access

The GMT recommends that the commercial limited entry and open access trip limits described in Attachment 1 be approved for review. The GMT will explore setting trip limits that would accommodate incidental catch levels without encouraging targeting overfished species in an effort to reduce bycatch while meeting rebuilding needs.

The limited entry fixed gear primary sablefish fishery's tier limits under the Council's preferred sablefish OY alternative would be: Tier 1, 48,500 lb; Tier 2, 22,000 lb; and Tier 3, 12,500 lb. Rockfish Conservation Area boundaries would likely have to be moved farther offshore under the Council's low overfished species OY alternative than under the high overfished species OY alternative.

Under the phase-in yelloweye rockfish OY, in 2007, the amount of yelloweye rockfish estimated to be caught by the limited entry fixed gear and open access spiny dogfish fisheries will likely accommodate the status quo fishery. However, with the phase-in yelloweye reduction in 2008, dogfish catch reductions, perhaps as much as 50% of current levels, would likely be needed to stay within the lower yelloweye OY, if the fishery continued to be prosecuted in its present area. Yelloweye encounters in the dogfish fishery could also be reduced by extending the current non-trawl RCA seaward boundary from 100 fms to 150 fms. Due to the depth at which fishable concentrations of dogfish aggregate, fishers have indicated that such a measure would likely make a longline dogfish fishery impractical. They also stated that this would severely affect the sablefish fishery off northern Washington given the configuration of the non-trawl RCA.

In addition to the trip limit tables, the GMT also proposes to analyze the following potential area management measures. The GMT may recommend implementing one or more of the options below, in other words, they may be additive. (Options 1 and 2 would require changes to the Pacific Halibut Catch Sharing Plan as well as the groundfish regulations):

- *Option 1*: Add a yelloweye rockfish conservation area off the northern coast, which would be closed to limited entry and open access fixed gear fisheries, including salmon troll, as defined by the following coordinates
  Beginning at 48° 02.23' N by 125° 17.87' W
  Then to 48° 01.42' N by 125° 15.89' W
  Then to 47° 59.11' N by 125° 18.03' W
  Then to 47° 59.97' N by 125° 19.92' W, and back to the point of origin.

(Note: This is described in Supplemental WDFW Report 3, which is changed from Agenda Item F.5.b, WDFW Report)

- *Option 2:* Add a yelloweye rockfish conservation area off the northern Washington coast, which would be closed to limited entry and open access fixed gear fisheries and the salmon troll fishery, as defined by the following coordinates:
  Beginning at 48° 11.77' N by 125° 13.03' W
  Then to 48° 16.43' N by 125° 07.55' W
  Then to 48° 14.72' N by 125° 01.84' W
  Then to 48° 13.36' N by 125° 03.20' W
  Then to 48° 12.74' N by 125° 05.83' W
  Then to 48° 11.55' N by 125° 04.99' W
  Then to 48° 09.96' N by 125° 06.63' W
  Then to 48° 09.68' N by 125° 08.75' W, and back to the point of origin.

(Note: This is described in Supplemental WDFW Report 3, which is changed from Agenda Item F.5.b, WDFW Report)

- *Option 3:* Consistent with the salmon troll regulations off Oregon, allow the retention of lingcod in the salmon troll fishery when fishing shoreward of a line approximating 30 fathoms north of 40°10'N. lat.

- *Option 4:* Prohibit the retention of lingcod in the salmon troll fishery shoreward of the non-trawl RCA seaward boundary (e.g., shoreward of 100 fathoms north of 40°10' N. lat. under status quo).

Recreational Management Measures

The GMT is recommending a range of recreational management measures to facilitate rebuilding of overfished rockfish and to stay within the state harvest targets, which in turn, stay within the range of Council-preferred OYs for all species. The range of management measures include the continuation of and additional conservation areas for overfished rockfish, particularly yelloweye, cowcod, and canary. The GMT recommends continuing to prohibit the retention of canary, yelloweye, and cowcod rockfish in recreational fisheries coastwide to discourage any potential targeting of these sensitive stocks. These prohibitions are recommended even in light of the fact that they result in creating some limited discard, again, in order to remove the incentive to target these species. The GMT also supports considering a lower minimum size limit for lingcod to reduce the amount of time that anglers spend on the water (and, in turn, the potential bycatch of overfished rockfish). Specific state recreational management measures include:

Washington

The Washington Department of Fish and Wildlife (WDFW) is not proposing any changes to the bottomfish bag limit or lingcod season dates, which are listed below.

<u>Bottomfish Bag Limits All Areas</u>: 15 bottomfish aggregate bag limit, which includes a sublimit of 10 rockfish, and 2 lingcod with a 24-inch minimum size limit, but does not include halibut (which has a daily bag limit of 1). Retention of canary and yelloweye rockfish is prohibited, regardless of area caught.

<u>Lingcod Seasons</u>

- Marine Areas 1-3 (OR/WA border to Cape Alava): Open the Saturday closest to March 15 (which is March 17 in 2007 and March 15 in 2008) through the Saturday closest to October 15 (which is October 13 in 2007 and October 18 in 2008).
- Marine Area 4 (Cape Alava to U.S./Canada border): Open April 16 through October 13 in 2007 and open April 16 through October 15 in 2008.

<u>Area Closures</u> For all options, the "C-shaped" yelloweye rockfish conservation area in the north coast would remain in effect for recreational halibut and bottomfish fisheries. The GMT may recommend implementing one or more of the options below, in other words, they may be additive.

The proposed preliminary range of additional 2007-2008 management measure alternatives that WDFW supports for public review include:

<u>Statewide – Lingcod Minimum Size Limit:</u>

- *Status quo (2006 season)* – There is a minimum size limit of 24 inches for lingcod.
- *Option 1*: Reduce the minimum size limit for lingcod to 20 inches in Marine Areas 1-4.

<u>North Coast Seasons (Washington Marine Areas 3 and 4)</u>

- *Status quo (2006 season)* – Prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from May 22 through September 30, except on days that halibut fishing is open (e.g., June 22 and 24). The retention of canary and yelloweye rockfish is prohibited. It is prohibited to fish for, retain, or possess bottomfish and halibut in the "C-shaped" yelloweye rockfish conservation area.

- *Option 1*: Prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from May 1 through June 30, except on days that halibut fishing is open, and from August 1 through September 30; prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the month of July.
- *Option 2*: Prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the months of May and September; close the North Coast to halibut fishing, except in Area 4B; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from June 1 through August 31.
- *Option 3:* Prohibit retention of rockfish and lingcod seaward of a line approximating 10 fathoms during the months of May, August and September; close the North Coast to halibut fishing, except in Area 4B; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from June 1 through July 31.
- Option 4: Add another yelloweye rockfish conservation area off the northern coast, which would be closed to recreational bottomfish and halibut fishing, as defined by the following coordinates:
  Beginning at 48^o 02.23' N by 125^o 17.87' W
  Then to 48^o 01.42' N by 125^o 15.89' W
  Then to 47^o 59.11' N by 125^o 18.03' W
  Then to 47^o 59.97' N by 125^o 19.92' W, and back to the point of origin.

(This option is further described in Supplemental WDFW Report 4, which is changed from Agenda Item F.5.b, WDFW Report.)

Options 2, 3, and 4 would require changes to the Pacific Halibut Catch Sharing Plan as well as to the bottomfish regulations.

<u>South Coast (Washington Marine Area 2)</u>
Status quo (2006 season) – Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day (March 18 in 2006) through June 15. The retention of canary and yelloweye rockfish is prohibited.

- *Option 1:* Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through July 31.
- *Option 2:* Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through August 31.
- *Option 3:* Prohibit retention of rockfish and lingcod seaward of a line approximating 30 fathoms from lingcod opening day through July 31; prohibit retention of rockfish and lingcod seaward of a line approximating 20 fathoms from August 1 through September 30.

<u>Columbia Area (Washington Marine Area 1)</u>
There is very little yelloweye and canary rockfish (0.03 mt and 0.02 mt, respectively, in 2005) caught in Marine Area 1; therefore, WDFW proposes to keep the status quo bottomfish fishing regulations in place through 2007 and 2008. These are: Prohibit

retention of bottomfish, except sablefish and Pacific cod, with halibut onboard from May 1 through September 30. The retention of canary and yelloweye rockfish is prohibited.

Oregon

The Oregon Department of Fish and Wildlife (ODFW) is proposing a range of management measures for its recreational fisheries in 2007 and 2008 and is exploring which measures may be necessary to meet the constraints of the high and low overfished species OYs. These management measures include:

Season: The season alternatives proposed by the ODFW include a mixture of time and depth closures. These alternatives are shaped to address various levels of yelloweye and canary rockfish impacts. The most liberal alternative is the "status quo" alternative, reflecting the initial 2006 season. The most conservative alternative results in a recreational groundfish fishery that is conducted from July 1 through Labor Day (~2 months), and is restricted to the waters shoreward of the 20 fathom RCA. Proposed season structures and associated yelloweye and canary rockfish impacts are shown in the table below.

1	GF open all depth	GF open <40 fm	GF open all depth	4.3	5.5
2	GF open <40 fm			3.6	4.2
3	GF open <40 fm	GF open <25 fm	GF open <40 fm	3.2	3.8
4	GF open <20 fm			2.4	2.8
5	CLOSED	GF open <20 fm	CLOSED	1.9	1.7
6	CLOSED	GF open <20 fm *	CLOSED	1.6	2.3

* Option 6 results in a 55% reduction in yelloweye rockfish impacts in the Pacific halibut fishery. This would be accomplished using tools such as reduced Pacifc halibut catch and time on the water.

Daily Bag Limit: Two definitions of "marine fish" are being explored; one that includes all flatfish species except sanddabs (status quo), and one that separates flatfish species into a separate daily bag limit. A daily bag limit for flatfish species (except Pacific halibut) of 25 fish is being proposed. A range of 1-10 marine fish is included in the alternatives, as well as a range of 2-3 lingcod. No retention of yelloweye rockfish and canary rockfish.

Minimum Length Limits: In order to access the increased lingcod OY without increasing impacts to overfished species, length limits ranging from 24-inches (status quo) to 20-inches is being proposed. No adjustments to the length limits for cabezon (16-inches) or kelp greenling (10-inches) are being proposed.

YRCA Closures: A Yelloweye Rockfish Conservation Area (YRCA) closure is being proposed for the area known as Stonewall Bank, located off the coast of Newport, Oregon. ODFW is proposing coordinates for an analysis area at this Council. Specific YRCA coordinates will be developed for the June Council meeting. The ODFW is proposing a process for implementing additional YRCA closures for 2008, in response to the potential need for further reduction to yelloweye rockfish impacts.

These alternatives are outlined in Agenda Item F.5.b Supplemental ODFW Report, titled "Proposed Management Measures for 2007-08 Oregon Recreational Groundfish Fishery" and Agenda Item F.5.b Supplemental ODFW Report 2, titled "Oregon Department of Fish and Wildlife Proposal for Adoption of a Range of Management Measures for the 2007-2008 Oregon Recreational Groundfish Fishery".

California

The California Department of Fish and Game is proposing a range of options for structuring the 2007-2008 recreational groundfish fisheries with the intent of remaining within harvest guidelines (HGs), particularly for species under rebuilding plans. This range of options includes the following: Options are considered that meet the suite of high or low rebuilding OYs.

- Continued non-retention of cowcod, canary and yelloweye rockfish statewide
- Management specifications which are structured around constituent's preferred fishing season while still providing as much fishing opportunity as possible
- Alternatives that allow for more access to deeper waters when possible, paired with bycatch reduction tools (hot spots, gear restrictions)
- Use of closed seasons, depth restrictions, bag limits, and size limits in combination to manage recreational catch to specified harvest limits.

General Approach: Manage recreational fisheries through a regional management approach to address specific management and fishery needs in each of three Rockfish and Lingcod Management Areas (RLMAs) in the north (42^{o} N. Lat. to 40^{o}10'), central (40^{o}10' to Pt. Conception), and South (Pt. Conception to Mexico border). The Central RLMA is further subdivided into two or three smaller areas to accommodate regional differences in fisheries and resources.

Management Specifications to Consider Keeping Status Quo for 2007-2008

- Continue exemption for all divers and shore-based anglers from closures for rockfish, cabezon, greenlings, California scorpionfish, and lingcod closures outside the spawning closures. Lingcod spawning closures continue to apply.
- In all RLMAs, prohibit the retention of lingcod during the primary spawning and nesting season (possible closed months: January, February, March, November, and December).
- Prohibit the retention of lingcod during any rockfish closure due to concerns about bycatch of rockfish in the lingcod fishery.
-

<u>Bag limits</u>

- RCG (all rockfish, cabezon, kelp greenling, and rock greenling) keep as 10 per bag with following sub-bag limits:
  - Bocaccio north of 40° 10' N. lat. status quo 2 fish
  - Black Rockfish status quo 10 fish

- Blue Rockfish status quo 10 fish
- Scorpionfish status quo 5 fish

- “Other flatfish” status quo: 20 fish except for Pacific sanddab and starry flounder which have no bag limit

Size limits
Bocaccio status quo: 10 inches TL
Cabezon status quo: 15 inches TL
Kelp greenling (and other species of the genus Hexagrammos) status quo: 12 inches TL
California scorpionfish status quo: 10 inches TL

Filet size limits
All others (except lingcod): status quo

Gear restrictions
Rockfish status quo: limit of 2 hooks and 1 line
Lingcod status quo: limit of 2 hooks and 1 line
“Other flatfish” status quo: limit of up to 12 hooks, “Number 2” or smaller, which measure no more than 11 mm point to shank, and up to 2 pounds of weight per line

Specific Fishing Area Prohibitions
Cordell Banks: Status Quo
Recreational fishing for groundfish prohibited in waters less than 100 fm (183 m) around the Cordell Banks as defined by specific latitude and longitude coordinates except that recreational fishing for “other flatfish” is permitted given the restrictions described above.

Farallon Islands: Status Quo
Recreational fishing for groundfish prohibited between the shoreline and the 10-fm (18-m) depth contour around the Farallon Islands except that recreational fishing for “other flatfish” is permitted given the restrictions described above

Management Specifications to Consider Changing for 2007-2008

Changes to fishing management areas, seasons and depths: The proposed options provide for the use of closed seasons and depths for rockfish, lingcod and associated species (*i.e.*, cabezon, greenlings, California scorpionfish, California sheephead, and ocean whitefish). The proposed fishing seasons and depths vary by Rockfish and Lingcod Management Area (RLMA) and, in some cases, by species or species group. The currently proposed changes to management areas, seasons and depths are presented below, but may be modified prior to adoption by the Council.

Most of California’s proposed changes are contained in Agenda Item F.5. b CDFG Report 2. Options shown in **BOLD** below represent modifications provided for consideration to meet potential impacts resulting from the adopted rebuilding OY alternatives. Analyses of the impacts of Options that meet the suite of high or low rebuilding OYs adopted by the Council are provided in Tables 4 and 5.

Seasons and Depth Restrictions

North Coast Region
Seasons: 6 - 9 months open for groundfish fishing

South Coast Region
Seasons: **8 -11 months open for groundfish fishing**;

Bag limits
Within 20 finfish bag limit, the following ranges would be analyzed with the option for differential bag limits for boat and shore anglers (with diver limits set to those of shore anglers):

- Lingcod 2 - 3 fish; status quo 2 fish
- Bocaccio south of 40° 10' N. lat. 1 – 2 fish
- Greenlings 1 – 2 fish
- Cabezon 1-2 fish

Size limits: Lingcod 22 -26 inches TL; status quo of 24 inches TL

Filet size limits: Lingcod filet size changed if size limit changed; status quo: 16 inches and must bear an intact 1 inch square patch of skin

Harvest Guidelines : California has separate Federal Harvest Guidelines to take action to accommodate recreational bycatch of canary and yelloweye rockfish and will consider additional HGs for the recreational fishery for bocaccio and widow rockfish.

Rockfish Conservation Areas: California will also be considering the potential use of Area RCAs as inseason measures to be used during the 2007 and 2008 fishing periods or for the full year to mitigate for unanticipated bycatch of rebuilding species. One inseason implementation of Area RCAs could include closing areas of higher canary rockfish encounters for the recreational fishery during the boat-based fishery season. California is still analyzing the impacts of these proposed areas and will provide specific boundaries for these areas in June. The Farallon Islands are one area being considered.

Farallon Islands:
Option 1 - Recreational fishing for groundfish prohibited between the shoreline and the 10-fm (18-m) depth contour around the Farallon Islands and deeper than the 20-fm depth contour except that recreational fishing for "other flatfish" is permitted given the restrictions described above.
Option 2 - Recreational fishing for groundfish prohibited around the Farallon Islands during inseason action taken to move the RCA boundary inshore to protect overfished

species, except that recreational fishing for “other flatfish” is permitted given the restrictions described above.

Table 4.

2007-2008 Option A
(Opt A = Reb. Alt 5)

Changes to 2006 Expected (SQ):
DEPTHS: North area - all open months to 0-20 fm; South area - all open months 0-30 fm
MONTHS: North Central area - Close October

RCG SEASON BY REGION:

<table>
<tr><th>Region</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>North region</td><td>---</td><td>---</td><td>---</td><td>---</td><td>??</td><td colspan="6">> 20fm Closed</td><td>??</td></tr>
<tr><td>North Central</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="3">> 20fm Closed</td><td>---</td><td colspan="2">> 20fm Closed</td></tr>
<tr><td>South Central - Monterey</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="6">> 20fm Closed</td></tr>
<tr><td>South Central - Morro Bay</td><td>---</td><td>---</td><td>---</td><td>---</td><td colspan="5">> 40fm Closed</td><td>---</td><td>---</td><td>---</td></tr>
<tr><td>South Region</td><td>---</td><td>---</td><td colspan="10">> 30fm Closed</td></tr>
</table>

NOTES AND KEY:
Shore fishing allowed in all waters in all months
RCG = Rockfish, cabezon, greenlings
--- = Closed to boat-based fishing for RCG
LINGCOD SEASON IS OPEN **ONLY** WHEN RCG IS OPEN, EXCEPT CLOSED DEC, JAN, FEB, MAR FOR SPAWNING

ESTIMATED IMPACTS FROM OPTION:

	Estimated Impacts (mt)			
Region	**Yelloweye**	**Canary**	**Cowcod**	**Bocaccio**
North region	0.8	0.5	N/A	N/A
North Central	0.4	3	0	0.2
South Central - Monterey	0	0.2	0	1.8
South Central - Morro Bay	0	1	0	1.8
South Region	0	0.3	0	13.4
TOTAL CALIFORNIA	1.2	5.0	0	17.2

Table 5.

2007-2008 Option F
(Opt F = Reb. Alt 3)

Add to 2006 Expected (SQ):
DEPTHS: North, North Central, and Monterey South Central areas - 0-40 fm; Morro Bay South Central area - 0-60 fm; South area - 0-60 fm for Sept-Oct
MONTHS: North Central area - open June; Monterey South Central area - open June; Morro Bay South Central area - open April & October
OTHER CHANGES: Bocaccio bag limit increase to 2 fish for south of 40° 10' N. lat

RCG SEASON BY REGION

Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
North region	---	---	---	---	> 40fm Closed							
North Central	---	---	---	---	---	> 40fm Closed						
South Central - Monterey	---	---	---	---	---	> 40fm Closed						
South Central - Morro Bay	---	---	---	> 60fm Closed							---	---
South Region	---	---	> 60fm Closed									

NOTES AND KEY:
Shore fishing allowed in all waters in all months
RCG = Rockfish, cabezon, greenlings
--- = Closed to boat-based fishing for RCG
LINGCOD SEASON IS OPEN **ONLY** WHEN RCG IS OPEN, EXCEPT CLOSED DEC, JAN, FEB, MAR FOR SPAWNING

ESTIMATED IMPACTS FROM OPTION:

	Estimated Impacts (mt)			
Region	Yelloweye	Canary	Cowcod	Bocaccio[a/]
North region	0.7	0.7	N/A	N/A
North Central	0.5	5.2	0	0.6
South Central - Monterey	0	0.4	0	5.9
South Central - Morro Bay	0.2	1.4	0	24.2
South Region	0	0.3	0.3	57.4
TOTAL CALIFORNIA	1.4	8.0	0.3	88.1

ADDITIONAL ESTIMATED IMPACTS WITH ADDED MONTHS:

Additional Months by Region	Estimated Impacts (mt)			
1. Add June to North Central	0	0.9	0	0.1
2. Add June to South Central-Mon	0	0.1	0	0.9
3. Add April to South Central-MB	0	0.2	0	3.4
4. Add October to South Central-MB	0.1	0.3	0	5.1
Total Additional Impacts (1-4)	0.1	1.5	0	9.5

a/ Does not yet include impacts from proposed bag limit increase;anticipate increase in harvest less than double the harvest with 1 fish/bag.

GMT Recommendations

1. Approve the range of recreational harvest guidelines for canary and yelloweye rockfish in the attached table for public review.
2. Approve the GMT recommended catch sharing for the southern black rockfish OY of 58% to Oregon and 42% to California for review.
3. Approve the GMT–proposed limited entry trawl, limited entry fixed gear, tribal, and groundfish-directed open access management measure alternatives for public review.
4. Approve the proposed state recreational management measure alternatives for public review.
5. Approve the proposed Oregon and California Nearshore management approaches for public review.
6. Identify Council-preferred management measures to help focus the analyses in the EIS.

Attachment 1

Limited Entry Bottom Trawl Regulations and Impacts Under Council Preferred OYs

Cumulative Limits and RCA Boundaries for Higher Council OYs

		RCA BOUNDARIES		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLEFISH	LONGSPN	SHORTSP	DOVER	OTR FLT	PETRALE	ARROWTTH	SLOPE ROCK
North 40 10	1	75	200*	14,000	12,000	6,000	60,000	110,000	100,000	120,000	4,000
seaward of	2	75	200	14,000	12,000	6,000	60,000	110,000	35,000	120,000	4,000
RCA	3	75	250	17,000	12,000	6,000	60,000	110,000	35,000	120,000	4,000
	4	100	250	17,000	12,000	6,000	60,000	110,000	35,000	120,000	4,000
	5	75	200	17,000	12,000	6,000	60,000	110,000	35,000	120,000	4,000
	6	75	200*	14,000	12,000	6,000	60,000	110,000	100,000	120,000	4,000
North 40 10	1	75	200*	5,000	3,000	3,000	24,000	40,000	16,000	40,000	4,000
shoreward	2	75	200	9,000	3,000	3,000	24,000	40,000	25,000	40,000	4,000
of RCA	3	75	250	11,000	3,000	3,000	24,000	40,000	25,000	40,000	4,000
	4	100	250	11,000	3,000	3,000	24,000	40,000	25,000	40,000	4,000
	5	75	200	9,000	3,000	3,000	24,000	40,000	25,000	40,000	4,000
	6	75	200*	5,000	3,000	3,000	24,000	40,000	16,000	40,000	4,000
38 - 40 10	1	75	150	15,500	22,000	7,000	60,000	110,000	100,000	10,000	15,000
	2	75	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	15,000
	3	75	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	15,000
	4	100	200	15,500	22,000	7,000	60,000	110,000	35,000	10,000	15,000
	5	75	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	15,000
	6	75	150	15,500	22,000	7,000	60,000	110,000	100,000	10,000	15,000
S 38	1	75	150	15,500	22,000	7,000	60,000	110,000	100,000	10,000	40,000
	2	100	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	40,000
	3	100	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	40,000
	4	100	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	40,000
	5	100	150	15,500	22,000	7,000	60,000	110,000	35,000	10,000	40,000
	6	75	150	15,500	22,000	7,000	60,000	110,000	100,000	10,000	40,000

* includes petrale areas
note: splitnose limits equal slope rockfish limits

Cumulative Limits and RCA Boundaries for Lower Council OYs

		RCA		CUMULATIVE LIMITS							
SUBAREA	PERIOD	INLINE	OUTLINE	SABLEFISH	LONGSPN	SHORTSP	DOVER	OTR FLT	PETRALE	ARROWTTH	SLOPE ROCK
N 40 10	1	75	250*	10,000	5,000	3,000	65,000	10,000	70,000	5,000	2,000
seaward of	2	75	250	8,000	5,000	3,000	10,000	10,000	10,000	5,000	2,000
the RCA	3	60	250	8,000	5,000	3,000	10,000	10,000	10,000	5,000	2,000
	4	60	250	8,000	5,000	3,000	10,000	10,000	10,000	5,000	2,000
	5	75	250	8,000	5,000	3,000	10,000	10,000	10,000	5,000	2,000
	6	75	250*	10,000	5,000	3,000	65,000	10,000	70,000	5,000	2,000
N 40 10	1	75	250*	7,000	3,000	3,000	20,000	30,000	15,000	5,000	2,000
shoreward of	2	75	250	7,000	3,000	3,000	10,000	10,000	10,000	5,000	2,000
the RCA	3	60	250	8,000	3,000	3,000	10,000	10,000	10,000	5,000	2,000
	4	60	250	8,000	3,000	3,000	10,000	10,000	10,000	5,000	2,000
	5	75	250	7,000	3,000	3,000	10,000	10,000	10,000	5,000	2,000
	6	75	250*	7,000	3,000	3,000	20,000	30,000	15,000	5,000	2,000
38 40 10	1	75	200*	12,000	22,000	7,000	20,000	70,000	70,000	5,000	4,000
	2	75	200	12,000	22,000	7,000	20,000	70,000	10,000	5,000	4,000
	3	75	200	12,000	22,000	7,000	20,000	70,000	10,000	5,000	4,000
	4	75	200	12,000	22,000	7,000	20,000	70,000	10,000	5,000	4,000
	5	75	200	12,000	22,000	7,000	20,000	70,000	10,000	5,000	4,000
	6	75	200*	12,000	22,000	7,000	65,000	70,000	70,000	5,000	4,000
S 38	1	75	150	12,000	22,000	7,000	65,000	70,000	70,000	5,000	40,000
	2	75	150	12,000	22,000	7,000	20,000	70,000	10,000	5,000	40,000
	3	75	150	12,000	22,000	7,000	20,000	70,000	10,000	5,000	40,000
	4	75	150	12,000	22,000	7,000	20,000	70,000	10,000	5,000	40,000
	5	75	150	12,000	22,000	7,000	20,000	70,000	10,000	5,000	40,000
	6	75	150	12,000	22,000	7,000	65,000	70,000	70,000	5,000	40,000

* includes petrale areas
note: splitnose limits equal slope rockfish limits

LE Bottom Trawl Impacts Under High set of Rebuilding OYs

		North	South	Total
rebuilding species	canary	4.2	2.8	7.0
	POP	86.4	0.0	86.4
	darkblotch	135.3	41.9	177.2
	widow	1.0	0.1	1.0
	bocaccio	-	35.6	35.6
	yelloweye	0.1	0.1	0.2
	cowcod	-	1.5	1.5
target species	sablefish	1,841.3	558.2	2,399.5
	longspine	178.1	577.4	755.6
	shortspine	598.5	376.4	974.8
	dover	7,849.4	2,596.8	10,446.2
	arrowtooth	4,467.3	26.5	4,493.8
	petrale	2,121.1	366.3	2,487.4
	other flat	592.2	674.2	1,266.4
	slope rock	172.8	340.8	513.6
Exvessel Revenue				$ 22,600,000

LE Bottom Trawl Impacts Under Low set of Rebuilding OYs

		North	South	Total
rebuilding species	canary	1.5	1.7	3.2
	POP	36.9	0.0	36.9
	darkblotch	52.1	22.6	74.6
	widow	0.1	0.0	0.1
	bocaccio	-	15.7	15.7
	yelloweye	0.0	0.1	0.1
	cowcod	-	0.4	0.4
target species	sablefish	1,244.3	427.5	1,671.8
	longspine	173.3	577.1	750.5
	shortspine	303.6	375.4	679.0
	dover	3,755.2	1,382.0	5,137.2
	arrowtooth	1,403.5	19.2	1,422.7
	petrale	1,143.7	221.3	1,365.0
	other flat	152.2	418.4	570.6
	slope rock	113.0	208.7	321.7
Exvessel Revenue				$ 13,000,000

Limited Entry Trawl Whiting Impacts Under Council Preferred OYs

LOW Rebuilding OYs

US OY	Sector	Allocation	Canary	Darkblotch	POP	Widow	Yelloweye
213,873.6	Tribal	30,000	1.3	0.0	0.6	5.2	-
	Mothership	43,650	0.4	3.3	1.2	18.6	0.0
	CP	61,837	0.3	3.4	1.0	55.5	0.0
	Shoreside	76,387	0.4	5.8	2.0	33.4	0.0
	Total		2.4	12.5	4.8	112.7	0.0
Exvessel Revenue		24,756,344					

High Rebuilding OYs (also status quo OY)

US OY	Sector	Allocation	Canary	Darkblotch	POP	Widow	Yelloweye
269069	Tribal	35,000	1.6	0.0	0.6	6.0	-
	Mothership	55,697	0.5	4.2	1.5	23.8	0.0
	CP	78,903	0.4	4.4	1.3	70.8	0.0
	Shoreside	97,469	0.5	7.4	2.6	42.6	0.0
	Total		2.9	16.0	6.0	143.2	0.0
Exvessel Revenue		31,205,640					

Limited Entry and Open Access Sablefish Impacts Under Council Preferred OYs

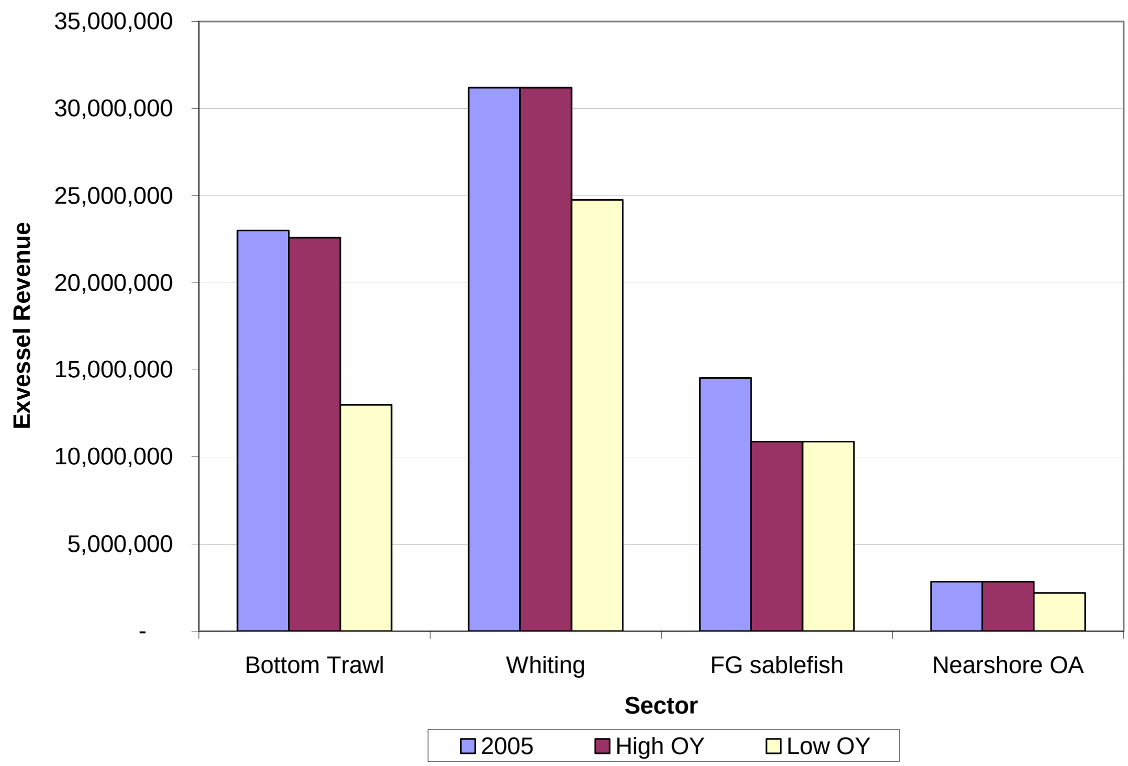
Rebuilding OY Alternatives and Impacts Corresponding to Sablefish Adopted OY

	High OY (100 fm)	Low OY (150 fm)	2005
LE and OA FG Sable (mt)	2394	2394	3080
widow	0	0	0
canary	0.5	0.1	1
yelloweye	1.2	0.4	1.5
bocaccio	0	0	0
cowcod	0	0	0
POP	0.3	0.3	0.4
darkblotched	0.8	1.1	1.1
Exvessel Revenue	10,883,747	10,883,747	14,531,241

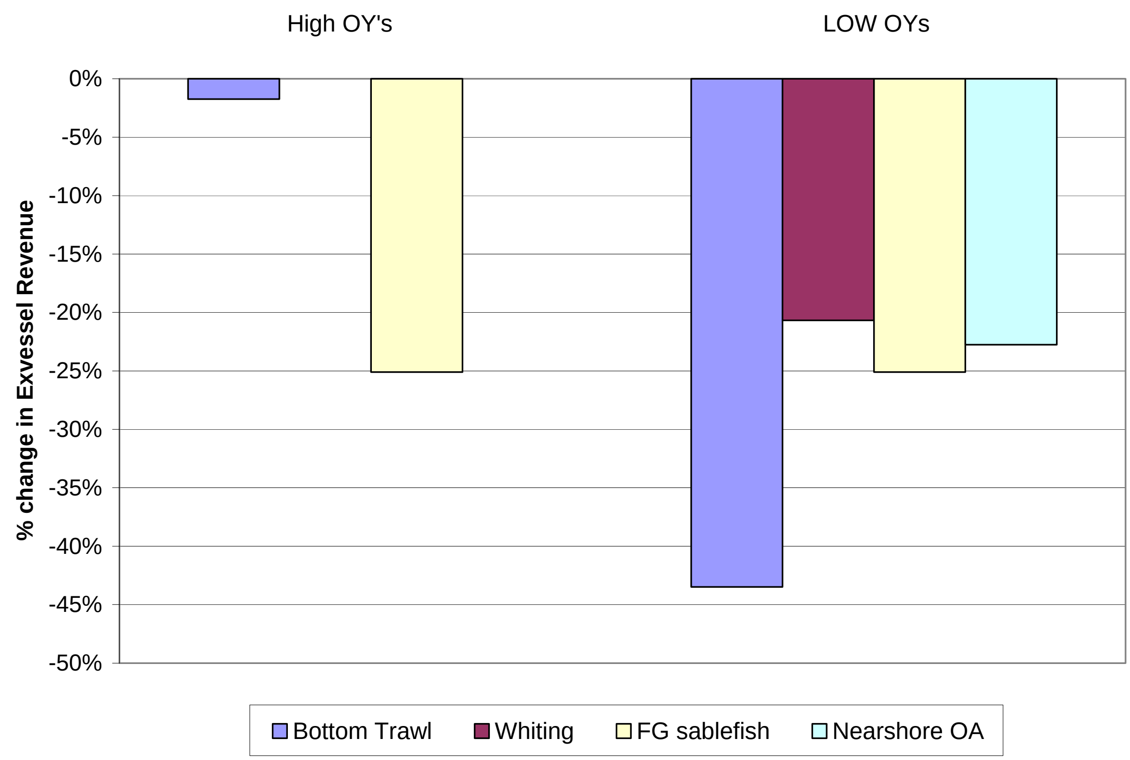
Nearshore Open Access Impacts Under Council Preferred OYs

Nearshore OA	Species	Low OYs	High OYs
South	shallow nearshore	49	55
	deeper nearshore	42	48
	cabezon	41	46
	kelp greenling	3	3
	canary	0.29	0.33
	exvessel rev	$ 1,512,320	$ 1,718,545
North	black rockfish	35	176
	blue rockfish	11	11
	other minor nearshore	10	10
	cabezon	31	31
	kelp greenling	23	23
	canary	0.8	1.65
	yelloweye	1.05	2.12
	widow	0.03	0.07
	exvessel rev	$ 686,717	$ 1,128,082
Total	canary	1.09	1.97
	yelloweye	1.05	2.12
	widow	0.03	0.07
	exvessel rev	$ 2,199,037	$ 2,846,627

Exvessel Revenue by Sector and Rebuilding OY



Percent Change in Exvessel Revenue by Sector and Rebuilding OY



Attachment 2

Council-adopted alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for 2007 and 2008. (Overfished stocks in CAPS; Stocks with new assessments in bold). a/

Stock	No Action Alternative				2007 and 2008 Action Alternatives a/												
	2005 ABC	2005 OY	2006 ABC	2006 OY	Alt 1 2007 ABC	Alt 2 2007 ABC	Alt 1 2008 ABC	Alt 2 2008 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Council 2007 ABC b/	Council 2008 ABC b/	Council OY b/
Lingcod - coastwide	2,922	2,414	2,716	2,414	6,706		5,853		6,280	6,088					***6,280***	***6,280***	
Columbia and US-Vanc. areas		1,694		1,694					5,428	5,428							
Eureka, Monterey, and Conception areas		719		719					852	660							
N. of 42 (OR & WA)		1,801		1,801					5,558	5,558							5,558
S. of 42 (CA)		612		612					722	530							612
Pacific Cod	3,200	1,600	3,200	1,600	3,200		3,200		1,600						3,200	3,200	1,600
Pacific Whiting (U.S.)	269,545	269,069	488,850	269,069	244,425	733,275	244,425	733,275	134,534	403,604					To be determined in March 2007 and 2008		
Sablefish (Coastwide)	8,368	7,761	8,175	7,634	6,210		6,058		4,574	5,934					6,210	6,058	5,934
N. of 36 (Monterey north)		7,486		7,363					4,411	5,723							
S. of 36 (Conception area)		275		271					162	210							
PACIFIC OCEAN PERCH	966	447	934	447	900		911		0	87	405	514	749		900	911	44 or 100
Shortbelly Rockfish	13,900	13,900	13,900	13,900	13,900		13,900		13,900						13,900	13,900	13,900
WIDOW ROCKFISH	3,218	285	3,059	289	5,334		5,144		0	329	456	917	1,369		5,334	5,144	120 or 368
CANARY ROCKFISH	270	47	279	47	172		179		0	24	44	68			172	179	32 or 44
Chilipepper Rockfish	2,700	2,000	2,700	2,000	2,700		2,700		2,000	2,700					2,700	2,700	2,000
BOCACCIO	566	307	549	309	602		618		0	149	218	315	424		602	618	40 or 218
Splitnose Rockfish	615	461	615	461	615		615		461						615	615	461
Yellowtail Rockfish	3,896	3,896	3,681	3,681	4,585		4,510		4,548						4,548	4,548	4,548
Shortspine Thornyhead - coastwide					2,488		2,463		1,661	2,476					2,476	2,476	
Shortspine Thornyhead - N. of 34deg27'	1,055	999	1,077	1,018					1,240	1,634							1,634
Shortspine Thornyhead - S. of 34deg27'									421	841							421
Longspine Thornyhead - coastwide	2,851	2,656	2,851	2,656	3,953		3,860		2,696	3,930					3,907	3,907	
Longspine Thornyhead - N. of 34deg27'		2,461		2,461					2,220	2,989							2,220
Longspine Thornyhead - S. of 34deg27'		195		195					476	941							476
COWCOD - S. of 36 (Conception area)	5	2.1	5	2.1	17		17		0	4	7	9	11		17	17	4 or 8 d/
COWCOD - Monterey area	19	2.1	19	2.1	19		19		0	4	7	9	11		19	19	
DARKBLOTCHED	269	269	294	200	456		487		0	130	229	330	472		456	487	130 or 229
YELLOWEYE	54	26	55	27	26		26		0	12	~~17~~	~~21~~	~~24~~	~~27~~	26	26	12.6 or ramp-down e/
Nearshore Species																	
Black Rockfish (WA)	540	540	540	540	540		540		540						540	540	540
Black Rockfish (OR-CA)	753	753	736	736	725		719		722						722	722	722
Minor Rockfish North	3,680	2,250	3,680	2,250	3,680				2,250	2,270	2,290				3,680	3,680	2,270
Nearshore Species		122		122					122	142	162						142
Shelf Species		968		968			968		968	968	968						968
Slope Species		1,160		1,160			1,160		1,160	1,160	1,160						1,160
Remaining Rockfish North f/	1,612	1,216	1,612	1,216	1,612		1,612		1,216								
Bocaccio	318	239	318	239	318		318		239								
Chilipepper - Eureka	32	32	32	32	32		32		32								
Redstripe	576	432	576	432	576		576		432								
Sharpchin	307	230	307	230	307		307		230								
Silvergrey	38	29	38	29	38		38		29								
Splitnose	242	182	242	182	242		242		182								
Yellowmouth	99	74	99	74	99		99		74								
Other Rockfish North f/	2,068	1,034	2,068	1,034	2,068		2,068		1,034								

Council-adopted alternatives for acceptable biological catches (ABCs) and total catch optimum yields (OYs) (mt) for **2007 and 2008 (continued)**. (Overfished stocks in CAPS; Stocks with new assessments in **bold**).

Stock	No Action Alternative				2007 and 2008 Action Alternatives a/												
	2005 ABC	2005 OY	2006 ABC	2006 OY	Alt 1 2007 ABC	Alt 2 2007 ABC	Alt 1 2008 ABC	Alt 2 2008 ABC	Alt 1 OY	Alt 2 OY	Alt 3 OY	Alt 4 OY	Alt 5 OY	Alt 6 OY	Council 2007 ABC b/	Council 2008 ABC b/	Council OY b/
Minor Rockfish South	3,412	1,968	3,412	1,968	3,403		3,403		1,753	1,855	1,931	2,006			3,403		1,904
Nearshore Species		615		615					413	515	591	666					564
Shelf Species		714		714					714	714	714	714					714
Slope Species		639		639					626	626	626	626					626
Remaining Rockfish South f/	854	689	854	689	854		854		689								
Bank	350	263	350	263	350		350		263								
Blackgill	343	305	343	305	292		292		292								
Gopher	97	48.5	97	48.5	302		302		49	151	227	302					
Sharpchin	45	34	45	34	45		45		34								
Yellowtail	116	87	116	87	116		116		87								
Other Rockfish South f/	2,558	1,279	2,558	1,279	2,558		2,558		1,279								
California scorpionfish	Not specified - managed as part of Minor RF South				137	219	137	219	137	219					219	219	175
Cabezon (off CA only)	103	69	108	69	94		94		69						94	94	69
Dover Sole	8,522	7,476	8,589	7,564	28,522		28,442		16,500	28,482					28,522	28,442	16,500
English Sole	3,100	3,100	3,100	3,100	6,773		5,701		6,237						6,237	6,237	6,237
Petrale Sole (coastwide) c/	2,762	2,762	2,762	2,762	2,917		2,919		1,921	2,499	2,883				2,917	2,919	2,499
Columbia and US-Vanc. areas									910	1,347	1,347						
Eureka, Monterey, and Conception areas									1,012	1,152	1,536						
N of 40deg10'									1,176	1,651	1,752						
S of 40deg10'									745	848	1,131						
Arrowtooth Flounder	5,800	5,800	5,800	5,800	5,800		5,800		5,800						5,800	5,800	5,800
Starry Flounder	Not specified - managed as part of Other Flatfish				1,221		1,395		890	1,186					1,221	1,221	890
Other Flatfish	6,781	4,909	6,781	4,909	6,731		6,731		4,884						6,731	6,731	4,884
Other Fish	14,600	7,300	14,600	7,300	14,600		14,600		7,300						14,600	14,600	7,300
Kelp Greenling HG (OR)									No Fed HG	fed HG = state HG							No Fed HG

a/ The Council elected to average OY projections for 2007 and 2008 and analyze/specify the average OYs for each year. ABCs, in some cases, are specified similarly for some species with quantitative assessments. Otherwise, ABCs are year-specific.

b/ Council ABC and Council OY represent the Council's preferred harvest alternative for 2007 and 2008.

c/ Area OYs/HGs are stratified according to the assessment areas and alternatively adjusted by management areas for lingcod and petrale sole.

d/ The preferred OY is for the Conception and Monterey areas combined.

e/ The ramp-down strategy ramps the harvest rate down from the status quo harvest rate and resumes a constant harvest rate strategy in 2011. The 2007-2010 OYs are 23 mt, 20 mt, 17 mt, and 14 mt, respectively.

f/ The Remaining Rockfish and Other Rockfish categories are shown to understand how the Minor Rockfish complex harvest specifications are derived. These are not management targets.

Attachment 3

Estimated Total Mortality Impacts For 2007 HIGH OY ALT - April 2006 Council Meeting

4/12/2006 13:47

Fishery	Bocaccio *a/*	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	47.4	7.7	**2.7**	160.3	63.3	1.0	0.3
Limited Entry Trawl- Whiting							
At-sea whiting motherships				4.7	1.0		0.0
At-sea whiting cat-proc		4.7		6.3	2.9	200.0	0.0
Shoreside whiting				5.2	1.8		0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		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**
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	0.4	0.5	2.9
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	0.1	0.1	3.0
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		8.4					6.7
OR						1.4	
CA	**98.0**	9.2	0.4			**8.0**	3.7
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	3.0	3.0	0.1	3.8	3.6	**3.0**	**3.0**
Non-EFP Total	173.7	44.0	3.4	181.9	77.4	260.4	22.3
EFPs e/							
EFP Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	173.7	44.0	3.4	181.9	77.4	260.4	22.3
2007 High OY Alt	**218**	**44.0**	**8.0**	**229**	**100**	**368**	**23**
Difference	44.3	0.0	4.6	47.2	22.6	107.6	0.7
Percent of OY	79.7%	99.9%	42.5%	79.4%	77.4%	70.8%	96.8%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

d/ Values for yelloweye in California represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained

Estimated Total Mortality Impacts For 2008 HIGH OY ALT - April 2006 Council Meeting

4/12/2006 13:48

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	47.4	7.7	**2.7**	160.3	63.3	1.0	0.3
Limited Entry Trawl- Whiting							
At-sea whiting motherships				4.7	1.0		0.0
At-sea whiting cat-proc		4.7		6.3	2.9	200.0	0.0
Shoreside whiting				5.2	1.8		0.0
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		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**
Limited Entry Fixed Gear	13.4	1.2	0.1	1.3	0.4	0.5	2.5
Open Access: Directed Groundfish	10.6	3.0	0.1	0.2	0.1	0.1	2.6
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		8.4					5.8
OR						1.4	
CA	**98.0**	9.2	0.4			**8.0**	3.2
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	3.0	3.0	0.1	3.8	3.6	**3.0**	**3.0**
Non-EFP Total	173.7	44.0	3.4	181.9	77.4	260.4	20.0
EFPs e/							
EFP Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	173.7	44.0	3.4	181.9	77.4	260.4	20.0
2008 High OY Alt	**218**	**44.0**	**8.0**	**229**	**100**	**368**	**20**
Difference	44.3	0.0	4.6	47.2	22.6	107.6	0.0
Percent of OY	79.7%	99.9%	42.5%	79.4%	77.4%	70.8%	99.8%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

d/ Values for yelloweye in California represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained

Estimated Total Mortality Impacts For 2007 LOW OY ALT - April 2006 Council Meeting

4/12/2006 13:48

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	10.0	5.0	**3.2**	113.7	32.9	0.3	0.1
Limited Entry Trawl- Whiting							
At-sea whiting motherships				3.3	0.5		
At-sea whiting cat-proc		3.0		4.5	1.5	66.9	
Shoreside whiting				3.7	0.9		
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		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**
Limited Entry Fixed Gear	2.8	0.8	0.1	0.9	0.2	0.2	1.4
Open Access: Directed Groundfish	2.2	1.9	0.1	0.1	0.1	0.0	1.4
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		5.5					3.2
OR						0.5	
CA	**20.7**	6.0	0.5			2.7	1.8
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	3.0	3.0	0.1	3.8	3.6	3.0	**2.0**
Non-EFP Total	40.0	32.0	4.0	130.0	44.0	120.1	12.6
EFPs e/							
EFP Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	40.0	32.0	4.0	130.0	44.0	120.1	12.6
2008 Low OY Alt	**40**	**32.0**	**4.0**	**130**	**44**	**120**	**12.6**
Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percent of OY	100.0%	99.9%	100.0%	100.0%	100.1%	100.0%	99.7%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was gr

d/ Values for yelloweye in California represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained

Estimated Total Mortality Impacts For 2008 LOW OY ALT - April 2006 Council Meeting

4/12/2006 13:49

Fishery	Bocaccio a/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	10.0	5.0	**3.2**	113.7	32.9	0.3	0.1
Limited Entry Trawl- Whiting							
At-sea whiting motherships				3.3	0.5		
At-sea whiting cat-proc		3.0		4.5	1.5	66.9	
Shoreside whiting				3.7	0.9		
Tribal whiting		1.6		0.0	0.6	6.1	0.0
Tribal							
Midwater Trawl		1.8		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**
Limited Entry Fixed Gear	2.8	0.8	0.1	0.9	0.2	0.2	1.4
Open Access: Directed Groundfish	2.2	1.9	0.1	0.1	0.1	0.0	1.4
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.1		0.0	0.0		
CA Gillnet b/	0.5			0.0	0.0	0.0	
CA Sheephead b/				0.0	0.0	0.0	0.0
CPS- wetfish b/	0.3						
CPS- squid c/							
Dungeness crab b/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut b/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	1.6	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
Recreational Groundfish d/							
WA		5.5					3.2
OR						0.5	
CA	**20.7**	6.0	0.5			2.7	1.8
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	3.0	3.0	0.1	3.8	3.6	3.0	**2.0**
Non-EFP Total	40.0	32.0	4.0	130.0	44.0	120.1	12.6
EFPs e/							
EFP Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	40.0	32.0	4.0	130.0	44.0	120.1	12.6
2008 Low OY Alt	**40**	**32.0**	**4.0**	**130**	**44**	**120**	**12.6**
Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percent of OY	100.0%	99.9%	100.0%	100.0%	100.1%	100.0%	99.7%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ South of 40°10' N. lat.

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

c/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch). In 2001, out of 84,000 mt total landings 1 mt was groundfish. This suggests that total bocaccio was caught in trace amounts.

d/ Values for yelloweye in California represent specified harvest guidelines.

e/ Values are proposed EFP bycatch caps, not estimates of total mortality. The EFP is terminated inseason if the cap is projected to be attained

Attachment 4

Status Quo State Recreational Catch Sharing for Canary and Yelloweye Alternatives

<table>
<tr><th rowspan="2">Canary</th><th colspan="2">2007</th><th colspan="2">2007 HGs</th><th colspan="2">2008</th><th colspan="2">2008 HGs</th></tr>
<tr><th>High</th><th>Low</th><th>High</th><th>Low</th><th>High</th><th>Low</th><th>High</th><th>Low</th></tr>
<tr><td>OY</td><td>44</td><td>32</td><td colspan="2" rowspan="2"></td><td>44</td><td>32</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Rec</td><td>17.6</td><td>11.5</td><td>17.6</td><td>11.5</td></tr>
<tr><td>WA</td><td>1.7</td><td>1.1</td><td rowspan="2">8.4</td><td rowspan="2">5.5</td><td>1.7</td><td>1.1</td><td rowspan="2">8.4</td><td rowspan="2">5.5</td></tr>
<tr><td>OR</td><td>6.7</td><td>4.4</td><td>6.7</td><td>4.4</td></tr>
<tr><td>CA</td><td>9.2</td><td>6.0</td><td>9.2</td><td>6.0</td><td>9.2</td><td>6.0</td><td>9.2</td><td>6.0</td></tr>
</table>

<table>
<tr><th rowspan="2">Yelloweye</th><th colspan="2">2007</th><th colspan="2">2007 HGs</th><th colspan="2">2008</th><th colspan="2">2008 HGs</th></tr>
<tr><th>High</th><th>Low</th><th>High</th><th>Low</th><th>High</th><th>Low</th><th>High</th><th>Low</th></tr>
<tr><td>OY</td><td>23</td><td>12.6</td><td colspan="2" rowspan="2"></td><td>20</td><td>12.6</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Rec</td><td>10.4</td><td>5.0</td><td>9.0</td><td>5.0</td></tr>
<tr><td>WA</td><td>3.5</td><td>1.7</td><td rowspan="2">6.7</td><td rowspan="2">3.2</td><td>3.0</td><td>1.7</td><td rowspan="2">5.8</td><td rowspan="2">3.2</td></tr>
<tr><td>OR</td><td>3.2</td><td>1.5</td><td>2.8</td><td>1.5</td></tr>
<tr><td>CA</td><td>3.7</td><td>1.8</td><td>3.7</td><td>1.8</td><td>3.2</td><td>1.8</td><td>3.2</td><td>1.8</td></tr>
</table>

Attachment 5

Figure 1: Median rebuilding times anticipated under alternative harvest rate strategies in the 2009-2010 fishing year.

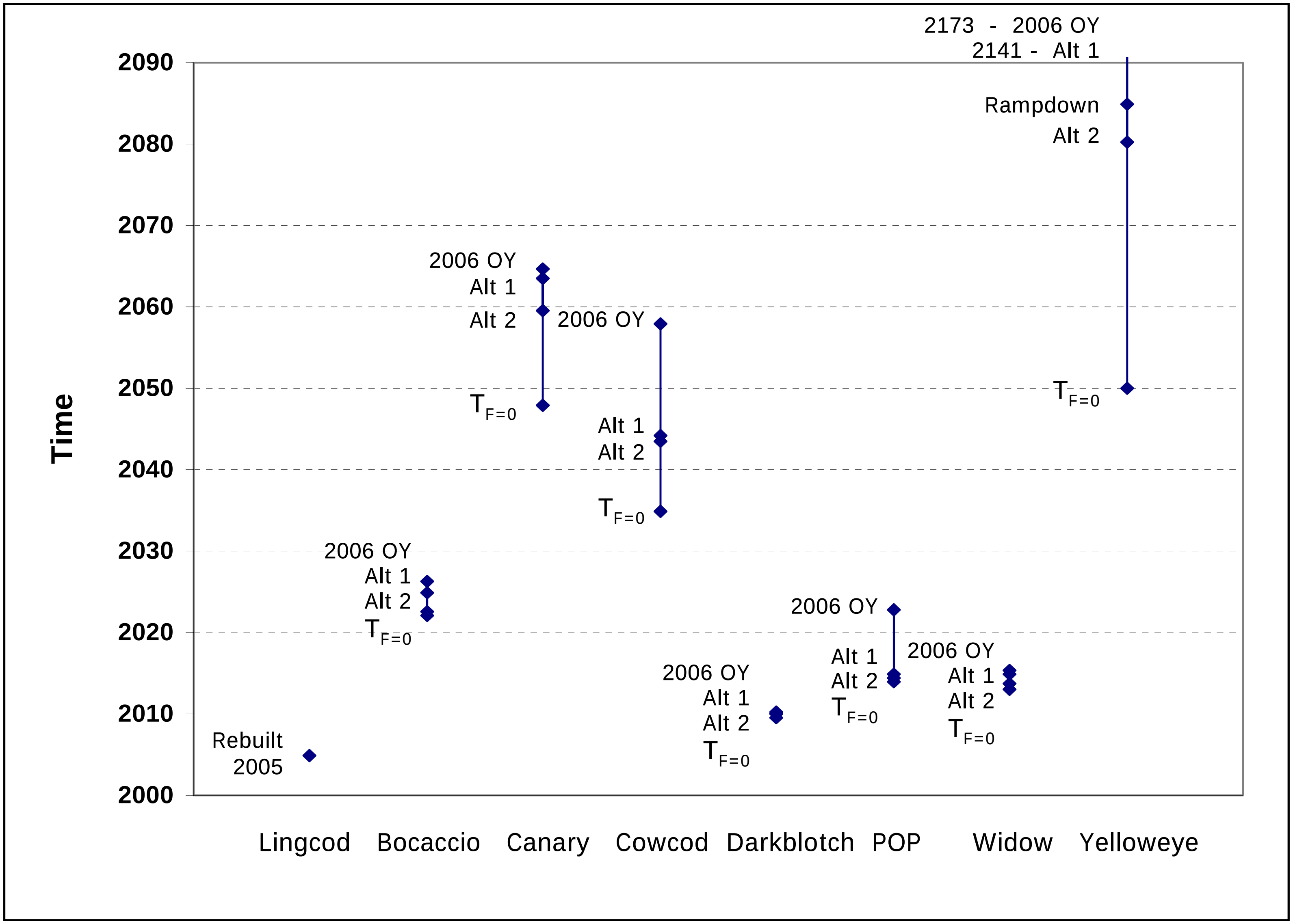


Table: Impacts on estimated rebuilding times projected from 2007-2008 OY Alternatives for rebuilding species

	OY Alternatives			**Time to rebuild**				**Increase (in years) from $T_{F=0}$[a]**			Difference
	status quo	2007-2008 Alternatives		F=0 from	status quo	2007-2008 Alternatives		status quo	2007-2008 Alternatives		between
	2006 OY	Alt. 1	Alt. 2	2007-2008	(2006 OY)	Alt. 1	Alt. 2	(2006 OY)	Alt. 1	Alt. 2	Alt. 2 and 1
Bocaccio	309	40	218	2022	2026.2	2022.5	2025.0	4.2	0.5	3	2.5
Canary	47	32	44	2048	2064.6	2059.5	2063.6	16.6	11.5	15.6	4.1
Cowcod	4.2	4	8	2035	2044.1	2043.6	2057.9	9.1	8.6	22.9	14.3
Darkblotched	200	130	229	2009.5	2010.1	2009.9	2010.2	0.6	0.4	0.7	0.3
POP	447	44	100	2014	2022.8	2014.4	2015.0	8.8	0.4	1	0.6
Widow	289	120	368	2013	2014.9	2013.8	2015.4	1.9	0.8	2.4	1.6
Yelloweye[b]	27	12.6	23	2050	2173.4	2080.2	2141.2	123.4	30.2	91.2	61

Research catches impacts (if not included within the OY)

	Research catch		**Increase in rebuild time**	
	2005	2006	2005	2006
Bocaccio	1.7	2	<0.1	<0.1
Canary	2.3	3	0.8	1.1
Cowcod	0.1	0.1	0.1	0.1
Darkblotched	2.1	3.8	<0.1	<0.1
POP	1.8	3.6	<0.1	<0.1
Widow	1.1	0.9	<0.1	<0.1
Yelloweye*	0.6	2	0.3	1.6

a/ $T_{F=0}$ represents the estimated year that the stock would be rebuilt if there were no fishing beginning in 2007.

b/ The expected increase in the time to rebuild under the rampdown approach (23 mt in 2007 to 13.5 in 2011) would be approximately 35 years from $T_{F=0.}$

c/ Values not taken directly from rebuilding runs are interpolated, and subject to modest uncertainty.

Agenda Item F.5.c.
Supplemental GMT Report 2
April 2006

Status Quo Commercial/Recreational Catch Sharing for Overfished Rockfish Alternatives
(Note: The catch shares and OY values were calculated after research was subtracted.)

High OY Shares	Bocaccio	Canary	Cowcod	Darkbl	POP	Widow	Yelloweye	
							2007	2008
Commercial	42.6%	57.1%	87.1%	100.0%	100.0%	96.3%	46.1%	55.0%
Recreational	57.4%	42.9%	12.9%	0.0%	0.0%	3.7%	53.9%	45.0%

Low OY Shares	Bocaccio	Canary	Cowcod	Darkbl	POP	Widow	Yelloweye (07 & 08)
Commercial	48.3%	64.1%	87.5%	100.0%	100.0%	97.3%	60.3%
Recreational	51.8%	35.9%	12.5%	0.0%	0.0%	2.7%	39.7%

High OY Values	Bocaccio	Canary	Cowcod	Darkbl	POP	Widow	Yelloweye	
							2007	2008
Commercial	72.7	23.4	2.9	178.1	73.8	248	8.9	8
Recreational	98	17.6	0.4	0	0	9.4	10.4	9

Low OYs	Bocaccio	Canary	Cowcod	Darkbl	POP	Widow	Yelloweye (07 & 08)
Commercial	16.3	17.5	3.4	126.2	40.4	117.1	5.6
Recreational	20.7	11.5	0.5	0	0	3.2	5

Status Quo State Recreational Catch Sharing for Canary and Yelloweye Alternatives

Canary	2007		2007 HGs		2008		2008 HGs	
	High	Low	High	Low	High	Low	High	Low
OY	44	32			44	32		
Rec	17.6	11.5			17.6	11.5		
WA	1.7	1.1	8.4	5.5	1.7	1.1	8.4	5.5
OR	6.7	4.4			6.7	4.4		
CA	9.2	6.0	9.2	6.0	9.2	6.0	9.2	6.0

Yelloweye	2007		2007 HGs		2008		2008 HGs	
	High	Low	High	Low	High	Low	High	Low
OY	23	12.6			20	12.6		
Rec	10.4	5.0			9.0	5.0		
WA	3.5	1.7	6.7	3.2	3.0	1.7	5.8	3.2
OR	3.2	1.5			2.8	1.5		
CA	3.7	1.8	3.7	1.8	3.2	1.8	3.2	1.8

Agenda Item F.5.d
Supplemental Public Comment
April 2006

Subject: [Fwd: 030706E] Groundfish Comments
From: "PFMC Comments" <pfmc.comments@noaa.gov>
Date: Tue, 21 Mar 2006 11:01:50 -0800
To: John DeVore <John.DeVore@noaa.gov>

--
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
Phone: 503-820-2280
Toll Free: 1-866-806-7204
Fax: 503-820-2299
Email: pfmc.comments@noaa.gov
Visit us on the web at: http://www.pcouncil.org

Subject: 030706E
From: "Mike O'neill" <mijomar@charter.net>
Date: Tue, 21 Mar 2006 10:59:16 -0800
To: <pfmc.comments@noaa.gov>

In reality, current regulatory restrictions, probably need to be stricter then you will propose as regards rulings on the ground fish commercial catch. I quit the business in the mid sixties due to the unavoidable loss to the ground fish 'recruitment' biomass due to the increasing ratio of 'by-catch' to usable saleable product per haul. We were slowly killing the ' Golden Goose' as it were. A complete ban on bottom trawling should be enacted and enforced, period. The system worked when there were fewer trawlers, smaller markets, more fish and when we were blissfully ignorant of the destruction being caused by the industry. All of the target species, both historic and current, can be caught on a long line, the old tried and true ' mothership-dory ' system, (with some modern adjustments to the system) True, the will be some tough adjustments to be made, but at least we can harvest a resource and not destroy it at the same time...with good oversight, the resource should get better each succeeding season. This may be our last chance to allow it to recover. Over time, the process would be less expensive then current technology, including labor. The resource will re-establish itself within seven or so years if the ' bottom' is allowed to recover. More fishermen will be gainfully employed, the resource will continue to rebuild and markets will adjust until full potential production of product is restored. We have no choice, but to admit past mistakes, put supply and demand quota's on hold and begin anew.
There is more to discuss, but not in this venue. M.O'Neill

030706E	**Content-Type:**	message/rfc822
	Content-Encoding:	7bit

PART II OF MANAGEMENT MEASURES FOR 2007-2008 FISHERIES

This is the final step at this meeting in the process to adopt a range of 2007-2008 groundfish management measure alternatives that will be fully analyzed in a Draft Environmental Impact Statement (DEIS). The adopted process and schedule for finalizing 2007-2008 management recommendations calls for a preliminary DEIS to be distributed in the June briefing book for public review and used to base final Council decision-making at the June Council meeting. The states, tribes, advisory bodies, and public recommended management measure alternatives to be analyzed in the DEIS under Agenda Item F.5. The objective of these management measure alternatives is to meet, but not exceed the preferred harvest levels decided under Agenda Item F.1. The Council is expected to give guidance to the Groundfish Management Team (GMT) and Groundfish Advisory SubPanel (GAP) on Thursday April 6 during Council action under Agenda Item F.5 for further refinement and analysis of proposed 2007-2008 management measures. The Council task under this agenda item is to adopt a refined range of 2007-2008 management measure alternatives and, if possible, a tentative preferred alternative for formal analysis and public review.

Council Action:

1. Adopt a Range of Refined Management Measures, and, if Possible, a Tentative Preferred Alternative.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. State, Tribal, and Federal Agency Recommendations
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action**: Adopt a Range of Refined Management Measures, and, if Possible, a Tentative Preferred Alternative

PFMC
03/17/06

Tribal Motion Regarding
Groundfish Fisheries for 2007 and 2008

Black Rockfish - The 2007 and 2008 tribal harvest guidelines will be set at 20,000 pounds for the management area between the US/Canada border and Cape Alava, and 10,000 pounds for the management area located between Destruction Island and Leadbetter Point. No tribal harvest restrictions are proposed for the management area between Cape Alava and Destruction Island.

Sablefish - The 2007 and 2008 tribal set asides for sablefish will be set at 10 percent of the Monterey through Vancouver area OY minus 1.9 percent to account for estimated discard mortality. Allocations among tribes and among gear types, if any, will be determined by the tribes.

Pacific cod - The tribes will be subject to a 400 mt harvest guideline for 2007 and 2008.

For all other tribal groundfish fisheries the following trip limits will apply:

Thornyheads - Tribal fisheries will be restricted to the Limited Entry trip limits in place at the beginning of the year for both shortspine and longspine thornyheads.

Canary Rockfish - Tribal fisheries will be restricted to a 300 pound per trip limit.

Other Minor Nearshore, Shelf and Slope Rockfish - Tribal fisheries will be restricted to a 300 pound per trip limit for each species group, or the Limited Entry trip limits if they are less restrictive than the 300 pound per trip limit.

Yelloweye Rockfish - The tribes will continue developing depth, area, and time restrictions in their directed Pacific halibut fishery to minimize impacts on yelloweye rockfish. Tribal fisheries will be restricted to 100 pounds per trip.

Spiny Dogfish - The Makah Tribe is proposing a directed longline fishery for spiny dogfish for 2007 and 2008. The fishery would be restricted to the Limited Entry trip limits. Increased landings of dogfish by treaty fishermen in 2007 and 2008 would be dependent on successful targeting in 2006 while staying within current estimates of impacts on overfished species.

Full Retention - The tribes will require full retention of all overfished rockfish species as well as all other marketable rockfishes during treaty fisheries.

Tribal Proposals Regarding
Makah Trawl fisheries for 2007 and 2008

Midwater Trawl Fishery - Treaty midwater trawl fishermen will be restricted to a cumulative limit of yellowtail rockfish, based on the number of vessels participating, not to exceed 180,000 pounds per two month period for the entire fleet. Their landings of widow rockfish must not exceed 10 percent of the poundage of yellowtail rockfish landed in any given period. The tribe may adjust the cumulative limit for any two-month period to minimize the incidental catch of canary and widow rockfish, provided the average cumulative limit does not exceed 180,000 pounds for the fleet.

Bottom Trawl Fishery - Treaty fishermen using bottom trawl gear will be subject to the trip limits applicable to the limited entry fishery for Dover sole, English sole, rex sole, arrowtooth flounder, and other flatfish. For petrale sole, fishermen would be restricted to 50,000 pounds per two month period for the entire year. Because of the relatively modest expected harvest, the trip limits for the tribal fishery will be those in place at the beginning of the season in the limited entry fishery and will not be adjusted downward, nor will time restrictions or closures be imposed, unless in-season catch statistics demonstrate that the tribe has taken ½ of the harvest in the tribal area. Fishermen will be restricted to small footrope ($\leq$ 8 inches) trawl gear. Exploration of the use of selective flatfish trawl gear will be conducted in 2006.

Observer Program - The Makah Tribe has an observer program in place to monitor and enforce the limits proposed above.

FINAL CONSIDERATION OF INSEASON ADJUSTMENTS (IF NECESSARY)

Consideration of inseason adjustments to ongoing and upcoming groundfish fisheries is a two-step process at this meeting. The Council will meet on Wednesday, April 5, 2006 and consider advisory body and public advice on inseason adjustments under Agenda Item F.4. If the Council elects to make final inseason adjustments under Agenda Item F.4, then the Council task under this agenda item is to clarify and/or confirm these decisions. Otherwise, the Council task under this agenda item is to consider advisory body advice and public comment on the status of ongoing 2006 groundfish fisheries and recommended inseason adjustments for 2006 groundfish fisheries prior to adopting final changes as necessary.

Council Action:

1. **Consider information on the status of ongoing fisheries.**
2. **Consider and adopt inseason adjustments as necessary.**

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Report of the Groundfish Management Team (GMT) — Susan Ashcraft
c. Agency and Tribal Comments
d. Reports and Comments of Advisory Bodies
e. Public Comment
f. **Council Action**: Adopt or Confirm Final Inseason Adjustments to 2006 Fisheries (If Necessary)

PFMC
03/16/06